

**Department of Water Resources
Andhra Pradesh State
Republic of India**

**Republic of India
Data Collection Survey on Agriculture,
Food Processing and Distribution
in Andhra Pradesh State**

Final Report

**Volume II
Attachments**

June 2016

Japan International Cooperation Agency (JICA)

Nippon Koei Co., Ltd.

Kaihatsu Management Consulting, Inc.

4R
CR(5)
16-019

**Department of Water Resources
Andhra Pradesh State
Republic of India**

**Republic of India
Data Collection Survey on Agriculture,
Food Processing and Distribution
in Andhra Pradesh State**

Final Report

**Volume II
Attachments**

June 2016

Japan International Cooperation Agency (JICA)

Nippon Koei Co., Ltd.

Kaihatsu Management Consulting, Inc.

Republic of India

Data Collection Survey on Agriculture, Food Processing and Distribution in Andhra Pradesh State

Attachments

Table of Contents

Attachment 1.6.1	Minutes of Kick off Meeting.....	1
Attachment 1.6.2	Minutes of Wrap up meeting (1)	4
Attachment 1.6.3	Minutes of Wrap up meeting (2)	6
Attachment 2.2.1	Recent Policy Decisions of Andhra Pradesh State stated in White Paper 2014	8
Attachment 4.1.1	Irrigation Area in India by State in 2010-11	12
Attachment 4.1.2	State-wise Per Cent Coverage of Irrigated Area under Principal Crops during 2011-12.....	13
Attachment 4.1.3	Irrigation Source by State in India.....	14
Attachment 4.1.4	Monthly Rainfall by District in Andhra Pradesh State (1901-2002, 2009- 2013).....	15
Attachment 4.1.5	Monthly Mean Temperature by District in Andhra Pradesh State (1901- 2002).....	15
Attachment 4.2.1	Overall Organization of Department of Water Resources of Andhra Pradesh State.....	16
Attachment 4.5.1	Primary Roles and Responsibilities of Farmers' Organizations	17
Attachment 4.5.2	Government Order on Plough Back of 100% Water Tax	18
Attachment 5.3.1	Major Market Facilities in Andhra Pradesh States	19
Attachment 5.3.2	FPO Structure proposed in APRIGP	23
Attachment 6.3.1	District-wise No. of CSU up to 2014-15 in the State of Andhra Pradesh	24
Attachment 6.4.1	Observation Summary of Animal Husbandry Value Chain of the Selected Produces	25
Attachment 6.6.1	Observation Summary of Value Chain of the Selected Produces.....	29
Attachment 6.8.1	Results of Household Survey	38
Attachment 7.2.1	List of Proposed Irrigation Project	47
Attachment 7.2.2	Data for Selection of Medium Irrigation Projects	48
Attachment 7.2.3	Scoring Results of Medium Irrigation Projects.....	49
Attachment 7.2.4	Medium Irrigation – Trial Ranking Summary	50
Attachment 7.2.5	Data for Selection of Minor Irrigation Projects.....	51
Attachment 7.2.6	Scoring Results of Minor Irrigation Projects.....	58
Attachment 7.2.7	Minor Irrigation – Trial Ranking Summary	67
Attachment 7.2.8	Minor Irrigation – Trial Ranking Summary by Cluster.....	68
Attachment 7.3.1	Result of Value Chain Evaluation.....	69
Attachment 8.2.1	Summary of Procedures for Project Sanction	72
Attachment 8.2.2	Status of DPRs for APILIP-II.....	75
Attachment 8.2.3	DPR Check List Based on CWC Guidelines.....	76
Attachment 8.2.4	Detailed Field Survey.....	85
Attachment 8.2.5	Water Balance Study	105
Attachment 8.3.1	Current Situation in Andhra Pradesh State, Constraints and Counter Measures.....	116

Attachment 8.3.2	Crop Budgets under Present and Proposed Conditions.....	118
Attachment 8.4.1	Detailed Findings of Livelihood of Livestock during the Survey.....	121
Attachment 8.4.2	Statement of Type-wise Societies in the State.....	126
Attachment 8.4.3	Marine Fish Production from 1995-96 to 2014-2015 in Andhra Pradesh State	128
Attachment 8.4.4	Organisation Structure of Department of Fisheries.....	131
Attachment 8.6.1	Current status of famers in Andhra Pradesh State.....	132
Attachment 8.6.2	Field Observation of the Value Chain of Each Strategic Crops.....	133
Attachment 8.6.3	Details of Shrimp Value Chain.....	142
Attachment 8.6.4	Details of Tuna Value Chain.....	146
Attachment 8.7.1	Investigation of Potential Food Park Sites.....	148
Attachment 8.7.2	Questioner Survey to Japanese Companies about Business Operation in India.....	162
Attachment 9.8.1	Tentative Assignment Schedule of the Project Management Consultant (PMC).....	169
Attachment 9.8.2	Draft Terms of Reference for Consulting Services on APILIP-II.....	170
Attachment 10.3.1	Community Resource Persons.....	186
Attachment 10.3.2	Activities for Capacity Development Support – WUA.....	187
Attachment 10.3.3	Guidelines, Modules and Learning Materials to Be Prepared.....	212
Attachment 10.3.4	Monitoring Indicators for Supporting Organization based on the Outputs & Outcomes of the project.....	216
Attachment 10.3.5	Summary Form of the Budget for WUA Capacity Building.....	218
Attachment 10.3.6	Waghad Model, Nashik District, Maharashtra.....	220
Attachment 10.3.7	No. of WUAs and Land Holders by Medium Irrigation Projects.....	223
Attachment 10.3.8	Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes.....	224
Attachment 10.3.9	Outline of Farmers Support Programmes.....	237
Attachment 10.3.10	Crop Cultivation Plan and Progress in Irrigation Scheme (Sample).....	241
Attachment 10.3.11	Extension Activities Plan for Farmers (Sample).....	242
Attachment 10.4.1	Organization chart and number of staff, Department of Animal Husbandry.....	243
Attachment 10.4.2	Livelihood Improvement Opportunities through Fisheries.....	244
Attachment 10.4.3	Organization Chart and Number of Staff, Department of Fishery.....	245
Attachment 11.2.1	Summary of Interview with Processing Companies.....	246
Attachment 11.2.2	Project Design Matrix (PDM) and Plan of Operation (PO) for FVC pilot project.....	254
Attachment 11.2.3	Government Subsidy Schemes in Horticulture and Food Processing in Andhra Pradesh State.....	287
Attachment 11.2.4	TOR for PPIC.....	294
Attachment 11.2.5	Brief Descriptions for the Examples of New Ideas for Horticulture FVC Pilot Project.....	301
Attachment 11.3.1	Outline of AMTC and Workshop.....	313
Attachment 11.3.2	Crop-wise Package of Farm Machinery.....	314
Attachment 11.3.3	Breakdown of Consulting Services.....	315
Attachment 11.3.4	Tentative Manpower Cost for AMTCs and Workshop.....	316
Attachment 11.4.1	Comparison of Micro Irrigation System.....	317
Attachment 12.2.1	GAP Analysis between JICA Guideline and Legislation in India.....	318
Attachment 12.2.2	Environmental Screening Format (Draft version at March 2016; This should be finalized/updated based on the progress of the project study).....	320
Attachment 12.3.1	Preliminary Environmental Evaluation for APILIP-II.....	331
Attachment 12.3.2	Tentative Mitigation Measure for the potential Impact in APILIP-II.....	334

Attachment 12.3.3	Forest Dwellers Development Framework (Sample).....	337
Attachment 12.5.1a	Cyclone Disasters in Andhra Pradesh State (1977 to 2014).....	352
Attachment 12.5.1b	District-wise, Year-wise Nos. of Mandals Declared as Drought Affected (1984-85 to 2014-15).....	353
Attachment 12.5.2	Climate Change.....	354
Attachment 13.3.1	Summary of Project Cost.....	357
Attachment 13.3.2	Cost Breakdown for Modernisation of Medium and Minor Irrigation Projects.....	358
Attachment 13.3.3	Costs Sorted by Scope of Works in Sample Medium Irrigation Projects.....	358
Attachment 13.3.4	Unit Cost Estimate for Medium Irrigation Project.....	359
Attachment 13.3.5	Construction Costs of Medium Irrigation Projects.....	360
Attachment 13.3.6	Summary - Construction Cost of Irrigation Project by Cluster.....	361
Attachment 13.3.7	Cost Breakdown for PIM Support.....	362
Attachment 13.3.8	Strengthening of Extension Service Function.....	372
Attachment 13.3.9	Recruitment of Outsource Persons: State Coordinating Officer.....	373
Attachment 13.3.10	Recruitment of Outsource Persons: Mandal-wise Extension Staff.....	373
Attachment 13.3.11	Unit Cost for Strengthening of Extension Service Function.....	374
Attachment 13.3.12	Disbursement Schedule for Extension Service Function.....	377
Attachment 13.3.13	Promotion of Farmers Producer Organisations (FPOs).....	378
Attachment 13.3.14	Cost Breakdown for FPO Promotion.....	379
Attachment 13.3.15	Cost Breakdown for Farmer Support Programme.....	381
Attachment 13.3.16	Disbursement Schedule for Promotion of Farmer Producer Organizations.....	385
Attachment 13.3.17	Cost Breakdown for Livelihood Support Programme.....	386
Attachment 13.3.18	Cost Breakdown for Food Value Chain for Strategic Crops.....	388
Attachment 13.3.19	Original and Reviewed Budget for Implementation of AMTC.....	396
Attachment 13.3.20	Expenditures on Farm Machinery for Training Activities.....	397
Attachment 13.3.21	Disbursement Schedule for Farm Mechanisation.....	402
Attachment 13.3.22	Cost Breakdown for Project Management.....	403
Attachment 13.3.23	Costs for Consulting Services (PMC).....	404
Attachment 13.4.1	Annual Fund Requirement.....	405
Attachment 14.2.1	Economic Crop Budget under Present and Proposed Conditions.....	406
Attachment 14.2.2	Economic Cost and Benefit Stream.....	409
Attachment 14.5.1	Project Status Report.....	418
Attachment 15.5.1	Comparison of Potential Site for Food Park in North Area.....	430
Attachment 15.5.2	Comparison of Potential Site for Food Park in Central Area.....	431
Attachment 15.5.3	Comparison of Potential Site for Food Park in South Area.....	432

MINUTES OF MEETING OF AP-IWMPHIP-JICA-II HELD ON 17.11.2015.

MEMBERS PRESENT:

List of Members attended the meeting are enclosed in the Annexure.

* * * * *

Sub:- Andhra Pradesh Irrigation and Livelihood Improvement Project Phase – II – (Renamed as 'Andhra Pradesh Integrated Water Management and Post Harvest Investment Promotion' – APIWMPHIP) JICA survey team visit – Kick – off meeting - Reg.

1. Sri. V. Venkataramaiah, I.F.S., State Project Director, APILIP briefed on the concept note of "Andhra Pradesh Integrated Water Management and Post Harvest Investment Promotion" APIWMPHIP-JICA- Phase-II proposal and its main features.
2. Sri. Sri Sanjay Gupta, I.F.S., Special Secretary, Planning Department duly citing APILIP-I experiences, has briefed out the following key points.
 - a) One to one mapping with the experts of Nippon Koei and the departmental in charges while preparing the various component of the data collection survey report.
 - b) All the Stake holder departments should identify and nominate one Nodal Officer who coordinates with Nippon koei team in preparation of the report. They should work jointly so that best report can be prepared.
 - c) The Nippon koei consultants may submit the interim report by end of February, 2016 so that this preliminary report can be made use of for obtaining Government of India approvals. The final report may be submitted during May 2016 for conclusion of agreements between Government of India and Government of Japan.

- d) All steps should be taken while selecting the irrigation projects to avoid land acquisition.
- e) Rules may be framed for selecting the tanks for modernization.
- f) The departments of agriculture, horticulture are instructed to prioritise the key crops for value addition instead of horizontal expansion.
- g) Highlighted the importance on focusing on few Agri commodities and provide complete value chain with proper infrastructure facilities.
- h) An effective funds distribution system between the various stake holder departments may be evolved.

3. Sri.S.P.Tucker,I.A.S.,Spl.Chief Secretary to Government of A.P., Planning Department advised to incorporate the following points in the report.

- i. To include precision farming to ensure more production in addition to the modernization of irrigation projects.
- ii. To support drip irrigation around the areas where irrigation is practiced with bore wells.
- iii. To use these funds for preparation of project reports for the growth of aquaculture.
- iv. To create lab for monitoring based on 'PEMANDU' principle – (Performance Management and Delivery Unit) for effective monitoring. The above tool is developed by Malaysia.

Nippon koei team gave a presentation on the "Data Collection Survey on Agriculture, Food Processing and Distribution in Andhra Pradesh State" and requested the following.

- 1. Formation of working group with all stake holder departments to ensure close coordination between Nippon koei and Government of A.P., in preparation of the report.

Finally, all the stake holder department representatives assured that, they would come up with the names of the in charge persons as nodal officers for the working group within a day after consulting the respective head of the Department.

Sd/- 17.11.2015
State Project Director
APILIP

// T.C.F.B.O //

K. Appanna
✓ Superintending Engineer
APILIP 21/11/15

Minutes of Wrap-up Meeting (1) for Data collection survey on Agriculture, Processing and Distribution in Andhra Pradesh on 28th March 2016

1. Time: 15:00-17:00
2. Venue: Interstate Conference Hall, Department of Water Resources (DoWR)
3. Participants: See Attachment
4. Main points discussed

4.1 Since the purpose of this wrap-up meeting was to discuss soft components of proposed APILIP-II, the discussion of component-1: modernisation of medium and minor irrigation projects was left out from agenda.

4.2 JICA survey team explained the implementation structure and activities of component-2: institutional development and capacity building programme, the following topic was discussed.

Farmers Producer Organisation (FPO)

- The representative from DOA commented that JICA survey team should prepare the plan with attention to the differences of characters among FPOs to be established by DOA and DOH. DOA plans to establish FPOs in the medium irrigation project areas, which cover wide range of crops, such as rice, pulses, sugarcane and maize. DOH, on the other hand, plans to establish FPO on a commodity basis.
- JICA survey team agreed to consider the suggestion by DOA.

4.3 JICA survey team explained the outline, implementation framework and activities of component-3: livelihood support programme, and there was no comment from participants.

4.4 JICA survey team explained the outline, implementation structure and activities of component-4.1: pilot programme of food value chain (FVC) for strategic crops, and the following topic was discussed.

Implementation structure of pilot programme

- JICA survey team raised a question that the head of pilot project management unit (PPMU) would be either AP state Food Processing Society (APFPS) or line departments such as Department of Horticulture (DOH) or Department of Fishery (DOF).
- Mr. V. Venkatramaiah, State Project Director (SPD), Irrigation and Command Area Development commented that head of PPMU should not be selected either APFPS or line departments. Instead, SPD proposed that the activities relating to production should be managed by DOH or DOF and the other activities relating to post harvesting and processing should be managed by APFPS.
- The representative from DOH proposed that DOH would be able to manage overall pilot program including production, post harvesting and processing as DOH had experiences of post harvesting and marketing activities.

- The representative from APFPS, on the other hand, commented that APFPS was the delegated organization under Department of Industry and Commerce (DoIC) to promote food processing industry and APFPS would be able to manage overall pilot program with support of Department of Agriculture (DOA) and DOH.
- JICA survey team proposed to have further discussion after the meeting to finalize the implementation structure and the participants agreed to do that.

4.5 JICA survey team explained the outline, implementation structures and activities of component-4.2: farm mechanization and component-4.3: conjunctive use of surface water and groundwater, and there was no comment from the participants.

4.6 JICA survey team explained the results of the survey on environmental and social consideration, and the following topic was discussed.

Procedure of environmental impact assessment (EIA)

- The representative of DOA commented that there was no environmental assessment required on APILIP-II since all the schemes were not new development but rehabilitation of existing structures.
- JICA survey team answered that DoWR had to follow a certain procedure instructed by the environmental authority and submit a self certification at least, even though it would be a rehabilitation project.
- SPD agreed to do that.

4.7 JICA survey team explained the food park development would be out of scope of APILIP-II and the participants agreed.

Minutes of Wrap-up Meeting (2) for Data collection survey on Agriculture, Processing and Distribution in Andhra Pradesh on 16th April 2016

1. Time: 15:00-16:15
 2. Venue: Interstate Conference Hall, Department of Water Resources (DoWR)
 3. Participants: See Attachment
 4. Main topics discussed
 - 4.1 Evaluation of medium and minor irrigation projects
 - Mr. V. Venkatramaiah, State Project Director (SPD), Irrigation and Command Area Development inquired the selection criteria for minor irrigation projects. JICA survey team explained the criteria and SPD agreed.
 - SPD inquired about the definition of “orphan” among minor irrigation projects. JICA survey team answered that “orphan” was an isolated minor irrigation project which was not in any cluster of target medium irrigation project under APIIP-II. SPD suggested to rename “orphan” to “isolated minor irrigation project” and JICA survey team agreed to do so.
 - SPD inquired whether additional 26 minor irrigation projects of those DPRs were submitted to JICA survey team were included in the project list or not. JICA survey team answered that the team had already included additional 25 minor irrigation projects in the project list except for one irrigation project which was system irrigation tank of a medium irrigation scheme. JICA survey team also answered one another additional project was proposed by DoWR but JICA survey team rejected to receive due to late submission. SPD agreed but requested JICA survey team to take note the above facts on the final report.
 - 4.2 Development objectives and project scope of APILIP-II
 - SPD commented that the objectives and components proposed by JICA survey team should follow the concept note. SPD also commented the components of livelihood support program for animal husbandry and pilot programme of conjunctive use of surface water and groundwater should not be included since those components were not in the concept note.
 - JICA survey team answered to discuss with JICA with consideration of the above comments.
 - 4.3 Organisation structures and implementation schedule
 - SPD commented that project implementation period should be from 2016/17 to 2020/21 as the tendering would be ready by August 2016 following to the preparation of DPR by June 2016.
 - JICA survey team answered that it would be difficult to start the project within the year 2016/17 as the loan agreement was scheduled within financial year of 2016 (by March 2017) according to JICA, following to the appraisal mission on October 2016 tentatively.
 - SPD again suggested JICA survey team to reconsider the project period to complete by the year 2020/21. JICA survey team agreed to reconsider the schedule in consultation with JICA .
 - 4.4 Project cost and project evaluation
-

- SPD inquired about the status of Kandaleru Reservoir Project. JICA survey team answered that Kandaleru project was not included in the project list as this project was categorized as a major irrigation scheme and the construction work for this project was only rehabilitation of the dam structure. SPD agreed but requested JICA survey team to take note the above facts on the final report.
- SPD commented that the component of institutional development and capacity building programme should be divided into two parts according to the concept note; capacity building of WUA is under DoWR and agriculture extension services is under line departments. JICA survey team answered to reconsider the said comment in consultation with JICA.

4.5 Others

- The representative of Department of Agriculture (DOA) inquired about the detail status of formulation of 200 FPOs proposed by DOA. JICA survey team answered the details would be explained after preparation of draft final report and DOA agreed it.
- The representative of Department of Horticulture (DOH) inquired about the status of construction of training center proposed by DOH. JICA survey team answered the construction cost of training center was included in the cost item of Project Management.
- SPD commented the overall project cost would be finalized between JICA and Chief Secretary though the present estimate was exceeding the amount proposed in the concept note.
- SPD requested the representatives from line departments to submit the comments for JICA survey team by Monday morning (18/April), and the participants agreed to do.

Attachment 2.2.1 Recent Policy Decisions of Andhra Pradesh State stated in White Paper 2014

SN.	Sub-Sector	Recent Policy Decisions
(a)	Agriculture	<ul style="list-style-type: none"> - Strengthening the extension system to reach seven million farmers: There is need to strengthen the existing departmental extension system to improve the reach to the farmers in the state. It is proposed to use ICT-based technologies. Multi Purpose Extension officers will be appointed for every 1000 ha to strengthen the Extension reach to the farmers. - Soil health mapping and balanced fertilizer use for increasing profitability and minimizing land degradation: It is proposed to undertake soil health mapping through stratified sampling and by using GIS to devise soil test based nutrient recommendations through soil health cards to the farmers in a phased and mission mode. - Supply of Soil health cards: A comprehensive soil health card will be issued to every farmer. This will contain the details of soil test analysis, the crops that can be grown in the land, ideal doses of the fertilizers, amendments' requirement and green manures etc. - Use of satellite imagery and use of other technologies: Satellite imagery and remote sensing data will be used for soil mapping and crop coverage area estimation at village level, progress of restoration of waste and degraded lands, area covered by canal irrigation in each season, monitoring of farm pond and water conservation / watershed development activities and condition of the crop during the season at fixed intervals. - Developing Andhra Pradesh state as seed industry hub: The farmers of the state will be encouraged to produce their own seed through Seed Village Programme (SVP) to make quality seed available at the door step of the farmers at affordable price. The programme will be streamlined to ensure transfer of seed from seed growing farmers to other farmers. - Farm mechanization: Establishing Custom Hiring Centers (CHC) and Implement Hiring Stations (IHS) which facilitates the availability of high cost machinery to small and marginal farmers on hire basis will be a priority item. - Organic farming: To ensure healthy agricultural produce and to save the soil, extensive program will be taken up for encouraging the organic farming program by coordinating programmes of both agriculture department and SERP. - Drought proofing of rainfed areas: Comprehensive and viable package of water and moisture conservation, farm pond development, integrated farming system approach backed by micro irrigation for crops will be taken up to improve the productivity and economic returns in rainfed areas. Drip and sprinkler systems shall be adopted for agricultural crops like cotton, sugarcane and ground nut crops. Drip and sprinkler units will be supplied to, SC&ST farmers on 100%, Small, marginal farmers on 90% and other farmers on 50% subsidy. - Marketing: The farmers are not getting fair price due to lack of proper linkages between buyers and farmers in many cases. Price fluctuations also affect the farmers adversely. So market interventions will be initiated in every season at appropriate time. - Agri processing: Agri processing policy will be formulated to give support to the processing of agriculture produce for achieving value addition. - Agriculture Research: Intensive programme will be taken up to strengthen the existing system of research & development in Agriculture University. Focus will be for the development of suitable high yielding varieties in paddy, ground nut, pulses and other crops which are resistant to pests and diseases with tolerance to floods and drought and suitable for different agro climatic zones. - Convergence of Agriculture and allied sectors: Focus will be to integrate all the line departments of Agriculture, Horticulture, Animal Husbandry, Irrigation, Forestry, Sericulture, Fisheries, Marketing and Rural development etc, for the benefit of the farmers and to reduce cost of cultivation and increase their income.
(b)	Horticulture	<ul style="list-style-type: none"> - Increase "Pandal" cultivation of vegetables for better quality and higher production. - Distribute more Farm Fresh Vegetable Vending Vans to farmer groups for direct marketing of their produce. - Encourage 14,000 Ha. of Oil Palm cultivation in the State in the year 2014-15. - Identification of crop specific clusters and promotion of high value Horticulture crops including

SN.	Sub-Sector	Recent Policy Decisions
		<p>fruits, vegetables and flowers.</p> <ul style="list-style-type: none"> - Convergence of MGNREGS with Horticulture Department for better utilization of labour and empowerment of backward communities. - Promotion of Post Harvest Management practices through establishment of pack houses, cold storages, ripening chambers and reduce postharvest losses thereby increasing Horticulture exports. - Improving marketing facilities through Rythu bazaars, vegetable markets, collection centers and Refer vans so that the farmers get remunerative prices for their produce. - Promotion of precision farming through micro irrigation, fertigation, Green House Cultivation, Mulching for better water conversation and quality production. - Encouragement of modern farm machinery and tools to save time and labour. - Establishment of Center of Excellence to demonstrate new technologies and practices and training to farmers and officers. - More focus will be given for training and extension for better coordination between Department and Horticulture University for increasing the productivity of Horticulture Crops. - For improving productivity a team of subject matter specialists and technical support group members will be visiting the horticulture fields regularly to advise the farmers on better management practices. - The productivity gap between the State and the Country will be reduced through introduction of high yielding varieties and better extension by the Horticulture University and the Department of Horticulture.
(c)	Animal Husbandry	<p>I. <u>Milk Production and Productivity</u></p> <ul style="list-style-type: none"> - State Livestock Mission will be launched immediately. Similarly, at District level, District Livestock Mission will be launched. Under SLM, various schemes worth Rs. 3,500 million will be implemented. - Breed improvement through large scale cross breeding, up-gradation of local buffaloes with Murrah, selective breeding in indigenous cattle like Ongole. - Massive frozen semen, dose production and establishing Embryo Transfer (ET) technology facilities. Taking up pilot project to import and introduced sexed semen of very superior bulls in selected farms to increase in production. - Promotion of commercial dairy farming in the areas surrounding Smart Cities like Vijayawada, Guntur, Visakhapatnam, Rajahmundry, Kakinada, Tirupathi, Kurnool and in North Coastal and Rayalaseema Districts of Andhra Pradesh. - Privatising specific Animal Husbandry services - that can be run on a commercial basis and where individual interest is greater than the public interest such as Artificial Insemination and fodder development. - Comprehensive Livestock Health Care activities including disease surveillance program for quick response and control of diseases like vaccination in campaign mode, large number of Animal Health camps etc., - Establishing a large vaccine production centre at Indira Gandhi Centre for Advance Research on Livestock (IGCARL) at Pulivendula, Kadapa dist. - Creating a feed and fodder development programme which includes encouraging research on high yield fodder seeds and ways of upgrading crop residue (Total Mixed Ration - TMR); developing wastelands as fodder grounds through corporate/Gram Panchayat participation; working with agricultural extension and education officers to encourage fodder cropping; making available high yield fodder seed in rural areas; and setting quality standards for feed concentrates and mixes. - 2 lakh acre will be covered under green fodder cultivation every year. - Fodder banks will be established in four Rayalseema Districts (drought prone) under cooperative/ppp/Joint venture mode. - Establishing 5-10 fodder block making in fodder surplus areas (like Godavari districts, Guntur,

SN.	Sub-Sector	Recent Policy Decisions
		<p>Krishna) through unemployed youth entrepreneurs- to supply fodder blocks to deficit areas of Rayalseema.</p> <ul style="list-style-type: none"> - Policy decision to ensure that the Veterinary Doctors attend the Veterinary Institution during Hospital hours from 8AM to 12 Noon invariably and to attend other duties from afternoon. - Policy decision to prevent VAS (Veterinary Assistant Surgeons) on deputation work in other departments which is non-technical in nature. - Credit of Rs.3663 Crs for Dairy development, Rs. 8,700 million for Poultry, Rs. 2,900 million for sheep & goat sector will be mobilized from different banks. (Total: Rs. 48,230 million for AH sector). <p>II. <u>Egg Sector</u></p> <ul style="list-style-type: none"> - Government support for private investment on three fronts: reform regulation; provide infrastructure; and actively promote the sector. - Reforming regulation which will include simplifying procedures, providing policies to enable large players to work closely with farmers, and ensuring policies that facilitate exports, enabling contract farming, simplifying land acquisition and export procedures, and rationalising sales tax on processed food. - Promotion of Backyard Poultry for the benefit of rural/tribal farmers. <p>III. <u>Meat Sector</u></p> <ul style="list-style-type: none"> - Mass vaccination of sheep & goat with PPR and entero-toxaemia, sheep pox. - De-worming to increase weight gain. - Thrust on Meat Breeds – promoting exchange of breeding rams among farmers to avoid inbreeding which is a common problem now. - Quality and Hygienic Meat Production – promoting rural slaughter houses and training the butchers. - Process Development and Technology Up-gradation - Appropriate technologies for efficient utilization of Animal byproducts like variety meats, wool, hides, skins, bone, hoof, horn, tallow and others of pharmaceutical importance. - Promoting Marketing Agencies – facilitation sheep/goat, market yards under cooperative/ PPP mode.
(d)	Fisheries	<ul style="list-style-type: none"> - Establishment and management of more Fishing Harbours in places such as Juvvaladinne (Nellore District), Uppada (East Godavari District), Vadarevu (Prakasam District) and Nizampatnam Phase-II (Guntur District) through PPP Mode. - Establishment of SPF Brood stock for Fresh Water Aquaculture and Brackish water Aquaculture and import of SPF seed for shrimp farming so as to make available quality seed to shrimp farmers. - Putting in place a policy framework to promote fish processing and fish feed industry by private participation. - Large Scale participation of women fishers through Mahila Matsya Mitra Groups (MMGs) in fish marketing and fish processing through up-gradation of their skills. - Promoting “Blue Revolution” through a multi-pronged approach including large scale Cage Culture in the sea and large reservoirs in coordination with CMFRI, establishment of cold chain etc., through PPP Mode/ Government schemes. - Developing a Policy Framework for allotment of marine areas and areas in large reservoirs for Cage Culture through Fishermen Cooperatives/ private participation. - Strengthening of cadre strength for coastal security with GoI assistance.
(e)	Agricultural Marketing	<ul style="list-style-type: none"> - Strengthening of the existing Rythubazars and establishing new Rythubazars where ever feasible with Cold storage facility, to be managed by Farmers Producers Processors Organisations (FPPO). - Rythu Bandhu Pathakam – Pledge Loan to increase from Rs. 10 thousand to 20 thousand, free of interest upto 180 days. - Warehousing Corporation will access Rs. 2,500 million assistance under Warehouse

SN.	Sub-Sector	Recent Policy Decisions
		<p>Infrastructure Fund, announced by the Hon'ble Finance Minister, Govt. of India, for construction of Warehouse of 5,000 MTs and above capacity.</p> <ul style="list-style-type: none"> - Ensure fair price to the farming community by creating competitive marketing scenario and the mission of achieving this by enforcing Act and Rules more effectively and also implementing new technologies aimed at reducing post harvest losses through appropriate methods and encourage value addition. - Ensuring daily updation of prices in agmarknet and department website, which enable farmers to negotiate with traders and also facilitates spatial distribution of products from rural areas to towns and between markets. - Developing modern communication technologies for market information services to improve information delivery through SMS, voice mails and FM radio channels. - Imparting training to officers of agriculture, horticulture departments and other extension staff on marketing and post harvest technologies since they are often well trained in production techniques but not in post harvest techniques. - Developing new marketing linkages between agri business, large retailers and farmers gradually through contract farming etc., - Shaping Agricultural Market Committees into integrated supply chain centers with a view to minimize post harvest losses to provide scientific storage facility, provide post harvest credit through Warehousing receipt financing. - Strengthening convergence with line departments and Agricultural universities in implementing and creating awareness and different welfare programmes. - Creation of additional storage facility upto 5,000 MTs Capacity in Agricultural Market committees. - Computerisation of Agricultural Market Committees to facilitate E-trading and online issue of E-permits to enable traders to transport produce to processing place without hassle. - Revival of Soil Testing Laboratories in Agricultural Market Committees with the coordination of Agriculture Department and establishing new Soil Testing Laboratories in the market yards on need basis. - Revival of farmer training programmes. - Permitting essential rural link roads to connect missing links. - Market Price information to be disseminated upto Gram Panchayat level. - Establish sub market yard in each Mandal with required infrastructure to facilitate Marketing and Minimum Support Price (MSP) operations. - The Terminal Markets are proposed for stimulating trade in agricultural commodities at Guntur, Kurnool and Anantapur. These places because of their location on National Highways enjoy better transport facility.

Source: White Paper on Agriculture, Horticulture, Sericulture, Animal Husbandry, Dairy, Fisheries and Agriculture Marketing, 23th July 2014, GoAP, <http://www.ap.gov.in/wp-content/uploads/2015/11/White-paper-on-agri.-and-allied-depts.pdf>

Attachment 4.1.1 Irrigation Area in India by State in 2010-11

(Unit: 1,000 ha)

No.	State	Net Area Sown	Total Cropped Area	Crop Intensity (%)	Net Irrigated Area	Gross Irrigated Area	Net Irrigation Coverage (%)	Gross Irrigation Coverage (%)	Ranking
		(1)	(2)	(3)=(2)/(1)x100	(4)	(5)	(6)=(4)/(1)x100	(7)=(5)/(1)x100	
1	Andhra Pradesh	11,186	14,512	129.7%	5,034	7,153	45.0%	63.9%	9
2	Arunachal Pradesh	213	278	130.5%	56	56	26.3%	26.3%	19
3	Assam *	2,811	4,160	148.0%	162	170	5.8%	6.0%	28
4	Bihar *	5,259	7,194	136.8%	3,030	4,448	57.6%	84.6%	5
5	Chhattisgarh	4,697	5,671	120.7%	1,356	1,605	28.9%	34.2%	16
6	Goa	131	160	122.1%	36	36	27.5%	27.5%	18
7	Gujarat *	10,302	12,247	118.9%	4,233	5,616	41.1%	54.5%	10
8	Haryana	3,518	6,505	184.9%	2,887	5,543	82.1%	157.6%	2
9	Himachal Pradesh *	539	949	176.1%	106	188	19.7%	34.9%	15
10	Jammu & Kashmir	732	1,140	155.7%	321	479	43.9%	65.4%	8
11	Jharkhand	1,085	1,249	115.1%	125	150	11.5%	13.8%	26
12	Karnataka	10,523	13,062	124.1%	3,490	4,279	33.2%	40.7%	14
13	Kerala	2,072	2,647	127.8%	415	467	20.0%	22.5%	24
14	Madhya Pradesh	15,119	22,046	145.8%	7,140	7,421	47.2%	49.1%	11
15	Maharashtra *	17,406	24,069	138.3%	3,256	4,496	18.7%	25.8%	22
16	Manipur *	348	348	100.0%	73	73	21.0%	21.0%	25
17	Meghalaya	284	338	119.0%	63	74	22.2%	26.1%	20
18	Mizoram	130	133	102.3%	12	12	9.2%	9.2%	27
19	Nagaland	362	452	124.9%	83	92	22.9%	25.4%	23
20	Orissa	4,682	5,429	116.0%	1,284	1,539	27.4%	32.9%	17
21	Punjab	4,158	7,883	189.6%	4,070	7,724	97.9%	185.8%	1
22	Rajasthan	18,349	26,002	141.7%	6,661	8,322	36.3%	45.4%	13
23	Sikkim *	77	152	197.4%	14	20	18.2%	26.0%	21
24	Tamil Nadu	4,954	5,753	116.1%	2,912	3,348	58.8%	67.6%	7
25	Tripura *	256	350	136.7%	60	122	23.4%	47.7%	12
26	Uttarakhand	723	1,170	161.8%	336	562	46.5%	77.7%	6
27	Uttar Pradesh	16,593	25,383	153.0%	13,386	19,374	80.7%	116.8%	3
28	West Bengal	4,991	9,563	191.6%	2,955	5,194	59.2%	104.1%	4
Total States		141,500	198,845	140.5%	63,556	88,563	44.9%	62.6%	-
1	A. & N. Islands *	15	19	126.7%	0	0	0.0%	0.0%	-
2	Chandigarh *	1	2	200.0%	1	1	100.0%	100.0%	-
3	D. & N. Haveli*	17	22	129.4%	4	7	23.5%	41.2%	-
4	Daman & Diu *	3	3	100.0%	0	0	0.0%	0.0%	-
5	Delhi	22	44	200.0%	22	32	100.0%	145.5%	-
6	Lakshadweep*	3	3	100.0%	1	1	33.3%	33.3%	-
7	Puducherry	19	31	163.2%	15	25	78.9%	131.6%	-
Total Uts		80	124	155.0%	43	66	53.8%	82.5%	-
Grand Total		141,580	198,969	140.5%	63,599	88,629	44.9%	62.6%	-

Source: Ministry of Statistics and Programme Implementation

http://mospi.nic.in/Mospi_New/upload/SYB2015/CH-8-AGRICULTURE/Table-8.1.xls

http://mospi.nic.in/Mospi_New/upload/SYB2015/CH-12-IRRIGATION/Table%2012.1.xls

Note: Andhra Pradesh includes Telangana State.

* The figures are taken from the latest forestry statistics publication, agriculture census, are estimated based on latest available year data received from the States/UTs respectively.

Attachment 4.1.2 State-wise Per Cent Coverage of Irrigated Area under Principal Crops during 2011-12

(%)

	State	Rice	Total Cereals	Total Pulses	Total Foodgrains	Sugarcane	Groundnut	Total Area under All Crops	Ranking
1	Andhra Pradesh	97.1	83.7	3.7	62.5	95.8	21.9	49.3	7
2	Arunachal Pradesh	38.7	25.7	-	24.6	-	-	20.1	20
3	Assam	4.9	4.9	-	4.6	-	-	3.9	28
4	Bihar	61.1	72.8	3.2	67.4	67.8	7.1	67.4	4
5	Chhattisgarh	34.2	33.2	12.1	29.7	96.6	12.3	29.1	15
6	Goa	33.9	33.7	97.9	44.9	100	100	25	17
7	Gujarat*	61.5	53.7	15.2	46	94.5	12.4	48.2	9
8	Haryana	99.9	90.6	27.6	88.9	99.7	89.4	87.5	2
9	Himachal Pradesh*	64.4	19.9	12.5	19.6	49.7	1.5	19.7	21
10	Jammu & Kashmir	90.2	38.7	12.5	38	47.4	-	41.3	10
11	Jharkhand*	3.2	7.4	2.9	7	44.7	-	12.1	27
12	Karnataka	75.2	37.5	7.6	28.2	100	27.6	34.3	14
13	Kerala	100	99.7	-	97.9	16.1	0	20.5	19
14	Madhya Pradesh	21.7	59	35.1	50.5	99.5	8.2	36.5	11
15	Maharashtra*	26.1	19.7	8.7	16.4	100	20.8	18.7	24
16	Manipur*	30.7	27.4	-	24.6	-	-	18.8	23
17	Meghalaya	49.9	42.5	-	41.3	-	-	23.6	18
18	Mizoram	50.9	40.2	-	36	-	-	13.5	26
19	Nagaland	47.4	33	1.3	29.3	-	-	19.4	22
20	Odisha	33.2	31.7	3	29	100	19.8	28.9	16
21	Punjab	99.5	98.7	83.4	98.7	96.2	41.5	98.3	1
22	Rajasthan	55.1	34.1	13.1	27.7	98.3	76.6	36.3	12
23	Sikkim*	84.5	19.3	3	17.8	-	-	13.7	25
24	Tamil Nadu	93.7	77.4	10.6	63.5	100	40	59.7	5
25	Tripura*	38.4	38	16.2	37.4	4.8	17.9	34.9	13
26	Uttarakhand	68.9	46.1	9.9	44	98.8	6.3	49	8
27	Uttar Pradesh*	80.4	83.7	21	76.1	93.1	3.2	76.7	3
28	West Bengal*	48.2	50.2	23.3	49.3	59.3	-	58.1	6
	Total States	58.7	57.7	16.1	49.8	94.3	24.3	46.9	-

Source: Pocket Book on Agricultural Statistics 2013, Ministry of Agriculture, Department of Agriculture & Cooperation, Directorate of Economics & Statistics

http://eands.dacnet.nic.in/Publication12-12-2013/AgriculturalStats%20inside_website%20book.pdf

Note: * The figures related to irrigated area (Part-II) are either estimated based on the data for the latest available year received from the State/UT or are estimated/taken from Agriculture Census.

Note: Andhra Pradesh includes Telangana State.

Attachment 4.1.3
Irrigation Source by State in India

State	Territory (Sq. km)			Net Area under Irrigation (2011-12)															
				by Canals			by Tanks			by Wells			Other Sources		Total				
				(1,000 ha)	(%)	Rank	(1,000 ha)	(%)	Rank	Tube Wells	Other Wells	Total	(%)	Rank	(1,000 ha)	(%)	(1,000 ha)	(%)	Rank
														(1,000 ha)					
Andhra Pradesh	160,205	4.9%	8.4%	1,818	11.4%	3	550	28.4%	1	1,991	554	2,545	6.3%	6	178	2.5%	5,090	7.8%	4
Telangana	114,840	3.5%	8.4%	1,818	11.4%	3	550	28.4%	1	1,991	554	2,545	6.3%	6	178	2.5%	5,090	7.8%	4
Arunachal Pradesh	83,743	2.5%	2.5%	0	0.0%	23	0	0.0%	16	0	0	0	0.0%	21	57	0.8%	57	0.1%	25
Assam	78,438	2.4%	2.4%	33	0.2%	17	5	0.3%	14	27	2	29	0.1%	16	94	1.3%	161	0.2%	18
Bihar	94,163	2.9%	2.9%	947	5.9%	9	60	3.1%	7	1,910	20	1,930	4.8%	8	116	1.6%	3,052	4.7%	11
Chhattisgarh	135,192	4.1%	4.1%	873	5.5%	10	54	2.8%	8	383	20	403	1.0%	12	85	1.2%	1,415	2.2%	13
Goa	3,702	0.1%	0.1%	8	0.0%	20	23	1.2%	11	5	3	8	0.0%	18	2	0.0%	41	0.1%	26
Gujarat**	196,244	6.0%	6.0%	771	4.8%	11	45	2.3%	10	1,122	2,181	3,303	8.2%	4	114	1.6%	4,233	6.5%	5
Haryana	44,212	1.3%	1.3%	1,193	7.4%	5	0	0.0%	16	1,879	0	1,879	4.7%	9	0	0.0%	3,073	4.7%	10
Himachal Pradesh**	55,673	1.7%	1.7%	4	0.0%	21	0	0.0%	16	18	2	20	0.0%	17	82	1.2%	106	0.2%	20
Jammu & Kashmir	222,236	6.8%	6.8%	285	1.8%	13	7	0.4%	13	4	4	8	0.0%	18	19	0.3%	319	0.5%	17
Jharkhand	79,716	2.4%	2.4%	4	0.0%	21	14	0.7%	12	24	40	64	0.2%	15	33	0.5%	125	0.2%	19
Karnataka	191,791	5.8%	5.8%	1,178	7.4%	6	178	9.2%	4	1,278	423	1,701	4.2%	10	383	5.4%	3,440	5.3%	7
Kerala	38,852	1.2%	1.2%	84	0.5%	15	47	2.4%	9	25	137	162	0.4%	14	116	1.6%	409	0.6%	15
Madhya Pradesh	308,252	9.4%	9.4%	1,276	8.0%	4	220	11.4%	3	2,408	2,865	5,273	13.1%	2	1,119	15.7%	7,887	12.1%	2
Maharashtra**	307,713	9.4%	9.4%	1,082	6.8%	8	0	0.0%	16	2,169	0	2,169	5.4%	7	0	0.0%	3,252	5.0%	8
Manipur**	22,327	0.7%	0.7%	0	0.0%	23	0	0.0%	16	0	0	0	0.0%	21	69	1.0%	69	0.1%	22
Meghalaya	22,429	0.7%	0.7%	65	0.4%	16	0	0.0%	16	0	0	0	0.0%	21	0	0.0%	65	0.1%	23
Mizoram	21,081	0.6%	0.6%	13	0.1%	18	0	0.0%	16	0	0	0	0.0%	21	0	0.0%	13	0.0%	28
Nagaland	16,579	0.5%	0.5%	0	0.0%	23	0	0.0%	16	0	0	0	0.0%	21	84	1.2%	84	0.1%	21
Orissa	155,707	4.7%	4.7%	0	0.0%	23	0	0.0%	16	0	0	0	0.0%	21	1,258	17.7%	1,259	1.9%	14
Punjab	50,362	1.5%	1.5%	1,116	7.0%	7	0	0.0%	16	2,969	0	2,969	7.4%	5	0	0.0%	4,086	6.3%	6
Rajasthan	342,239	10.4%	10.4%	1,844	11.5%	2	69	3.6%	6	2,933	2,179	5,112	12.7%	3	98	1.4%	7,119	10.9%	3
Sikkim**	7,096	0.2%	0.2%	0	0.0%	23	0	0.0%	16	0	0	0	0.0%	21	14	0.2%	14	0.0%	27
Tamil Nadu	130,060	4.0%	4.0%	746	4.7%	12	538	27.8%	2	406	1,277	1,683	4.2%	11	7	0.1%	2,964	4.5%	12
Tripura**	10,486	0.3%	0.3%	9	0.1%	19	2	0.1%	15	6	2	8	0.0%	18	41	0.6%	60	0.1%	24
Uttarakhand	240,928	7.3%	7.3%	96	0.6%	14	0	0.0%	16	188	36	224	0.6%	13	20	0.3%	339	0.5%	16
Uttar Pradesh**	53,483	1.6%	1.6%	2,563	16.0%	1	126	6.5%	5	9,634	1,034	10,668	26.5%	1	53	0.7%	13,411	20.5%	1
West Bengal**	88,752	2.7%	2.7%	0	0.0%	23	0	0.0%	16	0	0	0	0.0%	21	3,078	43.2%	3,078	4.7%	9
Union Territory																			
A. & N. Islands**	8,249	0.3%	0.3%	0	0.0%	-	0	0.0%	-	0	0	0	0.0%	-	0	0.0%	0	0.0%	-
Chandigarh**	114	0.0%	0.0%	0	0.0%	-	0	0.0%	-	1	0	1	0.0%	-	0	0.0%	1	0.0%	-
D. & N. Haveli	491	0.0%	0.0%	1	0.0%	-	0	0.0%	-	0	0	0	0.0%	-	2	0.0%	4	0.0%	-
Daman and Diu	111	0.0%	0.0%	0	0.0%	-	0	0.0%	-	0	0	0	0.0%	-	0	0.0%	0	0.0%	-
Delhi	1,483	0.0%	0.0%	2	0.0%	-	0	0.0%	-	19	0	19	0.0%	-	1	0.0%	22	0.0%	-
Lakshadweep**	30	0.0%	0.0%	0	0.0%	-	0	0.0%	-	0	0	0	0.0%	-	0	0.0%	0	0.0%	-
Puducherry	490	0.0%	0.0%	6	0.0%	-	0	0.0%	-	10	0	10	0.0%	-	0	0.0%	15	0.0%	-
Total	3,287,469	100.0%	100.0%	16,017	100.0%	-	1,938	100.0%	-	29,409	10,779	40,188	100.0%	-	7,123	100.0%	65,263	100.0%	-

Source: Statistical Year Book, India 2015
http://mospi.nic.in/Mospi_New/upload/SYB2015/index1.html

Attachment 4.1.4 Monthly Rainfall by District in Andhra Pradesh State (1901-2002, 2009-2013)

District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	South West Monsoon (June to Sep.)	North East Monsoon (Oct. - Dec.)	Winter Period (Jan. - Feb.)	Hot Weather Period (Mar. - May)	Total
Srikakulam	7.4	10.3	9.5	31.4	44.5	118.9	150.8	166.3	172.7	177.8	70.9	5.3	608.7	254.0	17.7	85.5	965.8
Vizianagaram	8.9	10.6	10.6	47.3	51.5	129.7	204.8	219.1	196.8	161.1	70.9	7.7	750.5	239.7	19.5	109.3	1,119.0
Visakhapatnam	5.5	10.5	8.5	35.0	42.9	132.9	199.4	195.9	194.1	169.7	90.0	11.1	722.4	270.8	16.0	86.4	1,095.6
East Godavari	3.6	8.6	6.9	20.1	38.8	124.1	195.8	174.7	181.1	171.4	91.9	13.5	675.7	276.8	12.2	65.9	1,030.6
West Godavari	3.1	7.1	5.4	15.6	41.1	112.7	185.3	166.5	173.1	161.9	85.4	12.5	637.6	259.7	10.2	62.2	969.7
Krishna	3.9	6.0	3.9	14.5	48.5	96.8	149.0	144.1	155.7	162.9	95.5	15.2	545.5	273.5	9.9	67.0	896.0
Guntur	3.9	5.6	3.7	14.6	45.0	72.8	111.0	117.1	140.5	167.0	101.3	15.1	441.4	283.3	9.5	63.3	797.5
Prakasam	2.5	3.9	4.8	12.9	40.9	56.4	90.1	98.6	134.4	158.2	104.0	19.0	379.4	281.2	6.4	58.6	725.6
Nellore	5.0	6.9	8.3	15.9	42.8	49.3	85.4	104.8	136.1	182.6	163.0	55.5	375.6	401.1	11.9	66.9	855.6
Kadapa	0.8	3.0	5.9	22.4	57.2	49.6	71.4	93.5	152.8	123.0	71.8	17.5	367.3	212.3	3.8	85.5	668.8
Kurnool	1.1	1.4	3.6	17.8	46.0	51.2	63.5	74.6	132.9	108.5	40.0	7.9	322.1	156.4	2.5	67.4	548.5
Ananthapur	0.8	1.9	4.6	33.2	74.6	56.1	68.8	85.7	140.5	128.2	49.8	7.8	351.1	185.7	2.7	112.5	652.0
Chittoor	4.4	7.0	8.5	31.5	79.2	68.0	87.4	112.2	162.1	158.1	112.0	39.8	429.7	310.0	11.4	119.3	870.4
All AP State	3.9	6.4	6.5	24.0	50.2	86.1	127.9	134.8	159.4	156.2	88.2	17.5	508.2	261.9	10.3	80.7	861.2

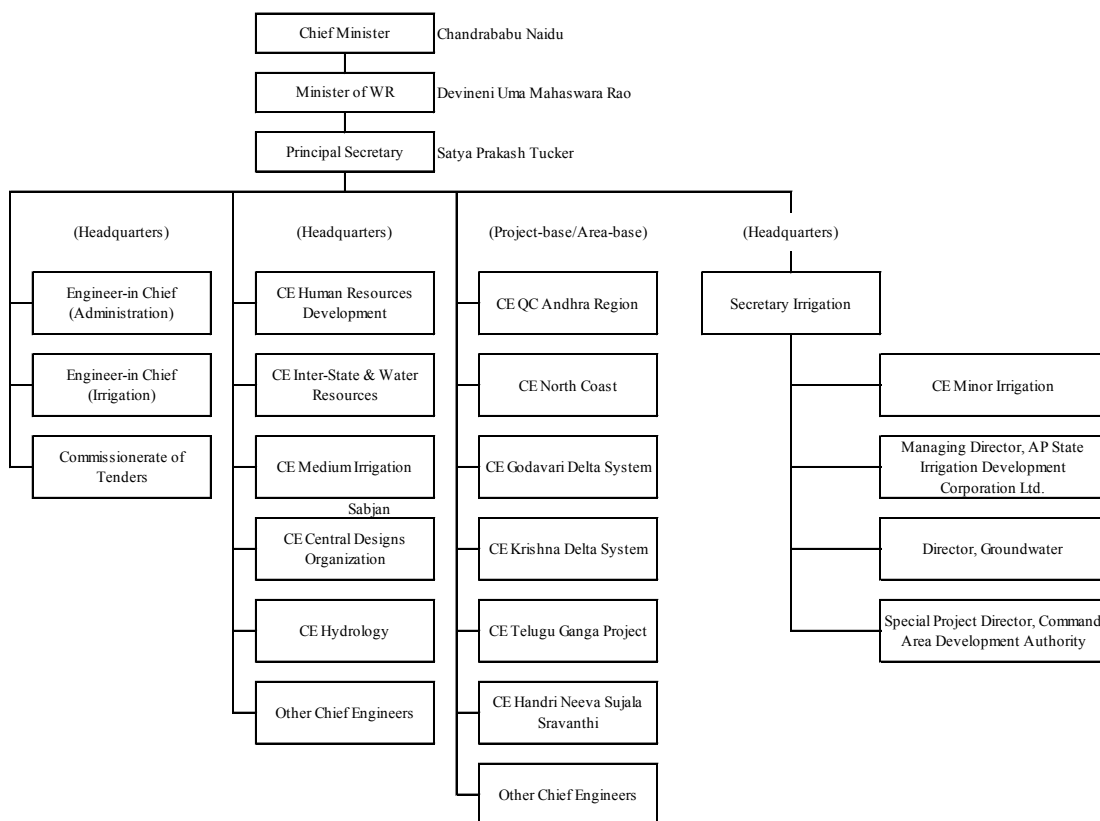
Source: India Water Portal (<http://www.indiawaterportal.org/>)
Customized Rainfall Information System (<http://hydro.imd.gov.in/hydrometweb/>)

Attachment 4.1.5 Monthly Mean Temperature by District in Andhra Pradesh State (1901-2002)

District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	South West Monsoon (June to Sep.)	North East Monsoon (Oct. - Dec.)	Winter Period (Jan. - Feb.)	Hot Weather Period (Mar. - May)	Ave
Srikakulam	20.7	22.5	25.2	27.2	28.5	27.6	26.1	26.0	26.0	25.1	22.7	20.6	26.4	22.8	21.6	27.0	24.9
Vizianagaram	20.9	22.9	25.8	28.1	29.5	28.2	26.3	26.2	26.2	25.2	22.7	20.7	26.7	22.9	21.9	27.8	25.2
Visakhapatnam	22.4	24.4	27.1	29.6	31.3	29.9	27.7	27.4	27.6	26.6	24.3	22.2	28.1	24.4	23.4	29.4	26.7
East Godavari	23.2	25.0	27.4	30.0	32.0	30.9	28.6	28.3	28.3	27.3	25.1	23.2	29.0	25.2	24.1	29.8	27.4
West Godavari	23.4	25.2	27.5	30.1	32.4	31.4	29.0	28.6	28.5	27.5	25.2	23.5	29.4	25.4	24.3	30.0	27.7
Krishna	23.3	25.2	27.6	30.3	32.4	31.1	28.8	28.4	28.2	27.2	24.8	23.2	29.1	25.0	24.3	30.1	27.5
Guntur	23.7	25.7	28.5	31.3	33.1	31.4	29.2	28.6	28.5	27.4	24.9	23.4	29.4	25.2	24.7	31.0	28.0
Prakasam	24.0	26.2	29.1	32.0	33.2	31.2	29.3	28.7	28.4	27.3	24.9	23.5	29.4	25.2	25.1	31.4	28.2
Nellore	23.7	26.2	29.4	32.0	32.1	29.5	27.6	27.3	27.2	26.5	24.4	22.9	27.9	24.6	24.9	31.2	27.4
Kadapa	22.6	24.7	27.7	30.2	30.6	28.4	27.0	26.6	26.3	25.4	23.3	22.0	27.1	23.6	23.6	29.5	26.2
Kurnool	23.7	26.2	29.4	32.0	32.1	29.5	27.6	27.3	27.2	26.5	24.4	22.9	27.9	24.6	24.9	31.2	27.4
Ananthapur	22.6	24.9	27.7	29.7	29.3	26.7	25.3	25.1	25.2	24.8	23.1	21.8	25.6	23.3	23.7	28.9	25.5
Chittoor	22.3	24.1	26.7	29.1	29.7	28.1	26.9	26.6	26.2	25.2	23.4	22.1	27.0	23.5	23.2	28.5	25.9
All AP State	22.8	24.9	27.6	30.1	31.3	29.5	27.7	27.3	27.2	26.3	24.1	22.4	27.9	24.3	23.8	29.7	26.8

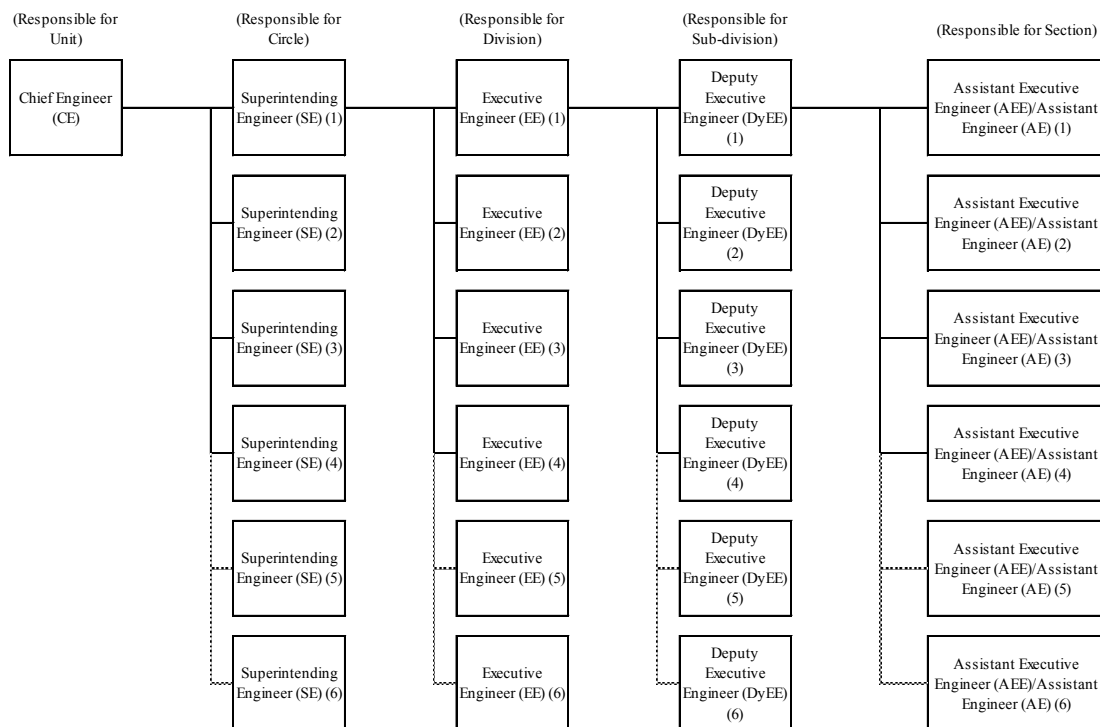
Source: India Water Portal (<http://www.indiawaterportal.org/>)

Attachment 4.2.1 Overall Organization of Department of Water Resources of Andhra Pradesh State



Source: <http://irrigationap.cgg.gov.in/wrd/underConstruction>

Hierarchic Structure under Chief Engineer of AP State Water Resources Department



Source: <http://irrigationap.cgg.gov.in/wrd/underConstruction>

Attachment 4.5.1 Primary Roles and Responsibilities of Farmers' Organizations

Water Users Association (WUA)	Distributory Committee (DC)	Project Committee (PC)
<ul style="list-style-type: none"> - To prepare and implement a warabandi schedule for each irrigation season, consistent with the operational plan, based upon the entitlement area, soil and cropping pattern as approved by the DC, or as the case may be, the PC. - To prepare a plan for the maintenance of irrigation system in the area of its operation at the end of each crop season and carry out the maintenance work of both distributory system and minor and field drains in its area of operation with the funds of the association from time to time. - To regulate the use of water among the various pipe outlets under its area of operation according to the warabandi schedule of the system. - To promote economy in the use of water allocated. - To assist the Revenue Department in the preparation of demand and collection of water rates. - To monitor flow of water for irrigation. - To resolve the disputes, if any, between the members and water users in the area of operation. - To raise resources. - To maintain records and to cause annual audit of its accounts. - To encourage avenue plantation on canal bunds and tank bunds by leasing such bunds. - To conduct regular water budgeting and also to conduct periodical social audit, as may be prescribed. - To encourage modernization of agriculture in its area of operation. - To maintain the feeder channels of minor irrigation tanks by the respective WUAs in the manner prescribed. 	<ul style="list-style-type: none"> - To prepare an operational plan, based upon the entitlement area, soil and cropping pattern at the beginning of each irrigation seasons, consistent with the operation by the PC. - To prepare a plan for maintenance of both distributaries and medium drains within its area of operation at the end of each crop seasons and execute the maintenance works with the funds of the Dc from time to time. - To regulate the use of water among the various WUAs under its area of operation. - To resolve disputes, if any, between the WUAs under its area of operation. - To maintain records and to cause annual audit. - To monitor the flow of water for irrigation. - To cause regular water budgeting and also the periodical social audit as may be prescribed. - To encourage avenue plantation in its area of operation. - To encourage modernization of agriculture in its area of operation. 	<ul style="list-style-type: none"> - To approve an operational plan based on its entitlement, area, soil, cropping pattern as prepared by the Competent Authority in respect of the entire project area at the beginning of each irrigation seasons - To approve a plan for the maintenance of irrigation system including the major drains within its area of operation at the end of each crop season and execute the maintenance works with the funds of the committee from time to time. - To resolve disputes if any, between the DCs. - To promote economy in the use of water. - To maintain records and cause annual audit of its accounts. - To cause regular water budgeting and also the periodical social audit as may be prescribed. - To encourage avenue plantation in its area of operation. - To encourage modernization of agriculture in its area of operation.

Source: APFMIS Act

Attachment 4.5.2 Government Order on Plough Back of 100% Water Tax

GOVERNMENT OF ANDHRA PRADESH
ABSTRACT

Irrigation & CAD Department- Water Tax apportionment – Plough back of 100 %
Water Tax – Amendment to G.O.Ms No 96 orders Issued.

IRRIGATION&CAMMAND AREA DEVELOPMENT(GENERAL.IV.1) DEPARTMENT

G.O.Ms .No:170

Dated:14.10. 2008

Read the following:

1. G.O. Ms No 96, Irrigation & Cammand Area Development (GENERAL.IV) Department, Dated 08.06.2007
2. Minutes of the meeting of Hon'ble Chief Minister on Irrigation Systems Management – Reg.

ORDER:

During the review meeting with Honorable Chief Minister on Irrigation Systems Management on 17-06-2008, it has been decided to apportion the 20 % Government share in water tax collected in case of Major and Medium sectors be apportioned to the Farmers Organizations towards Administration and Water Management. After careful examination of the issue, the Government hereby issue the following amendments to G.O. read in the reference.

Amendments

1. The following table shall be substituted for the table in 3 i)

Sector	Allocation						
	WUAs		D.Cs		P.Cs		G.P
	Works	Admn	Works	Admn	Works	Admn	
Major	50%	10%	15%	5%	14%	1%	5%
Medium	50%	10%	-		30%	5%	5%
Minor	80%	10%					10%

Amount earmarked for administration can be utilized for administrative expenses, Water Management and incidental charges etc., by the Farmers Organizations.

2. In rule 3, clauses xiv and xv shall be omitted

This order issues with the concurrence of Finance Department vide their UO. No 12603/1186/Exp.P.W.I/08 dated 4.10.2008

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

S.P.TUCKER

PRINCIPAL SECRETARY TO GOVERNMENT

To

The Commissioner, Command Area Development Authority,
Jalasoudha Buildings ,Hyderabad.

The All Heads of Departments under the control of I&CAD Department (through
Commissioner, CADA)

The All District Collectors (through Commissioner, CADA)

Copy to :

The Chief Commissioner of Land Administration , Hyderabad
The Commissioner, Panchayat Raj Rural Employment, Hyderabad
The Director of Treasuries and Accounts, A.P. Hyderabad.
The Director of Works and Accounts, A.P. Hyderabad.
The Accountant General A.P., Hyderabad
The Special Officer. A.P. Portal, I.T.& C Department, secretariat
The Revenue (Lr-3) Department
The Finance (Exp.PW.1/BG) Department
SF/SC

//FORWARDED :: BY ORDER//

SECTION OFFICER

Attachment 5.3.1 Major Market Facilities in Andhra Pradesh State

Commercial crop market in Andhra Pradesh State

No	District	AMC	Market Yard
1	Visakhapatnam	Anakapalle	Anakapalle
2	West Godavari	Tadepalligudem	Tadepalligudem
3	Guntur	Guntur	Guntur
4	Guntur	Duggirala	Duggirala
5	Kurnool	Kurnool	Kurnool
6		Adoni	Adoni
7		Yemmiganur	Yemmiganur
8	Ananthapur	Hindupur	Hindupur
9		Kalyanadurg	Kalyanadurg
10	Kadapa	Kadapa	Kadapa

1) Fruit Market in Andhra Pradesh State

No	District	AMC	Market Yard	Commodity
1	Vizianagaram	Vizianagaram	Vizianagaram	Banana
2	Visakhapatnam	Narsipatnam	Narsipatnam	Banana
3	East Godavari	Ambajipeta	Ambajipeta	Banana
4		Kothapeta	Ravulapalem	Banana
5		Rajahmundry	Rajahmundry	Mango
6	West Godavari	Eluru	Eluru	Banana, Lime
7		Polavaram	Jangareddygudem	Banana
8		Chintalapudi	Chintalapudi	Mango
9	Krishna	Vijayawada	Nunna	Mango
10	Guntur	Tenali	Tenali	Lime
11	Nellore	Gudur	Gudur	Lime
12		Rapur	Rapur	Lime
13	Chittoor	Chittoor	Chittoor	Mango
14		Puttur	Puttur	Mango
15		Tirupathi	Tirupathi	Mango
16		Bangarupalem	Bangarupalem	Mango
17	Ananthapur	Ananthapur	Ananthapur	Mango,
18				Sweet Orange
19		Tadipatri	Tadipatri	Banana, Lime,
20	Sweet orange			
21	Kadapa	Rajampeta	Rajampeta	Mango

2) Vegetable Market in Andhra Pradesh State

No	District	AMC	Market Yard	Commodity
1	Visakhapatnam	Paderu	Paderu	All Vegetables
2	Krishna	Nuzvidu	Bapulapadu	All Vegetables
3	East Godavari	Tuni	Tuni	All Vegetables
4	Prakasam	Kanigiri	Kanigiri	Tomato
5		Giddalur	Giddalur	Tomato
6		Martur	Martur	All Vegetables
7	Nellore	Nellore	Nellore	All Vegetables
8	Chittoor	Madanapalle	Madanapalle	Tomato
9			B.Kothakota	Tomato

No	District	AMC	Market Yard	Commodity
10		Valmikipuram	Valmikipuram	Tomato
11			Gurramkonda	Tomato
12			Chintaparathi	Tomato
13			Kalikiri	Tomato
14		Punganur	Punganur	Tomato
15		Pilier	Pilier	Tomato
16		Palamaner	Palamaner	All Vegetables
17			V.Kota	All Vegetables
18		Thamballapalli	Mulakalacheruvu	Tomato
19	Kadapa	Jammalamadugu	Muddanur	All Vegetables
20	Kurnool	Dhone	Dhone	Tomato
21		Kurnool	Kurnool	Onion
22		Pattikonda	Pattikonda	Tomato

3) Cattle Market

No	District	AMC	Market Yard
1	Vizianagaram	Parvathipuram	Parvathipuram
2	East Godavari	Tuni	Tuni
3	West Godavari	Palakol	Palakol
4		Polavaram	Jangareddygudem
5	Krishna	Kaikalur	Kaikaluru
6		Mylavaram	Mylavaram
7		Nandigama	Nandigama
8		Jaggaihpeta	Jaggaihpeta
9	Guntur	Krosur	Krosur
10		Narsaraopet	Narsaraopet
11		Piduguralla	Gurajala
12		Chilakaluripeta	Chilakaluripeta
13	Prakasam	Giddalur	Giddalur
14		Maddipadu	Santhanutalapadu
15	Kurnool	Nandikotkur	Nandikotkur
16		Nandyal	Nandyal
17		Pattikonda	Pattikonda
18		Dhone	Dhone
19	Anantapur	Anantapur	Anantapur
20		Guntakal	Guntakal
21		Kadiri	Kadiri
22		Tanakallu	Tanakallu
23		Hindupur	Gorantla
24	Kadapa	Mydukur	Mydukur
25		Pulivendula	Pulivendula
26		Rayachoti	Rayachoti
27	Chittoor	Palamaner	Palamaner
28		Piler	Piler
29		Punganur	Punganur

4) Cotton Market

No	District	Market Yard
1	Krishna	Kanchikacherla
2		Jaggiahpet
3		Nandigama
4		Mylavaram
5	Guntur	Chilakaluripeta
6		Piduguralla
7		Pedanandipadu
8		Macherla
9		Tadikonda
10		Sathenapalli
11		Krosur
12	Prakasham	Parchur
13		Markapur
14	Nellore	Kaligiri of AMC Kavali
15	Kurnool	Nandyala
16		Yemmiganur
17		Adoni

5) Mobile Rithubazars

NO	NAME OF CORPORATION	MOBILE RYTHUBAZARS
1	ANANTAPURAM	2
2	VIJAYAWADA	6
3	VISAKHAPATNAM	10
4	GUNTUR	6
5	RAJHAMUNDRY	6
6	KURNOOL	6
7	TIRUPATHI	3
8	CHILAKALURI PETA	1
TOTAL		40

6) Storage

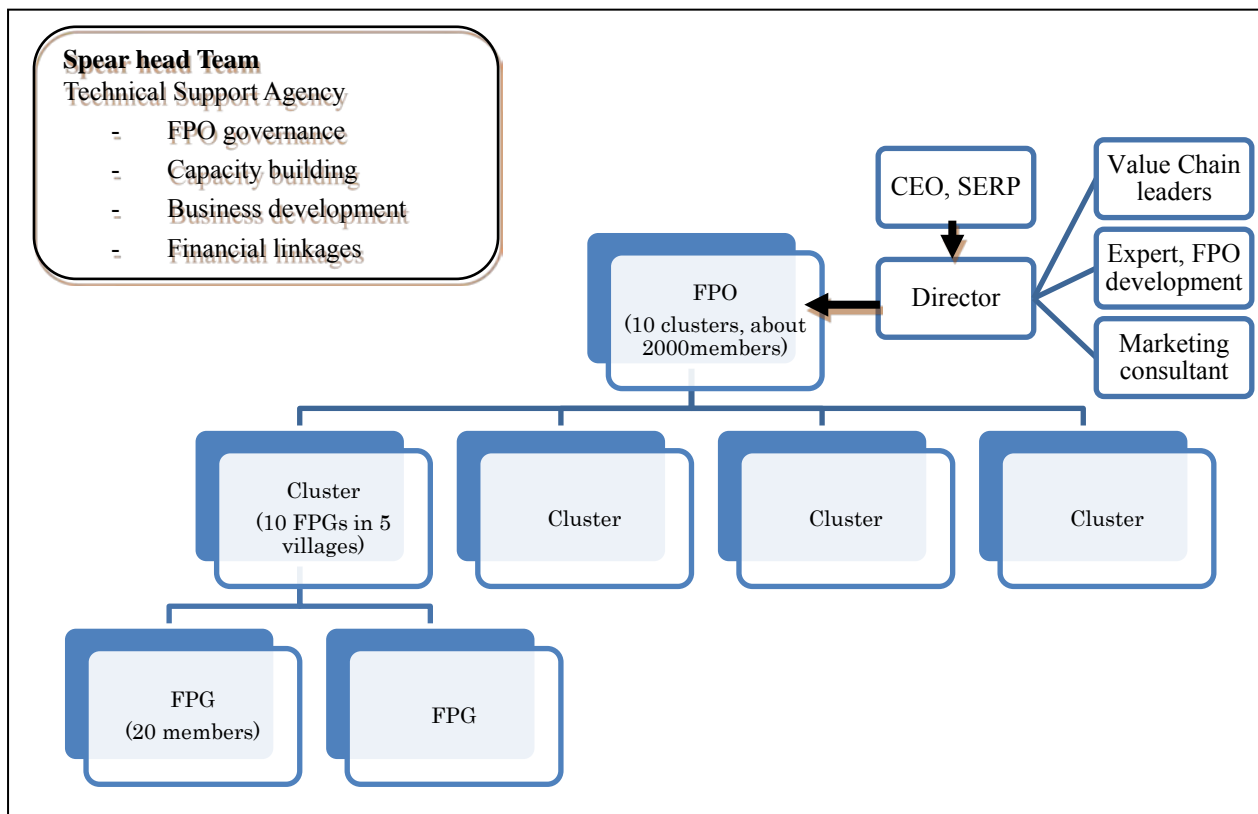
No.	District	RCC Roofs		AC / GCI sheet		Galvalume Sheets		Total	
		Quantity	Capacity	Quantity	Capacity	Quantity	Capacity	Quantity	Capacity
1	Srikakulam	7	4,200	43	24,300	0	0	50	28,500
2	Vizianagaram	10	5,720	38	20,240	0	0	48	25,960
3	Visakhapatnam	11	5,160	14	6,702	0	0	25	11,862
4	East Godavari	24	15,520	28	23,165	1	2,200	53	40,885
5	West Godavari	25	22,720	71	44,090	0	0	96	66,810
6	Krishna	50	46,150	101	66,350	19	45,000	170	157,500
7	Guntur	71	54,010	82	38,795	7	26,000	160	118,805
8	Prakasam	24	23,000	42	27,030	3	9,000	69	59,030
9	Nellore	28	25,650	22	14,600	1	5,000	51	45,250
10	Kurnool	13	10,800	76	49,060	8	30,000	97	89,860
11	Anantapur	8	8,000	66	32,810	1	5,000	75	45,810
12	Kadapa	11	7,090	33	20,300	4	6,000	48	33,390
13	Chittoor	6	5,300	61	20,300	5	11,000	72	36,600
Total		288	233,320	677	387,742	49	139,200	1,014	760,262

7) Godowns under progress

No	District	AMC	Market Yard	Capacity
1	Visakhapatnam	Chodavaram	Chodavaram	2,000
2	Vizianagaram	Saluru	Pachipenta	2,000
3		Pusapatirega	Bogapuram	2,500
4	Srikakulam	Amadalavalasa	Surubujji	2,000
5		Etcherla	Budumuru	2,000
6		Palasa	Mandasa	2,000
7		Palasa	Palasa	2,000
8		Palakonda	Palakonda	2,000
9	Krishna	Gudiwada	Gudlawaleru	5,000
10		Kaikaluru	Mandavalli	2,000
11		Machlipatnam	Machlipatnam	2,500
12		Movva i	Kodali	2,000
13		Pammaru	Pammaru	2,500
14		Penamaluru	Kankipadu	1,000
15		Vuyyuru	Vuyyuru	2,500
16		Vuyyuru	Vuyyuru	2,500
17	West Godavari	Akiveedu	Akiveedu	2,000
18		Chintalapudi	Dharmajigudem	2,500
19		Narsapuram	Narsapuram	5,000
20		Palakol	Palakol	2,500
21		T.P.Gudem	T.P.Gudem	5,000
22	East Godavari	Mummidivaram	Katrenikona.	5,000
23	Guntur	Rompicherla	Rompicherla	1,000
24	Prakasam	Addanki	Addanki	2,000
25		Santhamagulur	Martur	2,000
26	Nellore	Naidupet	Naidupet	1,000
27		Sullurpet	Sullurpet	2,000
28	Chittoor	Tiruchanur	Chandragiri	1,000
29		Punganur	Punganur	2,000
30		Puttur	Puttur	2,000
31	Kadapa	Badvel	Badvel	2,000
32	Kurnool	Alur	Alur	2,000
33		Pattikonda	Pattikonda	3,000
Total				78,500

Source: Agricultural Marketing Department of AP state government

Attachment 5.3.2 FPO Structure proposed in APRIGP



Source: SERP

Figure FPO structure proposed in APRIGP

- FPO consists of 10 Clusters from 5 villages, which consists of 10 FPG of 20 members
- Basically FPG members are SHG member, though not all the members become FPG members, depending on their interest. This automatically makes an FPG a women group. FPG membership is only for women but all their family can participate in the activities and meetings.
- 1 resource person is assigned at each cluster. A team of experts (Spear head team) are appointed to each FPO. The costs of those personnel are borne by Mandal Samakhya.

Attachment 6.3.1 District-wise No. of CHC up to 2014-15 in the State of Andhra Pradesh

District	CHC Paddy	Mini SMSRI	Paddy Nursery Package	Paddy Harvesting Package	CHC Maize	CHC Groundnut	CHC Cotton	CHC Tobacco	CHC Sugarcane	Total
Srikakulam	2	0	0	0	0	4	2	0	0	8
Vizianagaram	1	12	1	2	3	2	29	0	0	50
Visakhapatnam	0	0	0	0	0	0	0	0	0	0
East Godavari	5	3	0	3	0	0	44	0	0	55
West Godavari	14	17	1	2	4	7	2	5	0	52
Krishna	1	0	2	2	5	0	27	0	0	37
Guntur	2	0	3	6	3	3	116	0	0	133
Prakasam	2	0	2	1	3	0	78	0	0	86
Nellore	3	0	2	2	0	7	45	0	1	60
Kurnool	1	0	0	0	1	5	79	0	0	86
Ananthapur	0	0	0	0	0	85	10	0	0	95
Kadapa	2	0	2	1	0	29	70	0	0	104
Chittoor	8	0	1	0	0	75	0	0	0	84
Total	41	32	14	19	19	217	502	5	1	850

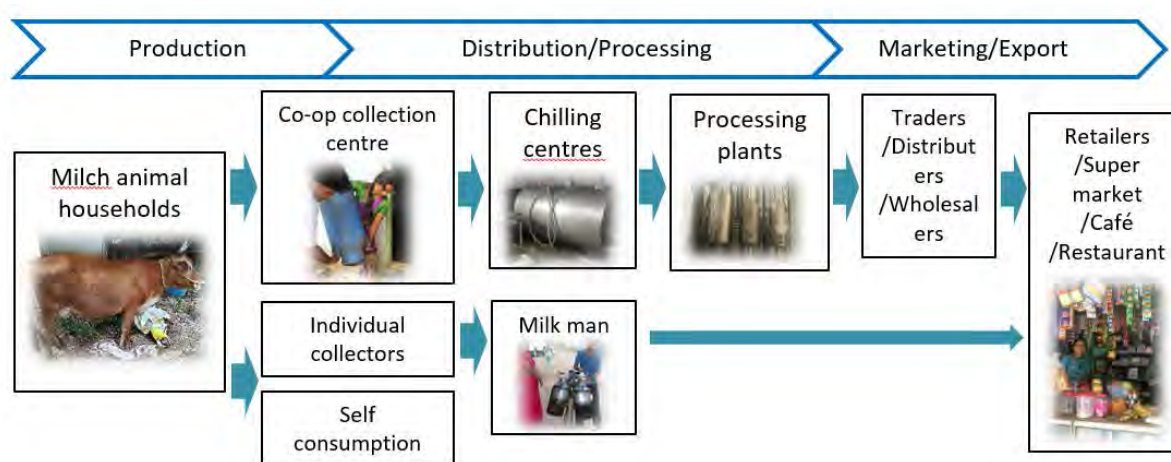
Source: Department of Agriculture, 2015

Attachment 6.4.1 Observation Summary of Animal Husbandry Value Chain on of the selected Products

(1) Dairy

India is known for the huge milk production after expansion of the evolutionary milk production in 15 centuries. AP has the 6th most production in India. Government is supporting dairy farmers mainly on the cattle breeding and medical care. The milk production is increasing every year but the same time its consumption is also growing. Traditional milk traders are dealing most of milk but organized procurement by the cooperatives and private sector also increasing. Farmers are facing problems such as expensive feed and fodder price and the stagnated milk price. Only some private sectors producing quality processed milk products and exporting them to south east Asian countries.

Typical value chain of Dairy is as follows.



Source: JICA Survey Team

Figure: Typical value chain of Dairy

The current situation, challenges and needs observed at the site visit are summarized as below.

Table: Current Situation, Challenges and Needs observed at the Site Visit

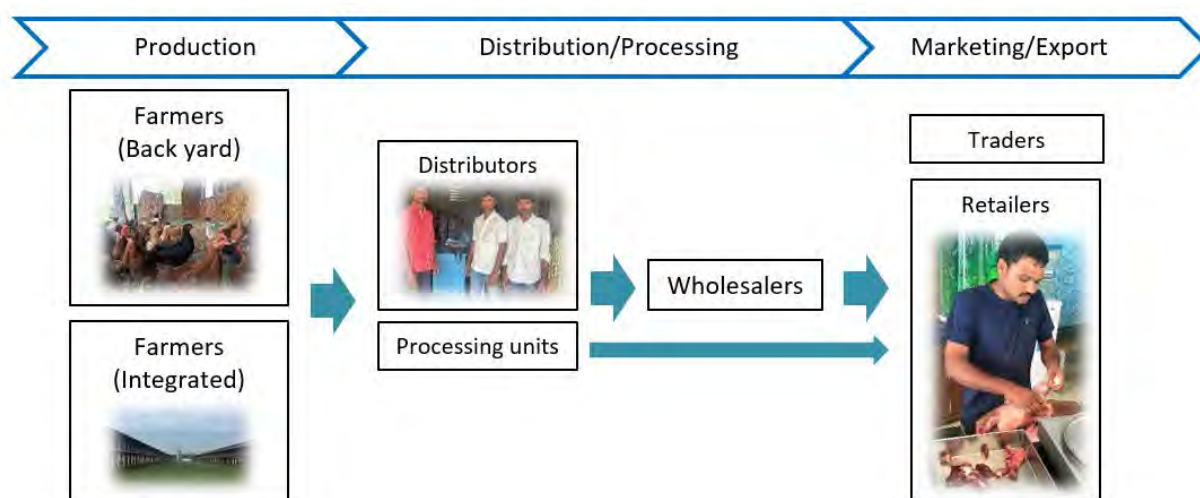
	Current situation	Challenges/Needs
Production	<ul style="list-style-type: none"> -The 6th state of milk production (8.4 million, 6% of all India). -Presence of Governmental support for breeding and veterinary health care services; and provision of inputs -Supply able to meet demand. 	<ul style="list-style-type: none"> -Expensive feed and fodder price. -Stagnancy in milk price offered to farmers. -Unavailability of labour and high cost of labour to take care animals. <Needs> -Organized milk procurement should be expanded to increase volume and quality of milk. To increase milk production, large scale dairy farmers could be promoted. -Feed production/procurement of feed ingredients has a space for foreign investment to address the expensive feeding issue.
Processing	<ul style="list-style-type: none"> -Optimal use of processing infrastructure. 	<Needs>
Marketing/Export	<ul style="list-style-type: none"> -Competitive procurement and market among cooperatives, private sector and informal traders. -The lead organization decides the benchmark price based on procurement cost, processing cost and international demand etc. 	<ul style="list-style-type: none"> -Marketing promotion effort for inside and outside of India; mainly support to producer companies and coop is essential -Low milk price caused by low international price of skim milk powder. -Market price incentive offered by neighbouring States <Needs>

Source: JICA Survey Team

(2) Poultry

AP has the 2nd most poultry population in India. 90% of poultry farmers are producing egg. The most of those poultry farmers are large scale and producing 20-450 thousand eggs per day. Egg consumption within the state is high but also some portions are exported to north east India or south east Asian countries. The problems they face are unavailability of labour and high cost of labour and feed. There is neither insurance nor governmental support for occurring epidemic. The only governmental support is to provide 40 birds back-yard poultry to mitigate poverty. AP's chicken meat production in 2012-13 was 297 thousand MT but the 97 percent of them are produced by commercial farmers.

Typical value chain of Poultry is as follows.



Source: JICA Survey Team

Figure: Typical Value Chain of Poultry

The current situation, challenges and needs observed at the site visit are summarized as below.

Table: Current Situation, Challenges and Needs observed at the Site Visit

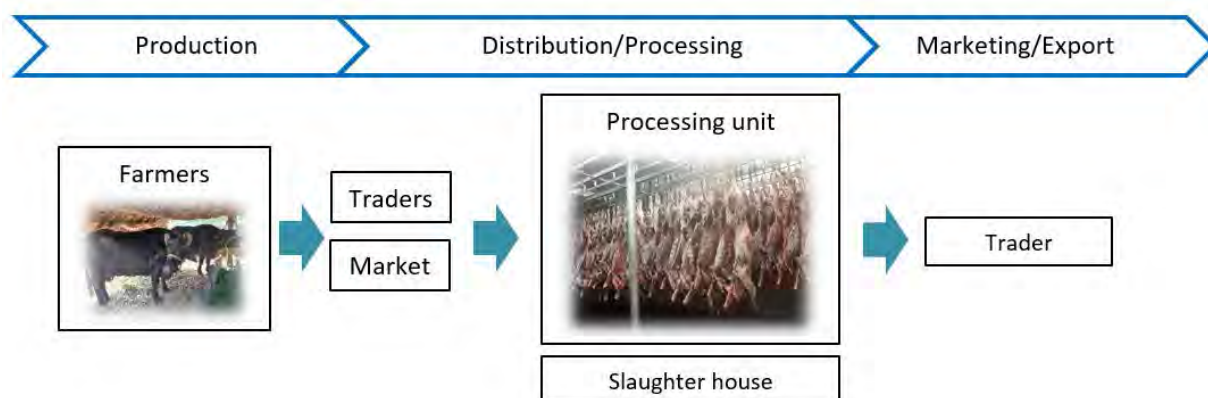
	Current situation	Challenges/Needs
Production	<ul style="list-style-type: none"> -The 2nd poultry in India (80 million, 11%) -Most of the eggs are produced by large scale units -Integrated farming in case of broiler units. -Increasing interests from Japanese companies -Government promoting backyard poultry 	<ul style="list-style-type: none"> -Increasing feed cost -Unavailability of labour and high cost of labour to take care birds -Risk of bio safety -High interest rate on loan for start-up commercial poultry units and short period to pay back the loan. -Insufficient Governmental support to finance start-ups and provision of insurance - Limited coverage for promotion of back-yard poultry. <p><Needs></p> <ul style="list-style-type: none"> -Governmental supports to manage risk of bio security; and the start-up units of rearing famers. -Feed production/procurement has a space for foreign investment to address the expensive feeding issue. -More scope for promotion of backyard poultry
Processing	<ul style="list-style-type: none"> -Consumers prefer meat as fresh as possible. -Processed and frozen chicken meat is not popular products yet. 	<p><Needs></p>
Marketing/Export	<ul style="list-style-type: none"> -East and north east India as key markets -Growth potential for exporting egg; and processed meat and egg products 	<ul style="list-style-type: none"> -Monopolized egg price decision by traders in key market (Kolkata). <p><Needs></p>

Source: JICA Survey Team

(3) Buffalo Meat

India has the most population of Buffalo. AP has the 6th most populations among the states. Buffalo living areas traditionally depended on the water resource availability hence the north and central regions of AP has more number of buffaloes than south regions. Farmers used to use them for cultivation purpose but nowadays they are mainly for milking purpose. About 10 years old buffaloes which produce less milk are to be sold in market. Through the market, the buffalo processing company procures them and produces processed meat to export only. The demand of buffalo meat is increasing in south east Asian countries but the FGM restriction of India disturbs its expansion of market. Export oriented abattoir is modern integrated units established on the guidelines given by APEDA. They follow world class sanitary and phytosanitary measure having mandatory requirement of HACCP and ISO certification.

Typical value chain of Buffalo meat is as follows.



Source: JICA Survey Team

Figure: Typical Value Chain of Buffalo Meat

The current situation, challenges and needs observed at the site visit are summarized as below.

Table: Current Situation, Challenges and Needs Observed at the Site Visit

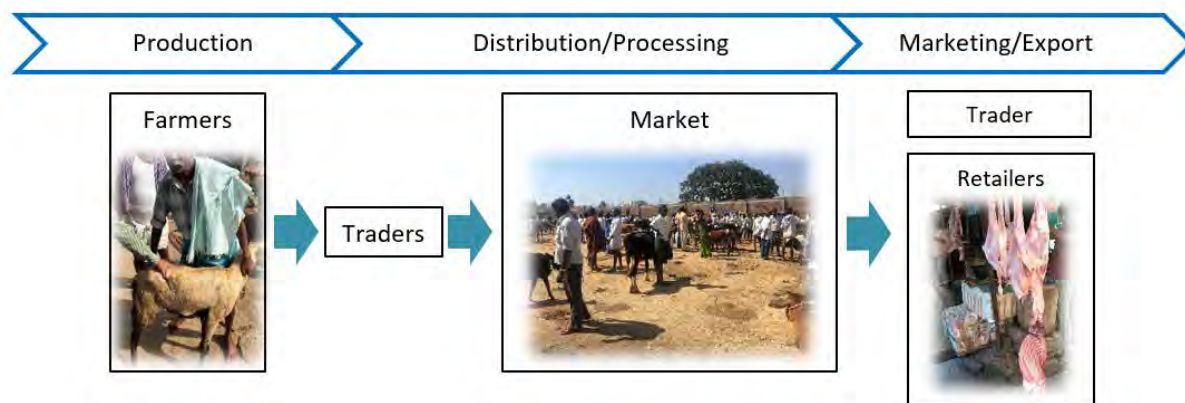
	Current situation	Challenges/Needs
Production	<ul style="list-style-type: none"> -The 6th among States in buffalo population in India (6.4 million, 6%). -Popular cattle in north and central regions where water resource is rich. -A family keep 2-3 buffaloes in general for milking purpose. 	<ul style="list-style-type: none"> -Unavailability of labour and high cost of labour to take care of animals. -Farmers selling young male calves (less than 1 y/o) for throating because of increase in cost of feeding and grazing. <Needs> -The volume of product will be significantly increased if the male calves raised, business environment supported, and the processing facility expanded.
Processing	<ul style="list-style-type: none"> -Over 10 y/o buffaloes are to be processed due to less productivity of milk. -Only one processing unit in AP state. -Government's veterinary doctor inspects the processed meat if the animal is free from diseases. 	<ul style="list-style-type: none"> -Lack of processing facility. -Meat processing unit finding it difficult to get right quality of animal <Needs> -Governmental supports to establish processing unit.
Marketing/Export	<ul style="list-style-type: none"> -100% of products for export. -The best exportable product based on the international demand and sufficient supply. -Increasing demand of south east Asian countries. 	<ul style="list-style-type: none"> -FMD restriction for export. -Anti throating sentiment; lack of enabling environment for meat export. <Needs> -Governmental support to enhance export.

Source: JICA Survey Team

(4) Sheep and Goat Meat

AP has the most sheep population in India. The state government is supporting mainly the production by providing medical care, vaccinations and deworming etc. services. Those farmers who rear sheep and goat have average 30-50 heads. They are facing difficulties of maintaining those animal, for instance unavailability of workers and limited land for grazing. The demand of the meat at market is high. No processed products are observed in market, they are simply slaughtered and separated in piece to sell.

Typical value chain of Sheep and Goat meat is as follows.



Source: JICA Survey Team

Figure: Typical value chain of Sheep and Goat meat

The current situation, challenges and needs observed at the site visit are summarized as below.

Table: Current situation, challenges and needs observed at the site visit

	Current situation	Challenges/Needs
Production	<ul style="list-style-type: none"> -The 1st among States in sheep population in India (13 million, 20%). 13th in goats in India (4 million, 3%). -No major health problem because of good coverage of governmental veterinary care -Individually owned units, but community led activity specially for grazing -Average flock size is 30-50; size steadily increasing 	<ul style="list-style-type: none"> -Unavailability of labour and high cost of labour to take care of animals. -Farmers demanding free of charge de-worming of animals. -Reduction in grazing land affecting rearing of goats and sheep. -Difficulty to promote semi intensive commercial rearing practices. <Needs> -Governmental supports to improve breed and promote semi intensive farming practices are in need to increase productivity and production
Processing	<ul style="list-style-type: none"> -Government's veterinary doctor inspects the processed meat at markets if the animal is free from diseases. 	<ul style="list-style-type: none"> -Consumers prefer only meat which processed in front of themselves. <Needs>
Marketing/Export	<ul style="list-style-type: none"> -Unorganized trading is in practice but the market is competitive and good income realization by farmers. -Demand is higher than supply. 	<ul style="list-style-type: none"> -Only unorganized marketing is in practice. <Needs> Involvement of private sector is necessary to develop this potential industry.

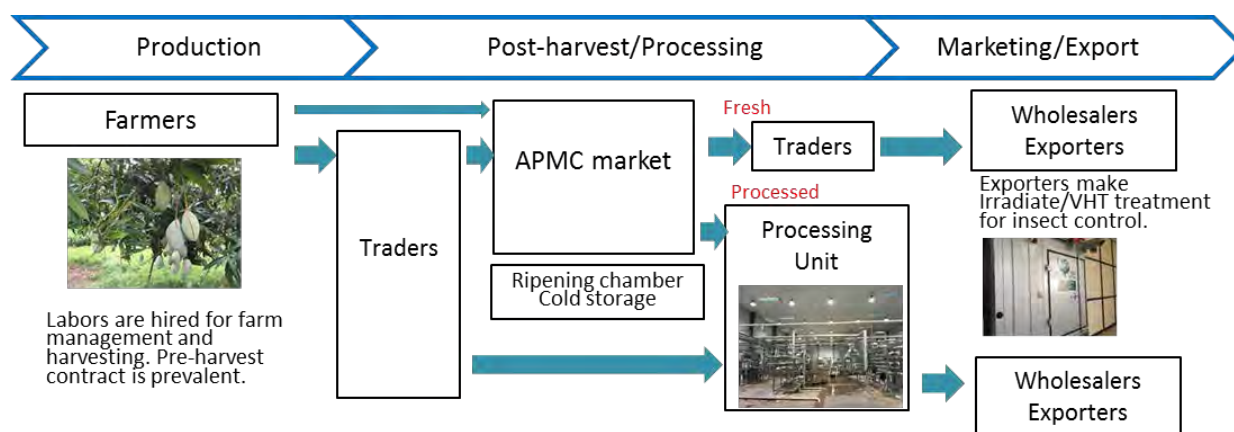
Source: JICA Survey Team

Attachment 6.6.1 Observation Summary of Value Chain of the Selected Produce

(1) Mango

India is the largest mango producing country and Andhra Pradesh State is the second largest producer in India. Major districts of production are Chittoor, Krishna and Vizianagaram. Despite the high production capacity, Andhra Pradesh State mango has yet tapped its marketing potential in global market. As there are several state of art processing facilities in the state, strengthening linkage between farmers and processors/exporters is required for supporting of farmers and development of the industry.

Typical value chain of mango is as follows.



Source: JICA Survey Team

Figure Typical value chain of mango

The current situation, challenges and needs observed at the site visit are summarized as below.

Table Current situation, challenges and needs observed at the site visit

Process	Current situation	Challenges/Needs
Production	<ul style="list-style-type: none"> -India is the world's largest producer of mango and Andhra Pradesh State is the second largest producer in India after UP with total volume of 2,737,008 MT. -The average productivity of mango in the state is 9.0 MT per hectare; this is higher than the national average of 7.2 MT per hectare, but much lower than 16 MT per hectare in UP.¹ 	<ul style="list-style-type: none"> -Productivity is low and has potential for further improvement if proper cultivation practice is introduced. -Production cost is high due to hiked labor and inputs cost. <Needs> -Technical intervention for IPM/ICM. -Support for micro irrigation. -Support for cultivation and harvesting technique.
Post-harvest/ Processing	<ul style="list-style-type: none"> -There are 66 processing units in Chittoor. -Several major players have established relation with big buyers such as Pepsi or Coca Cola. -Companies such as Jain Irrigation and Srinu Food Park established procurement network with farmers. Japanese companies buy processed mango from them. 	<ul style="list-style-type: none"> -For fresh mango, improper post-harvest handling, artificial ripening, weak linkage between farmers and exporters, and lack of aggregation is an issue. -For processed mango, weak linkage between farmers and processors, and reduced price for existing products. Need to explore higher value added products. <Needs> -Support for farmers collective marketing and linkage between farmers and processors/exporters.
Marketing/ Export	<ul style="list-style-type: none"> -World fresh mango import increased by 16.7% from 2010 to 2013, 47.9% since 2003. -India' is the second largest mango exporter 	<ul style="list-style-type: none"> -Brand image of Indian mango is not established. -Competition with other countries such as Kenya, Thailand, and Philippines is increased.

¹ Indian Horticulture Database 2014

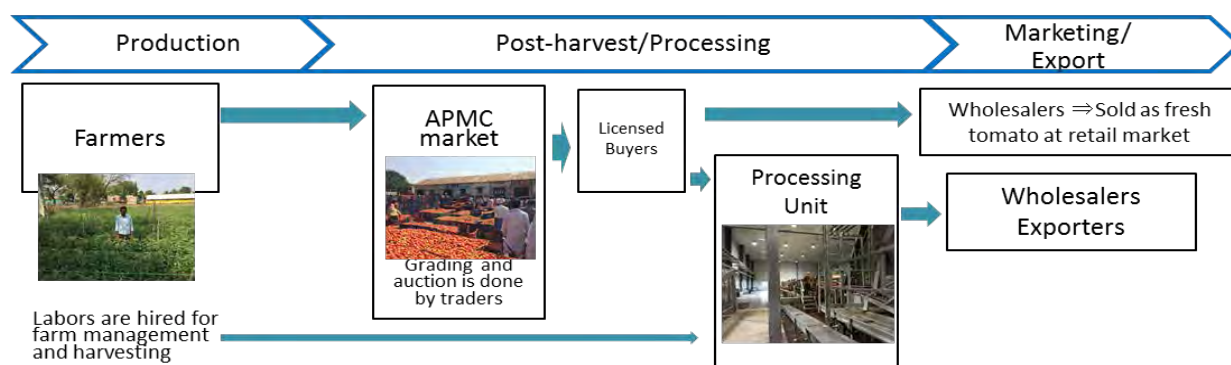
Process	Current situation	Challenges/Needs
	although its share is stagnated around 15% in recent years from 20% before 2010. -World mango pulp production increased by 18.6% from 2010 to 2013, 38.8% since 2003. ² -India' is the world biggest mango pulp producer with the share of more than 60% and it is increasing its share in recent years.	-There is no traceability. <Needs> -Support for identifying necessary specification for target market and introduce standards and certificates. -Promote local packaging industry.

Source: JICA Survey Team

(2) Tomato

Andhra Pradesh State is the largest tomato producer in India. Madanapalle market in Chittoor deals around 100,000 MT of tomato annually which is one of the largest in Asia. Major tomato production districts are Kurnool, Chittoor, Cadapa and Ananthapur in south region. Processing companies import tomato from China or US to meet increasing domestic demand due to difficulty of stable procurement of local tomato. Farmers are reluctant to cultivate processing varieties as there is high price fluctuation. There is possibility to stabilize farmers' income and develop industry by strengthening linkage between farmers and processors.

Typical value chain of tomato is as follows.



Source: JICA Survey Team

Figure Typical value chain of tomato

The current situation, challenges and needs observed at the site visit are summarized as below.

Table Current situation, challenges and needs observed at the site visit

Process	Current situation	Challenges/Needs
Production	-India is the second largest tomato producer next to China and Andhra Pradesh State is the largest tomato producer in India. Andhra Pradesh State produces 3,354,470 MT which accounts for 18% of tomato production in India. -Average yield in Andhra Pradesh State is 20 MT per hectare, which is almost the same as the national average, but only half of UP which is 40.6 MT per hectare. ³ -Processing variety is rarely cultivated.	-Productivity is low due to water shortage and cost of external labor is high. <Needs> -Irrigation. -Support to identify variety suitable for processing and demonstrate new varieties. -Introduction of farm management technique.
Post-harvest/Processing	-There are 15 processing units located in Chittoor capable of processing tomatoes. -Several big firms such as Srini Food Park, and Global Green started contract farming of tomato. -There are 14 tomato auction markets in Chittoor and Madanapalle is the largest dealing	-Price fluctuation is high and farmers dump harvest when price is too low. -Cost of processing is high as farmers do not cultivate processing variety. - The large aseptic firms don't producing paste on large scale as there is difficulty in getting a stable supply of fresh tomato.

² FAO STAT (<http://faostat3.fao.org/home/E>)

³ Indian Horticulture Database 2014

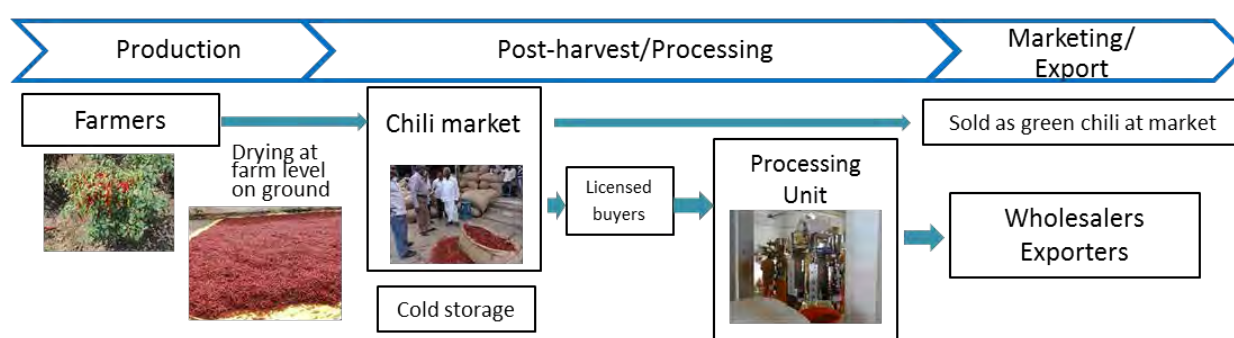
Process	Current situation	Challenges/Needs
	around 100,000MT a year.	
Marketing/ Export	-Tomato paste market in India has grown by 43.4% between 2010 and 2013, and 144.4% between 2003 and 2013. Although tomato paste production increased by more than 10% since 2010, it is not very stable. Consequently India is importing tomato paste to satisfy 30% of its demand every year.	-There is no traceability which hinders import by Japanese buyers. <Needs> -Promote linkages between processors and farmers, whereby processors buy tomato at pre-determined prices and farmers comply with the promise to sell to the processor. -Training for processors for upgrading and standardizing food processing operation such as contract farming, material handling, 5S, Kaizen, and food safety.

Source: JICA Survey Team

(3) Chili

Andhra Pradesh State is the largest chili producer in India and has the biggest chili market in Asia. Major production districts are Guntur, Prakasam and Kurnool. Guntur chili brand is famous nationwide. Due to lack of proper cultivation and post-harvest practices, Indian dry chili has issue of aflatoxin and chemical residue which hinders export to EU and Japan markets.

Typical value chain of Chili is as follows.



Source: JICA Survey Team

Figure Typical value chain of to chili

The current situation, challenges and needs observed at the site visit are summarized as below.

Table Current situation, challenges and needs observed at the site visit

Process	Current situation	Challenges/Needs
Production	-India is the world's largest chili producer and Andhra Pradesh State is the largest producer of chili in India by producing 40% of chili production in India. -Guntur chili is famous and popular for its pungency and quality. -Productivity of chili in Andhra Pradesh State is the highest in India.	-Lack of IPM/ICM causes issue of aflatoxin and chemical residue which hinders export to advanced countries. -High dependency on external labor leads to high cost of production. -Farm management remains low level. <Needs> -Technical intervention for IPM/ICM. -Support for harvesting technique.
Post-harvest/ Processing	-Post-harvest handling (drying) is done at farm level. -Linkage between farmers and processors is limited. -Some FPOs are formed for collective activities in support of NABARD. -There are several global companies like ITC and Synthite Industries which provide assistance to farmers and procure chilli from them.	-Improper drying methods generates toxin such as aflatoxin and chemical residues resulted in rejection of Indian chili import in EU or Japan. -There is no traceability. <Needs> -Post harvest infrastructure at farm level (Proper drying facility). -Technical support for proper post-harvest handling.
Marketing/	-Chilli market in Guntur is the biggest in Asia with the	-Indian chili has negative reputation in

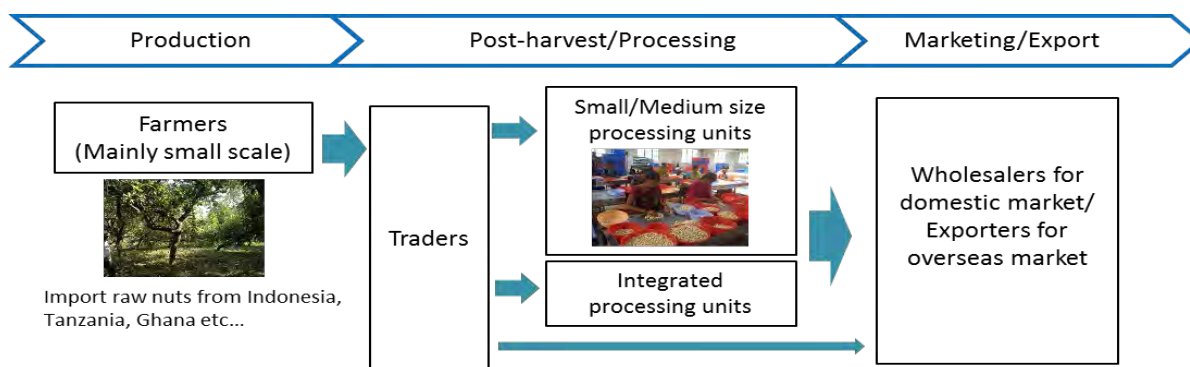
Process	Current situation	Challenges/Needs
Export	well-established network of traders, processors and exporter. -Dry chili and pepper export increased 8.9% between 2010 and 2013, and 57.1% between 2003 and 2013. India's share also grew from 23.2% in 20013 to 50% in 2013. ⁴ -India controls 60% of the 13,500 MT global spice oleoresins market even as China has emerged as a strong contender in paprika oleoresin, the most in-demand spice oil. ⁵	certain countries due to its unsafety. <Needs> -Proper quality test laboratory.

Source: JICA Survey Team

(4) Cashew

Andhra Pradesh State has largest production of cashew in India. Major cultivation districts are East Godavari, West Godavari, Vishakhapatnam, and Srikakulam. It is mainly cultivated in tribal area by small farmers and most orchards are aged and productivity is low. Processing industry which is highly labor intensive and creating local employment is active in the state

Typical value chain of Cashew is as follows.



Source: JICA Survey Team

Figure Typical value chain of Cashew

The current situation, challenges and needs observed at the site visit are summarized as below.

Table Current situation, challenges and needs observed at the site visit

Process	Current situation	Challenges/Needs
Production	-Andhra Pradesh State's total cultivation area of cashew is 126,121ha with annual production of 88,147 MT which is the highest in India. -It is mostly cultivated or naturally grown in the belt of tribal areas and low or no application of chemicals. -Average annual yield is 664.8kg/ha which is lower than Indian average of 759.8kg/ha and global average of 1,040kg/ha. ⁶ -India imports substantial quantity of raw cashews, processes them for domestic and export markets.	-Productivity of cashew in India is lower than international competitors such as Vietnam. -Lack of knowledge and awareness of farmers regarding cultivation practice such as land preparation, timely application of fertilizer and water, grafting technique. <Needs> -Technical intervention for cultivation management. -Rejuvenation of orchard trees. -Support for acquisition of certificates of organic, GAP, AGMARK.
Post-harvest/Processing	-Traders/middlemen collect harvested nuts directly from farmers and trade it with wholesalers.	-There is no aggregate marketing practice while some FPOs dealing cashew initiated activities. -There is no marketing channel for farmers other than

⁴ FAOSTAT

⁵ Reported in the Economic times on 27 July 2013

http://articles.economictimes.indiatimes.com/2013-07-27/news/40833605_1_paprika-oleoresin-geemon-korah-synthite-industries

⁶ Andhra Pradesh State Department of Horticulture

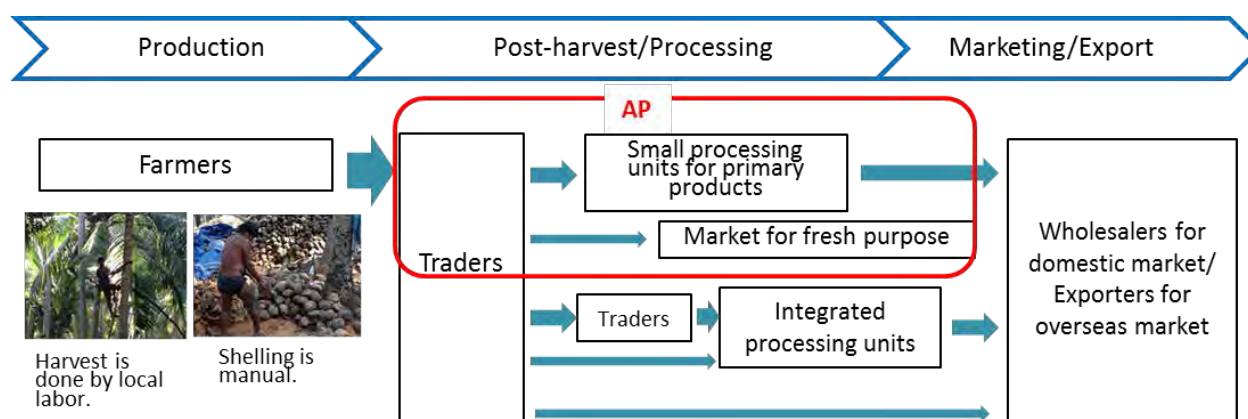
Process	Current situation	Challenges/Needs
	<ul style="list-style-type: none"> -There are 120 processing units in Srikakulam, 27 in Prakasam and 15 in Vishakhapatnam. (Including small ones) There is one large scale unit in Vizianagaram and export to overseas. - Low application of mechanization in processing units and most process are done manually. - Processing industry creates local employment especially women as it is highly labor intensive work. -Main product of cashew nuts is kernel and there is not much other value added products. 	<ul style="list-style-type: none"> selling to traders at noncompetitive price. -There is few storage facilities to strive price fluctuation. -Manual processing leads to high production cost. -There is seasonal labor shortage. -Utilization of cashew apple is not explored. <p><Needs></p> <ul style="list-style-type: none"> -Post harvest infrastructure at farm level (Storage, grading facility, and processing unit for cashew apple). -Aggregation for direct selling to processor to increase profit for farmers. -Mechanization and new technologies for processing. -Support for acquisition for certificates for HACCP, ISO etc. -Financial support for capital to upgrade processing facility.
Marketing/Export	<ul style="list-style-type: none"> -India accounts for 65% of global export and nearly 30% of global production. -US is the largest market for India followed by UAE and Netherland. (5.9% is exported to Japan.)⁷ -Demand in US and EU accounts for 40% of global demand and it is increasing. -Volume of global cashew trade is increasing (more than 4 times in 20 years). -Domestic consumption is about 200,000 MT annually which goes for nut consumption and processed products (traditional sweets). -Good potential for organic certification as cultivation in the area is naturally organic. 	<ul style="list-style-type: none"> -Poor market infrastructure and no specialized market facility for cashew. -No mechanism is established for organic certification for cashew to sell at premium price. <p><Needs></p> <ul style="list-style-type: none"> -Market platform of cashew trade. -Support for branding of Indian (Andhra Pradesh State) cashew in global market. -Support for establish organic certification system.

Source: JICA Survey Team

(5) Coconuts

India is one of the major coconuts producers in the world and Andhra Pradesh State accounts for about 12% of the total production of India. Major production districts are East Godavari, West Godavari, Srikakulam and Vishakhapatnam. Coconuts has various ways of utilization for high value addition such as ball copra, oil, power, water etc., but Andhra Pradesh State yet to tap the potential as there is no processing unit at industrial scale.

Typical value chain of Coconuts is as follows.



Source: JICA Survey Team

Figure Typical value chain of Coconut

⁷ FAOSTAT

The current situation, challenges and needs observed at the site visit are summarized as below.

Table Current situation, challenges and needs observed at the site visit

Process	Current situation	Challenges/Needs
Production	<ul style="list-style-type: none"> -India is the third largest producer (17%) in the world after Indonesia and Philippines. -Andhra Pradesh State's total cultivation area of coconuts is 121,9171ha with annual production of 1,828,755 MT which is the fourth highest in India. (After Tamil Nadu, Karnataka and Kerala) -Average yield of Andhra Pradesh State is 10.3MT/ha (16,100 nuts/ha) which is much higher than Indian average of 7.3MT/ha.⁸ -Intercrop of banana and cacao is promoted in coconuts plantation. -Nuts are harvested by skilled local labor. 	<ul style="list-style-type: none"> -Occasional outbreak of pest and disease is observed in the region at controllable level. -Labor for harvesting is in shortage and labor cost is increasing. <Needs> -Development and dissemination of sustainable preventive measures for pest and disease such as bio-agents. -Mechanization and new technology for harvesting.
Post-harvest/ Processing	<ul style="list-style-type: none"> -Some FPOs are formed to conduct collective activities supported by Coconut Development Board. -There is one large scale integrated processing unit in Vizianagaram (under construction). -There are many (more than 200) small scale processing units (coir and primary processing). 	<ul style="list-style-type: none"> -There is no aggregate marketing practice and only one marketing channel for farmers is selling to traders. -There is not enough post-harvest and processing facility in the region for value addition. <Needs> -Post-harvest infrastructure at farm level (Drying facility for making ball/dry copra, primary processing for taking shells). -Aggregation for direct selling to processor to increase profit for farmers. -Technology for producing new value added products.
Marketing/ Export	<ul style="list-style-type: none"> -There is one coconut market in Ambajipet. -Volume of coconuts products exported from India has increased from 5,120 MT in 2007 to 102,236 MT in 2013. -Total volume of global trade of coconuts has increased from 343,904 MT in 2000 to 837,720 MT in 2013.⁹ -Rope made by coconuts coir is exported mainly to China. Other high value products such as oil are not produced in the state. 	<ul style="list-style-type: none"> -The coconuts market is not functional. -Direct marketing of the value added products are not conducted by local stakeholders as there is no processing unit of high value added products in the state. <Needs> -Market platform of coconuts trade. -Support for facilitating linkage between farmers group and processors/exporters.

Source: JICA Survey Team

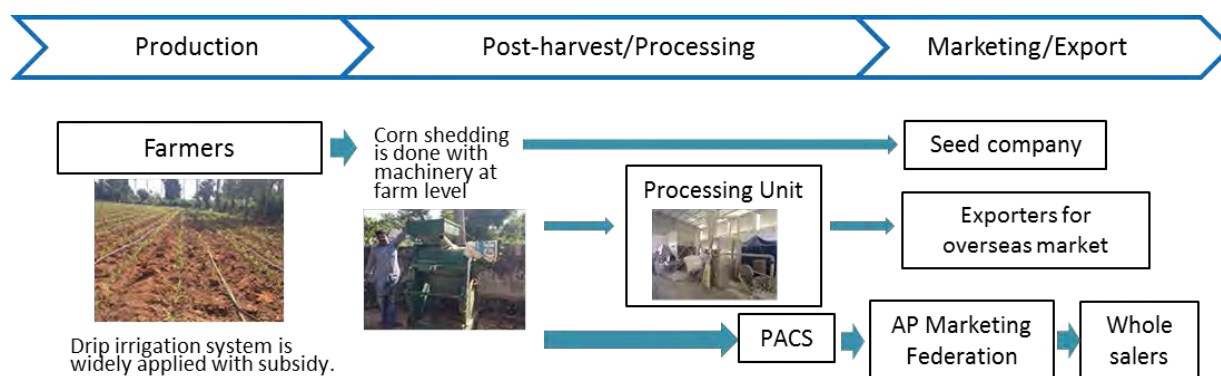
(6) Maize

Andhra Pradesh State has the highest total production volume and yield of maize in India. Minimum Support Price (MSP) and increasing domestic demand stable maize producing farmers' income. Major production districts are Guntur, West Godavari, Kurnool, Krishna and Vizianagaram. There is one integrated processing unit producing industrial products and export volume is increasing.

Typical value chain of Maize is as follows.

⁸ Coconuts Development Board

⁹ FAOSTAT



Source: JICA Survey Team

Figure Typical value chain of Maize

The current situation, challenges and needs observed at the site visit are summarized as below.

Table: Current situation, challenges and needs observed at the site visit

Process	Current situation	Challenges/Needs
Production	<ul style="list-style-type: none"> -Andhra Pradesh State's total cultivation area of maize is 303,000 ha with annual production of 1,938,000 MT which is the highest in India. -Average yield of Andhra Pradesh State is 6.39MT/ha, which is much higher than Indian average of 2.5MT and global average of 5.5MT. -Area under hybrid seed is 100% in Andhra Pradesh State -Drip irrigation is widely used in the cultivation areas.¹⁰ -MSP is applied for maize and it stabilizes farmers' income. 	<ul style="list-style-type: none"> -Shortage of water irregularly occurs in the dry season in the area using bore well. -Improper usage of chemical inputs hinders export to several countries. <Needs> -Canal irrigation. -Mechanization. -Training for proper cultivation technique for processing industry.
Post-harvest/ Processing	<ul style="list-style-type: none"> -There is one large scale integrated processing unit in Vizianagaram producing high value added products such as starch, gluten, liquid glucose etc. and export products mainly to middle east. 	<ul style="list-style-type: none"> -Poor post-harvest infrastructure, handling, and low drying techniques lead to high rate of post-harvest loss. <Needs> -Post-harvest infrastructure (storage, mechanical drying). -Support for proper post-harvest handling (such as drying) for high value products.
Marketing/ Export	<ul style="list-style-type: none"> -Global maize production has grown at 3.4% over the past 10 years. -US, China, Brazil are the largest producing countries and India accounts for 2% of global production. -Top maize importing country is Japan, accounts for 15%. -Consumption volume has grown 3.6% in the past 5 years in India. Mainly used for snack products. -Export volume from India has increased 23.5% over the 10 years.¹¹ 	<ul style="list-style-type: none"> -Marketing opportunity is untapped with big importing countries such as Japan. <Needs> -Analysis for required specification of industrial products and support for global marketing.

Source: JICA Survey Team

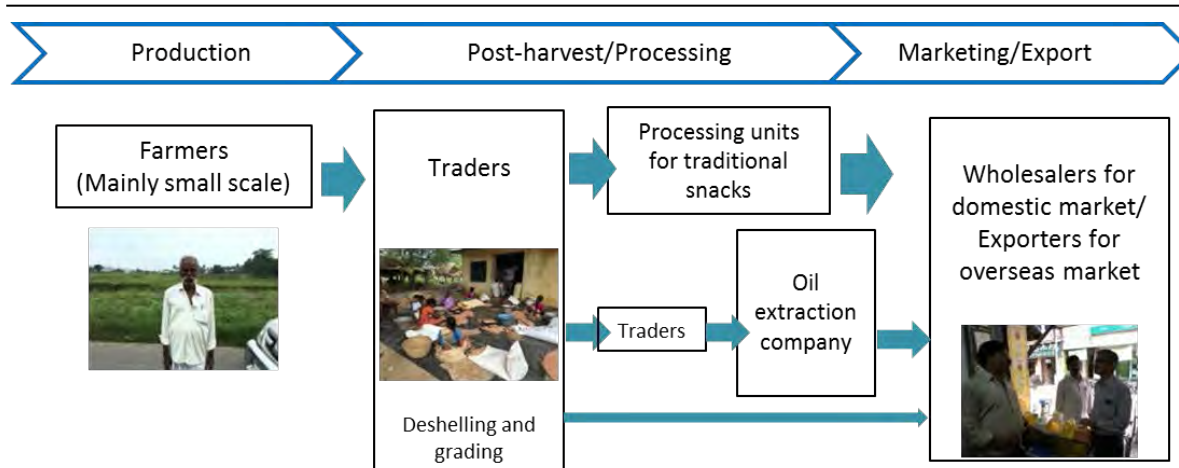
(7) Groundnut

Andhra Pradesh State has the second highest total production volume of groundnut in India. Groundnut is grown mainly in southern districts such as Ananthapur, Kurnool and Chittoor. The crops are sold as fresh nuts or processed into groundnut oil or snacks.

Typical value chain of Groundnut is as follows.

¹⁰ Andhra Pradesh State Department of Agriculture

¹¹ FAOSTAT



Source: JICA Survey Team

Figure Typical value chain of Groundnut

The current situation, challenges and needs observed at the site visit are summarized as below.

Table Current situation, challenges and needs observed at the site visit

Process	Current situation	Challenges/Needs
Production	<ul style="list-style-type: none"> -Andhra Pradesh State's total cultivation area of groundnut is 1.39 million ha with annual production of 1.23 million MT which is the second largest in India¹². -Average yield of Andhra Pradesh State is 0.89MT/ha in 2013/14, which is much lower than Indian average of 1.75MT¹³. -Groundnut is grown where irrigation water is not available. It is considered as a chance crop. -Major production areas are Ananthapur, Kurnool and Chittoor. 	<ul style="list-style-type: none"> -As groundnut is grown in rain-fed areas, its production is very much dependent on climate. Thus it is vulnerable to drought and other climatic risk. -Farmers afraid of climatic risk would not invest in groundnut. They do not apply enough amount of pesticide, resulting low quality of crop. <Needs> -Crop insurance
Post-harvest/Processing	<ul style="list-style-type: none"> -Groundnut is processed mainly to groundnut oil, or traditional snacks and peanut bar (chikki). -Deshelling and grading is normally done by traders who procure raw groundnuts and sell them to processors of various kind. -Production of groundnut oil in India as well as in the world have decreased by 33.1% and 9.7% respectively¹⁴, although it still constitutes 25% of the oilseed crops in India. -There are only a couple of modern oil refineries in the state 	<ul style="list-style-type: none"> -Declining demand for groundnut oil due to increasing health consciousness among consumers in both domestic and international market. -Need to develop more value added products.
Marketing/Export	<ul style="list-style-type: none"> -There is no market infrastructure dealing with groundnuts. -Farmers have no option to sell their produce to traders. 	<ul style="list-style-type: none"> -Very weak linkage among farmers, traders, and processors. There are a number of intermediaries (about 3 to 5) which results in low returns to farmers. <Needs> -Market infrastructure.

Source: JICA Survey Team

(8) Banana

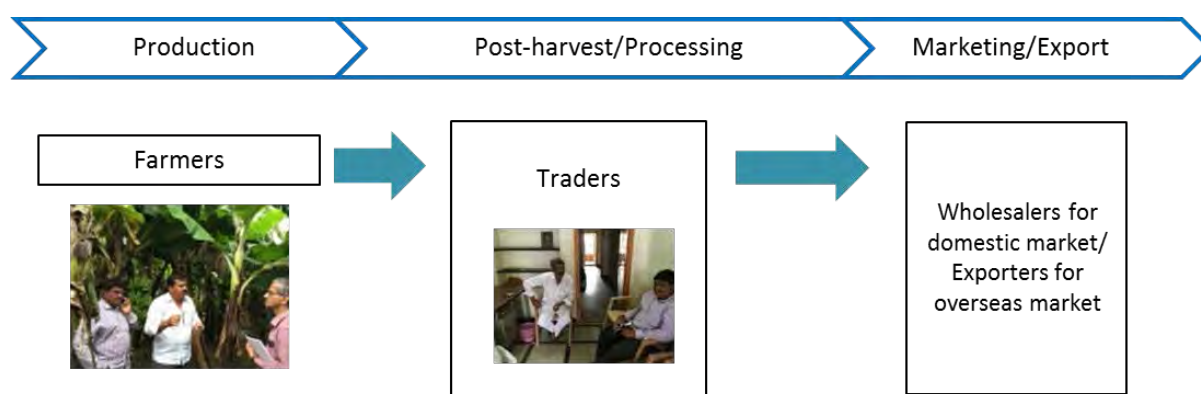
India is the world's largest producer of banana and Andhra Pradesh State is the fourth largest producer in India. Banana is predominantly consumed as fresh fruit. Major banana production districts are East Godavari and Kadapa.

¹² Agricultural Statistics at a glance 2014

¹³ ditto

¹⁴ FAOSTAT (<http://faostat3.fao.org/home/E>)

Typical value chain of Banana is as follows.



Source: JICA Survey Team

Figure Typical value chain of Banana

The current situation, challenges and needs observed at the site visit are summarized as below.

Table Current situation, challenges and needs observed at the site visit

Process	Current situation	Challenges/Needs
Production	<ul style="list-style-type: none"> -India is the world's largest producer of banana. Andhra Pradesh State's total cultivation area of banana in 2013/14 is 90,483 ha with annual production of 3,166,897 MT which is the 4th largest in India¹⁵. -Average yield of Andhra Pradesh State is 35MT/ha in 2013/14, which is similar to Indian average of 37MT.¹⁶ -Tissue culture plant material is in extensive use in Andhra Pradesh State. Grand Naine variety is the most popular and it has international & domestic market acceptance. -The banana grown in Cadapa has longer shelf life. -Major production areas are East Godavari, Cadapa, Ananthapur, Vizianagaram and East Godavari. 	<ul style="list-style-type: none"> -Productivity is just below national average and there is scope of improvement.
Post-harvest/ Processing	<ul style="list-style-type: none"> -Ripening using ethylene gas is carried out by wholesalers at retail side. -Banana Puree, powder and chips are the major processed products. -Most of the mango aseptic processing plants (about 15) in Chittoor can also process banana. 	<ul style="list-style-type: none"> -Domestic demand for processed banana is limited (for baby foods, ice creams) and India is not competitive in international market.
Marketing/ Export	<ul style="list-style-type: none"> -There is limited market infrastructure dealing with banana. -India is exporting banana to Middle East. However, Indian share in banana export is meagre 0.2% in 2013¹⁷. 	<ul style="list-style-type: none"> -Very weak linkage among farmers, traders, and processors.

Source: JICA Survey Team

¹⁵ National Horticulture Board

¹⁶ ditto

¹⁷ FAOSTAT (<http://faostat3.fao.org/home/E>)

Attachment 6.8.1 Results of Household Survey

1. Family Size

Average family size per household in the survey area is around 4.0 to 5.0 persons.

Table 1 Family Size

(Unit: No. of persons)

Particular	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Average Family Size	4.7	4.1	4.9	5.0	4.5	4.2

Source: JICA Household Survey 2016

2. Social Category

Households surveyed are predominantly Hindus. Among the Hindus, the OBCs (Other Backward Class) community households constituted the majority.

Table 2 Social Category of Sample Households

(Unit: % of HHs)

Social Category	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Scheduled Caste	5	13	0	0	12	12
Scheduled Tribe	0	5	0	0	0	2
OBC	15	38	100	100	42	80
General	80	43	0	0	46	6
Total	100	100	100	100	100	100

Source: JICA Household Survey 2016

3. Prime Source of Income of Households:

It is observed from the data analysed below that the households in general are agriculture oriented and farming and/or working on farms as labour constituted their single largest source of income.

Table 3 Prime Source of Income of Households

(Unit: % of HHs)

Activities	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Govt. Service	2	-	-	-	2	2
Private Service	8	5	-	-	10	3
Farmer	20	17	-	50	72	43
Agriculture labor	45	58	100	50	15	50
Artisans	10	10	-	-	-	2
Skilled worker	12	5	-	-	1	-
Unskilled worker	2	2	-	-	-	-
Pensioner	-	3	-	-	-	-
Others	1	-	-	-	-	-
Total	100	100	100	100	100	100

Source: JICA Household Survey 2016

4. Electricity and Water

More than 95% of the HHs reported having electricity supplied from the main grid.

Table-4 Electricity Supply to Households

(Unit: % of HHs)

Item	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
None	5	0	-	-	5	-
Electricity connected to grid	95	98	100	100	95	93

Item	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Battery	-	-	-	-	-	5
Others	-	2	-	-	-	2
Total	100	100	100	100	100	100

Source: JICA Household Survey 2016

As shown in the following Table, almost all the drinking water sources are stated to be within easy access of households.

Table 5 Main Source of Drinking Water

(Unit: % of HHs)

Drinking Water Source	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Tap water	83	98	100	100	78	80
Shallow well	-	-	-	-	-	2
Tube well	-	-	-	-	-	-
Spring	-	-	-	-	-	-
River or Canal	-	-	-	-	-	6
Tank, Pond, Lake	-	-	-	-	5	2
Rainwater collection	-	-	-	-	-	-
Bottles water	-	2	-	-	-	10
Others	17	-	-	-	17	-
Total	100	100	100	100	100	100

Source: JICA Household Survey 2016

5. Adequacy of Drinking water

Northern zone has deficit in meeting drinking water needs of families. Other areas do not have significant drinking water problem.

Table 6 Availability of Drinking Water to Households

(Unit: % of HHs)

Drinking Water Source	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Sufficient	100	98	-	50	100	100
Insufficient	-	2	100	50	-	-

Source: JICA Household Survey 2016

6. Land Holding Size of Sample Households in the Project

Land holding size of beneficiaries in the project is shown in Table 7. In the survey, it is clarified that beneficiaries in Medium Irrigation Schemes have larger size of cultivated land rather than ones in Minor Irrigation Schemes.

7. Major constraints in agriculture production

Major constraints in agriculture production during Rabi and Kharif seasons are shown in Table 8.

8. Average Household Income and Expenditure

Scheme and Zone-wise household average annual income and expenditure are compiled and given in the following Table 9 and Table 10. Farming and working as farm labour combined is the main source of income for the households, except South Minor area.

Table 7 Average Land Holding by Land Categories

(Unit: ha)

Land Category	Central Medium			Central Minor			North Medium			North Minor			South Medium			South Minor		
	IS	OIS	Total	IS	OIS	Total	IS	OIS	Total	IS	OIS	Total	IS	OIS	Total	IS	OIS	Total
Cultivated Land (irrigated)	2.63	0.27	2.9	0.82	0.09	0.91	2.3	-	2.3	1.59	-	1.59	1.09	0.37	1.46	0.67	0.2	0.87
Cultivated Land (rainfed)	0.38	0.39	0.77	0.07	0.2	0.27	-	0.22	0.22	-	-	-	0.09	0.6	0.69	0.03	0.65	0.68
Orchard	-	-	-	-	-	-	-	-	-	-	-	-	0.09	-	0.09	-	0.03	0.03
Grass Land	-	-	-	-	-	-	-	-	-	-	-	-	0.14	0.14	-	-	-	-
Fallow	-	-	-	-	-	-	-	-	-	-	-	-	0.38	-	0.38	0.07	0.11	0.18
Barren	0.08	0.77	0.85	0.12	0.22	0.34	-	-	-	-	-	-	0.41	1.06	1.47	-	-	-
Total	3.09	1.43	4.52	1.01	0.51	1.52	2.3	0.22	2.52	1.59	-	1.59	2.06	2.17	4.23	0.77	0.99	1.76

Note: IS: Irrigation scheme, OIS: Outside Irrigation Scheme

Source: JICA Household Survey 2016

Table 8 Season-wise Major Constraints in Agriculture Production

(Unit: No. of HHs)

Constraints	Rabi Season						Kharif Season					
	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Lack of irrigation facilities	32	52	60	60	29	60	31	28	0	-	23	-
Lack of irrigation water	28	30	60	60	58	60	58	30	0	-	39	-
Erratic precipitation.	27	13	0	-	-	-	19	15	0	-	2	-
Lack of suitable land for cultivation.	3	8	0	-	1	-	4	0	0	-	1	-
Soil degradation.	8	6	0	-	-	-	14	5	0	-	1	-
Difficult to obtain suitable seeds/seedlings.	17	30	60	60	-	60	3	33	0	-	-	-
Difficult to apply fertilizer appropriately.	5	4	0	-	2	-	4	4	60	60	-	60
Difficult to control insects.	11	0	0	-	2	-	2	2	60	60	6	60
Difficult to control diseases.		5	0	-	-	-		0	60	0	-	60
Lack of labour forces.(Kind of practice)	9	0	0	-	1	-	13	32	30	60	1	60
Lack of farm machineries/equipments	3	2	0	-	-	-	0	30	0	-	1	-
Lack of skills and knowledge on cultivation.	7		0	-	1	-	30		0			
Transportation of farm inputs/outputs	2		0	-	-	-	1		0		1	

(e.g. high-yielding, disease resistance, etc.)

Source: JICA Household Survey 2016

Table 9 Annual Average Farmer Household Income

Source	Central Medium		Central Minor		North Medium		North Minor		South Medium		South Minor	
	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%
Agriculture	145083	79.3	81900	63.9	61541.7	51.8	114786	73.7	61541.7	51.8	37208.3	36.7
Fruits	2916.7	1.6	1150	0.9	250	0.2	40936	26.3	250	0.2	583.3	0.6
Others crops	600	0.3	1333.3	1	3866.7	3.3	0	0	3866.7	3.3	3333.3	3.3
By-products	246.7	0.1	1240	1	0	0	0	0	0	0	0	0
Livestock/Dairy	6533.3	3.6	10783.3	8.4	9766.7	8.2	0	0	9766.7	8.2	9750	9.6
Fishing/Aquaculture	0	0	0	0	0	0	0	0	0	0	0	0
Forest Produces	0	0	0	0	0	0	0	0	0	0	0	0
Sericulture	0	0	0	0	0	0	0	0	0	0	0	0
Cottage industry/Processing	0	0	0	0	0	0	0	0	0	0	0	0
Business/Trading	0	0	0	0	0	0	0	0	0	0	0	0
Wage Labourer (casual work)	3600	2	2000	1.6	0	0	0	0	0	0	500	0.5
Agricultural Labourer	11433.3	6.2	16900	13.2	12383.3	10.4	0	0	12383.3	10.4	9666.7	9.5
Salary	7333.3	4	7000	5.5	4133.3	3.5	0	0	4133.3	3.5	7783.3	7.7
Pension	600	0.3	2400	1.9	800	0.7	0	0	800	0.7	0	0
Loan	2500	1.4	833.3	0.7	26083.3	22	0	0	26083.3	22	32533.3	32.1
Others	2185	1.2	2600	2	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0	0	0	0	0
Total	183031	100	12814	100	118825	100	155723	100	118825	100	101358	100

Source: JICA Household Survey 2016

Table 10 Annual Average Farmer Household expenditure

Item	Central Medium		Central Minor		North Medium		North Minor		South Medium		South Minor	
	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%
Foods	48693	33	47717	40.4	25143	26.2	38150	28.7	25143	26.2	21643	20.2
Fuel	4907	3.3	3920	3.3	433	0.5	8600	6.5	433	0.5	2467	2.3
Water	2121	1.4	3476	2.9	530	0.6	0	0	530	0.6	840	0.8
Electricity	5595	3.8	6118	5.2	1695	1.8	3708	2.8	1695	1.8	1416	1.3
Transportation	5910	4	6670	5.6	1525	1.6	0	0	1525	1.6	1120	1
Communication	3557	2.4	3630	3.1	1225	1.3	2880	2.2	1225	1.3	1493	1.4
Agriculture Inputs (seeds, fertilizers, pesticides, , etc)	32528	22.1	14318	12.1	18383	19.2	40800	30.7	18383	19.2	13350	12.4
Education	15740	10.7	8625	7.3	25283	26.3	13300	10	25283	26.3	22550	21
Health (medicine)	7035	4.8	5842	4.9	4977	5.2	3700	2.8	4977	5.2	5637	5.2
Clothing	3850	2.6	4958	4.2	5043	5.3	6200	4.7	5043	5.3	4917	4.6
Social Functions	988	0.7	200	0.2	183	0.2	4800	3.6	183	0.2	17	0
Loan repayment	7465	5.1	5433	4.6	6783	7.1	0	0	6783	7.1	30317	28.2
Saving	4217	2.9	1900	1.6	570	0.6	10800	8.1	570	0.6	383	0.4
Purchase of assets	233	0.2	223	0.2	0	0	0	0	0	0	0	0
Interest payout	240	0.2	40	0	1850	1.9	0	0	1850	1.9	818	0.8
Remittance	17	0	17	0	33	0	0	0	33	0	25	0
Maintenance/repair to assets	4017	2.7	5127	4.3	1867	1.9	0	0	1867	1.9	100	0.1
Insurance	397	0.3	0	0	458	0.5	0	0	458	0.5	277	0.3
Others	0	0	0	0	0	0	0	0	0	0	0	0
Total	147510	100	118214	100	95982	100	132938	100	95982	100	107369	100

Source: JICA Household Survey 2016

9. Post-harvest Activities

It is said that in all the regions processing is scarcely being done.

Table 11 Post-harvest Treatment applied for Grains, Vegetables and Fruits

(Unit: No. of HHs)

	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
No processing	37	32	60	50	12	34
Threshing	12	8	50	-	-	-
Cleaning	7	5	10	50	9	2
Drying	-	2	-	-	-	4
Processing	-	-	-	-	28	-
Washing	-	3	-	-	-	-
Grading	-	10	-	-	-	-
Other	-	-	-	-	5	-

Source: JICA Household Survey 2016

Storage is generally done in bulk or in bags in almost all zones.

Table 12 Storage Way of Grains, Vegetables and Fruits

(Unit: No. of HHs)

	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Bulk	3	24	50	20	16	20
Bag	25	6	70	30	29	18
Wooden Box	1	-	-	-	-	-
Plastic Container	1	-	-	-	1	1

	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Metal Bin	10	1	-	-	-	2
Others	3		-	-	1	-

Source: JICA Household Survey 2016

Most of storages for grains, vegetables and fruits has been done in the house of the producer on the ground or floor.

Table 13 Storage Place of Grains, Vegetables and Fruits

(Unit: No. of HHs)

	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Storage Shed	11	54	-	20	1	21
On ground in house	10	11	50	-	18	18
On floor in house	19	7	60	30	25	1
others	3		-	-	2	3

Source: JICA Household Survey 2016

Major loss generation stage for grains, vegetables and fruits in is reported as shown in Table 15.

Table 14 Major Loss Generation Stage for Grains, Vegetables and Fruits

(Unit: No. of HHs)

	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
No Processing	12	18	60	50	4	2
Threshing	9	6	60	-	5	2
Cleaning	1	19	-	-	12	19
Drying	5	10	-	-	24	
Storage	15	2	-	-	2	4
Transportation	1		-	-	5	-
Others	-	-	-	-	2	-
Washing	-	2	-	-	-	-

Source: JICA Household Survey 2016

Birds and rodents and rough handling are the major loss generating factors. Late shipping of produce (since they are not properly stored), also results in losses to farmers. The most affected zones are central minor and south medium where loss is high.

Table 15 Causes of Loss Generation of Grains, Vegetables, and Fruits

(Unit: No. of HHs)

	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Birds	6	17	60	-	3	4
Rodents	2	16	60	20	13	18
Insects	1	13	-	20	18	2
Rain	22	11	-	10	19	10
Rough Handling	2	6	-	20	6	
Late Shipping	-	10	-	-	7	2
Inferior tool / Equipment	-	1	-	-	1	-

Source: JICA Household Survey 2016

Regarding constraints on post-harvest treatment, lack of labour is a major trouble to all the zones along with lack of skills and knowledge.

Table 16 Constraints on Post-harvest Treatment

(Unit: No. of HHs)

	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Lack of Labour	-	8	60	40	13	17
Lack of Skills and Knowledge	-	26	60	20	22	1
Lack of Storage Facilities	-	30	-	10	16	4
Lack of Processing Machine	-	14	-	-	3	4
Others	-	5	-	-	-	-

Source: JICA Household Survey 2016

Regarding place to sell the produces, sale of produce happens at the farm gate or village market for many in all the Zones. Opportunities to access remunerative markets are very few or non-existent in most of the Zones as shown in Table 18.

Table 17 Place to Sell the Produces

(Unit: No. of HHs)

	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Farm Gate	8	39	30	-	8	7
Village market	11	8	90	40	8	2
Roadside Market	10	-	-	-	3	-
Town City Market	4	6	-	20	5	5
Outside State		7				12

Source: JICA Household Survey 2016

Produces irrespective of the Zones or regions are mainly sold to collectors/aggregators/brokers or agents. Their supply chain is limited to brokers and agents mostly as follows:

Table 18 Sale of Produce

(Unit: No. of HHs)

	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Consumer	1	-	-	-	1	1
Retailer	0	29	20	-	6	2
Collector / Broker / Agent / Wholesaler	25	31	40	20	23	24
Processing factory	7	-	60	40	11	
Others	-	-	-	-	-	-

Source: JICA Household Survey 2016

For transportation of produces almost all categories of vehicles are used as follows:

Table 19 Transportation

(Unit: No. of HHs)

	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Collected by collector / middleman	12	-	-	-	1	-
Cart	4	6	-	-	-	15
Truck	17	26	90	40	19	2
LMV	-	11		20	3	10
Three Wheeler	-	17	30	-	1	-

Source: JICA Household Survey 2016

Important constraints are low price and fluctuation of price. Further lack of market information is also expressed as binding constraints in market of produce as follows:

Table 20 Constraints on Marketing

(Unit: No. of HHs)

	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Low price	8	13	70	20	5	-
Fluctuation of price	1	44	-	-	12	21
Lack of market information	13	34	-	-	10	1
Limited buyer	2	3	50	20	1	2
Market access	-	14	-	-	-	2
Transportation facilities	-	-	-	-	2	-
Lack of knowledge	8	3	-	-	2	-
Lack of labour force	1	10	-	20	-	-

Source: JICA Household Survey 2016

10. Division of Labour

Distribution of labour by farming practices is relatively different by regions as shown in the following Table 21.

Table 21 Division of Labour

(Unit: % of HHs)

Activity	Central Medium			Central Minor			North Medium			North Minor			South Medium			South Minor		
	M/F	Male	Female	M/F	Male	Female	M/F	Male	Female	M/F	Male	Female	M/F	Male	Female	M/F	Male	Female
Land Preparation	67	32	1	60	35	5	100	0	0	-	100	-	67	32	1	37	3	60
Sowing	63	37	0	58	37	5	50	50	0	-	100	-	63	37	-	100	-	-
Raising Seedlings	65	35	0	58	38	4	-	100	-	-	100	-	65	35	-	-	100	-
Transplanting	55	43	2	58	38	4	-	-	100	-	-	100	55	43	2	100	-	-
Weeding	45	40	15	58	38	4	-	-	100	-	-	100	45	40	15	12	50	48
Harvesting	65	30	5	58	38	4	-	-	100	-	-	100	65	30	5	50	-	50
Watering	45	5	50	50	5	45	-	100	-	-	100	-	45	5	50	-	-	100
Post-harvest (Threshing / Winnowing / Cleaning etc.)	45	35	20	55	42	3	100	-	-	100	-	-	45	35	20	3	50	47
Processing	25	57	18	50	45	5	100	-	-	100	-	-	25	56	19	50	50	-
Transportation	18	73	9	50	45	5	-	100	-	-	100	-	18	73	9	-	100	-
Marketing & Sales	18	73	9	50	0	50	100	-	-	100	-	-	18	73	9	100	-	-
Participation in the social gathering and meetings	18	73	9	50	45	0	100	-	-	100	-	-	18	73	9	100	-	-

Note: M/F=no discrimination

Source: JICA Household Survey 2016

11. Seasonal Migration

Seasonal migration is not a significant phenomenon in any of the families studied. However, these are circular migrations as these migrants return home periodically, that is just less than 6 months.

Table 22 Seasonal Migration from Villages

(Unit: No. of HHs)

Assets	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
1. Yes in the District	-	-	-	-	-	7
2. Yes to the other District in AP	-	-	-	-	-	-
3. Yes to outside the State	8	-	-	-	-	2
4. Yes to outside India	-	-	-	-	-	-
5. No	-	-	-	-	-	-
Total	8	-	-	-	-	9

Source: JICA Household Survey 2016

12. Household Ownership of Productive Assets:

The ownership percentage of agricultural and transportation equipments by households in the surveyed area is below average.

Table 23 Agricultural and Transportation Equipment

(Unit: No. of HHs)

Assets	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Pump	57	28	-	-	14	5
Sprayer	14	1	-	-	6	1
Drip Irrigation System	1	-	-	-	10	2
Power Tiller	-	-	-	-	1	-
4-wheel tractor	4	-	-	-	2	2
Harvester	-	-	-	-	-	1
Transplanter	-	-	-	-	-	1
Bicycle	40	35	-	-	1	2
Motorcycle	36	26	6	60	9	1
Three wheeler	-	-	-	-	-	-
Cart	-	-	-	-	6	2

Source: JICA Household Survey 2016

13. Household Ownership of Information/Communication/Consumer Items

The study feels that the major information and communication equipments owned by almost every household is TVs and mobile phones.

Table 24 Households owning Information/Communication/Consumer Items

(Unit: No. of HHs)

Assets	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
TV	55	28	60	60	57	53
Radio	-	31	-	-	10	5
Cell phone	55	57	60	60	57	54
TV dish antenna	33	22	60	60	56	49
Computer	2	31	-	-	-	-
Refrigerator	20	12	-	-	17	10

Source: JICA Household Survey 2016

14. Household Ownership of Livestock

Livestock is not a major asset category for most of the households. Among those who owned any type of livestock, Buffaloes are the preferred assets, followed by poultry. No data has come in from North Andhra (Medium and Minor).

Table 25 Households owning Livestock

(Unit: No. of HHs)

Livestock	Central				North				South			
	Medium		Minor		Medium		Minor		Medium		Minor	
	HHs	No.	HHs	No.	HHs	No.	HHs	No.	HHs	No.	HHs	No.
Cow	6	1.5	-	-	-	-	-	-	-	-	34	2.0
Goat	-	-	-	-	-	-	-	-	-	-	1	10
Pig	-	-	-	-	-	-	-	-	-	-	-	-
Buffalo	33	2.1	34	2.6	-	-	-	-	-	-	9	1.7
Poultry	-	-	-	-	-	-	-	-	-	-	2	9.5

Note: HHs= No. of households of livestock, No.=Average No. of livestock held by HHs

Source: JICA Household Survey 2016

15. Participation in Farmers' Cooperative Societies and Groups

Only in the Central Zone (Medium and Minor) and South Medium, the survey obtained some data on this subject.

Table 26 Participation in Farmers' Cooperative Societies and Groups

(Unit: No. of HHs)

Particulars	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Agriculture/Farming	60	7	36	60	27	20
Horticulture	-	-	-	-	-	-
Livestock/Dairy	-	-	-	-	-	-
Sericulture	-	-	-	-	-	-
Fishery	-	1	-	-	-	-
Sales/Marketing	-	-	-	-	-	-
Saving/Credit	-	-	-	-	-	-
SHG	60	-	30	60	8	15

Source: JICA Household Survey 2016

16. Natural Disasters and Land Conservation

Only in the Central Zone (Medium and Minor) and South Medium, the survey obtained some data on this subject.

Table 27 Natural Disasters

(Unit: No. of HHs)

Particulars	Central Medium	Central Minor	North Medium	North Minor	South Medium	South Minor
Hot-weather damage	-	-	-	-	-	-
Drought	20	19	-	-	20	-
Landslides	-	-	-	-	-	-
Flooding	-	-	-	-	-	-
Storm	-	-	-	-	-	-
Rodents / Animals / Insects	11	28	-	-	11	-

Source: JICA Household Survey 2016

Attachment 7.2.1 List of Proposed Irrigation Projects

Medium Irrigation Projects

No.	Project Name	District	Command Area (ha)	Status
1	Peddankalam Anicut	Vizianagaram	3,113	Maintained
2	Vottigedda Reservoir	Vizianagaram	6,746	Maintained
3	Vengalaraya Sagaram	Vizianagaram	9,996	Maintained
4	Peddagedda Reservoir	Vizianagaram	4,858	Maintained
5	Andra Reservoir	Vizianagaram	3,603	Maintained
6	Torrighedda Pumping Scheme	East Godavari	5,998	Maintained
7	Thammileru Reservoir Scheme	West Godavari	3,711	Maintained
8	Mopadu Reservoir System	Prakasam	5,147	Maintained
9	Veeraraghavani Kota Anicut System	Prakasam	2,267	Maintained
10	Krishnapuram Reservoir	Chittoor	2,479	Maintained
11	Aranjar Reservoir	Chittoor	2,226	Maintained
12	Buggavanka	Kadapa	3,926	Maintained
13	Upper Pennar	Ananthapuramu	4,066	Maintained
14	Pennar Kumudvathi	Ananthapuramu	2,479	Maintained
15	Millimadugu Project	Chittoor	1,600	Withdrawn
16	Maddigedda Reservoir	East Godavari	1,214	Maintained
17	Kanupur Canal System	Nellore	7,077	Withdrawn
18	Narayanapuram Anicut	Srikakulam	14,995	Maintained
19	Guntur Channel Scheme	Guntur	10,927	Withdrawn
20	Raiwada Reservoir	Visakhapatnam	6,111	Maintained
21	Siva Bhashyam Sagar	Kurnool	4,894	Maintained
22	Muniyeru	Krishna	6,648	Added
23	DR & DM Channels	Nellore	10,117	Added
24	Krishnapuram Lift	Chittoor	-	Dismissed
25	Kandaleru Reservoir	Nellore	121,460	Dismissed

Minor Irrigation Projects

No.	District	Original		Final	
		Nos.	Command Area (ha)	Nos.	Command Area (ha)
1	Srikakulam	80	8,041	80	8,557
2	Vizianagaram	75	5,664	63	6,250
3	Visakhapatnam	50	1,649	50	3,422
4	East Godavari	25	2,029	25	3,079
5	West Godavari	20	1,991	20	1,988
6	Krishna	20	756	20	3,146
7	Guntur	10	1,780	10	1,842
8	Prakasam	20	1,668	20	4,638
9	Nellore	30	5,152	30	7,882
10	Kadapa	30	2,809	30	3,118
11	Kurnool	25	4,518	25	2,091
12	Ananthapur	20	3,844	19	3,883
13	Chittoor	80	5,220	80	10,363
Total		485	45,121	472	60,259

Source: JICA Survey Team

Attachment 7.2.2 Data for Selection of Medium Irrigation Projects

Serial No.		01	02	03	04	05	06	07	08	09	10
Name of Project		Peddankalam Anicut	Votigedda Reservoir	Vengalaraya Sagar	Peddagedda Reservoir	Andhra Reservoir	Tomigedda Pumping Scheme	Thammleru Reservoir Scheme	Mopadu Reservoir System	Veeraraghavani Kota Anicut System	Krishnapuram Reservoir
District		Vizianagaram	Vizianagaram	Vizianagaram	Vizianagaram	Vizianagaram	East Godavari	West Godavari	Prakasam	Prakasam	Chittoor
Mandal		Seethanagaram & Balakrishna	J.M.Valasa	Salur	Pachipenta	Mentada	Sithanagaram	Chinthalapudi	Pamuru	Lingasamudram	Karvelinagaram
Village		Peddankalam	Rawada	Laxmipuram	Kesali	Andhra	Purushottapalnam	Nagreddudem	Lakshmi Narasapuram	V.R.Kola	Krishnapuram
Location of Dam/Tank/Headworks/Lift											
N DD-MM-SS		18-40-03	18-50-11	18-37-24	18-28-14	18-20-58	17-15-57	17-00-44	15-06-21	15-06-08	13-22-08
E DD-MM-SS		83-27-27	83-35-22	83-13-17	83-06-46	83-11-50	81-39-36	80-57-35	79-28-56	79-48-14	79-21-11
DPR (D), Project Note (P) Preparation	D/P	D	D	D	P	P	D	D	D	P	D
Command Area	ha	3,113	6,746	9,996	4,858	3,603	5,998	3,711	5,147	2,267	2,479
Water Allocation	MCM	24.65	56.64	95.58	23.56	15.67	73.34	34.26	100.00	16.98	13.08
Live Storage Capacity of Dam/Tank	MCM	0.00	25.15	42.34	28.90	26.40	0.00	34.26	56.63	16.98	4.87
Original Construction Year	YYYY	1976	1976	1997	1959	1998	1964	1980	1921	1956	1979
GAP Ayacut	%	19%	25%	10%	6%	22%	37%	32%	24%	18%	41%
Water Use Efficiency	%	81%	76%	82%	90%	93%	63%	70%	40%	80%	60%
Water Cess Collection	%	-	-	-	-	0%	65%	55%	80%	-	20%
Project Committee's Willingness for Project	YN	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Land Acquisition	YN	N	N	N	N	N	N	N	N	N	N
Benefit/Cost Ratio	-	2.24	4.50	5.23	1.79	2.71	4.03	3.31	2.25	6.38	4.69
Project Type	-	Diversion	Dam	Dam	Dam	Dam	Lift	Dam	Dam	Diversion	Dam
Construction Cost	Rs.	395,300,000	441,800,000	500,400,000	703,700,000	344,700,000	311,800,000	225,000,000	424,900,000	56,200,000	273,900,000

Serial No.		11	12	13	14	16	18	20	21	22	23
Name of Project		Aranar Reservoir	Buggavanka	Upper Pennar	Pennar Kumudvathi	Maddigedda Reservoir	Narayanapuram Anicut	Raiwada Reservoir	Siva Bhashyam Sagar	Muniyeru	DR & DM Channels
District		Chittoor	Kadapa	Ananthapuram	Ananthapuram	East Godavari	Srikakulam	Visakhapatnam	Kurool	Krishna	Nellore
Mandal		Pichatur Mandal	C. K. Dinne	Ramagiri	Parigi	Addateegala	Burja	Devarapalli	Kothapalle	Vaisavai	Dagadarthi
Village		Pichatur	Ippapenta	Peruru	Konapuram	Addateegala	Narayanapuram	Devarapalli	Kotalacheruvu	Polampalli	Dagadarthi
Location of Dam/Tank/Headworks/Lift											
N DD-MM-SS		13-25-06	14-24-01	14-20-12	13-49-29	17-29-09	18-29-07	18-00-23	15-58-00	17-00-53	14-38-26
E DD-MM-SS		79-44-44	78-50-08	77-21-15	77-27-48	82-00-43	83-48-30	82-57-56	78-38-46	80-10-04	79-54-05
DPR (D), Project Note (P) Preparation	D/P	D	P	D	D	P	P	P	P	D	D
Command Area	ha	2,226	3,926	4,066	2,479	1,214	14,995	6,111	4,894	6,648	10,117
Water Allocation	MCM	56.70	27.00	51.25	23.90	11.33	198.44	138.81	10.22	93.45	67.96
Live Storage Capacity of Dam/Tank	MCM	51.73	12.04	44.53	0.00	12.27	0.00	92.54	10.22	22.48	0.00
Original Construction Year	YYYY	1958	1985	1958	1956	1976	1962	1982	2000	1898	1961
GAP Ayacut	%	28%	89%	53%	27%	25%	14%	20%	54%	36%	88%
Water Use Efficiency	%	73%	50%	21%	60%	40%	75%	80%	50%	70%	65%
Water Cess Collection	%	40%	70%	0%	45%	45%	-	20%	-	100%	30%
Project Committee's Willingness for Project	YN	Y		Y	Y	Y	Y	Y		Y	Y
Land Acquisition	YN	N	N	N	N	N	N	N	N	N	N
Benefit/Cost Ratio	-	1.71	1.89	3.15	3.02	1.37	3.57	2.46	3.78	2.11	12.15
Project Type	-	Dam	Dam	Dam	Diversion	Dam	Diversion	Dam	Dam	Dam	Diversion (Escape Water)
Construction Cost	Rs.	367,100,000	666,800,000	316,000,000	155,300,000	167,900,000	1,138,200,000	709,400,000	317,900,000	666,400,000	428,500,000

Source: JICA Survey Team

Attachment 7.2.3 Scoring Results of Medium Irrigation Projects

Condition/Project	No.		01		02		03		04		05		06		07		08		09		10	
	Unit	Point Distribution	Peddankalam Anicut	Vizianagaram	Votligedda Reservoir	Vizianagaram	Vengalaya Sagaram	Peddagedda Reservoir	Vizianagaram	Andra Reservoir	Vizianagaram	Torrigeedda Pumping Scheme	East Godavari	West Godavari	Thammieru Reservoir Scheme	Mopadu Reservoir System	Prakasam	Prakasam	Prakasam	Prakasam	Prakasam	Prakasam
District			Vizianagaram	Vizianagaram	Vizianagaram	Vizianagaram	Vizianagaram	Vizianagaram	Vizianagaram	Vizianagaram	East Godavari	West Godavari	Prakasam	Prakasam	Prakasam	Prakasam	Prakasam	Prakasam	Prakasam	Prakasam	Prakasam	Chittoor
Project Type			Diversion	Dam	Dam	Dam	Dam	Dam	Dam	Dam	Lift	Dam	Dam	Dam	Dam	Dam	Dam	Dam	Dam	Dam	Dam	Dam
Comand Area			3,113 ha	6,746 ha	9,996 ha	4,858 ha	3,603 ha	5,998 ha	3,711 ha	5,147 ha	2,267 ha	2,479 ha										
1 Status of Project	-	10	10.0	10.0	10.0	5.0	5.0	10.0	10.0	10.0	5.0	5.0	10.0	10.0	10.0	5.0	5.0	10.0	10.0	10.0	10.0	10.0
1-1 DPR is already available.	-	(10)	Y (10.0)	Y (10.0)	Y (10.0)							Y (10.0)	Y (10.0)	Y (10.0)	Y (10.0)							Y (10.0)
1-2 Project Note is already prepared.	-	(5)						Y (5.0)	Y (5.0)											Y (5.0)		
1-3 Neither is available.	-	(0)																				
2 Water Availability	-	10	5.8	5.1	5.8	4.5	4.9	7.5	7.6	9.6	5.6	3.0										
2-1 Water allocation to the project per unit command area is high.	mm	(5)	792 (3.3)	840 (3.5)	956 (4.0)	485 (2.0)	435 (1.8)	1,223 (5.0)	923 (3.8)	1,943 (5.0)	749 (3.1)	528 (2.2)										
2-2 Live storage capacity per unit command area is high.	mm	(5)	0 (2.5)	373 (1.6)	424 (1.8)	595 (2.5)	733 (3.1)	0 (2.5)	923 (3.8)	1,100 (4.6)	749 (2.5)	196 (0.8)										
3 Irrigation Practice	-	10	4.1	4.6	3.5	2.9	3.2	6.0	6.3	7.0	4.0	6.3										
3-1 More than 20 years have passed after original construction.	-	(2)	1976 (2.0)	1976 (2.0)	1997 (1.9)	1959 (2.0)	1998 (1.8)	1964 (2.0)	1980 (2.0)	1921 (2.0)	1956 (2.0)	1979 (2.0)										
3-2 Irrigation gap in command area (Gap Ayacut) is high.	%	(4)	19% (0.8)	25% (1.0)	10% (0.4)	6% (0.2)	22% (0.9)	37% (1.5)	32% (1.3)	24% (1.0)	18% (0.7)	41% (1.6)										
3-3 Water use efficiency is low.	%	(4)	81% (1.3)	76% (1.6)	82% (1.2)	90% (0.7)	93% (0.5)	63% (2.5)	70% (2.0)	40% (4.0)	80% (1.3)	60% (2.7)										
4 Framers' Organization	-	10	5.0	5.0	5.0	5.0	5.0	8.3	7.8	9.0	5.0	6.0										
4-1 Percentage of water cess (tax) collection is high.	%	(5)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	0% (0.0)	65% (3.3)	55% (2.8)	80% (4.0)	20% (1.0)										
4-2 Willingness of Project Committee for the project implementation is confirmed.	Y/N	(5)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)
5 Others	-	10	6.2	10.0	10.0	4.0	8.6	10.0	10.0	6.3	10.0	10.0										
5-1 Land acquisition is required.	Y/N	Qualification	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK
5-2 B/C ratio is high. (Max. 3)	-	(10) Qualification	2.24 (6.2)	4.50 (10.0)	5.23 (10.0)	1.79 (4.0)	2.71 (8.6)	4.03 (10.0)	3.31 (10.0)	2.25 (6.3)	6.38 (10.0)	4.69 (10.0)										
Total Score	-	50	31.1	34.7	34.3	21.4	26.7	41.8	40.7	41.9	29.6	35.3										
Rank	-	-	14	10	11	20	17	3	4	2	15	9										

Condition/Project	No.		11		12		13		14		16		18		20		21		22		23	
	Unit	Point Distribution	Aranar Reservoir	Buggavanka	Upper Pennar	Pennar Kumudivathi	Maddigedda Reservoir	Narayanaapuram Anicut	Rahivada Reservoir	Siva Bhashyam Sagar	Muniyeru	DR & DM Channels	Chittoor	Kadapa	Ananthapuram	Ananthapuram	East Godavari	Srikakulam	Visakhapatnam	Kurnool	Krishna	Nellore
District			Chittoor	Kadapa	Ananthapuram	Ananthapuram	East Godavari	Srikakulam	Visakhapatnam	Kurnool	Krishna	Nellore	Chittoor	Kadapa	Ananthapuram	Ananthapuram	East Godavari	Srikakulam	Visakhapatnam	Kurnool	Krishna	Nellore
Project Type			Dam	Dam	Dam	Diversion	Dam	Diversion	Dam	Dam	Dam	Diversion (Escape Water)	Dam	Dam	Dam	Dam	Dam	Dam	Dam	Dam	Dam	Dam
Comand Area			2,226 ha	3,926 ha	4,066 ha	2,479 ha	1,214 ha	14,995 ha	6,111 ha	4,894 ha	6,648 ha	10,117 ha										
1 Status of Project	-	10	10.0	5.0	10.0	10.0	5.0	5.0	5.0	5.0	10.0	10.0										
1-1 DPR is already available.	-	(10)	Y (10.0)		Y (10.0)	Y (10.0)					Y (10.0)	Y (10.0)								Y (10.0)	Y (10.0)	Y (10.0)
1-2 Project Note is already prepared.	-	(5)		Y (5.0)			Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)								Y (5.0)	Y (5.0)	Y (5.0)
1-3 Neither is available.	-	(0)																				
2 Water Availability	-	10	10.0	4.2	9.6	6.5	8.1	7.5	10.0	1.8	6.4	5.3										
2-1 Water allocation to the project per unit command area is high.	mm	(5)	2,547 (5.0)	688 (2.9)	1,260 (5.0)	964 (4.0)	933 (3.9)	1,323 (5.0)	2,271 (5.0)	209 (0.9)	1,406 (5.0)	672 (2.8)										
2-2 Live storage capacity per unit command area is high.	mm	(5)	2,324 (5.0)	307 (1.3)	1,095 (4.6)	0 (2.5)	1,011 (4.2)	0 (2.5)	1,514 (5.0)	209 (0.9)	338 (1.4)	0 (2.5)										
3 Irrigation Practice	-	10	4.9	8.8	8.1	5.8	7.0	4.2	4.1	7.1	5.4	7.8										
3-1 More than 20 years have passed after original construction.	-	(2)	1958 (2.0)	1985 (2.0)	1958 (2.0)	1956 (2.0)	1976 (2.0)	1962 (2.0)	1982 (2.0)	2000 (1.6)	1898 (2.0)	1961 (2.0)										
3-2 Irrigation gap in command area (Gap Ayacut) is high.	%	(4)	28% (1.1)	89% (3.5)	53% (2.1)	27% (1.1)	25% (1.0)	14% (0.5)	20% (0.8)	54% (2.2)	36% (1.4)	88% (3.5)										
3-3 Water use efficiency is low.	%	(4)	73% (1.8)	50% (3.3)	21% (4.0)	60% (2.7)	40% (4.0)	75% (1.7)	80% (1.3)	50% (3.3)	70% (2.0)	65% (2.3)										
4 Framers' Organization	-	10	7.0	3.5	5.0	7.3	7.3	6.0	6.0	0.0	10.0	6.5										
4-1 Percentage of water cess (tax) collection is high.	%	(5)	40% (2.0)	70% (3.5)	0% (0.0)	45% (2.3)	45% (2.3)	(0.0)	20% (1.0)	(0.0)	100% (5.0)	30% (1.5)										
4-2 Willingness of Project Committee for the project implementation is confirmed.	Y/N	(5)	Y (5.0)	N (0.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	Y (5.0)	N (0.0)	Y (5.0)	Y (5.0)								Y (5.0)	Y (5.0)	Y (5.0)
5 Others	-	10	3.6	4.5	10.0	10.0	1.9	10.0	7.3	10.0	5.6	10.0										
5-1 Land acquisition is required.	Y/N	Qualification	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK	N OK
5-2 B/C ratio is high. (Max. 3)	-	(10) Qualification	1.71 (3.6)	1.89 (4.5)	3.15 (10.0)	3.02 (10.0)	1.37 (1.9)	3.57 (10.0)	2.46 (7.3)	3.78 (10.0)	2.11 (5.6)	12.15 (10.0)										
Total Score	-	50	35.5	26.0	42.7	39.6	29.3	31.7	32.4	23.9	37.4	39.6										
Rank	-	-	8	18	1	6	16	13	12	19	7	5										

Source: JICA Survey Team

Attachment 7.2.4 Medium Irrigation - Trial Ranking Summary

No.	Project	District	Original		After Screening				
			Command Area (ha)	Cost (Rs.)	Command Area (ha)	Score	Rank	Cost (Rs.)	Accumulation (Rs.)
13	Upper Pennar	Ananthapuramu	4,066	316,000,000	4,066	42.7	1	316,000,000	316,000,000
08	Mopadu Reservoir System	Prakasam	5,147	424,900,000	5,147	41.9	2	424,900,000	740,900,000
06	Torrigedda Pumping Scheme	East Godavari	5,998	311,800,000	5,998	41.8	3	311,800,000	1,052,700,000
07	Thammileru Reservoir Scheme	West Godavari	3,711	225,000,000	3,711	40.7	4	225,000,000	1,277,700,000
23	DR & DM Channels	Nellore	10,117	428,500,000	10,117	39.6	5	428,500,000	1,706,200,000
14	Pennar Kumudvathi	Ananthapuramu	2,479	155,300,000	2,479	39.6	6	155,300,000	1,861,500,000
22	Muniyeru	Krishna	6,648	666,400,000	6,648	37.4	7	666,400,000	2,527,900,000
11	Araniar Reservoir	Chittoor	2,226	367,100,000	2,226	35.5	8	367,100,000	2,895,000,000
10	Krishnapuram Reservoir	Chittoor	2,479	273,900,000	2,479	35.3	9	273,900,000	3,168,900,000
02	Vottigedda Reservoir	Vizianagaram	6,746	441,800,000	6,746	34.7	10	441,800,000	3,610,700,000
03	Vengalaraya Sagaram	Vizianagaram	9,996	500,400,000	9,996	34.3	11	500,400,000	4,111,100,000
20	Raiwada Reservoir	Visakhapatnam	6,111	709,400,000	6,111	32.4	12	709,400,000	4,820,500,000
18	Narayanapuram Anicut	Srikakulam	14,995	1,138,200,000	14,995	31.7	13	1,138,200,000	5,958,700,000
01	Peddankalam Anicut	Vizianagaram	3,113	395,300,000	3,113	31.1	14	395,300,000	6,354,000,000
09	Veeraraghavani Kota Anicut System	Prakasam	2,267	56,200,000	2,267	29.6	15	56,200,000	6,410,200,000
16	Maddigedda Reservoir	East Godavari	1,214	167,900,000	1,214	29.3	16	167,900,000	6,578,100,000
05	Andra Reservoir	Vizianagaram	3,603	344,700,000	3,603	26.7	17	344,700,000	6,922,800,000
12	Buggavanka	Kadapa	3,926	666,800,000	3,926	26.0	18	666,800,000	7,589,600,000
21	Siva Bhashyam Sagar	Kurnool	4,894	317,900,000	4,894	23.9	19	317,900,000	7,907,500,000
04	Peddagedda Reservoir	Vizianagaram	4,858	703,700,000	4,858	21.4	20	703,700,000	8,611,200,000
Total			104,594	8,611,200,000	104,594	-	-	8,611,200,000	-
Average			5,230	430,560,000	5,230	33.8	-	430,560,000	-

Source: JICA Survey Team

Attachment 7.2.5 Data for Selection of Minor Irrigation Projects (5/13)

Code	Name of the Project	District	Mandal	Village	Coordinates		System tank?	Command Area	GAP Ayacut	Storage Capacity of tank	Approximate months of Full Water Level in a Year	Water Allocation	Water Use Efficiency	Water Cess Collection	Willingness of WUA for Modernisation of Project	Land Acquisition	Estimated Cost	Parent Major/Medium Irrigation Project
					N	E												
05-01	Rachappa	West Godavari	Lingsalem	Dharmajugudem	16-53-40	80-59-20	N	32	25%	0.140	5.0	0.561	62%	0%	Y	N	2,710,000	Thammleru Reservoir
05-02	Talle	West Godavari	Lingsalem	Ayyaparigugudem	16-53-05	81-01-05	N	47	30%	1.478	5.0	4.414	63%	0%	Y	N	3,500,000	Thammleru Reservoir
05-03	Vomanakunta	West Godavari	Lingsalem	Narasannapalem	16-56-25	81-01-55	N	43	30%	1.353	5.0	4.006	65%	0%	Y	N	3,290,000	Thammleru Reservoir
05-04	Ura	West Godavari	Lingsalem	Konjerla	16-54-20	80-58-40	N	115	24%	3.190	5.0	9.571	64%	0%	Y	N	7,090,000	Thammleru Reservoir
05-05	Pedda	West Godavari	Lingsalem	T Ch.R Palam	16-55-58	80-57-58	N	202	25%	4.840	5.0	9.680	65%	0%	Y	N	11,680,000	Thammleru Reservoir
05-06	Kammaraju	West Godavari	Lingsalem	Konjerla	16-54-20	80-58-40	N	88	28%	1.748	5.0	5.243	62%	0%	Y	N	5,670,000	Thammleru Reservoir
05-07	Puta	West Godavari	Lingsalem	Chandrannapalem	16-55-10	81-01-58	N	45	33%	1.393	5.0	4.189	65%	0%	Y	N	3,400,000	Thammleru Reservoir
05-08	Bendadi	West Godavari	Chantalapudi	Sivapuram	17-06-47	80-53-15	N	79	24%	2.710	5.0	8.752	64%	0%	Y	N	5,190,000	Thammleru Reservoir
05-09	Ura	West Godavari	Chantalapudi	Ganjerla	17-06-25	80-55-45	N	67	24%	2.478	5.0	9.912	62%	0%	Y	N	4,560,000	Thammleru Reservoir
05-10	Venkatadi	West Godavari	Chantalapudi	Raghavapuram	17-06-58	80-55-05	N	189	25%	4.965	5.0	14.896	63%	0%	Y	N	11,000,000	Thammleru Reservoir
05-11	Nadikattu	West Godavari	Chantalapudi	Malayagudem	17-04-47	80-56-12	N	100	29%	4.151	5.0	24.908	65%	0%	Y	N	6,300,000	Thammleru Reservoir
05-12	Pedda	West Godavari	Chantalapudi	Pothuru	17-06-58	80-55-05	N	51	24%	4.904	5.0	14.713	61%	0%	Y	N	3,710,000	Thammleru Reservoir
05-13	Panakala	West Godavari	Chantalapudi	Kanthampalem	17-06-11	80-57-33	N	72	28%	3.868	5.0	19.340	63%	0%	Y	N	4,820,000	Thammleru Reservoir
05-14	Kopulakunta	West Godavari	Chantalapudi	Chantalapudi	17-04-42	80-58-00	N	61	28%	1.896	5.0	5.722	65%	0%	Y	N	4,240,000	Thammleru Reservoir
05-15	Eedula	West Godavari	Chantalapudi	Rechela	17-06-23	81-01-55	N	51	29%	0.668	5.0	4.825	64%	0%	Y	N	3,710,000	Thammleru Reservoir
05-16	Medavarapu	West Godavari	Chantalapudi	Settivarigudem	17-07-20	80-59-20	N	166	28%	11.195	5.0	22.391	63%	0%	Y	N	9,780,000	Thammleru Reservoir
05-17	Penumallakunta	West Godavari	Pedaveji	Muttanveedu	16-48-30	81-02-30	N	53	28%	4.740	5.0	4.999	62%	0%	Y	N	3,820,000	Thammleru Reservoir
05-18	Pedda	West Godavari	Pedaveji	Koppaka	16-43-35	81-01-10	N	426	27%	12.930	5.0	51.718	64%	0%	Y	N	23,510,000	Thammleru Reservoir
05-19	China	West Godavari	Pedaveji	Koppaka	16-43-35	81-01-10	N	64	28%	1.981	5.0	6.069	62%	0%	Y	N	4,400,000	Thammleru Reservoir
05-20	Thummalala	West Godavari	Pedaveji	Koppaka	16-43-35	81-01-10	N	37	30%	1.615	5.0	3.467	61%	0%	Y	N	2,970,000	Thammleru Reservoir

Source: JICA Survey Team

Attachment 7.2.5 Data for Selection of Minor Irrigation Projects (6/13)

Code	Name of the Project	District	Mandal	Village	Coordinates		System tank?	Command Area	GAP Ayacut	Storage Capacity of tank	Approximate months of Full Water Level in a Year	Water Allocation	Water Use Efficiency	Water Cess Collection	Willingness of WUA for Modernisation of Project	Land Acquisition	Estimated Cost	Parent Major/Medium Irrigation Project
					N	E												
06-01	Dachavaram	Krishna	Veerulapadu	Dachavaram	16-46-21	80-24-56	N	65	35%	0.300	2.0	0.500	64%	0%	Y	N	4,450,000	Isolated
06-02	Pedda	Krishna	Veerulapadu	Thimmapuram	16-45-33	80-27-56	N	203	35%	0.950	2.0	1.430	64%	0%	Y	N	11,740,000	Isolated
06-03	Pedda	Krishna	Kanchikacherla	Paribala	16-39-31	80-25-08	N	465	30%	2.160	2.0	3.250	64%	0%	Y	N	25,570,000	Isolated
06-04	Abbaraju	Krishna	Kanchikacherla	Gotumukkala	16-41-37	80-24-33	N	169	35%	0.800	2.0	1.180	64%	0%	Y	N	9,940,000	Isolated
06-05	Rammanna	Krishna	Chatri	Chittapur	16-56-13	80-52-17	N	89	33%	0.290	2.0	0.600	64%	0%	Y	N	5,720,000	Thammleru Reservoir
06-06	East(Ganapati)	Krishna	Myliwaram	Ganapavaram	16-44-56	80-42-56	N	206	33%	0.680	2.0	1.400	63%	0%	Y	N	11,900,000	Isolated
06-07	Kothuru	Krishna	Vijayawada Rural	Kothuru	16-37-25	80-37-07	N	89	30%	0.280	2.0	0.600	66%	0%	Y	N	5,720,000	Isolated
06-08	Pedda	Krishna	Jaggalahpeta	Gandri	16-58-22	80-06-42	N	60	35%	0.200	2.0	0.400	64%	0%	Y	N	4,190,000	Muniyuru Irrigation
06-09	Ginni	Krishna	Jaggalahpeta	Anumanchipalli	16-54-47	80-04-37	Y	191	38%	0.610	2.0	1.300	68%	0%	Y	N	11,100,000	Muniyuru Irrigation
06-10	Shermohammed	Krishna	Jaggalahpeta	Shermohammed	16-55-08	80-06-11	N	174	35%	0.590	2.0	1.180	64%	0%	Y	N	10,210,000	Muniyuru Irrigation
06-11	Ura	Krishna	Jaggalahpeta	Jaggalahpeta	16-53-10	80-05-45	N	123	38%	0.420	2.0	0.840	63%	0%	Y	N	7,510,000	Muniyuru Irrigation
06-12	Cintalapadu	Krishna	Chandrapadu	Cintalapadu	16-43-12	80-13-30	N	96	38%	1.370	2.0	0.650	63%	0%	Y	N	6,090,000	Muniyuru Irrigation
06-13	Bobbillapadu	Krishna	Chandrapadu	Bobbillapadu	16-42-54	80-11-45	N	317	38%	1.370	2.0	2.160	62%	0%	Y	N	17,760,000	Muniyuru Irrigation
06-14	Sri Rama	Krishna	Penuganchiprolu	Konakanchi	16-49-21	80-11-14	N	76	38%	0.520	2.0	0.520	61%	0%	Y	N	5,030,000	Muniyuru Irrigation
06-15	Rama	Krishna	Penuganchiprolu	Nawapet	16-49-24	80-13-47	N	71	38%	1.370	2.0	0.490	61%	0%	Y	N	4,770,000	Muniyuru Irrigation
06-16	Somavaram	Krishna	Nandigama	Somavaram	16-49-19	80-21-04	N	413	35%	1.400	2.0	2.800	60%	0%	Y	N	22,620,000	Muniyuru Irrigation
06-17	Kodanda Rama	Krishna	Vatsavai	Rameshndrapuram	16-57-54	80-09-55	N	81	32%	0.270	2.0	0.550	66%	0%	Y	N	5,300,000	Muniyuru Irrigation
06-18	Ura	Krishna	Vatsavai	Chilto	16-55-52	80-12-18	N	76	36%	0.420	2.0	0.510	64%	0%	Y	N	4,980,000	Muniyuru Irrigation
06-19	Ura	Krishna	Vatsavai	Kameveedu	16-58-04	80-11-19	N	77	36%	0.490	2.0	0.520	60%	0%	Y	N	5,080,000	Muniyuru Irrigation
06-20	Reddi	Krishna	Vatsavai	Potampalli	17-00-17	80-12-16	N	106	36%	0.510	2.0	0.720	60%	0%	Y	N	6,620,000	Muniyuru Irrigation

Source: JICA Survey Team

Attachment 7.2.5 Data for Selection of Minor Irrigation Projects (7/13)

Code	Name of the Project	District	Mandal	Village	Coordinates		System tank?	Command Area	GAP Ayacut	Storage Capacity of tank	Approximate months of Full Water Level in a Year	Water Allocation	Water Use Efficiency	Water Cess Collection	Willingness of WUA for Modernisation of Project	Land Acquisition	Estimated Cost	Parent Major/Medium Irrigation Project
					N	E												
07-01	Vippetta West	Guntur	Rompicherla	Vippeta Reddyapalem	16-18-00	79-56-00	N	46	30%	0.700	2.0	0.700	60%	0%	Y	N	3,450,000	Isolated
07-02	Ravulapuram	Guntur	Bollapalli	Bollapalli	16-15-55	79-34-55	N	275	29%	1.490	2.0	1.490	62%	0%	Y	N	15,540,000	Isolated
07-03	Chappidi Vagu	Guntur	Bollapalli	Bollapalli	16-11-30	79-41-29	N	405	28%	0.860	2.0	2.580	61%	0%	Y	N	22,400,000	Isolated
07-04	Macherla Big	Guntur	Macherla	Macherla	16-26-03	79-26-51	N	88	35%	2.700	2.0	0.600	64%	0%	Y	N	5,670,000	Isolated
07-05	Tondepi M.I	Guntur	Muggala	Tondepi	16-23-13	80-03-30	N	170	30%	1.340	2.0	1.340	63%	0%	Y	N	10,000,000	Isolated
07-06	Inavolu	Guntur	Nuzvid	Inavolu	15-58-23	79-40-13	N	45	27%	0.080	2.0	0.300	68%	0%	Y	N	3,400,000	Isolated
07-07	Lam Aricut	Guntur	Tadikonda	Lam	16-24-00	80-27-00	N	282	30%	0.200	3.0	1.920	61%	0%	Y	N	15,910,000	Isolated
07-08	Groyne Across Rallavagu (Ralla)	Guntur	Machavaram	Pinnelli	16-34-15	79-50-04	N	45	29%	0.080	2.0	0.310	66%	0%	Y	N	3,400,000	Isolated
07-09	Nadimalkota Aricut	Guntur	Dachepalli	Dachepalli	16-36-24	79-43-41	N	80	26%	0.110	3.0	0.400	66%	0%	Y	N	5,240,000	Isolated
07-10	Akkadivatha M.I	Guntur	Tadikonda	Tadikonda	16-24-41	80-27-02	N	406	30%	1.920	2.0	2.760	60%	0%	Y	N	22,460,000	Isolated

Source: JICA Survey Team

Attachment 7.2.5 Data for Selection of Minor Irrigation Projects (8/13)

Code	Name of the Project	District	Mandal	Village	Coordinates		System tank?	Command Area	GAP Aycut	Storage Capacity of tank	Approximate months of Full Water Level in tank in a Year	Water Allocation	Water Use Efficiency	Water Cess Collection	Willingness of WUA for Modernisation of Project	Land Acquisition	Estimated Cost	Parent Major/Medium Irrigation Project
					N	E												
08-01	C.S.Puram	Prakasam	C.S.Puram	C.S.Puram	15-08-20	79-10-50	N	384	32%	2,390	2.0	2,610	61%	0%	Y	N	21,290,000	Isolated
08-02	Chennupalli M.I	Prakasam	Balkurava	Chennupalli	16-01-29	79-59-10	N	59	47%	1,730	1.0	0,210	50%	0%	Y	N	4,120,000	Isolated
08-03	Kondana Chikar	Prakasam	Balkurava	Kondana	16-00-16	80-03-53	N	54	59%	1,670	1.0	0,280	52%	0%	Y	N	3,870,000	Isolated
08-04	Balipalli M.I	Prakasam	Aidanki	Balipalli	15-45-49	79-55-25	N	96	63%	2,120	1.0	0,490	72%	0%	Y	N	6,090,000	Isolated
08-05	Malakondapuram	Prakasam	Pimuru	Malakondapuram	15-06-03	79-34-33	N	186	35%	1,070	1.0	1,260	43%	0%	Y	N	10,840,000	Mapadu Reservoir System
08-06	Pelluru	Prakasam	Dingole	Pelluru	15-27-30	80-02-44	N	325	19%	2,220	1.0	2,210	40%	0%	Y	N	18,180,000	Isolated
08-07	Avulamandha M.I	Prakasam	Kurichedu	Avulamandha	15-57-00	79-31-15	N	81	25%	3,330	4.0	0,550	65%	0%	Y	N	5,300,000	Isolated
08-08	Boddikurupadu M.I	Prakasam	Talluru	Boddikurupadu	15-40-09	79-44-30	N	64	20%	2,630	4.0	0,440	66%	0%	Y	N	4,400,000	Isolated
08-09	Mannepal M.I	Prakasam	Talluru	Mannepal	15-44-30	79-50-30	N	350	26%	2,470	2.0	2,380	64%	0%	Y	N	19,500,000	Isolated
08-10	Guntupalli M.I	Prakasam	Balkurava	Guntupalli	15-58-06	80-00-58	N	1,652	59%	8,670	4.0	0,650	65%	0%	Y	N	88,240,000	Isolated
08-11	Nakkabokalapadu M.I	Prakasam	Balkurava	Nakkabokalapadu	16-01-00	80-01-30	N	465	59%	3,600	3.0	0,400	66%	0%	Y	N	25,570,000	Isolated
08-12	Kalavakur M.I	Prakasam	Aidanki	Kalavakur	15-52-42	79-59-43	N	235	58%	1,900	1.5	0,450	52%	0%	Y	N	13,430,000	Isolated
08-13	Gorepadi M.I	Prakasam	Balkurava	Gorepadi	15-57-10	79-55-17	N	88	60%	1,930	1.0	0,320	58%	0%	Y	N	2,570,000	Isolated
08-14	V.R.Kota Big	Prakasam	Lingasamudram	V.R.Kota	15-05-22	79-46-32	N	95	21%	1,660	1.0	0,650	64%	0%	Y	N	6,040,000	Veeraghavani Kota Anicut System
08-15	Sakavaram M.I	Prakasam	V.V.Palem	Sakavaram	15-08-19	79-48-44	N	121	33%	2,110	1.5	0,820	65%	0%	Y	N	7,410,000	Veeraghavani Kota Anicut System
08-16	Puretipalli M.I	Prakasam	Gudkur	Puretipalli	15-04-19	79-49-48	N	180	3%	3,140	1.0	1,220	63%	0%	Y	N	10,520,000	Veeraghavani Kota Anicut System
08-17	Naladipalur M.I	Prakasam	V.V.Palem	Naladipalur	15-08-21	79-49-49	N	59	24%	1,024	1.0	0,400	68%	0%	Y	N	4,130,000	Veeraghavani Kota Anicut System
08-18	Medaramillipalem M.I	Prakasam	Lingasamudram	Medaramillipalem	15-01-42	79-47-27	N	49	31%	1,250	2.0	0,330	67%	0%	Y	N	3,610,000	Veeraghavani Kota Anicut System
08-19	Z.Uppalapadu M.I	Prakasam	V.V.Palem	Z.Uppalapadu	15-09-23	79-44-59	N	49	27%	1,170	1.0	0,330	69%	0%	Y	N	3,610,000	Veeraghavani Kota Anicut System
08-20	Lingasamudram	Prakasam	Lingasamudram	Lingasamudram	15-05-15	79-42-59	N	46	26%	1,100	1.5	0,310	69%	0%	Y	N	3,450,000	Veeraghavani Kota Anicut System

Source: JICA Survey Team

Attachment 7.2.5 Data for Selection of Minor Irrigation Projects (9/13)

Code	Name of the Project	District	Mandal	Village	Coordinates		System tank?	Command Area	GAP Aycut	Storage Capacity of tank	Approximate months of Full Water Level in tank in a Year	Water Allocation	Water Use Efficiency	Water Cess Collection	Willingness of WUA for Modernisation of Project	Land Acquisition	Estimated Cost	Parent Major/Medium Irrigation Project
					N	E												
09-01	Tupali	Nellore	Vakadu	Juvvinatti	14-00-40	80-05-54	N	1,133	34%	7,700	2.0	7,930	60%	0%	Y	N	60,840,000	Isolated
09-02	Kalluru	Nellore	Vakadu	Kalluru	13-59-23	80-05-27	N	268	30%	1,590	2.0	1,820	61%	0%	Y	N	15,170,000	Isolated
09-03	Muttembaka	Nellore	Vakadu	Muttembaka	13-58-49	80-04-49	N	147	40%	0,620	2.0	1,000	64%	0%	Y	N	8,780,000	Isolated
09-04	Durgavaram	Nellore	Vakadu	Durgavaram	13-58-25	80-05-44	N	76	32%	0,320	2.0	0,520	66%	0%	Y	N	5,030,000	Isolated
09-05	Trimuru	Nellore	Vakadu	Trimuru	13-59-42	80-07-10	N	535	24%	0,940	2.0	3,640	40%	0%	Y	N	29,270,000	Isolated
09-06	Kodivaka	Nellore	Vakadu	Kodivaka	13-59-40	80-06-51	N	115	41%	0,330	2.0	0,780	65%	0%	Y	N	7,090,000	Isolated
09-07	Dugarji Patham	Nellore	Vakadu	Dugarji Patham	13-59-39	80-06-50	N	552	19%	1,430	2.0	3,750	40%	0%	Y	N	30,140,000	Isolated
09-08	Cheemalapadu	Nellore	Vakadu	Cheemalapadu	13-59-26	80-06-30	N	129	29%	0,600	2.0	0,870	64%	0%	Y	N	7,830,000	Isolated
09-09	Puchalapalli	Nellore	Kota	Puchalapalli	14-03-04	80-06-08	N	98	29%	0,350	2.0	0,670	65%	0%	Y	N	6,190,000	Isolated
09-10	Vinuvuru	Nellore	Varikuntapadu	Vinuvuru	15-04-00	79-20-49	N	85	21%	0,300	2.0	0,580	64%	0%	Y	N	5,510,000	Isolated
09-11	Guvvadi	Nellore	Varikuntapadu	Guvvadi	14-59-50	79-20-56	N	44	30%	0,220	2.0	0,300	66%	0%	Y	N	3,340,000	Isolated
09-12	Ikkapalli	Nellore	Varikuntapadu	Ikkapalli	15-00-04	79-19-11	N	45	20%	0,250	2.0	0,300	66%	0%	Y	N	3,400,000	Isolated
09-13	Dacheruru	Nellore	Venkatagiri	Dacheruru	13-56-26	79-31-46	N	189	35%	0,250	2.0	1,290	63%	0%	Y	N	11,000,000	Isolated
09-14	Perimidi Big	Nellore	Balayapalli	Perimidi	13-52-29	79-46-01	N	499	49%	1,260	2.0	3,390	60%	0%	Y	N	27,370,000	Isolated
09-15	Nidigallu	Nellore	Balayapalli	Nidigallu	13-57-26	79-38-19	N	161	35%	0,690	2.0	1,090	62%	0%	Y	N	9,520,000	Isolated
09-16	Maddali	Nellore	Kota	Maddali	14-02-27	79-57-44	N	104	4%	0,650	2.0	0,700	65%	0%	Y	N	6,510,000	Isolated
09-17	Manamala	Nellore	Ozili	Manamala	14-00-10	79-55-46	N	52	35%	0,350	2.0	0,350	66%	0%	Y	N	3,760,000	Isolated
09-18	Manubolu	Nellore	Manubolu	Manubolu	14-12-01	79-52-15	N	596	33%	1,530	2.0	4,050	60%	0%	Y	N	32,490,000	Isolated
09-19	Baddevolu	Nellore	Manubolu	Baddevolu	14-10-05	79-56-12	N	609	34%	1,480	2.0	4,140	60%	0%	Y	N	33,170,000	Isolated
09-20	Kattuvapalli	Nellore	Manubolu	Kattuvapalli	14-10-04	79-56-17	N	297	37%	0,820	2.0	2,020	61%	0%	Y	N	16,700,000	Isolated
09-21	Kolanakuduru	Nellore	Manubolu	Kolanakuduru	14-10-43	79-55-59	N	826	32%	3,120	2.0	5,610	60%	0%	Y	N	44,630,000	Isolated
09-22	Bangaramma	Nellore	Manubolu	L.N.Puram	14-12-41	79-54-32	N	515	34%	1,490	2.0	3,500	60%	0%	Y	N	28,210,000	Isolated
09-23	Udayagiri Big & Small	Nellore	Udayagiri	Udayagiri	14-53-11	79-19-04	N	120	30%	1,440	2.0	0,820	64%	0%	Y	N	7,360,000	Isolated
09-24	Trimulapuram	Nellore	Udayagiri	Trimulapuram	14-56-19	79-21-49	N	45	31%	0,520	2.0	0,300	66%	0%	Y	N	3,400,000	Isolated
09-25	Bijampalli	Nellore	Udayagiri	Bijampalli	14-51-45	79-21-49	N	182	30%	1,120	2.0	1,240	63%	0%	Y	N	10,630,000	Isolated
09-26	Appasamudram New	Nellore	Udayagiri	Appasamudram	14-54-27	79-21-20	N	121	30%	0,640	2.0	0,820	64%	0%	Y	N	7,410,000	Isolated
09-27	G.C.Palli	Nellore	Udayagiri	G.C.Palli	14-48-48	79-16-25	N	128	30%	0,750	2.0	0,870	64%	0%	Y	N	7,780,000	Isolated
09-28	Krishnapalli	Nellore	Udayagiri	Krishnapalli	14-58-54	79-15-10	N	109	30%	1,270	2.0	0,740	65%	0%	Y	N	6,770,000	Isolated
09-29	Pullish Pali	Nellore	Udayagiri	Pullish Pali	14-54-16	79-14-06	N	53	30%	0,440	2.0	0,360	65%	0%	Y	N	3,820,000	Isolated
09-30	Somiyajulu	Nellore	Udayagiri	Arlapadla	15-01-47	79-15-30	N	49	31%	0,570	2.0	0,330	66%	0%	Y	N	3,610,000	Isolated

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (1/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Construction Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		Point Distribution											
		10	3	2	5	2	4	4	5	5	10	50	
01-01	Yelibatti Groyne and Channel System	0.0	1.7	0.6	2.0	2.0	0.8	2.7	0.0	5.0	10.0	24.8	137
01-02	Sankujodu	0.0	3.0	0.6	2.0	2.0	0.8	2.7	0.0	5.0	9.2	25.3	99
01-03	Dabarsingi Reservoir	0.0	0.5	0.0	2.0	2.0	1.0	2.4	0.0	5.0	10.0	22.9	286
01-04	Meduri Krishnamma	0.0	1.7	0.6	1.0	2.0	0.6	2.3	3.5	5.0	7.3	24.0	201
01-05	Dora	0.0	1.7	0.6	1.0	2.0	0.4	2.3	3.5	5.0	4.8	21.3	356
01-06	Beruvani	0.0	1.7	0.5	1.0	2.0	0.6	2.3	3.8	5.0	5.4	22.3	315
01-07	Govinda Sagaram	0.0	1.7	0.6	1.0	2.0	0.4	2.5	3.5	5.0	8.4	25.1	110
01-08	Siddi	0.0	1.7	0.6	2.0	2.0	0.4	2.5	3.5	5.0	7.4	25.1	110
01-09	Rangasagaram	0.0	1.7	0.6	2.0	2.0	0.2	2.7	3.5	5.0	7.8	25.5	86
01-10	Pedda	0.0	3.0	0.6	1.0	2.0	0.9	2.7	0.0	5.0	6.6	21.8	339
01-11	Pedda	0.0	1.7	0.6	1.0	2.0	0.3	2.3	3.5	5.0	5.6	22.0	325
01-12	Pedda	0.0	1.7	0.5	1.0	2.0	0.5	2.3	3.0	5.0	5.8	21.8	334
01-13	Pedda	0.0	1.7	0.6	1.0	2.0	0.4	2.3	3.5	5.0	6.2	22.7	297
01-14	Patnaikuni	0.0	1.7	0.6	1.0	2.0	0.3	2.4	3.5	5.0	6.2	22.7	297
01-15	Padmanabhasagaram	0.0	1.7	0.6	3.0	2.0	0.3	2.4	3.0	5.0	6.7	24.7	144
01-16	Bannugai	0.0	1.7	0.6	1.0	2.0	0.2	2.3	3.0	5.0	4.8	20.6	397
01-17	Siddisagaram	0.0	1.7	0.6	1.0	2.0	0.3	2.3	3.5	5.0	5.8	22.2	318
01-18	Kondeti	0.0	1.7	0.6	1.0	2.0	0.7	2.4	3.5	5.0	5.6	22.5	303
01-19	Kolha	0.0	1.7	0.6	1.0	2.0	1.4	2.4	0.0	5.0	8.8	22.9	286
01-20	Pedda	0.0	1.7	0.4	2.0	2.0	1.5	2.5	0.0	5.0	10.0	25.1	110
01-21	Neradi Banda -Voora Banda	0.0	1.7	0.4	1.0	2.0	2.4	2.3	0.0	5.0	10.0	24.8	137
01-22	Pedda	0.0	1.7	0.1	1.0	2.0	2.5	2.4	0.0	5.0	10.0	24.7	144
01-23	Peddi Naidu	0.0	1.7	0.6	3.0	2.0	0.6	2.4	0.0	5.0	8.3	23.6	235
01-24	Pedda	0.0	1.7	0.6	2.0	2.0	0.6	2.5	0.0	5.0	6.7	21.1	370
01-25	Chintalagating	0.0	1.7	0.6	1.0	2.0	0.6	2.4	0.0	5.0	6.6	19.9	422
01-26	Siddaptruni	0.0	1.7	0.6	1.0	2.0	0.5	2.3	0.0	5.0	5.8	18.9	438
01-27	Sekharapatraikuni	0.0	1.7	0.4	2.0	2.0	0.5	2.4	0.0	5.0	7.5	21.5	343
01-28	Pedda	0.0	1.7	0.6	2.0	2.0	0.6	2.5	0.0	5.0	7.6	22.0	325
01-29	Voora	0.0	1.7	0.5	3.0	2.0	0.7	2.5	0.0	5.0	7.4	22.8	291
01-30	Yellappa	0.0	1.7	0.6	1.0	2.0	0.5	2.4	0.0	5.0	5.0	18.2	447
01-31	Potnuru	10.0	1.7	0.6	1.0	2.0	0.6	2.3	0.0	5.0	6.6	29.8	23
01-32	Neelapuvani	0.0	1.7	0.6	1.0	2.0	0.8	2.5	0.0	5.0	8.6	22.2	318
01-33	Pydayyavalasa Anicut Across Pedd	0.0	1.7	0.6	1.0	2.0	0.0	2.6	0.0	5.0	6.4	19.3	428
01-34	Gorievani	0.0	1.7	0.6	2.0	2.0	0.8	2.5	0.0	5.0	7.3	21.9	332
01-35	Vempalavani	0.0	1.7	0.6	2.0	2.0	0.8	2.3	0.0	5.0	7.8	22.2	318
01-36	Arthamuru Anicut Across Kondavag	0.0	1.7	0.6	3.0	2.0	0.8	2.5	0.0	5.0	10.0	25.6	76
01-37	Vijayaramasagaram	0.0	1.7	0.6	2.0	2.0	0.7	2.6	0.0	5.0	8.2	22.8	295
01-38	Ramasagaram	0.0	1.7	0.6	3.0	2.0	1.1	2.5	0.0	5.0	9.8	25.7	70
01-39	Lankala	0.0	1.7	0.6	3.0	2.0	0.8	2.3	0.0	5.0	8.4	23.8	230
01-40	Singasagaram	0.0	1.7	0.6	3.0	2.0	1.0	2.5	0.0	5.0	10.0	25.8	67
01-41	Salivani	0.0	1.5	0.6	3.0	2.0	0.7	2.6	0.0	5.0	8.2	23.6	235
01-42	Pedda	0.0	1.7	0.6	3.0	2.0	1.1	2.4	0.0	5.0	8.7	24.5	162
01-43	Pedda	0.0	1.7	0.6	3.0	2.0	0.7	2.5	0.0	5.0	6.9	22.4	309
01-44	Nalla System	0.0	1.7	0.3	2.0	2.0	0.6	2.6	4.5	5.0	7.6	26.3	61
01-45	Pasi System	0.0	1.7	0.7	2.0	2.0	0.7	2.5	4.5	5.0	6.6	25.7	70
01-46	Pedda	0.0	1.7	0.7	2.0	2.0	0.6	2.3	4.5	5.0	6.2	25.0	116
01-47	Yerra	0.0	1.7	0.7	2.0	2.0	0.7	2.4	4.5	5.0	6.3	25.3	99
01-48	Pedda	0.0	1.7	0.8	2.0	2.0	0.7	2.5	4.5	5.0	6.3	25.5	86
01-49	Krishnasagaram	0.0	1.7	0.7	2.0	2.0	0.6	2.4	4.5	5.0	6.4	25.3	104
01-50	Voora	0.0	1.7	0.2	1.0	2.0	0.6	2.5	4.5	5.0	6.6	24.1	198
01-51	Pedda System	0.0	1.7	0.6	2.0	2.0	0.6	2.3	4.5	5.0	6.9	25.6	76
01-52	Pedda	0.0	1.7	0.7	2.0	2.0	0.7	2.4	4.5	5.0	6.3	25.3	99
01-53	Jaggulavani	0.0	1.7	0.7	2.0	2.0	0.6	2.5	4.5	5.0	6.6	25.6	76
01-54	Asariasagaram	0.0	1.7	0.6	2.0	2.0	0.3	2.7	3.8	5.0	8.1	26.2	62
01-55	Gudivada	0.0	1.7	0.6	1.0	0.9	1.6	2.6	0.0	5.0	10.0	23.4	255
01-56	Veerasagaram	0.0	1.7	0.6	1.0	0.4	1.5	2.3	0.0	5.0	8.4	20.9	378
01-57	Pedda	0.0	1.7	0.6	2.0	0.9	2.0	2.4	0.0	5.0	10.0	24.6	152
01-58	Pothunaidu	0.0	1.7	0.7	2.0	0.9	0.9	2.3	4.5	5.0	7.6	25.6	76
01-59	Pedda	0.0	1.7	0.7	1.0	0.9	0.8	2.5	4.5	5.0	9.7	26.8	54
01-60	Pedda	0.0	1.7	0.7	2.0	0.9	1.0	2.5	4.5	5.0	7.3	25.6	76
01-61	Pedda	0.0	1.7	0.7	2.0	0.9	0.8	2.7	4.5	5.0	7.2	25.5	86
01-62	Ramasagaram	0.0	1.8	0.7	1.0	0.9	1.0	2.4	4.5	5.0	6.7	24.0	201
01-63	Jogamayya	0.0	1.7	0.6	1.0	0.4	0.7	2.5	0.0	5.0	6.5	18.4	445
01-64	Pedda	0.0	1.7	0.6	2.0	0.7	1.0	2.3	0.0	5.0	7.8	21.1	363
01-65	Pedda	0.0	1.7	0.6	1.0	0.5	1.0	2.4	0.0	5.0	7.3	19.5	425
01-66	Voora	0.0	1.7	0.6	1.0	0.6	1.1	2.5	0.0	5.0	7.6	20.1	415
01-67	Vorra	0.0	1.7	0.6	1.0	0.3	1.0	2.4	0.0	5.0	6.9	18.9	438
01-68	Vorra	0.0	1.7	0.6	1.0	0.6	1.0	2.4	0.0	5.0	7.4	19.7	423
01-69	Vorra	0.0	1.7	0.6	1.0	0.8	1.0	2.5	0.0	5.0	7.7	20.3	410
01-70	Peddagundam	0.0	1.7	0.6	1.0	0.7	1.0	2.3	0.0	5.0	7.7	20.0	419
01-71	Nalla	0.0	1.7	0.6	1.0	0.4	1.0	2.4	0.0	5.0	6.9	19.0	435
01-72	Pedda	0.0	1.7	0.6	1.0	0.4	1.0	2.5	0.0	5.0	6.9	19.1	432
01-73	Edula	0.0	1.7	0.6	1.0	0.9	0.8	2.4	0.0	5.0	6.3	18.7	441
01-74	Pedda	10.0	1.7	0.6	3.0	0.5	0.5	2.4	0.0	5.0	6.9	30.6	22
01-75	Pedda	0.0	1.7	0.6	3.0	0.7	0.8	2.5	0.0	5.0	9.7	24.0	201
01-76	Sylada	0.0	1.7	0.6	2.0	0.9	0.6	2.3	0.0	5.0	7.5	20.6	397
01-77	Tamara	0.0	1.7	0.6	3.0	1.0	0.9	2.3	0.0	5.0	9.0	23.5	246
01-78	Kanapala	0.0	1.7	0.6	3.0	0.9	0.6	2.3	0.0	5.0	6.8	20.9	378
01-79	Laxminaidu	0.0	1.7	0.6	3.0	0.8	0.5	2.4	0.0	5.0	6.1	20.1	415
01-80	Pedda	0.0	1.7	0.6	3.0	0.9	0.5	2.3	0.0	5.0	6.9	20.9	378

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (2/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Construction Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		Point Distribution											
		10	3	2	5	2	4	4	5	5	10		
02-01	Gopinadhapatnaikuni	0.0	1.7	0.6	3.0	0.9	1.1	0.9	0.0	5.0	10.0	23.2	271
02-02	Voorra	0.0	1.7	0.6	3.0	0.9	1.2	1.1	0.0	5.0	7.4	20.9	378
02-03	Kolha	0.0	1.7	0.6	3.0	0.9	1.2	0.9	0.0	5.0	10.0	23.3	262
02-04	Golusulametta	0.0	1.7	0.4	3.0	0.9	1.2	0.9	0.0	5.0	10.0	23.1	279
02-05	Yellamma	0.0	1.7	0.6	3.0	0.9	1.2	0.8	0.0	5.0	8.2	21.4	355
02-06	Pandregula Cheruvu	0.0	1.7	0.6	3.0	0.9	1.2	0.9	0.0	5.0	9.6	22.9	286
02-07	Sangamnaidu	0.0	1.7	0.6	3.0	0.9	1.0	1.0	0.0	5.0	8.6	21.8	339
02-08	Voorra	0.0	1.7	0.7	3.0	0.9	1.0	0.8	0.0	5.0	7.6	20.7	394
02-09	Jaggunaidu	0.0	1.7	0.6	3.0	0.9	1.1	0.9	0.0	5.0	7.6	20.8	389
02-10	MI Varahalugedda	0.0	1.7	0.6	3.0	0.9	1.0	0.9	0.0	5.0	10.0	23.1	279
02-11	Tammayya	0.0	1.7	0.6	3.0	0.9	1.0	0.7	0.0	5.0	10.0	22.9	286
02-12	Buradalapati	10.0	1.7	0.6	3.0	0.9	1.1	1.3	0.0	5.0	8.6	32.2	17
02-13	Laxmu Naidu	0.0	1.7	0.6	3.0	0.9	1.7	0.9	0.0	5.0	10.0	23.8	220
02-14	Guruvinaidu	0.0	1.7	0.6	3.0	0.9	1.2	0.8	0.0	5.0	10.0	23.2	271
02-15	Tamara	0.0	1.7	0.6	3.0	0.9	0.8	0.7	0.0	5.0	6.2	18.9	438
02-16	Jagannadhapatnaikuni	0.0	1.7	0.6	3.0	0.9	0.9	0.9	0.0	5.0	6.6	19.6	424
02-17	Konkamayya	0.0	1.7	0.6	3.0	0.9	1.0	1.0	0.0	5.0	10.0	23.2	276
02-18	Tamara	0.0	1.7	0.6	3.0	0.9	0.4	0.9	0.0	5.0	6.0	18.5	443
02-19	Jangamnaidu	0.0	1.7	0.6	3.0	0.9	0.6	0.8	0.0	5.0	5.8	18.4	445
02-20	Raju	10.0	1.7	0.6	3.0	0.9	0.6	0.8	0.0	5.0	6.4	29.0	33
02-21	Tamminaidu	0.0	1.7	0.6	3.0	0.9	0.5	0.9	0.0	5.0	5.8	18.4	444
02-22	Surappa	0.0	1.7	0.6	3.0	0.9	0.5	0.8	0.0	5.0	5.6	18.1	448
02-23	Anasuyavathi	0.0	1.7	0.6	3.0	0.9	0.6	1.0	0.0	5.0	8.7	21.5	343
02-24	Chintala	0.0	1.7	0.6	3.0	0.9	0.6	0.7	0.0	5.0	7.8	20.3	410
02-25	Raju	0.0	1.7	0.7	3.0	0.9	0.7	1.2	0.0	5.0	6.0	19.2	431
02-26	Tamara	0.0	1.7	0.7	3.0	0.9	0.6	1.0	0.0	5.0	6.4	19.3	428
02-27	Lakshmanarao	0.0	1.7	0.7	3.0	0.9	0.8	1.4	0.0	5.0	6.6	20.1	415
02-28	Seethamma	0.0	1.7	0.7	3.0	0.9	0.7	0.9	0.0	5.0	9.4	22.3	311
02-29	Kalam Raju	0.0	1.7	0.7	3.0	0.9	1.0	1.7	0.0	5.0	6.7	20.7	396
02-30	Chintala	0.0	1.7	0.7	3.0	0.9	0.7	1.2	0.0	5.0	8.3	21.5	343
02-31	Muthyalamma	0.0	1.7	0.8	3.0	0.9	0.8	1.7	0.0	5.0	6.3	20.2	414
02-32	Pinna	0.0	1.7	1.1	3.0	0.9	1.3	1.4	0.0	5.0	8.4	22.8	291
02-33	Raju	0.0	1.7	0.7	3.0	0.9	1.2	1.3	0.0	5.0	7.7	21.5	343
02-34	Pedda	0.0	1.7	0.7	3.0	0.9	0.9	1.2	0.0	5.0	6.6	20.0	419
02-35	Komatigedda System	0.0	1.7	0.3	3.0	0.9	1.4	1.7	0.0	5.0	10.0	24.0	201
02-36	Pedda	0.0	1.7	0.3	3.0	0.9	0.9	1.3	0.0	5.0	7.4	20.5	399
02-37	Palagedda Reservoir	0.0	1.7	0.3	3.0	0.9	1.4	2.0	0.0	5.0	10.0	24.3	175
02-38	Voorra	0.0	1.7	0.6	3.0	0.9	0.8	1.4	0.0	5.0	7.0	20.4	408
02-39	Pedda	0.0	1.7	0.6	3.0	0.9	1.0	1.7	0.0	5.0	7.3	21.2	361
02-40	Pedda	0.0	1.7	0.6	3.0	0.9	0.5	0.8	0.0	5.0	8.4	20.9	378
02-41	Narasaraju	0.0	1.7	0.5	3.0	0.9	1.0	1.0	0.0	5.0	9.3	22.4	307
02-42	Gopalaraju	0.0	1.7	0.7	3.0	0.9	2.8	1.0	0.0	5.0	10.0	25.1	110
02-43	Sonappa	0.0	1.7	0.7	3.0	0.9	1.0	1.0	0.0	5.0	9.3	22.6	300
02-44	Ayyappa	0.0	1.7	0.7	3.0	0.9	0.8	1.0	0.0	5.0	7.8	20.9	373
02-45	Pedda	0.0	1.7	0.9	3.0	0.9	1.2	1.0	0.0	5.0	10.0	23.7	232
02-46	Raju	0.0	1.7	0.1	3.0	0.9	0.8	1.3	0.0	5.0	6.3	19.1	432
02-47	Ramannapatnaikuni	0.0	1.7	0.1	3.0	0.9	0.9	0.7	0.0	5.0	6.7	19.0	435
02-48	Ramasagaram	0.0	1.7	0.1	3.0	0.9	0.8	1.0	0.0	5.0	9.0	21.5	343
02-49	Dasarpapa	0.0	1.7	0.1	3.0	0.9	0.8	1.0	0.0	5.0	7.0	19.5	425
02-50	Voorra	0.0	1.7	0.2	3.0	0.9	0.8	1.7	0.0	5.0	6.1	19.4	427
02-51	Summantha-Sagaram	0.0	1.7	0.2	3.0	0.9	1.8	1.7	0.0	5.0	10.0	24.3	175
02-52	Barlavani	0.0	1.7	0.1	3.0	0.9	0.8	1.3	0.0	5.0	6.3	19.1	432
02-53	Amindari	0.0	1.7	0.2	3.0	0.9	0.4	0.7	0.0	5.0	4.6	16.5	449
02-54	Tamara	0.0	1.7	0.1	3.0	0.9	0.8	1.7	0.0	5.0	6.9	20.1	415
02-55	Katri	0.0	1.7	0.1	3.0	0.9	1.0	1.7	0.0	5.0	7.5	20.9	378
02-56	Raju	0.0	1.7	0.1	3.0	0.9	0.8	2.0	0.0	5.0	8.6	22.1	321
02-57	Kshatriya	0.0	1.7	0.2	3.0	0.9	0.8	2.0	0.0	5.0	7.4	21.0	371
02-58	Akamma	0.0	1.7	0.1	3.0	0.9	0.8	1.3	0.0	5.0	6.2	19.0	435
02-59	Venkatarayudu	0.0	1.7	0.1	3.0	0.9	0.6	1.0	0.0	5.0	7.9	20.2	413
02-60	Raju	0.0	1.7	0.1	3.0	0.9	0.6	1.0	0.0	5.0	6.3	18.6	442
02-61	Vijayaramsagaram	0.0	1.7	0.1	3.0	0.9	0.6	1.0	0.0	5.0	7.7	20.0	419
02-62	Padhmanabha Raju	0.0	1.7	0.0	3.0	0.9	0.6	1.0	0.0	5.0	9.7	21.9	332
02-63	Kanumula	0.0	1.7	0.1	3.0	0.9	0.8	1.3	0.0	5.0	8.1	20.9	378

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (3/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Construction Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		10	3	2	5	2	4	4	5	5	10		
03-01	Matalavani	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.2	23.4	255
03-02	Raju	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	7.9	23.0	282
03-03	Reddivani - Peddivani	10.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	6.4	31.5	19
03-04	Nagarayudu	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.1	23.3	262
03-05	Venkayya	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.1	23.3	262
03-06	Krishna Sagaram	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	8.1	23.2	271
03-07	Nagarayudu	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.1	23.3	262
03-08	Anna Sagaram	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	7.8	22.9	285
03-09	Ravibanda	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	6.7	21.8	334
03-10	Naidu	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	6.0	21.2	360
03-11	Patruni	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	5.6	20.8	389
03-12	Lagudu	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.7	20.8	389
03-13	Korupoluvani	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	5.9	21.1	363
03-14	Gompavani	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	5.9	21.1	363
03-15	Tunga	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.7	20.8	389
03-16	Sarvakala	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.7	20.8	389
03-17	Saryasinaidu	0.0	2.1	0.7	3.0	0.9	0.8	2.7	0.0	5.0	6.3	21.5	343
03-18	Bandaru	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	5.7	20.9	373
03-19	Gurupeddivani	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.4	20.5	399
03-20	Seethamma	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.1	23.3	262
03-21	Pydamma	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	8.2	23.3	262
03-22	Bandaru	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.4	20.5	399
03-23	Kotha	0.0	1.5	0.5	3.0	0.9	1.7	2.7	0.0	5.0	9.6	24.9	127
03-24	Gowramma	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.4	20.5	399
03-25	Valama	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.4	20.5	399
03-26	Jureddyvani	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	6.8	22.0	325
03-27	Pedda	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	6.8	22.0	325
03-28	Yerrammadeviseri	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	6.4	21.5	343
03-29	Lova	10.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	6.4	31.5	19
03-30	Kanumula	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.2	23.4	255
03-31	Chavada	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.1	23.3	262
03-32	Pedda	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	6.8	22.0	325
03-33	Lekkalavani	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	5.7	20.9	373
03-34	Revidi	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.4	20.5	399
03-35	Seetharama Sagaram	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.4	20.5	399
03-36	Konda	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	5.7	20.9	373
03-37	Padala	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.1	23.3	262
03-38	Pedda	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.4	20.5	399
03-39	Pillakandivani	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.4	23.6	235
03-40	Yenugubilli	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.4	23.6	235
03-41	Pedda	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	6.6	21.7	341
03-42	Pedda	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.6	20.7	394
03-43	Raju	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	5.7	20.9	373
03-44	Ramudu Cheruvu	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	5.4	20.5	399
03-45	Simhadri	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	7.6	22.8	291
03-46	Anandasagaram	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.4	23.6	235
03-47	Somaraju	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	7.1	22.2	316
03-48	Swami Naidu	0.0	2.2	0.7	3.0	0.9	0.6	2.7	0.0	5.0	7.9	23.0	282
03-49	Somayajula	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	8.1	23.3	262
03-50	Pedda	0.0	2.2	0.7	3.0	0.9	0.7	2.7	0.0	5.0	7.0	22.2	316

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (4/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Constructio n Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		Point Distribution											
10	3	2	5	2	4	4	5	5	10	50			
04-01	Karibandavari	0.0	1.7	1.4	2.0	0.9	1.2	2.3	0.0	5.0	9.1	23.6	235
04-02	Nalla	10.0	1.7	0.5	2.0	0.9	1.2	2.3	0.0	5.0	10.0	33.6	15
04-03	Kurmana	0.0	1.7	0.4	1.5	0.9	1.4	2.5	0.0	5.0	10.0	23.4	255
04-04	Nagabutchanna	0.0	1.7	0.2	1.5	0.9	1.4	2.2	0.0	5.0	8.6	21.5	343
04-05	Raju	0.0	1.7	0.4	1.0	0.9	1.4	2.7	0.0	5.0	10.0	23.1	279
04-06	Krishamachari	0.0	1.7	0.1	1.0	0.9	1.4	2.5	0.0	5.0	10.0	22.6	300
04-07	Chinna Pedda	0.0	1.7	0.2	1.0	0.9	1.4	2.5	0.0	5.0	10.0	22.7	297
04-08	Tammudu	10.0	1.7	0.4	1.0	0.9	1.4	2.4	0.0	5.0	10.0	32.8	16
04-09	Patruni	0.0	1.7	0.4	2.0	0.9	1.4	2.5	0.0	5.0	10.0	23.9	214
04-10	Jaggappa	0.0	0.8	2.0	2.0	0.9	1.8	2.4	0.0	5.0	10.0	24.9	127
04-11	Balaramayya	0.0	0.8	2.0	2.0	0.9	2.3	2.3	0.0	5.0	10.0	25.3	99
04-12	Kurmana	0.0	0.7	2.0	1.5	0.9	1.4	2.3	0.0	5.0	10.0	23.8	220
04-13	Narayarakanna	0.0	0.4	2.0	1.5	0.9	1.5	2.2	0.0	5.0	10.0	23.5	246
04-14	A.V.	0.0	0.4	2.0	2.0	0.9	0.8	2.3	0.0	5.0	10.0	23.4	255
04-15	Vissanna	0.0	0.7	2.0	2.0	0.9	0.7	2.3	0.0	5.0	9.6	23.2	271
04-16	Ura	0.0	1.2	2.0	2.0	0.9	1.0	2.4	0.0	5.0	10.0	24.5	162
04-17	Mallapadu Reservoir	0.0	1.4	0.7	1.5	0.9	1.0	2.4	0.0	5.0	9.8	22.7	296
04-18	Musurumanu	0.0	1.6	0.5	1.5	0.9	1.1	2.3	0.0	5.0	9.6	22.5	303
04-19	Dora	0.0	3.0	0.6	1.5	0.9	0.9	2.5	0.0	5.0	8.8	23.2	271
04-20	Dotulavari Calva	0.0	3.0	0.6	1.0	0.9	0.9	2.5	0.0	5.0	7.9	21.8	334
04-21	Ura	0.0	3.0	0.6	1.0	0.9	0.7	2.5	0.0	5.0	7.3	21.0	371
04-22	Khambavari	0.0	3.0	1.2	1.0	0.9	1.1	2.7	0.0	5.0	9.3	24.2	186
04-23	Ura	0.0	3.0	0.5	2.0	0.9	1.0	2.7	0.0	5.0	9.2	24.3	175
04-24	Goragommi	0.0	3.0	0.6	2.0	0.9	1.2	2.5	0.0	5.0	9.4	24.6	152
04-25	Pidathamamidi Reservoir	0.0	2.2	1.1	1.5	0.9	1.2	2.4	0.0	5.0	9.4	23.7	231

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (5/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Constructio n Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		Point Distribution											
10	3	2	5	2	4	4	5	5	10	50			
05-01	Rachappa	0.0	3.0	0.7	5.0	0.9	1.0	2.5	0.0	5.0	6.4	Failed	450
05-02	Talla	0.0	3.0	2.0	5.0	0.9	1.2	2.5	0.0	5.0	8.7	28.3	44
05-03	Vemanakunta	0.0	3.0	2.0	5.0	0.9	1.2	2.3	0.0	5.0	8.1	27.5	52
05-04	Ura	0.0	3.0	2.0	5.0	0.9	1.0	2.4	0.0	5.0	10.0	29.3	29
05-05	Pedda	0.0	3.0	2.0	5.0	0.9	1.0	2.3	0.0	5.0	10.0	29.2	30
05-06	Kamaraju	0.0	3.0	2.0	5.0	0.9	1.1	2.5	0.0	5.0	10.0	29.5	24
05-07	Pula	0.0	3.0	2.0	5.0	0.9	1.3	2.3	0.0	5.0	8.8	28.3	44
05-08	Bendadi	0.0	3.0	2.0	5.0	0.9	1.0	2.4	0.0	5.0	9.6	28.9	35
05-09	Ura	10.0	3.0	2.0	5.0	0.9	1.0	2.5	0.0	5.0	8.9	38.3	4
05-10	Venkatadri	0.0	3.0	2.0	5.0	0.9	1.0	2.5	0.0	5.0	10.0	29.4	26
05-11	Nadikattu	0.0	3.0	2.0	5.0	0.9	1.2	2.3	0.0	5.0	10.0	29.4	26
05-12	Pedda	0.0	3.0	2.0	5.0	0.9	0.9	2.6	0.0	5.0	8.2	27.6	51
05-13	Panakala	0.0	3.0	2.0	5.0	0.9	1.1	2.5	0.0	5.0	9.6	29.1	32
05-14	Kopulakunta	0.0	3.0	2.0	5.0	0.9	1.1	2.3	0.0	5.0	9.4	28.7	39
05-15	Edula	0.0	3.0	2.0	5.0	0.9	1.2	2.4	0.0	5.0	9.0	28.5	40
05-16	Medavarapu	0.0	3.0	2.0	5.0	0.9	1.1	2.5	0.0	5.0	10.0	29.5	24
05-17	Perumallakunta	0.0	3.0	2.0	5.0	0.9	1.1	2.5	0.0	5.0	9.0	28.5	40
05-18	Pedda	0.0	3.0	2.0	5.0	0.9	1.1	2.4	0.0	5.0	10.0	29.4	26
05-19	Chinna	10.0	3.0	2.0	5.0	0.9	1.1	2.5	0.0	5.0	9.3	38.8	1
05-20	Thummala	0.0	3.0	2.0	5.0	0.9	1.2	2.6	0.0	5.0	7.5	Failed	450

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (6/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Constructio n Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		10	3	2	5	2	4	4	5	5	10		
06-01	Dachavaram	0.0	1.9	0.8	2.0	0.9	1.4	2.4	0.0	5.0	10.0	24.4	169
06-02	Pedda	0.0	1.8	0.8	2.0	0.9	1.4	2.4	0.0	5.0	10.0	24.3	175
06-03	Pedda	0.0	1.7	0.8	2.0	0.9	1.2	2.4	0.0	5.0	10.0	24.0	201
06-04	Abbaraju	0.0	1.7	0.8	2.0	0.9	1.4	2.4	0.0	5.0	10.0	24.2	186
06-05	Rammana	0.0	1.7	0.5	2.0	0.9	1.3	2.4	0.0	5.0	10.0	23.8	220
06-06	East(Ganapati)	0.0	1.7	0.6	2.0	0.9	1.3	2.5	0.0	5.0	10.0	24.0	201
06-07	Kolhuru	0.0	1.7	0.5	2.0	0.9	1.2	2.3	0.0	5.0	10.0	23.6	235
06-08	Pedda	10.0	1.7	0.6	2.0	0.9	1.4	2.4	0.0	5.0	10.0	34.0	13
06-09	Ginni	0.0	1.7	0.5	2.0	0.9	1.5	2.1	0.0	5.0	10.0	Failed	450
06-10	Shermohammaed	0.0	1.7	0.6	2.0	0.9	1.4	2.4	0.0	5.0	10.0	24.0	201
06-11	Ura	0.0	1.7	0.6	2.0	0.9	1.5	2.5	0.0	5.0	10.0	24.2	192
06-12	Cintalapadu	0.0	1.7	2.0	2.0	0.9	1.5	2.5	0.0	5.0	10.0	25.6	76
06-13	Bobbillapadu	0.0	1.7	0.7	2.0	0.9	1.5	2.5	0.0	5.0	10.0	24.3	175
06-14	Sri Rama	0.0	1.7	1.1	2.0	0.9	1.5	2.6	0.0	5.0	10.0	24.8	137
06-15	Rama	10.0	1.7	2.0	2.0	0.9	1.5	2.6	0.0	5.0	10.0	35.7	6
06-16	Somavaram	0.0	1.7	0.6	2.0	0.9	1.4	2.7	0.0	5.0	10.0	24.3	175
06-17	Kodanda Rama	0.0	1.7	0.6	2.0	0.9	1.3	2.3	0.0	5.0	10.0	23.8	220
06-18	Ura	0.0	1.7	0.9	2.0	0.9	1.4	2.4	0.0	5.0	10.0	24.3	175
06-19	Ura	0.0	1.7	1.1	2.0	0.9	1.5	2.7	0.0	5.0	10.0	24.9	127
06-20	Reddi	0.0	1.7	0.8	2.0	0.9	1.4	2.7	0.0	5.0	10.0	24.5	162

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (7/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Constructio n Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		10	3	2	5	2	4	4	5	5	10		
07-01	Vipperla West	10.0	3.0	2.0	2.0	0.9	1.2	2.7	0.0	5.0	8.5	35.3	8
07-02	Ravulapuram	0.0	1.4	0.9	2.0	0.9	1.2	2.5	0.0	5.0	10.0	23.9	214
07-03	Chappidi Vagu	0.0	1.6	0.4	2.0	0.9	1.1	2.6	0.0	5.0	10.0	23.6	235
07-04	Macherla Big	0.0	1.7	2.0	2.0	0.9	1.4	2.4	0.0	5.0	10.0	25.4	93
07-05	Tondepi M.I	0.0	2.0	1.3	2.0	0.9	1.2	2.5	0.0	5.0	10.0	24.9	127
07-06	Inavolu	10.0	1.7	0.3	2.0	0.9	1.1	2.1	0.0	5.0	8.0	31.1	21
07-07	Lam Anicut	0.0	1.7	0.1	3.0	0.9	1.2	2.6	0.0	5.0	10.0	24.5	162
07-08	Groyne Across Rallavagu (Rallavagu)	0.0	1.7	0.3	2.0	0.9	1.2	2.3	0.0	5.0	8.4	21.8	334
07-09	Nadimikatwa Anicut	0.0	1.3	0.2	3.0	0.9	1.1	2.3	0.0	5.0	10.0	23.8	220
07-10	Akkadevatha M.I.	0.0	1.7	0.8	2.0	0.9	1.2	2.7	0.0	5.0	10.0	24.3	175

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (8/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Constructio n Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		Point Distribution											
10	3	2	5	2	4	5	5	10	50				
08-01	C.S.Puram	0.0	1.7	1.0	2.0	0.9	1.3	2.6	0.0	5.0	10.0	24.5	162
08-02	Chennupalli M.I	0.0	1.3	2.0	1.0	0.9	1.9	3.3	0.0	5.0	10.0	25.4	93
08-03	Konidena Cirkar	0.0	1.3	2.0	1.0	0.9	2.4	3.2	0.0	5.0	10.0	25.8	67
08-04	Rallapalli M.I	0.0	1.3	2.0	1.0	0.9	2.5	1.9	0.0	5.0	10.0	24.6	152
08-05	Malakondapuram	0.0	1.7	1.0	1.0	0.9	1.4	2.5	0.0	5.0	10.0	23.5	246
08-06	Pelluru	0.0	1.7	1.1	1.0	0.9	0.8	2.7	0.0	5.0	10.0	23.2	276
08-07	Avulamandha M.I	0.0	1.7	2.0	4.0	0.9	1.0	2.3	0.0	5.0	9.6	26.5	57
08-08	Boddikurapadu M.I	0.0	1.7	2.0	4.0	0.9	0.8	2.3	0.0	5.0	8.2	24.9	127
08-09	Mannepalli M.I	0.0	1.7	1.2	2.0	0.9	1.0	2.4	0.0	5.0	10.0	24.2	186
08-10	Guntupalli M.I	0.0	0.1	0.9	4.0	0.9	2.4	2.3	0.0	5.0	10.0	25.6	76
08-11	Nakkabokalapadu M.I	0.0	0.2	1.3	3.0	0.9	2.4	2.3	0.0	5.0	10.0	25.1	110
08-12	Kalavakur M.I	0.0	0.5	2.0	1.5	0.9	2.3	3.2	0.0	5.0	10.0	25.4	93
08-13	Gorrepadu M.I	0.0	0.9	2.0	1.0	0.9	2.4	2.8	0.0	5.0	10.0	25.0	116
08-14	V.R.Kota Big	0.0	1.7	2.0	1.0	0.9	0.8	2.4	0.0	5.0	9.6	23.4	255
08-15	Sakavaram M.I	0.0	1.7	2.0	1.5	0.9	1.3	2.3	0.0	5.0	10.0	24.7	144
08-16	Purelipalli M.I	0.0	1.7	2.0	1.0	0.9	0.1	2.5	0.0	5.0	7.7	20.9	378
08-17	Naladalapur M.I	0.0	1.7	2.0	1.0	0.9	0.9	2.1	0.0	5.0	8.8	22.4	307
08-18	Medaramillapalem M.I	10.0	1.7	2.0	2.0	0.9	1.2	2.2	0.0	5.0	9.1	34.1	12
08-19	Z.Uppalapadu M.I	10.0	1.7	2.0	1.0	0.9	1.1	2.1	0.0	5.0	8.4	32.2	17
08-20	Lingasamudram	0.0	1.7	2.0	1.5	0.9	1.0	2.1	0.0	5.0	7.9	22.1	321

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (9/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Constructio n Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		Point Distribution											
10	3	2	5	2	4	4	5	5	10	50			
09-01	Tupili	0.0	1.7	1.1	2.0	0.9	1.4	2.7	0.0	5.0	10.0	24.8	137
09-02	Kalluru	0.0	1.7	1.0	2.0	0.9	1.2	2.6	0.0	5.0	10.0	24.4	169
09-03	Muttembaka	0.0	1.7	0.7	2.0	0.9	1.6	2.4	0.0	5.0	10.0	24.3	175
09-04	Durgavaram	10.0	1.7	0.7	2.0	0.9	1.3	2.3	0.0	5.0	10.0	33.9	14
09-05	Tirumuru	0.0	1.7	0.3	2.0	0.9	1.0	2.7	0.0	5.0	10.0	23.6	235
09-06	Kodivaka	0.0	1.7	0.5	2.0	0.9	1.6	2.3	0.0	5.0	10.0	24.0	201
09-07	Dugaraja Patnam	0.0	1.7	0.4	2.0	0.9	0.8	2.7	0.0	5.0	10.0	23.5	246
09-08	Cheemalapadu	0.0	1.7	0.8	2.0	0.9	1.1	2.4	0.0	5.0	10.0	23.9	214
09-09	Putchalapalli	0.0	1.7	0.6	2.0	0.9	1.1	2.3	0.0	5.0	10.0	23.6	235
09-10	Viruvuru	0.0	1.7	0.6	2.0	0.9	0.8	2.4	0.0	5.0	10.0	23.4	255
09-11	Guvvadi	0.0	1.7	0.8	2.0	0.9	1.2	2.3	0.0	5.0	10.0	23.9	214
09-12	Iskapalli	0.0	1.7	0.9	2.0	0.9	0.8	2.3	0.0	5.0	10.0	23.6	235
09-13	Dacheruvu	0.0	1.7	0.2	2.0	0.9	1.4	2.5	0.0	5.0	10.0	23.7	232
09-14	Perimidi Big	0.0	1.7	0.4	2.0	0.9	2.0	2.7	0.0	5.0	10.0	24.7	144
09-15	Nidigallu	0.0	1.7	0.7	2.0	0.9	1.4	2.5	0.0	5.0	10.0	24.2	186
09-16	Maddali	0.0	1.7	1.0	2.0	0.9	0.2	2.3	0.0	5.0	9.5	22.6	300
09-17	Manamala	0.0	1.7	1.1	2.0	0.9	1.4	2.3	0.0	5.0	10.0	24.4	169
09-18	Manubolu	0.0	1.7	0.4	2.0	0.9	1.3	2.7	0.0	5.0	10.0	24.0	201
09-19	Baddevolu	0.0	1.7	0.4	2.0	0.9	1.4	2.7	0.0	5.0	10.0	24.1	198
09-20	Kattuvapalli	0.0	1.7	0.5	2.0	0.9	1.5	2.6	0.0	5.0	10.0	24.2	186
09-21	Kolanakuduru	0.0	1.7	0.6	2.0	0.9	1.3	2.7	0.0	5.0	10.0	24.2	192
09-22	Bangaramma	0.0	1.7	0.5	2.0	0.9	1.4	2.7	0.0	5.0	10.0	24.2	192
09-23	Udayagiri Big & Small	0.0	1.7	2.0	2.0	0.9	1.2	2.4	0.0	5.0	10.0	25.2	105
09-24	Tirumulapuram	0.0	1.7	1.9	2.0	0.9	1.2	2.3	0.0	5.0	10.0	25.0	116
09-25	Bijjampalli	0.0	1.7	1.0	2.0	0.9	1.2	2.5	0.0	5.0	10.0	24.3	175
09-26	Appasamudram New	0.0	1.7	0.9	2.0	0.9	1.2	2.4	0.0	5.0	10.0	24.1	198
09-27	G.C.Palli	0.0	1.7	1.0	2.0	0.9	1.2	2.4	0.0	5.0	10.0	24.2	186
09-28	Krishnampalli	0.0	1.7	1.9	2.0	0.9	1.2	2.3	0.0	5.0	10.0	25.0	116
09-29	Pulliah Palli	10.0	1.7	1.4	2.0	0.9	1.2	2.3	0.0	5.0	10.0	34.5	11
09-30	Somayajulu	0.0	1.7	1.9	2.0	0.9	1.2	2.3	0.0	5.0	10.0	25.0	116

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (10/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Construction Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		Point Distribution											
10	3	2	5	2	4	4	5	5	10	50			
10-01	Pullampalli	0.0	3.0	1.2	0.0	0.9	3.7	2.3	0.0	5.0	10.0	26.1	63
10-02	Utukur	0.0	3.0	1.2	0.0	0.9	3.3	2.3	0.0	5.0	10.0	25.7	72
10-03	Kampalli	0.0	3.0	1.2	0.0	0.9	2.4	2.2	0.0	5.0	10.0	24.7	144
10-04	Balupalli	0.0	3.0	1.2	0.0	0.9	2.3	2.5	0.0	5.0	10.0	24.9	127
10-05	Koparhi	0.0	3.0	1.2	0.0	0.9	2.4	2.4	0.0	5.0	10.0	24.9	127
10-06	Ganganapalli	0.0	3.0	1.2	0.0	0.9	2.4	2.3	0.0	5.0	10.0	24.8	137
10-07	Sadipiralla	0.0	3.0	1.6	0.0	0.9	2.4	2.3	0.0	5.0	10.0	25.2	107
10-08	Maddireddipalli	10.0	3.0	1.6	0.0	0.9	2.9	2.3	0.0	5.0	10.0	35.7	6
10-09	Lingaladinnepalli	0.0	3.0	1.6	0.0	0.9	2.8	2.2	0.0	5.0	10.0	25.5	86
10-10	Kammavaripalli	0.0	2.6	0.9	0.0	0.9	2.4	2.5	0.0	5.0	10.0	24.3	175
10-11	Nagisetipalli	0.0	3.0	1.6	0.0	0.9	2.4	2.1	0.0	5.0	10.0	25.0	116
10-12	Thuvapalli	0.0	3.0	1.2	0.0	0.9	2.4	2.5	0.0	5.0	10.0	25.0	116
10-13	Nandyalampet	10.0	3.0	1.2	0.0	0.9	2.4	2.5	0.0	5.0	10.0	35.0	9
10-14	Goderu	0.0	3.0	1.6	0.0	0.9	2.4	2.1	0.0	5.0	10.0	25.0	116
10-15	Duvvur	0.0	3.0	1.6	0.0	0.9	2.4	2.2	0.0	5.0	10.0	25.1	110
10-16	Chintakunta	0.0	3.0	1.6	0.0	0.9	2.4	2.5	0.0	5.0	10.0	25.4	93
10-17	Nandalur	0.0	3.0	1.2	0.0	0.9	1.8	2.1	0.0	5.0	10.0	24.0	201
10-18	Thallapaka	0.0	3.0	1.2	0.0	0.9	2.4	2.5	0.0	5.0	10.0	25.0	116
10-19	Vontimitta	0.0	3.0	1.2	0.0	0.9	2.4	2.1	0.0	5.0	10.0	24.6	152
10-20	Kothacheruvu	0.0	3.0	1.2	0.0	0.9	2.4	2.2	0.0	5.0	10.0	24.7	144
10-21	Kothacheruvu Of Atlur	0.0	3.0	1.2	0.0	0.9	2.4	2.1	0.0	5.0	10.0	24.6	152
10-22	C.Boyanapalli	0.0	3.0	1.2	0.0	0.9	2.3	2.2	0.0	5.0	10.0	24.6	152
10-23	Ramgampalli	0.0	3.0	1.2	0.0	0.9	2.4	2.1	0.0	5.0	10.0	24.6	152
10-24	K.Agraharam	0.0	3.0	1.2	0.0	0.9	2.4	2.2	0.0	5.0	10.0	24.7	144
10-25	Pedda Cheruvu Etc.,	0.0	3.0	1.2	0.0	0.9	2.4	2.5	0.0	5.0	10.0	25.0	116
10-26	Veerappa Cheruvu Etc.,	0.0	3.0	1.6	0.0	0.9	2.4	2.3	0.0	5.0	10.0	25.2	107
10-27	Boyanapalli Cheruvu To Chintamani	0.0	3.0	1.6	0.0	0.9	3.0	2.2	0.0	5.0	10.0	25.7	72
10-28	Uppu Cheruvu To Thummalapalli	0.0	3.0	1.6	0.0	0.9	2.8	2.3	0.0	5.0	10.0	25.6	76
10-29	Dasabandana Cheruvu To Kammava	0.0	3.0	1.6	0.0	0.9	2.6	2.3	0.0	5.0	10.0	25.4	93
10-30	Amagampalli Cheruvu To Mudamala	0.0	3.0	1.6	0.0	0.9	2.9	2.2	0.0	5.0	10.0	25.6	76

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (11/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Construction Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		Point Distribution											
10	3	2	5	2	4	4	5	5	10	50			
11-01	Danthalavanipenta	0.0	1.7	0.5	2.0	0.9	1.2	2.5	0.0	5.0	10.0	23.8	220
11-02	Thurpucheruvu	10.0	1.7	2.0	2.0	0.9	1.1	2.7	0.0	5.0	9.3	34.7	10
11-03	Erra Cheruvu	0.0	1.7	1.7	2.0	0.9	1.3	2.7	0.0	5.0	10.0	25.3	99
11-04	Cheelaboyala Cheruvu	0.0	1.7	2.0	2.0	0.9	1.4	2.7	0.0	5.0	10.0	25.7	72
11-05	Chinthalacheruvu	0.0	1.7	0.7	2.0	0.9	1.1	2.7	0.0	5.0	9.3	23.4	253
11-06	Venganampallicheruvu	0.0	1.7	0.7	2.0	0.9	1.4	2.7	0.0	5.0	9.0	23.4	253
11-07	Peddarajucheruvu	0.0	1.7	0.3	2.0	0.9	1.6	2.7	0.0	5.0	10.0	24.2	192
11-08	Machinenipalli(Big)	0.0	1.7	0.4	2.0	0.9	1.7	2.7	0.0	5.0	10.0	24.4	169
11-09	B.Nagireddypalli M.I.	0.0	1.7	2.0	2.0	0.9	1.5	2.3	0.0	5.0	10.0	25.4	92
11-10	Rallavagu Cheruvu	0.0	1.7	0.7	2.0	0.9	1.7	2.7	0.0	5.0	10.0	24.7	143
11-11	Chinna Rajucheruvu	0.0	1.7	0.5	2.0	0.9	1.4	2.3	0.0	5.0	10.0	23.8	220
11-12	Beeravolu	0.0	1.7	0.9	2.0	0.9	1.5	2.7	0.0	5.0	9.3	24.0	201
11-13	Katamma Cheruvu	0.0	1.7	0.7	2.0	0.9	1.8	2.7	0.0	5.0	10.0	24.8	137
11-14	Kolha Cheruvu	0.0	1.7	0.6	2.0	0.9	1.8	2.7	0.0	5.0	10.0	24.7	144
11-15	Rangareddy	0.0	1.7	0.8	2.0	0.9	1.6	2.7	0.0	5.0	9.5	24.2	192
11-16	Peddacheruvu	0.0	1.7	1.5	2.0	0.9	1.7	2.7	0.0	5.0	10.0	25.5	86
11-17	Gangavaram	0.0	1.7	1.4	2.0	0.9	1.7	2.7	0.0	5.0	9.5	24.9	127
11-18	Isukapalli Thuvva Cheruvu	0.0	1.7	0.7	2.0	0.9	1.6	2.7	0.0	5.0	10.0	24.6	152
11-19	Kypa	0.0	1.7	0.6	2.0	0.9	1.7	2.7	0.0	5.0	10.0	24.6	152
11-20	Ramatheertham	0.0	1.7	1.2	2.0	0.9	1.5	2.7	0.0	5.0	10.0	25.0	116
11-21	Deekshthula	0.0	1.7	1.9	2.0	0.9	1.8	2.7	0.0	5.0	10.0	26.0	64
11-22	Mettupalli M.I	10.0	1.7	2.0	2.0	0.9	1.5	2.7	0.0	5.0	10.0	35.8	5
11-23	Pedda Cheruvu	0.0	1.7	2.0	2.0	0.9	1.4	2.7	0.0	5.0	10.0	25.7	72
11-24	Vadagandla	0.0	1.7	2.0	2.0	0.9	1.5	2.7	0.0	5.0	10.0	25.8	67
11-25	Pedda & Chinna	0.0	1.7	0.6	2.0	0.9	1.2	2.3	0.0	5.0	10.0	23.7	232

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (12/13)

Site No.	Name of the Project	1 DPR	2-1 Water Allocation	2-2 Tank Capacity	2-3 Full Water Frequency	3-1 Constructio n Year	3-2 Irrigation GAP	3-3 Water Use Efficiency	4-1 Water Cess Collection	4-2 Willingness	5-4 B/C Ratio (Critical)	Total Score	Rank
		Point Distribution											
		10	3	2	5	2	4	4	5	5	10	50	
12-01	Peruru Big	0.0	1.7	2.0	1.0	0.9	2.1	2.5	0.0	5.0	10.0	25.2	105
12-02	Tallimadugu MI	0.0	0.7	0.7	1.0	0.9	2.5	2.7	0.0	5.0	10.0	23.5	246
12-03	Nallaguttai MI	0.0	1.7	2.0	1.0	0.9	2.3	2.4	2.5	5.0	10.0	27.8	48
12-04	D.Chenampali MI	10.0	1.7	1.8	1.0	0.9	2.6	2.4	3.0	5.0	10.0	38.4	2
12-05	Jyothi	0.0	1.7	2.0	1.0	0.9	1.6	3.1	3.0	5.0	10.0	28.3	44
12-06	Byrasamudrum	0.0	1.7	2.0	1.0	0.9	1.2	2.3	3.0	5.0	10.0	27.1	53
12-07	Basetti	0.0	1.7	1.3	1.0	0.9	4.0	2.4	0.0	5.0	10.0	26.3	60
12-08	Pulakunta	0.0	0.7	2.0	1.0	0.9	4.0	2.3	0.0	5.0	10.0	25.9	65
12-09	Kaggallu	0.0	1.7	1.6	1.0	0.9	2.6	2.4	3.3	5.0	10.0	28.5	40
12-10	Beerapalli	0.0	1.7	1.1	1.0	0.9	2.4	2.5	3.0	5.0	10.0	27.6	50
12-11	Guddampalli	10.0	1.7	1.4	1.0	0.9	2.9	2.5	3.0	5.0	10.0	38.4	2
12-12	Santhebidanur	0.0	1.7	0.6	1.0	0.9	2.1	2.5	3.0	5.0	10.0	26.8	54
12-13	Chowlur	0.0	1.7	0.3	1.0	0.9	2.4	2.6	0.0	5.0	10.0	23.9	214
12-14	Maluguru	0.0	1.7	1.8	1.0	0.9	2.9	2.6	0.0	5.0	10.0	25.9	66
12-15	Kallur MI	0.0	0.7	2.0	1.0	0.9	1.5	2.7	3.0	5.0	10.0	26.8	54
12-16	Parigi	0.0	1.7	2.0	1.0	0.9	2.9	2.7	3.0	5.0	10.0	29.2	30
12-17	Kodigenahalli	0.0	1.7	0.9	1.0	0.9	3.2	2.4	3.0	5.0	10.0	28.1	47
12-18	Utakur	0.0	1.7	1.5	1.0	0.9	2.6	2.7	3.0	5.0	10.0	28.4	43
12-19	Kotnur	0.0	1.7	0.6	1.0	0.9	1.6	2.7	3.0	5.0	10.0	26.5	57

Source: JICA Survey Team

Attachment 7.2.6 Scoring Results of Minor Irrigation Projects (13/13)

Site No.	Name of the Project	1	2-1	2-2	2-3	3-1	3-2	3-3	4-1	4-2	5-4	Total Score	Rank
		DPR	Water Allocation	Tank Capacity	Full Water Frequency	Construction Year	Irrigation GAP	Water Use Efficiency	Water Cess Collection	Willingness	B/C Ratio (Critical)		
		Point Distribution											
		10	3	2	5	2	4	4	5	5	10		
13-01	SADDIKOOTI MADUGU	0.0	1.2	0.6	1.0	0.9	0.9	1.6	0.0	5.0	10.0	21.2	361
13-02	MARRIMAKULA CHERUVU	0.0	2.0	1.0	1.0	0.9	0.9	1.5	0.0	5.0	10.0	22.3	312
13-03	VELLURU	0.0	2.0	1.0	1.0	0.9	0.8	1.6	0.0	5.0	10.0	22.3	312
13-04	SEMBAKAM	0.0	1.3	0.6	1.0	0.9	0.9	1.6	0.0	5.0	10.0	21.3	356
13-05	KOTTAKADU	0.0	2.1	1.0	1.0	0.9	0.9	1.5	0.0	5.0	10.0	22.4	309
13-06	T.P.PALEM OLD	0.0	2.4	1.1	1.0	0.9	0.8	1.6	0.0	5.0	10.0	22.8	291
13-07	KADIVEDU	0.0	1.1	0.5	1.0	0.9	0.9	1.5	0.0	5.0	10.0	20.9	378
13-08	BEERAKUPPAM	0.0	1.4	0.7	1.0	0.9	0.7	1.4	0.0	5.0	10.0	21.1	363
13-09	GAJASINGARAPURAM	0.0	1.9	0.4	1.0	0.9	0.8	2.1	0.0	5.0	10.0	22.1	321
13-10	ALE TI KONA	0.0	0.4	0.3	2.0	0.9	0.4	1.3	0.0	5.0	10.0	20.3	410
13-11	S.S.B.PET	0.0	0.8	0.4	2.0	0.9	0.7	1.3	0.0	5.0	10.0	21.1	363
13-12	BANGALA	0.0	0.7	0.4	2.0	0.9	1.0	2.1	0.0	5.0	10.0	22.1	321
13-13	BHUDERI	0.0	0.8	0.4	3.0	0.9	0.7	0.9	0.0	5.0	10.0	21.7	341
13-14	THULASIKRISHNAPURAM	0.0	0.4	0.3	1.0	0.9	0.4	1.3	0.0	5.0	10.0	19.3	428
13-15	KARURU	0.0	1.1	0.6	2.0	0.9	0.6	1.3	0.0	5.0	10.0	21.5	343
13-16	Nindra MI	0.0	2.8	1.7	1.0	0.9	0.9	1.5	0.0	5.0	10.0	23.8	220
13-17	Iruguvai MI	0.0	1.1	0.7	1.0	0.9	0.9	1.9	0.0	5.0	10.0	21.5	343
13-18	Aruru MI	0.0	1.1	0.6	1.0	0.9	1.0	1.7	0.0	5.0	10.0	21.3	356
13-19	Melambakam MI	0.0	0.9	0.5	1.0	0.9	1.1	1.9	0.0	5.0	10.0	21.3	356
13-20	Chavarambakam MI	0.0	0.8	0.4	1.0	0.9	0.9	1.9	0.0	5.0	10.0	20.9	378
13-21	Kacharavedu MI	0.0	0.7	0.4	1.0	0.9	1.0	2.1	0.0	5.0	10.0	21.1	363
13-22	Athuru MI	0.0	1.3	0.8	1.0	0.9	1.0	1.8	0.0	5.0	10.0	21.8	334
13-23	D.Kodimbedu MI	0.0	1.3	0.7	1.0	0.9	0.9	1.7	0.0	5.0	10.0	21.5	343
13-24	Kavanuru Pedda Cheruvu	0.0	1.3	0.7	1.0	0.9	1.0	1.6	0.0	5.0	10.0	21.5	343
13-25	Agaram MI	0.0	0.8	0.5	1.0	0.9	0.9	1.8	0.0	5.0	10.0	20.9	378
13-26	Netteri MI	0.0	2.6	0.6	1.0	0.9	1.0	1.9	0.0	5.0	10.0	23.0	282
13-27	Kosalanagaram	0.0	3.0	2.0	2.0	0.9	1.6	2.3	0.0	5.0	10.0	Failed	450
13-28	Madhavaram	0.0	1.3	2.0	2.0	0.9	1.5	2.5	0.0	5.0	10.0	Failed	450
13-29	Tatimakulakona	0.0	2.3	2.0	2.0	0.9	1.4	2.4	0.0	5.0	10.0	Failed	450
13-30	Guruswamy	0.0	3.0	2.0	2.0	0.9	1.4	2.5	0.0	5.0	10.0	Failed	450
13-31	Kanikalammakona	0.0	2.3	2.0	2.0	0.9	1.5	2.5	0.0	5.0	10.0	Failed	450
13-32	Mangalam	0.0	2.4	2.0	2.0	0.9	1.7	2.5	0.0	5.0	10.0	Failed	450
13-33	Maharajapuram	0.0	3.0	2.0	2.0	0.9	1.5	2.5	0.0	5.0	10.0	Failed	450
13-34	Restoration Of Mudipalli	0.0	0.7	1.3	2.0	0.9	2.4	2.4	0.0	5.0	10.0	Failed	450
13-35	Restoration Of Gundraju Kuppam	10.0	0.7	1.6	2.0	0.9	2.4	2.4	0.0	5.0	10.0	Failed	450
13-36	Satrawada	0.0	0.7	1.0	2.0	0.9	2.4	2.3	0.0	5.0	10.0	Failed	450
13-37	Netham Kandriga	0.0	0.7	1.5	2.0	0.9	2.4	2.5	0.0	5.0	10.0	Failed	450
13-38	Ayanambakam	0.0	0.7	1.0	2.0	0.9	2.4	2.4	0.0	5.0	10.0	Failed	450
13-39	Erikambattu	0.0	0.7	1.1	2.0	0.9	2.4	2.4	0.0	5.0	10.0	Failed	450
13-40	Nakkala Cheruvu	0.0	0.7	1.1	2.0	0.9	2.4	2.3	0.0	5.0	10.0	Failed	450
13-41	Thumbur	0.0	0.7	1.0	2.0	0.9	2.4	2.5	0.0	5.0	10.0	Failed	450
13-42	Sriharipuram New	0.0	0.7	0.5	2.0	0.9	2.4	2.6	0.0	5.0	10.0	Failed	450
13-43	Buchanatham Big	0.0	3.0	2.0	2.0	0.9	1.2	2.5	0.0	5.0	10.0	Failed	450
13-44	Pannur	0.0	1.6	1.8	2.0	0.9	1.1	2.4	0.0	5.0	10.0	Failed	450
13-45	Kallambakam New	0.0	1.6	1.5	2.0	0.9	2.4	2.3	0.0	5.0	10.0	Failed	450
13-46	Alapakam Big	0.0	0.8	2.0	2.0	0.9	2.4	2.5	0.0	5.0	10.0	Failed	450
13-47	Ayyappa Reddy Cheruvu	0.0	1.7	0.6	2.0	0.9	2.0	1.7	0.0	5.0	10.0	23.9	214
13-48	Pakala Big	0.0	1.9	1.3	3.0	0.9	1.7	2.7	0.0	5.0	10.0	26.5	57
13-49	Ramasamudram Cheruvu	0.0	3.0	2.0	4.0	0.9	1.2	2.8	0.0	5.0	10.0	28.9	35
13-50	Venkatarayuni Chervu	0.0	1.5	0.8	2.0	0.9	0.7	2.3	0.0	5.0	10.0	23.2	276
13-51	Nallasamudram Cheruvu	0.0	1.3	0.9	2.0	0.0	1.2	2.1	0.0	5.0	10.0	22.5	303
13-52	Rayala Cheruvu	0.0	1.6	0.9	2.0	0.0	1.9	1.5	0.0	5.0	10.0	22.9	286
13-53	Kullapa Reddy Cheruvu	0.0	3.0	2.0	4.0	0.0	0.9	2.8	0.0	5.0	10.0	27.7	49
13-54	Mulapalli	0.0	1.7	0.7	4.0	0.0	2.4	2.7	0.0	5.0	10.0	22.5	303
13-55	Kumara Ahobilanayani Cheruvu	0.0	3.0	2.0	1.0	0.0	0.9	1.9	5.0	5.0	10.0	28.8	38
13-56	Konda Vanka Cheruvu	0.0	3.0	2.0	1.0	0.2	0.8	2.0	5.0	5.0	10.0	29.0	33
13-57	Komativani Cheruvu	0.0	3.0	2.0	1.5	0.2	0.9	1.3	5.0	5.0	10.0	28.9	35
13-58	Diguvamasapalli Cheruvu	0.0	1.7	1.0	4.0	0.2	0.9	1.0	0.0	5.0	10.0	23.8	220
13-59	Arthala Hissa	0.0	1.7	1.1	4.0	0.2	1.0	1.0	0.0	5.0	10.0	24.0	201
13-60	Namahshivaya Chetty Cheruvu	0.0	1.7	1.0	5.0	0.2	0.8	0.7	0.0	5.0	10.0	24.4	169
13-61	Bomminayani Cheruvu	0.0	1.7	0.9	5.0	0.2	0.7	0.7	0.0	5.0	10.0	24.2	192
13-62	Chennarayani Cheruvu	0.0	1.7	2.0	5.0	0.2	0.8	0.7	0.0	5.0	10.0	25.4	93
13-63	Kolha Cheruvu	0.0	1.7	2.0	4.0	0.2	1.0	1.0	0.0	5.0	10.0	24.9	127
13-64	Ellapalle Pedda Cheruvu	0.0	1.7	1.4	4.0	0.2	0.7	1.0	0.0	5.0	10.0	24.0	201
13-65	Pedda Cheruvu Of Vepejeri	0.0	1.7	0.9	4.0	0.2	0.7	1.0	0.0	5.0	10.0	23.5	246
13-66	Hissa Pedda Cheruvu	0.0	1.7	1.5	4.0	0.2	0.9	2.3	0.0	5.0	10.0	25.6	76
13-67	Rathi Cheruvu	0.0	1.7	1.0	4.0	0.2	0.9	1.7	0.0	5.0	10.0	24.5	162
13-68	Tenepalli Pedda Cheruvu	0.0	1.7	2.0	4.0	0.2	1.2	1.1	0.0	5.0	10.0	25.2	107
13-69	Diguvapalli Cheruvu & Supply Chan	0.0	1.7	0.4	4.0	0.2	1.5	1.0	0.0	5.0	10.0	23.8	220
13-70	Peddy Nayani Cheruvu	0.0	1.7	1.2	4.0	0.2	0.8	1.7	0.0	5.0	10.0	24.6	152
13-71	Thati Cheruvu	0.0	1.7	1.0	4.0	0.2	1.0	1.5	0.0	5.0	10.0	24.4	169
13-72	Ramalinga Samudram Cheruvu	0.0	2.2	1.5	4.0	0.2	1.3	1.3	0.0	5.0	10.0	25.5	86
13-73	HISSA OF PULIKALLU	0.0	1.8	1.2	4.0	0.2	1.4	1.3	0.0	5.0	10.0	24.9	127
13-74	Pedda Cheruvu	0.0	0.7	0.5	4.0	0.2	1.8	1.3	0.0	5.0	10.0	23.5	246
13-75	Pedda Cheruvu	0.0	1.1	0.8	4.0	0.2	1.7	1.7	0.0	5.0	10.0	24.5	162
13-76	Medivanka	0.0	0.8	0.6	4.0	0.2	0.1	1.0	0.0	5.0	8.7	20.4	408
13-77	Ramana Cheruvu	0.0	2.7	1.9	4.0	0.2	0.0	1.3	0.0	5.0	7.2	22.3	312
13-78	Kothacheruvu	0.0	0.6	0.2	4.0	0.2	1.0	1.0	0.0	5.0	10.0	22.0	325
13-79	Nunjerla Project	0.0	0.3	0.2	4.0	0.2	0.2	1.2	0.0	5.0	10.0	21.1	363
13-80	Bodham Cheruvu	0.0	0.8	0.5	4.0	0.2	0.6	0.9	0.0	5.0	10.0	22.0	325

Source: JICA Survey Team

Attachment 7.2.7 Minor Irrigation - Trial Ranking Summary

District	Original			Rank Distribution						Command Area (ha)	Construction Cost (Rs.)	Failed
	No. of MI Tanks	Comamnd Area (ha)	Construction Cost (Rs.)	1 - 100	101 - 200	201 - 300	301 - 400	400 -	Sub-total			
01 Srikakulam	80	8,557	533,390,000	19	12	14	20	15	80	8,557	533,390,000	0
02 Vizianagaram	63	6,250	394,200,000	2	3	13	21	24	63	6,250	394,200,000	0
03 Visakhapatnam	50	3,422	231,670,000	2	1	18	29	0	50	3,422	231,670,000	0
04 East Godavari	25	3,079	188,060,000	3	5	13	4	0	25	3,079	188,060,000	0
05 West Godavari	20	1,988	125,350,000	18	0	0	0	0	18	1,919	119,670,000	2
06 Krishna	20	3,146	186,510,000	3	10	6	0	0	19	2,955	175,410,000	1
07 Guntur	10	1,842	107,470,000	3	3	3	1	0	10	1,842	107,470,000	0
08 Prakasam	20	4,638	265,280,000	7	7	3	3	0	20	4,638	265,280,000	0
09 Nellore	30	7,882	446,750,000	2	17	11	0	0	30	7,882	446,750,000	0
10 Kadapa	30	3,118	195,210,000	10	19	1	0	0	30	3,118	195,210,000	0
11 Kurnool	25	2,091	135,900,000	9	10	6	0	0	25	2,091	135,900,000	0
12 Ananthapur	19	3,883	224,390,000	16	1	2	0	0	19	3,883	224,390,000	0
13 Chittoor	80	10,363	628,660,000	9	9	12	27	3	60	7,330	448,150,000	20
Total	472	60,259	3,662,840,000	103	97	102	105	42	449	56,966	3,465,550,000	23

Source: JICA Survey Team

Attachment 7.2.8 Minor Irrigation - Trial Ranking Summary by Cluster

Parent Medium Irrigation Project	Ranking Parent Medium	Original			After Screening			
		No. of MI Tanks	Comamnd Area (ha)	Construction Cost (Rs.)	No. of MI Tanks	Command Area (ha)	Construction Cost (Rs.)	Cost Accumulation (Rs.)
13 Upper Pennar	1	5	391	25,750,000	5	391	25,750,000	923,020,000
08 Mopadu Reservoir System	2	1	186	10,840,000	1	186	10,840,000	555,860,000
06 Torrigedda Pumping Scheme	3	16	2,515	149,110,000	16	2,515	149,110,000	419,630,000
07 Thammileru Reservoir	4	21	2,077	131,070,000	19	2,008	125,390,000	545,020,000
23 DR-DM Channel	5	0	0	0	0	0	0	1,510,020,000
14 Pennar Kumudvathi	6	11	3,287	184,760,000	11	3,287	184,760,000	1,107,780,000
22 Muniyeru Irrigation	7	13	1,860	111,470,000	12	1,669	100,370,000	1,510,020,000
11 Araniar Reservoir	8	39	4,917	299,340,000	26	3,132	191,850,000	839,430,000
10 Krishnapuram Reservoir	9	16	2,077	125,970,000	9	829	52,950,000	647,580,000
02 Vottigedda Reservoir	10	10	1,046	65,420,000	10	1,046	65,420,000	109,050,000
03 Vengalaraya Sagaram	11	2	509	28,910,000	2	509	28,910,000	137,960,000
20 Raiwada Reservoir	12	31	2,114	143,250,000	31	2,114	143,250,000	1,409,650,000
18 Narayanapuram Anicut	13	18	1,919	119,670,000	18	1,919	119,670,000	1,266,400,000
01 Peddankalam Anicut	14	8	672	43,630,000	8	672	43,630,000	43,630,000
09 Veeraraghavani Kota Anicut System	15	7	599	38,770,000	7	599	38,770,000	594,630,000
16 Maddigedda Reservoir	16	9	564	38,950,000	9	564	38,950,000	1,146,730,000
05 Andhra Reservoir	17	22	1,710	112,690,000	22	1,710	112,690,000	270,520,000
12 Buggavanka	18	8	941	57,840,000	8	941	57,840,000	897,270,000
21 Shiva Bhasham Sagar	19	0	0	0	0	0	0	1,409,650,000
04 Peddagedda Reservoir	20	4	299	19,870,000	4	299	19,870,000	157,830,000
99 Isolated	-	231	32,576	1,955,530,000	231	32,576	1,955,530,000	3,465,550,000
Total		472	60,259	3,662,840,000	449	56,966	3,465,550,000	-

Source: JICA Survey Team

Attachment 7.3.1 Result of Value Chain Evaluation

1) Mango, Chili, Cashew and Tomato

Crop	Mango	Chili	Cashew	Tomato
Area	South/North	Central	North	South
Target product	Fresh & processed mango	Dry chili & Oleoresin	Cashew kernel	Tomato paste
Market	Export	Export	Export	Domestic
Production capacity	<p><Strength> -India is the world's largest producer of mango and AP is the second largest producer in India.</p> <p><Weakness> -Water shortage, low productivity, high cost of production, low quality (improper harvesting, ripening, chemical residue and pest issues) and low image -Linkage between farmer to processors/ marketers is missing/ minimal</p>	<p><Strength> -India is the world's largest chili producer and AP is the largest producer of chili in India by producing 40% of chili production in India. -Guntur chili is famous and popular for its pungency and quality. Productivity of chili in AP is the highest in India.</p> <p><Weakness> -Lack of IPM/ICM causes issue of aflatoxin and chemical residue which hinders export to advanced countries.</p>	<p><Strength> -India accounts for nearly 30% of global production. AP is the largest producer of cashew in India.</p> <p><Weakness> -Low yield (664.8kg/ha against Indian average of 759.8kg/ha and global average of 1,040kg/ha).¹ -Almost no cultivation management.</p>	<p><Strength> -India is the second largest tomato producer next to China and AP is the largest tomato producer in India. AP produces 18% of tomato production in India².</p> <p><Weakness> -Water shortage -High price fluctuation -Farmers not willing to grow processing variety and thus high cost of processing</p>
Value addition	Jam, juice, jelly, squash, pulp, concentrate, pickle and puree, mango bar, dehydrated mango slices, IQF Mango	Curry powder, chili powder, oleoresin, color extraction, pickle, chutney, paste, ingredients of pharma and cosmetic products	Kernel, traditional sweet, cashew apple juice	Tomato paste, ketchup, sauce, chutney, pickle, powder, dehydrated tomato
Trend of market demand	<p><Fresh mango> -World mango import increased by 16.7% from 2010 to 2013, 47.9% since 2003. India is the second largest mango exporter although its share is stagnated around 15% in recent years from 20% before 2010³. -Good potential for exporting fresh mangoes to developed countries (current levels are low)</p> <p><Processed mangoes> -World mango pulp production increased by 18.6% from 2010 to 2013, 38.8% since 2003⁴. India is the world biggest mango pulp producer with the</p>	<p><Dry chili> -Dry chili and pepper export increased 8.9% between 2010 and 2013, and 57.1% between 2003 and 2013. India's share also grew from 23.2% in 2003 to 50% in 2013⁵.</p> <p><Oleoresin> -India controls 60% of the 13,500 MT global spice oleoresins market even as China has emerged as a strong contender in paprika oleoresin, the most in-demand spice oil.⁶</p>	<p><Kernel> -Volume of global cashew trade is increasing. (more than 4 times in 20 years) - India accounts for 65% of global export. -Demand in US and EU accounts for 40% of demand and it is increasing.⁷</p>	<p><Tomato paste> -Tomato paste market in India has grown by 43.4% between 2010 and 2013, and 144.4% between 2003 and 2013⁸. Although tomato paste production increased by more than 10% since 2010⁹, it is not very stable. Consequently India is importing tomato paste to satisfy 30% of its demand every year.</p>

¹ India Horticulture Database 2014

² National Horticulture Board

³ FAOSTAT (<http://faostat3.fao.org/home/E>)

⁴ FAOSTAT (<http://faostat3.fao.org/home/E>)

⁵ FAOSTAT (<http://faostat3.fao.org/home/E>)

⁶ Reported in the Economic times on 27 July 2013 http://articles.economicstimes.indiatimes.com/2013-07-27/news/40833605_1_paprika-oleoresin-geemon-korah-synthite-industries

⁷ FAOSTAT (<http://faostat3.fao.org/home/E>)

⁸ FAOSTAT (<http://faostat3.fao.org/home/E>)

⁹ FAOSTAT (<http://faostat3.fao.org/home/E>)

Crop	Mango	Chili	Cashew	Tomato
Area	South/North	Central	North	South
Target product	Fresh & processed mango	Dry chili & Oleoresin	Cashew kernel	Tomato paste
Market	Export	Export	Export	Domestic
	share of more than 60% and it is increasing its share in recent years.			
Access to existing processing industries and export market	<p><Strength> -There are 66 processing units in Chittoor. -Several major players established relations with big buyers such as Pepsi or Coca Cola. -Companies such as Jain Irrigation and Srini Food Park established procurement network with farmers. -Japanese companies buy processed mango from them.</p> <p><Weakness> -Improper post-harvest handling, weak linkage between farmers and exporters, and lack of aggregation is an issue. -Weak linkage between farmers and processors, and reduced price for existing products. Need to explore higher value added products.</p>	<p><Strength> -Chili market in Guntur is the largest in Asia with the well-established network of traders, processors and exporter. -There are several global companies like ITC and Synthite Industries which provide assistance to farmers and procure chili from them.</p> <p><Weakness> -Aflatoxin and chemical residues resulted in rejection of Indian chili import in EU or Japan. -Lack of traceability.</p>	<p><Strength> -There are more than 120 processing units in Srikakulam, 27 in Prakasam and 15 in Vishakapatnam. (Including small ones), one large scale unit in Vizianagaram and export overseas.</p> <p><Weakness> -Lack of raw material. India imports substantial quantity of raw cashews. -Low application of mechanization and consequently high production cost. -No aggregate marketing practice. Some FPOs initiated activities.</p>	<p><Strength> -There are 15 processing units located in Chittoor which are capable of processing tomatoes. -Several big firms such as Srini Food Park, and Global Green started contract farming of tomato.</p> <p><Weakness> -High cost of processing as farmers do not cultivate processing variety. -No linkage between farmers and processors. -No traceability.</p>

Source: JICA Survey Team

2) Coconut, Maize, Groundnut and Banana

Criteria	Maize	Coconut	Groundnut	Banana
Area	Central/North	Central/North	South	Central/South
Target product	Starch and other value added products	Various processed products	Groundnut oil	Fresh and processed banana
Market	Export	Export	Export	Export
Production capacity	<p><Strength> -US, China, Brazil are the largest producing countries and India accounts for 2% of global production. -AP is the largest producer of maize. -Yield is 6.39MT/ha, which is much higher than Indian average of 2.5 MT and global average of 5.5 MT.¹⁰</p>	<p><Strength> -India is the third largest producer (17%) after Indonesia and Philippines. -AP is the fourth highest in India. -Yield is 10.3MT/ha (16,100 nuts/ha) which is higher than Indian average of 7.3MT/ha.¹¹</p>	<p><Strength> -India is the second largest producer of groundnut in the world. AP is the biggest producer in India.</p> <p><Weakness> -Very Low productivity and low quality -Farmers choose the crop as a 'chance crop' as it is drought resistance and relatively carefree and generally do not put a lot of energy to improve quality and productivity.</p>	<p><Strength> -India is the world's largest producer of banana and AP is the fourth largest producer in India. -Tissue culture plant material is in extensive use in AP. -Grand Naine variety is the most popular and it has international & domestic market acceptance. -The banana grown in Cadapa has longer shelf life.</p> <p><Weakness> Productivity is just</p>

¹⁰ AP Department of Agriculture

¹¹ Coconuts Development Board (<http://www.coconutboard.nic.in/>)

Criteria	Maize	Coconut	Groundnut	Banana
Area	Central/North	Central/North	South	Central/South
Target product	Starch and other value added products	Various processed products	Groundnut oil	Fresh and processed banana
Market	Export	Export	Export	Export
				below national average and there is scope of improvement.
Value addition	Starch, gluten, liquid glucose and other high value products. Raw material for animal feed.	Dry coconut (ball copra/ dry copra) , coconut oil (edible & industrial) coconuts cream/milk, tender coconut water, powder, shell powder for mosquito coil, shell charcoal and deactivated carbon, de-oiled cake for animal feed, fiber (coir) for mattress and ropes, coco pith for soil replacement.	Groundnut oil, Traditional snacks and peanut bar (chikki), Peanut butter	Banana Puree, powder and chips are the major processed products.
Trend of market demand	<p><Starch> -Global export of starch is stable around 750 million USD/year. -India is 4th largest exporter of starch following Germany, USA and Spain. Its share between 2011 and 2014 is 8.7%. -India's starch export increased by 105% from 39 million USD in 2011 to 79 million USD in 2013.¹²</p>	<p><Coconut product> -Export value of coconuts products by India has drastically increased by 1,897% from 512million INR in 2007 to 10.2billion INR in 2013. -Total volume of global export has increased by 133% from 183,785 MT in 2000 to 429,119MT in 2013.¹³</p>	<p><Groundnuts> -Production of groundnut in India and in the world has somehow stagnated in recent year. Its production in India also decreased by 19% between 2003 and 2013¹⁴. <Groundnut oil> -Production of groundnut oil which is the prime processing product of groundnut in India as well as in the world have decreased by 33.1% and 9.7% respectively, although it still constitutes 25% of the oilseed crops in India¹⁵.</p>	<p><Fresh Banana> -India is a major exporter of Banana and the major destinations are UAE, Saudi Arabia, Iran, Kuwait, & Bahrain. -Indian share in banana export is meagre 0.2% in 2013¹⁶.</p>
Access to existing processing industries and export market	<p><Strength> -There is one large scale integrated processing unit in Vizianagaram exporting industrial products mainly to middle east. <Weakness> -Proper post-harvest handling (such as drying) is required for high value products. Post-harvest infrastructure (storage, mechanical drying) is necessary.</p>	<p><Strength> -There is one large scale integrated processing unit in Vizianagaram (under construction). -There are more than 200 small scale processing units (coir and primary processing). -Some FPOs have initiated activities and supported by Coconut Development Board. <Weakness> -Weak market linkage. Selling to traders is only choice for farmers. -No aggregate marketing practice.</p>	<p><Weakness> -Farmers have no option to sell their produce to traders as there is no market infrastructure for groundnut. -Very weak linkage among farmers, traders, and processors. There are a number of intermediaries (about 3 to 5) which results in low returns to farmers. -There are only a couple of modern oil refineries in the state.</p>	<p><Strength> -Most of the mango aseptic processing plants (about 15) in Chittoor can also process banana. <Weakness> -Domestic demand for processed banana is limited (for baby foods, ice creams) and India is not competitive in international market.</p>

Source: JICA Survey Team

¹² FAOSTAT (<http://faostat3.fao.org/home/E>)

¹³ ditto

¹⁴ ditto

¹⁵ ditto

¹⁶ ditto

Attachment 8.2.1 Summary of Procedures for Project Sanction

Summery of Procedures for Project Clearance

In case the Project has no inter-state issue

- 1) The State Government obtains a certificate from the CWC to the effect that such project/scheme does not have any inter-State ramifications/implications.
- 2) The State Governments are empowered to accord investment approval for the major and medium irrigation projects which do not have inter-State ramifications.
- 3) The State Government shall obtain all required statutory clearance(s) form the MoEF, MoSJE and all other clearances..
- 4) The State Governments shall intimate the copy of the investment clearance accorded by them to the Planning Commission. MoWR/CWC and all concerned Central Ministries Organizations.

In case the Project has inter-state issue

- 1) Preparation of Preliminary Report
Major CWC Delhi
Medium Regional CWC
- 2) Preparation of DPR
Major CWC Delhi
Medium Regional CWC

Guidelines for Submission, Appraisal and Clearance of Irrigation and Multipurpose Projects

In case Inter-state ramification is involved.

Major	Medium	Remarks	
Preliminary Report			
The preliminary report shall be prepared to contain brief and to the point chapters on General data, General Planning, Inter-State and International aspects, Surveys & Investigations including Geological investigation, Seismic investigation, Foundation investigation, Construction material survey, Hydrological and meteorological investigations etc.		2.1	Check List (Annexure-5)
to be submitted to PAO, CWC, Delhi	to be submitted to Regional CWC	2.2	
CWC conveys 'In Principle' consent to the State Government.		2.3	
Required time is 18 weeks (major)		2.3	Annexure-6
The 'In Principle' consent of CWC for DPR preparation for a project shall have a validity period of 3 (three) years.		2.7	
DPR Preparation			
DPR shall be prepared in accordance with applicable Indian Standards and 'Guidelines for preparation of Detailed Project Reports of Irrigation and Multipurpose Projects', after detailed surveys and investigations.		3.1	
The clearances obtained in respect of Environment Impact Assessment, Forest, R&R Plans, etc. shall also be appended with DPRs and implied costs shall be duly accounted in the estimate.		3.2	
DPRs along with relevant clearances as per check-list shall be submitted for examination.	Proforma reports shall be prepared giving salient features, notes in respect of basic planning, international/inter-State aspects, hydrology, irrigation planning, storage planning, spillway capacity, rates of important items, abstract of cost estimates, benefit cost ratio, etc. and sufficient copies of the same shall be submitted to respective regional offices of CWC for examination.	3.3	Check List (Annexure-7)
to be submitted to PAO, CWC, Delhi	to be submitted to Regional CWC		
In case CDO has sufficient competency to design such projects and a certificate is furnished by them in prescribed proforma in respect of their detailed examination/clearance of the project proposal and appraisal/clearance of the State level project Appraisal/Technical Advisory and Environmental Appraisal committees, <u>examination of the project by CWC will be generally restricted to inter-State aspects, basic planning, hydrology and economic viability.</u>		3.4	Certificate by CDO (Annexure-8)
The project authorities will also submit concurrence of the State Finance for the finalized cost.		3.7	
The projects found acceptable by the Advisory Committee shall be recommended for investment clearance by the Planning Commission and inclusion in the Five Year Plan/Annual Plan.		3.11	
Normally for project proposals submitted with CDO certificates, appraisal will be completed within six months and for other proposals it would be completed within 12 months provided response of the concerned State in respect of the observations of Central Agencies are received within 3 months.		3.12	
Modification			
In case of major and medium projects which have been approved by the Planning Commission and where the revised estimates of the project have increased by more than 15% of the original estimates, excluding escalation due to price-rise, or where there is change in scope i.e. change in projects parameters resulting in change in nature and benefits such as CCA, installed capacity, energy generation etc., Revised project Reports including Estimates will be furnished to CWC for examination as new major/medium schemes and the procedure for scrutiny for such revised project/estimates shall be same as outlined in the preceding chapters.		4.1	
The revised estimate for Major Irrigation and Multipurpose Projects, where there is no change in scope shall be critically examined in the State Standing Committee before submission to CWC. The estimates shall be submitted to CWC incorporating the action taken report on the recommendations of the committee as per direction of the Planning Commission.	The revised estimates for medium projects in which there is no change in scope can be approved by the TAC of concerned State under intimation to CWC, MoWR and Planning Commission as per direction of the Planning Commission (Annexure-10). In this regard, a State Government will have to first satisfy the CWC that there has no change in the scope of the project and obtain their clearance for this before approving revised cost. If required, CWC will carry out a site inspection of the project before issue of no objection.	4.2 4.3	Annexure-10

Data Collection Survey on Agriculture, Food Processing and Distribution in Andhra Pradesh State
Attachment 8.2.1

Guidelines for Submission, Appraisal and Clearance of Irrigation and Multipurpose Projects

Major	Medium	Remarks	
Major projects are examined in CDO before these are sent to the CWC, the examination of such projects in the CWC may be restricted to the scrutiny of Inter-State aspects, hydrology, water accounting and economic viability.	Medium irrigation projects should be examined in the State's CDO and only thereafter these may be sent to the CWC for information with regard to water accounting.	Annexure-1	1986/07
	Inter-State aspects of medium projects are, however, required to be cleared by the Centre.	Annexure-1	1986/07
The Planning Commission shall hereafter accord investment clearance in case of all major irrigation and/or multipurpose projects.	The Planning Commission shall hereafter accord investment clearance in the case of medium irrigation, only for those projects where Inter-State angle is involved.	Annexure-2	1997/11
	The State Governments are hereby empowered to accord investment approval for medium irrigation schemes that do not involve any Inter-State aspect(s).	Annexure-2	1997/11
	The State Government shall obtain all required statutory clearance(s) from the MoEF and Ministry of Welfare like environmental clearance. Forest clearance, approval for R&R Plan and all other clearance, as may be required before the investment approval is accorded.	Annexure-2	1997/11
	The State Governments shall intimate the copy of the investment clearance accorded by them in respect of eligible medium irrigation schemes to the Planning Commission, MoWR, CWC and all concerned Central Ministries/Organizations.	Annexure-2	1997/11
	Before consideration of a medium irrigation project for investment clearance, the concerned State Govt. shall approach the CWC to obtain the confirmation/certification from the CWC to the effect that proposed medium project is not located on an inter-state river or its tributary.	Annexure-3	1998/07
In case of major irrigation and multipurpose projects, the scrutiny at CWC shall henceforth be completed in 38 weeks' time from the date of receipt of DPR in CWC.	It has now been decided in consultation with the CWC that the scrutiny of medium irrigation projects at CWC shall henceforth be completed in 18 weeks' time from the date of receipt of project proposal in CWC where the inter-state aspects have been resolved and hydrology and economic viability of the project is found acceptable.	Annexure-3	1998/07
All major and or multi-purpose and medium irrigation projects and flood control projects which have Inter-State ramifications will be subject to techno-economic appraisal in CWC and then approval by the Advisory Committee on Irrigation.		Annexure-4	2000/11
The State Governments are empowered to accord investment approval for the major and or multipurpose & medium irrigation projects and flood control projects which do not have inter-State ramifications. It is also clarified that any project which is located on an inter-State river or its tributary will be deemed to involve inter-State ramification and as such shall need investment clearance from the Planning commission.		Annexure-4	2000/11
Before acceding the investment approval to the projects, the concerned State Government will first obtain as a pre-requisite a certificate from the CWC in case of major and medium irrigation (and multi-purpose) projects whereas for flood and drainage projects schemes, to the effect that such project/scheme does not have any inter-State ramifications/implications.		Annexure-4	2000/11
The State Government shall obtain all required statutory clearance(s) from the MoEF and MoSJE like environmental clearance. Forest clearance, approval for R&R plan and all other clearances, as may be required before the investment approval is accorded.		Annexure-4	2000/11
The State Governments shall intimate the copy of the investment clearance accorded by them in respect of eligible schemes to the Planning Commission. MoWR/CWC and all concerned Central Ministries Organizations.		Annexure-4	2000/11

Attachment 8.2.2 Status of DPRs for APILIP-II

Status of DPRs of 8 Medium Irrigation projects submitted to CWC

Sl.no	Name of the project	Status of DPR	Remarks
1	Modernization of Vengalaraya sagar Medium Irrigation project in Vizianagaram district.	<ol style="list-style-type: none"> 1. Cleared in respect of interstate angle by CWC vide letter no.25/05-II/13-EA/72-73 Dt: 27.03.2014. 2. Hydrology Directorate has cleared this project CWC/U.O.NO.7/AP-74/2003-Hyd(s)/276 Dt: 02.05.2013. 3. The DPR is to be recasted with current S.S.R of 2015-16 and to be resubmitted to CWC 	Scanned copies of clearance from CWC are enclosed
2	Modernization of Vottigedda Medium Irrigation project in Vizianagaram district.	<ol style="list-style-type: none"> 1. Cleared in respect of interstate angle by CWC vide letter no.25/05-II/13-EA/72-73 Dt: 27.03.2014. 2. Hydrology Directorate of CWC has cleared this project vide Letter no. 25/05-II/13-EA/50 Dt: 24.02.2014. 3. The DPR is to be recasted with current S.S.R of 2015-16 and to be resubmitted to CWC 	Scanned copies of clearance from CWC are enclosed
3	Modernization of Peddankalam Medium Irrigation project in Vizianagaram district.	<ol style="list-style-type: none"> 1. Cleared in respect of interstate angle by CWC vide letter no.25/05-II/13-EA/72-73 Dt: 27.03.2014. 2. Hydrology Directorate has cleared this project CWC/U.O.NO.7/AP-74/2003-Hyd(s)/287 Dt: 09.05.2013. 3. The DPR is to be recasted with current S.S.R of 2015-16 and to be resubmitted to CWC 	Scanned copies of clearance from CWC are enclosed
4	Modernization of Pennar Kumdavathi Medium Irrigation project in Ananthapur district.	<ol style="list-style-type: none"> 1. Cleared in respect of interstate angle by CWC vide letter no.7/2/1 AP/2010/ISM/315 Dt: 11.06.2014. 2. Hydrological clearance is awaited from CWC 3. The DPR is to be recasted with current S.S.R of 2015-16 and to be resubmitted to CWC 	Scanned copy of clearance from CWC is enclosed
5	Modernization of Upper Pennar Medium Irrigation project in Ananthapur district.	<ol style="list-style-type: none"> 1. Cleared in respect of interstate angle by CWC vide letter no.7/2/1 AP/2010/ISM/316 Dt: 11.06.2014. 2. The Hydrological clearance is awaited from CWC 3. The DPR is to be recasted with current S.S.R of 2015-16 and to be resubmitted to CWC 	Scanned copy of clearance from CWC is enclosed
6	Modernization of Torrigedda Pumping scheme in East Godavari district.	<ol style="list-style-type: none"> 1. The Director of ISM has communicated certain observations vide their lr no 25/05-11/13-EA/33-34 dt.11-2-2014.Replies furnished in T.O. Lr no COM/CAD/APIILIP /DEE1/339/Torrigedda Dt 8-1-2015 2. The Hydrological clearance is awaited from CWC. 3. The DPR is to be recasted with current S.S.R of 2015-16 and to be resubmitted to CWC 	
7	Modernization of Mopadu Medium Irrigation project in Prakasam district.	<ol style="list-style-type: none"> 1. The Director of ISM has cleared the project stating that the project does not require any examination from Interstate angle as the river is intra – state river. Vide CWC lr. No. 7/2/1 AP/2010/ISM/261 Dt:- 9.5.2013 2. The project is on intra – State River hence the clearance is to be given by state TAC. 3. The DPR is to be recasted with current S.S.R of 2015-16 and to be placed before State TAC for clearance. 	Scanned copy of clearance from CWC is enclosed
8	Modernization of Thammileru Medium Irrigation project in West Godavari District.	<ol style="list-style-type: none"> 1. The Director of ISM has cleared the project stating that the project does not required any examination from Interstate angle as the river is intra – state river. Vide CWC lr. No. 7/2/1 AP/2010/ISM/261 Dt:- 9.5.2013 2. The project is on intra – State River hence the clearance is to be given by state TAC as indicated by CWC. 3. The DPR is to be recasted with current S.S.R of 2015-16 and to be placed before State TAC for clearance. 	Scanned copy of clearance from CWC is enclosed

Source: DoWR, AP State

Attachment 8.2.3 DPR Check List Based on CWC Guidelines

Evaluation of DPRs based on the Guideline*

Table of Contents		Vottigedda	Thammileru	Krishnapuram
1. Introduction	The following points and additional points, if any, as relevant to the project shall be discussed in details under this chapter.			
1.1	Brief description of major components of the project as formulated/conceived originally/completed	OK (Source-1.1, p.9)	OK (Source-2.1, p.1)	OK (Source-3.1, p.39 - p.42, p.49, p.64)
1.2	Salient features/aspect; (a) Envisaged at the time of approval of the project, (b) As completed, (c) As proposed, (d) Comparison between the existing and proposed features	OK (Source-1.1, p.4 – p.6)	No mention	OK (Source-3.1, p.39 - p.42)
1.3	Present performance of various components of the project	OK (Source-1.1, p.9)	OK (Source-2.1, p.5 - p.9)	Part (Source-3.1, p.39 – p.42)
1.4	Irrigation potential envisaged originally/created on completion of project and its utilization year to year (indicate what changes have taken place in the development of irrigation potential during the operation of the project.	No mention	No mention	No mention
1.5	Deficiencies in the existing irrigation system; (a) Engineering, (b) Agronomical, (c) Administrative, (d) Legislative	Part (Source-1.1, p.9)	Part (Source-2.1, p.5 - p.9)	Part (Source-3.1, p.39- p.42, p.49)
1.6	Justification/need for modernization	OK (Source-1.1, p.10)	OK (Source-2.1, p.1 – p.2)	OK (Source-3.1, p.39- p.42)
1.7	Dove-tailing of the project in the basin plan/master plan	No mention	No mention	No mention
2. Hydrology	The following points and additional points, if any, as relevant to the project shall be discussed in details under this chapter.			
2.1	Original studies made at the time of preparation of the project in respect of (a) Rainfall, (b) Runoff, (c) Flood, (d) Sediment, (e) Ground water, (f) Evaporation, (g) Any other	Part (Source-1.2, p.1 – p.2)	No mention	Part (Source-3.1, p.50)
2.2	Additional data collected after approval and during the operation of the project in respect of (a) Rainfall, (b) Runoff, (c) Floods, (d) Sediment, (e) Ground water, (f) Evaporation, (g) Any other	Part (Source-1.2, p.1 – p.2)	Part (Source-2.2)	No mention
2.3	Review of all studies under 2.1 in the light of new information collected under 2.2.	No mention	No mention	No mention
2.4	Gross/net 75% dependable annual flow available at the site	OK (Source-1.2, p.1)	OK (Source-2.3, p.2)	OK (Source-3.1, p.50)
2.5	Balance groundwater availability	No mention	No mention	No mention
3. Reservoir				
	Original studies made at the time of preparation of project for fixation of MWL, FWL, LWL, DSL, RBL, IOL and revised studies as a result of studies made at paras 2.3 and 6 to 9.	No mention	No mention	No mention
4. Dam/Barrage/Weir				
	Dam/Barrage/Weir and appurtenant structures should be reviewed with regards to the adequacy of design,			

	performance and safety.			
4.1	The following records of the dam are required to be reviewed. (a) Completion report, (b) Operation & maintenance manual, (c) Instrumentation details of the dam, (d) Installation of standard meteorological instruments, (e) Emergency action plans, including inundation maps, (f) Determination of hydrological safety of dams, (g) Checking the dams against maximum credible earthquake.	No mention	No mention	No mention
4.2	The following components are to be checked during the inspection of the dams; [Masonry/concrete dams] 1.Upstream and downstream faces, 2.Dainage gallery, 3.Seepage from foundations, 4.Seepage from body wall, 5.Structural performance, 6.Spillway gates, 7.Spillway bridge, hoist bridge, 8.Energy dissipation arrangements, 9.Walls, 10.End weir, 11.Hydraulic performance of energy dissipation arrangements, 12.Instruments installed and observations, 13.Outlets, 14.Outlet gates, 15.River outlet/river sluice and gates, 16.power outlet, 17.Emergency preparedness, 18.Access roads, 19.Communication facilities, 20.General assessment of condition of the dams [Earth dams] In addition to the above aspects, the following need to be seen; 1.Downstream drainage, 2.Surface drainage of downstream slopes, 3.Seepage measurements, 4.Earth dam section crest, 5.Earth dam section –u/s and d/s slopes, 6.Junction earth work with masonry/concrete sections and outlets, 7.Relief walls, 8.Breaching section (if provide)	No mention	No mention	No mention
4.3	Remedial measures proposed as a part of modernization of project should be described.	OK (Source-1.1, p.9)	OK (Source-2.1, p.5 – p.9)	OK (Source-3.1, p.49)
5.	Land Potential The following points and additional points, if any, as relevant to the project shall be discussed in details under this chapter.			
5.1	Culturable command area (C.C.A) (a)Originally adopted with basis, (b)Basis for fixing, (i)Basis on general topographical maps of survey of India (scale 1:50,000), (ii)Survey conducted to a scale 1:15,000 confirm availability of land, (iii)Based on village maps, (iv)Actual attained at present under the outlet, (c)Area that will be attained in the post modernization stage, the basis thereof. (Refer item (b), (i), (ii), and (iii) above).	Part (Source-1.1, p.3)	Part (Source-2.1,p.1)	Part (Source-3.1, p.49)
5.2	Soil Survey			
	(a)Pre-irrigation (at the time of original project formulation stage), if any, (b)Post-irrigation (after appraisal of the original project and/or during its operation), (c) Latest survey carried out for formulation of the modernization scheme)	No mention	No mention	No mention
5.3	Soil capability classification based on the latest soil survey	No mention	No mention	No mention
5.4	Land irrigability classification based on the latest soil survey	No mention	No mention	No mention
6.	Cropping pattern and crop water requirement The following points and additional points, if any, as relevant to the project shall be discussed in details under this chapter.			

	Note: Where the information is asked in from of table(s) it will be followed by discussions in details under this chapter.			
6.1	Details of pre-project cropping pattern, crop calendar (Annexure 1)	Part (Source-1.1, p.14)	No mention	OK (Source-3.1, p.52)
6.2	Details of original cropping pattern, crop calendar (Annexure 1) and basis for its adoption i.e. (a)Soil surveys and agroclimatic conditions, (b)Ad-hoc (based on information from similar projects in the vicinity), (c)Experimental farm results	Part (Source-1.1, p.14)	Part (Source-2.1, p.15)	Part (Source-3.1, p.52)
6.3	Studies carried out and data collected in respect of crops since operation of the project. (a)Details of crop season, (b)Availability and use of (i)Seeds, high yielding varieties etc, (ii)Fertilisers, (iii)Pesticides, (iv)Weedicides, 8c)Net irrigation and field irrigation requirements crop-wise, (d)Assumed field application efficiency with basis (i)paddy, (ii)upland crop.	No mention	No mention	No mention
6.4	Cropping pattern (details of crop to be discussed Annexure 1) suggested on the basis of latest available data in respect of (a)Land, (b)Soil, (c)Availability of water improved implements and other inputs like improved seeds, fertilizers, weedicides, pesticides etc. (d)Agroclimatic condition, (e)Existing irrigated agricultural practices, (f)Farmers attitude towards new practices.	No mention	Part (Source-2.1, p.15)	No mention
6.5	Estimation of effective rainfall (fortnightly) in different periods of crop season with basis (Fortnightly rainfall & climatic data to be given as per Annexures 6 & 7. Part-II and calculation of effective rainfall may be also given.)	No mention	No mention	No mention
6.6	Assessment of crop water requirements. (a)Based on actual experimental farm data or field plot experiments conducted on different crops. (b) Consumptive use based on Modified Penman method. Note: This data would directly give the field plot water requirement (including losses due to deep percolation and for the effective rainfall, these values directly give field irrigation requirement at the outlet.)	No mention	No mention	No mention
6.7	Assumed conveyance efficiencies with basis. Kharif and Rabi.	No mention	No mention	Part (Source-3.1, p.53)
6.8	Irrigation water requirement (at canal head).(a)Crop water requirement, (b)Irrigation demand table at (i)Kharif, (ii)Rabi, (iii)Two seasonal, (iv)Perennials, (v)Hot water	No mention	No mention	Part (Source-3.1, p.52 – p.54)
7.	Pisciculture			
	(a)Details of pre-project pisciculture activities (area & varieties cultured), (b)Details of originally planned pisciculture activities (area, varieties and month wise water requirement), (c)Details of existing pisciculture activities (area, varieties, month wise water requirement)	No mention	No mention	No mention
8.	Horticulture			
	(a)Details of horticulture crops grown in pre-project conditions, (b)Details of horticulture crops as originally planned with month wise/season wise water requirement, (c)Details of horticulture crops grown at present and water supplied (month wise/season wise), (d)Details of horticulture crops proposed as a part of modernization	No mention	No mention	Part (Source-3.1, p.52)

	alongwith water requirement (month wise/season wise)			
9.	Others			
	Like Domestic & industrial water supply, power generation, navigation etc. Similar details as in 7 and 8 may be furnished.	No mention	No mention	No mention
10.	Demand Table			
	The demand table covering the water requirement in para 6, 7,8 & 9 may be prepared.	No mention	No mention	Part (Source-3.1, p.53 – p.54)
11.	Impact of modernization proposal on existing, ongoing and proposed projects in the basin.			
	(a)Upstream projects, (b)Downstream projects	No mention	No mention	No mention
12.	International/interstate aspect			
	1(a) Impact on international agreements/tribunal awards, 1(b) Impact on interstate agreement/tribunal awards, 1(c) Impact on existing ongoing/proposed projects in the other states/countries to the extent information can be collected with reasonable efforts 2. In respect of irrigation projects on western rivers of Indus basin, the following shall be necessary and followed; (a) Ever efforts shall be made to harness the potential of the water resources and hydropower to the maximum extent permissible under the treaty. (b) The design, construction, initial filling and operation of projects shall conform to the provisions of the Indus water treaty, 1960. (c) A chapter showing compliance to this effort shall be include in the detailed project report (DPR). (d) In irrigation schemes, the irrigated cropped area (ICA) shall conform to the provisions of Indus Water Treaty, 1960.	No mention	No mention	No mention
13.	Canal System			
	The following points and additional points, if any, as relevant to the project shall be discussed in details under this chapter. Note: Where the information is asked in form of table(s), it will be followed by discussion of tabulated data.			
13.1	Hydraulic Survey of the Canal System	Part (Source-1.1, p.7 – p.8)	No mention	No mention
13.2	Field measurement of seepage losses in main/branch/distributary/minor/sub-minor/water courses (Annexure-2).	No mention	No mention	No mention
13.3	Review of the capacity of existing canals (annexure-3) (a) Original design capacity, (b) Present capacity, (c) Is sufficiency or otherwise for the proposed peak requirement including rash irrigation, (d) Design of revised section (lined/unlined)	No mention	No mention	No mention
13.4	Identification of the reaches needing improvement (annexure-2 & 4) (a) Lining, (b) Re-sectioning, (c) Strengthening/stabilization of banks	OK (Source-1.1, p.9)	OK (Source-2.1, p.5- p.9)	OK (Source-3.1, p.53 – p.56)
13.5	Preparation of capacity statement showing discharges from main canal, each branch canal worked out from tail to head taking into account transmission losses as per IS 5968-1970 (Annexure-11 Part-II)	Part (Source-1.1, p.8)	No mention	No mention
13.6	Need for remodeling and extension of existing canal system/new canals and distribution system.	OK (Source-1.1, p.9)	OK (Source-2.1, p.5- p.9)	OK (Source-3.1, p.53 – p.56)

13.7	Review of the existing canal structures and needs for additional structures. And/or remodeling. (a)Headworks, (b)Outlets (number, size, location, command area), (c)Cross regulators, (d)Escapes including terminal, (e)Cross drainage works, (f)Conversion of inlets into cross drainage works., (g) Bridges, (h)Water measuring devices.	Part (Source-1.1, p.9)	OK (Source-2.1, p.5- p.9)	OK (Source-3.1, p.53 – p.56)
13.8	Estimation of conveyance (canal and distribution system) efficiency	No mention	No mention	OK (Source-3.1, p.53)
13.9	Gross water requirement at the canal head.(Annexure-10 Part-II); (a)Irrigation crop-wise (para-6), (b)OPisciculture (para-7), (c)Horticulture (para-9), (d)Domestic water supply (para-9), (e)Industrial water supply (para-9), (f)Power generation (para-9), (g)Navigation (para-9), (h)Others (para-9)	No mention	No mention	Part (Source-3.1, p.53 – p.54)
13.10	Availability of river supplies and storages. (a)Their efficiency to meet diversion requirement based on ten daily/monthly reservoir operation tables, for sufficient number of years (Annexure-12 Part-II). (b)If available supplies are not adequate and the head-works not capable to divert the peak requirements into the canal system, the head-works, may be redesigned suitably based on proper investigations after examining the possibility of (i)Raising the F.R.L of the reservoir,(ii)Providing back-up storage for diversion structures, (iii)raising the pond level of diversion works by installing mechanically/electrically operated gates on the diversion weir, (iv)Supplementing water supply by exploitation of ground water. ©If there is no possibility of increasing storage/pondage to the required extent or providing the necessary back-up storage or supplementary water supplies by ground water, the cropping pattern/irrigation intensity/area to be irrigated may be suitably adjusted to match the availability of the supplies and pattern of diversion requirement.	No mention	No mention	No mention
13.11	Details of land-water budgeting showing whether land available is more than corresponding quantity of water or vice-versa.	No mention	No mention	No mention
13.12	Intensity of irrigation crops-wise (season-wise) (a)Pre project, (b)As originally proposed, (c)As actually attained, (d)As proposed in post-modeemisation stage. Note: irrigation includes pisciculture, horticulture and others.	No mention	No mention	Part (Source-3.1, p.52)
13.13	Water quality; (a)Period of study, (b)Physical, chemical and bacteriological, (i)Salinity, (ii)pH, (iii)SAR, (iv)Boron, Phosphorus, Fluoride Studies should be made for upstream, reservoir and downstream area. Reasons for variation in water quality parameters should be studied and described. Measures for improvement in water quality should also be described and provided for in the project.	No mention	No mention	No mention
14. Power				
14.1	Present Status If there is any installed capacity in the project proposed to be modernized, its details i.e. installed capacity, unit size, load factor, type & size of power house, type of turbines, rated head, rated/design unit discharge, specific speed generator type, capacity, voltage, power benefits & firm	No mention	No mention	No mention

	power/energy generation, type of station i.e. peaking or non-peaking etc. may be discussed.			
14.2	Modernisation/Uprating proposal Impact of modernization proposal on the existing power generation may be discussed and alternative arrangements for power generation, if any, in case of adverse impact on existing power generation, may be discussed. If there is any proposal for modernization on the power pant, that may also be discussed here. Details of power evacuation arrangement and adequacy of the existing evacuation system to evacuate the enhanced power may be given. Detailed information also to be furnished for existing/proposed system for lift canal or other pumping system for drinking water supply system including power requirement & sources of power for lift/pumping scheme.	No mention	No mention	No mention
15	Navigation			
	Impact of modernization proposal on navigation may be discussed. Remedial measures, if any may also be discussed and prepared for.	No mention	No mention	No mention
16.	Ground Water			
	The following points and additional points, if any, as relevant to the project shall be discussed in details under this chapter.			
16.1	Depth of ground water level (present) (a)Pre-monsoon, (b)Post-monsoon	No mention	No mention	No mention
16.2	Assessment of the ground water potential in the command area; (a)Total potential, (b)Present use, (c)balance for future utilization	No mention	No mention	No mention
16.3	Quality of ground water (salinity, P, SAR, B, F, etc.) – Suitability for irrigation & drinking.	No mention	No mention	No mention
16.4	Assessment of possible impact on ground water recharge due to canal lining and ground water utilization and action taken for its replenishment.	No mention	No mention	No mention
16.5	Identification of areas where ground water; (a)Can be exploited economically, (b)Cannot be exploited due to non-availability of ground water aquifer or the quality being not suitable.	No mention	No mention	No mention
16.6	Conjunctive use of surface and ground waters-identification of areas where this is possible, such as areas of rising water table and detailed proposals may be formulated as per CWC guidelines for planning conjunctive use of surface and ground water in irrigation projects.	No mention	No mention	No mention
16.7	Possibility of ground water utilization for irrigation areas not commanded by the canal system.	No mention	No mention	No mention
17.	Drainage and land reclamation			
	The following points and additional points, if any, as relevant to the project shall be discussed in details under this chapter.			
17.1	Review of existing drainage system; (a)Maximum 1, 2 and 3 day rainfall in the command, (b)Assessment of water logging, soil salinity, alkalinity., (c)Identification of areas needing drainage and reclamation. (d)Length of the existing drains and its intensity per sq.km of GCA.	No mention	No mention	Part (Source-3.1, p.56)
17.2	Type of drainage needed with proposals; (a)Surface drainage, (b)Sub-surface drainage,(c)Vertical drainage (tubewells).	No mention	No mention	No mention

17.3	Type of reclamation needed with proposal; (a)Soil salinity, (b)Alkalinity, (c)Sodicity	No mention	No mention	No mention
18. Land acquisition, rehabilitation and resettlement				
18.1	Land acquisition category-wise i.e. Government, forest, private land proposed to be acquired may be furnished for various components of the project as under; (a)Dam/reservoir, (b)Main canals/branch system, (c)Distribution system, (d)Drainage improvement, (e)O.F.D works	No mention	Part (Source-1, p.4)	No mention
18.2	Rehabilitation/resettlement; (a)If villages affected (partly/fully), (b)No. of families/population affected, (c)Proposals for R & R – Definition of family and R & R package are to be in accordance with the State Government's policy on R & R/National policy on R & R (as & when finalized). Detailed breakup of families/population in this ST/SC/OBC and general categories be given.	No mention	Part (Source-2.1, p.3)	No mention
19. Water management and maintenance				
The following points and additional points, if any, as relevant to the project shall be discussed in details under this chapter.				
19.1	Review of existing system of operation, maintenance and distribution (CWC's guidelines issued in March, 1997 may please referred to)	No mention	No mention	Part (Source-3.1, p.57 – p.64)
19.2	Water Users Associations (WUA)/Participating irrigation Management (PIM). The existing set up, if any may be their constitution, powers, function etc. may be described.	No mention	No mention	Part (Source-3.1, p.57 – p.64)
19.3	Water supplied (existing/proposed); (a)Irrigation, (b)Drinking water, (c)Industrial, (d)Power generation, (e)Others	No mention	No mention	Part (Source-3.1, p.57 – p.64)
19.4	Improvements proposed; (a)Scope of introduction of modern technology like sprinkler, drip irrigation etc. specially in lift schemes, (b)Ground water recharging/conjunctive use, (c)Use of poor quality water, (d)Recycling of drainage water, (e)Instrumentation for assessing day to day canal requirement accurately, (f)Canal automation, (g)Any other improvements.	No mention	No mention	Part (Source-3.1, p.57 – p.64)
20. On farm development				
The following points and additional points, if any, as relevant to the project shall be discussed in detail under this chapter.				
20.1	Review of the present on-farm development works and proposed improvements; (a)Water courses, field channels and field drain, (b)Land leveling and land shaping	No mention	No mention	No mention
20.2	Status of individual holdings; (a)Land holdings, (b)Land consolidation (past efforts), (c)Deficiencies and proposals for improvement	No mention	No mention	No mention
20.3	Extension services – Details of existing and proposed services under different ongoing programmes of agriculture and other departments and those proposed under modernization proposal should be furnished. (a)Trail-cum-demonstration farmers, demonstration on farmer's fields, package programs etc., (b)Dissemination of information to the farmers through audio@visual media, like radio, television, films etc., (c)Farmers' training, (d)Others	No mention	No mention	No mention

20.4	Facilities for input supplies-details of existing and proposed facilities under various ongoing schemes/programmes and proposals under modernisation proposals may be furnished; (a)Institutional finance, (b)Agricultural credit, (c)Seeds, (d)Fertilizer, (e)Pesticides, (f)Weedicides.	No mention	No mention	No mention
20.5	Infra-structural facilities-existing and proposed; (a)Roads including ayacut and farm roads, (b)Railways, (c)Navigable water ways, (d)Airfields, (e)Grain storage, (f)Agro-processing, (g)Agro-servicing, (h)Animal husbandry, (i)Poultry, (j)Dairying, (k)Markets (mandis), (l)Any other.	No mention	No mention	No mention
20.6	Communication facilities-existing and proposed; (a)Telephone, (b)Telegraph, (c)Wireless, (d)E-mail, internet, NIC NET.	No mention	No mention	No mention
21. Construction programme				
	Works should be planned for a period of 5 days, If required the project can be taken up in stages & phases rather than planning completion of the project over a long period. Detailed construction programme split into different packages may be given.	No mention	No mention	No mention
21.1	Physical	No mention	No mention	No mention
21.2	Financial	No mention	No mention	No mention
22. Construction organization				
22.1	Organization set-up for execution (including quality control) of the modernization works with justification.	No mention	No mention	No mention
22.2	Organization set-up for execution of OFD works with justification	No mention	No mention	No mention
23. Environment, Ecology and Forest aspects (details as per Para 17 Section-3 Part-II)				
	As per MOEF's notification, environmental clearance is required if the project is estimated to cost more than Rs. 50 crores. Forest clearance would be required if diversion of forest land is envisaged. Clearance of R & R action plan is required if population affected/displaced is tribal.	No mention	Part (Source-2.1, p.3)	No mention
24. Economic Evaluation				
	Guidelines for economic evaluation of projects as given in Chapter-7 Part-1 & Part-2 Section-3 Part-2 applicable for modernisation project as well. The following points and additional points, if any, as relevant to the project shall be discussed in details under this chapter.			
24.1	Cost estimates (a)Modernization works (details as per para 18, Section-3, Part 2), (b)Existing works	Part (Source-1.1, p.16 – p.17)	OK (Source-2.1, p.17 -)	Part (Source-3.1, p.69)
24.2	Benefits	Part (Source-1.1, p.13 – p.15)	Part (Source-2.1, p.14- p.16)	Part (Source-3.1, p.67)
24.3	Operation and maintenance charges; (a)Present, (b)Proposed	No mention	No mention	Part (Source-3.1, p.68)
24.4	Water rate from irrigation, drinking water, industrial water supply, power generation etc. (a)Present, (b)Proposed	No mention	No mention	No mention
24.5	Betterment Levy; (a)Present, (b)Proposed	No mention	No mention	No mention
24.6	Assessment of crop yield; (a)Pre project, (b)Pre modernization, (c)Post modernization	No mention	Part (Source-2.1, p.15 – p.16)	No mention
24.7	Benefit cost ratio	OK (Source-1.1,	OK (Source-2.1,	OK (Source-3.1,

	p.13)	p.14)	p.69)
24.8 Internal rate of return (IRR)	No mention	No mention	Part (Source-3.1, p.69)
24.9 Financial return	No mention	No mention	No mention
24.10 Baseline survey & development of parameters for evaluation of the performance of the project at regular intervals say 5 years after completion of the project.	No mention	No mention	No mention
25. Administrative and legislative provisions The following points and additional points, if any, as relevant to the project shall be discussed in details under this chapter.			
25.1 Measures and procedures; (a)Deficiencies in existing measures and procedure, (b)Proposed measure to overcome or remove the deficiencies	No mention	No mention	No mention
25.2 Assessment and mode of collection of revenue; (a)Existing, (b)Modification proposed, if any.	No mention	No mention	No mention
25.3 Assessment and mode of collection of betterment levy; (a)Existing, (b)Modification proposed, if any.	No mention	No mention	No mention
26. Facilities for training the operational and maintenance personal The following points and additional points, if any, relevant to the project shall be discussed in details under this chapter.			
26.1 Existing	No mention	No mention	Part (Source-3.1, p.60)
26.2 Proposals for improvement and extension	No mention	No mention	Part (Source-3.1, p.60)

Source: JICA Survey Team

Remarks:

*: Government of India, Ministry of Water Resources, "Guideline for Preparation of Detailed Project Report of Irrigation & Multipurpose Projects 2010"

[Vottigedda Medium Irrigation Project]

Source-1.1: Absrtract and Detailed Estimate CWC Format, Modernization of Vottigedda Reservoir Project Eawada (V), J.M.Valasa (M), Vizianagaram District.

Source-1.2: Hydrological Studies of Vottigedda Project, Vizianagaram District, Andhra Pradesh

[Thammileru Medium Irrigation Project]

Source-2.1; Modernisation of thammileru reservoir Project Volume-I Abstrcut Estimates

Source-2.2; Statement showing the Monthly water utilisation on Thammileru Reservoir Project, Nagireddigudem, W.G. District, 1991/92 to 2013/14

Source-2.3; Hydrological Studies of Thammileru Reservoir Project, West Godavari District, Andhra Prased

[Krishnapuram Medium Irrigation Project]

Source-3.1; Volume-1 Project Report on modernization Project Proposals of Krishnapuram Projct in Karvetinagaram Mandal of Chittoor District

Attachment 8.2.4 Detailed Field Survey
Check List for Vottigedda Medium Irrigation Project

Check List for Vottigedda Medium Irrigation Project in Vizianagaram District

Items		DPR description		Evaluation by JICA Team		
		Description	Source	Result	Reason	
1. Hydrology	1.1 Yield Studies (Water availability)		Data is the latest 40 years (1971-72 to 2010-11) monthly rainfall data. Homogeneity test is done.	Hydrological Studies of Vottigedda Project, p.1	OK	JICA survey team got the report and confirmed at the wrap up meeting as follows; The rainfall data is more than 20 years and homogeneity test is done.
	1.2 Inflow data		Data is 34 years (1977-78 to 2010-11) monthly net inflow data. Homogeneity test is done. The consistency of the observed inflow data with catchment rainfall is also checked.	Hydrological Studies of Vottigedda Project, p.1	OK	JICA survey team got the report and confirmed at the wrap up meeting as follows; The inflow data is more than 20 years and homogeneity test is done. The consistency of the data is checked.
	1.3 Upstream utilization		There are no minor project/ schemes in its catchment on upstream side of Vottigedda project.	Hydrological Studies of Vottigedda Project, p.1	OK	JICA survey team got the report and confirmed at the wrap up meeting as follows; There are no upstream utilization.
	1.4 Maximum Flood Discharge		The maximum flood discharge calculations have been done as per guidelines given in "Flood Estimation Report for Eastern Coast Region Sub-zone-4(a, b, c)" -1987 of Central Water Commission, New Delhi.	Hydrological Studies of Vottigedda Project, p.2	OK	The calculations are based on the guideline of CWC.
	1.5 Sedimentation		The hydrographic survey was conducted by the Andhra Pradesh Engineering Research Laboratory, Humayathsagar, Hyderabad in the year 2005 for sedimentation study.	Hydrological Studies of Vottigedda Project, p.2	OK	The calculations are based on the hydrographic survey.
2. Farming	2.1 Present Cropping Pattern	(1) Kharif crops	Paddy is a predominant Kharif crop, accounting 100% of irrigated area (6,746.25ha).	Abstract and Detailed estimate CWC Format, p.3	OK	Paddy is a predominant Kharif crop.
		(2) Rabi crops	Single cropping is a common practice.	Same as above	OK	Single cropping is a common practice.
	2.2 Proposed Cropping Pattern	(1) Kharif crops	Paddy: 100%	—	OK	JICA Team confirmed by kick off meeting as follows; Proposed cropping pattern is double. The main crops are pasesu, maize, groundnut, and cotton.
		(2) Rabi crops	There account for about 30% of the total Kharif crop area depending on the water availability in the reservoir after modernization.	Abstract and Detailed estimate CWC Format, p.3	OK	
3. Water Balance (Irrigation Plan)	3.1 Water Resources		It is not mentioned.	—	Recommendation	JICA survey team could not collect the water balance report. The team recommends to prepare the documents and to confirm the balance.
	3.2 Water Requirement		It is not mentioned.	—		
	3.3 Water Balance		It is not mentioned.	—		
4. Facility Design	4.1 Dam	(1) Dimension of dam	• Dam type: Earth dam of homogeneous type	—	Ok	JICA Team confirmed by Design drawings
			• Top of bund level: 124.66m	Volume-1	Ok	
			• H.W.L/F.W.L: 121.62m	Volume-1	Ok	
			• Freeboard of dam: fb=3.04m(calculated)	—	Ok	JICA Team confirmed by Indian Standards. Freeboard is not less than 2.0m (IS 10635 of WRD)
			• Deepest bed level: 97.26m	Project notes	Ok	
			• Dam height: 27.4m	Project notes	Ok	
			• Top width of bund: 4.5m	Volume 1	—	Top width of bund is less than 6m (IS 8826), it is not satisfied the condition of Indian Standards
			• Side slope of upstream/downstream of dam	Volume-1	Ok	JICA Team requested to be confirmed by Design reports
			Upstream 1:1.2-10.0			
			Downstream 1:2.0-3.5			
4.2 Spillway	(1) Food discharge	(1) Food discharge	• Maximum flood discharge: 1507.6 m ³ /s	Volume-1	Ok	The calculations are based on the guideline of CWC
			(2) Capacity of Spillway	• Spillway gates: B12.2 H6.4-3nos.	Volume-1	Ok
			• Spillway length(overflow section): 48.8m	—	Ok	JICA Team calculated
			• Capacity of spillway: 1507.6m ³ /s	Volume-1	Ok	JICA Team requested to be checked by Design reports
4.3 Intake	(1)Design discharge	(1)Design discharge	• Left side: 1.70 m ³ /s	Volume-1	Ok	The calculations are based on the Design reports
			• Right side: 6.40m ³ /s	Volume-1	Ok	
	(2)Gates	(2)Gates	• Left side: B1.2 H1.2m	Volume-1	Ok	The calculations are based on the Design reports
			• Right side: B1.8 H1.8m	Volume-1	Ok	
4.4 Canal	(1)Design discharge	(1)Design discharge	• Left Main canal: 1.70m ³ /s	Volume-1	Ok	The calculations are based on the Design reports
			• Right Main canal: 6.40m ³ /s	—	Ok	
			• Distributor System: varied	—	Ok	
	(2)Canal length	(2)Canal length	• Left Main canal: 8.047km	Volume-1	Ok	The calculations are based on the Design reports
			• Right Main canal: 9.756km	Project notes	Ok	
			• Distributor System: 29.5km	—	Ok	
	(3)Standard section	(3)Standard section	• Left Main canal	Volume-1	Ok	The calculations are based on the Design report
			• Right Main canal	—	Ok	
			• Distributor System	—	Ok	
4.5 Drip Irrigation			It is not mentioned.	—	OK	JICA Team confirmed by the kick of meeting as follows; Paddy is 100% out of crops, Farmers do not want to promote the drip irrigation for irrigated dry (ID) crops.
4.6 Road (Farm land or village to market or town)			It is not mentioned.	—	OK	JICA Team confirmed by the kick of meeting as follows; The roads are developed fully, Farmers do not want to develop the roads more.
5. Others	5.1 Land acquisition		Not mentioned.	—	OK	JICA Team confirmed by the kick of meeting as follows; Land acquisition is not required, because it is a rehabilitation project.

Source: JICA Survey Team

Photographs of Vottigedda Medium Irrigation Project (1/2)



(Dam) Top of Bund (Dam): Repair



(Spillway) D/S apron: Repair



(Spillway) Gates: Replacement (wire ropes, rubber seals, painting etc.)



(Spillway) Gates: Replacement (wire ropes, rubber seals, painting etc.)



Intake of Left Side: Replacement (concrete and sluice gate)



Intake of Right Side: Repair (concrete) and replacement (sluice gate)

Source: JICA Survey Team

Photographs of Vottigedda Nedium Irrigation Project (2/2)



Right Main Canal: Lining



Right Main Canal: Distributor



Right Main Canal: Regulator and Bridge



Right Main Canal: Distributor_Syphon



Right Main Canal: Distributor_Bridge



Right Main Canal: Distributor_UT (Drain Syphon)

Source: JICA Survey Team

Scope of Works for Clustered Minor Irrigation Projects of Vottogedda Medium Irrigation Project

Minor Irrigation Project (1)

Basic Information

Date (DD/MM/YY) :	29/Jan./2016	District Name :	Vizianagaram
Project Name :	<u>Konkamavva tank of dalaivalasa</u>	Command Area:	152.29 (ha)

Scope of Works

Facilities		Quantity	Contents
Tank	Bund	L= 700 (m)	Reshaping (slope/embankment/removing trees)
	Surplus Weir	N = 1 (nos.)	Reconstruction
	Sluice	N = 3 (nos.)	Reconstruction
Canal	Earth channel	L = 800 (m)	Reconstruction (downstream of the surplus weir)
On Farm	Field Channel	L = 200 (m)	Repair (earth channel)

Source: JICA Survey Team

Minor Irrigation Project (2)

Basic Information

Date (DD/MM/YY) :	29/Jan./2016	District Name :	Vizianagaram
Project Name :	<u>Tamara tank of Ullibhadra</u>	Command Area:	46.22 (ha)

Scope of Works

Facilities		Quantity	Contents
Tank	Bund	L= 700 (m)	Reshaping (slope/embankment/removing trees)
	Surplus Weir	N = 1 (nos.)	New construction
	Sluice	N = 2 (nos.)	Repair (replacement of gates)
		N = 2 (nos.)	Reconstruction
Canal	Earth Canal	L = 1,650 (m)	Reconstruction (supply channel)
On Farm	Field Channel	L = 200 (m)	Repair (earth channel)

Source: JICA Survey Team

Konkamayya Minor Irrigation Project in Vizianagaram District



Bund: Reshaping



Bund: Reshaping



Surplus weir: Reconstruction



Sluice: Reconstruction



Drain Channel (downstream of the surplus weir): Reconstruction



Field channel: Repair

Source: JICA Survey Team

Tamara Minor Irrigation Project in Vizianagaram District

 <p>Tank</p>	 <p>Tank</p>
<p><u>Bund</u>: Reshaping</p>	<p><u>Bund</u>: Reshaping</p>
	
<p><u>Sluice</u>: Reconstruction</p>	<p><u>Supply channel</u>: Reconstruction</p>
	
<p><u>Sluice</u>: Reconstruction</p>	<p><u>Surplus Weir</u>: New construction</p>

Source: JICA Survey Team

Check List for Thammileru Medium Irrigation Project (1/2)

Check List for Thammileru Medium Irrigation Project in West Godavari District (1/2)

Items			DPR description		Evaluation by JICA Team	
			Description	Source	Result	Reason
1. Hydrology	1.1 Water Availability	(1) Rainfall data	Latest 35 years rainfall data (from 1977-78 to 2011-12) for two rain gages. Homogeneity test has been performed and the data is homogeneous.	Hydrological Studies, p.2	OK	The data is more than 30 years.
		(2) Consistency of rainfall data	Consistency of rainfall data is checked by double mass curve.	Hydrological Studies, p.2 and p.22 to p.28	OK	The data is checked by double mass curve.
		(3) Weighted rainfall	Thiessen weights by thiessen polygon method have been worked out. Homogeneity test is performed on weight rainfall data.	Hydrological Studies, p.2	OK	Thiessen method is common and data is checked.
		(4) Inflow data	Latest 32 years inflow data (from 1980-81 to 2011-12). Homogeneity test has been performed and the data is homogeneous.	Hydrological Studies, p.2	OK	The data is more than 30 years.
		(5) Consistency of inflow data	Consistency of inflow data is checked with weighed rainfall data.	Hydrological Studies, p.2	OK	The data is checked.
		(6) Upstream utilization	The total actual annual upstream utilization under the minor irrigation tanks is obtained.	Hydrological Studies, p.2	OK	JICA Team confirmed at the kick off meeting as follows; The irrigation and drinking water utilization is considered.
	1.2 Maximum Flood Discharge		The discharge calculations have been done as per guidelines given in "Flood Estimation Report for Eastern Coast Region Subzone-4 (a, b, c)" of 1987 of Central Water Commission, New Delhi.	Hydrological Studies, p.3	OK	The calculations are based on the guideline of CWC.
1.3 Status of Sedimentation		So far hydrographic survey is not carried out for this project. The sedimentation is estimated using "Compendium on Silting of reservoirs in India" given for East Flowing Rivers up to Godavari published by the Central Water Commission.	Hydrological Studies, p.2	OK	The estimation is based on the rate of CWC.	
2. Farming	2.1 Present Cropping Pattern	(1) Kharif crops	Before modernization: Paddy (7,120 acre) and Maize (549 acre).	Statement showing Yield Particulars	OK	Paddy is generally a main crop for medium irrigation projects.
		(2) Rabi crops	The cropping pattern is single, only Kharif season.	—	OK	Same as above.
	2.2 Proposed cropping pattern	(1) Kharif crops	After modernization: Paddy (8,100 acre) and Maize (1,069 acre)	Statement showing Yield Particulars	OK	Paddy is generally a main crop for medium irrigation projects.
		(2) Rabi crops	It is not mentioned.	—	OK	It is single cop.
3. Water Balance (irrigation plan)	3.1 Water Resources (availability)		Inflow, spillway out flow, and rainfall data are available regarding Thammileru reservoir during 24 years from 1991 to 2014.	Monthly water utilisation on Thammileru Reservoir Project	Recommendation	JICA Team confirmed at the kick off meeting as follows; Water availability is calculated by using the data.
	3.2 Water Requirement		Water requirement for paddy is 11.61 MCM, for maize is 0.764 MCM.	-	OK	JICA Team confirmed water requirement at the kick off meeting.
	3.3 Water Balance		It is not mentioned.	-	Recommendation	JICA survey team recommended as follows; The water balance should be evaluated based on the water availability and the water requirement.
4. Facility Design	4.1 Dam	(1) Dimension of dam	<ul style="list-style-type: none"> • Dam type: Earth dam of zone type • Top of bund level: 111.25m • H.W.L/F.W.L(FTL): 108.204m • L.W.L(MDDL): 98.602m • Freeboard of dam: 3.046m(calculated) • Deep bed level: 87.996m • Dam height: 23.254m • Top width of bund: 4.5m • Side slope of upstream/downstream of dam Upstream 1:1.0-3.0 Downstream 1:2.0 	-	Ok	JICA Team confirmed by design drawings
				-	Ok	The same as above
				Volume-1	Ok	
				Volume-1	Ok	
				-	Ok	JICA Team confirmed by Indian Standards. Freeboard is not less than 2.0m (IS 10635 of WRD)
				-	Ok	JICA Team confirmed by design report
				-	Ok	JICA Team calculated
				-	-	Top width of bund is less than 6m (IS 8826), it is not satisfied the condition of Indian Standards
				-	Ok	JICA Team confirmed by design drawings

Source: JICA Survey Team

Check List for Thammileru Medium Irrigation Project (2/2)

Check List for Thammileru Medium Irrigation Project in West Godavari District (2/2)							
Items		DPR description		Evaluation by JICA Team			
		Description	Source	Result	Reason		
4. Facility Design	4.2 Spillway	(1) Flood discharge	• Maximum flood discharge: 736 m ³ /s	Volume-1	Ok	The calculations are based on the guideline of CWC (26000e/s x 0.0283)	
		(2) Capacity of Spillway	• Spillway gates: B12.9-H4.6 x 3nos. • Spillway length(overflow section): 38.7m • Capacity of spillway: 736m ³ /s	Volume-1 - Volume-1	Ok Ok	The calculations are based on the Design reports JICA Team calculated JICA Team checked as below Q=CBH ^{1.5} =764m ³ /s>736 OK in case of C=1.8-2.0	
	4.3 Intake	(1) Design discharge	• Left side: 5.097 m ³ /s • Right side: 2.55 m ³ /s • Monkollu Main canal: 0.72 m ³ /s	Volume-1 The river basin and its developments	Ok	The calculations are based on the Design reports	
		(2) Gates	• Left side: B1.22 H1.85m x 1nos • Right side: B0.91 H1.52m x 1nos • Monkollu Main canal: B0.91 H1.52m x 1nos	Volume-1 The river basin and its developments	Ok	The calculations are based on the Design reports	
	4.4 Canal	(1) Design discharge	• Left Main canal: 5.097 m ³ /s • Right Main canal: 2.55 m ³ /s • Monkollu Main canal: 0.72 m ³ /s	Volume-1 The river basin and its developments	Ok	The calculations are based on the Design reports	
		(2) Canal length	• Left Main canal: 11.985km • Right Main canal: 6.508km • Monkollu Main canal: 3.38km	Volume-1 The river basin and its developments	Ok	The calculations are based on the Design reports	
		(3) Standard section	• Left Main canal • Right Main canal • Monkollu Main canal	Volume-1 The river basin and its developments	Ok	The calculations are based on the Design reports	
	4.5 Drip Irrigation		It is not mentioned.	—	Recommendation	JICA Team confirmed at the kick off meeting as follows; It is possible to promote the drip irrigation in the project. Drip irrigation is proposed in and around Thammileru project by JICA Team.	
	4.6 Road (Farm land or village to market or town)		It is not mentioned.	—	OK	JICA Team confirmed at the wrap up meeting as follows; If it is necessary, DoWR propose.	
	5. Cost Estimate	5.1 Unit Cost	The estimate is prepared based on current SSR for the year 2014-15.	Abstract Estimates, p.4	OK	The estimate will be coordinated based on inflation by JICA survey team.	
6. Others	6.1 Land acquisition	No land acquisition is required as it is not only modernization of existing system.	Abstract Estimates, p.4	OK	It is mentioned clearly.		
	6.2 Resettlement	Resettlement is not involved and hence not required.	Abstract Estimates, p.3	OK	It is mentioned clearly.		
	6.3 Data of Crops	The data of crops have been obtained from agricultural department.	Abstract Estimates, p.4	OK	The data is based on agricultural department.		

Source: JICA Survey Team

Thammileru Medium Irrigation Project in West Godavari (1/2)



(Dam) Toe drain: Repair



(Spillway) Rubber seals of gates: Replacement



(Generator House) Generator: Replacement



(Left side intake) Gate: Replacement



(Left Main canal) Wall type canal: Reconstruction



(Left main canal) Off take: Reconstruction

Source: JICA Survey Team

Thammileru Medium Irrigation Project in West Godavari (2/2)



(Left main canal) Aqueduct: Reconstruction



(Left main canal) Regulator: Replacement of gate



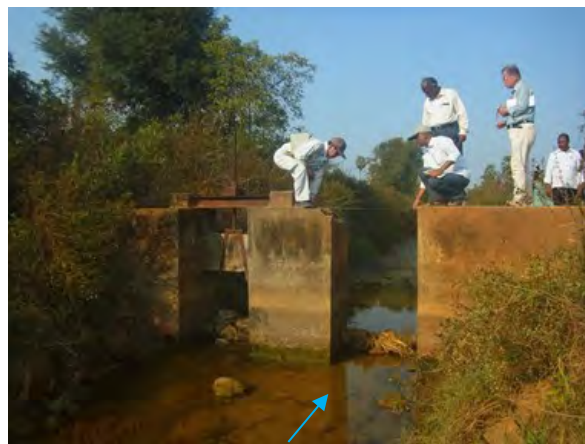
(Left main canal) Siphon: Reconstruction



(Left main canal) Drop: Reconstruction



(Monkollu main canal) Off take: Wall type canal



(Right main canal) Regulator: Reconstruction

Source: JICA Survey Team

Scope of Works for Minor Irrigation Projects Near to Thammileru Medium Irrigation Project in West Godavari District

Minor Irrigation Project (1)

Basic Information

Date (DD/MM/YY) :	04/Feb./2016	District Name :	West Godavari
Project Name :	<u>Pedda Tnak</u>	Command Area:	426.55 (ha)

Scope of Works

facilities		Quantity	Contents
Tank	Bund	L= 2,850 (m)	Reshaping (slope/embankment/removing trees)
	Surplus Weir	N = 2 (nos.)	Reconstruction
	Sluice	N = 1 (nos.)	Reconstruction
Canal	Earth Canal	L = 8,168 (m)	Repair
	Bridge	N= 2	Not mentioned
	Escape	N= 1	
	Falls	N= 1	
	Aqueduct/UTs	N= 5	
	Inlet	N= 6	
	Gide wall	N= 1	
On Farm	Distribution Box	N = 7 (nos.)	Repair

Source: JICA Survey Team

Minor Irrigation Project (2)

Basic Information

Date (DD/MM/YY) :	04/Feb./2016	District Name :	West Godavari
Project Name :	<u>Vemanakunta Tnak</u>	Command Area:	42.55 (ha)

Scope of Works

facilities		Quantity	Contents
Tank	Bund	L= 1,150 (m)	Reshaping (slope/embankment/removing trees)
	Surplus Weir	N = 2 (nos.)	Reconstruction
	Sluice	N = 3 (nos.)	Repair (gates and civil work of wing walls)
Canal	Earth Canal	L = 4,500 (m)	Repair
	Structure/Ramps	N= 4	

Source: JICA Survey Team

Pedda Minor Irrigation Project in West Godavari



Bund: Reshaping



Surplus Weir 1: Reconstruction



Surplus Weir 2: Reconstruction



Sluice: Reconstruction



Feeder canal: Reconstruction



Field channel: Reconstruction

Source: JICA Survey Team

Vemanakunta Minor Irrigation Project in West Godavari

	
<p><u>Bund</u>: Reshaping</p>	<p><u>Surplus Weir 1</u>: Reconstruction</p>
	
<p><u>Surplus Weir 2</u>: Reconstruction</p>	<p><u>Gate of sluice</u>: Replacement</p>
	
<p><u>Feeder canal</u>: Reconstruction</p>	<p><u>Field channel</u>: Reconstruction</p>

Source: JICA Survey Team

Check List for Krishnapuram Medium Irrigation Project

Items		DPR description		Evaluation by JICA Team			
		Description	Source	Result	Reason		
1. Hydrology	1.1 Rainfall Data	The record of the LAVA which is water resources of the project is observed from 1982 to 2015 (34 years).		Project report Volume 1, p.50	OK The data is more than 30 years.		
2. Farming	2.1 Present Cropping Pattern	(1) Kharif crops	Kharif crops are paddy and ID crop (ground nut).	Project report Volume 1, p.55	OK The present and proposed cropping pattern is shown.		
		(2) Rabi crops	Rabi crops are paddy and ID crop (ground nut).				
	2.2 Proposed cropping pattern	(1) Kharif crops	Kharif crops are paddy and ID crop (ground nut).				
		(2) Rabi crops	Rabi crops are paddy and ID crop (ground nut).				
3. Water Balance	3.1 Water Availability	The calculation is based on the previous (existing) project report.		Project report Volume 1, p.57	Recommendation		
	3.2 Water Requirement						
	3.3 Water Balance						
4. Facility Design	4.1 Dam	(1) Dimension of dam	• Dam type: Zone type	—	OK	JICA Team confirmed by Design drawings JICA Team confirmed by Indian Standards. Freeboard is not less than 2.0m (IS 10635 of WRD) Top width of bund is less than 6m (IS 8826), it is not satisfied the condition of Indian Standards JICA Team confirmed by Design drawings_	
			• Top of bund level: 215.0m	Project note Volume-1	OK		
			• H.W.L/F.W.L: 213.0m	—	OK		
			• Freeboard of dam: fb=2.0m(JICA Team calculate)	—	OK		
	• Deep bed level: 194.0m	Project note	OK				
	• Dam height: 21.0m	Project note	OK				
	• Top width of bund: 5.0m	Volume-1	—				
	• Side slope of upstream/downstream of dam Upstream 1:2.0-3.0 Downstream 1:2.5	Project note	OK				
	4.2 Spillway	(1) Flood discharge	• Maximum flood discharge: 1069m ³ /s	Project note	OK		The calculations are based on the guideline of CWC (37.775C/s)
			• Spillway gates: B12.2 H6.1 - 3nos	Project note	OK		
	(2) Capacity of Spillway	• Spillway length(overflow section): 36.6m	—	OK	The calculations are based on the Design reports JICA Team calculated JICA Team checked as below $Q = CBH^{1.5} = 1103m^3/s > 1069$ OK. in case of C=1.8-2.0		
		• Capacity of spillway: 1069m ³ /s	—	OK			
4.3 Intake	(1) Design discharge	• Left side: Q=2.78 m ³ /s • Right side: Q=8.46 m ³ /s	Project notes	Ok	The calculations are based on the Design reports		
	(2) Gates	• Left side • Right side	No mention No mention	—		JICA Team requested to be confirmed by Design reports	
4.4 Canal	(1) Design discharge	• Left Main canal: Q=2.78 m ³ /s • Right Main canal: Q=8.46 m ³ /s	Project notes	Ok Ok	The calculations are based on the Design reports		
	(2) Canal length	• Left Main canal: 7.0km • Right Main canal: 4.05km • Left side tail end distributary: 6.0km	Project notes	Ok Ok Ok			
	(3) Standard section	• Left Main canal • Right Main canal	Project notes	Ok Ok			
	4.5 Drip Irrigation	It is not mentioned.		—	Recommendation JICA Team confirmed at the kick off meeting as follows; It is possible to promote the drip irrigation in the project. Drip irrigation is proposed in and around Krishnapuram Project by JICA Team.		
	4.6 Road (Farm land or village to market or town)	It is not mentioned.		—	Recommendation JICA Team confirmed at the kick off meeting as follows; DoWR will discuss with other department regarding the road development.		
5. Others	5.1 Land acquisition	It is not mentioned.		—	OK JICA Team confirmed at the kick off meeting as follows; There is not land acquisition.		
	5.2 Resettlement	It is not mentioned.		—	OK JICA Team confirmed at the kick off meeting as follows; There is not resettlement.		

Source: JICA Survey Team

Investigation form leakage from reservoir

1. Confirmation of leakage spot

- 3 types of leakage
 - i) Leakage of directly through dam body
 - ii) Leakage of detour through ground
 - iii) Leakage of guide conduit
- Allowable leakage of “Indian Standard”

If leakage value is less than allowable leakage → No problem

more than allowable leakage → Need countermeasures

→”Japanese Standard: $V=0.05\% \times \text{Live storage/day}$

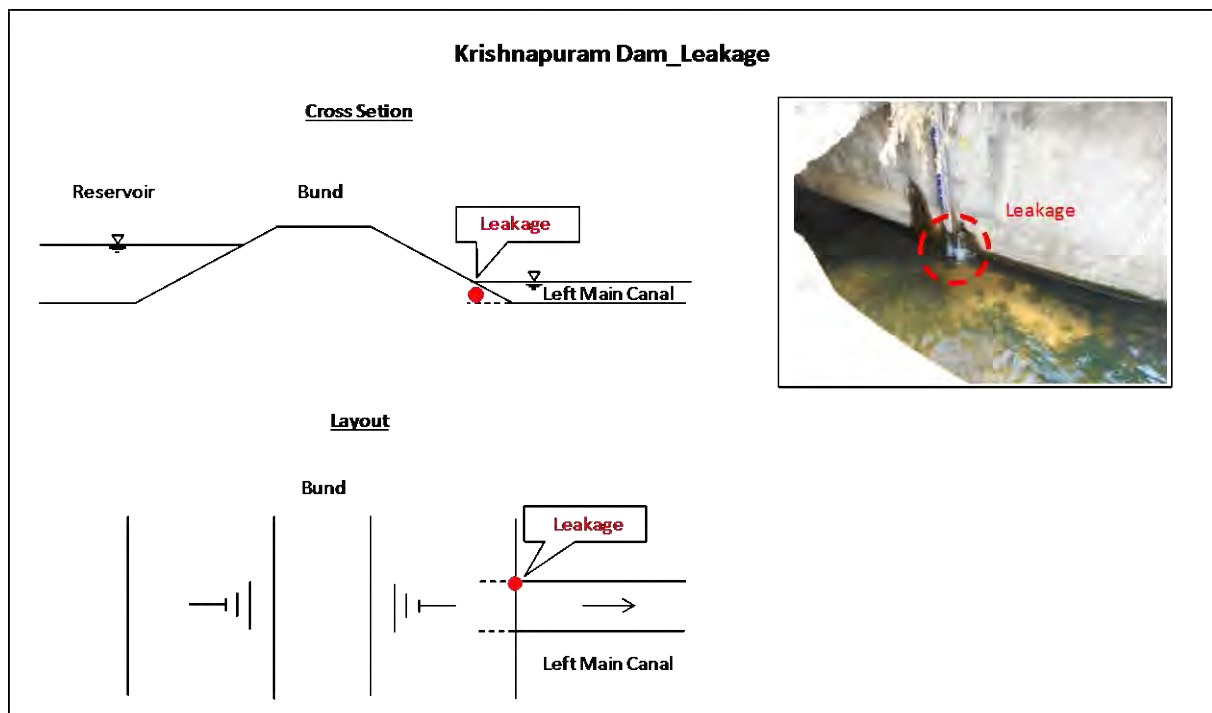
$$V=60\ell/100\text{m}/\text{min}$$

2. Identification of leakage

- Observation of ground water by some boring holes
- Observation of electric conductivity by solution of salt

3. Consideration of countermeasures

- Grouting of ground
- Replacement of embankment



Source: JICA Survey Team

Krishnapuram Medium Irrigation Project in Chittoor District (1/2)



(Spillway) Eplon: Repair



(Left Main Canal) Concrete Lining: Reconstruction



(Left Main Canal) Super Passage: Reconstruction



(Left Main Canal) Under Tunnel (Syphon):
Reconstruction



(Left Main Canal) Off take 1: Reconstruction



(Left Main Canal) Off take 1: Reconstruction

Source: JICA Survey Team

Krishnapuram Medium Irrigation Project in Chittoor District (2/2)



(Left Main Canal) Off take 2: Reconstruction



(Left Main Canal) Drop: Reconstruction



(Left Main Canal) Aqueduct: Reconstruction



(Left Main Canal) Aqueduct: Reconstruction



(Right Main Canal) Aqueduct: Reconstruction



(Right Main Canal) Aqueduct: Reconstruction

Source: JICA Survey Team

Scope of Works for Minor Irrigation Projects Near to Krishnapuram Medium Irrigation Project in Chittoor District

Minor Irrigation Project (1)

Basic Information

Date (DD/MM/YY) :	10/Feb./2016	District Name :	West Godavari
Project Name :	<u>Errikambatta Tnak</u>	Command Area:	138 (ha)

Scope of Works

facilities		Quantity	Contents
Tank	Bund	L= 1,250 (m)	Reshaping (slope/embankment/removing trees)
	Surplus Weir	N = 1 (nos.)	Repair
	Sluice	N = 1 (nos.)	Reconstruction
Canal	Wall Canal	L = 3,000 (m)	Reconstruction

Source: JICA Survey Team

Minor Irrigation Project (2)

Basic Information

Date (DD/MM/YY) :	10/Feb./2016	District Name :	West Godavari
Project Name :	<u>Thumburu Tnak</u>	Command Area:	81 (ha)

Scope of Works

facilities		Quantity	Contents
Tank	Bund	L= 1,250 (m)	Reshaping (slope/embankment/removing trees)
	Surplus Weir	N = 1 (nos.)	Reconstruction
	Sluice	N = 1 (nos.)	Reconstruction
Canal	Wall Canal	L = 2,900 (m)	Reconstruction

Source: JICA Survey Team

Errikambattu Minor Irrigation Project in Chittoor District



Bund: Reshaping



Bund: Reshaping



Surplus Weir: Reconstruction



Sluice: Reconstruction



Supply Channel 1: Reconstruction



Supply Channel 2: Reconstruction

Source: JICA Survey Team

Thumburu Minor Irrigation Project in Chittoor District



Bund: Reshaping



Bund: Reshaping



Surplus Weir: Reconstruction



Sluice: Reconstruction



Supply Channel 1: Reconstruction



Supply canal 2: Reconstruction

Source: JICA Survey Team

Attachment 8.2.5 Water Balance Study

Vottigedda Medium Irrigation Project

Project:	Vottigedda Reservoir Project (Medium Irrigation Project)		
District:	Vizianagaram		

Diagram of Water Balance

Reservoir Canal Tank Canal Farmland

Irrigation Dimension

Items	Before	After	Remarks
Command Area (ha)	6,746	6,746	
Gap Ayacut (%)	14	0	
Actual Irrigated Area (ha)	5,802	6,746	
Evaporation from Reservoir (mm/day)	6	6	
Rainfall (mm/year)	1,119	1,119	
Return Flow Ratio (%)	25	25	
Seepage Loss from Reservoir (%)	5	5	Live strage volume
Present Cropping Pattern			
[Kharif] Paddy (ha)	1,915	4,115	
[Kharif] Pules (ha)	3,887	2,631	
[Rabi] Pules (ha)	0	2,024	
total	5,802	8,770	
Water Requirement			
[Kharif] Paddy (mm/crop)	1,257	1,257	
[Kharif] Pules (mm/crop)	325	325	
[Rabi] Pules (mm/crop)	325	325	
Conveyance Efficiency (%)	35	60	
Effective Rainfall (mm/year)	1,119	1,119	

Water Balance

Items	Before	After	Remarks
Rw: Water Allocatopn (MCM)	56.64	56.64	
Rr: Rainfall on Reservoir (MCM)	2.31	2.31	
Re: Evapolation form Reservoir (MCM)	4.51	4.51	
Rp: Seepage from Reservoir (MCM)	2.72	2.72	
Tr: Return Flow (MCM)	13.61	13.61	
Cl: Conveyance Loss from Canal (MCM)	68.16	44.58	
Fr: Effective Rainfall on Farmland (MCM)	39.92	47.08	
Fw: Water Requirement of Crops (MCM)	36.70	66.86	
Total Balance (Rw+Rr-Re-Rp+Tr-Cl+Fr-Fw)	0.39	0.97	

Source: JICA Survey Team

Calculation-1: Water Balance Calculation (Before Modernisation)

(1) Basic Information

Name of project Vottigedda Reservoir Project (Medium Irrigation Project)
Name of District Vizianagaram

(2) Command area

Command Area (ha) (a.) 6,746 (Source-1)
Gap Ayacut (%) (b.) 14 (Based on abstract prepared by DoWR)
Actual Irrigated area (ha) (c.=a.*(1-b./100)) 5,802

(3) Water Resources

Water Allocation (MCM) (a.) 56.64 (Source-2)
Evaporation (mm/day) (b.) 6
Evaporation (mm/year) (c.=b.*365) 2,190.0 (Source-2.1)
Rainfall (mm/year) (d.) 1,119.0 (Source-2.2)
Balance (mm/year) (e.=c.-d.) 1,071.0
Live Storage (MCM) (f.) 25.14 (Source-2.3)
Average Depth (m) (g.) 12.23 (Source-2.3)
Surface Area (million m²) (h.=f./g.) 2.06
Balance of Evaporation and Rainfall (MCM) (i)=(e./1000)*h.) 2.21
Evaporation (MCM) (c./1000*h) 4.51
Rainfall (MCM) d./1000*h) 2.31
Return Flow Ratio (%) (j.) 25 (Source-2.4)
Loss (seepage etc.) (%) (k.) 5 (Source-2.5)
Seepage Loss (MCM) (l.) 2.72
Return Flow (MCM) (m.) 13.61
Water Resources (MCM) (n.=a.-i.-l.+m.) 65.32

(4) Cropping Pattern

Present cropping pattern (Source-3)

Name of crops	Month												Area (ha)	Proportion of area	
	J	F	M	A	M	J	J	A	S	O	N	D			
	Rabi					Kharif									
[Kharif] Paddy														1,915	33%
[Kharif] Pulses														3,887	67%
[Rabi] Pulses														0	0%

(5) Water Requirement

Present

Crops	WR (mm) (a.)	Area (ha) (b.)	WR (MCM) (c.=a.*b/10 ⁵)	Efficiency (%) (d.)	WR (MCM) (e.=c./d.)	Conveyance Loss (MCM)
[Kharif] Paddy	1,257	1,915	24.07	35	68.77	44.70
[Kharif] Pulses	325	3,887	12.63	35	36.09	23.46
[Rabi] Pulses	325	0	0.00	35	0.00	0.00
Total			36.70		104.86	68.16

Remarks: WR; Water Requirement (Reference-1) MCM; Million Cubic Meter

Efficiency (Conveyance efficiency);

Original plan (%) (based on Krishnapuram Medium) 45 (Source-4)

Assumed efficiency (%) 35 (25% decline from original: assumed by JICA Survey Team)

(6) Effective Rainfall

Average annual rainfall (mm) (a.) 1,119.0 (Reference-2)
Cropping period rainfall (mm) 782 (Reference-2)
Ratio (1,200mm, 75%) 0.88 (Reference-3) and (Source-5)
Effective rainfall (mm) 688
Total area (ha) 5,802
Irrigated area during cropping period (ha) 5,802
Effective rainfall (MCM) 39.92

(7) Water Balance

(Unit: MCM)

Items	Quantity	Remarks
Water resource (a.)	65.32	
Water requirement (b.)	104.86	
Effective rainfall (c.)	39.92	
Balance (d.=a.-b.+c.)	0.38	

Source

Source-1: Abstract and Detailed Estimate CWC Format, Modernisation of Vottigedda Reservoir Project Rawad (V), J.M.Valasa(M), Vizianagaram District, p.3

Source-2: Abstract prepared by DoWR

Source-2.1: Average of evaporation in India. MoWR URL: <http://wrmin.nic.in/forms/list.aspx?lid=284>

Source-2.2: (Reference-2)

Source-2.3: Maximum depth = Dam height (27.5m)-Freeboard (3.04m) = 24.46m, Average depth = 24.46/2 = 12.23 m, Abstract and Detailed Estimate CWC Format, Modernisation of Vottigedda Reservoir Project Rawad (V) J.M. Valasa(M), Vizianagaram District, p4

Source-2.4: Abstract and Detailed Estimate CWC Format, Modernisation of Vottigedda Reservoir Project Rawad (V) J.M. Valasa(M), Vizianagaram District

Source-2.5: Japanese criteria (irrigation water for paddy, p.241)

Source-3: Prepared by JICA Survey Team

Source-4: Abstract and Detailed Estimate CWC Format, Modernisation of Vottigedda Reservoir Project Rawad (V) J.M. Valasa(M), Vizianagaram District

Source-5 (75%): Abstract and Detailed Estimate CWC Format, Modernisation of Vottigedda Reservoir Project Rawad (V) J.M. Valasa(M), Vizianagaram District

Source: JICA Survey Team

Calculation-2: Water Balance Calculation (After Modernisation)

(1) Basic Information

Name of project Vottigedda Reservoir Project (Medium Irrigation Project)
Name of District Vizianagaram

(2) Command area

Command Area (ha) (a.) 6,746 (Source-1)
Gap Ayacut (%) (b.) 0
Actual Irrigated area (ha) (c.=a.*(1-b./100)) 6,746

(3) Water Resources

Water Allocation (MCM) (a.) 56.64 (Source-2)
Evaporation (mm/day) (b.) 6
Evaporation (mm/year) (c.=b.*365) 2,190.0 (Source-2.1)
Rainfall (mm/year) (d.) 1,119.0 (Source-2.2)
Balance (mm/year) (e.=c.-d.) 1,071.0
Live Storage (MCM) (f.) 25.14 (Source-2.3)
Average Depth (m) (g.) 12.2 (Source-2.3)
Surface Area (million m²) (h.=f./g.) 2.06
Balance of Evaporation and Rainfall (MCM) (i)=(e./1000)*h.) 2.21
Evaporation (MCM) (c./1000*h) 4.51
Rainfall (MCM) d./1000*h) 2.31
Return Flow Ratio (%) (j.) 25 (Source-2.4)
Loss (seepage etc.) (%) (k.) 5 (Source-2.5)
Seepage Loss (MCM) (l.) 2.72
Return Flow (MCM) (m.) 13.61
Water Resources (MCM) (n.=a.-i.-l.+m.) 65.32

(4) Cropping Pattern

Proposed cropping pattern 12 (Source-3)

Name of cops	Month												Area (ha)	Proportion of area	
	J	F	M	A	M	J	J	A	S	O	N	D			
[Kharif] Paddy														4,115	61%
[Kharif] Pulses														2,631	39%
[Rabi] Pulses														2,024	30%

(5) Water Requirement

Proposed

Crops	WR (mm) (a.)	Area (ha) (b.)	WR (MCM) (c.=a.*b/10 ⁵)	Efficiency (%) (d.)	WR (MCM) (e.=c./d.)	Conveyance Loss (MCM)
[Kharif] Paddy	1,257	4,115	51.73	60	86.22	34.49
[Kharif] Pulses	325	2,631	8.55	60	14.25	5.70
[Rabi] Pulses	325	2,024	6.58	60	10.97	4.39
Total			66.86		111.44	44.58

Remarks: WR: Water Requirement (Reference-1) MCM: Million Cubic Meter
Efficiency (Conveyance efficiency) ; Reference-3

(6) Effective Rainfall

Average annual rainfall (mm) (a.) 1,119.0 (Reference-2)
Kharif cropping period rainfall (mm) 781.8 (Reference-2)
Ratio (1,200mm, 75%) 0.88 (Reference-3) and (Source-5)
Kharif effective rainfall (mm) 688
Kharif cropping area (ha) 6,746
Kharif effective rainfall (MCM) 46.41
Rabi cropping period rainfall (mm) 37.78
Ratio (1,200mm, 75%) 0.88
Kharif effective rainfall (mm) 33
Kharif cropping area (ha) 2,024
Kharif effective rainfall (MCM) 0.67
Total effective rainfall (MCM) 47.08

(7) Water Balance

(Unit: MCM)

Items	Quantity	Remarks
Water resource (a.)	65.32	
Water requirement (b.)	111.44	
Effective rainfall (c.)	47.08	
Balance (d.=a.-b.+c.)	0.96	

Source

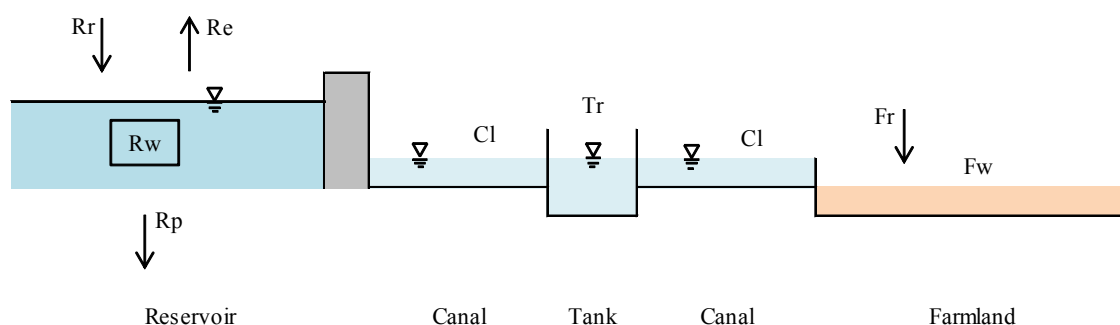
- Source-1: Abstract and Detailed Estimate CWC Format, Modernisation of Vottigedda Reservoir Project Rawad (V), J.M.Valasa(M), Vizianagaram District, p.3
Source-2: Abstract prepared by DoWR
Source-2.1: Average of evaporation in India. MoWR URL: <http://wrmin.nic.in/forms/list.aspx?lid=284>
Source-2.2: (Reference-2)
Source-2.3: Maximum depth = Dam height (27.5m)-Freeboard (3.04m) = 24.46m, Average depth = 24.46/2 = 12.23 m, Abstract and Detailed Estimate CWC
Source-2.4: Abstract and Detailed Estimate CWC Format, Modernisation of Vottigedda Reservoir Project Rawad (V) J.M.Valasa(M), Vizianagaram District
Source-2.5: Japanese criteria (irrigation water for paddy, p.241)
Source-3: Prepared by JICA Survey Team
Source-4: Abstract and Detailed Estimate CWC Format, Modernisation of Vottigedda Reservoir Project Rawad (V) J.M.Valasa(M), Vizianagaram District
Source-5 (75%): Abstract and Detailed Estimate CWC Format, Modernisation of Vottigedda Reservoir Project Rawad (V) J.M.Valasa(M), Vizianagaram District

Source: JICA Survey Team

Thammileru Medium Irrigation Project

Project: Thammileru Reservoir Scheme Project (Medium Irrigation Project)
District: West Godavari

Diagram of Water Balance



Irrigation Dimension

Items	Before	After	Remarks
Command Area (ha)	3,711	3,711	
Gap Ayacut (%)	28	0	
Actual Irrigated Area (ha)	2,672	3,711	
Evaporation from Reservoir (mm/day)	6	6	
Rainfall (mm/year)	970	970	
Return Flow Ratio (%)	25	25	
Seepage Loss from Reservoir (%)	5	5	Live strage volume
Present Cropping Pattern			
[Kharif] Paddy (ha)	775	2,041	
[Kharif] Pluses (ha)	1,897	1,670	
[Rabi] Maize (ha)		0	
total	2,672	3,711	
Water Requirement			
[Kharif] Paddy (mm/crop)	1,257	1,257	
[Kharif] Pluses (ha)	325	325	
[Rabi] Maize (mm/crop)	325	510	
Conveyance Efficiency (%)	35	60	
Effective Rainfall (mm/year)	591	591	

Water Balance

Items	Before	After	Remarks
Rw: Water Allocated (MCM)	34.26	34.26	
Rr: Rainfall on Reservoir (MCM)	7.34	7.34	
Re: Evaporation from Reservoir (MCM)	16.57	16.57	
Rp: Seepage from Reservoir (MCM)	1.25	1.25	
Tr: Return Flow (MCM)	6.26	6.26	
Cl: Conveyance Loss from Canal (MCM)	29.55	20.73	
Fr: Effective Rainfall on Farmland (MCM)	15.79	21.93	
Fw: Water Requirement of Crops (MCM)	15.91	31.09	
Total Balance (Rw+Rr-Re-Rp+Tr-Cl+Fr-Fw)	0.37	0.15	

Source: JICA Survey Team

Calculation-1: Water Balance Calculation (Before Modernisation)

(1) Basic Information

Name of project Thammileru Reservoir Scheme Project (Medium Irrigation Project)
Name of District West Godavari

(2) Command area

Command Area (ha) (a.) 3,711 (Source-1)
Gap Ayacut (%) (b.) 28 (Based on abstract prepared by DoWR)
Actual Irrigated area (ha) (c.=a.*(1-b./100)) 2,672

(3) Water Resources

Water Allocation (MCM) (a.) 34.26 (Source-2)
Evaporation (mm/day) (b.) 6
Evaporation (mm/year) (c.=b.*365) 2,190.0 (Source-2.1)
Rainfall (mm/year) (d.) 969.7 (Source-2.2)
Balance (mm/year) (e.=c.-d.) 1,220.3
Live Storage (MCM) (f.) 76.41 (Source-2.3)
Average Depth (m) (g.) 10.10 (Source-2.3)
Surface Area (million m²) (h.=f./g.) 7.57
Balance of Evaporation and rainfall (MCM) (i.=e./1000)*h.) 9.23
Evaporation (MCM) (c./1000*h) 16.57
Rainfall (MCM) d./1000*h) 7.34
Return Flow Ratio (%) (j.) 25 (Source-2.4)
Loss (seepage etc.) (%) (k.) 5 (Source-2.5)
Seepage Loss (MCM) (L) 1.25
Return Flow (MCM) (m.) 6.26
Water Resources (MCM) (n.=a.-i.-l.+m.) 30.04

(4) Cropping Pattern

Present cropping pattern (Source-3.1)

Name of crops	Month												Area (ha)	Proportion
	J	F	M	A	M	J	J	A	S	O	N	D		
	Rabi					Kharif								
[Kharif] Paddy													775	29%
[Kharif] Pulses													1,897	71%

(5) Water Requirement

Present

Crops	WR (mm) (a.)	Area (ha) (b.)	WR (MCM) (c.=a.*b/10 ⁵)	Efficiency (%) (d.)	WR (MCM) (e.=c./d.)	Conveyance Loss (MCM)
[Kharif] Paddy	1,257	775	9.74	35	27.83	18.09
[Kharif] Pulses	325	1,897	6.17	35	17.63	11.46
Total			15.91		45.46	29.55

Remarks: WR; Water Requirement (Reference-1) MCM; Million Cubic Meter

Efficiency (Conveyance efficiency);

Original plan (%) (based on Krishnapuram Medium) 45 (Source-4)

Assumed efficiency (%) 35 (25% decline from original: assumed by JICA Survey Team)

(6) Effective Rainfall

Average annual rainfall (mm) (a.) 969.7 (Reference-2)
Cropping period rainfall (mm) 686.8 (Reference-2)
Ratio (1,000mm, 75%) 0.86 (Reference-3) and (Source-5)
Effective rainfall (mm) 591
Total area (ha) 2,672
Irrigated area during cropping period (ha) 2,672
Effective rainfall (MCM) 15.79

(7) Water Balance

(Unit: MCM)

Items	Quantity	Remarks
Water resource (a.)	30.04	
Water requirement (b.)	45.46	
Effective rainfall (c.)	15.79	
Balance (d.=a.-b.+c.)	0.37	

Source

Source-1: Modernisation of Thammileru Reservoir Project

Source-2: Prepared by DoWR

Source-2.1: Average of evaporation in India. MoWR URL: <http://wrmin.nic.in/forms/list.aspx?lid=284>

Source-2.2: (Reference-2)

Source-2.3: Maximum depth = Dam height (23.254m)-Freeboard (3.046m) = 20.208m, Average depth = 20.208/2 = 10.104 m, Modernisation of

Thammileru Reservoir Project p1

Source-2.4: Modernisation of Thammileru Reservoir Project

Source-2.5: Japanese criteria (irrigation water for paddy, p.241)

Source-3.1: Prepared by JICA Survey Team

Source-4: Modernisation of Thammileru Reservoir Project

Source-5 (75%): Modernisation of Thammileru Reservoir Project

Source: JICA Survey Team

Calculation-2: Water Balance Calculation (After Modernisation)

(1) Basic Information

Name of project Thammileru Reservoir Scheme Project (Medium Irrigation Project)
Name of District West Godavari

(2) Command area

Command Area (ha) (a.) 3,711 (Source-1)
Gap Ayacut (%) (b.) 0
Actual Irrigated area (ha) (c.=a.*(1-b./100)) 3,711

(3) Water Resources

Water Allocation (MCM) (a.) 34.26 (Source-2)
Evaporation (mm/day) (b.) 6
Evaporation (mm/year) (c.=b.*365) 2,190.0 (Source-2.1)
Rainfall (mm/year) (d.) 969.7 (Source-2.2)
Balance (mm/year) (e.=c.-d.) 1,220.3
Live Storage (MCM) (f.) 76.41 (Source-2.3)
Average Depth (m) (g.) 10.10 (Source-2.3)
Surface Area (million m²) (h.=f./g.) 7.57
Balance of Evaporation and rainfall (MCM) (i.=e./1000)*h.) 9.23
Evaporation (MCM) (c./1000*h) 16.57
Rainfall (MCM) d./1000*h) 7.34
Return Flow Ratio (%) (j.) 25 (Source-2.4)
Loss (seepage etc.) (%) (k.) 5 (Source-2.5)
Seepage Loss (MCM) (l.) 1.25
Return Flow (MCM) (m.) 6.26
Water Resources (MCM) (n.=a.-i.-l.+m.) 30.04

(4) Cropping Pattern

Proposed cropping pattern (Source-3.1)

Name of cops	Month												Area (ha)	Proportion		
	J	F	M	A	M	J	J	A	S	O	N	D				
	Rabi					Kharif										
[Kharif] Paddy															2,041	55%
[Kharif] Pulses															1,670	45%
[Rabi] Maize															0	0%

(5) Water Requirement

Proposed

Crops	WR (mm) (a.)	Area (ha) (b.)	WR (MCM) (c.=a.*b./10 ⁵)	Efficiency (%) (d.)	WR (MCM) (e.=c./d.)	Conveyance Loss (MCM)
[Kharif] Paddy	1,257	2,041	25.66	60	42.77	17.11
[Kharif] Pulses	325	1,670	5.43	60	9.05	3.62
[Rabi] Maize	510	0	0.00	60	0.00	0.00
Total			31.09		51.82	20.73

Remarks: WR; Water Requirement (Reference-1) MCM; Million Cubic Meter
Efficiency (Conveyance efficiency); Reference-3

(6) Effective Rainfall

Average annual rainfall (mm) (a.) 969.7 (Reference-2)
Kharif Cropping period rainfall (mm) 686.8 (Reference-2)
Ratio (1,000mm, 75%) 0.86 (Reference-3) and (Source-5)
Effective rainfall (mm) 591
Kharif cropping period (ha) 3,711
Kharif effective rainfall (MCM) 21.93
Rabi cropping period rainfall (mm) 28.1
Total effective rainfall (MCM) 21.93

(7) Water Balance

(Unit: MCM)

Items	Quantity	Remarks
Water resource (a.)	30.04	
Water requirement (b.)	51.82	
Effective rainfall (c.)	21.93	
Balance (d.=a.-b.+c.)	0.15	

Source

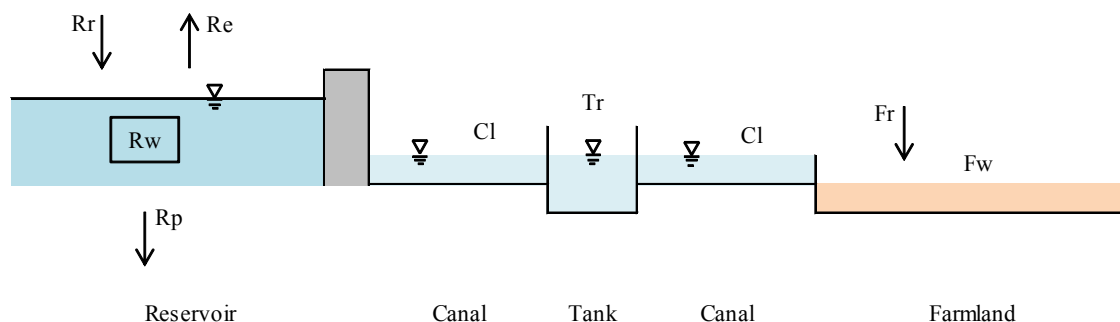
Source-1: Modernisation of Thammileru Reservoir Project
Source-2: Prepared by DoWR
Source-2.1: Average of evaporation in India. MoWR URL: <http://wrmin.nic.in/forms/list.aspx?lid=284>
Source-2.2: (Reference-2)
Source-2.3: Maximum depth = Dam height (23.254m)-Freeboard (3.046m)=20.208m, Average depth = 20.208/2 = 10.104 m, Modernisation of Thammileru Reservoir Project p1
Source-2.4: Modernisation of Thammileru Reservoir Project
Source-2.5: Japanese criteria (irrigation water for paddy, p.241)
Source-3: Prepared by JICA Survey Team
Source-4: Modernisation of Thammileru Reservoir Project
Source-5 (75%): Modernisation of Thammileru Reservoir Project

Source: JICA Survey Team

Krishnapuram Medium Irrigation Project

Project: Krishnapuram Reservoir Project (Medium Irrigation Project)
District: Chittoor

Diagram of Water Balance



Irrigation Dimension

Items	Before	After	Remarks
Command Area (ha)	2,479	2,479	
Gap Ayacut (%)	61	0	
Actual Irrigated Area (ha)	967	2,479	
Evaporation from Reservoir (mm/day)	6	6	
Rainfall (mm/year)	870	870	
Return Flow Ratio (%)	25	25	
Seepage Loss from Reservoir (%)	5	5	Live strage volume
Present Cropping Pattern			
Sugarcane (ha)	503	1,289	
[Rabi] Paddy (ha)	164	198	
[Rabi] Groundnut (ha)	300	992	
total	967	2,479	
Water Requirement			
Sugarcane (mm/crop)	680	680	
[Rabi] Paddy (mm/crop)	1,257	1,257	
[Rabi] Groundnut (mm/crop)	325	325	
Conveyance Efficiency (%)	35	60	
Effective Rainfall (mm/year)	689	689	

Water Balance

Items	Before	After	Remarks
Rw: Water Allocated (MCM)	13.08	13.08	
Rr: Rainfall on Reservoir (MCM)	0.45	0.45	
Re: Evaporation from Reservoir (MCM)	1.12	1.12	
Rp: Seepage from Reservoir (MCM)	0.62	0.62	
Tr: Return Flow (MCM)	3.10	3.10	
Cl: Conveyance Loss from Canal (MCM)	12.00	9.66	
Fr: Effective Rainfall on Farmland (MCM)	3.71	9.49	
Fw: Water Requirement of Crops (MCM)	6.46	14.48	
Total Balance (Rw+Rr-Re-Rp+Tr-Cl+Fr-Fw)	0.14	0.24	

Source: JICA Survey Team

Calculation-1: Water Balance Calculation (Before Modernisation)

(1) Basic Information

Name of Project Krishnapuram Reservoir Project (Medium Irrigation Project)
Name of District Chittoor

(2) Command area

Command Area (ha) (a.) 2,479 (Source-1)
Gap Ayacut (%) (b.) 61 (based on abstract prepared by DoWR)
Actual Irrigated area (ha) (c.=a.*(1-b./100)) 967

(3) Water Resources

Water Allocation (MCM) (a.) 13.08 (Source-2)
Evaporation (mm/day) (b.) 6
Evaporation (mm/year) (c.=b.*365) 2,190.0 (Source-2.1)
Rainfall (mm/year) (d.) 870.4 (Source-2.2)
Balance (mm/year) (e.=c.-d.) 1,319.6
Live Storage (MCM) (f.) 4.87 (Source-2.3)
Average Depth (m) (g.) 9.5 (Source-2.3)
Surface Area (million m²) (h.=f./g.) 0.51
Balance of Evaporation and Rainfall (MCM) (i.=e./1000*h.) 0.68
Evaporation (MCM) (c./1000*h) 1.12
Rainfall (MCM) d./1000*h) 0.45
Return Flow Ratio (%) (j.) 25 (Source-2.4)
Loss (seepage etc.) (%) (k.) 5 (Source-2.5)
Seepage Loss (MCM) (l.) 0.62
Return Flow (MCM) (m.) 3.1
Water Resources (MCM) (n.=a.-i.-l.+m.) 14.88

(4) Cropping Pattern

Present cropping pattern (Source-3.1)

Name of crops	Month												Area (ha)	Proportion
	J	F	M	A	M	J	J	A	S	O	N	D		
Sugarcane													503	52%
[Rabi] Paddy													164	17%
[Rabi] Ground nut													300	31%

(5) Water Requirement

Present

Crops	WR (mm) (a.)	Area (ha) (b.)	WR (MCM) (c.=a.*b/10 ⁵)	Efficiency (%) (d.)	WR (MCM) (e.=c./d.)	Conveyance Loss (MCM)
Sugarcane	680	503	3.42	35	9.77	6.35
[Rabi] Paddy	1,257	164	2.06	35	5.89	3.83
[Rabi] Groundnut	325	300	0.98	35	2.80	1.82
Total			6.46		18.46	12.00

Remarks: WR; Water Requirement (Reference-1) MCM; Million Cubic Meter

Efficiency (Conveyance efficiency);

Original plan (based on Krishnapuram Medium) 45 (Source-4)

Assumed efficiency (%) 35 (25% decline from original: assumed by JICA Survey Team)

(6) Effective Rainfall

Average annual rainfall (mm) (a.) 870.4 (Reference-2)
Kharif cropping period rainfall (mm) 810.7 (Reference-2)
Ratio (900mm, 75%) 0.85 (Reference-3) and (Source-5)
Kharif effective rainfall (mm) 689
Kharif cropping area (ha) 503
Kharif effective rainfall (MCM) 3.47
Rabi cropping period rainfall (mm) 59.8
Ratio (900mm, 75%) 0.85
Kharif effective rainfall (mm) 51
Kharif cropping area (ha) 464
Kharif effective rainfall (MCM) 0.24
Total effective rainfall (MCM) 3.71

(7) Water Balance

(Unit: MCM)

Items	Quantity	Remarks
Water resource (a.)	14.88	
Water requirement (b.)	18.46	
Effective rainfall (c.)	3.71	
Balance (d.=a.-b.+c.)	0.13	

Source

- Source-1: Volume-I Project Report on Modernization Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District
- Source-2: Prepared by DoWR
- Source-2.1: Average of evaporation in India. MoWR URL: <http://wrmin.nic.in/forms/list.aspx?lid=284>
- Source-2.2: (Reference-2)
- Source-2.3: Maximum depth = Dam height (21.0m)-Freeboard (2.0m) = 19.0m, Average depth = 19.0/2 = 9.5 m, Volume-I Project Report on Modernization Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District p40
- Source-2.4: Volume-I Project Report pn Modernization Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District, p.53
- Source-2.5: Japanese criteria (irrigation water for paddy, p.241)
- Source-3.1: Prepared by JICA Survey Team
- Source-4: Volume-I Project Report pn Modernization Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District, p.53
- Source-5 (75%): Volume-I Project Report pn Modernization Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District, p.53

Source: JICA Survey Team

Calculation-2: Water Balance Calculation (After Modernisation)

(1) Basic Information

Name of Project: Krishnapuram Medium Irrigation Project
Name of District: Chittoor

(2) Command area

Command Area (ha) (a.): 2,479 (Source-1)
Gap Ayacut (%) (b.): 0 (Assumed based on this water balance by JICA Survey team)
Actual Irrigated area (ha) (c.=a.*(1-b./100)): 2,479

(3) Water Resources

Water Allocation (MCM) (a.): 13.08 (Source-2)
Evaporation (mm/day) (b.): 6
Evaporation (mm/year) (c.=b.*365): 2,190.0 (Source-2.1)
Rainfall (mm/year) (d.): 870.4 (Source-2.2)
Balance (mm/year) (e.=c.-d.): 1,319.6
Live Storage (MCM) (f.): 4.87 (Source-2.3)
Average Depth (m) (g.): 9.5 (Source-2.3)
Surface Area (million m²) (h.=f./g.): 0.51
Balance of Evaporation and Rainfall (MCM) (i.=e./1000)*h.: 0.68
Evaporation (MCM) (c./1000*h): 1.12
Rainfall (MCM) d./1000*h): 0.45
Return Flow Ratio (%) (j.): 25 (Source-2.4)
Loss (seepage etc.) (%) (k.): 5 (Source-2.5)
Seepage Loss (MCM) (l.): 0.62
Return Flow (MCM) (m.): 3.1
Water Resources (MCM) (n.=a.-i.-l.+m.): 14.88

(4) Cropping Pattern

Present cropping pattern (Source-3.1)

Name of crops	Month												Area (ha)	Proportion		
	J	F	M	A	M	J	J	A	S	O	N	D				
	Rabi					Kharif										
Sugarcane															1,289	52%
[Rabi] Paddy															198	8%
[Rabi] Ground nut															992	40%

(5) Water Requirement

Present

Crops	WR (mm) (a.)	Area (ha) (b.)	WR (MCM) (c.=a.*b./10 ⁵)	Efficiency (%) (d.)	WR (MCM) (e.=c./d.)	Conveyance Loss (MCM)
Sugarcane	680	1,289	8.77	60	14.62	5.85
[Rabi] Paddy	1,257	198	2.49	60	4.15	1.66
[Rabi] Ground nut	325	992	3.22	60	5.37	2.15
Total			14.48		24.14	9.66

Remarks: WR; Water Requirement (Reference-1) MCM; Million Cubic Meter Efficiency (Conveyance efficiency); Reference-3

(6) Effective Rainfall

Average annual rainfall (mm) (a.): 870.4 (Reference-2)
Kharif cropping period rainfall (mm): 810.7 (Reference-2)
Ratio (900mm, 75%) (b.): 0.85 (Reference-3) and (Source-5)
Kharif effective rainfall (mm): 689
Kharif cropping area (ha): 1,289
Kharif effective rainfall (MCM): 8.88
Rabi cropping period rainfall (mm): 59.8
Ratio (900mm, 75%) (c.): 0.85
Rabi effective rainfall (mm): 51
Rabi cropping area (ha): 1,190
Rabi effective rainfall (MCM): 0.61
Total effective rainfall (MCM): 9.49

(7) Water Balance

(Unit: MCM)

Items	Quantity	Remarks
Water resource (a.)	14.88	
Water requirement (b.)	24.14	
Effective rainfall (c.)	9.49	
Balance (d.=a.-b.+c.)	0.23	

Source

- Source-1: Volume-I Project Report on Modernisation Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District J.M. Valasa(M), Vizianagaram District, p.3
Source-2: Prepared by DoWR
Source-2.1: Average of evaporation in India. MoWR URL: <http://wrmin.nic.in/forms/list.asp?lid=284>
Source-2.2: (Reference-2)
Source-2.3: Maximum depth = Dam height (21.0m)-Freeboard (2.0m) = 19.0m, Average depth = 19.0/2 = 9.5 m, Volume-I Project Report on Modernisation Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District p.40
Source-2.4: Volume-I Project Report on Modernisation Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District, p.53
Source-2.5: Japanese criteria (irrigation water for paddy, p.241)
Source-3: Prepared by JICA Survey Team
Source-4: Volume-I Project Report on Modernisation Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District, p.53
Source-5 (75%): Volume-I Project Report on Modernisation Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District, p.53

Source: JICA Survey Team

Reference-1 (Water requirement for each crop)

Crops	Water Requirement (mm)
Paddy	1,257
Maize	510
Bajra	150
Barley	200
Groundnut/ Pulses	325
Mustard	180
Linseed	75
Cotton	730
Sugarcane	680

Water requirement for each crop

Crop	State/Place	Type of Soil	Season	Requirement (mm)
Paddy	Karnata/Siruguppa		Kharif (June to Oct.)	1,344
			Kharif (June to Oct.)	1,170
			Average	1,257
Maize	Karnata/Siruguppa	Clay loam	Summer	510
Bojra	Karnata/Siruguppa	Clay	Kharif	150
Barley	Madhya/Bhind	Sandy loam	Rabi	200
Groundnut	Karnata/Yemmiganur	Red sandy loam	Spring	325
Mustard	Delhi	Sandy loam		180
Linseed	Madhya/Jabalpur	Clay loam		75
Cotton	Karnata/Siruguppa	Clay	Rabi	730
Sugarcane	AP/Anakapalle	Clay loma		680

Source: A Guide for Estimating Irrigation Water Requirements, Government of India, Ministry of Irrigation Water Management Division, p.77 - p.85

Reference-2: Monthly Rainfall by District in AP State (1901-2002, 2009-2013)

(Unit: mm)

District	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Jul. to Oct.	Dec to Mar.	Jul. to Oct.+Dec. to Mar.
Srikakulam	7.4	10.3	9.5	31.4	44.5	118.9	150.8	166.3	172.7	177.8	70.9	5.3	965.8	667.6	32.4	700.0
Vizianagaram	8.9	10.6	10.6	47.3	51.5	129.7	204.8	219.1	196.8	161.1	70.9	7.7	1,119.0	781.8	37.8	819.6
Visakhapatnam	5.5	10.5	8.5	35.0	42.9	132.9	199.4	195.9	194.1	169.7	90.0	11.1	1,095.6	759.2	35.6	794.8
East Godavari	3.6	8.6	6.9	20.1	38.8	124.1	195.8	174.7	181.1	171.4	91.9	13.5	1,030.6	723.0	32.6	755.6
West Godavari	3.1	7.1	5.4	15.6	41.1	112.7	185.3	166.5	173.1	161.9	85.4	12.5	969.7	686.8	28.1	714.9
Krishna	3.9	6.0	3.9	14.5	48.5	96.8	149.0	144.1	155.7	162.9	95.5	15.2	896.0	611.6	29.0	640.7
Guntur	3.9	5.6	3.7	14.6	45.0	72.8	111.0	117.1	140.5	167.0	101.3	15.1	797.5	535.6	28.3	563.8
Prakasam	2.5	3.9	4.8	12.9	40.9	56.4	90.1	98.6	134.4	158.2	104.0	19.0	725.6	481.3	30.2	511.5
Nellore	5.0	6.9	8.3	15.9	42.8	49.3	85.4	104.8	136.1	182.6	163.0	55.5	855.6	508.9	75.6	584.5
Kadapa	0.8	3.0	5.9	22.4	57.2	49.6	71.4	93.5	152.8	123.0	71.8	17.5	668.8	440.6	27.2	467.8
Kurmoor	1.1	1.4	3.6	17.8	46.0	51.2	63.5	74.6	132.9	108.5	40.0	7.9	548.5	379.4	14.1	393.5
Ananthapur	0.8	1.9	4.6	33.2	74.6	56.1	68.8	85.7	140.5	128.2	49.8	7.8	652.0	423.2	15.0	438.2
Chittoor	4.4	7.0	8.5	31.5	79.2	68.0	87.4	112.2	162.1	158.1	112.0	39.8	870.4	519.9	59.8	579.6
All AP State	3.9	6.4	6.5	24.0	50.2	86.1	127.9	134.8	159.4	156.2	88.2	17.5	861.2	578.4	34.3	612.7

Source: India Water Portal (<http://www.indiawaterportal.org/>)
Customized Rainfall Information System (<http://hydro.imd.gov.in/hydrometweb/>)

Reference-3 (Average Ratios Applicable to Effective Rainfall)

Average annual rainfall (mm)	Percent Chance of Occurrence				
	50	60	70	80	90
100	0.84	0.72	0.61	0.50	0.38
200	0.90	0.81	0.71	0.62	0.51
300	0.93	0.85	0.78	0.69	0.58
400	0.95	0.88	0.81	0.73	0.63
500	0.96	0.90	0.83	0.75	0.67
600	0.97	0.91	0.84	0.78	0.70
700	0.97	0.92	0.86	0.80	0.72
800	0.98	0.93	0.87	0.81	0.74
900	0.98	0.93	0.88	0.82	0.75
1,000	0.98	0.94	0.89	0.83	0.76
1,200	0.98	0.94	0.90	0.85	0.78
1,400	0.99	0.95	0.91	0.86	0.80
1,600	0.99	0.95	0.91	0.87	0.82
1,800	0.99	0.95	0.92	0.88	0.84
2,000	0.99	0.95	0.92	0.89	0.85

Source: A Guide for Estimating Irrigation Water Requirements, Government of India, Ministry of Irrigation Water Management Division, p.58

Reference-4 (Irrigation Efficiency)

Canal type	KC Canal (Reference project)	
	Canal type	Efficiency
Main canal (a.)	Concrete	0.9
Distributor (b.)	Concrete	0.9
Field canal (c.)	Earth	0.8
Efficiency (d.=a.*b.*c.)		0.648
Adoption		0.60

Source: JICA Survey Team

Attachment 8.3.1 Current Situation in Andhra Pradesh State, Constraints and Counter Measures

(1) Current Situation

Particulars	Northern Zone	Central Zone	Southern Zone
Climate	Hot and humid. The area is served mostly by North-East monsoon .out of average annual rain fall 1000mm , 600 mm is received during N-E monsoon period.	Moderately Hot and Humid. Most of the rain fall is received through S-W monsoon Out of total annual rain fall of 1000mm, 600mm is received in S-W monsoon period.	Hot, humid and semi-arid. Most of the rain fall is received from N-E monsoons due to depressions in Bay of Bengal Out of mean annual rain fall of 1000 mm , 500 mm is received during N-E monsoon period .Ananthpur District is in semi-arid region with an annual rain fall of 550mm which is second lowest rain fall area after Jaisalma r (100mm) in Rajastan.
Crops	Rice, pulses, Mesta, Sugar cane, Finger millet, Mango, Sesamum , Banana, pineapple, Cashew , Coconut, oil palm, and Chilli.	Rice, Sugar cane, Maize, Pulses, Mango, Oil Palm, Coconut, Cocoa, Banana, Chillies, Tomato , Cotton, Vegetables tobacco and Cashew.	Rice ,Ground nut, Sugarcane, Tomato ,Mango , Sorghum, Red Gram, Bengal Gram, Cotton, Sunflower ,Onion, pearl millet and finger millet.
Irrigation	Nagavali and Vamsadhara rivers provide Irrigation to a small extent. Major water sources are medium and minor irrigation projects and bore wells. Irrigated area is low (30%).	Krishna and Godavari rivers provide irrigation through well-planned canal systems(60%). In uplands, medium and minor irrigation projects provide water for crops and people	Medium and Minor Projects and Bore wells-irrigated area is low (31%)
Pest and Diseases (Major problems)	Maize : Shoot borer Rice: Sheath blight and Stem borer Sugarcane: Red rot, wooly aphids. Coconut: Mite and Ganoderma Cocoa: Rats, Fruit borer Pulses: YMV, Maruca Tomato and Chilli:Thrips and Fruit borer	Maize : Shoot borer Rice: Sheath blight and Stem borer Sugarcane: Red rot, wooly aphids Coconut: Mite, Ganoderma Cocoa: Rats, Pulses: YMV and Maruca Tomato and Chilli:Thrips , Fruit borer and YMV	Rice: Stem Borer, BPH and Sheath Blight Ground nut: Tikka leaf spot, kalahasti malady and root grub Sugarcane: Red rot and scale insects Mango: Hoppers Tomato: Thrips , Fruit borer, YMV Coconut: Mite, Ganoderma Tomato and Chilli:Thrips , Fruit borer and YMV
Farm Mechanization	Picking up at a slow pace	Picking up fast now.	To a small extent
Crop Productivity	Low due to scarcity of water and erratic rain fall	High in Irrigated areas and low in uplands.	Low due to scant irrigation water sources and low and erratic rain fall
Availability of Labour	Moderate	Scarce	Moderate
Menace of Wild Boars, Monkeys and Rats.	Severe	Moderate	Severe

Source: JICA Survey Team

(2) Constraints and Countermeasures

Constraints	Related Districts	Countermeasures
1. Vagaries of weather (droughts, floods and cyclones)	North South	1. Intensifying farm extension activities, trainings, and demonstrations and exposure visits with JICA support 2. The Adopting cropping pattern following the weather pattern. 3. Promotion of bore wells
2. Low productivity due to traditional cultivation. - due to shortage of water - less amount of fertilizer use	South North	More demos, trainings and exposure visits to encourage Farm Mechanization with JICA support. Strengthening existing medium and minor irrigation reservoirs and tanks
3. Non-availability of HYV seeds and seedlings at right time	Central South	1. Encouragement of Seed Village Programmes 2. Purchase by group (subscription for farm inputs)
4. Scarcity of water in uplands	Central South North	1. Strengthening existing medium and minor irrigation reservoirs and tanks 2. Promotion of construction of field tanks 3. Promotion of micro-irrigation system 4. Promotion of conjunctive use of limited water
5. Indiscriminate use of agro-chemicals -Proper chemicals and proper timing unaware -Function and mode of action of chemicals not aware of.	North Central South	1. Advocating scientific POP 2. Laying more emphasis on IPM, INM, ICM and GAP 3. Rationalizing the use agro-chemicals
6. Scarcity of labour	Central	1. Introducing mechanized implements for labor and time - saving
7. Slow mechanization -High prices -Long waiting list due to shortage of fund -Less suppliers -Information not available	North Central South	1. Demonstration of cost-effective and promising farm machinery 2. Awareness campaign for mechanization and subsidy 3. Arrangement of more funds of subsidy
8. Low prices of farm produces	North Central South	1. IKP- government India programme and purchases paddy from farmers directly offering good market prices. IKP should be mobilized to procure Kharif, Rabi, and Summer season paddy from farmers. 2. Regarding maize, APMARKFED purchases maize directly from farmers fields, offering good market prices. Farmers evince keen interest to sell their maize to MARKFED. Hence MARKFED should be strengthened to purchase the Kharif and Rabi maize from farmers. 3. Improvement of quality of products 4. Improvement of bargaining power of farmers 5. Promotion of direct selling by farmers
9. Insufficient storage facilities for farm produce (go-downs and warehouses) in village	North Central South	1. Government is planning to construct more go-downs in proper locations. 2. The existing go-down in village levels should be managed adequately.

Source: JICA Survey Team

Attachment 8.3.2 (1/6) Crop Budgets under Present and Proposed Conditions: Rice (Rabi)

Present Condition					Proposed Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/acre	Amount Rs./acre	Particulars	Unit	Price Rs/unit	Quantity Unit/ha	Amount Rs./acre
A Seeds / Agro-chemicals					A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	30	30	900	Seeds / Seedlings	kg	30	25	750
Nursery bed					Nursery bed 200 m2				
Organic materials (no buying)	kg				Organic materials (no buying)	kg			
Urea	kg	7	2	10	Urea	kg	7	4.4	30
SSP	kg	6	6	40	SSP	kg	6	6.25	40
MOP	kg	16	2	30	MOP	kg	16	1.6	30
Main field					Main field	-	-	-	-
Urea	kg	7	100	700	Urea	kg	7	110	770
SSP	kg	6	100	600	SSP	kg	6	150	900
MOP	kg	16	25	400	MOP	kg	16	26	420
Micro-nutrient (ZnSO4)	kg	25	20	500	Micro-nutrient (ZnSO4)	kg	25	20	500
Pesticide (Acephate)	kg	350	0.5	180	Pesticide (Chlorpyrifos)	L	240	1.5	360
Fungicide (Wettable Sulpher)	kg	44	6	260	Pesticide (Phorate granules) 10G	kg	40	12.5	500
Sub-total				3,620	Herbicide (Butachlor)	kg	160	1.25	200
					Sub-total				4,500
B Labour Cost					B Labour Cost				
Land Preparation (Tractor: plogu/hing / cultivation / pu	time	800	3	2,400	Land Preparation (Tractor: plogu/hing / cultivation / pu	time	800	3	2,400
Nursery preparation	man-day	300	1	300	Nursery preparation	man-day	300	2	600
Removing of seedlings / Planting	man-day	200	10	2,000	Planting	man-day	200	10	2,000
Weeding	man-day	200	10	2,000	Weeding	man-day	200	10	2,000
Irrigation	man-day	300	1	300	Irrigation	man-day	300	1	300
Application of agro-chemicals (pesticide)	man-day	300	1	300	Application of pesticide/fungicide/weedicide	man-day	300	3	900
Application of fertilizer	man-day	300	1	300	Application of fertilizer	man-day	300	2	600
Harvesting	man-day	200	10	2,000	Harvesting	man-day	200	10	2,000
Heaping / Threshing / Winnowing / Bagging	man-day	300	6	1,800	Heaping / Threshing / Winnowing / Bagging	man-day	300	6	1,800
Transport	ls	500	1	500	Transport	ls	500	1	500
Sub-total				11,900	Sub-total				13,100
Total (A+B)				15,520	Total (A+B)				17,600
C Yield					C Yield				
Price	bag	1,100			Price	bag	1,100		
Gross Income				33,000	Gross Income				38,500
Net Income (C-(A+B))				17,480	Net Income (C-(A+B))				20,900

Source: JICA Survey Team

Attachment 8.3.2 (2/6) Crop Budgets under Present and Proposed Conditions: Rice (Kharif)

Present Condition					Proposed Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/ha	Amount Rs./acre	Particulars	Unit	Price Rs/unit	Quantity Unit/ha	Amount Rs./acre
A Seeds / Agro-chemicals					A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	30	30	900	Seeds / Seedlings	kg	30	25	750
Nursery bed					Nursery bed 200 m2				
Organic materials (no buying)	kg	6	20	120	Organic materials (no buying)	kg			
Urea	kg	7	2	10	Urea	kg	7	4.4	30
SSP	kg	6	6	40	SSP	kg	6	6.25	40
MOP	kg	16	2	30	MOP	kg	16	1.6	30
Main field					Main field	-	-	-	-
Urea	kg	7	60	420	Urea	kg	7	90	630
SSP	kg	6	100	600	SSP	kg	6	150	900
MOP	kg	16	25	400	MOP	kg	16	26	420
Micro-nutrient (ZnSO4)	kg	25	20	500	Micro-nutrient (ZnSO4)	kg	25	20	500
Pesticide (Phorate Granule)	kg	40	8	320	Pesticide (Phorate granules)	kg	40	12.5	500
Pesticide (Monocrotophos)	L	330	0.5	170	Pesticide (Monocrotophos)	L	330	0.5	170
Sub-total				3,510	Herbicide (Butachlor)	kg	160	1.25	200
					Sub-total				4,170
B Labour Cost					B Labour Cost				
Land Preparation (Tractor: plogu/hing / cultivation / pu	acre	800	3	2,400	Land Preparation (Tractor: plogu/hing / cultivation / pu	time	800	3	2,400
Nursery preparation	man-day	300	1	300	Nursery preparation	man-day	300	2	600
Removing of seedlings / Planting	man-day	200	10	2,000	Planting	man-day	200	10	2,000
Weeding	man-day	200	10	2,000	Weeding	man-day	200	10	2,000
Irrigation	man-day	300	1	300	Irrigation	man-day	300	2	600
Application of pesticide/fungicide/weedicide	man-day	300	2	600	Application of pesticide/fungicide/weedicide	man-day	300	3	900
Application of fertilizer	man-day	300	2	600	Application of fertilizer	man-day	300	2	600
Harvesting	man-day	200	10	2,000	Harvesting	man-day	200	10	2,000
Heaping / Threshing / Winnowing / Bagging	man-day	300	6	1,800	Heaping / Threshing / Winnowing / Bagging	man-day	300	6	1,800
Transport	ls	500	1	500	Transport	ls	500	1	500
Sub-total				12,500	Sub-total				13,400
Total (A+B)				16,010	Total (A+B)				17,570
C Yield					C Yield				
Price	bag			25	Price	bag			30
Gross Income				27,500	Gross Income				33,000
Net Income (C-(A+B))				11,490	Net Income (C-(A+B))				15,430

Source: JICA Survey Team

Attachment 8.3.2 (3/6) Crop Budgets under Present and Proposed Conditions: Maize

Present Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/acre	Amount Rs./acre
A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	25	8	200
Main field				
Urea	kg	7	100	700
SSP	kg	6	150	900
MOP	kg	16	100	1,600
Gypsum	kg	2	200	400
Micro-nutrient (ZnSO4)	kg	25	20	500
Pesticide (Chlorpyrifos)	L	240	0.5	120
Pesticide (Phorate granules)	kg	40	10	400
Pesticide (Monochrotophos)	L			
Herbicide (Atrazine 50% WP)	kg	196	1	200
Herbicide 2-4-D	kg	1,400	0.5	700
Sub-total				5,720
B Labour Cost				
Land Preparation (Tractor: harrow / cultivation)	time	800	2	1,600
Sowing	man-day	200	6	1,200
Weeding	man-day			0
Hoing	man-day	200	4	800
Irrigation	man-day	300	4	1,200
Application of pesticide/fungicide/weedicide	man-day	300	3	900
Application of fertilizer	man-day	300	4	1,200
Harvesting	man-day	200	10	2,000
Drying / Shelling	man-day	200	10	2,000
Transport	ls	500	1	500
Sub-total				11,400
Total (A+B)				17,120
C Yield				
Yield	kg			3,000
Price	kg	12		
Gross Income				36,000
Net Income (C-(A+B))				18,880

Proposed Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/ha	Amount Rs./acre
A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	25	8	200
Main field				
Urea	kg	7	220	1,540
SSP	kg	6	200	1,200
MOP	kg	16	54	860
Gypsum	kg			
Micro-nutrient (ZnSO4)	kg	25	20	500
Pesticide (Chlorpyrifos)	L	240	0.5	120
Pesticide (Phorate granules)	kg	40	10	400
Pesticide (Monochrotophos)	L	330	0.5	170
Herbicide (Atrazine 50% WP)	kg	196	1	200
Herbicide 2-4-D	kg	1,400	0.5	700
Sub-total				5,890
B Labour Cost				
Land Preparation (Tractor: harrow / cultivation)	ls	800	2	1,600
Sowing	man-day	200	6	1,200
Weeding	man-day			
Hoing	man-day	200	4	800
Irrigation	man-day	300	6	1,800
Application of pesticide/fungicide/weedicide	man-day	300	6	1,800
Application of fertilizer	man-day	300	2	600
Harvesting	man-day	200	10	2,000
Drying / Shelling	man-day	200	10	2,000
Transport	ls	500	1	500
Sub-total				12,300
Total (A+B)				18,190
C Yield				
Yield	kg			3,500
Price	kg	12		
Gross Income				42,000
Net Income (C-(A+B))				23,810

Source: JICA Survey Team

Attachment 8.3.2 (4/6) Crop Budgets under Present and Proposed Conditions: Ground Nut

Present Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/acre	Amount Rs./acre
A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	50	80	4,000
Main field				
Urea	kg	7	25	180
SSP	kg	6	80	480
MOP	kg	16	25	400
Gypsum	kg	2	200	400
Micro-nutrient (ZnSO4)	kg			0
Rhizobium inoculum	200g			0
Pesticide (Imidacloprid)	L	700	0.2	140
Fungicide (Mancozeb)	kg			0
Herbicide (Fluchloralin)	L	800	1	800
Sub-total				6,400
B Labour Cost				
Land Preparation (Tractor: ploguigh / harrowing)	time	800	2	1,600
Sowing	man-day	200	10	2,000
Weeding	man-day	200	6	1,200
Irrigation	man-day	300	1	300
Application of pesticide/fungicide/weedicide	man-day	300	2	600
Application of fertilizer	man-day	300	1	300
Harvesting	man-day	200	10	2,000
Shelling	man-day	200	10	2,000
Transport	ls	500	1	500
Sub-total				10,500
Total (A+B)				16,900
C Yield				
Yield	kg			600
Price	kg	50		
Gross Income				30,000
Net Income (C-(A+B))				13,100

Proposed Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/ha	Amount Rs./acre
A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	50	80	4,000
Main field				
Urea	kg	7	30	210
SSP	kg	6	100	600
MOP	kg	16	32	510
Gypsum	kg	2	200	400
Micro-nutrient (ZnSO4)	kg	25	10	250
Rhizobium inoculum	200g	250	1	250
Pesticide (Imidacloprid)	L	700	0.2	140
Fungicide (Mancozeb)	kg	275	0.5	140
Herbicide (Fluchloralin)	L	800	1	800
Sub-total				7,300
B Labour Cost				
Land Preparation (Tractor: ploguigh / harrowing)	time	800	2	1,600
Sowing	man-day	200	10	2,000
Weeding	man-day	200	6	1,200
Irrigation	man-day	300	1	300
Application of pesticide/fungicide/weedicide	man-day	300	2	600
Application of fertilizer	man-day	300	1	300
Harvesting	man-day	200	10	2,000
Shelling	man-day	200	10	2,000
Transport	ls	500	1	500
Sub-total				10,500
Total (A+B)				17,800
C Yield				
Yield	kg			800
Price	kg	50		
Gross Income				40,000
Net Income (C-(A+B))				22,200

Source: JICA Survey Team

Attachment 8.3.2 (5/6) Crop Budgets under Present and Proposed Conditions: Pulses

Present Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/acre	Amount Rs./acre
A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	100	16	1,600
Main field				
Urea	kg			0
SSP	kg			0
DAP	kg			0
MOP	kg			0
Rhizobium inoculum	kg			0
Fungicide (Captan)	kg			0
Pesticide (Monocrotophos)	L	330	0.5	170
Fungicide (Mancozeb)	kg			0
Herbicide (Pendimethalin)	L			0
Sub-total				1,770
B Labour Cost				
Land Preparation (Tractor: cultivating)	time			0
Sowing	man-day	300	1	300
Weeding	man-day	200	4	800
Irrigation	man-day			0
Application of monocrotophos	man-day	300	1	300
Application of fertilizer	man-day			0
Harvesting	man-day	200	8	1,600
Bagging / Transport	man-day	300	2	600
Transport	ls			0
Sub-total				3,600
Total (A+B)				5,370
C Yield				
Yield	kg			200
Price	kg	75		
Gross Income				15,000
Net Income (C-(A+B))				9,630

Source: JICA Survey Team

Proposed Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/ha	Amount Rs./acre
A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	100	16	1,600
Main field				
Urea	kg			
SSP	kg			
DAP	kg	24	10	240
MOP	kg			
Rhizobium inoculum	200 g	250	1	250
Fungicide (Captan)	kg	500	0.1	50
Pesticide (Monocrotophos)	L	330	0.5	170
Fungicide (Mancozeb)	kg	270	0.5	140
Herbicide (Pendimethalin)	L	325	1.5	490
Sub-total				2,940
B Labour Cost				
Land Preparation (Tractor: cultivating)	time			
Sowing	man-day	300	1	300
Weeding	man-day	200	6	1,200
Irrigation	man-day	300	1	300
Application of pesticide/fungicide/weedicide	man-day	300	2	600
Application of fertilizer	man-day			
Harvesting	man-day	200	8	1,600
Bagging / Transport	man-day	300	2	600
Transport	ls			0
Sub-total				4,600
Total (A+B)				7,540
C Yield				
Yield	kg			350
Price	kg	75		
Gross Income				26,250
Net Income (C-(A+B))				18,710

Attachment 8.3.2 (6/6) Crop Budgets under Present and Proposed Conditions: Sugarcane

Present Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/acre	Amount Rs./acre
A Seeds / Agro-chemicals				
Sets	no.	2.5	4,000	10,000
Main field				
Urea	kg	7	150	1,050
SSP	kg	6	150	900
MOP	kg	16	100	1,600
Micro-nutrient (ZnSO4)	kg	25	20	500
Pesticide (Malathion)	L	900	1	900
Fungicide (Carbendazim)	kg	375	2	750
Herbicide (Atrazine)	kg	196	1.5	290
Sub-total				15,990
B Labour Cost				
Land Preparation (Tractor: ploughing / Culti	hr	800	4	3,200
Planting	man-day	200	10	2,000
Weeding	man-day	200	5	1,000
Earthing	man-day	300	4	1,200
Irrigation	man-day	300	6	1,800
Propping & tying plants	man-day	300	5	1,500
Application of pesticide/weedicide	man-day	300	2	600
Application of fertilizer	man-day	300	2	600
Harvesting	man-day	200	10	2,000
Collection and Heaping	man-day	300	4	1,200
Transport	ls	10,000	1	10,000
Sub-total				25,100
Total (A+B)				41,090
C Yield				
Yield	kg			30,000
Price	kg	2.2		
Gross Income				66,000
Net Income (C-(A+B))				24,910

Source: JICA Survey Team

Proposed Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/ha	Amount Rs./acre
A Seeds / Agro-chemicals				
Sets	no.	2.5	4,000	10,000
Main field				
Urea	kg	7	220	1,540
SSP	kg	6	250	1,500
MOP	kg	16	75	1,200
Micro-nutrient (ZnSO4)	kg	25	20	500
Pesticide (Malathion)	L	900	1	900
Fungicide (Carbendazim)	kg	375	2	750
Herbicide (Atrazine)	kg	196	2	390
Sub-total				16,780
B Labour Cost				
Land Preparation (Tractor: ploughing / Cultiv	ls	800	4	3,200
Planting	man-day	200	10	2,000
Weeding	man-day	200	5	1,000
Earthing	man-day	300	4	1,200
Irrigation	man-day	300	6	1,800
Propping & tying plants	man-day	300	5	1,500
Application of pesticide/weedicide	man-day	300	2	600
Application of fertilizer	man-day	300	2	600
Harvesting	ls	200	15	3,000
Collection and Heaping	man-day	300	4	1,200
Transport	ls	10,000	1	10,000
Sub-total				26,100
Total (A+B)				42,880
C Yield				
Yield	kg			35,000
Price	kg	2.2		
Gross Income				77,000
Net Income (C-(A+B))				34,120

Attachment 8.4.1 Detailed Findings of Livelihood of Livestock during the Survey

The study team implemented interview survey with farmers in the visited villages of three district, Vizianagaram, West Godavari, and Chittoor. The detailed findings and raised issues by farmers are consolidated below tables. Other findings and issues observed from other related parties are following each box.

1. Vizianagaram district

Visited village names:	-Pittada village, Gajapatinagaram mandal -Gangachallapenta village, Gajapatinagaram mandal -Pedda Thumbali village,
Number of livestock per farmer:	-Buffalo 1-4 (Murrar), -Caw 2-3 (Jersey),
Land holding (Acre):	1 - 3
Income balance between agriculture and livestock:	-6:4 -10:0 (Paddy, Maiz, Pulse, Millet, Mango etc)
Quantity of milk per cattle (Little):	-Morning 2.5 and evening 1.5, total 4 per day -Total 3.5 per day -Morning 1-2 and evening 1-2, total 2-4.
Self-consumption of milk (Little):	Less than 1 little
Milk buyer / collection center:	Visakha Dairy, Heritage, Dolphin
Milk selling price (Rs.):	-20-25 (Cow), 25-30 (Buffalo) -35-40 (Buffalo)
Fodder:	Paddy, Rice bran, grazing
Market:	15 km far from village
Veterinary service:	-Visit of Veterinary sergeant every week. -0-1 Goparmithra appointed. -Veterinary service is available by phone call request -Vaccination of FMD every year -5 units of Back yard poultry scheme provided -AI (Artificial Insemination)
Other:	-Farmers receive veterinary service from Visakha Dairy, such as subsidy, annual bonus, animal insurance, free animal health care. -A farmer has governmental animal insurance. The beneficiary receives free feed for joining the service as an incentive.
Challenges:	-Lack of fodder, and its cultivation area. -Low milk selling price. -Natural disaster like cyclone and heavy rain. -Low income from crops and livestock. -Lack of budget to invest on livestock. -Disease during the rainy season. -Water shortage. -Labor shortage.

Source: JICA Survey Team

Visakha Dairy, one of the biggest dairy company in AP plays a significant role in the area.

- The company collects 700,000 litters of milk per day from around 2,700 villages of Vizianagaram, Visakhapatnam, and Srikakulam district.
- To collect more quantity and better quality of milk, the company provides not only AI but also related trainings, subsidy to purchase animals, annual bonus, animal insurance, family insurance, scholarship etc.
- An interesting rule of the company is that their official staff must have parents who have livestock and its experience to take care.
- The purchasing price of milk from farmer is increasing every year according with the staff of their milk collection center. The purchasing price of 2016 is increased by Rs. 5 from the one of 2015 according to the provided document.
- Noteworthy, the collection center has a large land of solar panels. They create the necessary electric power for the center and also extra power so that the center earns extra income from them.

The department of Animal Husbandry of Vizianagaram district raised some issues related to the livestock.

- The large scale poultry farmers are recognized as not agricultural farmer but business person. Therefore, they have to pay tariff of electricity with the business category. It would less if they could be categorized the agricultural farmers.
- National Rural Employment Guarantee Act (NREGA) employs the jobless people and appoints them to the public works with better conditions and better fee than general agricultural works. Hence the land-holds farmers who need manpower for farming at his land face serious shortage of workers. Government is now under the process to amend the Act to secure the agricultural workers.
- It is important and necessary to create a loan scheme for landless farmer because. Most of the loan scheme requires their own land as collateral.

2. West Godavari district

Visited village names:	-Narasannapalem village, Lingapalem mandal -Koppaka village -Elure city
Number of livestock per farmer:	-Buffalo 1-15 (Murrar), -Poultry 2-10 (Desi) -Sheep and goat 2-30
Land holding (Acre):	0 – 3
Income balance between agriculture and livestock:	-7:3 -9:1
Quantity of milk per cattle (Little):	-Morning 2-4, evening 2-4, total 4-8 per day -Total 7 per day -Morning 2-3, total 4-6.
Self-consumption of milk (Little):	1-2 little
Milk buyer / collection center:	Modal, Jersey, Turmula, Farmer Dairy, Vijaya, Heritage, Telmor
Milk selling price (Rs.):	-35-45 (Buffalo) -30 (2015) & 35 (2016) (Buffalo)
Fodder:	Paddy, Rice bran, Rice mill, grazing
Market:	Nearby
Veterinary service:	-Veterinary dispensary with an Assistant Veterinary Sargent. -AI, Health check, De-worming
Other:	-Most of male calf buffalos are being sold within a month after birth through local brokers. -Most of landless schedule cast farmers have bank account but no money in it.
Challenges:	-Lack of fodder due to lack of rain in recent years. -Lack of fodder cultivation land due to the expansion of agricultural land. -The result of fat content differs from different devices of companies. -Low productivity of buffalo milk. Maximum ten little per day in peak season. -Unsuitability of breeding cow type in this specific climate condition. -Not very good quality of cattle semen from governmental service. -Lack of budget to invest on fodder to increase productivity. -Lack of subsidy to purchase more animals. -Decreasing milk selling price to dairy. -Lack of knowledge among farmers to feed mixed ration fodder. -Necessity of grass-root veterinary service. -Lack of agricultural workers -Lack of drinking water (SC area) -Unpaved road to the community (SC area)

Source: JICA Survey Team

Milk price in a retail shop in city seems to be controlled among the companies. The milk prices from different providers are all same in the shop as below. Therefor the customers are able to choose milk product not by the price but its quality and other factors.

- Full cream 3.5% Fat content 0.5 littles: Rs. 24 (Vijaya, Jersey, Heritage, Visakha Dairy)
- Toned milk 3.0% Fat content 0.5 littles: Rs. 20 (Vijya)
- Curd 0.2 littles: Rs. 10 (Jersey), 0.5 littles: Rs.24
- Lassi 0.2 littles: Rs. 17 (Jersey)



Figure 8.4.1 Milk outlet in city (left) and a pack of curd (right)

Milk collection center is the point where the farmer brings their milk two times every day in the village. The study team confirmed the followings.

- Most of the visited villages have the collection center
- It is a competitive situation among dairy companies to collect milk from farmers for their service.
- The dairy companies provide different incentives for the farmers, such as subsidy to buy animal or fodder, annual bonus, better fodder, animal insurance, health check-up, and even AI so that they attract milk pourers more than other companies.
- Farmers have a variety of choices of dairy companies to sell their milk. They can always choose better rate company and better incentives.
- The most important thing to have stable milk quantity is to build mutual trust between the company and farmers, according to a staff of dairy company. To build such trust, the regular payment is the most crucial. Usually the farmer receive money through bank transfer every ten days or two weeks.
- All collection centers have a device to check the milk weight and fat content.
- The collected milk is gathered within two to three hours by each company truck and transported to the milk chilling center to be cooled by four to five degrees.
- This milk collection network is spreading most of regions in the AP and still growing larger and larger along with the newly appeared dairy companies.



Figure 8.4.2 Milk Fat Checker (left) and milk can (right)

“Vijaya dairy” is another leading dairy company of AP. The points raised by the staff interview are below.

- The company collects 27,000 littles of milk every day from 170 villages and produces not only processed milk but also Ghee, butter, curd, etc.
- 96% of the collected milk is from buffalo and the rest from cow. They mix the both milk and control the fat content to be standardized.
- 60% of their product are consumed in AP, the rest are transported to Hyderabad.
- There is no problem to transport the milk because of the spread collection network and the milk cooling systems. There is no waste of milk in the whole process.
- Due to the bifurcation, the company will face the lack of processing facility in this year. They need to establish new processing facility.
- While the private sector develops their market by themselves, Vijaya dairy, established originally as cooperative, does not have enough capacity for marketing activities. It is necessary to spread their market share in not only West Godavari but other districts.

“Gopal Mithra” means “Friend of animals” in local language. They are working as the door step services of the animal owner with a view to provide Artificial Inseminations.

- It was originally established by Gujarat Livestock Development Board and spread to other states.
- Gopal Mithra is trained with six months’ class room training and practical training and given AI kits.
- Since it is quite difficult to cover the whole state under AI services by government institutions, especially the remote and hinterland areas, Gopal Mithra are appointed most of villages and cover those areas.
- Gopal Mithra receives monthly salary from the Department of Animal Husbandry, at the same time they can earn Rs.30 every time as the fee when they provide AI to farmers.
- Gopal Mithra can provide also a brief health check-up of animals and refer veterinary service of the department if necessary.
- During the survey, the study team confirmed their presence in most of the visited villages and their active role especially in the remote villages. It is recommendable to work with Gopal Mithra to develop new livestock activities by project.

Department of Animal Husbandry of West Godavari raised issues below during the interview.

- The number of small ruminants in this district are less than other district because the grazing land is also less than other regions.
 - The farmers who mainly keep sheep and goat are belong to a specific cast and inherit them from ancestors.
 - Animal leather in most cases are wasted due to lack of presence of commercial industry.
 - Cattles are regarded as family members with the religious back ground.
 - The milk productivity should be increased by one million littles per day while current figure is 600,000 littles. This is because the number of buffalo, produces less milk than cows, is more than cow. Also unexpected epidemic, lack of fodder, not enough health care of animals are the bottlenecks.
 - Farmers do not have proper knowledge of balanced feeding for animal. They just give the grass around to their animal without mineral. The department needs to provide educational training regarding the animal nutrition.
 - Due to the lack of proper health care, the calf mortality is still high. With the same reason, the dry season of pregnancy also too long in many cases.
 - The morbidity of animal in regions is much higher than urban areas. The health care support in the regions is still not enough.
 - There are many vacancies in the governmental veterinary services due to lack of human resources.
-

- Low profitability of animal husbandry discourages farmer to invest more on their animal, then end up in the low productivity.
- The department is using old knowledge, techniques and machineries. To develop better breeding and to support farmers with updated methods, the department itself needs to be updated.

3. Chittoor district

Visited village names:	-Chokkamadugu village -Krishna Puram village -Katherapalle village -Nagar village, Chittoor city
Number of livestock per farmer:	-Cow 1-5 (Jersey and HF), -Poultry 2 (Desi) -Some Sheep and goat
Land holding (Acre):	0-5
Income balance between agriculture and livestock:	-0:10 -5:5 -8:2
Quantity of milk per cattle (Little):	-Morning 3, evening 4, total 7 per day -Morning 5, evening 5 total 10 per day.
Self-consumption of milk (Little):	0.5-1 little
Milk buyer / collection center:	Baraj Dairy, Srija Dairy, Dote, Heritage, Jersey, Hutsun.
Milk selling price (Rs.):	-Rs. 22-25 -30-32 (Baraj Dairy)
Fodder:	Paddy, paddy hask, groundnut cake, sugarcane leaf, grazing
Market:	-Tirpati
Veterinary service:	-Assistant Veterinary Sargent visits 1-2 times every week. -AI, Health check, De-worming.
Other:	-Water fall in this year is changings situation better.
Challenges:	-Lack of fodder due to the dry climate. Needed to import fodder from other districts last years. -Unavailability of subsidy to purchase animals, fodder and minerals. -Decreasing milk selling price. -Lack of knowledge to increase milk productivity. -Lack of labor due to NREGA

Source: JICA Survey Team

Milk price in a retail shop in town are below.

- 0.5 litters: Toned milk Rs.19, Double Toned milk Rs.16, and Full cream milk Rs.24.

Department of Animal Husbandry of Chittoor District explained the situation during the interview as below.

- Due to the draught, Chittoor district had to import fodder from other district in 2015.
- Because of the water fall in this year, the milk productivity has been already increased by 15-20%.
- Chittoor was chosen to implement the governmental “Intensive Cattle Development Scheme” in a couple decades ago. Therefore, the number of cow in the district increased dramatically.
- The district was chosen also to implement “FMD control program” by government. The first year of the program, total 16 times vaccination were implemented all around the district in 2012.
- Average income ratio from livestock is 36% for the general farmers. Incomes from horticulture and agriculture are following.
- The milk purchasing price is decreasing along with the declining needs for milk. The price of this year is around Rs. 22-24 while last year was Rs.26-30.
- The government has to work on the marketing of milk to increase the demand of milk.

Attachment 8.4.2

Statement of T Type Wise Societies in the State

Sl. No.	Name of the District	Inland F.C.S			Marine F.C.S			Brakish water F.C.S			Fisherwomen F.C.S			Fishermen Mkt. C.S		
		No. of Socs.	No. of Members	Share Capital	No. of Socs.	No. of Members	Share Capital	No. of Socs.	No. of Members	Share Capital	No. of Socs.	No. of Members	Share Capital	No. of Socs.	No. of Members	Share Capital
1	Srikakulam	68	7573	659537	57	13926	852223	0	0	0	14	673	58460	0	0	0
2	Vizianagaram	55	6597	170000	12	2908	84100				9	947	72300	0	0	0
3	Vishakapatnam	25	2089	229790	70	10996	1209560	0	0	0	39	3831	420030	0	0	0
4	East Godavari	249	24840	868209	112	17404	520420	2	115	1107	197	10116	619815	0	0	0
5	West godavari	217	21922	1205710	16	1042	57365	4	194	1940	28	2318	127490	1	2000	5888
6	Krishna	222	18332	860905	42	8501	271988	5	417	95525	86	9109	552357	1	99	5445
7	Guntur	106	10829	773188	26	5855	292750	1	36	10000	19	1142	60960			
8	Prakasam	49	5338	571449	39	10450	559000	0	0	0	19	1155	43600	0	0	0
9	Nellore	88	16351	201860	50	10239	107854	0	0	0	71	7514	339322	2	235	6180
10	Ananthapur	90	7195	395725	0	0	0	0	0	0	4	261	2871	0	0	0
11	Kurnool	80	4583	590435	0	0	0	0	0	0	8	373	19325	0		0
12	Kadapa	34	1763	62809	0	0	0	0	0	0	2	52	620	0	0	0
13	Chittoor	43	2527	32945	0	0	0	0	0	0	13	327	14177	0	0	0
	Total	1326	129939	6622562	424	81321	3955260	12	762	108572	509	37818	2331327	4	2334	17513

Source: Fisheries Department, Andhra Pradesh

Consolidated Statement of Fishermen Coop. Societies

Sl.No	Type of Society	No. of Societies
1	Inland Fishermen Cooperative Societies	1,326
2	Marine Fishermen Cooperative Societies	424
3	Brakish water Fishermen Coop. Societies	12
4	Fisher women Coop. Societies	509
5	Fishermen Marketing Coop.Societies.	4
6	District Fishermen Coop.Societies	13
	Total No. of Societies	2,288

Source: Fisheries Department, Andhra Pradesh

Name of District	Inland Fishermen		Marine Fishermen		Brackish Water		Fisherwomen		Fishermen Marketing		
	Cooperative Societies		Cooperative Societies		Fishermen Cooperative Society		Cooperative Society		Cooperative Society		
	No of FCS	No of Members	No of FCS	No of Members	No of FCS	No of Members	No of FCS	No of Members	No of FCS	No of Members	
1	Srikakulam	68	7573	57	13926	0	0	14	673	0	0
2	Vizianagaram	55	6597	12	2908			9	947	0	0
3	Vishakapatnam	25	2089	70	10996	0	0	39	3831	0	0
4	East Godavari	249	24840	112	17404	2	115	197	10116	0	0
5	West godavari	217	21922	16	1042	4	194	28	2318	1	2000
6	Krishna	222	18332	42	8501	5	417	86	9109	1	99
7	Guntur	106	10829	26	5855	1	36	19	1142		
8	Prakasam	49	5338	39	10450	0	0	19	1155	0	0
9	Nellore	88	16351	50	10239	0	0	71	7514	2	235
10	Ananthapur	90	7195	0	0	0	0	4	261	0	0
11	Kurnool	80	4583	0	0	0	0	8	373	0	0
12	Kadapa	34	1763	0	0	0	0	2	52	0	0
13	Chittoor	43	2527	0	0	0	0	13	327	0	0
	Total	1326	129939	424	81321	12	762	509	37818	4	2334

Source: Fisheries Department, Andhra Pradesh

1. MARINE FISH PRODUCTION FROM 1995-96 TO 2014-2015(Andhra Pradesh)

Sl. No.	Name of District	(Fig. in Tonnes)																			
		1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2000-03	2000-04	2000-05	2000-06	2000-07	2000-08	2000-09	2000-10	2000-11	2000-12	2012-13	2013-14	2014-15
1	Srikakulam	1,371	4,151	23,209	23,786	24,868	26,024	30,483	31,815	32,311	32,325	32,615	31,259	25,614	30,735	32,131	33,858	40,352	42,203	46,042	55,517
2	Vizianagaram	12,339	6,056	7,864	8,131	8,373	9,310	12,430	13,357	8,689	8,184	17,033	8,080	8,444	10,110	10,947	12,688	12,868	12,957	15,446	15,607
3	Visakhapatnam	7,119	8,252	21,418	21,787	25,798	26,591	31,257	40,798	46,348	34,455	35,157	35,212	49,448	54,777	52,578	59,037	69,982	73,523	78,585	85,620
4	East Godawari	6,993	8,964	20,014	21,500	21,771	22,796	34,315	34,775	48,948	42,847	28,948	46,219	49,811	53,844	52,157	58,096	68,370	80,189	79,030	85,078
5	West Godawari	271	222	2,000	2,100	2,448	2,859	6,314	7,551	10,229	6,919	8,027	4,657	2,536	1,576	1,680	1,682	7,372	7,940	9,908	10,583
6	Krishna Dist	3,731	4,177	7,152	7,522	8,246	9,402	12,620	14,675	13,627	10,700	10,452	13,079	13,997	16,192	17,050	19,062	21,932	23,296	25,419	28,037
7	Guntur	9,175	10,509	8,367	8,554	11,903	14,736	12,492	13,181	14,903	11,488	14,448	13,434	14,487	19,623	20,075	20,133	24,816	26,751	26,818	31,460
8	Prakasam	63,768	65,373	5,379	5,464	7,229	9,286	11,079	12,327	12,435	7,539	11,007	11,577	12,254	13,040	14,699	13,387	17,907	20,528	20,339	22,789
9	Nellore	26,015	22,699	33,640	31,279	32,118	36,155	29,771	43,054	42,473	27,124	34,380	43,596	42,224	45,027	45,227	33,883	62,873	64,198	71,751	71,558
	TO TAL	130,782	130,403	129,043	130,123	142,754	157,159	180,761	211,533	229,963	181,581	192,067	207,112	218,815	244,924	246,544	251,826	326,472	351,585	373,338	406,249

Source: Fisheries Department, Andhra Pradesh

2. MARINE SHRIMP PRODUCTION FROM 1995-96 TO 2014-15 (Andhra Pradesh)

Sl. No.	Name of District	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2000-03	2000-04	2000-05	2000-06	2000-07	2000-08	2000-09	2000-10	2000-11	2000-12	2012-13	2013-14	2014-15
1	Srikakulam	355	388	375	410	421	490	740	803	728	727	710	903	1,109	685	1,224	723	1,050	1,103	1,316	1,446
2	Vizianagaram	129	144	226	378	429	475	552	662	374	288	629	362	423	607	561	547	723	754	985	900
3	Visakhapatnam	211	224	2,987	3,357	3,853	3,944	3,520	3,217	5,256	5,372	4,775	4,447	6,459	8,525	5,961	7,234	9,292	10,709	11,321	11,700
4	East Godawari	3,393	3,542	1,692	1,865	1,959	1,744	2,188	7,978	5,842	4,473	2,301	6,880	6,788	9,980	8,201	9,159	12,758	16,521	15,415	16,651
5	West Godawari	60	61	127	168	185	306	1,137	751	832	633	808	558	67	484	319	317	818	934	1,090	1,222
6	Krishna Dist	2,783	2,758	2,975	3,323	5,207	5,569	5,800	7,918	6,605	5,800	5,350	6,485	6,600	8,435	7,670	7,426	9,275	9,800	11,200	11,906
7	Guntur	964	907	917	1,118	1,186	2,118	2,331	2,001	3,885	3,478	3,182	3,957	4,542	6,194	4,525	4,389	5,571	6,597	7,042	7,454
8	Prakasam	5,192	5,264	1,202	1,374	1,613	1,717	2,115	2,535	4,328	3,030	3,838	3,921	3,550	4,112	5,111	4,358	4,997	6,268	5,806	6,820
9	Nellore	8,121	8,356	7,003	7,884	8,875	8,980	5,796	10,897	6,113	5,350	5,176	6,087	6,539	7,214	13,034	4,574	8,461	10,078	10,733	11,053
	TO TAL	21,208	21,644	17,504	19,877	23,728	25,343	24,179	36,762	33,963	29,151	26,769	33,599	36,077	46,236	46,606	38,727	52,945	62,764	64,908	69,152

Source: Fisheries Department, Andhra Pradesh

3. BRACKISH WATER SHRIMP PRODUCTION FROM 1995-96 TO 2014-15 (Andhra Pradesh)

(Tonnes)

Sl. No.	Name of District	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2000-03	2000-04	2000-05	2000-06	2000-07	2000-08	2000-09	2000-10	2000-11	2000-12	2012-13	2013-14	2014-15
1	Srikakulam	137	205	223	255	278	458	265	266	285	350	305	300	138	176	135	505	481	495	733	821
2	Vizianagaram	8	2	3	47	24	21	19	14	20	21	110	38	27	24	35	48	74	82	129	138
3	Visakhapatnam	524	306	339	372	400	318	361	203	437	342	416	335	62	279	215	534	1,001	1,011	1,326	3,265
4	East Godavari	2,329	3,696	3,796	4,573	3,298	5,707	3,832	4,508	5,852	10,187	4,189	3,628	4,618	5,501	5,243	5,621	6,254	7,876	9,183	11,373
5	West Godavari	4,935	5,176	5,063	11,632	3,439	3,775	2,983	3,878	5,371	10,127	7,947	8,061	24,260	1,161	1,674	8,318	18,187	18,367	26,864	31,550
6	Krishna Dist	10,127	13,477	14,094	13,402	10,865	12,328	14,104	13,517	7,172	2,450	14,700	11,272	5,336	6,305	6,350	12,061	9,001	16,344	10,391	13,801
7	Guntur	3,139	3,128	3,238	4,542	4,360	4,151	5,253	5,283	4,030	2,227	5,139	2,732	1,707	2,835	5,746	3,135	4,056	3,960	6,575	7,594
8	Prakasam	2,172	1,746	1,966	4,047	4,234	4,947	4,311	4,343	3,547	4,531	4,827	4,903	2,814	2,727	2,731	4,610	4,785	9,763	7,420	10,301
9	Nellore	3,769	2,641	2,598	5,988	5,371	6,139	5,476	6,489	6,625	2,738	4,340	6,543	7,923	7,333	8,530	8,546	12,340	11,973	25,415	26,319
	TOTAL	27,140	30,377	31,320	44,858	32,269	37,844	36,604	38,501	33,339	32,973	41,973	37,811	46,885	26,341	30,659	43,378	56,179	69,871	88,036	105,162

Source: Fisheries Department, Andhra Pradesh

4. INLAND FISH PRODUCTION FROM 1995-96 TO 2014-15 (Andhra Pradesh)

(Tonnes)

Sl. No.	Name of District	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2000-03	2000-04	2000-05	2000-06	2000-07	2000-08	2000-09	2000-10	2000-11	2000-12	2012-13	2013-14	2014-15
1	Srikakulam	1,132	1,152	1,287	1,596	1,854	2,533	3,184	3,043	2,575	3,171	4,315	3,665	3,423	5,648	7,093	6,934	8,376	8,602	9,594	10,255
2	Vizianagaram	15,414	15,505	2,954	3,790	3,895	4,013	3,906	5,064	3,290	5,779	6,668	4,199	4,764	5,871	6,503	7,287	8,050	8,661	9,256	10,300
3	Visakhapatnam	10,345	10,373	1,068	1,103	2,568	2,845	9,545	2,239	2,865	3,437	1,894	1,934	2,806	6,116	2,738	4,361	6,932	6,630	8,050	8,461
4	East Godavari	1,845	1,870	12,094	12,783	15,824	11,821	15,664	12,142	11,844	10,225	9,620	8,764	11,168	20,176	19,999	21,884	25,547	30,053	28,524	30,771
5	West Godavari	21,740	22,109	41,302	45,706	76,367	84,172	101,232	208,130	249,635	256,282	258,372	207,373	248,051	304,459	300,055	594,593	350,018	432,250	471,369	548,807
6	Krishna	4,355	4,433	31,915	37,596	57,770	87,165	98,980	163,382	207,468	176,000	201,265	234,895	246,529	300,812	369,600	347,277	391,661	430,917	486,600	535,542
7	Guntur	2,117	2,153	3,332	4,107	7,404	6,641	7,962	6,066	6,710	6,672	6,146	8,053	8,754	13,698	17,086	18,991	24,980	26,029	27,237	30,381
8	Prakasam	5,311	5,374	1,815	2,133	6,228	3,555	6,052	3,164	132	91	779	4,438	3,263	6,448	7,405	7,476	9,670	10,257	13,748	17,924
9	Nellore	20,980	21,150	11,078	12,099	12,172	18,861	18,260	16,814	13,703	14,702	14,112	16,426	22,727	27,173	25,889	21,217	34,067	37,288	50,437	46,259
10	Kurnool	13,523	13,745	2,505	2,803	3,328	1,061	3,708	2,525	460	1,830	10,265	17,495	12,990	17,596	18,274	18,743	20,501	21,740	24,506	24,123
11	Kadapa	9,036	9,184	1,926	2,027	2,689	3,771	5,010	3,605	1,427	912	804	2,075	2,833	3,929	591	2,510	4,028	4,361	775	3,269
12	Anantapur	1,387	1,410	8,539	9,887	11,719	11,128	12,115	9,402	8,705	10,525	2,250	2,073	2,724	3,609	3,730	3,697	2,866	3,576	4,740	6,600
13	Chittoor	5,120	5,203	2,680	3,938	5,047	1,215	3,939	3,251	1,223	1,999	1,334	2,316	1,264	1,329	3,545	780	1,613	2,133	4,872	4,125
	TOTAL	112,305	113,661	122,495	139,568	206,865	238,781	289,557	438,827	510,037	491,625	517,824	513,706	571,296	716,864	782,508	1,055,750	888,309	1,022,497	1,139,708	1,276,817

Source: Fisheries Department, Andhra Pradesh

5. FRESH WATER PRAWN PRODUCTION FROM 1995-96 TO 2014-15 (Andhra Pradesh)

(Tonnes)

Sl. No.	Name of District	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2000-03	2000-04	2000-05	2000-06	2000-07	2000-08	2000-09	2000-10	2000-11	2000-12	2012-13	2013-14	2014-15
1	Srikakulam	398	403	410	447	480	795	963	736	560	698	315	635	407	664	514	531	1,062	1,069	1,408	1,657
2	Vizianagaram	4,860	5,102	1,242	1,600	1,960	1,298	543	328	319	365	892	381	438	598	700	806	951	1,037	1,139	1,210
3	Visakhapatnam	894	1,050	402	514	430	351	564	833	1,402	749	635	876	797	1,220	437	1,634	6,162	4,380	6,007	7,130
4	East Godawari	419	431	4,118	4,614	1,730	3,080	4,364	3,692	6,468	2,054	4,719	488	7,235	9,346	6,794	5,714	9,220	10,123	10,301	15,528
5	West Godawari	4,082	4,136	3,839	4,810	8,000	9,751	5,820	8,913	12,823	11,055	4,767	14,782	22,675	15,723	6,809	3,353	12,631	14,835	17,943	20,454
6	Krishna Dist	989	998	2,224	2,295	6,941	7,500	9,100	10,980	8,567	2,708	3,190	4,378	8,671	10,856	10,200	11,021	15,293	15,003	26,084	24,585
7	Guntur	310	314	1,161	1,387	1,840	3,598	2,401	508	786	629	722	860	867	829	915	1,661	1,973	3,049	3,704	3,326
8	Prakasam	604	638	448	880	1,681	2,531	3,819	620	46	56	202	510	363	519	943	1,718	2,172	2,627	3,042	7,050
9	Nellore	4,004	4,142	6,231	6,556	11,313	11,662	15,332	22,946	22,397	15,517	20,089	26,891	23,078	27,313	24,586	7,635	29,205	29,483	32,981	40,081
10	Kurnool	0	0	0	0	0	0	0	6	48	43	4	39	40	33	10	30	79	93	129	130
11	Kadapa	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0	6	0	0	0
12	Anantapur	0	0	0	0	0	0	0	0	0	0	17	5	15	21	10	21	25	34	44	47
13	Chittoor	0	0	0	0	0	0	0	0	1	0	2	5	10	0	0	6	2	0	11	0
	TOTAL	16,560	17,214	20,075	23,103	34,375	40,566	42,906	49,572	53,417	33,874	35,554	49,849	64,596	67,121	51,917	34,130	78,781	81,733	102,793	121,198

Source: Fisheries Department, Andhra Pradesh

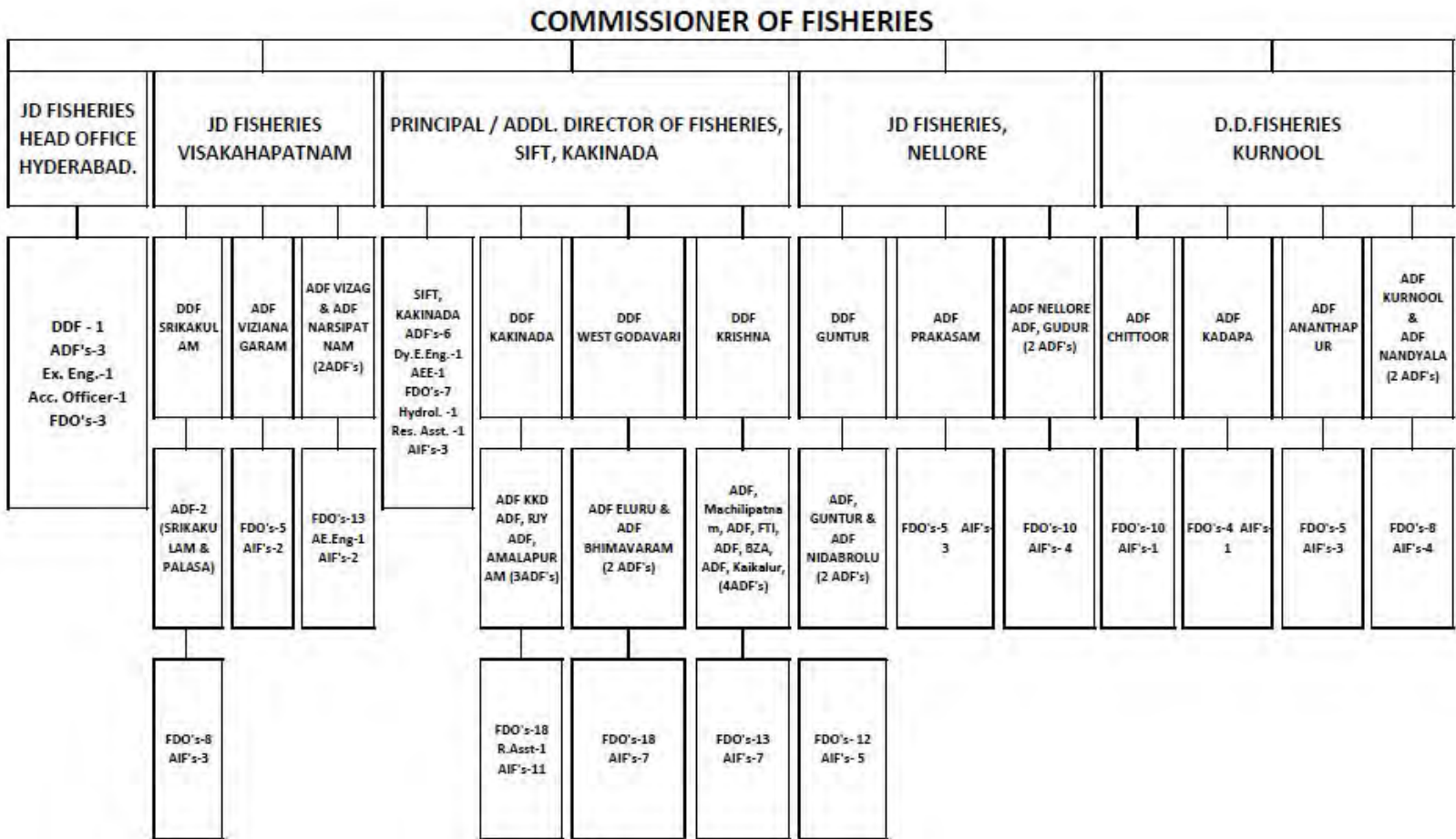
6. ABSTRACT OF FISH AND PRAWN PRODUCTION FROM 1995-96 TO 2014-2015 (Andhra Pradesh)

(Tonnes)

Sl. No.	Name of District	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2000-03	2000-04	2000-05	2000-06	2000-07	2000-08	2000-09	2000-10	2000-11	2000-12	2012-13	2013-14	2014-15
1	Srikakulam	3,393	6,299	25,504	26,494	27,901	30,300	35,635	36,663	36,459	37,271	38,260	36,762	30,691	37,908	41,097	42,551	51,321	53,472	59,093	69,696
2	Vizianagaram	32,750	26,809	12,289	13,946	14,681	15,117	17,450	19,425	12,692	14,637	25,332	13,060	14,096	17,210	18,746	21,376	22,666	23,491	26,955	28,155
3	Visakhapatnam	19,093	20,205	26,214	27,133	33,049	34,049	45,247	47,290	56,308	44,355	42,877	42,804	59,572	70,917	61,929	72,800	93,369	96,253	105,289	116,176
4	East Godawari	14,979	18,503	41,714	45,335	44,582	45,148	60,363	63,095	78,954	69,786	49,777	65,978	79,620	98,847	92,394	100,474	122,149	144,762	142,453	159,401
5	West Godawari	31,088	31,704	52,331	64,416	90,439	100,863	117,486	229,223	278,890	285,016	279,921	235,430	297,589	323,403	310,537	608,263	389,026	474,326	527,174	612,616
6	Krishna Dist	21,985	25,843	58,360	64,138	89,029	121,964	140,604	210,472	243,439	197,658	234,957	270,109	281,133	342,600	410,870	396,847	447,162	495,360	559,694	613,871
7	Guntur	15,705	17,011	17,015	19,708	26,693	31,244	30,439	27,039	30,314	24,494	29,637	29,036	30,357	43,179	48,347	48,309	61,396	66,386	71,376	80,215
8	Prakasam	77,047	78,395	10,810	13,898	20,985	22,036	27,376	22,989	20,488	15,247	20,653	25,349	22,244	26,846	30,889	31,549	39,531	49,443	50,355	64,884
9	Nellore	62,889	58,988	60,550	63,806	69,849	81,797	74,635	100,200	91,311	65,431	78,097	99,543	102,491	114,060	117,266	75,855	146,946	153,020	191,317	195,270
10	Kurnool	13,523	13,745	2,505	2,803	3,328	1,061	3,708	2,531	508	1,873	10,269	17,534	13,030	17,629	18,284	18,773	20,580	21,833	24,635	24,253
11	Kadapa	9,036	9,184	1,926	2,027	2,689	3,771	5,010	3,615	1,427	912	804	2,075	2,833	3,929	591	2,510	4,034	4,361	775	3,269
12	Anantapur	1,387	1,410	8,539	9,887	11,719	11,128	12,115	9,402	8,705	10,525	2,267	2,078	2,739	3,630	3,740	3,718	2,891	3,610	4,784	6,647
13	Chittoor	5,120	5,203	2,680	3,938	5,047	1,215	3,939	3,251	1,224	1,999	1,336	2,321	1,274	1,329	3,545	786	1,615	2,133	4,883	4,125
	ANDHRA PRADESH	307,995	313,299	320,437	357,529	#####	499,693	574,007	775,195	860,719	769,204	814,187	842,078	937,669	1,101,486	1,158,235	1,423,812	1,402,686	1,588,450	1,768,783	1,978,578

Source: Fisheries Department, Andhra Pradesh

Attachment 8.4.4 Organisation Structure of Department of Fisheries



Source: Fisheries Department, Andhra Pradesh

Attachment 8.6.1 Current Status of Famers in Andhra Pradesh State

Table 1 Summary of the current status of paddy farmers in Andhra Pradesh State

	North	Central	South
Place/District	Pedda Thumbale, Vizianagaram	Lingapalem, West Godavari	Krishnapuram, Chittoor
Land holding (ha)	Average 0.4~2ha. 70% is tenant farmers.	Average 1.1 ha	Average 0.4~2ha No tenant
Irrigation	Canal water only monsoon	Communitypond, tube well	Canal from tank, tube well
Season	Karif only	Karif only	Karif only
Major variety	1010, RGL, Masri	1010	ADT137, BPT5204
Input cost(INR/ha)	29,000~37,000	37,000~50,000	24,700
Production(ton/ha)	4~5	3.7~4.6	4.1
Selling price(INR/kg)	14.1 (government) 12.5 (traders)	14.1 (government)	10~12 (Traders) 25 (Premium variety)
Income	In case of 1 ha farmer producing 4 tons: 26,000~30,000	In case of 1 ha farmer producing 4 tons: 12,200	In case of 1ha farmer producing 4 tons: 16,300
Loan	Most farmers from money lenders	Almost all farmers from money lenders	
Selling to	20% to government 80% to traders	100% to traders	100% to traders

Source: JICA Survey Team

Table 2 Summary of the current status of maize farmers in Andhra Pradesh State

	Central	
Place/District	Musunuru, Krishna	Sitanagaram, East Godavari
Land holding (ha)	Average 0.4~2ha. 70% is small farmers. (No tenant)	Average 0.4~4.4ha 70% is tenant farmers.
Irrigation	Tube well, drip irriagation	Lift irrigation by tank, tube well
Season	Rabi only. Some farmers cultivate in Karif also.	Rabi only (Paddy in Karif)
Input cost(INR/ha)	62,000~74,000	63,000 (including tenant fee 100,000)
Production(ton/ha)	10~12.3	8.6~10
Selling price(INR/kg)	13.1 (government)	13.1 (government), 12 (traders)
Income	In case of 1 ha farmer producing 10 tons: 53,000~65,000	In case of 1 ha farmer producing 10 tons: 63,000 (in case of tenant 20,000)
Loan	NA	Some get loan from money lenders
Selling to	100% to government (PACS)	10% to government (PACS) 90% to traders (Due to capacity shortage of PACS)

Source: JICA Survey Team

Table 3 Minimum Support Price (INR/100kg)

Commodity		2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Paddy	Common	1,000	1,080	1,250	1,310	1,360	1,410
	Grade A	1,030	1,110	1,280	1,345	1,400	1,450
Maize		880	980	1,175	1,310	1,310	1,325

Source: Ministry of Agriculture and Farmers Welfare, Government of India

Attachment 8.6.2 Field Observation of the Value Chain of Each Strategic Crops

(1)Mango

1) Stakeholder Analysis

i) Farmers

Mango is harvested once a year and the peak harvesting season is in April and May in most districts in AP. The yield of mango varies between 5 tons and 20 tons per acre due to alternate bearing and the difference in water availability. The average cost of production is INR15,000~20,000 per acre. About 10 labors are necessary for harvesting mango per acre and the labor cost per head (currently around INR200) is rapidly increasing every year¹. Supply of water is a major problem, as there is little rainfall and groundwater in the major cultivation areas. The cost of boring is about INR100, 000, which is a heavy burden. Each farmer has his own well, as the amount of water in each well is too small to share. Many farmers face problems in pest and disease, and thus the demand for pest and disease control technology is high. There are a small number of progressive farmers who have GAP certificates and are skillful in producing good quality mangoes.

There are a few mango farmers' organizations aiming for collective farming and marketing but none of them are considered to be very successful thus far. At the field survey however, some promising initiatives have been observed in Chittoor district. For example, a farmers' group in Piler in Chittoor district supported by a local NGO called Center for Collective Development started training and growing fruits as per required specifications of some exporters identified by the NGO. They start group marketing by eliminate intervention of middlemen and build direct linkage with exporters in support of the NGO and the Department of Horticulture.

ii) Traders/AMPC Market

Traders (many times they are also commission agents) collect the products from farmers and sell them to buyers at wholesale markets, processors or exporters depending on quality. APMC manages the registration of commission agents and traders who can participate in the trade at the market, and setting up management rules, commission rates and registration rates based on the APMC Act. Though the designated commission rate at the APMC is 4 percent, 8-10 percent margin on sales value is generally taken by commission agents at the market. Traders buy agricultural products at auction and transport them all over the country. They also do casual grading before shipping the products.

iii) Processing companies

In AP, there are several large scale aseptic units processing fresh mango into processed products such as pulp, puree and concentrate in aseptic containers. There are also some small scale canning units which process fruits into canned products. Many aseptic units have daily processing capacity around 10,000-70,000 tons per season with large machinery and storage facilities for processing mango products. Many units have obtained certificates such as HACCP and ISO2200. Those processing companies usually procure fruits from the markets and traders, but some large scale companies procure directly from farmers. They have a unit of agronomists who provide training and guidance of GAP or IPM to the farmers who they have a regular contact and coordinate the direct procurement. Srimi Food Park, for example, 20 percent of procurement is directly from farmers and they have a plan to further expand the proportion. Large scale aseptic companies have good connections with large bottlers like Coca Cola. The large portion of processed products are marketed domestically as the demand is rapidly increasing but also exported to overseas including Japan.

iv) Ripening chambers

In India, ripening by calcium carbide is widely practiced at the farm level, but it is harmful for human health and banned by the government. As an alternate means for good ripening, ripening chambers provide the facility to ripen fruits using ethylene gas, which improves the quality and look of the fruit. Although the government conducts awareness campaign for harmfulness of calcium carbide, only small portion of farmers are aware that the price of naturally ripened mangoes (by ethylene) is 20-30 percent

¹ Interview with farmers and DOH

higher than those that are ripened by calcium carbide. There are 79 ripening chambers in Vijayawada used for ripening of mango and banana, but the facilities are not fully in utilization.

v) Treatment facilities

The constraint for the export of mango products is the stringent sanitary and phytosanitary standards (SPS) requirement imposed by importing countries, especially the US, the EU and Japan. Pesticide residue and microbial contamination limits are important to exporting to those countries. The US requires irradiation treatment, while EU requires hot-water treatment. Japan only allows imports of Indian mangoes provided they are treated by a vapor heat treatment (VHT) facility, which can eliminate a certain type of fruit fly strictly monitored in Japan. There are only 4 VHT facilities in India, two of which are in AP (Tirupati and Nuzbid). These facilities are originally set up by the government and the management is currently handed over to a private company (Srini Food). To ensure the SPS of Japan is cleared, it is required that inspectors dispatched by the Japanese plant quarantine authority stay at the VHT facility throughout the season and check all the processes. The cost of inviting inspectors from Japan should be covered by Indian exporters, and 85 percent of the cost is subsidized by APEDA.

2) Price structure of VC

The price the farmer can get from mango farming in AP is found to be very different place to place depending on the variety, location and agro-climatic conditions. The price in Chittoor is relatively higher than areas like West Godavari as it is assumed that Chittoor has good market linkage. Below is the sample price structure of mango value chain as of March 2016.

Price structure of mango VC

For Fresh				
Farmer	Trader	APMC	Whole sellers	Retail shops
Selling price: INR5~20/kg	Traders take 4~10% commission	Buying price: INR8~25/kg	Buying price: INR20~40/kg	Retail price: INR30~60/kg
		For ripening INR2.5/kg will be added.	Packhouse, VHT For export, treatment fee of INR15/kg will be added. Inspection fee is also added.	Exporter Export price: INR60~180/kg
For Processing				
Farmer	Trader	Processor	Buyers/Exporter	Retail shops
Selling price: INR8~10/kg	Traders take 4~10% commission	Buying price: INR10~20/kg (Same as market price of Totapuri)	Average price: INR44~51/kg for Totapuri mango pulp (1kg of pulp requires about 2 kg of mango to be processed).	Retail price is different at products and place to be sold.

Source: JICA Survey Team

3) Market situation

India is the world's largest producer and consumer of mangoes, now accounting for about 40 percent of global production.² India is the world's largest exporter of fresh mango products, exporting amount to 390,000 tons of fruits in 2013-2014. Exports of mango products have been growing along with production steadily in the past decades, but as the table below shows, it accounts for only 3-4 percent of domestic supplies. Exports of fresh mangoes account for approximately 2 percent of India's mango production. India's major export markets for fresh mangoes are primarily in neighboring areas of South Asia, the Middle East, and Southeast Asia, but also include more distant markets, such as the UK, the US and Japan (pulp).

² FAO STAT (<http://faostat3.fao.org/home/E>)

Supply and use of mango in India (tons)

	Production in AP	Production in India	Export			Consumption in India
			Pulp	Fresh	Total	
2012	3,514,000	16,196,000	300,898	63,441	364,339	15,831,661
2013	4,406,000	18,002,000	295,632	55,585	351,217	17,650,783
2014	2,737,000	18,431,000	349,720	41,280	391,000	18,040,000

Source: India Horticulture Database 2014

Tables below shows the major exporting countries of mango products from India. Although the large volume is exported to the Middle Eastern countries, unit price can be earned for the export to the US, the UK and Japan is much higher. In order to realize good return for mango farming and mango processing, it is recommended for the state to target exporting mango to those countries who pay premium price for quality products.

Export of Mango pulp

	Quantity (ton)	Value (lakh Rs)	Unit value
Saudi Arabia	47,178	22,494	0.48
Yemen	26,180	11,007	0.42
Netherland	12,018	8,846	0.74
UAE	9,822	5,133	0.52
Kuwait	8,696	4,505	0.52
UK	4,883	3,597	0.74
US	4,205	3,331	0.79
China	4,106	2,880	0.70
Japan	825	898	1.09

Source: APEDA

Export of Mango fresh

	Quantity(ton)	Value(lakh Rs)	Unit value
UAE	29,232	21,498	0.74
Saudi Arabia	2,171	1,429	0.66
Kuwait	787	1,238	1.57
Qatar	998	811	0.81
Nepal	3,575	695	0.19
US	272	688	2.53
UK	330	606	1.84
Singapore	563	588	1.05
Bahrain	659	505	0.77
Bangladesh	2,475	473	0.19
Japan	5	16	3.20

Source: APEDA

(2) Tomato

1) Stakeholder Analysis

i) Farmers

Tomato farmers are typically small farmers with less than 1.2 hectares (3 acres). They conduct cultivation and harvesting with the help of agricultural laborers as tomato cultivation requires intensive labor inputs such as setting sticks for trellises etc. The performance of tomato farmers is heavily dependent on the market price of tomato, which fluctuates wildly depending on the amount produced in other areas.

According to the interviewed tomato farmers in Chittoor, the yield of tomato varies between 50-75 tons per ha, depending on facilities and availability of water. The yield of tomato in Chittoor is significantly higher than the average yield of tomato in AP, 20 tons per ha.³ On the cost side, the production cost of tomato is high, about INR200,000-300,000 per ha. As the price of tomato is highly fluctuating all the time, the income generated by farmers is generally unstable. Many farmers are using plastic crates with AP government support (50% subsidy) and private sector involvement in order to minimize loss during transportation.

ii) Traders/AMPC Market

Traders (many times they are also commission agents) collect the products from farmers and sell them to buyers at the APMC markets. Commission agents (CA) at the APMC usually get 8-10 percent margin on sales value at the market despite the designated rate is 4 percent. They often do casual grading before shipping. In Chittoor there are 14 market yards for the auction of tomato. Madanapalle market is the biggest on about 7.6 ha, which dealt with about 99,073 tons in 2013/14. About 5,000 tomato farmers utilize Madanapalle market, and 200 trucks ship tomato all over the country every day.⁴ There are 109 commission agents and 30 licensed traders in Madanapalle market.⁵

³ National Horticulture Board (2013-2014)

⁴ Brief note on the Agricultural Market Committee, Madanapalle

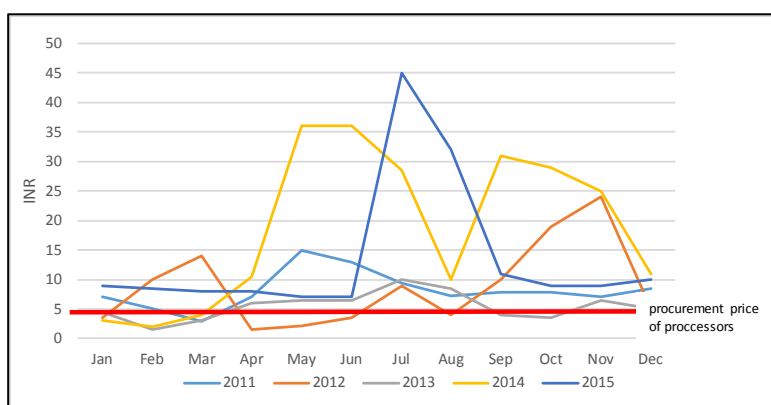
⁵ Interview at the APMC office

iii) Processing companies

There are several large scale companies who process tomato to puree, paste and sauce. All of them are integrated units processing mainly mango at the peak season, and process tomato in the off-season as an additional operation. Some companies like Srini Food and Jain Irrigation buys 20-50 percent of tomato from their contact farmers directly, but majority of processing companies buy tomato from traders as stable supply is key for the business. These 2 companies though have initiated contract farming of tomato in cooperation with the Department of Horticulture this year at a pilot basis. They provide technical and input support through their in-house team of agronomist and buy-back the products at the fixed rate of INR5 per kg which is the maximum price processor can yield profit under the current conditions. ⁶The seedlings they provide are a hybrid variety which brings high yield. DOH provides input subsidies to the contract farmers on priority. Since the price of tomato is usually high in Karif season, it is planned to focus the procure in Rabi season only for processing when the price is dropped and farmers can get profit even at INR5 per kg.

2) Price structure of VC

Tomato is one of the commodities with very high price fluctuation as shown in the below figure. The range of market price is INR2-40 per kg, changing due to various reasons like climatic conditions, production of other states, speculative activities of traders, grade etc. Below is the sample price structure as of March 2016.



Source: APMC

Price of tomato in Madanapalli market

Price structure of tomato VC

	Farmer	APMC (CA)	Wholesalers	Retail shops
Range	Selling price: INR2-36/kg	Trader/CA take 4-10% commission	Buying price: INR4-40/kg	Retail price INR7-70/kg Sold at retail shops, supermarket etc.
Sample price March 2016 (local variety)	INR8/kg		INR10/kg	Retail price: INR17/kg
Price in Rabi	Farmer Selling price: INR4.5-5/kg	Processing companies Selling price: INR65/kg (paste) (8kg of tomato is required to make 1kg past. Buying price: INR40/kg)		Exporter/Manufacture Price varies for products/country

Source: JICA Survey Team

3) Market situation

Processed tomato products mainly tomato paste are competitive commodities in a global market. Worldwide, there are three major players, the US, Europe (mainly Italy and Spain) and China in tomato paste production. At this moment, India does not possess high export competitiveness on the world market for tomato paste due to relatively low productivity and cost inefficiency. However, the domestic market is expanding, and the growth is very robust because of the rapid change of life-style of urban dwellers who increasingly consume processed tomato products. While India is the second largest tomato producer in the world next to China, India is importing tomato paste mainly from China and US as

⁶ Interview with multiple processing companies in Chittoor

shown in the below table in order to meet this increasing domestic demand. The existing tomato processing industry especially large scale ones are relying on cheaper and stable import of pulp and paste.

According to the interview with tomato farmers in Chittoor, when tomato price is crashing to INR 2 they had no choice but feed it to cattle or to throw it away as they may incur loss by transportation and transaction cost. The latest available data of 2013 shows that India imported US\$4.821 million worth of tomato paste from China when domestic farmers are dumping tomato in the field.

Therefore, it is required to develop a mechanism for the processing companies to source the raw material that is available from domestic source that will help reduce farm wastage and provide security for farmers income. It will also help develop a traceability norm which is becoming important also in India.

(3) Chili

1) Stakeholder Analysis

i) Farmers

The survey was conducted in Guntur, one of the major chili production areas in AP. In Guntur, cultivation is once a year. Seedlings are planted in September and harvesting is conducted from March to April. Average yield of the state is high as 4.58 tons per ha, but it highly depends on natural conditions mainly availability of

Table Tomato paste import to India (tons)

	China	US	Italy	Nepal
2009	3,089	7	196	643
2010	5,079	270	177	475
2011	6,943	220	243	264
2012	8,455	419	245	NA
2013	5,171	2,046	295	NA

Source: FAO STAT

water of the year. Special varieties can be sold at a higher price at the market, but the seeds of the special varieties, such as Teja, are as high as INR2,500 per kg, which is increased every year. When farmers cultivate Teja, they ask nurseries to germinate and grow their seeds for forty to forty-five days, paying 60 paisa or more per seedling. The typical total input cost is about INR 250 thousand per ha, big portion is spent for labour cost for harvesting. Drying chili is done by farmers. Department of Horticulture and the Spice Board are promoting drying on poly-sheet and distributing sheet at subsidised price, but many farmers practice drying on ground which increases mold risk causing toxin at the stage of storage. Farmers sell dried chili to the market or traders. The price of common varieties at APMC market range from INR36 to INR88 per kg, and INR65 per kg was the modal price in 2014/15. Average turnover for farmer per ha is around INR 300 thousand. The average profit for farmer is INR 47,700 per ha after deducting input cost.⁷⁷

According to the information provided by the Horticulture Department, there are 4 Farmers Producers Organization (FPO) dealing exclusively chili in AP. The one visited by the survey team in Guntur which is supported by both NABARD and the Spice Board and promoted by a NGO named EFFORT has about 800 chili farmers. The FPO has a plan for group marketing, development nursery, management of input store etc. but they do not conduct any activity other than collective receipt of subsidized inputs at this moment. 'E-Spice Bazar and Traceability Project' (see v.) initiative is just started with the FPO as a pilot basis.

ii) APMC Market

There is an APMC market exclusively dealing dried red chili in Guntur with the area of 20 ha which is one of the largest in the country. The market receives 300,000 tons of dried chili every year. More than 90 percent of dried chili in Guntur is sold through the APMC market. Only licensed CAs and licensed buyers can sell and buy the products in the market. The dried chili is sold through open auction at the market, and sale and purchase are generally carried out by mutual negotiation between licensed CAs and licensed buyers. Once a buyer tells a price, the CA asks the farmer who brought the chili whether the farmer agrees to the price or not. If the farmer agrees the price, the deal is concluded.

As of March 2015, the market has 582 licensed CAs, and 337 licensed chili buyers. During the peak season from January to July, more than 50,000 quintals of dried chili (5,000 tons) and 2,000 to 3,000 farmers come to the market every day.

⁷⁷ 4,580kg (average yield) × INR65 (mode price) – INR 250,000 =INR47,700

iii) Cold Storage

There are about 200 cold storage facilities in Guntur district, out of which 80 are located in Guntur town which are mainly used for dried chili. All of the facilities are owned and managed by private companies, and some are subsidized with the government scheme for construction. There is an association of cold storage companies in Guntur, and they set the storage fee - INR20/bag for a month and INR90/bag for a season. Main users of the facilities are traders, but many farmers are also using it for better price realization.

iv) Processing companies

There are some fifty small to medium scale chili grinding mills in Guntur. Chili powder is packed for bulk buyers or retail sellers. Some grinding mills directly export their products. There are two large scale processors of whole and powder chili.

One is ITC Ltd, which is one of the foremost multi-business enterprises started as a tobacco company. It entered the spice business about ten years ago, and has an office for their agribusiness division in Guntur. 50 percent of their products are exported to overseas. The company procures about 20,000 tons of spice (7,000 tons of chili) annually. In order to procure safe spice that does not contain agrochemical residue or aflatoxin, they provide technical assistance to farmers and buy spices directly from farmers. The percentage of their direct procurement from the contact farmers is about 20 percent.

Another major company is Synthite Industry Ltd. which is the largest oleoresin extract producing company in India. They have a headquarters in Kerala and processing units in six different places, including Guntur. 60 percent of the production is oleoresin and 40 percent is powder at the unit in Guntur. Total 22,000 tons of chili is processed in Guntur. The company has a separate unit called 'Farm Tech' which is responsible to provide technical guidance and farm inputs to the contact farmers in order for them to grow quality and chemical residue free chili. They have total 150 agronomist staffs over the country, and 14 staffs in Guntur. Currently, the program covers 1,800 farmers and 20 percent of the unit's procurement is directly from the contact farmers.

v) Spice Board

The Spice Board of India is the statutory commodity board under the Ministry of Commerce and Industry, and is responsible for export promotion activities for spice products. They have a head office in Kerala and some regional offices in major spice-producing areas. There is a regional office in Guntur, mainly focusing on chili and provide technical and inputs support for farmers. It is equipped with a quality test laboratory, which examines agrochemical residue and other harmful ingredients. They provide support for farmers to use the lab for subsidized price. The board initiated some innovative programs such as 'E-Spice Bazaar Traceability Project' which aims to provide web-based trade portal between producers and exporters. The board also has a plan of a Spice Park in Guntur. Construction of common facility is already completed and contracts for 18 plots among 40 plots to be allocated are also completed. It is expected to start operation in 2016.

2) Price structure of VC

The price of dried chili is highly fluctuating and changing time to time. Below is the sample price structure as of March 2016.

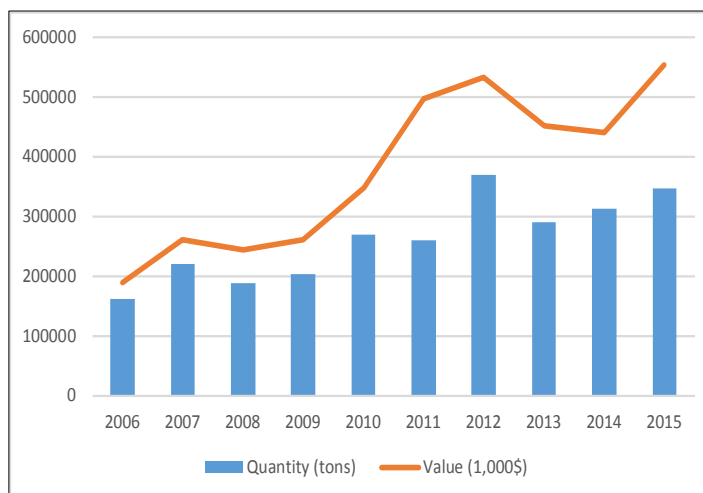
Price structure of chili VC

Farmer	APMC (CA)	Processor/ Exporter	Whole sellers	Retail shops
Selling price: INR63~68/kg	Market price: INR70/kg	Buying price: INR80~110/kg	Buying price: INR130/kg	Retail price: INR200-300/kg
2~10% commission is taken by traders	Common variety INR65/kg Special variety INR90/kg White chili INR60/kg Commission is taken by CAs	INR6/kg for grinding INR100/kg for retail packaging		Sold at retail shops, supermarket etc. Organic is sold at as high as INR450/kg

Source: JICA Survey Team

3) Market situation

Since chili is one of the most important and essential commodities for Indian food habit, the majority of chili production is consumed in the domestic and 12 percent of total produces is exported. While India has immense potential to export chili to various markets around the world, it is affected by the huge domestic demand and unstable production due to climate conditions such as erratic monsoon and drought as well as yield factor. It is observed that India's chili exports are increasing trend for the past decade on rising overseas demand.



Source: APEDA

Export of chili from India

The table below shows volume and value of chili export from the major chili exporting countries. According to the data, India is the largest chili export in the world, but the unit price it receives is the lowest among the top 6 countries. This is because the percentage of the export volume to the buyers who has strict quality standard and pay higher price such as the US or the UK is low in the Indian chili export.

Chili export countries (2013)

	Quantity (tons)	Value (000\$)	Price (per ton)
India	290,448	451,728	1.555
China	96,536	250,068	2.590
Peru	41,079	90,981	2.215
Spain	39,657	120,289	3.033
Mexico	22,143	45,599	2.059
Tunisia	17,610	31,298	1.777

Source: FAO stat

Countries export chili from India (2015)

	Quantity (tons)	Value (lakh INR)	Price (per ton)
Indonesia	65,997	58,093	0.880
Sri Lanka	44,795	29,050	0.649
Malaysia	35,747	35,711	0.999
Vietnam	31,812	35,555	1.118
USA	21,076	29,080	1.380
Bangladesh	9,054	7,308	0.807
Mexico	8,675	10,153	1.170
Saudi Arabia	4,997	4,196	0.840
UK	4,914	6,667	1.357

Source: Spice Board

The main quality parameters of export chili are chemical residue and presence of toxic fungus called aflatoxin. Those countries who pay premium price have strict legislation to ban import contaminated chili as the quality parameters are shown in the below table. Proper pesticide management and proper drying practices are essential to prevent occurrence of contamination. Therefore, it is important for processor who export their products overseas to procure chili directly from farmers for the traceability. When farmers practice IPM or Integrated Crop Management (ICM), processors pay a premium price to farmers. However the amount purchased directly is still limited and hence the benefit which can be acquired by export is also limited.

Mandatory test required for export chili products

Country/Region	Parameter	Maximum Limit
EU	Aflatoxin	Total 10 ppb
USA	Aflatoxin, Sudan I-IV	Total 20 ppb, Not Detected
Japan	Aflatoxin, Sudan I-IV, Ethion Iprobenphos, Triazophos, Profenofos	Total 10 ppb, Not Detected, 3 ppm 0.01 ppm, 0.01 ppm, 0.05 ppm

Country/Region	Parameter	Maximum Limit
Australia/NZ	Aflatoxin	Total 15 ppb
Other countries	Aflatoxin	Total 30 ppb

Source: Spice Board

(4) Coconut

1) Stakeholders

i) Farmers

The major coconut varieties grown in AP are East Coast Tall (ETC) variety (local variety) and Godavari Ganga variety (highbred variety). Average number of trees grown per area is 60~80, and average annual yield per tree is 100~120 nuts which makes total nuts production per acre is 6,000~9,600⁸. In AP, coconut can be harvested throughout the year because of its favorable climate condition. Harvesting nuts is conducted by special skilled labors in local communities, and cost of harvest paid to the labor is about INR400 per day. Farmers in the area sell coconut to local traders or traders come from other states. As there is no processing unit (except coir processing unit) in the state, farmers do not have no marketing channel other than selling nuts to traders. Selling price of tender coconut is fluctuating within the range of INR5 to 10. For getting additional income from coconut farming, intercropping of Cacao, Banana, Maize, beans etc. is promoted by the Department of Horticulture and Coconut Development Board.

ii) Processing units

There is no integrated processing unit for coconut in the state at this moment while there are number of small scale coir processing units. Coir is one of bi-products from coconut, fiber extracted from coconut husk and used in products such as floor mats, doormats, brushes, mattresses, etc. Among 760 coir units exist in AP, only 30 are middle to large scale with capital of INR 30 million and rests are small cottage scale units⁹. There are only two functioning coir exporters in the state and the major buyer of coir is China. The Coir Board is a statutory body established under the Ministry of Micro, Small and Medium Enterprises to promote coir products, new technologies and export. The head office is in Kochi in Kerala and in AP there is one branch office in Rajmandhry in AP.

iii) Coconuts Development Board

Coconut Development Board (CDB) is a statutory body established under the Ministry of Agriculture for the integrated development of coconut production and its utilization with focus on productivity increase and product diversification. The head office is in Kochi in Kerala and in AP there is one branch office at the state capital. The board implements various development scheme including area expansion, nursery development, palm insurance and so on. The board is playing especially important role for formation of Coconut Producers Society (CPS) for collective procurement, processing and marketing activities of small scale farmers to improve production, productivity and price of coconut. The board encourage to associate 40-100 coconut famers with a consolidated minimum of 4,000-5,000 palms. Subsidized inputs (fertilizer, seedlings etc) of the board are distributed only to such CPS, which accelerates motivation of farmers for formation. CPS will be further federated to Coconut Producer Federation (CPF) and 10 such CPFs will be encouraged to form the apex body – Coconut Producer Companies (CPC). A farmer equity contribution is also need to be mobilized. A matching equity contribution will be sought from the state government as a one-time assistance for making the CPS effective. Out of 58 CPC established as of today in the country, 6 are in AP¹⁰.

2) Price structure of VC








There are various products of coconut and price is different depending on the stage the nut is marketed or processed. As shown in the below table, if farmers keep nut until it is matured for additional 2 weeks, it can be sold higher price. Likewise, if farmers dry it at farm level to make ball copra or cup copra, it can be sold at further higher price. However, due to exigent financial needs and shortage of drying facilities, many farmers in the state tend to sell tender coconut only.

⁸ Hearing from Coconut Development Board and DOH in East Godavari

⁹ Annual Report of Coir Board (2015)

¹⁰ 4 CPC in East Godavari, 1 each in West Godavari and Srikaklum.

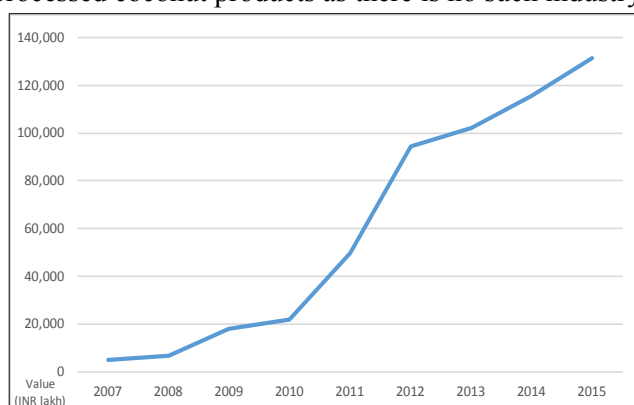
Price structure of coconut VC

Form of coconut	Time/Selling price	Products
 Tender Coconut	Average farm gate price is INR5/nut.  It becomes mature coconut after matured on tree for 10~20 more days.	Tender coconut water (Retail price is INR10~20/nut)
 Mature Coconut	Average farm gate price is INR8~10/nut.  It becomes ball copra after leaving it for drying for 6 months. Cup copra is produced if opened and sundry (10 days) or machine dry (2 days).	Coconut white for food (Retail price is INR 20~30/nut) Virgin oil Coconut cream, powder, flour, flakes Coir from husk Charcoal from shell
 Ball Copra	 Cup Copra Average farm gate price is INR 10~15/nut. (Cup copra is cheaper than ball copra)	Coconut white for food Edible oil, oil for cosmetic Biodiesel Coir from husk Charcoal from shell
 Neera	Average price INR20 per 150ml bottle. Neera is sweet sap extracted from coconut tree. It is susceptible to natural fermentation at ambient temperature within a few hours of extraction. As it transforms into toddy with 4% alcohol, neera extraction requires the state permission. (AP is currently under process.)	Drink, syrup, sugar, alcohol

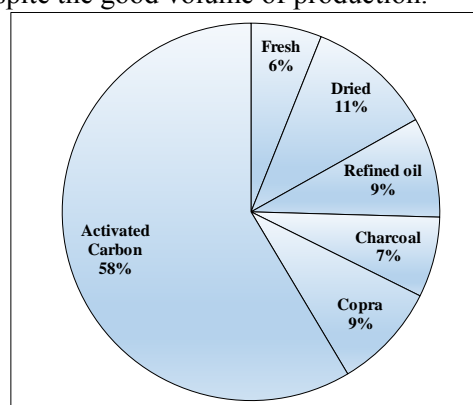
Source: JICA Survey Team

3) Market situation

While there are always good domestic demands for various coconut products for edible, industrial and religious purpose in the country, export demand is also steadily increasing. As Figure below shows the export value of coconuts products have increased more than 20 times in the past decades. Export of activated carbon produced by coconut shell which started from 2010 accounts for 58 percent in value of total coconut product export from India. AP is missing opportunities to get income from those integrated processed coconut products as there is no such industry despite the good volume of production.



Coconut export from India in value



Percentage of Indian exported coconut products (2014)

Source: Coconut Development Board

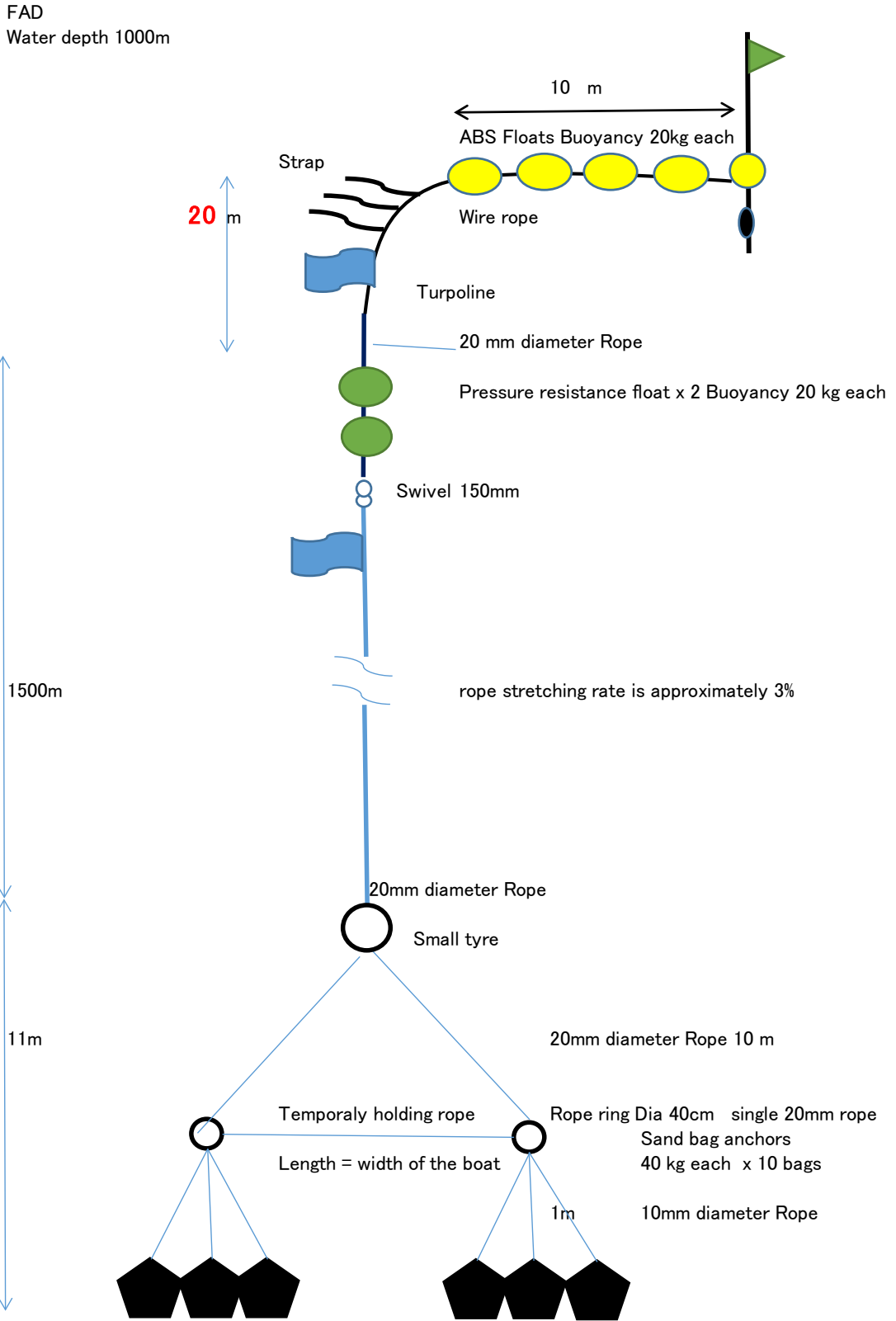
Attachment 8.6.3 Details of Shrimp Value Chain

(1) Collaboration for Strengthening Shrimp Value Chain

Proposed Interventions	Collaborating Organization
Research project on development of live feed	Central Institute of Brackishwater Aquaculture (CIBA), RGCA & Japanese Expert
Establishment of brood stock quarantine centres at airport	Marine Products Export Development Authority (MPEDA)
Research on formulation of low cost feed	Central Institute of Brackishwater Aquaculture (CIBA)
Developing Guideline of Good Aquaculture Practice	National Centre for Sustainable Aquaculture (NaCSA)
Demonstration of Good Aquaculture Practices	National Centre for Sustainable Aquaculture (NaCSA)
Promoting Shrimp Cultivation Cluster/Zones	National Centre for Sustainable Aquaculture (NaCSA)
Training of fisheries department Staff for disease management	Japanese Expert
Strengthening ICT based disease surveillance system of fisheries department	National Informatics Centre (NIC)
Research on ready to use disease detection tool kits	Central Institute of Brackishwater Aquaculture (CIBA) Japanese Research Institute
Training to farmers on Post harvest handling practices	NIFPHATT
Provision of ICT based market information to farmers	National Informatics Centre (NIC)
Developing accredited aqua lab for disease surveillance and export requirement	MPEDA
Facilitating and capacity building of accredited Aqualabs	MPEDA
Exposure visit of key persons of export units and key domestic market players	MPEDA
Product Development and Market Promotion support for high end domestic market	MPEDA

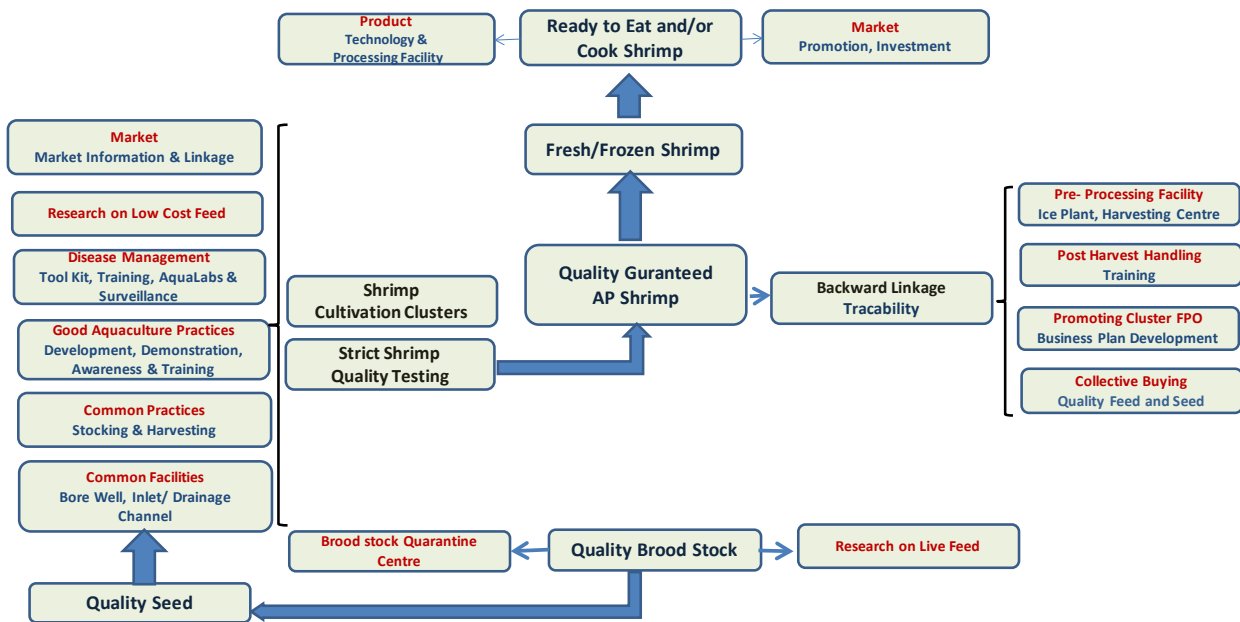
Attachment 8.6.3 Details of Shrimp Value Chain

(2) Example of Fish Aggregation Devices for Small Scale Fisheries



Attachment 8.6.3 Details of Shrimp Value Chain

(3) Shrimp Value Chain Flow Chart



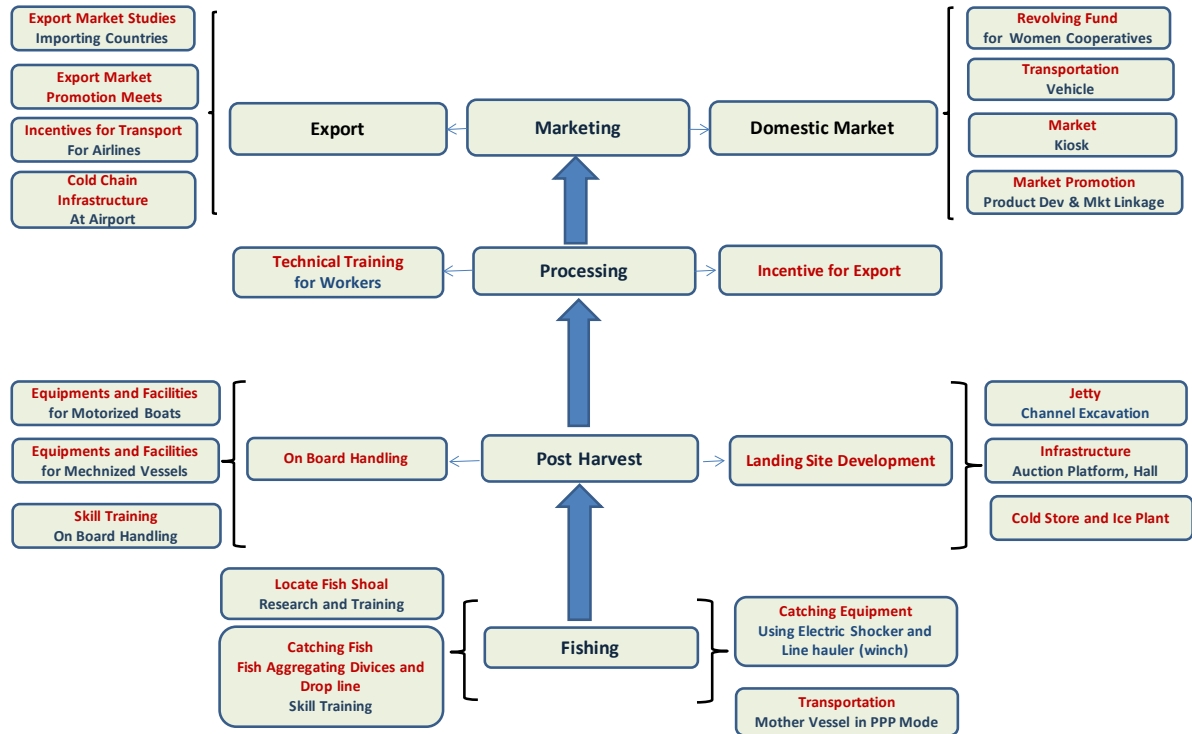
Attachment 8.6.3 Details of Shrimp Value Chain

(4) Shrimp Value Chain Opportunities

Value Chain	Constraints & Opportunities	Proposed Interventions
Inputs	Very limited availability of livefeed; Chances of disease occurrence through live feed; Potential for good yield of seed by consumption of live feed	Research project on development of pathogen free live feed culture
	Considering demand for procurement of brood stock, current capacity of existing quarantine centers at airport not sufficient	Establishment of brood stock quarantine centres at airport
	Small farmers vulnerable to buying low quality seed and high cost feed; Lack of funds for collective buying	Revolving fund support for collective buying of quality shrimp seeds and feed ingredients
	High cost of branded feed affecting viability of shrimp production	Research on formulation of low cost feed
Production	Need for small aquaculture farmers to work together through development of collective business plan	Facilitate developing business plan for cluster FPO
	Farmers not following environment friendly and sustainable aquaculture practices; Guidelines for Good Aquaculture Practices not available; Current practices focus on maximizing short term profitability	Developing Guideline of Good Aquaculture Practice
	Need for demonstrating Good Aquaculture Practices	Demonstration of Good Aquaculture Practices
	Inadequate awareness among farmers on sustainable aquaculture practices	Creating awareness on Good Aquaculture Practices in Shrimp Cluster
	Inadequate expertise with small farmers on scientific rearing of shrimps	Training on scientific rearing practices
	Need for common inlet and drainage facility for aquaculture cluster	Excavation and/or renovation of inlet and drainage channels
	Although small farmers can produce good shrimp, they are not able to take advantage of market; Cluster based farming may reduce likeliness of disease occurrence	Promoting Shrimp Cultivation Cluster/Zones
	Need for common facility such as water supply system in cluster	Installation of borewell as common facility
	Potential for collective production effort to reduce occurrence of disease and get higher market price	Developing common plan for seed stocking, rearing and harvesting
	Loss of shrimp due to frequent occurrence of disease during shrimp production	Strengthening disease surveillance for shrimp farming
	Inadequate capacity among department Staff to respond to disease management	Training of fisheries department Staff for disease management
	ICT based surveillance would lead to quick reporting of diseases and prompt action for disease management	Strengthening ICT based disease surveillance system of fisheries department
	Ready to use farmer friendly tool kit may support to quickly detect occurrence of diseases, and take prompt decision	Research on ready to use disease detection tool kits
	Emerging demand on traceability; Potential for high end export market	Facilitating supply chain development to focus on traceability
Supply chain development would enable getting shrimp of desired quality like less use of antibiotics, less antioxidants in feed thereby meeting buyer requirement	Demonstration of innovative practices (link to buyers' requirement)	
Harvesting/ Marketing	Deterioration of quality of shrimp during harvesting and post harvest stage	Training to farmers on Post harvest handling practices
	Lack of cold chain facilities in production clusters	Establishment of ice plant as common facility
	Possibility of taking up preprocessing activity in production cluster	Establishment of preprocessing facility common facility
	Inadequate information on market trend and current market price with small farmers market being buyers market	Provision of ICT based market information to farmers
	Farmers are vulnerable to sale to single buyer; No practice of prior price negotiation before production and/or harvesting	Facilitating market linkage through buyer sellers meets
Processing	Supply chain development could be strengthened by setting of preprocessing facilities in production clusters	Pre processing facilities (Hygiene and traceability, ice)
	Integration of supply chain require initial high investment	Financial assistance to facilitate integration
	Most of the shrimp currently processed as IQF or block frozen, not catering to end consumer; Possibility for processors to venture into retail market	Subsidy assistance for establishing processing facility for ready to eat and ready to cook products
Marketing/Export	Delay in unloading of shipment in importing countries to meet quality test requirement of buyer and Government authorities	Facilitating linkage for establishing compliance at source for export market
	Desirable to conduct quality testing in source country in production and processing areas	Developing accredited aqua lab for disease surveillance and export requirement
	Need for training of accredited aqualabs to be able to conduct test as per requirement of buyers and importing countries	Facilitating and capacity building of accredited Aqualabs
	Scope for understanding potential for ready to eat and ready to cook product market	Exposure visit of key persons of export units and key domestic market players
	Need for institutional support for venturing to high end domestic market like technology/equipments for product development and financial assistance for market promotion	Product Development and Market Promotion support for high end domestic market
	Exploring high end domestic and export retail market require joint venture effort including capital investments	Investors promotion meet for developing domestic and export market
	Potential for creating brand for Andhra shrimp to support export and domestic marketing	Facilitating brand promotion of Andhra Shrimp in export market
Others	Detail value chain analysis would support detail planning of proposed interventions	Value chain analysis and developing plan for PPP and cluster development

Attachment 8.6.4 Details of Tuna Value Chain

(1) Tuna Value Chain Flow Chart



Attachment 8.6.4 Details of Tuna Value Chain Tuna

(2) Food Value Chain Opportunities

Value Chain	Constraints & Opportunities	Proposed Interventions
Harvesting	Limited scientific knowledge on locating tuna fish shoal; Possibility of research collaboration	Technical research collaboration on locating fish shoal
	Motorized vessels use gill net for catching tuna and other species; Lack of facilities in such vessels for on board handling of tuna	Technical research collaboration with Indian research organizations like CIFT on developing gears and facilities for motorized vessels
	Despite best efforts many vessels are unsuccessful in locating tuna fish shoal, thereby discouraging tuna fishing	Technical Support i.e. both scientific and traditional practices to locate fish shoal. Use of Fish Aggregating Devices
	Inappropriate practices by fishermen related to catching and on board handling of tuna	Technical Training on catching, on boarding, and on board handling of the tuna. Use of electric shoker and line hauler.
	Inadequate facilities in mechanized vessels to handle tuna	Assistance for on board handling equipments and facilities for mechanized vessels
	Lack of equipments and facilities in motorized boats to handle tuna	Assistance for on board handling equipments and facilities for motorized vessels
	Possibility of introducing mother vessel buying fish from other vessels and supporting quick delivery of fresh tuna at fishing harbour	Part financial assistance to operate mother vessels in PPP mode; This could be taken up in pilot mode
	Unavailability of channel for easy landing of boats	Excavation of Channels and Creeks
	Unavailability of place for shelter of boats	Construction of jetty for fishing boats
Post Harvest	Usually, auction of marine fishes takes place in unhygienic condition	Construction of auction platform at landing center
	Lack of cold chain facilities in beach landing center; lack of access to electricity	Solar power enabled ice plant, ice storage and crushing unit
	Unavailability of cold storage facility in beach landing centers to be able to extend freshness of fish and get appropriate price	Solar power enabled small cold storage for temporary storage
	Inadequate skill to manage infrastructure	Training on management of common facilities at landing sites
	Unavailability of cold storage facility for vessel owners in fishing harbour to be able to extend freshness of fish and get appropriate price	Cold storage facilities at fishing harbour for the vessel owners subsidies (lease out facilities)
	Lack of appropriate place for post harvest and other activities like repair of nets	Construction of multi purpose community hall
Processing	Inadequate skill related to processing of tuna including assessing its quality	Technical training to processing unit workers
	Potential for developing product for domestic market and export; Emerging higher middle class consumer segment in domestic market	Product development and market promotion support to private companies including MNCs for tuna and other marine fish products
Marketing	Very high air transport cost for exporters to export Shesami grade and chilled tuna	Provision of air transport subsidy to tuna exporting units during initial stage
	Inadequate cold chain infrastructure at airport	Establishing cold chain infrastructure including cold storage
	Potential exporters not aware of demand pattern for tuna in importing countries	Country export market studies
	Very limited linkage of potential exporters with buyers in importing countries	Annual export promotion meets in India and major importing countries
	Lack of working capital with fisherwomen cooperatives for marketing	Revolving fund assistance to women cooperatives for marketing
	Difficult to utilize public transport facilities for marketing perishable marine fishes	Vehicle to women cooperatives for transportation of marine fishes
	Unavailability of permanent places in different parts of cities for marketing fish; Fish sold in unhygienic open places	Support to women cooperatives to start Kiosk in cities
	Fisherwomen mainly sale fresh marine fishes; Potential emerging demand for processed products but lack of skill for product development and marketing	Technical training and handholding support on processing, product development and marketing
	Initial market linkage support would enable women cooperatives to sale porocessed fish products like through wholesalers and in retail malls	Support for market linkage
Others	Inadequate expertise among leaders and staff on management of cooperatives including developing and pursuing simple business plan	Training on Management of Cooperatives

Attachment 8.7.1 Investigation of Potential Food Park Sites

Andhra Pradesh Industrial Infrastructure Corporation Ltd. (APIIC) is the premier organisation vested with the objective of providing industrial infrastructure through the development of industrial areas. APIIC has so far developed more than 420 industrial parks with an extent of more than 120,000 acres. APIIC is also developing sectoral specific parks like IT, bio-tech, automotive, apparel, pharma, leather, food processing, and SEZ. APIIC’s core functions include acquisition and/or alienation of government lands for industrial parks, identification of sites for industrial areas and development of layout plans. APIIC also facilitates provision of infrastructures, allotment of plots, industrial investment, implementation of projects, and promotion of infrastructure projects under public-private partnership (PPP).



Source: APIIC Hyderabad

Figure 8.7.1 Organisation Structure

Organisation structure of APIIC is given in Figure 8.7.1. APIIC operates in all districts being 13 zonal offices located at the existing industrial areas. As the maintenance of civic services in APIIC industrial areas was neglected by local municipalities, the Government of Andhra Pradesh has given statutorily the local authority status to APIIC to fix the situation. The property tax and revenues to APIIC are remitted from 35% to 50%. To promote “Local Self-governance” of the industrial areas, APIIC has evolved the concept of Industrial Areas Service Societies involving the tax payers’ community in the notified industrial areas for O&M of the areas.

1. North Area

(1) Industrial Parks in North Area

(a) Growth Center Bobbili

Growth Center Bobbili, with an area of 1,149.81 acre (465 ha), is located along SH36 between Ramathadrapuram and Bobbili, 54 km far away from Vizianagaram as shown in Figure 8.7.2. IP aims to be established in a heavy industry area. The total number of plots is 497. The plots are sold out. Land charges for sale and lease is INR 840 per m² and lease period is 99 years. Water source is underground water in IP. Wastewater is individually treated by each unit. Power S/S with a capacity of 220/132 kV (Transmission Corporation A.P. Ltd.) is located inside IP (15 acre). Industrial waste is treated with treatment, storage and disposal facilities (TSDF) and domestic waste is collected by the Municipality Corporation and disposed at the Bobbili Solid Waste Management Park (SWMP) according to APPCB (Pollution Control Board) norms.



Source: APIIC Vishakhapatnam

Figure 8.7.2 Layout Plan of Growth Center Bobbili

(b) IP Kantakapalli

IP with an area of 327.46 acre is located in Komavalasa southwest of Vizianagaram, 40 km away and Vishakhapatnam is situated 24 km far away from IP. Heavy industries are occupied in IP. Basic infrastructures such as roads with drainage, borewells, sewerage, and power supply shall be developed by each tenant. The area is sold out. Although APIIC Vizianagaram developed two more IPs: Nellmaria IP and Vizianagaram IP located in the southern part of the district where almost all lots are sold out.

(2) Land Bank in North Area

The features of four candidate areas for planning FP are presented below. Among the four areas, Chinarapalli, Peddaraopalli, and Katakapalli are located in Kotavalasa Mandal (Block) near Vizianagaram, while Kottakki belongs to Ramathapuram Mandal (Block) near Bobbili Town.



Source: JICA Survey Team

Figure 8.7.3 Area Map of Chinarapalli



Source: JICA Survey Team

Figure 8.7.4 Area Map of Peddaraopalli



Source: JICA Survey Team

Figure 8.7.5 Area Map of Katakapalli

(a) Chinarapalli in Kotavalasa Mandal

Available area is to be 177.53 acres. The area is a flat field with a land level between 59 m and 63 m. However, an access road of about 1 km long is narrow and plow lands and houses are spread along the access road as shown in Figure 8.7.3. Land acquisition shall be required for assuring the access road where farmlands and residents exit along. The site is situated 30 km away from Vizianagaram through the state road (Kothavalasa-Vizianagaram) with single lane. Water source for the site is to be groundwater or Vizianagaram Municipal Water Supply. A 32 kVA Vizianagaram S/S is available for power supply since Chinarapalli Village supplied power from the S/S. Waste is collected by local

panchayat at present.

(b) Peddaraopalli in Kotakapalli Mandal

The available area is located at the west side of Chinaraopalli site with 528.3 acres (213.8 ha). The site is a hilly area with a vertical drop of 30 m and mining has been conducted for macadam productson a certain part of the site as shown in Figure 8.7.4. It is supposed that land reclamation is costly in this site. The site is situated 36 km far from Vizianagaram. Accessibility of the site is necessary as it is next to the state road (Kothavalasa- Vizianagaram) connecting with the state highway (Araku–Vishakhapatnam) with single lane. Water source for the site is to be groundwater or Vizianagaram Municipal Water Supply. A 32 kVA Vizianagaram S/S with a distance of 36 km is useful for power supply. Waste is collected by local panchayat at present.

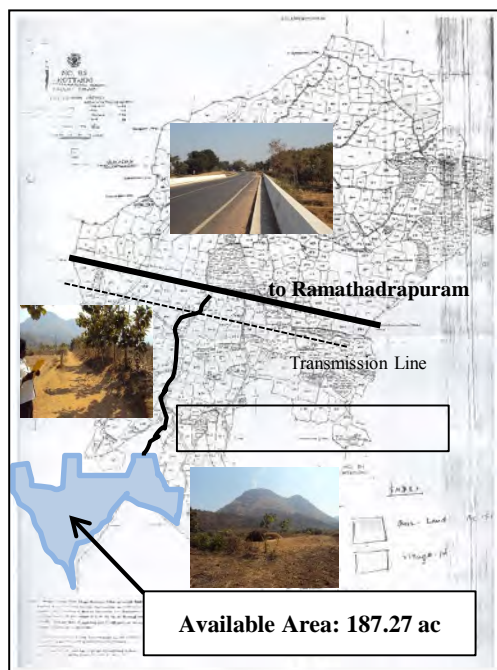
(c) Katakapalli in Kothavalasa Mandal

The site with an available area of 155.47 acre is situated across Peddaraopalli site through the state road (Kothavalasa-Vizianagaram) and at the north of the existing IP_Katakapalli. A distance between the site and Vishakhapatnam is about 40 km through the state highway (Araku–Vishakhapatnam). The area composes of two hills with a vertical drop of 50 m as presented in Figure 8.7.5. The cost of land reclamation is supposed to be extremely high. Plow lands and houses are scattered along an access road with narrow passage in Katakapalli Village. An access road with a distance of 2 km shall be improved from the state highway. Land acquisition and resettlement is assumed to be required for the access road improvement. Development of groundwater is required within the site. A 32 kVA Vizianagaram S/S is available for power supply. The local panchayat conducts garbage collection in Katakapalli Village at present.

(d) Kottakki in Ramabhapuram Mandal

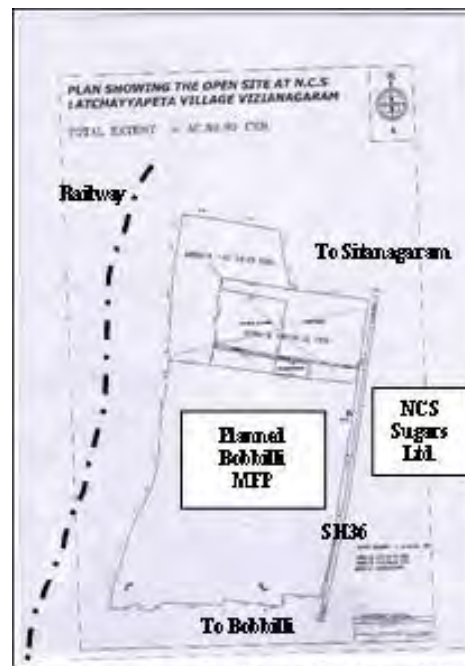
The site with available area of 187.27 acre (75.79 ha) is a flat area with gentle slope varying from 164 m to 167 m. The site is located near NH26 (43) between Ramathadrapuram and Salur as shown in Figure 8.7.6. The intersection of an access road of the site and NH26 is situated at a distance of 7 km far from Ramathadrapuram and 5 km far from Salur. The existing access road with a length of 2.5 km shall be expanded up from 3 m to 9 m width. There are plow lands and canal along the existing access road over 1 km distance from the intersection.

At present, Kottakki Village uses wells. Water source for the site is to be Peddagedda Reservoir of Vattigedda Stream 15 km away from the site. There are three power substations (S/S) surrounding Kottakki: 11 kVA S/S with a distance of 2 km, 32 kVA S/S with a distance of 5 km in Salur, and 220 kVA S/S with a distance of 17 km in Growth Center Bobbili. As for solid waste, two SWMPs are set up in the vicinity of the site; one is located in Salur at 2 km distance from the site and other is set in Bobbili 17 km away.



Source: APIIC Vizianagaram

Figure 8.7.6 Area Map of Kottakki



Source: NCS Sugars Ltd.

Figure 8.7.7 Area Map of Bobbili Mega Food Park

(3) Food Park in North Area

(a) Bobbili Mega Food Park

Bobbili Mega Food Park (MFP) planned by NCS Sugars Ltd. is located across the existing NCS Sugars Unit through SH36 in Latchayyapeta Village, Sethanagaram Mandal. Required land with a total area of 80.9 acre (32.74 ha) is acquired as shown in Figure 8.7.7. Development cost is estimated at INR 1.5 billion and land sale cost and 99 years lease cost is at INR 2.5 million per acre and INR 100,000 per acre, respectively.

The distance between Bobbili MFP and Vizianagaram is about 70 km. Accessibility of Bobbili MFP to public infrastructures is at 5 km away from Bobbili Railway Station, 110 km far from Vishakhapatnam Seaport with container handling yard and airport. It is reported that a new airport would be set up in Bhogapuram 18 km away southeast from Vizianagaram in 2020. The outline of Bobbili MFP is summarised below.

- Water source: Borehole wells with 12 m depth at the existing NCS Sugars Industry
- Power source: Coal thermal power plant (20 MW) at the existing NCS Sugars Industry
- Wastewater Treatment Plant: utilisation of existing plant with a capacity of 500 m³/day
- Solid waste management: Self-disposal (Zero Waste)
- Core/Sub-facilities: Cold storage (3 units x 10,000 ton), Dry warehouse for raw materials (30,000 ton), dry warehouse for finished goods (30,000 ton to be expanded up to 100,000 ton), silo (600 ton), and quality assurance, food testing and product development laboratory located at the existing NCS Sugars Industry
- 25 FCCs are set up within a radius of 30 km and PPC is not placed.

(4) SEZ in North Area

Andhra Pradesh government has been developing APSEZ with mulch products in Atchutapuram and Rambilli mandals of Vishakhapatnam District through APIIC under Andhra Pradesh Petroleum, Chemicals, and Petrochemicals Investment Region (AP PCPIR) as shown in Figure 8.7.8. PCPIR is the industrial corridor, a 140km long extended from Vishakhapatnam to Kakinada and the following infrastructure projects are expected to be conducted under PCPIR.

- PCPIR Expressway (138 km) from Gangavaram Port to Kakinada Port with a sixlane road
- Kakinada Port to South Central Railway Line via Kakinada SEZ (38 km), APSEZ to Gangavaram Port Railway Line (26 km) and Rail Freight Stations with Container Freight Stations (CFSs) and Integrated Container Depots (ICDs)
- New Visakhapatnam International Airport, Air Cargo Complex and Captive Airstrip at Kakinada, Upgradation of Rajahmundry Airport
- Upgradation of Visakhapatnam Port and Kakinada Deep Water Port
- Common Effluents Treatment Plants (CETPS) and Sewage Treatment Plants (STPS)

➤ Cluster	➤ CETP	➤ STP
➤ Visakhapatnam	➤ 4 x 40 MLD	➤ 3 x 2 MLD
➤ Nakkapalle	➤ 2 x 20 MLD	➤ 2 x 2 MLD
➤ Kakinada	➤ 3 x 25 MLD	➤ 2 x 5 MLD & 1 x 1 MLD
- Treatment, Storage and Disposal Facility (TSDF) for hazardous waste in JN Pharma City
- Sanitary landfill to cater to 1.5 to 2 lakh TPA for a 25-year period, incinerator for organic waste
- New captive power plants (2 x 500 MW)
- Industrial water supply project from Yeleru (Operational since December 2004)
 - i) 153 km Yeleru Left Main Canal from Yeleru Reservoir with a supply of 385 MLD, ii) 56 km pipeline from the Godavari River with a supply of 385 MLD, iii) Augmentation through Polavaram Left Main Canal from the Godavari River with a supply of 1,848 MLD, iv) Samalkota Canal from Godavari for Kakinada area with a supply of 220 MLD.



Figure 8.7.8 Location of PCPIR

Six SEZs are located within PCPIR with an area of 640 km² as indicated in Figure 8.5.8. These SEZs are identified as pharmaceutical industries of Pharma and Hetero Drugs SEZs, textile industry of Brandix SEZ, food processing of Parry's Food Products SEZ, and multi-product industries of APSEZ and Kakinada SEZ. APSEZ consists mainly of Vishakhapatnam SEZ, Atchutapuram SEZ, and Rambilli SEZ. Vishakhapatnam and Atchutapuram SEZs are completed and occupied by heavy and chemical industries. Road improvement and water pipe installation have been executed at the site of Rambilli SEZ aiming in luring pharmaceutical and light industries and food processing.

2. Central Area

(1) Industrial Park in Central Area

There is no industrial park identified due to lack of available land in existing industrial parks.

(2) Land Bank in Central Area

There are three available lands identified by APIIC in West Godavari District. The three featured candidate areas for planning food park are presented below.

(a) Bayyaram in Tallapudi Mandal

Bayyaram site with an available area of 203 acre is situated on the unpaved local road with width of 4 m leading from Gajjaram to Saggonda near a private Saggonda Power Project as shown in Figure 8.7.9.

The site is a field with gentle slope in hilly area.

Distances from the site to Kovvur Railway Station and Eluru are 30 km and 88 km, respectively. NH16 (double lane) is 35 km away. SH151 (single lane) connected to the local road is far from 4 km. A rough road of 1.5 km long for access road to the site and the local road of 4 km long shall be improved. The site will be supplied with water by means of lifting water from irrigation canal. The existing 32/11 kV Saggonda S/S which is 4 km away from the site is available. Solid waste is collected, transferred, and disposed by a local panchayat.



Source: APIIC Eluru

Figure 8.7.9 Area Map of Bayyaram



Source: APIIC Eluru

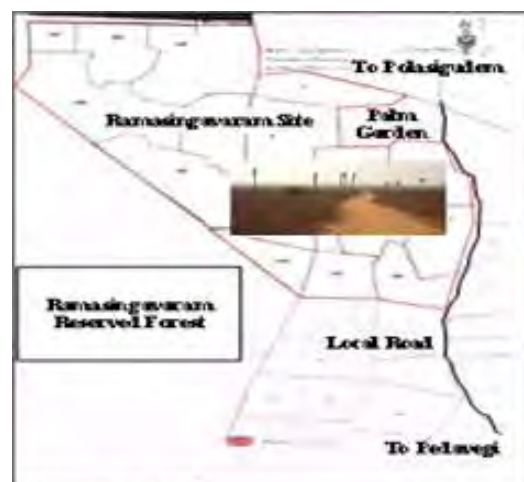
Figure 8.7.10 Area Map of Vatru

(b) Vatru in Pedapadu Mandal

Available arealocated at the southwest side of Eluru Town about 3 km away, will be around 332.5 acre in Vatru Village. The site is a flat field and bordered in the east by NH16 (double lane) as shown in Figures 8.7.10. The elevation of the site varies from 15 m to 20 m. The access road less than 0.5 km long shall be developed toconnect with NH16. Water source is to be groundwater or from Eluru canal, where Eluru Municipality is supplied with water. Power supply is available from the existing 132/33 kV Vatru S/S which is 1.5 km long. Vatru Panchayat conducts collection, transfer, and disposal of domestic garbage at present.

(c) Ramasingavaram in Pedavegi Mandal

The site with an available area of 193.84 acre is situated on the west side of the local road with 5 m in width between Gopannapalem to Chintalapudi in Ramasingavaram Village Habitation as shown in Figure 8.7.11. The site is a quite flat field and the reserved forest is extended onthe west side of the site. An elevation of the site varies from 53 m to 58 m. The distance between the site and Eluru is to be 25 km. NH 16 (double lane) and Eluru-Jangareddygudem SH (single lane) are located at 20 km and 16 km far from the site, respectively. The local road of 16 km long shall be widened and paved. Groundwater is supposed to be available. There is the existing 33/11 kV Ramasingavaram S/S which is 2 km away. Domestic waste is collected by local panchayat.



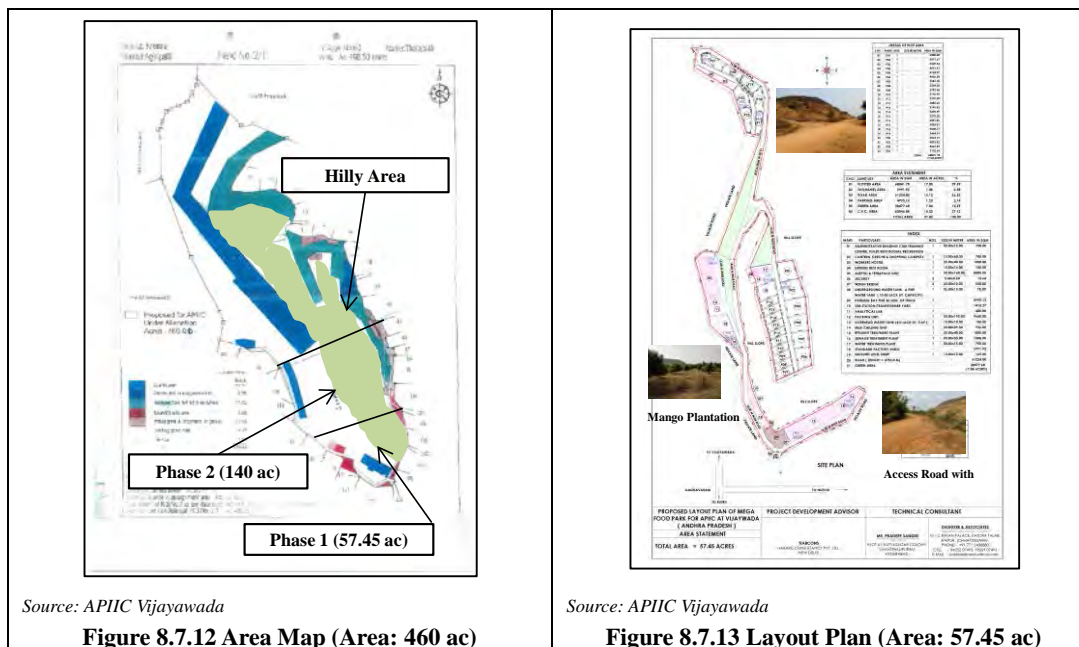
Source: APIIC Eluru

Figure 8.7.11 Area Map of Ramasingavaram

(3) Food Park in Central Area

(a) Krishna Mega Food Park

APIIC Vijayawada has a plan for the establishment of Mega Food Park (MFP) in Thotapalli Village, Agripalli Mandal, Krishna District. The planned MFP is situated near the irrigation project area 30 km away in West Godavari District. The site with a total area of 460 acre (186 ha) is located at the mountain area with a vertical drop of 60 m and quarries/borrow pits are scattered as shown in Figures 8.7.12 and 8.5.13. MFP with an area of 57.45 acre (23.24 ha) was planned as the first phase project and proposed to MoFPI as presented in Figure 8.7.13.



The estimated project cost and O&M cost totalled to INR 1.85 billion leading into a unit cost of INR 7,952/m², and INR 170 million/year, respectively. The site is situated on a rough road with a distance of 2 km through a paved local road (single lane), which is 16 km away from NH16 (double lane).

The outline of Krishna MFP Phase 1 is summarised below.

- i) Transportation System: 16km-NH16, 30km-Vijayawada Railway Station and Airport, 380km-Vishakhapatnam Port, 300km-Hyderabad International Airport
- ii) Basic Infrastructures
 - Internal Road: 15 m wide road with drainage system
 - Water Supply: underground water, 750 m³/day for industrial water and 250 m³/day for fire water, 400 m³ overhead tank
 - Sewerage System: separate sewer system, sewage treatment plant of 150 m³/day capacity, Common Effluent Treatment Plant (CETP) of capacity 500 m³/day with 42 m³/hr for industrial wastewater
 - Power Supply: Andhra Pradesh Southern Power Distribution Company Limited (APSPDCL), 33/11 kV S/S, total load of 1.47 MW
 - Telecommunication: provided voice and data services, laid OFC
 - Solid Waste Management: designed five solid waste dumping tanks
- iii) Common Core Facilities: storage and packing zone, aseptic pulping unit, milk chilling plant, standard design sheds, analytical laboratory
- iv) Non-core Facilities: administration building and training centre, security shed, driver restroom, canteen, creche and shopping complex, worker's hostel
- v) Number of CPC, PPCs, and FCCs: 1 CPC (Agiripalli in Krishna), 4 PPCs (Tadepalligudem in West Godavari, Rangampeta in East Godavari, Sattenapalli in Guntur, Ongole in

Prakasam) and 13 FCCs.

(b) Peddapuram Traditional Food Park

Peddapuram Traditional Food Park (TFP) for micro and small enterprise (MSE) is envisaged primarily by APIIC Kakinada for reinforcement of cluster development in a designated Industrial Development Area near Peddapuram, Samarlakota Mandal (Block), East Godavari District. The park aims to produce traditional/ethnic foods such as sweetmeats, pickles, and mango jelly. Project cost is estimated about INR 98 million in case of groundwater development.

The park is a homogenous cluster with total 118 units spread in an area of 21.63 acre as shown in Figure 8.7.14. The site of the park adjoins SH40, which is only 1 km away and has access to NH214 with 14 km distance. NH16 is 25 km away from the site. Samarlakota Railway Station is situated 5 km away. Rajahmundry Airport is close to the site which is 45 km away, while Vishakhapatnam Airport is at a distance of 160 km. Kakinada, Gangavaram, and Vishakhapatnam ports are located 22 km long, 150 km long, and 170 km long, respectively.

Development cost of the park is estimated at INR 96.8 million. Required water is estimated at 90 m³/d and water should be supplied from borewells to be developed in the site or Samarlakota Canal. Wastewater to be generated with 70% of water supply shall be treated by STP. About 33/11 kV Peddapuram S/S with 5 MVA transformer is available for the park. Peak load is to be 1,600 kW. Solid waste consisting of bio and organic matters such as peel and shells is estimated at about 4,000 ton/acre. Solid waste should be entirely recycled.

(4) SEZ in Central Area

(a) Kakinada SEZ (GMR Food and Agri Processing Park)

Kakinada Special Investment Region (SIR) with an area of 11,000 acre or so called Kakinada SEZ, is located along 17 km coastline consisting of Processing-Line Industrial Park, Captive Sea Port, Chemical and Pharma Park, Refinery and Petrochemical, Housing District, Heavy Manufacturing, Discrete Manufacturing, Toys-Games and Sports Goods, and GMR Food and Agri Processing Park. Kakinada SEZ is developed as a part of AP PCPIR as described previously (refer to Figure 8.7.8).

GMR Food and Agri Processing Park (GMR FAPP) with an area of 916 acre (370.7 ha) is situated in Kothapalli Mandal consisting of 12 villages. The resettlement area is to be provided in the southwest to the site as shown in Figure 8.7.15. The site of Phase 1 with an area of 267 acre (108 ha) is a flat field with an elevation of 4 m and laid out by a fence. Accessibility to main public infrastructures is summarised below.

- Road network: 12 km NH216, 20 km NH16



Source: APIIC Kakinada

Figure 8.7.14 Layout Plan of Peddapuram Traditional Food Park



Figure 8.7.15 Layout Plan of GMR FAPP

- Railway: Less than 25 km, 3 railway stations (Kakinada Junction, Kakinada Port, and Samalkot)
- Sea port: 15 km Kakinada and Kakinada Deep Water (Container), 153 km Vishakhapatnam (Container)
- Airport: 210 km Vijayawada, 480 km Hyderabad

The site is situated at 15 km far from Kakinada. The project of PCPIR expressway is not embarked yet by Andhra Pradesh State in order to connect to Kakinada Port and so this area is still a green field. Beach road with a length of 50 km is going to be expanded from single lane to double lane by the Asian Development Bank (ADB) as shown in Figure 8.7.15. Kakinada SIR's site except for FAPP is not developed and the site is still an open space and/or habitat.

At present, groundwater is utilised for water supply to the existing two toy industries. Required water of GMR FAPP is estimated around 75,000 m³/d. GMR FAPP intends to get the required water from Nagulapalli Spring of Gollaprolu at the initial stage and from Samarlakota Canal at the middle stage. The existing water storage yard with a surface area of 300 acre, which is located near Samarlakota Canal, may be used for GMR FAPP during the dry season. At the final stage, the whole area of Kakinada SIR is designed to supply 220,000 m³/d of water from the Godavari River through Samarlakota Canal.

FAPP is now being supplied with power from 132/33 kV S/S with a transformer capacity of 15 MW. GMR and Andhra Pradesh State intend to newly construct 220 MW plant, which is 20 km away and 750 MW plant, which is 70 km away from GMR FAPP. Solid waste generated in GMR FAPP is possible to be collected and disposed by the municipality corporation. GMR will set up a quality assurance, food testing, and product development laboratory in GMR FAPP. Common and other facilities for food processing shall be provided by each unit.

3. South Area

(1) Industrial Park in South Area

(a) Thamminapatnam IP

Thamminapatnam IP with an area of 793.73 acre (321 ha) is located along Buckingham Canal in Chillakur (M), south of Krishnapatnam Port, which is 15 km away. Project development cost is estimated at about INR 11.85 billion with a unit cost of INR 349 per m². Although IP is categorised as multi-product park, IP is dominated by power and energy industries. IP is situated at 30 km far from NH16, 36 km far from Gudur RS, and 75 km from Tirupathi Airport. IP gets water supply from Kandaleru Reservoir. Power is supplied from the existing 132/33 kV Manubolu S/S through 33/11 kV transmission line

(b) Naidupet IP

Naidupet IP with an area of 1,244 acre (503 ha) is located in Konetirajupalem (V) and Menakur (V), Naidupet (M), which has been developed and operated by APIIC. Development cost is estimated at around INR 2.1 billion leading a unit cost of INR 418/m². More than 35% area of Block B are prospected to be placed by various industries such as building materials, machineries/tools, solar, and food processing (rice milling, spice powder, beer, drinking water) as shown in Figure 8.7.16. APTRANSCO and turbine housing with an area of 26.3 acre are situated in Block-A. Block-C is still vacant.

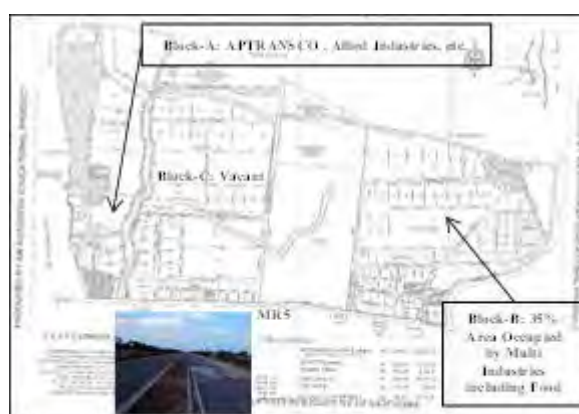


Figure 8.7.16 Layout Plan of Naidupet IP

IP accesses to NH16 through Naidupet-Venkatagiri Road (single lane) with a distance of 15 km. Accessibility to other transportations will be 10 km to Naidupet RS, 60 km to Tirupathi Airport, and 70 km to Krishnapatnam Port. Water source is to be groundwater from borewells at present and surface water from Mamidi Kaluva Canal in the future. Water purification plant, distribution mains, and

a reservoir are under construction. A 132/33 KV S/S with 46.5 MW transformer is provided by APTRANSCO in Block-A. IP complies with APPCB norms.

(c) Attivaram IP

Attivaram IP with an area of 302.03 acre (122 ha) is situated in Attivaram (V), Ozili (M). Development cost is estimated at INR 181.3 million with a unit cost of INR 148/m². Two steel manufactures and one bio-medical waste treatment unit are placed and operated in IP. Ten units such as pharmaceuticals and chemicals, are prospected to set up here. The site is only 5 km away from Naidupet MPSEZ through Naidupet-Venkatagiri Road. The existing local road of 2 km long shall be expanded. Groundwater is available in the site. There is the existing 33/11 kV S/S near DRA Industries Ltd. Around 132/33 KV S/S with 46.5 MW transformer will be provided by APTRANSCO. Solid waste shall be treated corresponding to APPCB norms.



Figure 8.7.17 Layout Plan of Attiyaram IP

(d) Mambattu IP Phase II

An area of Mambattu IP Phase II located in Mambattu (V) in Tada (M) will be 283 acre (114 ha) including 104.54 acre (42.3 ha) of MSME as shown in Figure 8.7.19. Development cost of MSME's area is estimated at INR 237 million indicating a unit cost of INR 560/m². There are two apparel units, a footwear unit, and a wind mill in IP. Indus coffee and leather products are prospected to invest in IP. The site is adjacent to NH16 and near Sri City with a distance of 10 km. Accessibility to public infrastructures is 9 km to Sullurpet RS, 98 km to Chennai Airport and 83 km to Chennai Port. Approach road with a distance of 5 km shall be expanded. Development of borewells is required. Power will be supplied from the existing Sullurpet S/S with 220 kV transformer through 132 kV transmission line of APTRANSCO. Solid waste is treated at CFC applying to APPCB norms.

(e) Piler IP

The site of Piler IP located northwest about 75 km away from Tirupati Town, is to be 639 acre (258ha) in Piler Town. Piler IP is a multi-product industrial park. The site is hilly area descending south with 2.5% slope. The elevation varies from 460 m to 483 m. Piler Railway Station is near the site with a distance of 3 km. Krishnapatnam Port is situated 150 km far away from the site.



Figure 8.7.18 Layout Plan of Piler IP

The site abutting on NH71 in the south and the Pincha River in the east as shown in Figure 8.7.21. Water source is expected to come from HNSS irrigation canal and the Pincha River as presented in Figure 8.7.18. There are two substations; 33/11 kV Piler S/S facing against the site and 132/33 kV Piler Town S/S which is 11 km away. Land use pattern of Piler IP is presented in Figure 8.5.18. Piler IP is designed to secure captive infrastructures such as new S/S, water works, solid waste management (SWM), common effluent treatment plant (CTEP) for industrial wastewater, and sewerage treatment plant for domestic wastewater.

(f) Gajulamadam IP in Tirupati

Gajulamadam IP with an area of 638 acre (258 ha) is situated on both sides of the entrance road to

Tirupati Airport. Gajulamadam IP is developed as a multi-product IP aiming to lure the light industry such as IT, pharmaceutical, and plastics. Around 170 units are prospected to be operated here. Water for IP is supplied from Kalyani Dam through Tirupati Distribution Main.

(2) Land Bank in South Area

No land bank was identified since there were number of existing industrial parks and/or food park.

(3) Food Park in South Area

(a) Bodduvaripalem FP

APIIC Nellore intends to set up the first food park in Nellore District. The site of food park with an area of 120.89 acre (49 ha) is located in Bodduvaripalem Village (V), Kodavalur Mandal (M) in the south of IFFCO KISAN SEZ. It is noted that an area of 22.5 acre, out of 120.89 acre is not obtained by APIIC Nellore yet as shown in Figure 8.7.19. The site is quite flat area with elevations varying from 17 m to 25 m. The site faces Sunnabatti-Dagadarthi SH in the north and NH16 in the east. The site is situated at Nellore Railway Station (RS), which is 20 km away, Krishnapatnam Port which is 30 km away, and Tirupati Airport which is 75 km away. Bodduvaripalem FP is suitable for food processing units aiming for domestic market.

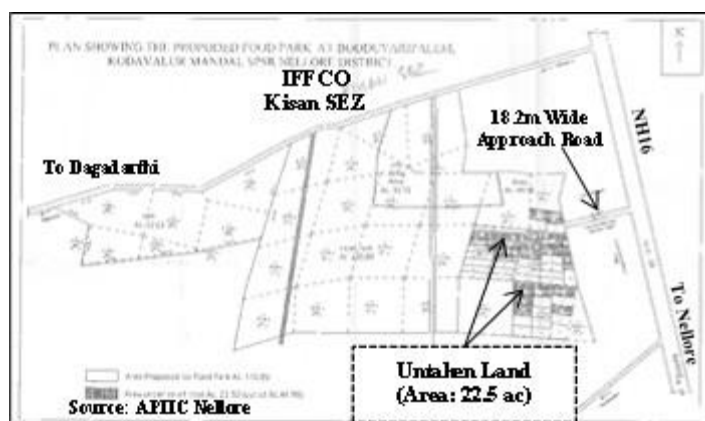


Figure 8.7.19 Area Map of Bodduvaripalem FP

Groundwater is available in the site. Power for food park will be supplied from 132/33 kV Dagadarthi S/S through 33/11 kV transmission line. Treatment, storage, and disposal facilities (TSDF) shall be provided for industrial waste in food park and domestic waste shall be collected by the municipality corporation according to APPCB (Pollution Control Board) norms.

(b) Pogurupalli Food Park

The site of Pogurupalli Food Park with an area of 460 acre (186 ha) is situated extensively in Pogurupalli, Lingapuram and Dasimanipalli villages (V) in Gudipalli Mandal as shown in Figure 8.7.20. Food park aims at processing vegetables (all kinds of vegetables) and fruit pulps (mango, tomato, temin, poppy, guava, etc.). The site is a field with gentle slope in hilly area. The site is located in a southwest in Chittoor District along the railway from Kuppam to Kolar. Accessibility to main public infrastructures is summarised to be 15km to NH42 and Kuppam Railway Station, 200km to Chennai Seaport and Airport, 100km to Bangalore Airport. Groundwater is available in the site. The existing 132/33 kV Pogurupalli S/S is useful for food park. Solid waste is collected, transferred, and disposed by a local panchayat.

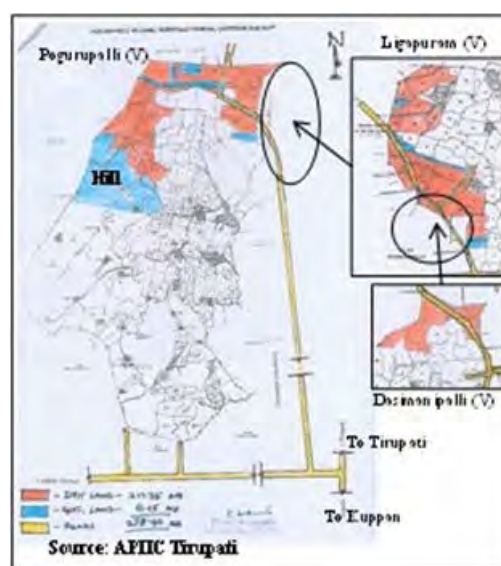


Figure 8.7.20 Area Map of Pogurupalli FP

(4) SEZ in South Area

(a) Naidupet MPSEZ

Naidupet MPSEZ with an area of 2,588 ac (1,047 ha) is situated in the south of the existing Naidupet IP.

Development cost is estimated at INR 2.7 billion with a unit cost of INR 257 per m². MPSEZ is sectionalised into six zones: Zone 1 of technical, electrical and engineering, Zone 2 of pharmaceuticals and chemicals, Zone 3 of textile and garments, Zone 4 of food products and beverages, Zone 5 of other green industry units, and Zone 6 of bonded warehouse as indicated in Figure 8.7.21. Although MPSEZ is under developed, three units are operating in Zone 1. One unit is prospected to be placed in Zone 2. Geographic conditions are the same as Naidupet IP. Basic infrastructures are planned to be utilised together with Naidupet IP. MPSEZ has an advantage for food processing units focusing on export.

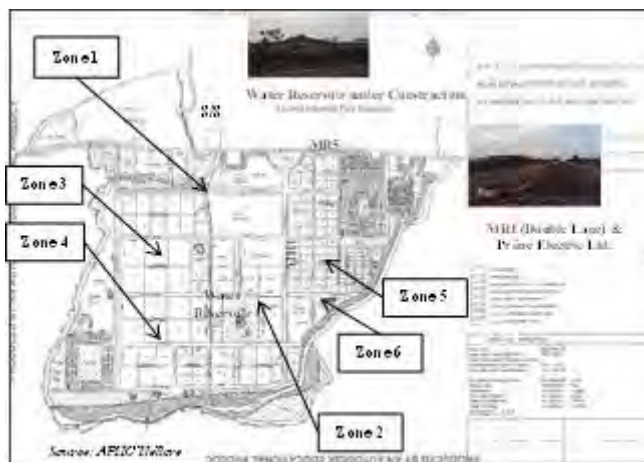


Figure 8.7.21 Layout Plan of Naidupet MPSEZ



Figure 8.7.22 Layout Plan of IFFCO Kisan SEZ

(b) IFFCO Kisan SEZ and Agro Park

IFFCO Kisan SEZ and Agro Park is planned for agribusiness which is 20 km north of Nellore. The site is situated along NH5 with six lanes. Eastern part of NH5 is to be the preset area of 700 acre for fertiliser mill while the western part of NH 5 is to be SEZ with an area of 2,000 acre (809 ha) as shown in Figure 8.7.22. There are existing food/cordage packing units (A.D.J.), Gamesa Ltd., of wind mill under construction and prospected softdrink unit (Coca Cola) in SEZ. Project cost is estimated around INR 6 billion with a unit cost of INR 741/m². Lease fee is to be INR 4 million/acre (INR 988 per m²) for 33-year period. Accessibility to main public infrastructures is summarised to be 20km to Nellore RS, 40km to Krishnapathnam Port, 180 km to Chennai Port, 139km to Tirupati Airport, 175km to Chennai Airport, 385 km to Bangalore Airport, and 515 km to Hyderabad Airport. Inner road with fourlanes shall be developed.

Although SEZ uses groundwater at present, SEZ will get water supply with a volume of 500,000 m³/day from Kanigiri Reservoir through installed double pipeline of 900 mm in diameter. Wastewater shall be individually treated by each unit. There is the existing 33 kV S/S with 2 MW transformer in SEZ. In the future, 220 kV S/S with 100 MW transformer will be provided by APTRASCO. Solid waste shall be treated individually by each unit according to APCCB (Pollution Control Board) norms. Solid waste will be collected and disposed by the municipality corporation. Common and other facilities for food processing shall be provided by each unit.

(c) Krishnapatnam SEZ

The Krishnapatnam SEZ (Phase I) aspires to be a multi-product SEZ, envisaged primarily by

KINRATECH PVT. Ltd. for reinforcement of cluster development in East Kanupur and Vellapalem villages of Chilakur Mandal and Kothapatnam, Siddavaram, and Karlapud villages of Kota Mandal in Nellore District. The site is located south of Krishnapatnam Port as industrial development of 5,070 acre (2,052 ha) as shown in Figure 8.7.23. Additionally, KPCT has plans to develop plant facilities such as power plant, water treatment plant, and waste water plant, near this area. It is expected to provide stable operational environment for industries in the future.

Krishnapatnam Port (Phase II) and the planned Durgarajapatnam Port have a draft of 18 meters, which could be one the deepest in the world. Krishnapatnam SEZ is planned to be developed in collaboration with these ports as the Chennai-Bengaluru Industrial Corridor Region.



Source: KPCT (Krishnapatnam Port Container Terminal)

Figure 8.7.23 Layout Plan of Krishnapatnam SEZ

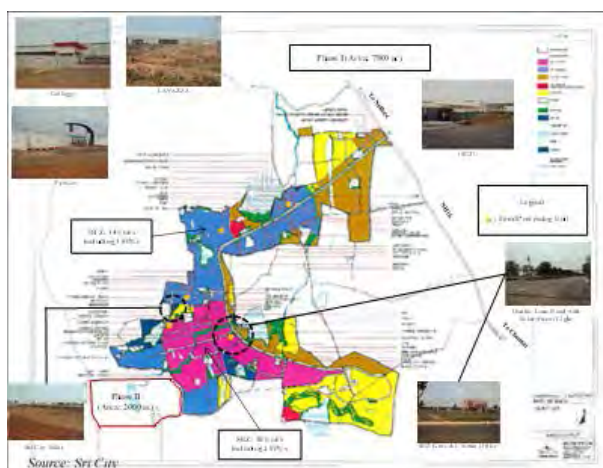


Figure 8.7.24 Layout Plan of Sri City

(d) Sri City

The site of Sri City with a total area of 9,800 acre (3,966 ha) consisting of 7,800 acre (3,156 ha) for Phase I and 2,000 acre (809 ha) for Phase II, is located in Chittoor District bordering Teda Mandal of Nellore District. Sri City Phase I is classified into the following zones: special economic zone (SEZ) in 2,500 acre, domestic tariff zone (DTZ) in 2,500 acre, free trade, and warehousing zone (FTWZ) in 500 acre. Sri City Phase I has been developing and operating, and 30 units including two FPU are placed in SEZ and 34 units including three FPU in DTZ as shown in Figure 8.7.24. As Sri City is directly linked to NH16, Sri City is conveniently located such as it is 1.5 km to Teda RS, 55 km to Chennai Port and 100 km to Krishnapatnam Port, 65 km to Chennai Airport, and 75 km to Tirupati Airport.

Sri City has three water sources, namely: Somsila-Kandreu Reservoir with an annual supply of 30 million m³, rainwater harvesting pond with a capacity of 2.4 million m³, and groundwater in the forest protection area for dry season. Water purification plant with a capacity of 77,000 m³/d and wastewater treatment plant with a capacity of 47,000 m³/d are constructed. Power is supplied by APTRASCO Power Station with 450 MW transformer. Industrial waste is treated individually by TSDF. Ramkuy Enterprise approved by government, collects, transfers, and disposes solid waste on a regular basis. It is recommended that Phase II with an area 2,000 acre is appropriate for foreign investor to set up the food park.

(e) Jain Ultra Mega Food Park (UMFP)

Around 52 ha of land is located in Tamgadamcha Village of Jupadu Bangla Mandal in Kurnool District about 40 km away from Kurnool Town. About INR 300 crore will be invested on Jain UMFP. Ambhuja Company is also setting up its corn processing industry (Ambhuja Food Products) in 200 acre with an investment cost of INR 2.4 billion. Moreover, N.G.Ranga Agriculture University, Tangedancha Seed Farm, and KC Canal are situated adjacent to UMFP as shown in Figure 8.7.25. At present, water and electricity are supplied from Jupadu Bangla Town.

Although the plan of UMFP is not disclosed, the following schemes are reported: i) processing unit for fruit, vegetables, and spices and ii) agri biotech and R&D centers. The centers include micro-irrigation system, tissue culture, product and crop demonstration center, water harvesting demonstration unit,

and renewable energy hubs.

It is noted that any progress are not apparent in the implementation of UMFP after the foundation stone for UMFP was laid in August 2015. It is expected that the progress of UMFP implementation is improved smoothly and this area is developed in cooperation with the industry, government, and academe.

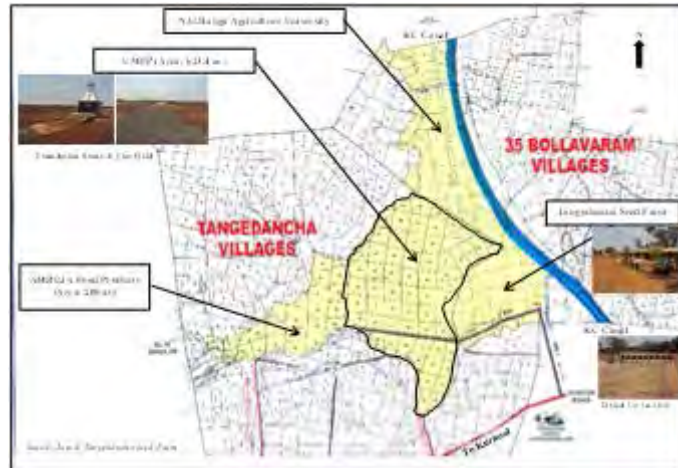
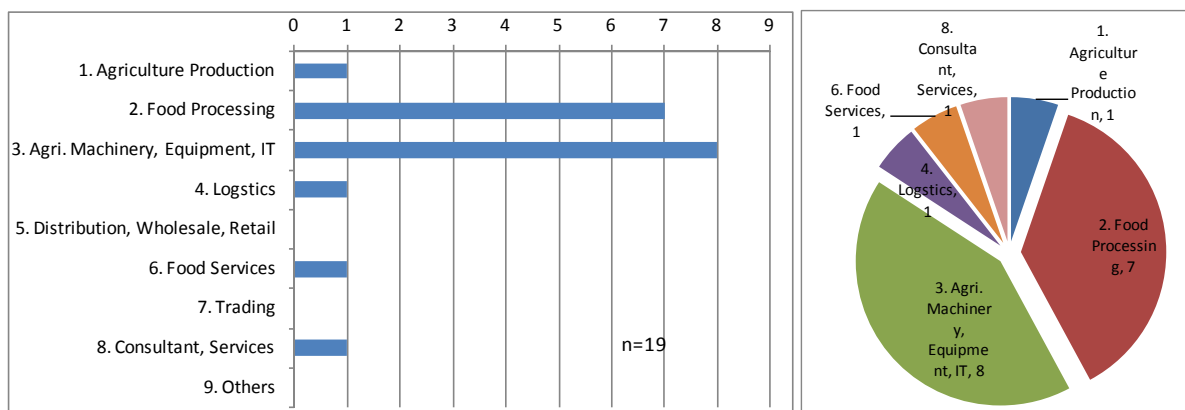


Figure 8.7.25 Area Map of Jain Irrigation UMFP

Attachment 8.7.2 Questionnaire Survey to Japanese Companies about Business Operation in India

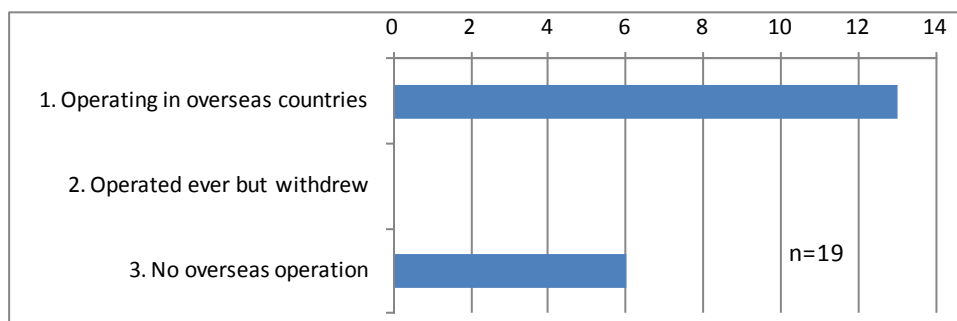
Survey method : Distribution of a questionnaire to Japanese food related companies from South Asia Department, JICA
 Survey period : 1st February – 11th March, 2016
 Target companies : 1. Agriculture Production, 2. Food Processing, 3. Agri. Machinery, Equipment, IT, 4. Logistics, 5. Distribution, Wholesale and Retail, 6. Food Services, 7. Trading, 8. Consultant, Services
 Number of reply : 19 companies

Number of replied companies per category



I. Current Situation of Business Operation in Overseas Countries

Question 1 Current status of operation in overseas countries

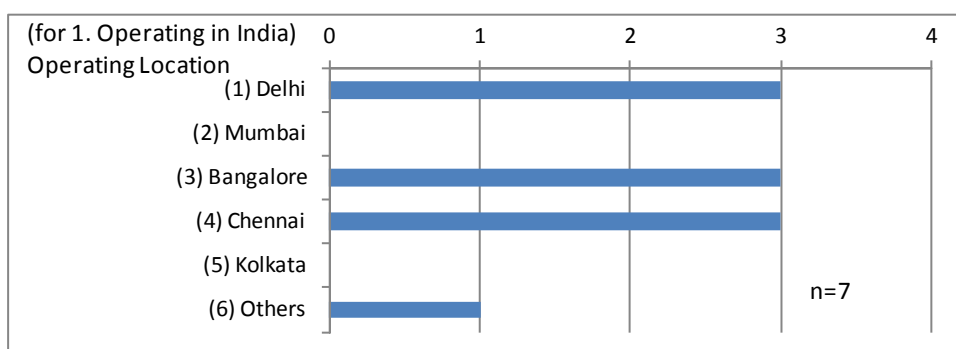
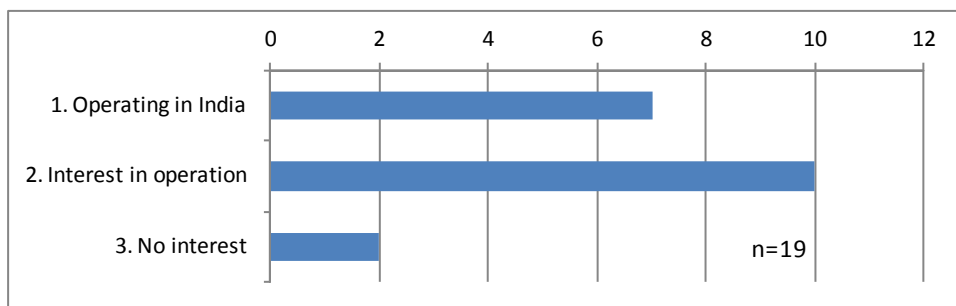


Countries in operation: China=9, North America=7, India=5, Europe=4, Africa=2, Others=2 (Australaria, World)

Out of 19 companies, 13 companies answered operating in overseas countries. The distribution of countries in operation is; China=9, North America=7, India=5, Europe=4, Africa=2, Others=2 (Australia, World). (multiple answers)

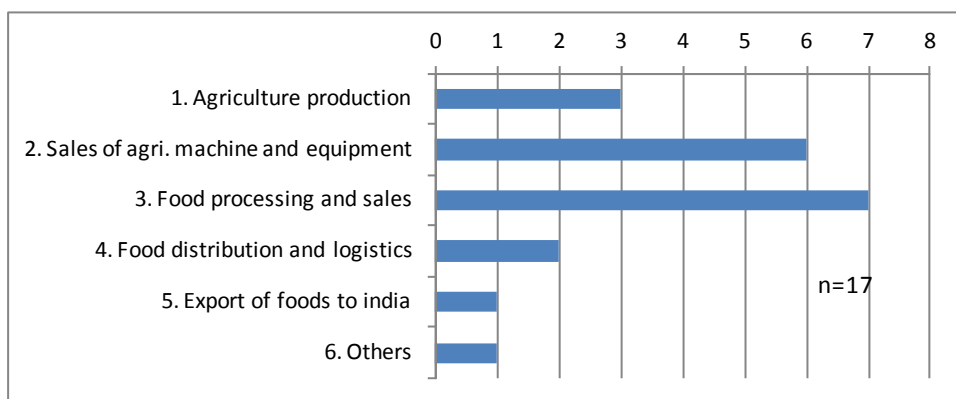
II. Current Situation of Business Operation in India

Question 2 Current status of operation in India



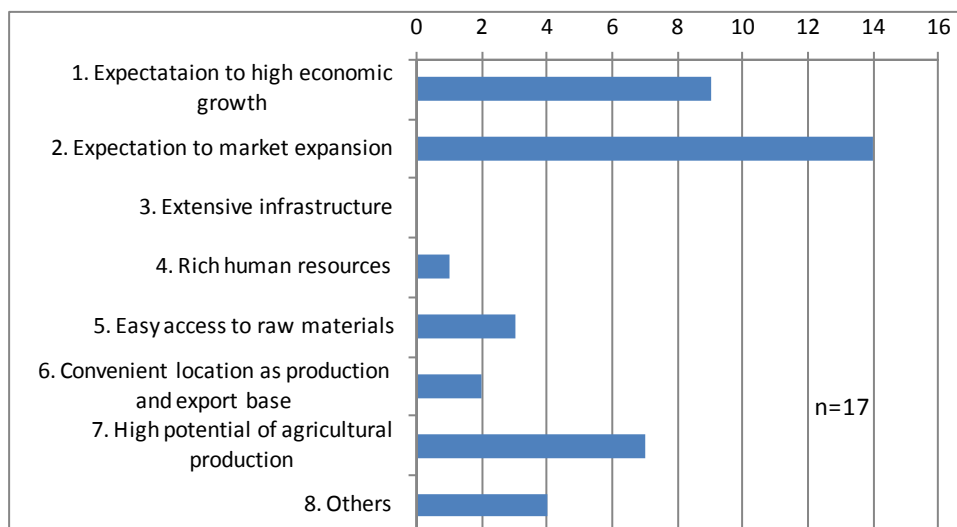
7 companies have already advanced in India and additional 10 companies show the interests in operation in India. For 7 operating companies, the locations in operation are; : Delhi=3, Bangalore=3, Chennai=3, Others=1(Oddisa).

Question 3 Business area in operation/ with interests in India (multiple answers)



Out of 17 companies operating and/or having interest in operation in India, 7 companies answered food processing and sales, 6 companies for sales of agriculture machine and equipment, 3 companies for agriculture productions.

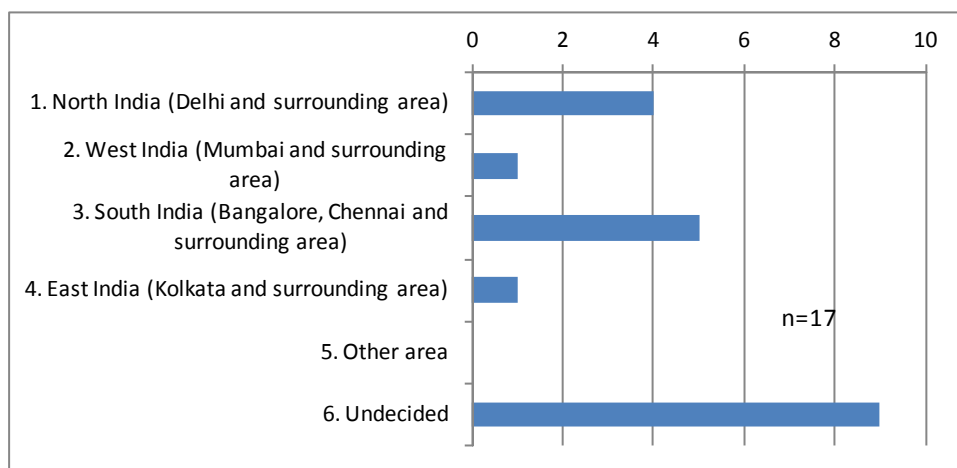
Question 4 Reason to choose India as business operation (multiple answers)



Others: Large population, Possibility of penetration of new food culture, Transition to mechanisation, Possibility of development by public-private partnership

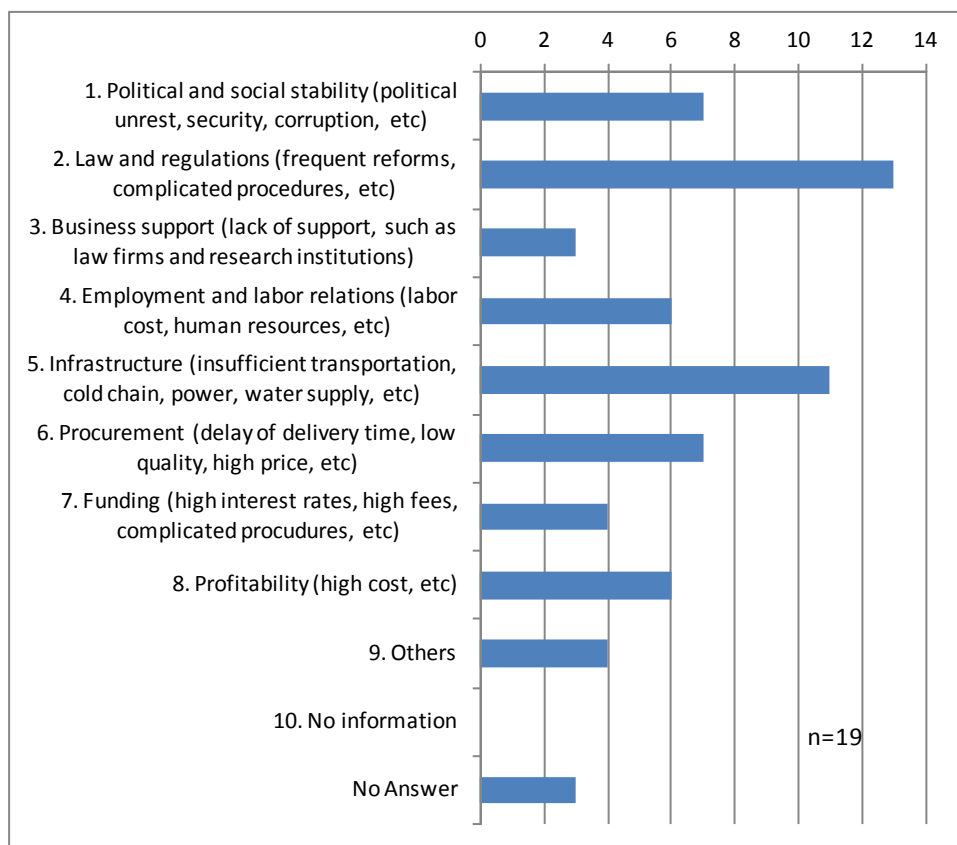
Main reasons to choose India as business operation were “2. Expectation to market expansion” (14 companies, 82%) and “1. Expectation to high economic growth” (9, 53%), Japanese companies show expectation on Indian market in terms of market size and stable growth. Some companies also has expectations on “7. High potential of agricultural production” (7, 41%) and “5. Easy access to raw materials” (3, 18%).

Question 5 Regions in operation/ with interests in India (multiple answers)



5 companies answered south India and 4 companies answered north India as the regions in operation or with interest in operation, even though 9 companies (53%) answered undecided.

Question 6 Problem and constraint on business in India (multiple answers)



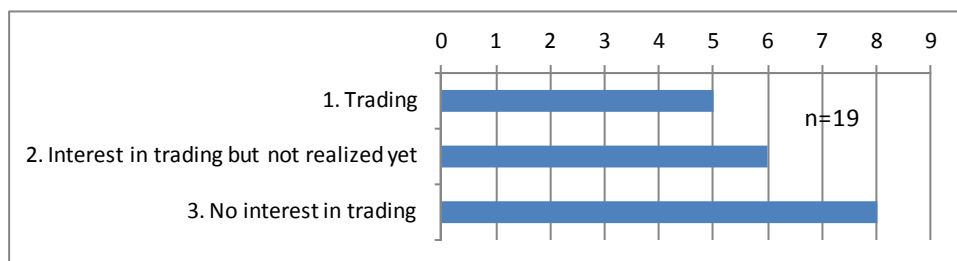
Others: difficult to find partner company, trouble on contract agreement, lack of support organization, depend on decision of parent company

Many companies indicated “2. Law and regulations (frequent reforms, complicated procedures, etc)” (13 companies, 68%) and “5. Infrastructure (insufficient transportation, cold chain, power, water supply, etc)” (11, 58%) as major problems and constraints on business in India.

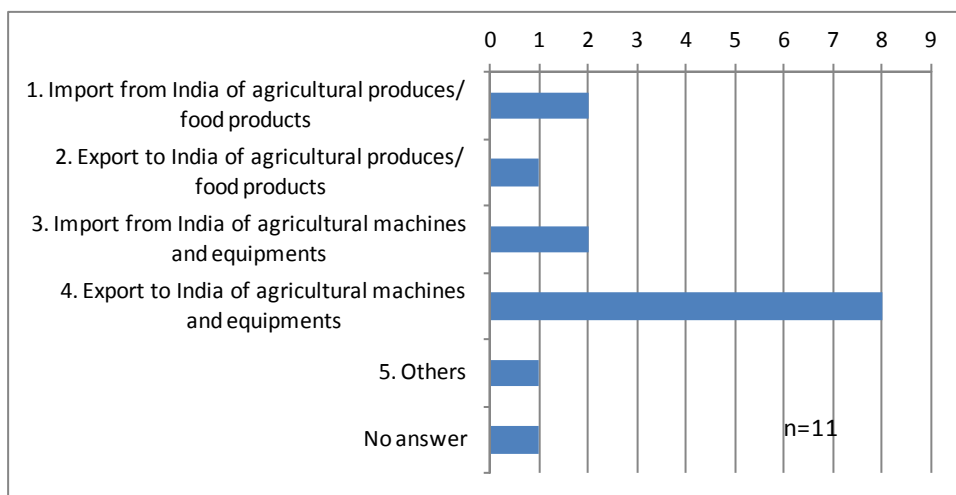
III. Direct Trade* with India

(*Direct trade refers that a company executes procurement of raw materials and sales of her own products directly with companies in India (including Japanese company in India).)

Question 7 Current status on trading with India



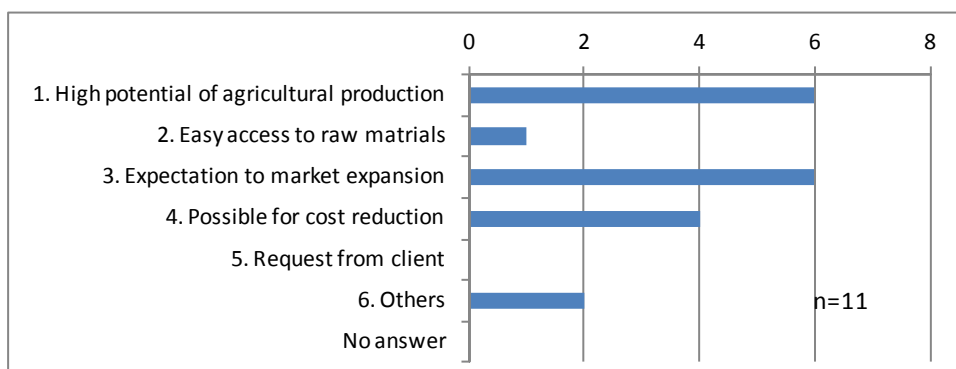
Question 8 Business area of trading in operation/ with interests (multiple answers)



Others: marketing and customer service by local agent

Agriculture machinery and equipment companies show their high interest in export of their own products to India. On the other hand, only one company has interest to export of agricultural produces/ food products to India.

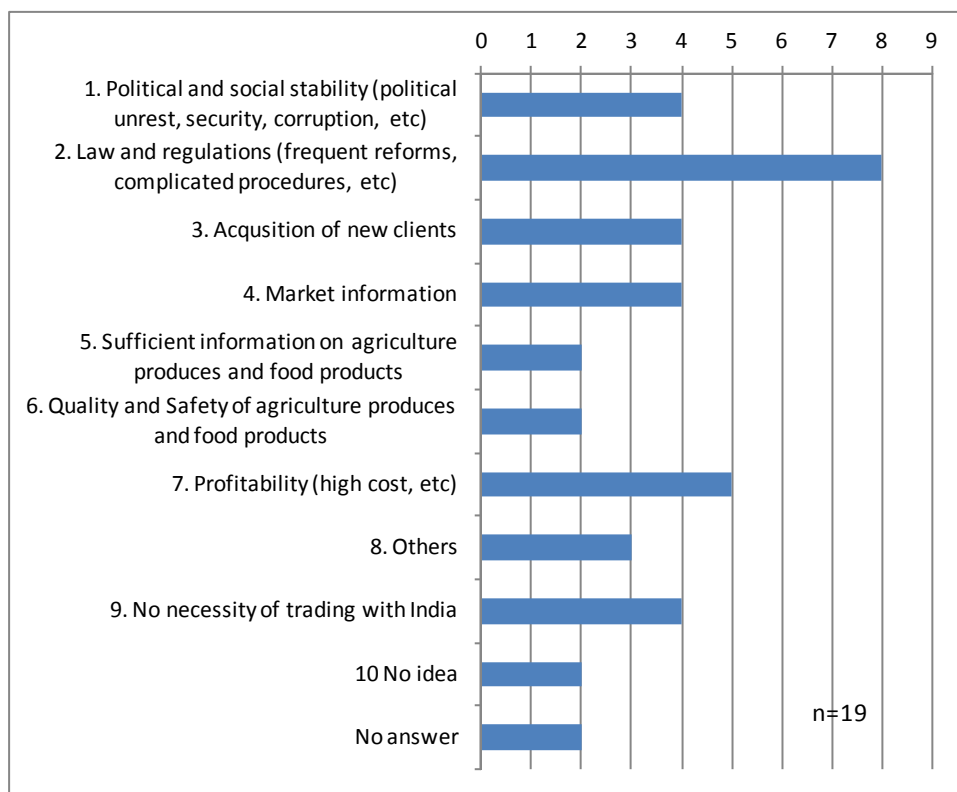
Question 9 Reason of trading with India (multiple answers)



Others: Progress of mechanisation

Out of 11 companies, 6 companies answered “1. High potential of agricultural production” and 6 companies also answered “3. Expectation to market expansion”.

Question 10 Problem and constraint on trading with India (multiple answers)

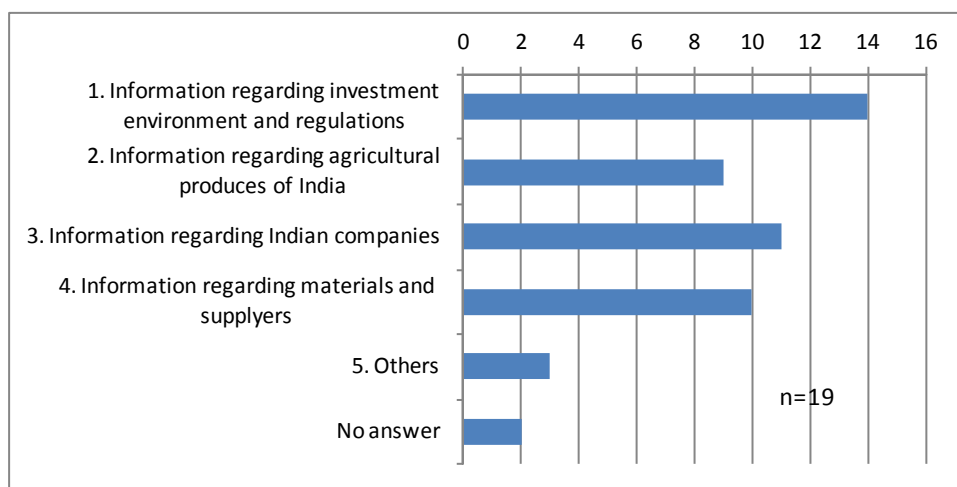


Others: high competition with local companies, low competitiveness due to high taxes, searching JV companies

Regarding problem and constraint on trading with India, “2. Law and regulations (frequent reforms, complicated procedures, etc)” (8 companies, 42%) was highest followed by “7. Profitability (high cost, etc)” (5, 26%). Some companies complains about complicated import procedures and high tariff on import of machine and equipment.

IV. Expected Public Support for Business Development in India

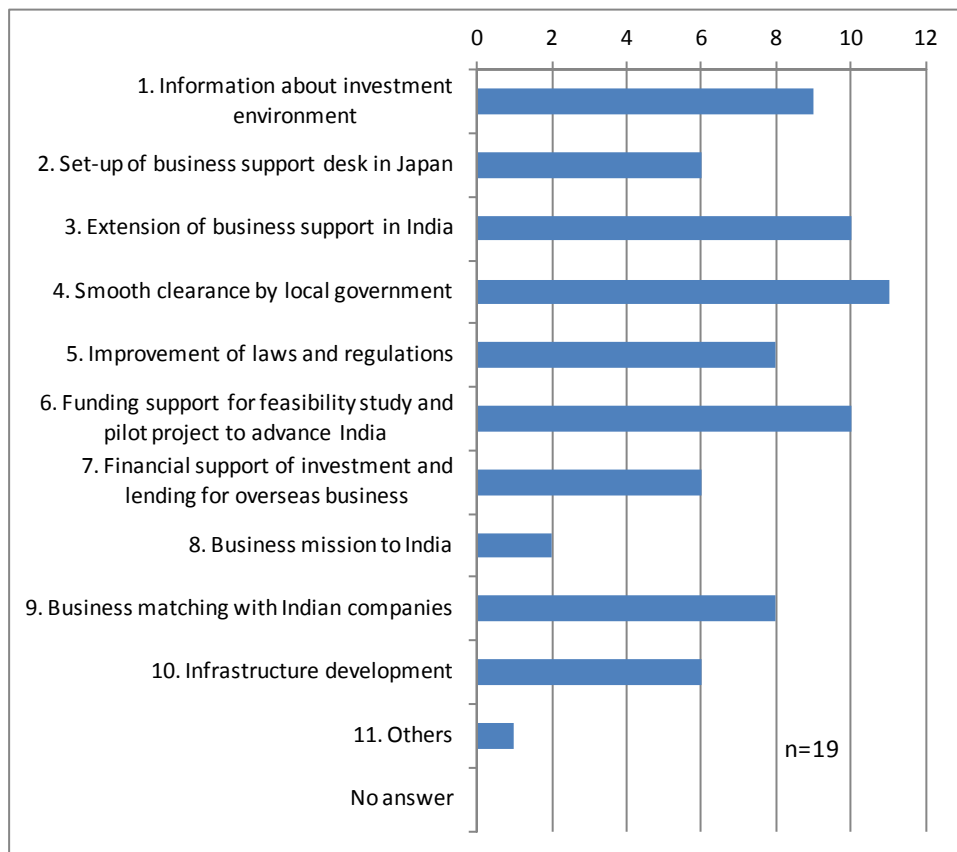
Question 11 Expected information to be provided by Government (multiple answers)



Others: Support for installation of sample machine, information about development plan of India

Highest demand among information from government is “1. Information regarding investment environment and regulations” (14 companies, 74%), even though many Japanese companies still demand broad information about Indian companies, materials and its suppliers and agricultural produces of India.

Question 12 Expectation of support and information from Government of Japan/ India (multiple answers)



Others: support for export promotion

Comment on No.5: improvement of regulations should include; flexible funding, food safety, EPA, elimination or mitigation of tariff barriers on seed, fertilizer and agro chemical, simplification of taxation and export/import procedures.

Comment of No.10: infrastructure development should include; stable supply of gas and electricity, improvement of water supply and sanitation, road, port, communication, logistics and cold chain, etc.

Highest answer was “4. Smooth clearance by local government” (11 companies, 58%) as the expected support from government of India/ Japan, followed by “3. Extension of business support in India” (10, 53%), “6. Funding support for feasibility study and pilot project to advance India” (10, 53%), and “1. Information about investment environment” (9, 47%).

Attachment 9.8.2 Draft Terms of Reference for Consulting Services on APILIP-II

1. Background

The Government of India will receive a loan from the Japan International Cooperation Agency (hereinafter referred to as "JICA") to finance the Andhara Pradesh Irrigation and Livelyhood Improvement Project Phase II (APILIP-II), hereinafter referred to as "the Project") in the AP State. The Government of India intends to use part of the proceeds of the loan for eligible payments for consulting services by the project management consultant (PMC) for which this ToR is issued.

(1) Objectives

The development objective of APILIP-II is to improve livelihoods of farmers in the command areas of old irrigation projects by increasing agriculture productivity and actual irrigated area through (i) modernisation of old irrigation systems for improvement of irrigation efficiency, (ii) institutional development and capacity building of WUAs for participatory irrigation management, and FPOs for integrated farming system and other agriculture activities, and (iii) support for local poor in animal husbandry and fishery communities leading viable livelihoods.

The challenges towards sector reform in the state focusing on food value chain development for strategic crops and farm mechanisation on a pilot basis are also objective as well.

From the implementation of the Project, the following benefits and social economic impact could be expected.

Table 1 Expected Benefits and Impact of the Project

Benefits	Social Economic Impacts
- Increased crop yield and production	- Reduced out seasonal immigration
- Reduction in gap ayacut	- Increased on-farm and off-farm employment
- Improvement of irrigation efficiency	- Enhanced food security
- Value addition to the food crops, fishery and animal husbandry products	- Promotion of FVC, fishery and animal husbandry development
- Increment of net farm income, etc.	- Improvement of living standards
	- Gender empowerment, etc.

Source: JICA Survey Team

(2) Project Components

The project comprises of the following eight components, of which the top seven components will be financed by JICA, with terms and conditions set forth in the Loan Agreement and the rest shall be totally funded by the Government of India.

Table 2 Project Components

Number of Component	Name of Component
Component 1	Modernisation of Medium and Minor Irrigation Projects
1.1	Medium irrigation projects
1.2	Minor irrigation projects
Component 2	Participatory irrigation management (PIM)
Component 3	Promotion of farmers producer organisations (FPOs)
Component 4	Livelihood Support Programme for Animal Husbandry and Fishery
4.1	Animal husbandry
4.2	Fishery
Component 5	Pilot Programmes
5.1	Food value chain for strategic crops
5.2	Farm mechnization
Component 6	Project Management
6.1	Support to PMU/DIU
6.2	Capacity building
6.3	Monitoring and evaluation
6.4	Thematic study and action research

Number of Component	Name of Component
Component 7	Consulting Services (PMC)
Component 8	GoAP Share : Administration, Taxes and Duties, tohers

Source: JICA Survey Team

(3) Scope of the Project

The scope of the Project is as stated below:

Table 3 Scope of the Project

No.	Component	Scope of Works
1	Modernisation of Medium and Minor Irrigation Projects	<p><u>1. Medium Irrigation Project:</u> 20, A= 104,594 ha</p> <p><u>2. Minor Irrigation Projects:</u> 449, A= 56,966 ha</p>
2	Participatory Irrigation Management (PIM)	<p>a) Revision of guideline and capacity building of government officers</p> <p>b) Equipping supporting organisations</p> <p>c) Capacity development of WUAs (minor irrigation projects)</p> <p>d) Capacity development of PCs and WUAs (medium irrigation projects)</p>
3	Promotion of Farmers Producer Organisations (FPOs)	<p>a) Agriculture extension programmes</p> <p>b) Preparation for FPO formation</p> <p>c) Support for establishing FPOs</p>
4	Livelihood Support Programme of Animal Husbandry and Fishery Sector	<p><u>1. Animal Husbandry</u></p> <p>a) Development of livelihood plan</p> <p>b) Enhancement of productivity of animals</p> <p>c) Promotion of livestock-based income generation activities</p> <p><u>2. Fishery</u></p> <p>a) Development of livelihood plan</p> <p>b) Support for fish production activities</p> <p>c) Support for marketing activities</p>
5	Pilot Programmes	<p><u>1. Food Value Chain for Strategic Crops</u> (mango (fresh and processed), tomato, chilli, coconut, shrimp, and tuna)</p> <p>a) Development of mechanism to assist entire value chain</p> <p>b) Capacity development of government officers, producers, producer groups, and other stakeholders</p> <p>c) Development of marketing and brand strategy</p> <p><u>2. Farm Mechanisation</u></p> <p>a) Establishment of agricultural mechanisation and technology Centre (AMTC): 2 AMTCs</p> <p>b) Establishment of workshop: 10 units</p> <p>c) Training of custom service units (CSUs): 107 CSUs</p> <p>d) Procurement of farm machinery for training purpose: 2 units each for rice and ID crops.</p>
6	Project Management	<p><u>1. Support to PMU/DIU</u></p> <p>a) PSC/PMU advisors</p> <p>b) PMU/DIU consultants- individual</p> <p>c) PMU/DIU consulting firms / NGOs</p> <p>d) Equipment and furniture</p> <p><u>2. Capacity Building</u></p> <p>a) Exposure visits and study tours (domestic)</p> <p>b) Seminars</p> <p>c) Workshops</p> <p>d) Publication of information, education, and communication materials</p> <p>e) Andhra Pradesh State training and research institute</p> <p>f) WUA facilities (multi-purpose communication centre, etc.)</p> <p><u>3. Monitoring and Evaluation</u></p> <p>a) Environmental monitoring</p> <p>b) Benchmark survey</p> <p>c) Water benchmarking and water audit</p> <p>d) Management information system (MIS)</p>

No.	Component	Scope of Works
		<p><u>4. Thematic Study and Action Research</u></p> <p>a) Value chain analysis</p> <p>b) Private sector leadership analysis</p> <p>c) Analysis of storage, transport and other regulations, and procedures for global standards</p> <p>d) Andhra Pradesh agriculture promotion video film</p>
7	Consulting Services by Project Management Consultant (PMC)	<p>PMC will assist PMU/DIU in the overall project management as follows:</p> <p>a) Guidance for the overall project monitoring and management,</p> <p>b) Inter-departmental coordination and close communication,</p> <p>c) Development and review of annual work plan and monitoring of the work progress at the state level,</p> <p>d) Facilitation of convergence among the departments concerned at the state level,</p> <p>e) Construction management, technical guidance and monitoring,</p> <p>f) Fund management,</p> <p>g) Technical support (training and awareness programme, etc.), and</p> <p>h) Liaison between PMU and JICA.</p>
8	GoAP Share	<p>a) Project administration</p> <p>b) Taxes and duties</p> <p>c) Interest during construction (2%)</p> <p>d) Front end fees (0.02%)</p>

Source: JICA Survey Team

(4) Implementation Schedule

The project implementation period is set for 7 years from the effective date of Loan Agreement. The loan would be provided for 9 years in consideration of contingency during the project implementation. The Project will start from January 2017 (establishment of PMU) and complete all project works by December 2023 as shown below.

Table 4 Overall Implementation Schedule

Item	Expected Time Schedule
Loan Agreement	December 2016
Establishment of PMU	January 2017 to March 2017 (3 months)
Selection of Consultants	January 2017 to December 2017 (12 months)
Consulting Services (PMC)	January 2018 to December 2023 (72 months)
Modernisation of Minor and Medium Irrigation Project	January 2018 to June 2021 (42 months)
Participatory Irrigation Management (PIM)	July 2018 to June 2023 (60 months)
Promotion of Farmers Producer Organisations (FPOs)	July 2018 to December 2023 (66 months)
Livelihood Support Programme	January 2019 to December 2022 (48 months)
Pilot Programme-1: FVC Chains for Strategic Produces	July 2018 to June 2022 (48 months)
Pilot Programme-2: Farm Mechanisation	April 2018 to June 2023 (63 months)
Project Completion	December 2023
Loan Closing	December 2025

Source: JICA Survey Team

(5) Location of the Project

The Project will cover all 13 districts of AP State as shown in **the Project Location Map**.

(6) Executing Agency

The executing agency of the Project will be the Department of Water Resources (DoWR) of GoAP, who has overall responsibility for the project implementation.

GoAP will set up the Project Steering Committee (PSC) and Project Management Unit (PMU) at state level, and District Project Implementation Unit (DIU) at district level. In principle, the Departments of Planning (DoP), Water Resources (DoWR), Agriculture (DoA), Horticulture (DoH), Animal Husbandry and Fisheries (DoAHF), Mines & Geology & Food Processing (DoMGFP), Finance (DoF) and also Andhra Pradesh Food Processing Society (APFPS) will be the members of these committee

and units.

(7) Technical Information

Construction works for minor and medium irrigation projects; materials, products and designs of agriculture infrastructures shall be compliant with the Indian Standards (IS).

2. Objectives of Consulting Services (PMC)

The consulting services (PMC) shall be provided by an international consulting firm (hereinafter referred to as "the PMC") in association with national consultants in compliance with Guidelines for the Employment of Consultants under Japanese ODA Loans, April 2012. The objective of the consulting services is to assist PMU/DIU in the efficient and proper preparation and implementation of the Project through the following works:

- Overall project management
- Construction management for minor and medium irrigation projects
- Institutional development and capacity building of WUAs in O&M of irrigation systems
- Institutional development and capacity building of FPOs in integrated farming system and other agriculture activities
- Livelihood support to animal husbandry and fishery societies
- Pilot programmes

3. Scope of Consulting Services (PMC)

The scope of the PMC is to assist the PMU in the following activities:

(1) Overall Project Management

- 1-1 Preparation of Overall Project Management Plan;
- 1-2 Preparation of Annual Work Plan and Budget Estimate;
- 1-3 Monitoring and evaluation of physical and financial progress;
- 1-4 Preparation of Monthly and Annual Progress Reports;
- 1-5 Technical guidance to PMU/DIU and the relevant departments;
- 1-6 Baseline Survey and Follow-up Evaluation on annual basis, and Terminal Impact Assessment;
- 1-7 Technical Reports related to the project if any;
- 1-8 Preparation of the Project Completion Report;
- 1-9 Coordination between PMU/DIU and the relevant departments; and
- 1-10 Coordination between PMU and JICA.

(2) Construction Management of Minor and Medium Irrigation Projects

- 2-1 Preparation of overall construction management/supervision plan by using mile stone of each project;
 - 2-2 Preparation of Annual Work Plan and disbursement programme;
 - 2-3 Construction supervision and management of minor and medium irrigation projects
 - 2-4 Advice to PMU for pre-construction works including design checking, tender works, preparation of evaluation of tender works;
 - 2-5 Advice to PMU for progress control, quality control and safety control
 - 2-6 Preparation detailed monitoring report indicating problems and measures to be taken
 - 2-7 Review of the completion reports to be submitted by contractors; and
 - 2-8 Training to PMU staff for advanced irrigation practice and Exposure Visits to similar projects.
-

- (3) Institutional development and capacity building of WUAs in proper O&M of irrigation systems
 - 3-1 Coordination with the line departments concerned;
 - 3-2 Monitoring and evaluation of physical and financial progress;
 - 3-3 Technical advices to DoWR/WUAs;
 - 3-4 Revision of guidelines and training modules;
 - 3-5 Training to NGOs/Support Organisations (SOs);
 - 3-6 Capacity building of WUAs/PC through NGOs/SOs; and
 - 3-7 Follow-up workshop for trainings.
- (4) Institutional development and capacity building of FPOs in integrated farming system and other agriculture activities
 - 4-1 Coordination with the line departments concerned;
 - 4-2 Monitoring and evaluation of physical and financial progress;
 - 4-3 Technical advices to DoA/FPOs;
 - 4-4 Establishment and promotion of FPOs by NGOs/DoA;
 - 4-5 Trainings to NGOs/DoA;
 - 4-6 Trainings on integrated farming system through NGOs/DoA;
 - 4-7 Trainings on processing and marketing of agriculture products and exposure visits to similar projects; and
 - 4-8 Follow-up workshop for trainings.
- (5) Livelihood support to animal husbandry and fishery societies
 - 5-1 Coordination with the line departments concerned;
 - 5-2 Monitoring and evaluation of physical and financial progress;
 - 5-3 Technical advice to the line departments, NGOs and target groups;
 - 5-4 Arrangement of training programmes; and
 - 5-5 Support for marketing activities.
- (6) Pilot programmes
 - 6-1 Coordination with the line departments concerned;
 - 6-2 Monitoring and evaluation of physical and financial progress;
 - 6-3 Technical advice to the line departments and PMU consultants;
 - 6-4 (FVC) Capacity development trainings to government officers, producers, producer groups and other stakeholders;
 - 6-5 (FVC) Development and operation of commodity-wise marketing strategy;
 - 6-6 (Farm Mechanisation) Establishment of Agriculture Mechanisation & Technology Centre (AMTC);
 - 6-7 (Farm Mechanisation) Training to Custom Services Units (CSUs);
 - 6-8 (Farm Mechanisation) Establishment of Workshop; and
 - 6-9 (Farm Mechanisation) Procurement of farm machinery for training purpose; rice, maize, pulses and sugarcane, etc.
 - 6-10 Terminal evaluation survey.

4. Expected Time Schedule

The total duration of consulting services by the PMC will be 72 months; starting on 1st January 2018 and ending on 31st December 2023.

5. Expert Requirement

The minimum man-month (M/M) input of the consultants is estimated at 291 M/M of Professional (A) and 411 M/M of Professional (B), and 568 M/M of supporting staff for the contract period of 72 months. The following experts would be assigned to the PMC. A detailed schedule of consulting services (PMC) and a distribution of man-months is shown in **Attachment-9.8.1**.

Table 5 Allocation of Man-Month of the PMC

Designation	No.	Total Input in Months (M/M)
Professional (A) : International Expert		
Team Leader	A-1	48
Monitoring and Evaluation Expert	A-2	15
Construction Management Expert	A-3	34
Irrigation and O&M Expert	A-4	26
Institutional and Capacity Building Expert	A-5	18
Agricultural Expert	A-6	30
FVC Expert	A-7	21
Cultivation of Processing Variety	A-8	6
Tuna (capture)	A-9	10
Tuna (on-board handling)	A-10	9
Tuna (Processing)*	A-11	5
Shrimp (aquaculture management)	A-12	5
Quality Management (kaizen and 5S)	A-13	9
Farm Machinery (operation and maintenance)	A-14	26
Agronomist	A-15	19
Specialists as Required	A-16	10
Sub-total (A)		291
Professional (B): National Expert		
Co-Team Leader	B-1	67
Monitoring and Evaluation Expert	B-2	56
Construction Management Expert	B-3	56
Irrigation and O&M Expert	B-4	59
Institution Capacity Building Expert	B-5	59
Agricultural Expert	B-6	53
FVC Expert	B-7	51
Specialists as Required	B-8	10
Sub-total (B)		411

Source: JICA Survey Team

5.1 Qualification of Experts

The minimum qualification of key team members is shown in the table below.

Table 6 Minimum Qualification of Key Experts of the PMC

Designation	Qualification
Professional (A): International Expert	
Team Leader	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in irrigation or civil engineering. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 15 years' work experience in irrigation-related projects; • 2 comprehensive irrigation-related projects in which he/she served as team leader or co-team leader; • 2 irrigation-related projects in South Asian countries, preferably India; • 10 years' work experience in Japanese ODA loan projects.

Monitoring and Evaluation Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in irrigation engineering or agriculture. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in monitoring and evaluation, planning, design and construction supervision of irrigation-related projects or similar; • 1 irrigation-related project in South Asian countries, preferably India; • 5 years' work experience in Japanese ODA loan projects.
Construction Management Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in irrigation or civil engineering. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in bid documents, bid evaluation, planning, design and construction supervision of irrigation-related projects or similar; • 1 irrigation-related project in South Asian countries, preferably India; • 5 years' work experience in Japanese ODA loan projects.
Irrigation and O&M Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in irrigation or civil engineering. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in agriculture development, preferably irrigation water management and O&M; • 1 irrigation and agriculture development project in South Asian countries, especially India is preferable; • 3 years' work experience in Japanese ODA projects.
Institutional Capacity Building Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in sociology, economy or agriculture. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in agriculture development, preferably institutional development, capacity building, community development or rural development; • 1 agriculture development project in South Asian countries, especially India is preferable; • 3 years' work experience in Japanese ODA projects.
Agricultural Experts	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in agriculture. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in agriculture development, preferably vegetable and fruit cultivation; • 1 agriculture development project in South Asian countries, especially India is preferable; • 3 years' work experience in Japanese ODA projects.
FVC Experts	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in agriculture or commerce. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in agriculture development, preferably agricultural processing and marketing; • 1 agriculture development project in South Asian countries, especially India is preferable; • 3 years' work experience in Japanese ODA projects.
Cultivation of Processing Variety Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in agriculture <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 20 years' work experience in agriculture & tomato cultivation, • Working experience in developing countries, especially • South Asian countries is preferable;
Tuna (capture) Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in Fisheries/Marine Biology <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in capture fisheries especially in tuna artisanal fishery • Experience in developing countries, Asia and the Pacific is preferable

Tuna (on-board handling) Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • Graduate in High school or higher <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in tuna longline or hand line fishery • Experience in developing countries, Asia and the Pacific is preferable
Tuna (processing) Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • Graduate in High school or higher <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in tuna quality assessment and processing • Experience in developing countries, Asia and the Pacific is preferable
Shrimp (aquaculture management) Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in Fisheries and aquaculture/Marine biology <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 15 years' work experience in aquaculture • 10 years' work experience in shrimp culture • Experience in developing countries, Asia and the Pacific is preferable
Quality management (kaizen and 5S) Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in business management or related field <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 20 years' work experience in quality management, • Working experience in South Asian countries is preferable;
Farm Machinery (operation and maintenance)	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in farm machinery <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years work experience in training activities for operation work of farm machinery especially in rice cultivation including the followings: <ul style="list-style-type: none"> - land preparation using tractor and rotavators, - transplanting with transplanter - harvesting with combine harvesters for rice • 10 years work experience in training activities for repairing work of farm machinery including tractor, rice transplanter and combine harvester as well.
Agronomist	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in agriculture <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience on cultivations of rice; • 3 years' work experience in preparation of rice seedlings with seedling tray/ automatic seeder, and transplanting with transplanter; • 3 years work experience in training activities on cultivation of rice and upland crops.
Professional (B): National Expert	
Co-team Leader	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in irrigation or civil engineering. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 15 years' work experience in irrigation-related projects; • 2 comprehensive irrigation-related projects in which he/she served as team leader or co-team leader; • 3 years' experience in foreign funded projects.
Monitoring and Evaluation Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in irrigation engineering or agriculture. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in monitoring and evaluation, planning, design and construction supervision of irrigation-related projects; • 3 years' experience in national funded projects.

Construction Management Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in irrigation or civil engineering. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in bid documents, bid evaluation, planning, design and construction supervision of irrigation-related projects or similar; • 3 years' experience in national funded projects.
Irrigation and O&M Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in irrigation or civil engineering. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in agriculture development, preferably irrigation water management and O&M; • 3 years' experience in national funded projects.
Institution Capacity Building Expert	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in sociology, economy or agriculture. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in agriculture development, preferably institutional development, capacity building, community development or rural development; • 3 years' experience in national funded projects.
Agricultural Experts	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in agriculture. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in economic agriculture development, preferably vegetable and fruit cultivation; • 3 years' experience in national funded projects.
FVC Experts	<p><u>Education:</u></p> <ul style="list-style-type: none"> • BS in agriculture or commerce. <p><u>Experience:</u></p> <ul style="list-style-type: none"> • 10 years' work experience in agriculture development, preferably agricultural processing and marketing; • 3 years' experience in national funded projects.

Source: JICA Survey Team

Consultant may propose other experts and supporting staffs required to accomplish the tasks outlined in the ToR. It is the Consultant's responsibility to select the optimum team and to propose the professionals which he believes best meets the needs of APILIP-II.

5.2 Scope of Works for the respective personnel

The major tasks and duties of each member of the consultant team are described as followed.

Table 7 Major Tasks and Duties of Key Experts of the PMC

No	Position	Major Tasks and Duties
A-1 B-1	Team Leader Co-team Leader	<ol style="list-style-type: none"> 1) Setting-up an effective organizational structure for the Consultant Team. Preparing and implementing all administrative systems and procedures needed to ensure the effective implementation in accordance with the scope of works with acceptable international standards. 2) Being responsible for overall direction of the Consultant Team, coordination of inputs, and management of individual experts. 3) Being responsible for the overall management of planning, design, construction supervision of agriculture infrastructure and institution building program and farmers support program. 4) Having overall responsibility for the timely delivery and quality of all outputs. 5) Managing the relationships with the government, PMU/DIU, JICA and all other stakeholders. 6) Advising on construction and contracting methods, and performing a comprehensive analysis of options, benefits, risks, mobilization and implementation schedules. 7) Assisting the PMU/DIU to prepare invitation for tender; preparing bid evaluation criteria, initially evaluating and providing advice to the PMU on alternative proposals,

		<p>and elaborating on recommendations with a ranking of all contractors concluding with a suggestion of the technically and economically qualified bidder.</p> <ol style="list-style-type: none"> 8) Identifying important technical and managerial issues which affect progress, safety, quality and compliance with safeguards. 9) Reviewing mobilization of the Contractor's resources (experience of the personnel, equipment and tools, quality and quantity of material, funds, etc.) and recommending additional resources to be mobilized. 10) Guiding, coordinating and supporting program activities and providing overall guidance and direction, and ensure that the Consultant works in harmony with other ongoing and planned programs. 11) Advicing PMU/DIU in coordinating the planning, management, monitoring and reporting of all project activities including supporting the developemnt and implementation of progress monitoring systems. 12) Advising PMU/DIU with packaging contracts and finalizing tender documents. 13) Coordinating with and assisting PMU/DIU on any relevant activities for the Project.. 14) Preparing monthly progress reports and quarterly progress reports in a form agreed with the PMU and JICA (in PSR), and submit the reports. 15) Preparing a final report, which will be a compilation and condensation of the data presented in regular monthly progress reports, together with copies of as-built drawings within two months from the issuance of the defects liability certificate. 16) Preparing a services completion report.
A-2 B-2	Monitoring and Evaluation Expert	<ol style="list-style-type: none"> 1) Carrying out a review of the project preparation documents with regard to project monitoring and evaluation (ME) and drawing attatntion to changes which may have necessary since their preparation; 2) Support the Team Leader and PMU/DIU in ensuring that the project is implemented in accordance with the development plan; 3) Set up ME frameworks and MIS for overall project activities; 4) Prepare selection and appraisal manual and plans; 5) Prepare evaluation criteria for each activity, and role and tasks of the agencies; 6) Work with PMU/DIU to develop (i) operation and effect indicators, (ii) database for effective data collection and management, (iii) method for evaluation and analysis, and (iv) procedure for audit and control; 7) Prepare the necessary guidelines for ME consistent with project documents; 8) Set up standards, contents and schedules for assistance to the PMU/DIU for ME to ensure the project components are implemented as scheduled and outputs are as specified in the development plan; 9) Prepare ME manual for monitoring and assesment; 10) Develop a community participation process within the ME system; 11) Collect necessary data, monitor and routinely evaluate project implementation results and impacts as part of the MIS; 12) Support the team in preparation and organization of training and workshop programs on data management and using ME for the PMU/DIU, stakeholders, and other government staff; 13) Prepare standardized reporting formats and templates; and 14) Assist the Team Leader to take over management and updating the ME and MIS.
A-3 B-3	Construction Management Expert	<ol style="list-style-type: none"> 1) Review the procurement plan and contract packages with regard to procurement and financial management, and draw attention to changes which may have become necessary since their preparation; 2) Assisting the PMU/DIU with procurement, review the progress, recommend adjustments and identify lessons learnt that can be applied to procurement of all other remaining packages in the procurement plan; 3) Annually updating the procurement plan according to actual implementation schedule and agreed changes, accounting for content, schedule, resources, contract awards and disbursement; 4) Preparing a procurement handbook in accordance with JICA procurement policies and guidelines and government regulation. The handbook should include guidelines for effective implementation of the procurement, and providing guidance on bid notification and bid submission, bid eveluation and contract award, contract supervision

		<p>and payment;</p> <ol style="list-style-type: none"> 5) Guiding, supporting and monitoring the PMU/DIU in procurement and financial management in accordance with the procurement guidelines; 6) Assisting cost estimate, bill of quantities, disbursement plan; 7) Preparing standard criteria and checklists for evaluation of the tenders and assist the PMU/DIU in preparation of the bid evaluation reports, and assist them in reviewing the selection process of bidders; 8) Carrying out construction supervision of civil works (Minor and medium irrigation projects) with Department engineers for the following works, pre-construction meeting, review and advice contractor's work plan, work progress control, quality control, safety control, etc; 9) Assisting the PMU/DIU with contract negotiations, preparation of contracts and contract awards; 10) Managing complete and updated files on all contractual issues including submittals, securities, insurance, and related documents; 11) Examining contractor's claims and support the PMU/DIU with determination of need for contract variations, etc.; 12) Updating, monitoring and evaluating the payment and disbursement of all packages in the project and identifying the causes of existing problems, delays and proposed remedial measures; 13) Assisting the PMU/DIU in preparing monthly reports for procurement and contract awards, contract management and performance of each contract package; 14) Providing advice as required helping resolve contractual and construction matters.
A-4 B-4	Irrigation and O&M Expert	<ol style="list-style-type: none"> 1) Prepare a training needs assessment and design a training program to strengthen the staff of PMU, DIU and WUAs in collaboration with other experts; 2) Prepare training modules and materials in relation to institution capacity building of the PMU; 3) Carry out capacity building training to the PMU/DIU staff; 4) Supervise and advise capacity building trainings to WUAs; 5) Provide advice and guidance to the PMU/DIU on the implementation of the training program which may include exposure visits on inter-blocks and inter-districts; 6) Assist the PMU/DIU with implementing the training program by providing logistical support.
A-5 B-5	Institutional Capacity Building Expert	<ol style="list-style-type: none"> 1) Prepare a training needs assessment and design a training program to strengthen the staff of PMU, DIUs, WUAs and FPOs in collaboration with other experts; 2) Prepare training modules and materials in relation to institution capacity building of the PMU; 3) Carry out capacity building training to the PMU/DIU staff; 4) Supervise and advise capacity building trainings to WUAs and FPOs; 5) Provide advice and guidance to the PMU/DIU on the implementation of the training program which may include exposure visits on inter-blocks and inter-districts; 6) Assist the PMU/DIU with implementing the training program by providing logistical support.
A-6 B-6	Agricultural Expert	<ol style="list-style-type: none"> 1) Prepare a training needs assessment and design a training program to strengthen the staff of PMU/DIU, CRPs and MFGs in collaboration with other experts; 2) Prepare training modules and materials in relation to institution capacity building of the PMU; 3) Carry out capacity building training to the PMU/DIU staff; 4) Supervise and advise capacity building trainings to WUAs and FPOs; 5) Provide advice and guidance to the PMU/DIU on the implementation of the training program which may include exposure visits on inter-blocks and inter-districts; 6) Assist the PMU/DIU with implementing the training program by providing logistical support.
A-7 B-7	FVC Expert	<ol style="list-style-type: none"> 1) Review and adjust the concept and details of pilot projects based on the existing conditions; 2) Assist the PMU in procuring Pilot Project Implementation Consultant (PPIC) by preparing tender documents and assisting evaluation; 3) Assist the Pilot Project Management Unit (PPMU) and PPIC to setup Pilot Project

		<p>Implementation Team (PIT) for each pilot project;</p> <p>4) Assist the PPMU and PPIC in conducting baseline survey and set the targets for evaluation indicators, Assist the PPMU to review the detailed project report and project implementation plan for each pilot project developed by PPIC;</p> <p>5) Assist the PPMU and PPIC in developing a monitoring and evaluation system for the pilot projects;</p> <p>6) Monitoring and advice the activities of pilot projects;</p> <p>7) Assist the PPMU and PPIC in conducting endline survey and evaluating the achievements;</p> <p>8) Preparation of study report on FVC technology for agricultural products for the Project and Report on FVC strategy on marketing and branding.</p>
A-8	Cultivation of Processing Variety Expert	<p>1) Assist PPMU and PPIC in preparing plan for technical support program</p> <p>2) Provide technical advice for PPIC and local experts on proper inputs (seed variety, etc.)</p> <p>3) Assist PPIC to conduct trainings for cultivation technique</p> <p>4) Assist PPIC to prepare technical guideline and training materials</p> <p>5) Assist PPIC to monitor the progress on technical aspects</p> <p>6) Provide advice for extension program and prepare report</p>
A-9	Tuna (capture) Expert	<p>1) Determining the fishing grounds and the water depth with the help of Fisheries Survey of India.</p> <p>2) Designing Fish Aggregation Devices (FADs)</p> <p>3) Training and construction of FADs with Fishermen</p> <p>4) Training of fishing methods such as drop line and longline for tuna</p> <p>5) Installation of fishing equipment</p>
A-10	Tuna (on-board handling) Expert	<p>1) Modification design for fishing boats</p> <p>2) Installation of fishing equipment</p> <p>3) Training of on-board handling of tuna</p>
A-11	Tuna (processing) Expert	<p>1) Training of quality assessment of tuna for the staff of fisheries department</p> <p>2) Training of different processing style of tuna</p> <p>3) Training of packaging and icing of tuna</p>
A-12	Shrimp (aquaculture management) Expert	<p>1) Assessment of current shrimp aquaculture practice including pond management</p> <p>2) Preparing an attainable good aquaculture practice with the fish farmers</p> <p>3) Training of good aquaculture practice for fish farmers</p>
A-13	Quality management (kaizen and 5S) Expert	<p>1) Monitor and assess the current conditions of quality management with stakeholders</p> <p>2) Assist PPMU and PPIC in preparing plan for technical support program based on the assessment</p> <p>3) Provide technical advice for PPIC and local experts on technical issues and conduct TOT</p> <p>4) Assist PPIC to conduct technical trainings of quality management to the concerned stakeholders</p> <p>5) Assist PPIC to prepare technical guideline and training materials</p> <p>6) Assist PPIC to monitor the progress on technical aspects</p> <p>7) Provide advice for extension program and prepare report</p>
A-14	Farm Machinery (operation and maintenance)	<p>1) Being responsible for coordination of inputs and management of individual experts</p> <p>2) Prepare training curriculum and materials on operation and maintenance of major farm machinery in cooperation with AMTC</p> <p>3) Have overall responsibility for the timely delivery and quality of all outputs</p> <p>4) Train trainers of AMTC, who conduct training of members of CSUs, regarding operation and maintenance of farm machiner</p> <p>5) Provide advice and guidance trainers of AMTC on training of members of CSU</p> <p>6) Assist monitoring and evaluation to be conducted by the AMTC, regarding activities of CSUs</p>
A-15	Agronomist	<p>1) Prepare training curriculum and materials on seedling preparation with seedling tray in cooperation with AMTC</p> <p>2) Have overall responsibility for the timely delivery and quality of all outputs</p> <p>3) Train trainers of AMTC, who conduct training of members of CSUs, regarding the following subjects: - Preparation of rice seedling with seedling tray</p>

		<ul style="list-style-type: none"> - General guidance on rice cultivation - General guidance on upland crops cultivation - General guidance on business plan to be prepared by CSU <ol style="list-style-type: none"> 4) Provide advice and guidance trainers of AMTC on training of members of CSU 5) Assist monitoring and evaluation to be conducted by the AMTC, regarding activities of CSUs 6) Arrange workshop or seminars for government staff to disseminate the activities in cooperation with AMTC
B-1	Co-team Leader	<ol style="list-style-type: none"> 1) Support the Team Leader in managing the overall assignment and be responsible for the the national consultant's outputs; 2) Collect and compile all relevant information, data and documents to the Project; 3) Maintain proper filing and reporting systems. Coordination with the PMU/DIU on a management information system (MIS) procedures and records maintenance; 4) Develop and deliver training materials on technical aspects including the MIS; 5) Review role of and interrelationship among important stakeholders and suggest ways to improve liaison, cooperation and coordination among them to achieve improved progress and quality of implementation; 6) Support the timely submission of all deliverables; 7) Support the necessary approval processes of deliverables; 8) Work closely with the Team Leader to guide the management and coordination with the government, and other stakeholders including the facilitation of regular management dialogue between the PMU/DIU, other associated agencies and stakeholders at state and district levels; 9) Support the establishment and guide the activities of the PMU/DIU and other proposed institutional arrangements as necessary; and 10) Support the PMU/DIU in liaising, coordinating and supervising of the contractors and other consultancies.

Source: JICA Survey Team

6. Reporting

Within the scope of consulting services, the Consultant (PMC) shall prepare and submit reports and documents to PMU as shown in Table below. PMC shall provide electronic copy of each of these reports.

Table 8 Summary of Reports to be submitted by the PMC

Category	Type of Report	Timing	No. of Copies
Consultancy Services	Inception Report	Within 5 month after commencement of the Services	5
	Monthly Progress Report	Monthly, by the 7 th of each following month	5
	Quarterly Progress Report	Quarterly, by the 15 th of the following month	5
	Annual Work Plan	Annually, by the 15 th of the following month	5
	Services Completion Report	At the end of Services	10
Bidding	Sample Bid Documents of Modernisation of Irrigation Projects including sample design drawings	At appropriate timing in accordance with bid schedule	5
	Sample Bid Evaluation Report of Modernisation of Irrigation Projects	At appropriate timing in accordance with bid schedule	5
Construction Supervision	Construction check list for irrigation project and Manual/guideline for Safety Control	Within 6 month after commencement of the Services	5
	Completion Report for Sample Irrigation Projects.	At the end of each contract period	5
Training	Annual Training Programme	Annually, by the 15 th of the following month	5
	Evaluation Report of Training Programme	Annually, by the 15 th of the following	5

		month	
Environment and Social Management System	Environmental Management Plan	Annually, by the 15 th of the following month	5
	Environmental Monitoring Plan	Annually, by the 15 th of the following month	5
Project Evaluation	Baseline Survey Report	Within 6 months after commencement of the Services	5
	Mid Term Evaluation Survey Report	In 4th Year	5
	Terminal Impact Assessment Report	Before the completion of services	5
Other Report	Technical Report	As required or upon request	As required

Source: JICA Survey Team

Contents to be included in each report are as follows:

(1) Inception Report (5 sets)

Inception report, to be submitted within 3 months after the commencement of the services, shall contain overall work schedule, work plan, administrative arrangement, results of review of available data and information, relevant to the project during the inception period, and so on.

(2) Monthly Progress Report and Quarterly Progress Report (5 sets)

Monthly progress report and quarterly progress report, to be prepared monthly by the 7th of the following month and quarterly by the 15th of the following month, shall contain detailed information of physical and financial progress of the project components, issues and problems, consultant's input and activities, and schedule of works for the next period.

(3) Annual Work Plan (5 sets)

Annual work plan, to be prepared annually by the 15th of the following month, shall contain detailed information of packaging plan, activities, schedule and budget estimate for the next physical year.

(4) Services Completion Report (10 sets)

Based on the monitoring and evaluation records of the project activities, the consultant shall prepare and submit the services completion report which covers the results of all the project components at the end of the services.

(5) Sample Bid Documents of Modernisation of Irrigation Project (5 sets)

Sample bid documents, to be prepared after the completion of design review/modification of irrigation facilities, and if required PQ documents as well.

(6) Sample Bid Evaluation Report of Modernisation of Irrigation Project (5 sets)

Sample bid evaluation report, to be prepared after the completion of bid evaluation, and if required PQ evaluation report as well.

(7) Sample Construction Check list for Irrigation Project and Manual/Guideline for Safety Control

Sample construction check list, to be prepared in compliance with the government guideline within 3 months after the commencement of the services, shall contain invitation for tender, standard tender documents, criteria and checklist for evaluation, contract negotiations, preparation of contracts and contract awards, etc.

(8) Completion Report for Sample Irrigation Projects

Completion report, to be prepared by the respective contractors within 1 month after the completion of each contract package, shall be reviewed including contract amount and actual payment, contract amendment if any, scope of works, bills of quantities, work schedule and progress, and photographs, etc.

(9) Annual Training Programme

Annual training Programme report, to be prepared annually by the 15th of the following month, shall

contain training details such as overall training plan, respective training subject, schedule, trainees, number of trainers and cost.

(10) Evaluation Report of Training Programme

Evaluation report for trainings, to be prepared annually by the 15th of the following month, shall contain list of training program, cost, number of participants, level of intelligibility, degree of satisfaction, etc.

(11) Environmental Management Plan (5 sets)

Environmental management plan, to be prepared by the PMU within 6 months after the commencement of the project implementation, shall contain objectives, scope, inventory of natural resources, issues related to environmental conservation, risk and mitigation measures, roles of stakeholders, monitoring method, cost, etc..

(12) Environmental Monitoring Plan (5 sets)

Environmental monitoring plan, to be prepared by the PMU annually by the 15th of the following month, shall contain water quality, soil condition, fertilizer application, usage of forest products, etc..

(13) Baseline Survey Report (5 sets)

Baseline survey report, to be prepared annually within 6 month after the commencement of the services, shall contain basic information, cropping pattern and production, marketing and post-harvesting activities, social environmental background, water source and soil condition, to be used as benchmark for terminal impact assessment at the end of the project.

(14) Mid Term Evaluation Survey Report (5 sets)

Annual follow-up survey report, to be prepared annually, by the 15th of the following month, shall contain basic information, cropping pattern and production, incomes, marketing and post-harvesting activities, etc. for the relevant year, to be used as a part of the terminal impact assessment at the end of the project.

(15) Terminal Impact Assessment Report (5 sets)

Terminal impact assessment report, to be prepared 3 months before the completion of the services, shall contain various aspects; basic information, cropping pattern and production, incomes, marketing and post-harvesting activities, social environmental background, water source and soil condition to be used as benchmark for impact assessment at the end of the project.

(16) Other Technical Reports (5 sets)

Technical Reports, as required, should be prepared on the specific technical issues with the aim to enhance and upgrade technical understandings and skill of the executing agencies and managing agency concerned for the project implementation.

7. Obligation of the Executing Agency

A certain range of arrangements and services will be provided by the Executing Agency to the PMC for smooth implementation of the Consulting Services. In this context, the DoWR will:

(1) Report and data

Make available to the Consultant existing reports and data related to the Project.

(2) Cooperation and counterpart staff

Appoint counterpart officials, agent and representative as may be necessary for effective implementation of the Consulting Services;

(3) Assistance and exemption

Use its best efforts to ensure that the assistance and exemption, as described in the Standard Request

for Proposal issued by JICA, will be provided to the Consultant, in relation to

- work permit and such other documents;
- entry and exit visas, residence permits, exchange permits and such other documents
- clearance through customs;
- instructions and information to officials, agent and representatives of the Borrower's Government;
- exemption from any requirement for registration to practice their profession; and
- privilege pursuant to the applicable law in the Borrower's Country.

Attachment 10.3.1 Community Resource Persons

Community Resource Persons (CRP) selection as lead farmers is to assist a WUA in performing its roles and responsibilities. Each WUA will have two CRPs (one man and one woman) across head, middle and tail end. The CRPs will be a literate person, from the WUA area identified by the respective WUAs and trained by the project to perform specific tasks.

The CRPs for Institutional Development activities will be paid a monthly honorarium of Rs. 500/- by the project through the WUA for a period of one year, 50% is to be borne by the project and the other half by the WUA in the second year, and from third year onwards, the honorarium cost to CRPs would be borne by the concerned WUA. After completion of the project, WUA would be paying the CRPs or the member, who would utilize the services on voluntary basis.

The WUA will convene a meeting to identify the CRPs, taking into consideration their educational background and interest in assisting the WUAs.

<p>Selection criteria for CRPs</p>	<ol style="list-style-type: none"> 1. Should be a WUA member or a family member of the WUA member, a practicing farmer and a resident in the village. 2. Should be able to read and write. 3. Should have good relationships with all the WUA members and be willing to work with all of them. 4. Should be willing to give the required time for the job along with his/her time for any other livelihood. 5. Should be available in the village in most of the time 6. Should have basic articulation and communication skills to work with individuals in the village. 7. Should have experience of conducting and participating in WUA meetings.
<p>Roles & Responsibilities</p>	<ol style="list-style-type: none"> 1. Duties CRP (Community mobilization): The CRPs will assist the SO in carrying out community mobilization in the WUA. This will involve the following duties: a) Assisting the WUA in book keeping b) Assist in organizing regular meetings (Managing Committee, Sub-committees and General Body) c) Assist the Support Organization activities like sensitization, village level trainings, and field monitoring activities etc d) Conducting quarterly self assessment by WUAs (PSA) e) Submitting progress reports, etc 2. CRP (Agriculture): In addition to assisting the SO in mobilizing farmers for the agricultural support services activities, the other duties will be: a) Mobilizing farmers for trainings, b) Assisting the WUA in water audit and crop planning, c) Motivating farmers in adoption of new technologies, d) Mobilize farmers for trainings and exposures e) support in marketing of produce by maintaining contacts with traders and market f) publicize market information among the WUA member. 3. CRP (Works & Water management): In addition to assisting the SO in mobilizing farmers for the water management activities, the other duties will be: a) Coordinating the NREGS fund for O&M, b) facilitating communication with relevant engineers and department officers

Attachment 10.3.2 Activities for Capacity Development Support – WUA

1. Capacity Development of Department officers		Responsible org (To be conducted by)	Target (Participants)	Operation (how it shall be implemented)	Contents	Reference materials
1.1 Development of guideline						
1.1.1	Review of existing training module of WUA and preparation of a new guideline and modules (under consultation with a project consultant)	Sub-let to an institution		Sublet to an institution	-Revision of existing training modules (WALAMTARI, APCBTMP), -Prepare training modules and training materials for three level of stakeholders 1) WUAs, 2) supporting SOs, and 3) Department officers (DEE, AEE) -Guidelines, modules, and learning materials to be prepared are mentioned in Attachment 10.3.3	Existing materials for modification mentioned in Attachment 10.3.3
1.1.2	Dissemination and explanation of the Guideline and training modules to at State and District officers	DoWR (state) with resource institutions	PMU, State level DoWR officers, CE Agr Dept (especially in crop planning).	One day workshop at state	-Explanation of the developed guideline and training modules by the institution in charge (the developer of the module) to state level department officers and the chiefs of the district departments -Discussion on roles of department officers on WUA support based on a new guideline -Audio visual of success stories (e.g. PMCBTMP, Maharashtra Waghad project, Gujarat Dharoi project etc)	APCBTMP: https://www.youtube.com/watch?v=TrvuBY1NS50 Maharashtra : https://www.youtube.com/watch?v=QnJbbOvm42M
1.1.3	Dissemination and explanation of the Guideline and training modules to at SEs level	DoWR (District) with resource institutions	SEs at each district Agr officers (especially in crop planning)	One day workshop at each district	-Explanation of the developed guideline and training modules by the institution in charge (the developer of the module) to SE at each departments -Discussion on roles of department officers on WUA support based on a new guideline -Audio visual of success stories (e.g. PMCBTMP, Maharashtra Waghad	

					project, Gujarat Dharoi project etc)	
1.2 Training programmes for department officers						
1.2.1	Preparation of training programme for Dept officers.	DoWR (state)		Internal preparation in DoWR	-Preparation of trainings for DEEs and AEE based on the above prepared module (including arrangement of resource persons) -Arrange the training in consideration of existing programme of department for AEE trainings	
1.2.2	Training of DEE, AEE on WUA development and Support	DoWR (District) with resource persons	DEE, AEE	5 day training at each District	Training contents: -Basic organisation of WUA and orientation of new guideline -Support of Organisational management of WUA -Support and monitoring on Cess collection, revenue generation and financial management -Monitoring of financial management by WUA -Support in water budgeting and crop planning by WUA	APCBTMP ToT Training Module 1 & 2
1.2.3	Training of DEE, AEE on O&M and technical guidance (1) -System for water management recording	DoWR (State) with resource persons	2 DoWR officer form each district and 5 DoWR officers from State	2-3 day training at state headquarters (or a model site) *2 times	Training Contents: 1) Recording storage volume at dam/discharge at headworks (lectures (1 day), exercise (1 day)) 2) Recording flow discharge at canals (lectures (1 day), exercise (2 day))	APCBTMP ToT Training Module 3, 4 & 5
1.2.4	Training of DEE, AEE on O&M and technical guidance (2) -System for Irrigation water management planning	DoWR (State) with resource persons	3 DoWR officer and 3 irrigation advisory board members form each district and 5 DoWR officers from State	4 day training at state headquarters (or a model site) *3 times (once a year after construction)	Training Contents: -Identification of canal portions with high conveyance loss -water balance simulation -preparation of adequate cropping patterns -optimal irrigation plan	

2. Monitoring and capacity development of SOs and Community Resource Persons (CRP)		Responsible org (To be conducted by)	Target (Participants)	Operation (how it shall be implemented)	Contents	Reference materials
<i>Awareness and instruction programmes for SOs. To be conducted by DoWR officers (with support of resource persons)</i>						
2.1	Pre-orientation meeting on project activities	DoWR (District) DIU Consultant	Candidate SOs	A half-day workshop at each district with SOs that are interested in	-Pre-explanatory workshops for the candidate SOs on outline of the project activities and works to be sub-let to the SOs	
2.2	Selection and appointment of SOs	DoWR (District) DIU Consultant		Internal preparation	-Announcement and bidding of SOs based on the proposed criteria	
2.3	Workshop on outline of the project and Basics about agreement, TOR and roles of the SO in the project	DoWR (District) DIU Consultant	SO representative s of the selected SOs	A one-day workshop at each district	-Consultation and explanation on SOs' roles, expected activities -Explanation of the contract, implementation schedule, fund flow management (procedure of the payment), reporting and assessment, etc	
2.4	Training of SO staffs on the Training module for WUA (ToT)	DoWR (District), DIU, with resource persons	SO staffs in charge, and DEE & AEEs in charge	5 day training at each district	-Training on SOs' roles, expected activities/trainings, follow-up activities, (based on the developed module for SOs) -Training on the training module for WUAs (based on the developed module for WUAs) -Reporting system to the project -Collaboration with DoWR engineers	
2.5	Monitoring workshop	DoWR (District)	SO staffs in charge, and DEE & AEEs in charge	1 day workshop * 3times/year in each district	-Preparation and submission of progress monitoring sheet from SOs -Reporting of the progress from Each SO -Discussion on difficulties and constraints faced and their counteractions -Discussion on any administrative	<i>Monitoring indicators in Attachment 10.3.4</i>

					procedures between SO and the DoWR	
2.6	Refresher training / additional training	DoWR (District) with resource persons	SO staffs in charge, and DEE & AEEs in charge	1 day training 3 times (1 training per year)	-Topics of the training shall be decided based on the issues and needs raised in the monitoring workshops	
2.7	Experience sharing workshop	DoWR (District)	SO staffs in charge, and DEE & AEEs in charge	1 day workshop * once a year in each district	-Sharing good experience among SOs -Learning experiences from other SOs	
2.8	Evaluation workshop	DoWR (District)	SO staffs in charge, and DEE & AEEs in charge	One day workshop at the end in each district	-Presentation of the outcome from SOs -Report submission by SOs	
2.9	Training of Community Resource person (CRP)	DoWR (District), DIU with resource persons	Community Resource Persons (6 per medium, 2 per minor)	5 days training in each district	-Roles of CRP -Skills for community workers -Mobilization skills. Co-ordination skills, PRA/RRA Needs. -Self-Assessment. And reporting -IT enabled services and Data Entry. -O&M plans.Training on WUAs functions (All the WUA modules) -Understanding WUA functions. -Book Keeping and water tax collection -Water Audit and Groundwater management. -Crop Planning, New technologies. -Support of WUAs and division of roles	

3. Support and capacity development of WUA		Responsible org (To be conducted by)	Target (Participants)	Operation (how it shall be implemented)	Contents	Reference materials
<i>Capacity building of WUAs to be conducted by SOs</i>						
3.1 Baseline survey		SO			-Baseline survey of command area of each tank -Data compilation and preparation of report	Annex 1(sample contents of baseline survey)
WUA support						
3.2 Initial awareness/preparation						
3.2.1	Orientation meeting on project activities	SO	Villagers in target area	Open gathering at each target village	-Orientation and explanation of outline of the project, activities, target, required participation of farmers,	
3.2.2	Awareness on Irrigation management (Kalajatha)	SO	Villagers in target area	Open gathering at each target village	-Preparation of the story about irrigation management and agriculture activities -Kalajatha play	<i>APCBTMT Karajatha module (Telugu)</i>
3.3 Organisational development support						
3.3.1	Internal preparation for development of the support programmes	SO		Internal preparation	-Arrangement of the training at a site, -Review of contents, preparation of teaching plans and materials	
3.3.2	Training programme (Concept of PIM and WUA institutional management)	SO (with resource persons and DEE AEE)	WUA MC, TC, women members (around 20)	6 day training for each WUA conducted at village	Training programme based on the developed training modules -Concept of PIM -APFMIS Act 1997- -Constitution of WUA and its process, FO at different level -Roles and responsibility of WUAs -Formation of Sub-committees and their roles and functions -Periodical meeting and agendas for discussion -Roles, responsibility, and rights of water users -Water use efficiency / management and irrigation scheduling -Water tax collection and plough back	WALAMTAR I training modules, -APCBTMP Training module for water management para workers, -APCBTMP ToT Training module 1. -Learning materials by APCBTMP in Telugu -Refer to Annex 2 for Gender contents

					-WUAs and its financial resources -Planning (maintenance plan, water budgeting and crop planning -Record maintenance -Effective use of tank water with other stakeholders (including management of illegal water use) -Issues of gender and social inclusion in water management -Climate change and water management	
3.3.3	Follow-up monitoring handholding support after training	SO, AEE	WUAs	Field visit after training (10 times visit)	-Support of establishing the organizational function after training (e.g. • supporting preparing constitutions, • organizing WUA meetings with agendas to be discussed, • record monitoring, • actual management of cess collection etc	
3.3.4	Disseminating workshop of role of water users	WUA MC, SO	WUA general body members	Half-day field workshop	-WUA MC to organize a half-day gathering of the WUA general body members -WUA MC to explain and sensitize on role and responsibilities of water users	
3.4 Fund generation and financial management						
3.4.1	Internal preparation for development of the support programmes	SO		Internal preparation (7 days)	-Preparation of option of activities in consideration of situation and potential of the target area, -Necessary interventions for each possible activity -Arrangement of the training at a site,	
3.4.2	Orientation and option presentation	SO, AEE	WUA general members	Open workshop	-Situation of O&M budget	-APCBTMP Progress review with SO and exit

					<ul style="list-style-type: none"> -Importance of raising WUA's own fund and savings - Entitlement of WUAs to collect fund in APFMIS - Options of the fund generating activities of WUAs e.g. <ul style="list-style-type: none"> • Example 1: Tank lease to fishermen cooperatives • Example 2: Tank bed (foreshore) cultivation • Example 3: Fixed capital investment (e.g. agriculture Implements on hire). 	<p>strategy summary report P4</p> <p>-Refer to the Annex 3 for fund generation activities</p>
3.4.3	Activity material support	SO	WUA		Support for initial investment for the activities	
3.4.4	Support planning of activities by WUA	SO, AEE	WUA MC, TC, women members (around 20)	On-site support (1 time)	<ul style="list-style-type: none"> -Support Organising meeting for planning of fund generating activities -Facilitate in discussion for actual preparation of plan of corpus generation by WUA with activities of their choice 	Refer to the Annex 3 for fund generation example
3.4.5	Skill development trainings for Fund generation activities	SO, AEE	WUA MC, TC, women members (around 20)	On-site support (2 times)	<ul style="list-style-type: none"> -Support of the activities of their choice -Technical instructions of each activity -Management of the activity (who will be in charge, cost/profit, social consideration -Consideration regarding tank structure (avoid damage on irrigation structure) 	
3.4.6	Financial management skill trainings	SO, AEE	WUA MC, TC, women members (Finance sub-committee) (around 20)	One-day training at village (3 times)	<ul style="list-style-type: none"> -Basic financial management skills with proper recording -Assessment of expected revenue (Water tax plough back and WUA's own revenue) and pooling of resources 	WALAMTAR I Module 4

					<p>-Budgeting of O&M activities and other administrative cost</p> <p>-Maintenance of basic financial record (ledger book),</p> <p>-Establishment of an accountable and transparent system (recording, division of roles between officers, approving system, reporting to and monitoring by the general members, auditing of financial statements and approving the same in general body etc.)</p> <p>-Records and book keeping by WUA</p> <p>-Management of corpus fund for O&M (budegeting, estimation and use of the fund for minor maintenance works)</p>	
3.4.7	Handholding support and mentoring	SO	WUA	Periodical site visit (10 times visits)	<p>-Support and monitoring of the financial management</p> <ul style="list-style-type: none"> • Support in revenue assessment, • Support in actual budgeting of O&M based on expected cess, • Monitoring of financial records • Support in establishing accountable system in agreement with the general members, etc <p>-Support prior and periodical consultation to AEE for technical advice in use of tank facilities</p>	
3.5 Maintenance works by WUA						
3.5.1	Internal preparation for development of the support programmes	SO, AEE		Internal preparation (10 days)	<p>-Preparation of the training, site inspection and arrangement of the maintenance works etc.</p>	

3.5.2	O&M Management skill training (Planning and maintenance work management)	SO, AEE, (RDD officer, gram panchayat : for NREGA convergence)	WUA MC, TC, women members Water management sub-committee (around 20)	One-day training at village (3 times)	<ul style="list-style-type: none"> -Ordinal maintenance works to be done by WUA -Judgment and assessment of the minor maintenance works to be done by WUA and major maintenance that requires support of the DoWR -Mobilisation and arrangement of the maintenance works with WUA members -Planning of maintenance works and preparation of monitoring record -Identification of the maintenance works that required support of DoWR -Assessment of the maintenance works together with the Department engineers -Utilisation of NREGS fund (sensitization on Convergence with NREGS) -Application for the maintenance fund -Supervision of the works done by the contractors by WUA 	<ul style="list-style-type: none"> -APCBTMP ToT Training Module 5, -Joint Convergence Guideline' NREGA and Programmes of Water Resources (Ministry of Rural Development)
3.5.3	Orientation and guidance on Maintenance activities by WUA to WUA general body members	SO, AEE, WUA MC	WUA general members	Open workshop at village (1 time)	<ul style="list-style-type: none"> -Awareness raising of importance of O&M by farmers through WUA. (WUA MC members will explain with help of SO and AEE) -Introduction of necessary O&M activities by farmers -Creating understanding on the benefit of the participatory maintenance -Role of WUA and general body members -O&M activities by WUA members (routine maintenance) 	

					<ul style="list-style-type: none"> • Periodical check-up of structures and reporting defects to the Department • Maintenance of sluices gate • clearing of silt and weeds/plants before irrigation • recording of water level, distributed water 	
3.5.4	O&M Technical skill development training (on site)	SO, AEE (technical support by AEE)	WUA general members	On-site practice (3 times)	<ul style="list-style-type: none"> -Actual maintenance works to be organized with WUA members and technical advice shall be given by the engineer (e.g. maintenance of sluice gate, etc) - Instruction on the points for routine check-up / observation for early detection of defects. - Advice on management of the operation and maintenance works by members through the actual experience 	
3.5.5	Handholding support and mentoring on O&M activities	SO	WUA	Periodical site visit (10 times visit)	<ul style="list-style-type: none"> - Monitoring of ordinal works and situation - Monitoring of the monitoring record by WUA 	
3.6 Water budgeting and Agriculture Development Plan (crop planning)						
3.6.1	Internal preparation for the support programmes	SO, AEE, AEOs		Internal preparation (4days)	-Preparation of the training, assessing necessary information for water budgeting and crop planning in a particular target area.	
3.6.2	Training programme on water budgeting and preparation of Agriculture Development Plan (Crop planning)	SO, AEE, AEOs	WUA MC, TC, women members (around 20)	3-day training at village (Two times)	Training Contents <ul style="list-style-type: none"> · Assessment of water availability · Conjunctive use with ground water and assessment of ground water potential · Estimation of water requirement and possible crops to be cultivated 	<ul style="list-style-type: none"> -APCBTMP ToT Training module2 -APILIP I Workbook -Ministry of Water Resources 'General Guidelines for Water Audit

					<ul style="list-style-type: none"> · Preparation of cropping patterns based on the water availability · Collection of water fee based on the cropping patterns and water use · Preparation of Agriculture Development Plan (crop plan) with seasonal M&E (PDCA cycle) 	<p>and Water Conservation</p> <ul style="list-style-type: none"> -Refer to the Annex 4 for sample crop planning -Refer to the Annex 5 for canal rotation model
3.6.3	Support on actual water budgeting and planning practice	SO, AEE, AEOs	WUA general members	On-site practice (actual planning before use of tank) (6 times)	<ul style="list-style-type: none"> -Field assessment of surface and ground water availability -Actual Planning with WUA members with technical advice by AEEs and AEOs -Technical support on assessment of water availability, water requirement, crops to be cultivated based on the water availability, and planning water allocation and distribution -Support in annual planning based on seasonal monitoring and evaluation by WUA members (let WUAs gradually became capable to conduct by themselves) 	
3.7 Optimal use of tank water (collaboration with other stakeholders)						
3.7.1	Internal preparation for development of the support programmes	SO, AEE, Fishery Dept officers, and other relevant department officials.	-	Internal preparation (2 days)	<ul style="list-style-type: none"> -Preparation for the meeting, assessing existing stakeholders (users of the tank, current situation of the use of tank, involvement of all the relevant stakeholders etc). 	
3.7.2	Awareness and orientation workshop on Optimal use of tank water	SO, AEE, Fishery Dept officers, and other relevant department officials.	WUA general members, Fishermen society, other stakeholders who use tank for different purpose	Open workshop at village	<ul style="list-style-type: none"> -Awareness raising of importance of collective management of tank by different stakeholders with different use and purpose 	

					<p>-Analysing water and tank use by different stakeholders</p> <p>-Making consensus and cooperative use of tank between different stakeholders (roles in distribution of water, rule for allowing use of water for different purpose, etc)</p> <p>-Forming a committee (Tank users' committee) consisting of different stakeholders for periodical discussion.</p> <p>-Arrangement for different use and mutual agreement between farming, fishery, livestock rearing activities, and washing.</p> <p>-Management of pumping-up of tank water</p>	
3.7.3	Support periodical meeting among stakeholders	SO	Tank users' Committee	Periodical meeting organized by the committee (6 times = per season)	<p>-Support on organizing periodical meeting</p> <p>-Facilitation in discussion in the meeting (identification of problem, solution, conflict management between different stakeholders)</p>	
3.7.4	Handholding support on actual operation	SO	WUA, Fishermen society, other users of the tank	Periodical site visit (6 times)	<p>-Monitoring amicable share of tank use and maximization of the tank use</p> <p>-Support prior and periodical consultation to AEE for technical advice in use of tank facilities</p> <p>-Activity support e.g. Fishery</p> <ul style="list-style-type: none"> • Prevention of pumping up tank waters further than dead water level, • Respects on fishing period by planning and agreeing period of irrigation and fishing in advance, 	

					<ul style="list-style-type: none"> • Negotiation in period of tank lease for fishing (preferably 3 years instead of 1 year), and amount of lease charge • Structural arrangement for fishing (e.g. making tank in tank (small depression in the tank for aquaculture purpose), inserting net at the sluice gate to avoid releasing fishes through the gate, • Agreement to protect tank water quality for fishing (avoiding excess use of chemical fertilisers and pesticide at the water harvesting area, etc) <p>e.g. Tank bed (foreshore) cultivation</p> <ul style="list-style-type: none"> • leasing foreshore land to landless farmers for cultivation of crops • use of the tank bed for fodder cultivation • necessary consideration in use of tank bed (consultation and technical advice by AEE 	
3.8 Exposure and learning experiences						
3.8.1	Internal preparation for experience sharing and exposure visit	SO, AEE,	-	Internal preparation (5 days)	-Information collection about successful cases, pre-visit for exposure, preparation of programme for experience sharing and exposure visit. -Follow-up after exposure	
3.8.2	Convergence meeting for Sharing of success stories	SO, AEEs,	WUA Chairman and vice chair	One-day workshop at district level	-Requesting WUAs within the project to share their experience with others	

	by farmers organizations.			(3 times = once a year)	-Awarding to WUAs with good performance (as corpus fund for WUA)	
3.8.3	Exposure to successful examples	SO, AEEs,	WUA MC members	3 days exposure visit to successful WUA within AP	-Facilitate learning from successful cases through prepared planning -Sharing the learning and possible application of their leaning to their own WUA	
3.9 Introduction and awareness raising on Government schemes						
3.9.1	Awareness workshop on Government schemes (Convergence meeting)	SO, relevant officers,	WUA general body members and villagers	One-day workshop at village (3 times = Once a year)	-Introduction of available government schemes by relevant government officers (Agriculture, horticulture, fishery, animal husbandry, rural development, marketing and processing related, revenue, microcredit/fund/loans , etc) -Explanation on how to avail the scheme (eligibility, preconditions, necessary preparation,	
3.9.2	Support in applying for the government schemes	SO	Willing farmers, groups	On-site support (15 times= 5 groups per year for 3 years))	-Support in actual preparation for application for the scheme, -Support in preparation to meet requirement for the scheme (e.g. group formation, necessary documentation, collective responsibilities, preparation for cost sharing etc)	
3.10 Refresher training						
3.10	Refresher training / additional training	SO, relevant officers	WUA members and other stakeholders (depending on the contents)	1 day training 3 times (1 training per year)	-Topics of the training shall be decided based on the issues and needs raised in each WUA and irrigation scheme	
3.11 Social Audit Boards						

3.11.1	Election of Social Audit Board (V.O???)	SO, EE, DEE	WUA members under	Half-day meeting	-Orientation on importance of social auditing and its function -Selection and appointment of social auditing board	
3.11.2	Training of the Social Audit Board	SO, DEE, AEE,	Social Auditing Board, WUA members	2 day training	-Roles of Social Auditing Board -Practical session for auditing (auditing of record)	
3.11.3	Practical support of Social Audit Board	SO, DEE, AEE, Social Auditing Board	Social Auditing Board, WUA members	Actual auditing in field, once per season (5 times)	-Support of auditing activities of Social Audit Board with necessary advice	
3.11.4	Consultation meeting to share audit result	SO, DEE, Social Auditing Board	WUA members	Half-day meeting once per season	-Support Social Audit Board and WUA to organize general meeting to share audit result (can be integrated in Annual General Meetings) -Support Social Audit Board to prepare audit report and presentation to the members	

4. Support and capacity development of Project Committee of medium irrigations		Responsible org. (To be conducted by)	Target (Participants)	Operation (how it shall be implemented)	Contents	Reference materials
4.13 Establishment of PC office management and O&M of medium irrigation by PC <i>(4.1-4.11 are same as 3.1-3.10(3.12 is administration provision))</i>						
4.13.1.	Training on Project level management, office management and O&M	SO, EE, DEE, AEEs	PC members and WUA presidents under medium irrigation	3 day training at medium scheme level	<ul style="list-style-type: none"> -Contents -Basic function and roles of PC -Water budgeting and water distribution planning -Conflict management (especially with tail end farmers) -O&M planning with the department and supervision of the works -Financial management (??) -Issues of gender and social inclusion in water management -Setting-up social auditing system (by V.O) 	
4.13.2	Monthly PC meetings	SO, EE, DEE, AEEs	PC members and WUA presidents under medium irrigation	Monthly meeting conducted by PC	<ul style="list-style-type: none"> -Support PC in organizing monthly meeting with agenda setting, -Preparation and monitoring of water release schedule and water use, monitoring of record keeping 	
4.13.3	Project level consultation meetings for water cess with Revenue for reconciliation and issue of water tax proceedings	SO, EE, DEE, Revenue officer, AEO,	DEE, AEO, Revenue Officer, PC	Half-day meeting once per season at Project level	<ul style="list-style-type: none"> -Support PC in organizing the consultation meeting for water cess collection -Assessment of water tax based on availability of water, cropping plan, and water allocation -Making consensus on revenue collection procedure, with assistance of PC and WUAs 	-
4.13.4	Seasonal Water budgeting and Crop Planning for medium irrigation	SO, EE, DEE, AEE, AEOs, KVK	PC members and WUA presidents under medium irrigation	One-day meeting once per season conducted with initiative of PC	<ul style="list-style-type: none"> -Support PC in organizing seasonal water budgeting and planning meeting -Interaction sessions with scientists on crop planning & water management technologies at divisional level by KVKs. (Pre-Seasonal Meeting Activity). -Introduction of Canal Rotation system (refer to the Annex 5) 	Annex 5 for canal rotation model

4.13.5	Seasonal O&M planning meeting	SO, EE, DEE, AEE,	PC members and WUA presidents under medium irrigation	One-day meeting once per season (after season) conducted with initiative of PC	-Support PC in organizing seasonal O&M planning meeting -Assessment of required maintenance activities during off-period -Consultation with DoWR for the proposed major maintenance works -Work allocation and planning among WUAs under medium irrigation for minor maintenance works	-
4.14 Social Audit Boards						
4.14.1	Election of Social Audit Board (V.O???)	SO, EE, DEE	PC members and WUA members under medium irrigation	Half-day meeting	-Orientation on importance of social auditing and its function -Selection and appointment of social auditing board	-
4.14.2	Training of the Social Audit Board	SO, DEE, AEE,	Social Auditing Board, PCmembers	2 day training	-Roles of Social Auditing Board -Practical session for auditing (auditing of record)	-
4.14.3	Practical support of Social Audit Board	SO, DEE, AEE, Social Auditing Board	Social Auditing Board, PCmembers	Actual auditing in field, once per season	Support of auditing activities of Social Audit Board with necessary advice	-
4.14.4	Consultation meeting to share audit result	SO, DEE, Social Auditing Board	PC members and WUA members under medium irrigation	Half-day meeting once per season	-Support Social Audit Board and PC to organize general meeting to share audit result (can be integrated in Annual General Meetings) -Support Social Audit Board to prepare audit report and presentation to the members	-
4.15 Exposure visit						
4.15.1	Internal preparation for experience sharing and exposure visit	SO, EE, DEE	-	Internal preparation	-Information collection about successful cases, pre-visit for exposure, preparation of programme for experience sharing and exposure visit. -Follow-up after exposure	-
4.15.2	External Exposure visit on water management & other activities	SO, EE, DEE,	PC, and WUA MC under medium irrigation	5 days exposure visit to successful WUA in other states	-Facilitate learning from successful cases through prepared planning -Sharing the learning and possible application of their leaning to their own WUA	-

Attachment 10.3.2 Annex 1 Sample Outline of Baseline Survey

WUA

Category	Information to be collected
General information	<ul style="list-style-type: none"> - Social structure of the command area - Geographical information - Number of landholders and tenant farmers - Income level - Resource map (including number of borewells) - Information of different tank users (stakeholders such as fishermen)
General Function of WUA	<ul style="list-style-type: none"> - Number of WUA members (MC and general body members) - Gender ratio of MC and general body members (women membership) - Ratio of tenant farmers in WUA general body members - Average meeting frequency - Sub-committee functions - Record keeping - Saving and corpus fund - Water tax collection and plough back record - Current situation of Social auditing
O&M works	<ul style="list-style-type: none"> - Normal function of the structure - Defunct structure - Repair works conducted (when and what) - Annual cost of O&M works (external fund & WUAs' own budget) - Minor maintenance works conducted by WUA (type of works) - Frequency of maintenance works done (by WUA and constructor) - Frequency of use of NREGS fund and types of maintenance works done - Other funds utilised for maintenance work
Water distribution and agriculture development plan (crop planning)	<ul style="list-style-type: none"> - Water availability in tank and each command area (period of water flow in head, mid, tail reach area) - Tail end reach (frequency) - Current water distribution system/method and decision making system - Areas cultivated with tank water - Areas cultivated with ground water (bore-well) - Recent cropping pattern (past 3-5-years)
Others	<ul style="list-style-type: none"> - Existence of fishermen society - Other community organisations existing with regard to tank use - Frequency of meeting with other stakeholders - Frequency of convergence meeting with different government department

Source: JICA Survey Team

Attachment 10.3.2 Annex 2 Sample contents of the Training of WUA on gender in Activity

Gender Mainstreaming in Participatory Irrigation Management (PIM)

Note: The module has to be prepared (outsourced) or can be borrowed from any organization working on gender integration in water resources.

Module 1: Gender and Participatory Irrigation Management (PIM)

The module should set the platform for a common understanding of basic concepts that are related to gender, gender mainstreaming and PIM. This module would help in facilitating a better understanding of gender issues within the PIM framework, as would also help in promoting PIM; gender integration at different levels i.e., policy, institutional and grassroots.

Module 2: Gender-Sensitive Training Skills

The module will help in recognizing that even the trainer's need skills to manage a gender-sensitive and participatory course. This module will help and should aim to taking the participants through the training cycle. The training module should help / enable the participants an opportunity to share experiences and lessons learned in understanding & managing gender.

Module 3: Mainstreaming Gender in the Project Cycle

The module will help in responding to both the practical and strategic needs of women and men. This module will help a hands-on experiential learning approach and would also provide a checklist and will suggest strategies to enhance better design, implementation, monitoring and evaluation of projects with a gender perspective. This module will further dissect through the collection of sex-disaggregated data and other strategies to generate gender analytical information within the project cycle.

Module 4: Gender Mainstreaming Tools

The module will aim to assist those intending to mainstream gender within their projects with practical tools for situational assessment, analysis and planning. This module will enable and aim at demonstrating, simple, learner-centered, gender and poverty-sensitive participatory tools, that can be used within the policy, program and project levels.

Module 5: Gender Mainstreaming in Organizations and Policy Process

The module will aim at an enabling environment which is mandatory to make gender and poverty sensitive perspectives a norm for different types of organizations. Hence, the module should look at tools for formulating policies and designing or influencing organizations to be gender-sensitive.

Attachment 10.3.2 Annex 3 Sample Contents of the Training of WUA on Fund Generation

Activity 3.4.1 Awareness workshop on fund generation

- Situation of O&M budget
 - Current situation of scarce budget of O&M of irrigation schemes
 - Collection of Water tax, and required estimated maintenance cost
 - Importance of raising WUA's own fund and savings
 - Necessity of available money for minor maintenance and for emergency repair:
If the WUA has their own savings, they can take action immediately on the repair especially in case of emergency, as water users will suffer if they just wait for the fund from government
 - Necessity of availing operation cost:
Management of the organization (WUA) and daily operation of the irrigation scheme cost. Without covering necessary expenses in the operation, the systems cannot function properly.
 - Benefit for water users themselves
Those who suffer from the breakdown of the irrigation system is the water users themselves. Small contribution can ensure sustainable and effective water supply.
 - Entitlement of WUAs to collect fund in APFMIS
 - WUAs are entitled to levy and collect fees under *Section 20 & 22 of the APFMIS Act*
 - The rules of Levy and collection of fees are stated in *Section 25 of the AP Farmers Organisation Rules 1997* (with amendments afterwards)
 - Options of the fund generating activities of WUAs

The followings are possible activities to be conducted by WUAs for fund generations

 - Contribution / membership fee from WUA general body members
 - Fee from aquaculture ponds.
 - Captive tank feeding
 - Water lily cultivation (Minor Tanks).
 - Fixed capital investment (e.g. agriculture Implements on hire)
 - Initiation of micro-hydel projects.
 - Fee from borewells & dugwells.
 - Lease of tank beds (for Sheep & Goat rearing on tank bund, plantation activity on tank beds, community fodder cultivation, etc).
 - Nursery raising activity, during lean season.
 - Promotion of stylohamata (fodder grass variety) for fodder and curb soil erosion.
 - WUA can be a PIA for implementation of MNREGS & Watershed Activities.
 - Commercial plantation activity can be promoted or taken up in catchment area.
-

Activity 3.4.4 Skill development trainings for fund generation activities

Skill development on the fund generation activities of their choice

Example 1: Tank lease to fishermen cooperatives

- effective use of tank resource with different stakeholders and importance of cooperate with other stakeholders
- agreement between fishermen cooperative and WUA
- rules in tank use in consideration of fishery activities e.g.
- limit pumping of water below dead water level to secure water for fishing
- agree on fishing period and not to disturb fishing activities during the period
- agree on the terms of tank lease (better to make for 3 years)
- agreement and implementation of equipping nets at the sluice gates to prevent fishes to be released (and its operation e.g. cleaning of net removing dusts to ensure smooth flow etc)
- limitation of use of agri-chemicals at the up-land area of the tank
- room for negotiation for lease fee

Example 2: Tank bed (foreshore) cultivation

- leasing foreshore land to landless farmers for cultivation of crops
- use of the tank bed for fodder cultivation
- necessary consideration in use of tank bed (consultation and technical advice by AEE)

Attachment 10.3.2 Annex 4

Annual Agricultural Development Plan and Progress after Completion of Construction in Kharif Season

Scheme:

CCA:

Season:

Present Condition 0 year ()				Proposed Condition after Construction																
Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	1st Year ()				2nd Year ()				3rd Year ()								
				Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)					
Total				Total				Total				Total				Total				

Actual

Plan

Progress after Completion of Construction											
1st Year ()				2nd Year ()				3rd Year ()			
Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)
Total				Total				Total			

by Monitoring

Attachment 10.3.2 Annex 5 Canal Rotation Model**Rationale:**

Massive inequity, unevenness in water allocation and distribution is experienced by the group of water users, especially the tail enders. A reform measure is brought in to address the above, making water distribution at the tertiary level more reliable, transparent and equitable. "Canal Rotation" is one of the options as a reform measure.

Intervention of Canal Rotation:

"Canal Rotation" leads to methodical crop planning, much before the onset of the crop season, and the water requests (by the farmers) are collected periodically (as decided by the farmers) by the canal managers to prepare a schedule of water release at all diversion points. The conversion of the water volumes planned for each water course into water turns and duration of each water turn is calculated. This method, will build awareness and consensus among the water users to supervise water distribution.

PRE-SCENARIO	POST-SCENARIO
<i>In most of the irrigation projects, the distributaries are poorly maintained and have no water regulation structures; as a result the outlets are opened and closed manually, many a times, using spades, mud and stones. The water distribution becomes extremely difficult to manage and leads to frequent siltation and bank destruction. The water does not reach the tail end farmers and this accelerates to theft of water and misutilization of water.</i>	<i>Will help to gauge water delivery system, the environment and economic aspects of the production system in a given command area. The reliability of the actual water delivery schedules reflecting the planned or intended irrigation schedules. Water delivery against the specific time requested (timeliness), an extent to which, each farm receives water, according to the irrigation requirement of the crop grown (equity). The equity issue is addressed and the unintended outcome result will be "CESS collection."</i>

Advantages of Canal Rotation

- ✓ The total water demand is regulated by the water users and the water requests are collected every.... By the canal managers (WUAs & concerned engineers) to prepare a schedule of water release at all diversion points.
- ✓ The crop planning is done much before the onset of the crop season.
- ✓ In case of farmers requiring immediate watering, the manager can make to sudden changes to such schedules, of course with the request submission to the higher-level authorities or in case of emergency.
- ✓ The irrigation schedule has to be prepared by the WUA committee, with the assistance of irrigation officials.
- ✓ The model is user based rotational water distribution.
- ✓ Active participation of water users is ensured as the proportional scheduling of full canal flow for rotational delivery to individual outlets.
- ✓ The proposed water distribution method is timed on the duration of water delivery to each water course in the distributary in accordance with crop specific requirements.
- ✓ This model ensures water duty for each water course based on statutory water requirements for each crop grown.
- ✓ WUAs can operate the timing of opening and closing of each outlet.
- ✓ This model helps the WUAs to prepare water course, the local water use plans which are normally prepared annually, based on crop plans (crop type and area sown), canal characteristics (delivery efficiency) and weather forecast.

Operational Strategy

The key interventions planned have to be in phase wise manner.

To perform diagnostic analysis of the problems faced by the farmers.

Initiate meetings and surveys at each watercourse, to rectify problems faced by the farmers.

Build awareness and consensus among the water users to supervise water distribution.

WUA, irrigation officials collect the required technical data on the distributary canal and all its off takes.

The above data should include information on the command and sub-command areas, canal lengths, hydraulic and flow control structures, the no., of water users, temporal flow characteristics, cropping patterns of a particular growing season by each off take, long-term averages for water discharges and water level in the head of the distributary.

WUAs to be mobilized to make technical improvements to their canals; such as siltation, poor maintenance, and unstable flows and unregulated off take diversions.

The farmers can be asked for support for the project to desilt their canals (this can be merged with NREGS work)

The conversion of the water volumes planned for each watercourse into water turns

The duration of each water turn is calculated (concerned AEE & WUA & NGO personnel)

The water turns are transformed into 10-day draft irrigation schedules and the draft schedules to be discussed with WUGs every 10th day of each month throughout the growing season.

As the WUA decides the irrigation turns, irrigation can begin from head or from tail end of the canals.

- *In canal rotation method, the crop planning is done much before the onset of the crop season and the water requests can be collected every..... days/ weeks by the canal managers to prepare a schedule of water release at all diversion points.*
- *In case of farmers requiring immediate watering, the WUA along with concerned officials can make to sudden changes to such schedules, with the request submission to the higher-level authorities or in case of emergency.*

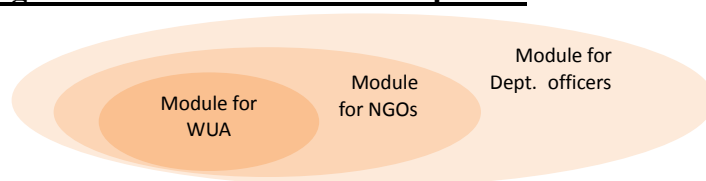
Training topics to be covered to implement Canal Rotation model

<p><u>Training for Irrigation Officials</u></p>	<ul style="list-style-type: none"> ✓ Orientation & Introduction to Canal Rotation Model. ✓ Need for adoption of canal rotation. ✓ Operationalization of canal rotation model. ✓ Theory cum practical classes. ✓ Role of stakeholders participation & coordination in implementation. ✓ Need for crop planning & climate change. ✓ Understanding water course at the Distributary level in the context of crop specific requirements. ✓ Preparation of water plans based on the canal characteristics. ✓ Understanding Water Use Efficiency (WUE) & its calculations.
<p><u>Training for WUAs.</u></p>	<ul style="list-style-type: none"> ✓ Orientation & Introduction to Canal Rotation Model. ✓ Need for adoption of canal rotation. ✓ Operationalization of canal rotation model. ✓ Theory cum practical classes. ✓ Role of stakeholders participation & coordination in implementation. ✓ Need for crop planning & climate change. ✓ Understanding water course at the Distributary level in the context for crop specific requirements. ✓ Preparation of water plans based on the canal characteristics.

	<ul style="list-style-type: none">✓ Understanding Water Use Efficiency (WUE) & its calculations.✓ Duration of water delivery to specific crops.✓ Training on governance & management of canal rotation.✓ Measurement of water discharged through IT enabled services.✓ Increased women's participation in canal rotation model.
--	---

Attachment 10.3.3 Guidelines, Modules and Learning Materials to be Prepared

Coverage of the modules for each component



Sample Table of Contents (ToC) of each training modules

ToC of Training module for WUA

- Awareness on Irrigation management
- Organisational development support
- Fund generation and financial management
- Maintenance works by WUA
- Water budgeting and Agriculture Development Plan (crop planning)
- Optimal use of tank water (collaboration with other stakeholders)
- Exposure and learning experiences
- Introduction of Government schemes and application for the schemes
- Social auditing (establishment of Social auditing board and social auditing activities)
- Establishment of PC office management and O&M of medium irrigation by PC

ToC of Training module for SOs

- 1 Outline of the project activities
 - 1.1 Implementation structure in the project
 - 1.2 Roles of the SOs in PIM development and WUA support
 - 1.3 Expected supporting activities in PIM
 - 1.4 Collaboration with relevant department and Community Resource Person
 - 2 Contract:
 - 2.1 Contents of contract,
 - 2.2 Operation manual,
 - 2.3 Implementation schedule,
 - 2.4 Fund flow management (procedure of the payment),
 - 2.5 Monitoring of activities (internal/external monitoring and monitoring indicators, experience sharing etc.)
 - 2.6 Reporting and assessment
 - 3 Baseline survey and end-line evaluation
 - 3.1 Objective and contents of Baseline survey
 - 3.2 Evaluation (output and outcome of achievement by WUA against the intervention by SOs)
-

- 4 Activities for WUA support in PIM
 - 4.1 Roles and major responsibility of SOs in WUA support
 - 4.1.1 Implementation of training/workshop/meeting programmes (based on the project programme)
 - 4.1.2 Necessary preparation for each training programme
 - 4.1.3 Field monitoring and follow-up visit after training
 - 4.1.4 Assessment of the practice by WUAs and farmers after training
 - 4.2 Contents of the Training Module for WUA
 - 4.2.1 Awareness on Irrigation management
 - 4.2.2 Organisational development support
 - 4.2.3 Fund generation and financial management
 - 4.2.4 Maintenance works by WUA
 - 4.2.5 Water budgeting and Agriculture Development Plan (crop planning)
 - 4.2.6 Optimal use of tank water (collaboration with other stakeholders)
 - 4.2.7 Exposure and learning experiences
 - 4.2.8 Introduction and awareness raising on Government schemes
 - 4.2.9 Refresher training
 - 4.2.10 Establishment of social audit board
 - 4.2.11 Establishment of PC office management and O&M of medium irrigation by PC

ToC of Training module for DoWR engineers

- 1 Roles of department officers on WUA support based on a new guideline
 - 1.1 Basic organisation of WUA and orientation of new guideline
 - 1.2 Support of Organisational management of WUA
 - 1.3 Support and monitoring on Cess collection, revenue generation and financial management
 - 1.4 Monitoring of financial management by WUA
 - 1.5 Support in water budgeting and crop planning by WUATOC
 - 2 O&M technical skills:
 - 2.1 Recording storage volume at dam/discharge at headworks
 - 2.2 Recording flow discharge at canals
 - 2.3 Identification of canal portions with high conveyance loss
 - 2.4 Water balance simulation
 - 2.5 Preparation of adequate cropping patterns
 - 2.6 Optimal irrigation plan
 - 3 Activities for WUA support in PIM
 - 3.1 Contents of the Training Module for WUA
 - 3.1.1 Awareness on Irrigation management
 - 3.1.2 Organisational development support
 - 3.1.3 Fund generation and financial management
-

- 3.1.4 Maintenance works by WUA
- 3.1.5 Water budgeting and Agriculture Development Plan (crop planning)
- 3.1.6 Optimal use of tank water (collaboration with other stakeholders)
- 3.1.7 Exposure and learning experiences
- 3.1.8 Introduction and awareness raising on Government schemes
- 3.1.9 Refresher training
- 3.1.10 Establishment of social audit board
- 3.1.11 Establishment of PC office management and O&M of medium irrigation by PC

Issues to be emphasised in the modules for each target group

Module for WUA:

- Prepared in Local Language
- Simple enough for the people with less education to understand and but with enough information for them to execute activity by referring it.
- Include advice on the issues frequently happening on the ground so that people can refer when they face problem or when they seek for advice.
- Distribute to all the participants in each training programme

Module for SOs:

Important issues / issues to be emphasized in the activities by the Supporting Organisations (NGOs)

- Preparation for the training / spend enough time for preparation
- ✧ Quality of the training highly depends on the preparation
 - What should be prepared before the training:
 - preparation of materials,
 - teaching method,
 - understanding of the target trainees,
 - reviewing the points to be stressed based on the ground situation etc.
- Evaluation of the training and reflect to the following training or activities
- ✧ assess the output of the training and outstanding issues after the training.
- ✧ evaluate understanding of the trainees, and possibility for them to practice after the training
- ✧ forward the outstanding issues to the following activity (review in the following training, instruct in the actual practice)
- Intensive and continuous follow-up and handholding support
- ✧ Training is just starting point and actual activities start after the training. Thus support during actual implementation is more important
- ✧ More learning can happen during actual implementation through struggling and solving problem they face. Therefore, back-support during that time is crucial for them to take up and continue their activities,

Existing training materials for modification and reference materials

- Module/materials for WUA
WALAMTARI 'Water User Association Work Book – Training Module Part 1-7' I&CAD
- Module/materials for Community Resource Person
APCBTMP 'Training module for water management para workers' I&CAD
- Module/materials for SOs
APCBTMP (2009) 'Conducting Training of Tainers – 15-days programme schedules'
I&CAD prepared by STEM
SPD-APCBTMP "Training Material for Training of WUAs and PWs in Civil Works"
Prepared by STEM – Centre for Symbiosis of Technology, Environment & Management,
Bangalore, on behalf of SPD-APCBTMP;
 - Training Module 1: Joint Ajmoish – Demand raising & Collection of Water Charge
 - Training Module 2: Water Budgeting & Crop planning
 - Training Module 3: Works Management
 - Training Module 5: Operation and Maintenance of TanksWALAMTARI 'Water User Association Work Book – Training Module Part 1-7' I&CAD
'Joint Convergence Guideline' Ministry of Rural Development (NREGA) and Ministry of
Water Resources
- Module/materials for Dept officers
SPD-APCBTMP "Training Material for Training of WUAs and PWs in Civil Works"
Prepared by STEM – Centre for Symbiosis of Technology, Environment & Management,
Bangalore, on behalf of SPD-APCBTMP;
 - Training Module 1: Joint Ajmoish – Demand raising & Collection of Water Charge
 - Training Module 2: Water Budgeting & Crop planning
 - Training Module 3: Works Management
 - Training Module 4: Supervision of Civil Works, Quality Control and SEM forms 4&6
 - Training Module 5: Operation and Maintenance of Tanks

Attachment 10.3.4 Monitoring Indicators for Supporting Organization based on the Outputs & Outcomes of the project

Achievement and evaluation of the SO's performance shall be judged based on the output of their activities as well as outcome as WUA's activities and farmer's situation. The followings are sample indicators to assess performance.

Activities / intervention	Output (quarterly)	Outcome (yearly)
Institutional Management	<ul style="list-style-type: none"> ➤ No., of trainings conducted against planned (supposed to conduct based on the ToR). ➤ No., of regular meetings held. ➤ No., of WUA and relevant stakeholders received training. ➤ No. of WUAs formed subcommittees ➤ No. of WUAs started records (activity, minutes, financial) ➤ No., of women in WUA MC ➤ Establishment of social auditing board 	<ul style="list-style-type: none"> ➤ WUAs conducting meetings without the support of SOs. ➤ Increased number of women/men participation in elections and meetings. ➤ Maintenance of records by WUAs ➤ Elected women representatives ➤ WUA operate in accountable and transparent manner (members are aware of management decision, financial situation, etc) ➤ Periodical social auditing and presentation to general body members ➤ Payment of remuneration of Community Resource person from WUA
Water tax collection	<ul style="list-style-type: none"> ➤ No., of relevant trainings conducted against planned (supposed to conduct based on the ToR). ➤ Field survey for water tax collection is conducted ➤ WUA assist water tax collection in collaboration with revenue officers ➤ Meetings with relevant officers including revenue officers are conducted 	<ul style="list-style-type: none"> ➤ Improved understanding and willingness of paying water tax among users ➤ Improvement of actual amount water tax collected ➤ Improved utilization of water tax plough back for O&M works
Corpus fund / fund generation activities	<ul style="list-style-type: none"> ➤ No., of trainings conducted against planned (supposed to conduct based on the ToR). ➤ No. of WUAs started activities for fund generation ➤ The amount of corpus fund generated ➤ Record of the fund generation (ledger of income and expenses) 	<ul style="list-style-type: none"> ➤ Continuity of Corpus fund generation activities of each WUA. ➤ Cost of rehabilitation borne from corpus fund. ➤ Accountable financial management of their fund
O&M of irrigation structure	<ul style="list-style-type: none"> ➤ No., of O&M trainings conducted against planned (supposed to conduct based on the ToR). ➤ No. of monitoring visit for O&M ➤ No., of WUAs with O&M Plans. ➤ Identifying areas and structures to be rehabilitated. ➤ Measures taken by WUAs to improve efficiency of O&M procedures. ➤ Volume of rehabilitation works completed. ➤ Utilization of available schemes such as NREGS for O&M works 	<ul style="list-style-type: none"> ➤ Increased frequency of maintenance works. ➤ Operational problems addressed promptly and adequately. ➤ Time take to repair major breakdowns. ➤ Reduced gaps between existing and desired levels of O&M performance. ➤ Reduction in water logging and salinity problems. ➤ No., of WUA members who actively participated in O&M activities. ➤ Water distribution efficiency (water reach to tail end based on the availability of water) ➤ Increased communication with Department engineers for O&M issues ➤ Application of available funds for O&M with initiative of WUAs

Activities / intervention	Output (quarterly)	Outcome (yearly)
Water budgeting and crop planning	<ul style="list-style-type: none"> ➤ No., of water budgeting and crop planning trainings conducted against planned (supposed to conduct based on the ToR). ➤ No. of WUAs preparing crop plan ➤ Frequency of crop plan monitoring and evaluation meeting 	<ul style="list-style-type: none"> ➤ Water budgeting and crop planning prepare with initiative of WUAs without support of the SOs ➤ Technical consultation with relevant line departments ➤ Result of the seasonal evaluation of water budgeting and crop planning ➤ Improvement of water distribution and efficient use of water ➤ Improvement of crop yield due to crop planning ➤ Increase in amount of water reaching to the tail end (Improved equity of water distribution to end farmers) ➤ Reduced conflict between head reach and tail end
Optimal use of tank resources	<ul style="list-style-type: none"> ➤ No., of relevant trainings conducted against planned (supposed to conduct based on the ToR). ➤ Participation of other stakeholders in the meetings ➤ Discussion made between different users of the tank resources and the results of the discussion ➤ Convergence meetings with line departments & linkages with WUAs 	<ul style="list-style-type: none"> ➤ Action taken to improve efficient use of tank resource ➤ Improved equal use of tank resources between different stakeholders

4 Capacity development of WUA for Medium irrigation (to be implemented by NGOs)									
For WUA under medium irrigation									
4.1	Baseline Survey on the WUA comand area	WUA	20	1					20
WUA support									
4.2 Initial awareness/preparation									
4.2.1	Orientation meeting on project activities	WUA	1	1					1
4.2.2	Awareness on irrigation management (Kalasha)	WUA	1	1					1
4.3 Organisational development support									
4.3.1	Internal preparation for development of the support programmes	PC	1	5					5
4.3.2	Training on concept of PIM and WUA institutional management	WUA	6	1		WALMART Training module (6 modules)			6
4.3.3	Follow-up monitoring handholding support after training	WUA	1	10					10
4.3.4	Dissemination workshop of roles of water users	WUA	1	1					1
4.4 Fund generation and financial management									
4.4.1	Internal preparation for development of the support programmes	PC	1	7					7
4.4.2	Orientation and option presentation	PC	1	1					1
4.4.3	Activity material support	WUA	2	1					2
4.4.4	Support planning of activities by WUA	WUA	1	1					1
4.4.5	Skill development trainings: Fund generation activities	WUA	1	2					2
4.4.6	Financial management skill trainings	WUA	1	3					3
4.4.7	Handholding support and mentoring	WUA	1	10					10
4.5 Maintenance works by WUA									
4.5.1	Internal preparation for development of the support programmes	PC	1	10					10
4.5.2	O&M Management skill training (planning and maintenance work management)	WUA	1	3					3
4.5.3	Orientation and guidance on maintenance activities by WUA to UW general body members	WUA	1	1					1
4.5.4	O&M Technical skill development training (on site)	WUA	1	3					3
4.5.5	Handholding support and mentoring on O&M activities	WUA	1	10					10
4.6 Water budgeting and preparation of Agriculture Development Plan (crop plan)									
4.6.1	Internal preparation for the support programmes	PC	2	2					4
4.6.2	Training programme on water budgeting and crop planning	WUA	3	2					5
4.6.3	Support on actual water budgeting and planning practice	WUA	1	6		per season for 3years			6
4.7	Optimal use of tank water (collaboration with other stakeholders)								
4.7.1	Internal preparation for development of the support programmes	PC	2	1					2
4.7.2	Awareness and orientation workshop	WUA	1	1					1
4.7.3	Support periodical meeting among stakeholders	WUA	1	6		per season for 3years			6
4.7.4	Handholding support on actual operation	WUA	1	6					6
4.8 Exposure and learning experiences									
4.8.1	Internal preparation for experience sharing and exposure visit	PC	5	1					5
4.8.2	Sharing of success stories by farmers organizations.	PC	1	3		once a year			3
4.8.3	Exposure to successful examples	PC	3	1					3
4.9 Introduction and awareness raising on Government schemes									
4.9.1	Awareness Workshop on Government schemes	WUA	1	3		Once a year			3
4.9.2	Support in applying for the government schemes	WUA	1	15		5 groups per year * 3 years			15
4.10 Refresher training									
4.10	Refresher training / additional training	WUA	1	3		Once a year			3
4.11 Social Audit Boards									
4.11.1	Election of Social Audit Board (V O/SHG)	WUA	1	1					1
4.11.2	Training of the Social Audit Board	WUA	2	1					2
4.11.3	Practical support of Social Audit Board	WUA	1	5		once a year (per season) * 5 years			5
4.11.4	Consultation meeting to share audit result	WUA	1	3		once a year * 3years			3
4.12 Administrative costs									
4.12	Administrative Works of NGO (including cost for participating the training for NGP provided by the project)	PC	1	1		R 5			1
For Support and Capacity Development of PC									
4.13 Establishment of PC office management and OSM of medium irrigation by R									
4.13.1	Training on Project level management, office management and O&M	PC	3	1					3
4.13.2	Monthly PC meetings	PC	1	12					12
4.13.3	Project level consultation meetings for water cess with Revenue for reconciliation and issue of water tax proceedings	PC	1	3		once a year * 3years		before start	3
4.13.4	Seasonal Water budgeting and Crop Planning for medium irrigation	PC	1	6		2 meetings in a year * 3 years			6
4.13.5	Seasonal O&M planning meeting	PC	1	7		2 meetings in a year * 3.5 years			7
4.14 Social Audit Boards									
4.14.1	Election of Social Audit Board (V O/SHG)	PC	1	1					1
4.14.2	Training of the Social Audit Board	PC	2	1					2
4.14.3	Practical support of Social Audit Board	PC	1	5		once a year (per season) * 5 years			5
4.14.4	Consultation meeting to share audit result	PC	1	3		once a year * 3years			3
4.15 Exposure visit									
4.15.1	Internal preparation for experience sharing and exposure visit	PC	5	1					5
4.15.2	External Exposure visit on water management & other activities	PC	5	1					5

Attachment 10.3.6 Waghad Model, Nashik District, Maharashtra.

To address efficient water management along with participatory approach, waghad model can be taken as one of the optional models to be piloted. In order to replicate it in AP context, adequate customization is necessary. Possible customization to be implemented as a pilot is indicated below.

Case study of Waghad irrigation scheme

PRE-PIM SCENARIO	POST-PIM SCENARIO
<p><i>The scheme was commissioned in year 1981; it is located in drought prone, tribal region of Nashik District, Maharashtra. The scheme caters to the needs of a good number of small farmers; 15926, who have an average land holding size of 0.50 to 1.0 hac. The scheme has a total Cultivable Command Area (CCA) of 9642 hac and the problem identified was that only 3212 hac of command area was getting irrigated and tail end farmers were deprived of irrigation water. The tail end had CCA of 1151 ha., and there was hardly 100 ha., which was irrigated and farmers were cultivating seasonal food crops, predominantly sorghum.</i></p>	<p><i>The water began to reach the tail end farmers of the command and trust was reinstated in the concept of PIM, there has been freedom of cropping pattern, leading to high yielding crops making command farmers financially sound. Due to PIM intervention the farmers average income per hectare varied from Rs. 2800 to Rs. 1,70,000/-. The farm labour employment increased from two months to 10 months in a year. Farmers, have diversified their crops from grapes to poly houses, nearly there are 200 poly houses in the command area. With the implementation of PIM from 2005, the average area irrigated increased from 8,393 ha to 9,745 ha, water receiving improved up to 30%, percentage of recovery of water charges raised from 72% to 100%, flood irrigation dropped from 75% to 60%, and drip and sprinkle raised from 25 % to 40%, and the net average income per Ha raised from Rs.80,000 to Rs.120,000</i></p>

PIM INTERVENTION in Waghad scheme

In 1990, a local Civil Society Organization (CSO) in collaboration with the State Irrigation Department took to initiation of PIM in Waghad Irrigation Scheme. Key steps involved the following; a) identification of the problem of tail end farmers; b) PIM as an intervention and local CSO providing handholding support; c) motivation of tail end farmers to form into WUAs; d) formation of 3 WUAs in tail end of the command area; e) replication of the tail end WUAs in other reaches of the command area, resulting in formation of 24 WUAs on entire command area in the scheme.

Farmers played a key role as, PIM is a long drawn process, farmers resurfaced as WUA with the resurgence concept of PIM. CSO played a key role in providing handholding support over a span of more than a decade, by motivating farmers to bridge the gap between farmers and the government machinery, more role of a catalyst. Government unrelenting support to strengthen the PIM tradition in the form of WUA continued and the government agreed to volumetric base water entitlements to farmers to be given through WUA (law provision made). Lastly, role of WALMI, continuously provided water literacy and gave the determinant their entitlement based irrigation water quotas.

Major feature of Waghad model

The key function of PLWUA in this project is the bulk volumetric supply of water to WUAs (24Nos) as per their quota entitlement based on cultivable command area. The key feature is as follows.

- The Canal Officer shall provide measuring devices and maintains them.
- The Department allocate water to FOs at the head regulator on volumetric basis and raises bill to the Project Level Association accordingly. Rate
For Khariff: Rs. 25 / 1000m³
For Rabi: Rs.50 / 1000 m³
For hot water crop: Rs.75 / 1000 m³
- The FOs are free to determine the rate to be paid by the farmers, which are usually 25 % higher than the rates payable by them to the Canal Officer.
- The FOs have to pay the water bill to the canal officer as per the time schedule. And WUAs that pay the water bill in time are given a rebate of 5%.
- Every WUA member is given Water Quota or Entitlement Certificate which entitle him to take water from the system and even sell his quota if he does not require it.
- The WRD and WUA staff jointly measure canal flow twice a day to ensure that the WUAs receive their assured entitlements.
- WUAs are empowered to appoint Secretary on contract basis each year with a monthly remuneration ranging from Rs.3000 to Rs.5000 and his continuation depends on his performance.
- Water rates are collected by the WRD only and Revenue Department has no role in this regard
- In order to make the farmers to adapt the system of volumetric supply and measurement, continuous training programmes are organized at WALMI duly involving agriculture and social service experts.

Application of Waghad model in AP context

Rationale: The need for piloting Waghad model is to increase efficient water management system, as the state has been experiencing recurring droughts in past few years. Adapting to the advanced better management of water systems, will increase crop production and finally lead to farmer owned process and action.

Application strategy:

The customization is necessary to apply the Waghad model in Andhra Pradesh as the cropping pattern starts with onset of monsoon on first week of June, whereas in case of Maharashtra, the cropping pattern begins in month of October, when the monsoon starts receding. Thus, pre-paid CESS by farmers in AP stands insignificant. However, CESS through volumetric count of water supply to each farmer can be enforced, through the above customization mentioned.

The following customization can be proposed to Waghad Model, to be piloted in the context of State of Andhra Pradesh.

- Joint assessment of water inflows, into MI tank to be undertaken both by the concerned MI tank Assistant Executive Engineer (AEE) and the respective Water User Association (WUA).
- Water release plan to be jointly done both by the concerned MI tank AEE and respective WUA and submit to District Irrigation Advisory Board (DIAB) for approval of the plan.
- Onset of kharif season (tentatively by 2nd week of June), the concerned WUA and AEE, call for release of water.
- Recording of water released at CTF* to be recorded by the concerned AEEs, WUAs, Waterman at respective CTFs.
- Software to be developed for data entry and processing.

It is the state government policy, that CTFs have to be constructed across all the projects, however, it has been noted (ref., to APCBTMB) due to poor construction & faulty construction (by the contractors) followed by poor supervision by the engineers the “real purpose of CTFs” has taken a defeat!! Therefore, imparting training and

capacity building to irrigation officials and farmer's Community Resource Persons (CRP) would have long term significant impact on "water use efficiency, O&M, CESS collection."

Training needs in application of Waghad model in Andhra Pradesh State

<p><u>TRAINING NEEDS:</u> <u>Irrigation Officials</u></p>	<ol style="list-style-type: none"> 1. Need for adoption of new technologies in water management. 2. Case study of Maharashtra: Better water management systems; Waghad Model. 3. Need for shift from fixed amount of CESS to volumetric count of water supplied to farmers. 4. Methodology involved in measuring water through CTFs. 5. Co-ordination and role of different stakeholders; Irrigation Officials, WUAs and waterman. 6. <u>Monitoring & follow up of the training imparted through field visits.</u>
<p><u>TRAINING NEEDS:</u> <u>WUA, CRP & Waterman</u></p>	<ol style="list-style-type: none"> 1. Droughts, famines and need for adoption of new technologies in water management. 2. Case study of Maharashtra: efficient water management systems; Waghad Model. 3. Need and necessity for shift from fixed amount of CESS to volumetric count of water supplied to farmers. 4. Methodology involved in measuring water through CTFs. 5. Importance of co-ordination and role of different stakeholders; irrigation officials, WUAs and waterman 6. <u>Need for payment of CESS based on volumetric count of water for efficient water management.</u>

**It is also, proposed, that local NGO, which had piloted the waghad model should be called for "resource" for customization of the model in the context of Andhra Pradesh State.*

Attachment 10.3.7 No. of WUAs and Land Holders by Medium Irrigation Projects

Sl. No.	Name of the Project	District	Command Area (ha)	Nos. of WUAs	No. of Land Holders	Batch	Mandal
1	Peddankalam	Vizianagaram	3,113	6	3,538	1	Seethanagaram & Balijipeta
2	Vottigedda	Vizianagaram	6,746	9	12,267	1	J.M.Valasa
3	Vengalraya Sagaram	Vizianagaram	9,996	10	15,220	1	Salur
4	Peddagadda Reservoir	Vizianagaram	4,858	6	8,912	2	Pachipenta
5	Andra reservoir	Vizianagaram	3,603	6	3,000	2	Mentada
6	Torrigedda Reservoir	East Godavari	6,002	5	2,100	1	Sithanagaram
7	Tammileru Reservoir	West Godavari	3,713	6	4,312	1	Chinthalapudi
8	Mopadu reservoir	Prakasam	5,147	6	7,000	1	Pamuru
9	Veeraraghavani Kota Anicut (DS)	Prakasam	2,267	5	1,852	2	Lingasamudram
10	Krishnapuram	Chittoor	2,481	5	3,500	1	Karvetinagaram
11	Araniar	Chittoor	2,228	5	4,085	1	Pichatur Mandal
12	Buggavanka	Kadapa	5,200	5	4,400	2	C. K. Dinne
13	Upper Pennar	Ananthapur	4,069	5	3,140	1	Ramagiri
14	Pennakumudavathi	Ananthapur	2,479	5	1,642	1	Parigi
16	Maddigedda Reservoir.	East Godavari	1,214	1	1,200	2	Addateegala
17	DR-DM Project	Nellore	10,117	20	20,000	1	Dagadathi
18	Narayanpur	Srikakulam	15,006	25	11,538	2	Burja
19	Muniyeru Irrigation Project	Krishna	6,648	9	1,120	1	Vatsavai
20	Raiwada	Visakhapatnam	6,111	10	10,230	2	Devarapalli
21	Siva Bhashyam Sagar	Kurnool	4,897	6	7,250	2	Kothapalle
Total			105,895	155	126,306		

Source: JICA Survey Team

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (1/13)

District: Srikakulam

Code	Mandal Name	Irrigation Scheme		DOA					DOH		
		Medium	Minor	AO	AEO	MPEO	NGO*1	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Veeraghattam		0				1		5		
2	Vangara		1						7		
3	Regidiamadala Valasa		1						0		
4	Rajam		1						7		
5	Ganguvari Singadam		2						7		
6	Laveru		5					1	8		1
7	Ranastalam		4						8		
8	Hetcherla		2						3		
9	Ponduru		2						8		
10	Santhakaviti		1						7		
11	Burja	1	0					6	4		6
12	Palakonda		2						5		
13	Seethampeta		0				1		6		
14	Bhamini		0						6		
15	Kothuru		0				1		6		
16	Hiramandalam		0						13		
17	Sarubujili		4						4		
18	Amadalavalasa		0						4, 5		
19	Srikakulam		8					1	0		1
20	Gara		2						0		
21	Polaki		1						15		
22	Narasannapeta		4						13, 15		
23	Jalumuru		3						15		
24	Saravakota		2						15		
25	Pathapatnam		11					2	13		2
26	Meliaputti		6					1	11		1
27	Tekkali		1						14		
28	Kotabommali		4						14		
29	Santha Bommali		1						14		
30	Nandigam		7					1	12		1
31	Vajrapu Kothuru		0						12		
32	Palasa		0						12		
33	Mandasa		2						11		
34	Sompeta		1						11		
35	Kanchili		1						9		
36	Kaviti		0						9		
37	Ichchapuram		1						9		
	Total	1	80	46	71	146	3	12	14	-	12
	Total of Mandals		27						34	-	

Note: NGO*1: Recommended for Comprehensive Revival of Millets Programme

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (2/13)

District: Vizianagaram

Code	Mandal Name	Irrigation Scheme		DOA				DOH			
		Medium	Minor	AO	AEO	MPEO	NGO*1	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Komarada		0						10	1	
2	Gummalakshampuram		0				1		9	1	
3	Kurupam		0				1		9	1	
4	Jiyammavalasa	1	0					2	9	1	2
5	Garugubilli		3						10	1	
6	Parvathipuram		5					1	10	1	1
7	Makkuva		2						12		
8	Seethanagaram	1	0					1	12		1
9	Balajipeta		7					1	12	1	1
10	Bobbili		0						14		
11	Salur	1	2					2	11	1	2
12	Pachipenta	1	0					1	11	1	1
13	Ramabhadrapuram		0						13	1	
14	Badangi		2						14	1	
15	Therlam		3						14	1	
16	Merakamudidam		1						13	1	
17	Dattirajeru		0						13	1	
18	Mentada	1	4					1	2	1	1
19	Gajapathinagaram		4						2	1	
20	Bondapalle		4						3	1	
21	Gural		2						5		
22	Garividi		3						5	1	
23	Cheepurupalle		2						5	1	
24	Nellimarla		2						3	1	
25	Pusapatirega		3						4		
26	Bhoghapuram		0						4	1	
27	Denkada		3						4		
28	Vizianagaram		5					1	3	1	1
29	Gantyada		0						6		
30	Srungavarapukota		0						6	1	
31	Vepada		1						6	1	
32	Lakkavarapukota		4						7	1	
33	Jami		1						7	1	
34	Kothavalasa		0						7	1	
Total		5	63	48	95	155	2	10	12	27	10
Total of Mandals			21						34	34	

Note: NGO*1: Recommended for Comprehensive Revival of Millets Programme

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (3/13)

District: Visakhapatnam											
Code	Mandal Name	Irrigation Scheme		DOA					DOH		
		Medium	Minor	AO	AEO	MPEO	NGO*1	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Munchingiputtu		0						9		
2	Pedabayalu		0				1		9		
3	Hukumpetau		0				1		9		
4	Dumbriguda		0				1		9		
5	Arakuvalley		0				1		9		
6	Ananthagiri		0				1		9		
7	Devarapalle	1	5					3	8		3
8	Cheedikada		1						6		
9	Madugula		12					2	7		2
10	Paderu		0				1		0		
11	Gangaraju Madugula		0						0		
12	Chintapalle		0				1		0		
13	Gudemkothaveedhi		0						0		
14	Koyyuru		0				1		0		
15	Golugonda		0						0		
16	Nathavaram		0						0		
17	Narsipatnam		0						0		
18	Rolugunta		0						0		
19	Ravikamatham		0						7		
20	Butchayyapeta		6					1	6		1
21	Chodavaram		6					1	6		1
22	K Kotapadu		20					4	8		4
23	Sabbavaram		0						3		
24	Pendurthi		0						3		
25	Anandapuram		0						4		
26	Padmanabham		0						4		
27	Bheemunipatnam		0						4		
28	Visakhapatnam		0						4		
29	Visakhapatnam (U)		0						2		
30	Gajuwaka		0						3		
31	Pedagantyada		0						3		
32	Paravada		0						3		
33	Anakapalli		0						5, 10		
34	Munagapaka		0						5		
35	Kasimkota		0						5		
36	Makavarapalem		0						0		
37	Kotauratla		0						0		
38	Payakaraopeta		0						0		
39	Nakkapalli		0						0		
40	S. Rayavaram		0						0		
41	Yelamanchili		0						0		
42	Rambilli		0						0		
43	Atchutapuram		0						0		
Total		1	50	72	65	162	8	11	10	-	11
Total of Mandals			6						26	-	

Note: NGO*1: Recommended for Comprehensive Revival of Millets Programme

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (4/13)

District: East Godavari

Code	Mandal Name	Irrigation Scheme		DOA				DOH			
		Medium	Minor	AO	AEO	MPEO	NGO*1	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Maredumilli		0				1		8		
2	Y Ramavaram		0						1		
3	Addateegala	1	7					1	0		1
4	Rajavommangi		0						0		
5	Kotananduru		0						2		
6	Tuni		0						2		
7	Thondangi		0						2		
8	Gollaprolu		0						7		
9	Sankhavaram		0						8		
10	Prathipadu		0						8		
11	Yeleswaram		0						1		
12	Gangavaram		2						1		
13	Rampachodavaram		0						8		
14	Devipatnam		0				1		8		
15	Seethanagaram	1	2					1	3		1
16	Korukonda		11					2	3		2
17	Gokavaram		0						4		
18	Jaggampeta		0						4		
19	Kirlampudi		0						4		
20	Peddapuram		0						1		
21	Pithapuram		0						7		
22	Kothapalle		0						7		
23	Kakinada(Rural)		0						1		
24	Kakinada(Urban)		0						1		
25	Samalkota		0						1		
26	Rangampeta		0						7		
27	Gandepalle		0						4		
28	Rajanagaram		3						3		
29	Rajahmundry(Rural)		0						2		
30	Rajahmundry (Urban)		0						2		
31	Kadium		0						2		
32	Mandapeta		0						2		
33	Anaparthi		0						7		
34	Biccavolu		0						7		
35	Pedapudi		0						1		
36	Karapa		0						1		
37	Thallarevu		0						5		
38	Kajuluru		0						1		
39	Ramachandrapuram		0						1		
40	Rayavaram		0						1		
41	Kapileswarapuram		0						0		
42	Alamuru		0						2		
43	Atreyapuram		0						5		
44	Ravula Palem		0						5		
45	Pamarru		0						0		
46	Kothapeta		0						5		
47	P Gannavaram		0						6		
48	Ambajipeta		0						6		
49	Ainavilli		0						5		
50	Mummidivaram		0						5		
51	I.Polavaram		0						5		
52	Katrenikona		0						5		
53	Uppalaguptam		0						6		
54	Amalapuram		0						3, 6		
55	Allavaram		0						6		
56	Mamidikuduru		0						0		
57	Razole		0						9		
58	Malikipuram		0						9		
59	Sakhinetipalle		0						9		
	Total	2	25	82	93	199	2	4	17	-	4
	Total of Mandals		5						54	-	

Note: NGO*1: Recommended for Comprehensive Revival of Millets Programme

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (5/13)

District: West Godavari

Code	Mandal Name	Irrigation Scheme		DOA					DOH		
		Medium	Minor	AO	AEO	MPEO	NGO	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Jeelugumilli		0						1		
2	Buttayagudem		0						0		
3	Polavaram		0						0		
4	Thallapudi		0						0		
5	Gopalapuram		0						0		
6	Koyyalagudem		0						0		
7	Jangareddigudem		0						6		
8	T.Narasapuram		0						5		
9	Chintalapudi	1	9					3	4		3
10	Lingapalem		6					1	4		1
11	Kamavarapukota		0						5		
12	Dwarakatirumala		0						0		
13	Nallajerla		0						0		
14	Devarapalle		0						0		
15	Chagallu		0						0		
16	Kovvur		0						0		
17	Nidadavole		0						0		
18	Tadepalligudem		0						0		
19	Unguturu		0						0		
20	Bhimadole		0						0		
21	Pedavegi		3						3		
22	Pedapadu		0						2		
23	Eluru		0						2		
24	Denduluru		0						2		
25	Nidamaru		0						0		
26	Ganapavaram		0						0		
27	Pentapadu		0						0		
28	Tanuku		0						0		
29	Undrajavaram		0						0		
30	Peravali		0						0		
31	Iragavaram		0						0		
32	Attili		0						0		
33	Undi		0						8		
34	Akiveedu		0						8		
35	Kalla		0						8		
36	Bhemavaram		0						8		
37	Palakoderu		0						8		
38	Veeravasaram		0						8		
39	Penumantra		0						0		
40	Penugonda		0						0		
41	Achanta		0						0		
42	Poduru		0						8		
43	Palacole		0						8		
44	Yelamanchili		0						8		
45	Narasapuram		0						8		
46	Mogalthur		0						8		
	Total	1	18	83	76	254		4	8	-	4
	Total of Mandals		3						21	-	

Note:

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (6/13)

District: Krishna

Code	Mandal Name	Irrigation Scheme		DOA					DOH		
		Medium	Minor	AO	AEO	MPEO	NGO	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Jaggayyapeta		3						0		
2	Vatsavai	1	4					2	0		2
3	Penuganchiprolu		2						0		
4	Nandigama		1						0		
5	Chandarlapadu		2						0		
6	Kanchika Cherla		2						0		
7	Veerullapadu		2						0		
8	Ibrahimpatnam		0						0		
9	G Konduru		0						0		
10	Mylavaram		1						4	1	
11	A Konduru		0						0		
12	Gampalagudem		0						0		
13	Tiruvuru		0						0		
14	Vissannapet		0						0		
15	Reddigudem		0						4	1	
16	Vijayawada Rural		1						3		
17	Vijayawada Urban		0						1, 3		
18	Penamaluru		0						3		
19	Thotlavalluru		0						0		
20	Kankipadu		0						0		
21	Gannavaram		0						2	1	
22	Agripalle		0						2		
23	Nuzvid		0						0		
24	Chatrai		1						0		
25	Musunuru		0						0		
26	Bapulapadu		0						5	1	
27	Unguturu		0						5		
28	Vuyyuru		0						6		
29	Pamidimukkala		0						6		
30	Movva		0						7		
31	Ghantasala		0						7		
32	Challapalli		0						7		
33	Mopidevi		0						8		
34	Avanigadda		0						8		
35	Nagayalanka		0						8		
36	Koduru		0						8		
37	Machilipatnam		0						8		
38	Gudur		0						7		
39	Pamaru		0						7		
40	Pedaparupudi		0						6		
41	Nandivada		0						6		
42	Gudivada		0						7		
43	Gudivalleru		0						7		
44	Pedana		0						8		
45	Bantumilli		0						8		
46	Mudinapalli		0						7		
47	Mandavalli		0						6		
48	Kaikalur		0						6		
49	Kalidindi		0						7		
50	Kruthivennu		0						8		
	Total	1	19	77	81	306		2		4	2
	Total of Mandals		10						32		

Note:

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (7/13)

District: Guntur

Code	Mandal Name	Irrigation Scheme		DOA					DOH		
		Medium	Minor	AO	AEO	MPEO	NGO	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Macherla		1						18	0	
2	Rentacrintala		0						0	0	
3	Gurazala		0						16	0	
4	Dachepalle		1						16	0	
5	Machavaram		1						0	0	
6	Bellamkonda		0						13	0	
7	Achampeta		0						10	0	
8	Krosuru		0						10	12	
9	Amaravathi		0						0	0	
10	Thullur		0						0	0	
11	Thadepalle		0						0	0	
12	Mangalagiri		0						0	0	
13	Tadikonda		2						0	0	
14	Pedakurapadu		0						10	11	
15	Sattenapalle		0						0	0	
16	Rajupalem		0						13	15	
17	Piduguralla		0						13	14	
18	Karempudi		0						16	17	
19	Durgi		0						18	19	
20	Veldurthi		0						18	0	
21	Bollapalle		2						4	5	
22	Nakarikallu		0						1	0	
23	Muppalla		1						0	0	
24	Phirangipuram		0						0	0	
25	Medikonduru		0						0	0	
26	Guntur		0						0	0	
27	Pedakakani		0						0	0	
28	Duggirala		0						0	0	
29	Kollipara		0						0	0	
30	Kollur		0						0	0	
31	Vemuru		0						0	0	
32	Tenali		0						0	0	
33	Tsundur		0						0	0	
34	Chebole		0						0	0	
35	Vatticherukuru		0						0	0	
36	Prathipadu		0						0	0	
37	Edlapadu		0						7	9	
38	Nadendla		1						7	8	
39	Narasaraopeta		0						0	2	
40	Rompicherla		1						1	3	
41	Ipur		0						1	0	
42	Savalyapuram		0						3	0	
43	Vinukonda		0						0	6	
44	Nuzendla		0						3	0	
45	Chilakaluripet		0						7	0	
46	Pedanandipadu		0						0	0	
47	Kakumanu		0						0	0	
48	Ponnur		0						0	0	
49	Amruthalur		0						0	0	
50	Cherukupalle		0						0	0	
51	Bhattiprolu		0						0	0	
52	Repalle		0						0	0	
53	Nagaram		0						0	0	
54	Nizampatnam		0						0	0	
55	Pittalavanipalem		0						0	0	
56	Karlupalem		0						0	0	
57	Bapatla		0						0	0	
	Total	0	10	95	141	350			7	12	
	Total of Mandals		8						21	12	

Note:

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (8/13)

District: Prakasam

Code	Mandal Name	Irrigation Scheme		DOA					DOH		
		Medium	Minor	AO	AEO	MPEO	NGO	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Yerragondapalem		0						8	1	
2	Pullalacheruvu		0						8		
3	Tripuranthakam		0						8	1	
4	Kurichedu		1						6		
5	Donakonda		0						7		
6	Pedaaraveedu		0						8		
7	Dornala		0						8	1	
8	Ardhaveedu		0						8		
9	Markapur		0						7		
10	Tarlapadu		0						7		
11	Konakanamitla		0						7		
12	Podili		0						6	1	
13	Darsi		0						5		
14	Mundlamuru		0						1	1	
15	Thallur		2						1		
16	Addanki		2						1	1	
17	Ballikuruva		5						4	1	
18	Santhamaguluru		0						4		
19	Yeddanapudi		0						3		
20	Martur		0						4		
21	Parchur		0						3		
22	Karamchedu		0						2		
23	Chirala		0						2		
24	Vetapalem		0						2		
25	Inkollu		0						5		
26	Janakavaram Panguluru		0						0		
27	Korisapadu		0						1		
28	Maddipadu		0						0		
29	Chimakurthi		0						6		
30	Marripudi		0						6	1	
31	Kanigiri		0						0		
32	Hanumanthunipadu		0						0		
33	Bestavaripeta		0						0		
34	Cumbum		0						0		
35	Racherla		0						0		
36	Giddaluru		0						0		
37	Komarolu		0						0		
38	Chadrasekara Puram		1						0		
39	Veligandla		0						0		
40	Pedacherlopalle		0						0		
41	Ponnaluru		0						0		
42	Kondapi		0						0		
43	Santhanuthlapadu		0						0		
44	Ongole		1						0		
45	Naguluppalapadu		0						0		
46	Chinaganjam		0						2		
47	Kothapatnam		0						0		
48	Tangutur		0						0		
49	Zarugumilli		0						0		
50	Kandukur		0						0		
51	Voletivaripalem		3						0		
52	Pamur	1	1					1	0		1
53	Lingasamudram	1	3					1	0		1
54	Gudluru		1						0		
55	Ulavapadu		0						0		
56	Singarayakonda		0						0		
	Total	2	20	80	97	372		2	8	8	2
	Total of Mandals		10						29	8	

Note:

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (9/13)

District: Kurnool

Code	Mandal Name	Irrigation Scheme		DOA					DOH		
		Medium	Minor	AO	AEO	MPEO	NGO*1	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Kowthalam		0						0		
2	Kosigi		0						0		
3	Mantralayam		0						0		
4	Nandavaram		0						0		
5	C.Belagal		0						0		
6	Gudur		0						0		
7	Kurnool		0						8		
8	Nandi Kotkur		0						7		
9	Pagidyala		0						7		
10	Kothapalle	1	0					1	1		1
11	Atmakur		0						1		
12	Srisailam		0						0		
13	Velgode		0						1		
14	Pamulapadu		0						1		
15	Jupadu Bungalow		0						7		
16	Midthur		0						7		
17	Orvakal		0						4		
18	Kallur		0						0		
19	Kodumur		0						0		
20	Gonegandla		0						0		
21	Yemmiganur		0						0		
22	Pedda Kadalur		0						0		
23	Adoni		0						0		
24	Holagunda		0						0		
25	Alur		0						0		
26	Aspari		0						0		
27	Devanakonda		0						0		
28	Krishnagiri		0						0		
29	Veldurthi		0						0		
30	Bethamcherla		0				1		3, 4		
31	Panyam		2						4		
32	Gadivemula		0						4		
33	Bandi Atmakur		0						5		
34	Nandyal		0						5		
35	Mahanandi		1						5		
36	Sirvel		2						6		
37	Rudravaram		14					3	6		3
38	Allagadda		1						6		
39	Chagalamarri		1						6		
40	Uyyalawada		0						2		
41	Dornipadu		0						6		
42	Gospadu		0						5		
43	Koilkuntla		0						2		
44	Banaganapalle		2				1		3		
45	Sanjamala		0						2		
46	Kolimigundla		0						2		
47	Owk		2						3		
48	Peapally		0						0		
49	Dhone		0						0		
50	Tuggali		0						0		
51	Pattikanda		0						0		
52	Maddikera East		0						0		
53	Chippagiri		0						0		
54	Halaharvi		0						0		
	Total	1	25	96	191	630	2	4	8	-	4
	Total of Mandals		8						28	-	

Note: NGO*1: Recommended for Comprehensive Revival of Millets Programme

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (10/13)

District: Anantapur

Code	Mandal Name	Irrigation Scheme		DOA					DOH		
		Medium	Minor	AO	AEO	MPEO	NGO*1	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	D.Hirchal		0						0		
2	Bommanahal		0						0		
3	Vidapanakal		0						0		
4	Vajrakarur		0						0		
5	Guntakal		0						0		
6	Gooty		0				1		0		
7	Peddavadugur		0						10		
8	Yadiki		0						10		
9	Tadpatri		0						10		
10	Peddappapur		0						10		
11	Singanamala		0						0		
12	Pamidi		0						0		
13	Garladinne		0				1		0		
14	Kudair		0						0		
15	Uravakonda		0						0		
16	Beluguppa		0						0		
17	Kanekal		0						0		
18	Rayadurg		0						0		
19	Gummagatta		2						0		
20	Brahmasamudram		1						0		
21	Settur		0						0		
22	Kunurpi		0						0		
23	Kalyandurg		0						0		
24	Atmakur		0				1		0		
25	Anantapur		0						0		
26	Bukkarayasamudram		0						0		
27	Narpala		0						7		
28	Putlur		0						7		
29	Yellanur		0						7		
30	Tadimarri		0						2		
31	Bathalapalle		0						2		
32	Raptadu		0				1		0		
33	Kanaganapalle		2						0		
34	Kambadur		2				1		0		
35	Ramagiri	1	1				1	1	0		1
36	Chenne Kothapalle		0				1		0		
37	Dharmavaram		0				1		2		
38	Mudigubba		0						2		
39	Talupula		0						4		
40	Nambulipulikunta		0				1		4		
41	Tanakal		0				1		5		
42	Nallacheruvu		0				1		5		
43	Gandlapenta		0				1		4		
44	Kadiri		0				1		4		
45	Amadagur		0				1		5		
46	Obuladevaracheruvu		0				1		5		
47	Nallamada		0				1		9		
48	Gorantla		0						8		
49	Puttaparthi		0						9		
50	Bukkapatnam		0				1		9		
51	Kothacheruvu		0						9		
52	Penu Konda		0				1		1, 7		
53	Roddam		0						8		
54	Somandepalle		0						8		
55	Chilamathur		0						3		
56	Lepakshi		1						3		
57	Hindupur		7					1	3		1
58	Parigi	1	3					1	3		1
59	Madakasira		0						6		
60	Gudibanda		0				1		6		
61	Amarapuram		0						6		
62	Agali		0						6		
63	Rolla		0				1		6		
Total		2	19	91	121	605	20	3	10	-	3
Total of Mandals			8						36		

Note: NGO*1: Recommended for Comprehensive Revival of Millets Programme

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (11/13)

District: Kadapa

Code	Mandal Name	Irrigation Scheme		DOA					DOH		
		Medium	Minor	AO	AEO	MPEO	NGO	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Kondapuram		0						2		
2	Mylavaram		0						1		
3	Peddamudium		0						1		
4	Raju Palem		0						1		
5	Duvvur		2						12		
6	S Mydukur		3						12		
7	Brahmangarimattam		8					1	12		1
8	B Kodur		0						13		
9	Kalasapadu		0						13		
10	Porumamilla		0						13		
11	Badvel		1						11		
12	Gopavaram		0						11		
13	Khajipet		0						12		
14	Chapad		0						12		
15	Proddatur		0						1		
16	Jammalamadugu		0						1		
17	Muddanur		0						2		
18	Simhadripuram		0						2		
19	Lingala		0						3		
20	Pulivendla		0						3		
21	Vemula		0						4		
22	Thandur		0						2		
23	Veerap unay unipalle		0						4		
24	Yerraguntla		0						4		
25	Kamalapuram		1						5		
26	Vallur		0						5		
27	Chennur		0						5		
28	Atlur		2						11		
29	Vontimitta		1						9		
30	Sidhout		0						11		
31	Cuddapah		1						5		
32	Chintha Kommadinne	1	4					1	5		1
33	Pendlimarri		1						5		
34	Vempalle		0						4		
35	Chaknayapet		0						6		
36	Lakkireddipalle		0						6		
37	Ramapuram		0						6		
38	Veeraballe		2						8		
39	Rajampet		1						9		
40	Nandalur		1						9		
41	Penagaluru		0						9		
42	Chitvel		0						14		
43	Kodur		0						10, 14		
44	Obulavaripalle		0						10		
45	Pullampeta		2						10		
46	T.Sundupalle		0						8		
47	Sambepalle		0						8		
48	Chinnamandem		0						7		
49	Rayachoti		0						7		
50	Galiveedu		0						7		
	Total	1	30	85	89	223		2	14		2
	Total of Mandals		14						50		

Note:

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (12/13)

District: Nellore

Code	Mandal Name	Irrigation Scheme		DOA				DOH			
		Medium	Minor	AO	AEO	MPEO	NGO	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Seetharamapuram		0						7	14	
2	Varikuntapadu		3						7	15	
3	Kondapuram		0						3	0	
4	Jaladanki		0						3	0	
5	Kavali		0						4	0	
6	Bogole		0						4	0	
7	Kaligiri		0						3	0	
8	Vinjamur		0						3	13	
9	Duttalur		0						7	15	
10	Udayagiri		8					1	7	14	1
11	Marripadu		0						6	12	
12	Atmakur		0						1, 2, 6	10	
13	Anumasamudrampeta		0						8	11	
14	Dagadathi	1	0					4	4	0	4
15	Allur		0						4	0	
16	Vidavalur		0						5	0	
17	Kodavalur		0						5	0	
18	Butchireddipalem		0						5	0	
19	Sangam		0						8	0	
20	Chejerla		0						0	0	
21	Ananthasagaram		0						0	0	
22	Kaluvoya		0						0	0	
23	Rapur		0						0	0	
24	Podlakur		0						8	11	
25	Nellore		0						1, 7	14	
26	Kovur		0						0	0	
27	Indukurpet		0						0	0	
28	Thotapalligudur		0						7	0	
29	Muthukur		0						5	0	
30	Venkatachalam		0						5, 8, 9	0	
31	Manubolu		5					1	8	0	1
32	Gudur		0						2	10	
33	Sydapuram		0						4	0	
34	Dakkili		0						4	0	
35	Venkatagiri		1						0	0	
36	Balayapalle		2						4	0	
37	Ojili		1						4	0	
38	Chillakur		0						2	0	
39	Kota		2						2	0	
40	Vakadu		8					1	2	0	1
41	Chittampur		0						2	0	
42	Naidupeta		0						3	13	
43	Pellakur		0						3	0	
44	Doravarisatram		0						0	0	
45	Sullurpeta		0						6	15	
46	Tada		0						6	0	
	Total	1	30	75	70	235		7	16	11	7
	Total of Mandals		8						38	13	

Note: Nellore I: No.1 toNo. 23, Nellore II: No. 24 to No. 46

Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.8 Mandal-wise Extension Staff of DOA and DOH and Irrigation Schemes (13/13)

District: Chittoor

Code	Mandal Name	Irrigation Scheme		DOA				DOH			
		Medium	Minor	AO	AEO	MPEO	NGO*1	Persons to be outsourced	HO	MPEO	Persons to be outsourced
1	Peddamandyam		0				1		10	1	
2	Thamballapalle		0				1		10	1	
3	Mulakalacheruvu		0						11	0	
4	Peddathippa Samudram		0						0	0	
5	B.Kothakota		0				1		11	1	
6	Kurabalakota		0						10	0	
7	Gurramkonda		0						0	0	
8	Kalakada		0						0	0	
9	Kambhamvaripalle		0						0	0	
10	Yerravaripalem		3						0	0	
11	Tirupati Urban		0						0	0	
12	Renigunta		0						0	0	
13	Yerpedu		0						0	0	
14	Srikalahasti		0						0	0	
15	Thottambedu		0						0	0	
16	Buchinaidu Khandriga		0						0	0	
17	Varadaiahpalem		0						0	0	
18	Satyavedu		0						0	0	
19	Nagalapuram		8					1	0	0	1
20	Pichatur	1	7					2	0	0	2
21	Vijaya Puram		0						0	0	
22	Nindra		11					2	0	0	2
23	K V P Puram		0						0	0	
24	Narayanavanam		0						0	0	
25	Vadamalapeta		0						0	0	
26	Tirupati Rural		0						0	0	
27	Kammappalle		0						0	0	
28	Chandragiri		1						0	0	
29	Chinnagottigallu		1						0	0	
30	Rompicherla		0				1		0	0	
31	Pileru		0						0	0	
32	Kalikiri		0						0	0	
33	Vayalpad		0				1		0	0	
34	Nimmanapalle		3						9	1	
35	Mandopalle		0						9	1	
36	Ramasamudram		0						9	0	
37	Punganur		0						7	1	
38	Chowdepalle		0						8	0	
39	Somala		0						8	1	
40	Sodam		0						8	1	
41	Pulicherla		0						0	0	
42	Pakala		3						0	0	
43	Veduru Kuppam		0						0	0	
44	Puttur		0						0	0	
45	Nagari		0						0	0	
46	Karvetinagar	1	0					1	0	0	1
47	Srirangaraja Puram		0						3	1	
48	Palasamudram		0						3	0	
49	Gangadhara Nellore		4						3	1	
50	Penumuru		4						3	1	
51	Puthalapattu		4						1	1	
52	Irala		2						2	0	
53	Thavanampalle		2						2	0	
54	Chittoor		2						1	1	
55	Gudipala		2						1	0	
56	Yadamari		2						1	1	
57	Bangarupalem		1						2	1	
58	Palamaner		0						6	1	
59	Gangavaram		0						7	1	
60	Pedda Panjani		0						7	1	
61	Baireddi Palle		0						6	1	
62	Venkatagiri Kota		0						6	1	
63	Ramakuppam		0				1		5	1	
64	Santhi Puram		0						5	0	
65	Gudi Palle		0						4	1	
66	Kuppam		0						4	1	
Total		2	60	100	112	201	6	6	11	23	6
Total of Mandals			17						32	23	

Note: NGO*1: Recommended for Comprehensive Revival of Millets Programme
Source: Department of Agriculture, 2016 / Department of Horticulture, 2016

Attachment 10.3.9 Outline of Farmers Support Programmes (1/4)

Training Activity	Purpose	Output	Outcome
1. Orientation and need assessment			
1.1	Orientation meeting on extension activities		
1.2	Formulation of farmers' groups and selection of model farmers as master	Formation of farmers' groups for receiving extension activities as well as training programmes effectively	Farmers understand the importance and necessity of farmers' groups
			Farmers' groups are formulated.
			Members of those groups effectively receive skills and information to be disseminated through extension activities.
			Leader farmers will be trained and become a master trainer.
	To select progressive farmers from each farmers' group for extension activities as well as training programmes	Leader farmers are selected for further activities.	Leader farmers (master trainers) disseminate skills as well as information, which are received from the extension activities, to member
			Educating model farmers can motivate neighbouring farmers to adopt latest farm technology.
			Communication in farmers' group is improved.
1.3	Capacity building for farmers' groups	Improvement of capability of management	Farmers understand necessity as well as importance of group work as well as sustainable management of farmers' group
			Farmers focus on products or activities for group work, and formulate farmers' SHG, VFF, and FPO.
2. Farm Management			
2.1	Training on budgeting / book-keeping / monitoring	To teach how to do book-keeping for every farm operation	Farmers understand how to do book keeping
			They continue to do book-keeping. Therefore, farmers can plan crop budgeting much before the crop season and there by avoiding unnecessary expenditure.
		To teach how to prepare budget and to monitor cultivation costs	Farmers understand how to prepare crop budget and monitoring cultivation cost.
			They continue to prepare crop budget and try to do monitoring of the cultivation cost. Thus, profit and loss account will be known. Farmers can spend money on need basis only.
3. Preparation Techniques			
3.1	Water use and fertilizer ap	To understand rational use of water and fertilizers.	Farmers understand importance and necessity of saving on water, fertilizer use and productivity enhancement.
			Useful skills for saving water and proper application of fertilizers can be adopted, resulting in improving the production as well as minimizing the cost of cultivation.
		To understand balanced use of N-P-K fertilizers and micro-nutrients based on crop requirement .	Farmers understand that higher yields and good soil health can be achieved through balanced N-P-K application.
			Farmers apply the new skills on balanced use of N-P-K fertilizer as well as micro-nutrients which will enhance crop yields, lower the risk of pest outbreak.
			Farmers learn correct dose, timing and method of fertilizer application to improve the yields and reduce the pest incidence as well.
3.2	Rain Water Harvesting Te	To understand and absorb the skills to collect and re-utilise rain water.	Farmers understand techniques of rain water harvesting and re-utilization.
			Some farmers try to apply the techniques for collection and reuse of rain water.

Attachment 10.3.9 Outline of Farmers Support Programmes (2/4)

Training Activity		Purpose	Output	Outcome
3.3	Micro-Irrigation Technolo	To learn how to apply micro-irrigation and maintain it.	Farmers can understand importance as well as necessity of micro-irrigation with drip, sprinkler and rain gun for water economy. Further, they learn how to apply micro-	Some farmers try to apply the techniques of micro-irrigation, and thus cultivated area under micro-irrigation would be extended.
3.4	Promotion of organic farm	To learn crop cultivation with organic substances	Farmers understand that organic matter improves soil fertility, conserves rain water, and reduces the use of fertilizers in crop production.	Organic farming can be practiced, and dosage of chemical fertilizers can be saved.
			Farmers learn how to prepare organic fertilizers as well as organic pesticides.	
3.5	Promotion of Vermi-comp	To learn how to prepare vermi-composting with earthworms as suppliment nutrients.	Farmers understand that vermi-composting is eco-friendly, and learn how to prepare vermi-compost.	Some farmers prepare and use vermi-compost, and minimize the adverse effect of chemical fertilizers.
3.6	Promotion of GAP (Good	To learn concept of GAP and key points of GAP	Farmers understand importance of GAP and procedure as well as essential points for introduction of GAP.	Some farmers promote the adoption of GAP.
3.7	Promotion of IPM and INM			
3.8	Seed Village Programme	To learn procedure of Seed Village Programme To learn proposed practices for seed production	Farmers understand proper farming practices and essential points for seed production.	Some farmers organize groups for seed production under seed village programme and start seed production..
4.	Demonstration and field school for rice cultivation	To show the farmers on the merits of conventionasal planting, drum-seeding, direct sowing, and machine transplanting	Farmers get information and knowledge on new skills on conserving seeds, water, labour and time to reduce drudgery in rice	Some farmers try new farming practices proposed in the demonstration.
			Farmers get information for improvement of rice productivity.	
5. Demonstration and field school for upland crops cultivation (maize, groundnut, pulses, sugarcane, fodder crops, etc.)				
5.1	Maize	To show farmers critical technologies in Maize production. For instance, selecting quality seed, irrigation at critical stages, and ridge-sowing can boost maize yields.	Farmers understand how to boost maize yields, and indicate their intension to comply with the new skills.	Farmers try farming practices proposed in the demonstration, achieving food security with less production cost.
5.2	Groundnut	To show farmers proposed technologies in groundnut production. For instance, selecting quality seed, watering at critical stages and gypsum application and irrigation at flowering. Further ridge sowing is recommended.	Farmers understand how to boost groundnut yields. And they indicate their intension to comply with the new technologies.	Farmers try farming practices proposed in the demonstration, achieving food security with less production cost.
5.3	Pulses	To show farmers proposed technologies in pulses production. For instance, optimum seed rate, irrigation and pest/disease control are considered in order to boost the Pulse yields. Further seedling treatment with thiram and rhizobium inoculation, irrigation and IPM can double the pulse yields.	Farmers understand how to boost pulses yields. And they indicate their intension to comply with the new production technologies.	Farmers try farming practices proposed in the demonstration, achieving food security with less production cost.

Attachment 10.3.9 Outline of Farmers Support Programmes (3/4)

Training Activity	Purpose	Output	Outcome
5.4 Sugarcane	To show farmers proposed technologies in pulses production. For instance, selection of proper variety, seed treatment, disease control water and nutrient management are key to higher yields in Sugarcane. Further seedling treatment with Captan+Malathion, proper fertilizer and micro-nutrient (Zn) application, watering and IPM can improve sugarcane yields and sugar recovery.	Farmers understand how to boost sugarcane yields, and they indicate their intension to comply with the new technologies like bud-chip method and planting at 4-inch wide rows	Farmers try farming practices proposed in the demonstration, achieving food security with less production cost.
5.5 Fodder crops	To show farmers that fodder production in their fields is useful and economical to imrove the milk yield of dairy animals. Selecting high value, quick-growing fodder crops will improve the milk yields of animals.	Farmers understand the importance and possibility of fodder production. They indicate their intension to comply with the new skills.	Sice 50% of the farmers in villages depend on dairing for there family income, growing fodder crops can stabilize the farmers income and provides economic security to dairy farmers.
5.6 Other crops	To show farmers proposed technologies in production of other crops, adopting scientific technology.	Farmers understand how to boost yields. And they indicate their intension to comply the skills.	Farmers try farming practices proposed in the demonstration, achieving food security with less production cost.
6. Demonstration on vegetable cultivation - Chilli - Tomato - Mango - Other crops	To show the growers to use optimum quantities of seed, fertilizers and water for getting higher yields, applying IPM, INM and GAP.	Farmers understand how to boost yields, and they indicate their intention to comply with the new skills.	Farmers try farming practices proposed in the demonstration, achieving food security with less production cost.
	To demonstrate the arrangement of viable cropping pattern, applying crop rotation as well as crop diversification	Viable cropping pattern arrangement will meet food needs of people while taking care of soil health and conserving resources.	This will lead to sustainable living with food security.
	To show farmers that fodder production in their fields is useful and economical to imrove the milk yield of dairy animals. Selecting high value, quick-growing fodder crops will improve the milk yields of animals.	Farmers understand the importance and possibility of fodder production. They indicate their intension to comply with the new skills.	Sice 50% of the farmers in villages depend on dairing for there family income, growing fodder crops can stabilize the farmers income and provides economic security to dairy farmers.
7. Exposure and learning experience			
7.1 IPM and Organic Pest Ma	To disseminate importance of eco-friendly use of pest control methods for reducing the use of chemicals and encouraging pest control through Neem, Pongamia and castor oils and baits	Farmers understand the importance of organic pesticide and bio-pesticides.	Farmers try saving in cost of cultivation and production of safe foods without harmful pesticide residue in foods.
	To bring awareness in modern farming by exposing the farmers to new places and new farm practices.	Exposure of farmers to new situations and new farm practices enable them to imbibe new methods / techniques for practicing in his own fields.	Adoption of new production techniques would help in reduction in unproductive expenditure, improvement in yield and quality, getting higher net income to farmers.
7.2 Succesful examples on farming practices	To bring awareness in modern farming by exposing the farmers to new places and new farm practices.	Exposure of farmers to new situations and new farm practices enable them to imbibe new methods / techniques for practicing in his own fields.	Adoption of new production techniques would help in reduction in unproductive expenditure, improvement in yield and quality, getting higher net income to farmers.

Attachment 10.3.9 Outline of Farmers Support Programmes (4/4)

Training Activity	Purpose	Output	Outcome
7.3 Post-Harvest Techniques	Exposing the farmers to new techniques in product management.	Farmers understand that post harvest techniques will be highly useful to prevent wastage after harvesting and to prevent losses due to rats, insects and excess moisture etc.	There will be saving through proper storage, preservation and solar drying of farm produce leading to national economy and ensuring food security to our people.
	To bring awareness in modern farming by exposing the farmers to new places and new farm practices.	Exposure of farmers to new situations and new farm practices enable them to imbibe new methods / techniques for practicing in his own fields.	Adoption of new production techniques would help in reduction in unproductive expenditure, improvement in yield and quality, getting higher net income to farmers.
7.4 Farm Mechanization	To bring awarness on new farm implements for planting and harvesting and to reduce dependance on labour and time and drudgery reduction.	Farmers understand that there will be saving of time and labour in farming and reduction in cost of cultivation.	Labour beinnng scarce, farm mechanization will help in reducing the cost of cultivation, increasing net income and avoiding dependance on labour.
	To bring awareness in modern farming by exposing the farmers to new places and new farm practices.	Exposure of farmers to new situations and new farm practices enable them to imbibe new methods / techniques for practicing in his own fields.	Adoption of new production techniques would help in reduction in unproductive expenditure, improvement in yield and quality, getting higher net income to farmers.

Attachment 10.3.10 Crop Cultivation Plan and Progress in Irrigation Scheme (Sample)

Sub- project:

--

CCA in irrigation scheme:

	ha	No. of HHs	
--	----	-------------------	--

Existing Condition 0 year ()				Proposed Condition after Completion of Modernization of Irrigation Scheme							
				1st Year ()				2nd Year ()			
Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)
Total				Total				Total			

Progress after Completion of Modernization of Irrigation Scheme							
1st Year ()				2nd Year ()			
Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)	Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)
Total				Total			

Attachment 10.3.11 Extension Activities Plan for Farmers (Sample)

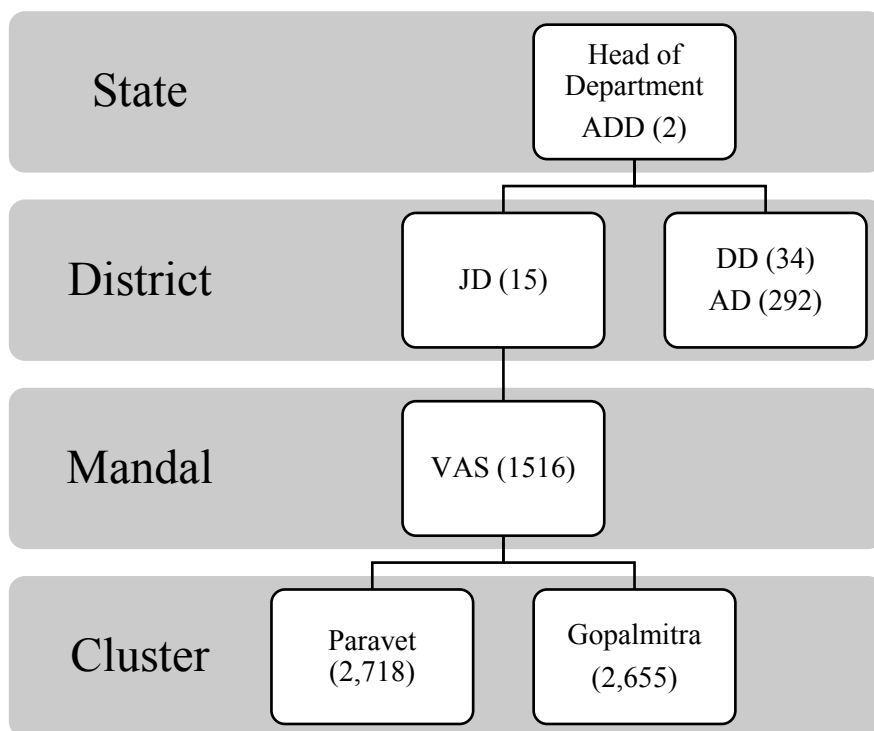
Sub-project:

Sub-project area: ha **No. of HHs**

Activities	1st year	2nd Year	3rd Year
1. Initial awareness/preparation (Preparatory work)			
1.1 Orientation on extension activities			
1.2 Formulation of farmers' groups and selection of master farmers			
1.3 Capacity building for farmers' groups			
2. Farm Management (class room training)			
2.1 Training on budgeting / book keeping / monitoring			
3. Fundamental Techniques (class room training)			
3.1 Water use and fertilizer application			
3.2 Rain water harvesting techniques			
3.3 Micro-irrigation Technology (O&M)			
3.4 Promotion of organic farming			
3.5 Promotion of vermi-composting			
3.6 Promotion of GAP			
3.7 Promotion of IPM and INM			
3.8 Seed village programme			
4. Demonstration and field school (hands-on training)			
4.1 Rice			
4.2 Upand crops (Maize, GN, Pulses, Sugarcane)			
4.3 Upand crops (fodder crops or others)			
4.4 Vegetables (Chilli / Tomato / Other crops)			
5. Exposure and learning experiences (hands-on training)			
5.1 IPM and Organic Pest Management			
5.2 Successful examples on farming practices			
5.3 Post-harvest techniques			
6. Demonstration and exposure visit on farm mechanization (hands-on training)			
6.1 Demonstration of machinery activities in farmers' fields			
6.2 Exposure visit to successful examples			

Source: JICA Survey Team

Attachment 10.4.1 Organisation Chart and Number of Staff, Department of Animal Husbandry



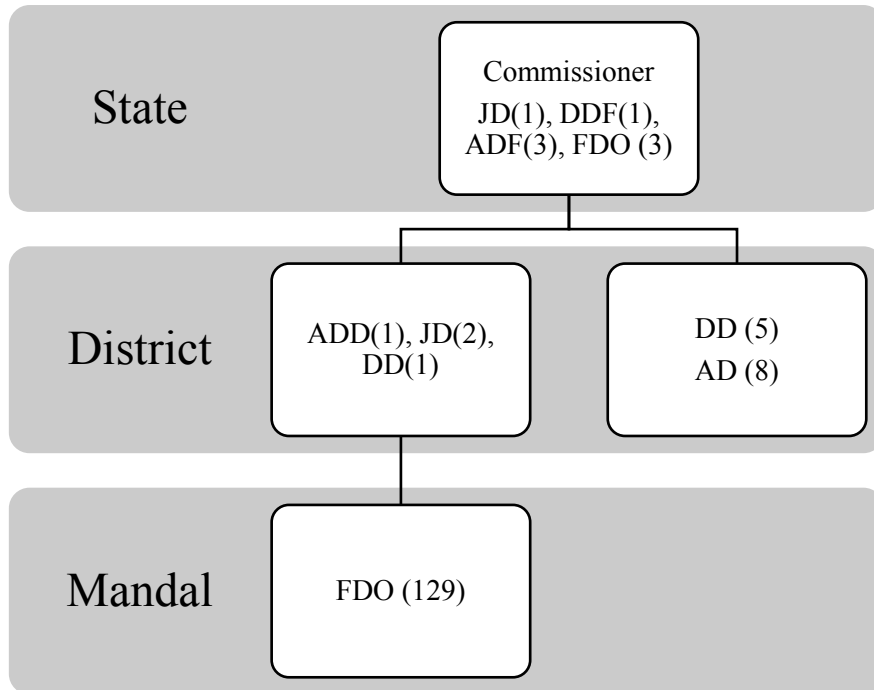
Source: Department of Animal Husbandry

Attachment 10.4.2 Livelihood Improvement Opportunities through Fisheries

Value Chain	Constraints & Opportunities	Interventions Ideas
Inputs	Availability and high cost of advance fingerling	Construction of In situ rearing tanks
	Inadequate water for rearing of fingerlings; Unavailability of electricity connection at tank site	Installation of bore well with solar pump
	Lack of working capital with cooperatives	Revolving Fund for buying feed and fish seed
Production	Difficult to maintain stock with temporary nets in sluice	Installation of permanent wire mesh in sluice
	Inadequate water in growing season of fish	Construction of small tank with in tank below dead storage level
	Very limited practice of using fish feed	Assistance to use fish feed as subsidy
	Potential to promote cage farming	Supporting cage culture through PPP (subsidy for fixed cost)
	Lack of shelter at tank for watch and ward	Rest Shed
	Potential to involve educated youth to take up inland fish farming in command area	Subsidy for construction of rearing and stocking tank
	Potential to promote integrated fish farming including paddy cum fish farming and in farm ponds	Assistance for construction of integrated fish farms including paddy cum fish farms
Harvesting/Processing	Unavailability infrastructure at landing site for boats and marketing activities – specially in Medium Irrigation Projects	Development of Landing Site cum Rest Shed
	Fishing across tanks including GP tanks is key livelihood activity; access to net would increase income	Supply of drag/gill net to fishermen cooperatives
	Small boats enables fishing across water body specially deep waters	Provision of boats
	Absence of hall to have common activities like marketing, net repair, storing of nets and meeting	Community Hall
Marketing	Unhygienic fish market; lack of designated place for marketing	Construction of fish market led by district fisheries federation, Use of ice box for fish
	Unavailability of exclusive outlets for day long sale of fish and fish products	Construction of fish parlors in cities; and operating on lease basis
Others	Aquarium at home gaining popularity; potential income generating activity for fisherwomen nearer to cities	Start up assistance for ornamental fish project

Source: Department of Fisheries

Attachment 10.4.3 Organisation Chart and Number of Staff, Department of Fishery



Source: Department of Fisheries

Attachment 11.2.1 Summary of Interview with Processing Companies

(1) Mango and Tomato

(a) Operation

Company	Navya	Jain Irrigation	Srini	Foods and Inns
Product	Mango puree (no concentrate)	Mango puree and concentrate, tomato paste	- Pulp, Concentrate, IQF - Mango, tomato, guava, chili and vegetable	- Pulp, Concentrate - Mango, guava, papaya, tomato
Capacity/production	200-250tons/day -t> 500 tons/day (2015) Mango: 7,000-8,000tons/season - >15,000 Other: 5,000 tons/season	Mango: 1,500 tons/day, 30 tons/hour (production: 70,000ton/year) Tomato paste production: 10,000ton/year (20,000ton target)	400 tons/day, 10 tons/hour for pulp 2tons /hour for IQF	Mango: production 45,000 tons/year, 1,600 tons/year
Procurement	-20% from farmers (200-250), 80% from trader -80% Totapuri (Cadapa and Chittoor) and 20% Alfonso (Mysore) - Buy totapuri at INR12/kg and INR27/kg	-20% from farmers (1,900), 40% from traders and rest from the market - Buy at the market price -Pay INR0.25/kg more for produce observing Jain GAP - Employ 10 field coordinators to advice farmers, 300-400 agronomists available all over India.	- 50-60% from farmers (around 1,300 including groups within a radius of 20km) - Pay INR0.5/kg extra in addition to market price. IND14/kg for IQF, INR13/kg for mango pulp last year.	- 50% of raw material procured from around 300 (big) farmers located in a radius of 60km. - The rest of mangoes is procured through traders. - 100% of tomatoes procured through the markets. - Four members of agronomists keep the good relation with farmers.
Market	OEM for Capricorn and EXOTIC, Export to EU and Middle East	Mango: 80% to Coca cola (60% in India and 40% abroad) USA, UK, Japan and Iran Tomato paste: Nestle, HUL for domestic market. No problem of marketing	Tomato: Global Green, Mother Dairy, India Food. No difficulty in finding the buyer. Fresh mango: Japan, NZ and EU	- Mango pulp is exported to UK and other European countries. - Mangos (5,000-8,000tons) with Rain Forest Alliance certificates are ordered by McDonald's. - The company's share in the processed mango export in India is 19-28%.

(b) Opinions for pilot

	Navya	Jain Irrigation	Srini	Foods and Inns
Interest in Pilot project	Not very much	Yes, mango (processing) and tomato (processing)	Yes, mango (processing and table purpose) and tomato (processing)	Yes, mango (processing). No, tomato (processing)
Length of project	NA	For their other projects such as Unnani: 1year implementation & review -> expansion	3years	No comment
Size of project	NA	No limitation. Any farmers in a radius of 250 km can be assisted. The area size of their pilot project such as Unnati is around 300-500 acres/year. The company prefers to dealing with individual farmers to farmer's groups.	- 3,000-4,000 acres for mango - The company's pilot with DoH for processing tomato is 150 acres with 75 farmers. They are planning to expand this to 400-500 acres.	- The size of their other project for Rain Forest Alliance or Fair Trade Label is around 20 farmers and 100 acres.
Contract farming	No need for contract. The farmers are coming in any way. The contract farming for tomato is not possible.	OK - For the pilot with DoH, they will make an agreement with farmers at INR4/kg as minimum guarantee price. The actual purchasing price would be average market price.	OK - For their project with DoH, they made agreements with farmers to buy tomato at INR4.5/kg. The farmers have freedom to sell their tomato in the market. - It may be acceptable for farmers to sell 50% to processors and 50% to the market.	Not workable for tomato. No comment for mango.
Mango processing	No need of strengthening linkage with farmers as traders are more flexible and convenient for production management.	-Interested in linkage with farmers in distant areas such as Anantapur where the impact of assistance is larger. -Setting up of collection points is useful. -Transportation cost should be covered by the project. INR0.25/kg incentive for Jain GAP can be utilized for this propose. - Support for testing lab should be considered.	-Interested in having more quality material.	- Interested in exploring and engaging new farmers in new areas. - They can identify the possible area by themselves with their agronomist team. - For farmers in a distant area, how to cover their transportation cost would be a key.

	Navya	Jain Irrigation	Srini	Foods and Inns
Tomato processing	No need as tomato processing by the company is very limited at the moment.	-One-year pilot with DoH for growing processing variety of tomato is about to start targeting 500 acres. -Tomato to be procured should satisfy requirements of color, TSS and acidity. The color is most important. TA for harvesting timing is important. -Setting up of collection points is useful. -Transportation cost should be covered by the project.	- Pilot with DoH target tomato produced between December and April.	The company thinks that the contract farming is not workable for tomato. Therefore, no interest.
Table purpose mango	NA	NA	- Their existing pack house facilities in Tirupati and Nuzvit can be utilized. - The participant farmers should register with APEDA. - Capacity of quarantine officials should be strengthened. At the moment, officials are called from Chennai or Mumbai. - Protocol of exporting Banganpali should be developed. - Sindhura variety also has export potential.	NA
Technical	-For farmers, raising awareness as well as improving farming skill is very much required. Especially food safety and chemical residue should be highlighted. - Some research projects such as bee pollination would be useful for improving productivity. - Upgrading capacity of processing companies is also necessary. Training in food technology is very important.	- Making awareness, exposure visit, production management, irrigation management, pest management, IPM, GAP, harvesting, post-harvest processing (cleaning, sorting) by Jain staff	- GAP certificates, post-harvest handling for farmers. - Developing cultivation protocols for fresh mango export. - Capacity development of quarantine officials for fresh mango export.	No comment

	Navya	Jain Irrigation	Srini	Foods and Inns
Equipment/ facilities	No comment.	- Tomato: seed, fertilizer, pesticide, crate, drip irrigation system- Mango: fertilizer, pesticide, drip irrigation system- Collection center: simple structure with shade- Collaboration with existing government schemes is effective.	- Tomato: seed, fertilizer, pesticide, crate, drip irrigation system- Mango: fertilizer, pesticide, drip irrigation system- Collection center: simple structure with shade- Promotion of mango harvesting machines (crane type, Shaktima)- Collaboration with existing government schemes is effective.	No comment
Financial	No comment.	Transport cost farmers.	- Crop insurance for crop failure - Each stakeholder contributes certain percentage of sales to the funds which can be utilized for common purpose activities or facilities.	Transport cost for farmers.
Others	Some sort of platform where opinions as an industry can be coordinated and represent is necessary.	- In order to set up NABL accredited testing lab at Jain, heavy metal testing machine which costs INR30-40million is required. This lab can be utilized not only by the company but also farmers and other processing units.	NA	- Some mechanism to stabilize or fix market price of mangoes. - Some mechanism to coordinate interests of different stakeholders for the development of industry.

(2) Chili

	Company	ITC Limited	Synthite
	Mandal	Guntur	Medarametla, Prakasam
Overview of operation	Product	Chili powder	Oleoresin extract, Chili powder
	Capacity/production	750tons/month (Spice processing) 12tones/month for PB packaging 90tons/month for blend products	Total 50,000tons/year (Chili). This ongole factory's capacity is 22,000 tons/year 60% is extract and 40% is powder
	Procurement	-20% from IPM farmers (6 villages, plan to increase to 12 villages) -INR5/kg added to IPM for premium	-20% from IPM farmers (1800 farmers 1,200 acres) -8% is added as premium price for IPM chili
	Market	-50% to domestic and 50% to export -UK, US etc. (Japan: Vox trading in discussion)	-100% of extract is for export (10% for Japan, Mitsubishi etc.) -Powder is for both domestic and overseas Mainly for UK, US
Comments and conditions for pilot	Interest in Pilot project	Possible	Possible
	Length of project	3 years	3 years
	Size of project	-Current IPM intervention covers 2000 farmers in 6 villages, 6000acres	-Current intervention is planned to expand to 4,000 acres this year
	Contract farming	No need for contract. ITC practices 'Contact farming'	No need for contract as farmers has no option to sell to other than market or company. Synthite always procures at better price than market for IPM chili, so 'Contact farming' works well.
	Processing	-Interest to increase the scale of currently practicing direct procurement of IPM chili from farmers	-Interest to increase the scale of currently practicing direct procurement of IPM chili from farmers (They have agriculture unit called 'Farm Tech' which has 14 agronomists (country total 150).
Required Assistance	Technical	NA	NA
	Equipment/facilities	NA	-Facility for drying
	Financial	NA	NA
	Others		

Attachment 11.2.2 Project Design Matrix (PDM) and Plan of Operation (PO) for FVC pilot project

(1) Mango (Processing)

- Project Period: 2018-2022 (Phase I: 4 years)
- Project Site: Chittoor District
- Target Group: APFPS, DoH, APEDA, Processing companies and FPO

(a) PDM

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>OVERALL GOAL</p> <p>Increase the competitiveness of processed mango industry in AP by developing AP brand</p>	<p>a. Number of farmers who directly supply their mangoes to the processing units increases by xx% on average in the target area of JICA loan project.</p> <p>b. The mango processing industry has a mechanism to coordinate opinions as an industry.</p> <p>c. AP state government promotes AP processed mango products as AP brand.</p>	<p>a. APFPS annual report</p> <p>b. APFPS annual report</p> <p>c. APFPS annual report</p>	
<p>PROJECT GOAL</p> <p>Efficiency of food value chain of processed mango is improved in the pilot area.</p>	<p>a. Share of direct procurement from farmers is increased for partner processing companies.</p> <p>b. Cost of procuring mango is decreased for partner processing companies.</p> <p>c. Income from processing variety mango is increased for partner farmers.</p>	<p>a. Baseline Survey and Impact Assessment</p> <p>b. Baseline Survey and Impact Assessment</p> <p>c. Baseline Survey and Impact Assessment</p>	<p>- No drastic change in development policy in agriculture sector of the central government and the state government happens.</p> <p>- Yen Loan Project will be implemented as scheduled.</p>
<p>OUTPUTS</p> <p>1. A mechanism to support the entire VC of processed mango is developed.</p>	<p>a. Staffs of PIT are secured.</p> <p>b. Institution building training to PMU staff at the state and districts is conducted xx times in total.</p> <p>c. 5 partner processing companies are selected for the pilot project.</p> <p>d. 1000 farmers (1000 ha) are selected for the pilot project.</p>	<p>a. Progress Reports/ Project Completion Report</p> <p>b. Progress Reports/ Project Completion Report</p> <p>c. Progress Reports/ Project Completion Report</p>	<p>- No drastic change in the market for processed mango happens.</p> <p>- No serious drought or flood damaged to agriculture production happens.</p>

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>2. Capacity of government officials, farmers and processing companies is developed.</p> <p>3. Development marketing strategy for processed mango VC is developed</p>	e. Baseline survey and project plan for each partner is prepared.	d. Progress Reports/ Project Completion Report	
	f. Capacity development plan and training modules are developed for the pilot project.	d. Progress Reports/ Project Completion Report	
	g. Expansion strategy of the pilot is prepared.	e. Progress Reports/ Project Completion Report	
	a. Training materials are developed.	a. Progress Reports/ Project Completion Report	
	b. Trainings to agronomists, lead farmers and horticulture officers are conducted xx times in total.	b. Progress Reports/ Project Completion Report	
	c. Trainings to partner farmers are conducted xx times in total.	c. Progress Reports/ Project Completion Report	
	d. No of farmers who have access to the government schemes	d. Progress Reports/ Project Completion Report	
	e. Trainings on quality control for processing companies are conducted xx times in total.	c. Progress Reports/ Project Completion Report	
	a. Developed guidelines and manuals for the target market	a. Progress Reports/ Project Completion Report	
	b. List of resource persons, institutions and service providers	b. Progress Reports/ Project Completion Report	
	c. Meetings among farmers, processors and government are held xx times in total.	c. Progress Reports/ Project Completion Report	
	d. Developed marketing and branding strategy	d. Progress Reports/ Project Completion Report	

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<p><Output-1></p> <p>1-1 A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant.</p> <p>1-2 Distract Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.</p> <p>1-3 Team building and confidence building of PIT and DPCC is conducted.</p> <p>1-4 Holding information sessions of the project and matching sessions between farmers and processing units</p> <p>1-5 Screening and appraisal of target processing units</p> <p>1-6 Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)</p> <p>1-7 Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.</p> <p>1-8 Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.</p> <p>1-9 Success and lessons learnt of the pilot is shared by developing promotional materials and accepting observation tours by interested farmers.</p> <p>1-10 Strategy and plan for replicating the pilot model are developed by stakeholders.</p>	<p><Project Implementation Team (PIT)></p> <p>(1) Staff requirement</p> <p>- DDH, Horticulture (Head of project) ADH, Horticulture (Financial Management)</p> <p>- Official of APFPS (Marketing coordinator of PPIC)</p> <p>- Horticulture Coordinator (PPIC) hired by Department</p> <p>- Marketing Coordinator (PPIC)</p> <p>- Training Coordinator (PPIC)</p> <p>- Administrative & Accounts Executive (PPIC)</p> <p>(2) Office Space (100 m2)</p> <p>(3) Data, information, documents and facilities relevant to the project</p> <p>(4) Running Expenses of PIT</p>		<p>- Policy of AP government on promoting processing industries will not change.</p> <p>- Interest of processing companies in participating in the pilot remain same.</p>

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<p><Output-2></p> <p>2-1 Trainings to agronomists of processing units, lead farmers and horticulture officers (including GAP, food safety, post-harvest handling and responsible contract farming) are conducted.</p> <p>2-2 Trainings to all participating farmers are conducted.</p> <p>2-3 Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)</p> <p>2-4 Training for quality management and productivity improvement such as 5S, Kaizen for the processors is conducted.</p> <p>2-5 Setup and operation of common facility utilizing common facility fund.</p> <p>3-1 Conduct survey to identify target markets and market analysis survey (potential buyers, required specifications, procedures, certificates etc.) is conducted.</p> <p>3-2 Collect information and establish linkages with necessary resources for developing AP brand such as research institutions, testing laboratories, business service providers including financial institutions and legal advisors and supporting industries.</p> <p>3-3 Develop guidelines for contract farming, cultivation and post-harvest protocols, export procedures, controlling chemical residues and other necessary procedures required for exporting to the target market.</p> <p>3-4 Marketing activity is supported with branding, material development, participation in trade fair etc.</p> <p>3-5 Develop a platform for mango farmers, processors and concerned government officials to exchange information and opinions on the mango processing industry.</p> <p>3-6 AP mango branding and marketing strategy is developed.</p>			<p><Pre-conditions></p> <ul style="list-style-type: none"> - Policy of AP government on promoting processing industries will not change. - Interest of processing companies in participating in the pilot remain same.

	Activity	Responsible organization	Target	Preparation												1st year												2nd year												3rd year												4th year											
				1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12						
No of month				1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12												
Month																																																															
0-1	Procurement of Pilot Project Implementation Consultant (PPIC)	PMU																																																													
1-1	A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant (PPIC).	DoH																																																													
1-2	District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	PIT																																																													
1-3	Team building and confidence building of PIT is conducted.	PPIC																																																													
1-4	Holding information sessions of the project and matching sessions between farmers and processing units	PIT																																																													
1-5	Screening and appraisal of target processing units	PIT																																																													
1-6	Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)	PIT/FPO/Processing company	PIT/FPO/Private																																																												
1-7	Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	PIT	PIT/FPO/Private																																																												
1-8	Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	PIT	PIT/FPO/Private																																																												
1-9	Success and lessons learnt of the pilot is shared by developing promotional materials and accepting observation tours by interested farmers.	PIT	PIT/FPO/Private																																																												
1-10	Strategy and plan for replicating the pilot model are developed by stakeholders.	PIT	PIT/FPO/Private																																																												
2-1	Trainings to agronomists of processing units, lead farmers and horticulture officers (including GAP, food safety, post harvest handling and responsible contract farming) are conducted.	PIT/DoH	FPO/lead farmer																																																												
2-2	Trainings to all participating farmers are conducted.	PIT/DoH	Farmer																																																												
2-3	Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)	PIT/DoH	Farmer																																																												
2-4	Training for quality management and productivity improvement such as 5S, Kaizen for the processors is conducted.	PIT/APFPS	Private																																																												
2-5	Setup and operation of common facility utilizing common facility fund.	PIT/DoH	Farmer																																																												
3-1	Conduct survey to identify target markets and market analysis survey (potential buyers, required specifications, procedures, certificates etc.) is conducted.	PIT/APFPS/APEDA	Private																																																												
3-2	Collect information and establish linkages with necessary resources for developing AP brand such as research institutions, testing laboratories, business service providers including financial institutions and legal advisors and supporting industries.	PIT/APFPS	APFPS																																																												
3-3	Develop guidelines for contract farming, cultivation and post harvest protocols, export procedures, controlling chemical residues and other necessary procedures required for exporting to the target market.	PIT/APFPS	APFPS																																																												
3-4	Marketing activity is supported with branding, material development, participation in trade fair etc.	PIT/APFPS	APFPS																																																												
3-5	Develop a platform for mango farmers, processors and concerned government officials to exchange information and opinions on the mango processing industry.	PIT/DoH/APFPS/APEDA	APFPS/APEDA																																																												
3-6	AP mango branding and marketing strategy is developed.	PIT/DoH/APFPS	APFPS																																																												

(b) PO

(2) Mango (Fresh Export)

- Project Period: 2018-2022 (Phase I: 4 years)
- Project Site: Krishna District
- Target Group: APFPS, DoH, APEDA, Processing companies and FPO

(a) PDM

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>OVERALL GOAL</p> <p>Increase the competitiveness of fresh mango export in AP by developing AP brand</p>	<p>a. Fresh mango export in AP increases by xx%.</p> <p>b. Rejection of AP mango import in advanced countries decreases.</p> <p>c. AP state government promotes AP fresh mangoes as AP brand.</p>	<p>a. Statistics of AP</p> <p>b. APEDA statistics</p> <p>c. AP policy statements</p>	
<p>PROJECT GOAL</p> <p>Efficiency of food value chain of fresh mango export is improved in the pilot area.</p>	<p>a. Cost of procuring mango is decreased for partner processing companies.</p> <p>b. Share of direct procurement from farmers is increased for partner exporters</p> <p>c. Income from table variety mango is increased for partner farmers.</p>	<p>a. Baseline Survey and Impact Assessment</p> <p>b. Baseline Survey and Impact Assessment</p> <p>c. Baseline Survey and Impact Assessment</p>	<p>- No drastic change in development policy in agriculture sector of the central government and the state government happens.</p> <p>- Yen Loan Project will be implemented as scheduled.</p>
<p>OUTPUTS</p> <p>1. A mechanism to support the entire VC of fresh mango export is developed.</p> <p>2. Capacity of government officials, farmers and processing</p>	<p>a. Staffs of PIT are secured.</p> <p>b. Institution building training to PMU staff at the state and districts is conducted xx times in total.</p> <p>c. 5 partner exporters are selected for the pilot project.</p> <p>d. 100 farmers (100 ha) are selected for the pilot project.</p> <p>e. Baseline survey and project plan for each partner is prepared.</p> <p>f. Capacity development plan and training modules are developed for the pilot project.</p> <p>g. Expansion strategy of the pilot is prepared.</p> <p>a. Training materials are developed.</p>	<p>a. Progress Reports/ Project Completion Report</p> <p>b. Progress Reports/ Project Completion Report</p> <p>c. Progress Reports/ Project Completion Report</p> <p>d. Progress Reports/ Project Completion Report</p> <p>e. Progress Reports/ Project Completion Report</p> <p>f. Progress Reports/ Project Completion Report</p> <p>g. Progress Reports/ Project Completion Report</p> <p>a. Progress Reports/ Project Completion Report</p>	<p>- No drastic change in the market for fresh mango export happens.</p> <p>- No serious drought or flood damaged to agriculture production happens.</p>

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>companies is developed.</p> <p>3. Development marketing strategy for fresh mango export VC is developed</p>	<p>b. Trainings to master trainers, lead farmers and horticulture officers are conducted xx times in total.</p> <p>c. Trainings to partner farmers are conducted xx times in total.</p> <p>d. No of farmers who have access to the government schemes is increased.</p> <p>e. Trainings on quarantine officials are conducted xx times in total.</p> <p>a. Developed guidelines and manuals for the target market</p> <p>b. List of resource persons, institutions and service providers</p> <p>c. Meetings among farmers, exporters and government are held xx times in total.</p> <p>d. Developed marketing and branding strategy</p>	<p>b. Progress Reports/ Project Completion Report</p> <p>c. Progress Reports/ Project Completion Report</p> <p>d. Progress Reports/ Project Completion Report</p> <p>c. Progress Reports/ Project Completion Report</p> <p>a. Progress Reports/ Project Completion Report</p> <p>b. Progress Reports/ Project Completion Report</p> <p>c. Progress Reports/ Project Completion Report</p> <p>d. Progress Reports/ Project Completion Report</p>	

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<p><Output-1></p> <p>1-1 A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant.</p> <p>1-2 District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.</p> <p>1-3 Team building and confidence building of PIT and DPCC is conducted.</p> <p>1-4 Holding information sessions of the project and matching sessions between farmers and processing units</p> <p>1-5 Screening and appraisal of target processing units and making agreement between DoH and exporters, exporters and farmers.</p> <p>1-6 Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)</p> <p>1-7 Capacity development plan and training module are identified or developed jointly by stakeholders and IT.</p> <p>1-8 Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.</p> <p>1-9 Success and lessons learnt of the pilot is shared by developing promotional materials and organizing observation tours for interested farmers.</p> <p>1-10 Strategy and plan for replicating the pilot model are developed by stakeholders.</p>	<p><Project Implementation Team (PIT)></p> <p>(1) Staff requirement</p> <p>- DDH, Horticulture (Head of project) ADH, Horticulture (Financial Management)</p> <p>- Official of APFPS (Marketing coordinator of PPIC)</p> <p>- Horticulture Coordinator (PPIC) hired by Department</p> <p>- Marketing Coordinator (PPIC)</p> <p>- Training Coordinator (PPIC)</p> <p>- Administrative & Accounts Executive (PPIC)</p> <p>(2) Office Space (100 m2)</p> <p>(3) Data, information, documents and facilities relevant to the project</p> <p>(4) Running Expenses of PIT</p>		<p>- Policy of AP government on promoting processing industries will not change.</p> <p>- Interest of processing companies in participating in the pilot remain same.</p>
<p><Output-2></p> <p>2-1 Trainings to agronomists of processing units, lead farmers and horticulture officers (including GAP, food safety, post-harvest handling and responsible contract farming) are conducted.</p> <p>2-2 Trainings to all participating farmers are conducted.</p>			

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<p>2-3 Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)</p> <p>2-4 Training for quarantine officials on inspection skills of fresh mango is conducted.</p> <p>2-5 Setup and operation of common facilities utilizing common facility fund.</p>			<p><Pre-conditions></p> <p>- Policy of AP government on promoting processing industries will not change.</p>
<p><Output-3></p> <p>3-1 Conduct survey to identify target markets and market analysis survey (potential buyers, required specifications, procedures, certificates etc.) is conducted.</p> <p>3-2 Collect information on and establish linkages with necessary resources for developing AP brand such as research institutions, testing laboratories, business service providers including financial institutions and legal advisors and supporting industries.</p> <p>3-3 Develop guidelines for contract farming, cultivation and post-harvest protocols, export procedures, controlling chemical residues and other necessary procedures required for exporting fresh mangoes to the target market.</p> <p>3-4 Marketing activity is supported with branding, material development, participation in trade fair etc.</p> <p>3-5 Develop a platform for mango farmers, exporters and concerned government officials to exchange information and opinions on the fresh mango export.</p> <p>3-6 AP mango branding and marketing strategy is developed.</p>			

Activity	Responsible organization	Target	Preparation	1st year												2nd year												3rd year												4th year													
				1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8
No of month				Month																																																	
0-1 Procurement of Pilot Project Implementation Consultant (PPIC)	PMU																																																				
1-1 A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant (PPIC).	DoH																																																				
1-2 Distract Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	PIT																																																				
1-3 Team building and confidence building of PIT is conducted.	PPIC																																																				
1-4 Holding information sessions of the project and matching sessions between farmers and exporters	PIT																																																				
1-5 Screening and appraisal of target exporters and making agreement between DoH and exporters, exporters and farmers.	PIT																																																				
1-6 Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)	PIT/FPO/Exporters	PIT/FPO/Private																																																			
1-7 Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	PIT	PIT/FPO/Private																																																			
1-8 Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	PIT	PIT/FPO/Private																																																			
1-9 Success and lessons learnt of the pilot is shared by developing promotional materials and organizing observation tours for interested farmers.	PIT	PIT/FPO/Private																																																			
1-10 Strategy and plan for replicating the pilot model are developed by stakeholders.	PIT	PIT/FPO/Private																																																			
2-1 Trainings to master trainers, lead farmers and horticulture officers (including GAP, food safety, post harvest handling, responsible contract farming) are conducted.	PIT/DoH	FPO/lead farmer																																																			
2-2 Trainings to all participating farmers are conducted.	PIT/DoH	Farmer																																																			
2-3 Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)	PIT/DoH	Farmer																																																			
2-6 Training for quarantine officials on inspection skills of fresh mango is conducted.	PIT	Quarantine officer																																																			
2-5 Setup and operation of common facilities utilizing common facility fund.	PIT/DoH	Farmer																																																			
3-1 Conduct survey to identify target markets and market analysis survey (potential buyers, required specifications, procedures, certificates etc.) is conducted.	PIT/APFPS/APEDA	Private																																																			
3-2 Collect information on and establish linkages with necessary resources for developing AP brand such as research institutions, testing laboratories, business service providers including financial institutions and legal advisors and supporting industries.	PIT/APFPS	APFPS																																																			
3-3 Develop guidelines for contract farming, cultivation and post harvest protocols, export procedures, controlling chemical residues and other necessary procedures required for exporting fresh mangoes to the target market.	PIT/APFPS	APFPS																																																			
3-4 Marketing activity is supported with branding, material development, participation in trade fair etc.	PIT/APFPS	APFPS																																																			
3-5 Develop a platform for mango farmers, exporters and concerned government officials to exchange information and opinions on the fresh mango export.	PIT/DoH/APFPS/APEDA	APFPS/APEDA																																																			
3-6 AP mango branding and marketing strategy is developed.	PIT/DoH/APFPS	APFPS																																																			

(b) PO

(3) Tomato

- Project Period: 2018-2020 (Phase I: 3 years)
- Project Site: Chittoor District
- Target Group: APFPS, DoH, APEDA, Processing companies and FPO

(a) PDM

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>OVERALL GOAL</p> <p>Increase the competitiveness of processed tomato industry in AP by developing AP brand</p>	<p>a. Number of farmers who directly supply their tomato to the processing units increases by xx% on average in the target area of JICA loan project.</p> <p>b. The tomato processing industry has a mechanism to coordinate opinions as an industry.</p> <p>c. AP state government promotes AP processed tomato products as AP brand.</p>	<p>a. APFPS annual report</p> <p>b. APFPS annual report</p> <p>c. APFPS annual report</p>	
<p>PROJECT GOAL</p> <p>Efficiency of food value chain of processed tomato is improved in the pilot area.</p>	<p>a. Share of direct procurement from farmers is increased for partner processing companies.</p> <p>b. Cost of procuring tomato is decreased for partner processing companies.</p> <p>c. Income from processing variety tomato is increased for partner farmers.</p>	<p>a. Baseline Survey and Impact Assessment</p> <p>b. Baseline Survey and Impact Assessment</p> <p>c. Baseline Survey and Impact Assessment</p>	<p>- No drastic change in development policy in agriculture sector of the central government and the state government happens.</p> <p>- Yen Loan Project will be implemented as scheduled.</p>
<p>OUTPUTS</p> <p>1. A mechanism to support the entire VC of processed tomato is developed.</p>	<p>a. Staffs of PIT are secured.</p> <p>b. Institution building training to PMU staff at the state and districts is conducted xx times in total.</p> <p>c. 3 partner processing companies are selected for the pilot project.</p> <p>d. 500 farmers (500 ha) are selected for the pilot project.</p>	<p>a. Progress Reports/ Project Completion Report</p> <p>b. Progress Reports/ Project Completion Report</p> <p>c. Progress Reports/ Project Completion Report</p> <p>d. Progress Reports/ Project Completion Report</p>	<p>- No drastic change in the market for processed tomato happens.</p> <p>- No serious drought or flood damaged to agriculture production happens.</p>

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>2. Capacity of government officials, farmers and processing companies is developed.</p>	<p>e. Baseline survey and project plan for each partner is prepared. f. Capacity development plan and training modules are developed for the pilot project. g. Expansion strategy of the pilot is prepared. a. Training materials are developed. b. Trainings to agronomists, lead farmers and horticulture officers are conducted xx times in total. c. Trainings to partner farmers are conducted xx times in total. d. No of farmers who have access to the government schemes e. Trainings on quality control for processing companies are conducted xx times in total.</p>	<p>e. Progress Reports/ Project Completion Report f. Progress Reports/ Project Completion Report g. Progress Reports/ Project Completion Report a. Progress Reports/ Project Completion Report b. Progress Reports/ Project Completion Report c. Progress Reports/ Project Completion Report d. Progress Reports/ Project Completion Report e. Progress Reports/ Project Completion Report</p>	
<p>3. Development marketing strategy for processed tomato VC is developed</p>	<p>a. Developed guidelines and manuals for the target market b. List of resource persons, institutions and service providers c. Meetings among farmers, processors and government are held xx times in total. d. Developed marketing and branding strategy</p>	<p>a. Progress Reports/ Project Completion Report b. Progress Reports/ Project Completion Report c. Progress Reports/ Project Completion Report d. Progress Reports/ Project Completion Report</p>	

ACTIVITIES		INPUTS		IMPORTANT ASSUMPTIONS
<Output-1>		<Project Implementation Team (PIT)>		
1-1	A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant.	(1)	Staff requirement	- Policy of AP government on promoting processing industries will not change
1-2	District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	-	DDH, Horticulture (Head of project) ADH, Horticulture (Financial Management)	- Interest of processing companies in participating in the pilot remain same.
1-3	Team building and confidence building of PIT and DPCC is conducted.	-	Official of APFPS (Marketing coordinator of PPIC)	
1-4	Holding information sessions of the project and matching sessions between farmers and processing units	-	Horticulture Coordinator (PPIC) hired by Department	
1-5	Screening and appraisal of target processing units and making agreement between DoH and processors, processors and farmers.	-	Marketing Coordinator (PPIC)	
1-6	Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)	-	Training Coordinator (PPIC)	
1-7	Capacity development plan and training module are identified or developed jointly by stakeholders and IT.	-	Administrative & Accounts Executive (PPIC)	
1-8	Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	(2)	Office Space (100 m2)	
1-9	Success and lessons learnt of the pilot is shared by developing promotional materials and organizing observation tours for interested farmers.	(3)	Data, information, documents and facilities relevant to the project	
1-10	Strategy and plan for replicating the pilot model are developed by stakeholders.	(4)	Running Expenses of PIT	

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<p><Output-2></p> <p>2-1 Trainings to agronomists of processing units, lead farmers and horticulture officers on cultivation techniques (including GAP, food safety and post-harvest handling) are conducted.</p> <p>2-2 Trainings to all participating farmers on cultivation techniques (including GAP, food safety and post-harvest handling) are conducted.</p> <p>2-3 Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)</p> <p>2-4 Training for quality management and productivity improvement such as 5S, Kaizen for the processors is conducted.</p> <p>2-5 Setup and operation of common facilities utilizing common facility fund.</p>			<p><Precondition></p> <ul style="list-style-type: none"> - Policy of AP government on promoting processing industries will not change. - Interest of processing companies in participating in the pilot remain same.
<p><Output-3></p> <p>3-1 Conduct survey to identify target markets and market analysis survey (potential buyers, required specifications, procedures, certificates etc.) is conducted.</p> <p>3-2 Collect information and establish linkages with necessary resources for developing AP brand such as research institutions, testing laboratories, business service providers including financial institutions and legal advisors and supporting industries.</p>			

ACTIVITIES		INPUTS		IMPORTANT ASSUMPTIONS
3-3	Develop guidelines for contract farming, cultivation and post-harvest protocols, export procedures, controlling chemical residues and other necessary procedures required for exporting to the target market.			
3-4	Marketing activity is supported with branding, material development, participation in trade fair etc.			
3-5	Develop a platform for tomato farmers, processors and concerned government officials to exchange information and opinions on the tomato processing industry.			
3-6	AP tomato branding and marketing strategy is developed.			

	Activity	Responsible organization	Target	Preparation						1st year												2nd year												3rd year																					
				1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12										
No of month				1	2	3	4	5	6	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12										
Month																																																							
0-1	Procurement of Pilot Project Implementation Consultant (PPIC)	PMU																																																					
1-1	A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant (PPIC).	DoH																																																					
1-2	District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	PIT																																																					
1-3	Team building and confidence building of PIT is conducted.	PPIC																																																					
1-4	Holding information sessions of the project to adjust the conditions of activities and matching sessions between farmers and processing units	PIT																																																					
1-5	Screening and appraisal of target processing units and making agreement with selected processing units.	PIT																																																					
1-6	Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)	PIT/FPO/Processing company	PIT/FPO/Private																																																				
1-7	Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	PIT	PIT/FPO/Private																																																				
1-8	Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	PIT	PIT/FPO/Private																																																				
1-9	Success and lessons learnt of the pilot is shared by developing promotional materials and organizing observation tours for interested farmers.	PIT	PIT/FPO/Private																																																				
1-10	Strategy and plan for replicating the pilot model are developed by stakeholders.	PIT	PIT/FPO/Private																																																				
2-1	Trainings to agronomists of processing units, lead farmers and horticulture officers on cultivation techniques (including GAP, food safety and post harvest handling) are conducted.	PIT/DoH	Farmer																																																				
2-2	Trainings to all participating farmers on cultivation techniques (including GAP, food safety and post harvest handling) are conducted.	PIT/DoH	Farmer																																																				
2-3	Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)	PIT	Farmer																																																				
2-4	Training for quality management and productivity improvement such as 5S, Kaizen for the processors is conducted.	PIT/APFPS	Private																																																				
2-5	Setup and operation of common facility utilizing common facility fund.	PIT/DoH	Farmer																																																				
3-1	Conduct survey to identify target markets and market analysis survey (potential buyers, required specifications, procedures, certificates etc.) is conducted.	PIT/APFPS/APEDA	Private																																																				
3-2	Collect information and establish linkages with necessary resources for developing AP brand such as research institutions, testing laboratories, business service providers including financial institutions and legal advisors and supporting industries.	PIT/APFPS	APFPS																																																				
3-3	Develop guidelines for contract farming, cultivation and post harvest protocols, export procedures, controlling chemical residues and other necessary procedures required for exporting to the target market.	PIT/APFPS	APFPS																																																				
3-4	Marketing activity is supported with branding, material development, participation in trade fair etc.	PIT/DoH/APFPS/APEDA	APFPS/APEDA																																																				
3-5	Develop a platform for tomato farmers, processors and concerned government officials to exchange information and opinions on the tomato processing industry.	PIT/DoH/APFPS/APEDA																																																					
3-6	AP tomato branding and marketing strategy is developed.	PIT/DoH/APFPS/APEDA	APFPS/APEDA																																																				

(b) PO

(4) Chili

- Project Period: 2018-2020 (3 years)
- Project Site: Guntur District
- Target Group: APFPS, DoH, Spice Board, APEDA, Processing companies, exporters and FPO

(a) PDM

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>OVERALL GOAL</p> <p>Increase the competitiveness of chili produce in AP by developing AP brand</p>	<p>a. AP chili industry has a mechanism to coordinate opinions as an industry.</p> <p>b. AP state government promotes AP chili products as AP brand.</p> <p>c. AP chili gets brand recognition in domestic and international markets.</p>	<p>a. APFPS annual report</p> <p>b. APFPS annual report</p> <p>c. APFPS annual report</p>	
<p>PROJECT GOAL</p> <p>Efficiency of food value chain of chili is improved in the pilot area.</p>	<p>a. Cost of procuring chili is decreased for partner processing companies and exporters.</p> <p>b. Share of direct procurement from farmers is increased for partner processing companies and exporters.</p> <p>c. Income from chili is increased for partner farmers.</p>	<p>a. Baseline Survey and Impact Assessment</p> <p>b. Baseline Survey and Impact Assessment</p> <p>c. Baseline Survey and Impact Assessment</p>	<p>- No drastic change in development policy in agriculture sector of the central government and the state government happens.</p> <p>- Yen Loan Project will be implemented as scheduled.</p>
<p>OUTPUTS</p> <p>1. A mechanism to support the entire VC of chili is developed.</p>	<p>a. Staffs of PIT are secured.</p> <p>b. Institution building training to management staff at the state and districts is conducted xx times in total.</p> <p>c. At least 2 FPOs are identified or formed.</p> <p>d. At least 2 partner processing companies are selected for the pilot project.</p> <p>e. 1000 farmers (800 ha) are selected for the pilot project.</p>	<p>a. Progress Reports/ Project Completion Report</p> <p>b. Progress Reports/ Project Completion Report</p> <p>c. Progress Reports/ Project Completion Report</p> <p>d. Progress Reports/ Project Completion Report</p> <p>e. Progress Reports/ Project Completion Report</p>	<p>- No drastic change in the market for chili happens.</p> <p>- No serious natural disaster (drought, flood, pest and disease outbreak) damaged to agriculture production happens.</p>

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>2. Capacity of government officials, farmers and processing companies is developed.</p> <p>3. Marketing strategy for processed chili VC is developed</p>	f. Baseline survey and project plan for each partner is prepared.	f. Progress Reports/ Project Completion Report	
	g. Capacity development plan and training modules are developed for the pilot project.	g. Progress Reports/ Project Completion Report	
	h. Expansion strategy of the pilot is prepared.	h. Progress Reports/ Project Completion Report	
	a. Training materials are developed.	a. Progress Reports/ Project Completion Report	
	b. Trainings to master trainers are conducted xx times in total.	b. Progress Reports/ Project Completion Report	
	c. Trainings to partner farmers are conducted xx times in total.	c. Progress Reports/ Project Completion Report	
	d. No of farmers who have access to the government schemes	d. Progress Reports/ Project Completion Report	
	e. No. of post-harvest facility in place	e. Progress Reports/ Project Completion Report	
	f. Trainings on quality control for processing companies are conducted xx times in total.	f. Progress Reports/ Project Completion Report	
	a. Developed guidelines and manuals for the target market	a. Progress Reports/ Project Completion Report	
	b. List of resource persons, institutions and service providers	b. Progress Reports/ Project Completion Report	
	c. Meetings among farmers, processors and government are held xx times in total.	c. Progress Reports/ Project Completion Report	
	d. Developed marketing and branding strategy	d. Progress Reports/ Project Completion Report	

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<p><Output-1></p> <p>1-1 A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant.</p> <p>1-2 District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.</p> <p>1-3 Team building and confidence building of PIT and DPCC is conducted.</p> <p>1-4 Target Farmer Producer Organizations (FPO) are identified (or mobilize farmers to form FPO) and capacity is enhanced.</p> <p>1-5 Holding information sessions of the project and matching sessions between farmers and processing units</p> <p>1-6 Screening and appraisal of target processing units and making agreement between DoH and processors, processors and farmers.</p> <p>1-7 Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)</p> <p>1-8 Capacity development plan and training module are identified or developed jointly by stakeholders and IT.</p> <p>1-9 Joint end line survey is conducted to evaluate the result of pilot by all stakeholders.</p> <p>1-10 Success and lessons learnt of the pilot is shared by developing promotional materials and accepting observation tours for interested farmers.</p> <p>1-11 Strategy and plan for replicating the pilot model are developed by stakeholders.</p>	<p><Project Implementation Team (PIT)></p> <p>(1) Staff requirement</p> <p>- DDH, Horticulture (Head of project) ADH, Horticulture (Financial Management)</p> <p>- Official of APFPS (Marketing coordinator of PPIC)</p> <p>- Horticulture Coordinator (PPIC) hired by Department</p> <p>- Marketing Coordinator (PPIC)</p> <p>- Training Coordinator (PPIC)</p> <p>- Administrative & Accounts Executive (PPIC)</p> <p>(2) Office Space (100 m2)</p> <p>(3) Data, information, documents and facilities relevant to the project</p> <p>(4) Running Expenses of PIT</p>		<p>- Policy of AP government on promoting processing industries will not change</p> <p>- Interest of processing companies in participating in the pilot remain same.</p>
<p><Output-2></p>			<p><Pre-conditions></p>

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<p>2-1 Trainings to master trainers (agronomists of processing units, lead farmers and horticulture officers) on cultivation and post-harvest techniques (including GAP, crop planning, soil health management, food safety and drying) are conducted.</p> <p>2-2 Trainings to all participating farmers on cultivation techniques (same as 2-1) are conducted.</p> <p>2-3 Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)</p> <p>2-4 Training for quality management and productivity improvement such as 5S, Kaizen for the processors is conducted.</p> <p>2-5 Setup and operation of common facilities utilizing common facility fund.</p>			<p>- Policy of AP government on promoting processing industries will not change</p> <p>- Interest of processing companies in participating in the pilot remain same.</p>
<p><Output-3></p> <p>3-1 Conduct market survey to identify target markets.</p> <p>3-2 Develop guidelines for procurement, cultivation and post-harvest protocols, export procedures, controlling chemical residues and other necessary procedures required for exporting to the target market.</p> <p>3-3 Sessions to enhance the public awareness on the danger of chemical residue and aflatoxin are conducted.</p> <p>3-4 Marketing activity is supported with branding, material development, participation in trade fair etc.</p> <p>3-5 AP chili branding and marketing strategy is developed.</p>			

(5) Coconut

- Project Period: 2018-2020 (3 years)
- Project Site: East Godavari District
- Target Group: APFPS, DoH, Coconuts Development Board, APEDA, Processing companies, exporters and FPO

(a) PDM

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>OVERALL GOAL</p> <p>Increase the competitiveness of coconut produces in AP by developing AP brand</p>	<p>a. AP coconut sector has a mechanism to coordinate opinions as a coconut cluster.</p> <p>b. AP state government promotes AP coconut products as AP brand.</p>	<p>a. APFPS annual report</p> <p>b. APFPS annual report</p>	
<p>PROJECT GOAL</p> <p>Efficiency of food value chain of coconut is improved in the pilot area.</p>	<p>a. Income from coconut is increased for partner farmers.</p> <p>b. Share of direct procurement from farmers is increased for exporters or partner processing companies.</p> <p>c. Successful marketing structure of target coconut products are established by CPCs.</p>	<p>a. Baseline Survey and Impact Assessment</p> <p>b. Baseline Survey and Impact Assessment</p> <p>c. Baseline Survey and Impact Assessment</p>	<p>- No drastic change in development policy in agriculture sector of the central government and the state government happens.</p> <p>- Yen Loan Project will be implemented as scheduled.</p>
<p>OUTPUTS</p> <p>1. A mechanism to promote coconuts value chain in East Godavari district is established as a pilot model and its capacity for expand to other areas is enhanced.</p>	<p>a. Staffs of PIT are secured.</p> <p>b. Institution building training to management staff at the state and districts is conducted xx times in total.</p> <p>c. At least 2 CPCs are identified or formed.</p> <p>d. 1,000 farmers (800 ha) are selected for the pilot project.</p> <p>e. Baseline survey and project plan for each partner is prepared.</p>	<p>a. Progress Reports/ Project Completion Report</p> <p>b. Progress Reports/ Project Completion Report</p> <p>c. Progress Reports/ Project Completion Report</p> <p>d. Progress Reports/ Project Completion Report</p> <p>e. Progress Reports/ Project Completion Report</p>	<p>- No drastic change in the market for chili happens.</p> <p>- No serious natural disaster (drought, flood, pest and disease outbreak) damaged to agriculture production happens.</p>

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>2. Capacity of the concerned stakeholders including government officials, farmer's groups and private partners is developed for targeting the identified markets.</p> <p>3. Marketing strategy for coconut VC is developed.</p>	f. Capacity development plan and training modules are developed for the pilot project.	f. Progress Reports/ Project Completion Report	
	g. Expansion strategy of the pilot is prepared.	g. Progress Reports/ Project Completion Report	
	a. Training materials are developed.	a. Progress Reports/ Project Completion Report	
	b. Trainings to master trainers are conducted xx times in total.	b. Progress Reports/ Project Completion Report	
	c. Trainings to partner farmers are conducted xx times in total.	c. Progress Reports/ Project Completion Report	
	d. XX farmers have access to the government schemes.	d. Progress Reports/ Project Completion Report	
	e. XX facilities (identified by 2-5) are established and managed with sustainable structure.	e. Progress Reports/ Project Completion Report	
	a. Guidelines and manuals for the target market and products are developed.	a. Progress Reports/ Project Completion Report	
	b. List of resource persons, institutions and service providers are developed.	b. Progress Reports/ Project Completion Report	
	c. Meetings among farmers, processors and government are held xx times in total.	c. Progress Reports/ Project Completion Report	
	d. Marketing and branding strategy is developed.	d. Progress Reports/ Project Completion Report	

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<Output-1>	<Project Implementation Team (PIT)>		
1-1 A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant.	(1)	Staff requirement	- Policy of AP government on promoting processing industries will not change.
1-2 Distract Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	-	DDH, Horticulture (Head of project) ADH, Horticulture (Financial Management)	- Interest of Coconut Producer Companies in participating in the pilot remain same.
1-3 Team building and confidence building of PIT and DPCC is conducted.	-	Official of APFPS (Marketing coordinator of PPIC)	
1-4 Target Coconut Producer Companies (CPCs) are identified (or mobilize farmers to form CPCs) and capacity is enhanced.	-	Horticulture Coordinator (PPIC) hired by Department	
1-5 Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)	-	Marketing Coordinator (PPIC)	
1-6 Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	-	Training Coordinator (PPIC)	
1-7 Joint sessions for supply chain management are conducted for concerned stakeholders to enhance linkage between CPCs and private partners (processors, exporters etc.)	-	Administrative & Accounts Executive (PPIC)	<Pre-conditions> - Policy of AP government on promoting processing industries will not change.
1-8 Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	(2)	Office Space (100 m2)	- Interest of Coconut Producer Companies in participating in the pilot remain same.
1-9 Success and lessons learnt of the pilot is shared by developing promotional materials and organizing observation tours for interested farmers.	(3)	Data, information, documents and facilities relevant to the project	
1-10 Strategy and plan for replicating the pilot model are developed by stakeholders.	(4)	Running Expenses of PIT	

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<Output-2>			
2-1 Trainings to master trainers (lead farmers, horticulture officers, research institute etc.) on cultivation and post-harvest techniques (including GAP, crop planning, soil health management, harvesting, husking, food safety etc.) are conducted.			
2-2 Trainings to all participating farmers on cultivation techniques (same as 2-1) are conducted.			
2-3 Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)			
2-4 Necessary inputs for processing facilities are provided for group activities of CPCs.			
2-5 Setup and operation of common facilities utilizing common facility fund.			
<Output-3>			
3-1 Conduct market survey to identify target markets and coconut products.			
3-2 Collect information and establish linkages with necessary resources for developing AP brand such as research institutions, testing laboratories, business service providers including financial institutions and legal advisors and supporting industries.			
3-3 Marketing activity is supported with branding, material development, participation in trade fair etc.			
3-4 AP coconut branding and marketing strategy is developed.			

(6) Shrimp

- Project Period: 2018-2020 (3 years)
- Project Site: West Godavari
- Target Group: Department of Fishery (DOF), Andhra Pradesh Food Processing Society (APFPS), Marine Products Export Development Authority (MPEDA), Central Institute of Blackish Aquaculture (CIBA), Coastal Aquaculture Authority (CAA), National Center for Sustainable Aquaculture (NaCSA), Processing companies, exporters and shrimp farmer's clusters

(a) PDM

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
OVERALL GOAL Increase the competitiveness of shrimp export in AP by developing AP brand	<ul style="list-style-type: none"> a. More than 3 shrimp farming zones observe GAP and certified by MPEDA b. Recognition of the AP brand name by overseas buyers 	<ul style="list-style-type: none"> a. Certificate of MPEDA b. APFPS annual report 	
PROJECT GOAL Efficiency of food value chain of shrimp export is improved in the pilot area.	<ul style="list-style-type: none"> a. 80% of the shrimp produced in the cluster is certified as high quality (20% is properly discriminated) b. Income from shrimp is increased for partner farmers. 	<ul style="list-style-type: none"> a. Record of test results for 2 years. a. Baseline Survey and Impact Assessment 	<ul style="list-style-type: none"> - No drastic change in development policy in fishery sector of the central government and the state government happens. - Yen Loan Project will be implemented as scheduled.
OUTPUTS 1 A mechanism to support the entire VC of shrimp export is developed.	<ul style="list-style-type: none"> a. Staffs of PIT are secured. b. Institution/confidence building training to management staff at the state and districts is conducted xx times in total. d. At least 5 partner processing companies are selected for the pilot project. e. At least 20 shrimp farmers cluster (25 farmers) are selected for the pilot project. 	<ul style="list-style-type: none"> a. Progress Reports/ Project Completion Report b. Progress Reports/ Project Completion Report d. Progress Reports/ Project Completion Report e. Progress Reports/ Project Completion Report 	<ul style="list-style-type: none"> - No drastic change in the market for shrimp happens. No serious natural disaster (drought, flood, pest and disease outbreak) damaged to fishery production happens.

2	Capacity of government officials, fishermen and processing companies is developed.	f.	Baseline survey and project plan for each partner is prepared.	f.	Progress Reports/ Project Completion Report	-	High quality shrimp seeds are available
		g.	Capacity development plan and training modules are developed for the pilot project.	g.	Progress Reports/ Project Completion Report	-	High quality shrimp feeds are available
		h.	Expansion strategy of the pilot is prepared.	h.	Progress Reports/ Project Completion Report	-	Reliable packer is available
		a.	Training materials are developed.	a.	Progress Reports/ Project Completion Report		
		b.	Trainings to master trainers are conducted xx times in total.	b.	Progress Reports/ Project Completion Report		
		c.	Trainings to partner fishermen are conducted xx times in total.	c.	Progress Reports/ Project Completion Report		
		d.	No of fishermen who have access to the government schemes	d.	Progress Reports/ Project Completion Report		
		e.	No. of facility for capture provided	e.	Progress Reports/ Project Completion Report		
3	Marketing strategy for shrimp export VC is developed	f.	Trainings on quality control for processing companies are conducted xx times in total.	f.	Progress Reports/ Project Completion Report		
		a.	Developed guidelines and manuals for the target market	a.	Progress Reports/ Project Completion Report		
		b.	List of resource persons, institutions and service providers	b.	Progress Reports/ Project Completion Report		
		c.	Meetings among fishermen, processors and government are held xx times in total.	c.	Progress Reports/ Project Completion Report		
		d.	Developed marketing and branding strategy	d.	Progress Reports/ Project Completion Report		

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<p><Output-1></p> <p>1-1 A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant.</p> <p>1-2 District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.</p> <p>1-3 Team building and confidence building of PIT and DPCC is conducted.</p> <p>1-4 Target shrimp farmer's clusters are identified and capacity is developed.</p> <p>1-5 Holding information sessions of the project and matching sessions between farmers and processing units</p> <p>1-6 Screening and appraisal of target processing units and making agreement between DOF and processors, processors and shrimp farming clusters.</p> <p>1-7 Joint project planning and baseline survey including market study is conducted with all stakeholders (government, shrimp farming clusters and private sectors)</p> <p>1-8 Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.</p> <p>1-9 Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.</p> <p>1-10 Success and lessons learnt of the pilot is shared by developing promotional materials and accepting observation tours for interested shrimp farming clusters.</p> <p>1-11 Strategy and plan for replicating the pilot model are developed by stakeholders.</p>	<p><Project Implementation Team (PIT)></p> <p>(1) Staff requirement</p> <p>- DDF, Fishery (Head of project) Official of APFPS (Marketing coordinator of PPIC)</p> <p>- 2 FDO in the project mandal</p> <p>- Computer assistant</p> <p>(2) Office Space (100 m2)</p> <p>(3) Data, information, documents and facilities relevant to the project</p> <p>(4) Running Expenses of PIT</p>		<p>- Policy of AP government on promoting processing industries will not change.</p> <p>- Interest of processing companies in participating in the pilot remain same.</p>

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<p><Output-2></p> <p>2-1 Necessary inputs and facilities for training such as healthy and high quality shrimp seed, appropriate feed and demonstration facility are provided to shrimp farming clusters.</p> <p>2-2 Training on scientific rearing practices for capture, pond environment monitoring methods and shrimp health monitoring methods is provided to shrimp farming clusters.</p> <p>2-3 Accredited aqua lab for disease surveillance and export requirement is developed.</p> <p>2-4 Setup and operation of common facilities utilizing common facility fund.</p>			<p><Pre-conditions></p> <ul style="list-style-type: none"> - Shrimp farms are willing to improve the production quality using cluster approach - Larger shrimp farms and packers support the cluster approach
<p><Output-3></p> <p>3-1 Conduct market survey to identify target markets.</p> <p>3-2 Develop guidelines for fishing, post-harvest, and processing and packing protocols required for exporting to the target market (Japan, Europe, USA, Asia, Middle East).</p> <p>3-3 Marketing activity is supported with sample shipment, branding, material development, participation in trade fair etc.</p> <p>3-4 AP shrimp branding and marketing strategy is developed.</p>			

(7) Tuna

- Project Period: 2018-2021
- Project Site: Vishakhapatnam District
- Target Group: Department of Fishery (DOF), Andhra Pradesh Food Processing Society (APFPS), Marine Products Exports Development Authority (MPEDA), Processing companies, exporters and Fishermen

(a) PDM

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p>OVERALL GOAL</p> <p>Increase the competitiveness of tuna export in AP by developing AP brand</p>	<p>a. Tuna export from AP increased.</p> <p>b. AP state government promotes AP tuna products as AP brand.</p> <p>c. More mechanical boat fishermen are showing interest in sashimi grade tuna fishing</p>	<p>a. APFPS annual report</p> <p>b. APFPS annual report MPEDA national certificate</p> <p>c. APFPS annual report Record of processors/exporters</p>	
<p>PROJECT GOAL</p> <p>Efficiency of food value chain of tuna export is improved in the pilot area. (Potential of producing sashimi grade tuna is proved.)</p>	<p>a. Sample tuna products are exported and receive a good reputation.</p> <p>b. Number of exporters showing interest in AP tuna increases.</p> <p>c. Partner fishermen continue to land sashimi grade tuna.</p> <p>d. Income from tuna is increased for partner farmers.</p>	<p>a. Baseline Survey and Impact Assessment</p> <p>b. Baseline Survey and Impact Assessment</p> <p>a. Baseline Survey and Impact Assessment</p> <p>Baseline Survey and Impact Assessment</p>	<p>- Fishing boat owners are willing to share the cost to modify their boats for tuna fishing.</p> <p>- Fisheries Department and National Fisheries Development Board continue to support tuna fishery development.</p>
<p>OUTPUTS</p> <p>1. A mechanism to support the entire VC of tuna export is developed.</p>	<p>a. Staffs of PIT are secured.</p> <p>b. Institution building training to management staff at the state and districts is conducted xx times in total.</p> <p>d. At least 5 partner processing companies are selected for the pilot project.</p> <p>e. 45 mechanized boats are selected for the pilot project.</p>	<p>a. Progress Reports/ Project Completion Report</p> <p>b. Progress Reports/ Project Completion Report</p> <p>d. Progress Reports/ Project Completion Report</p> <p>e. Progress Reports/ Project Completion Report</p>	<p>- No drastic change in the market for tuna happens.</p> <p>- No serious natural disaster (drought, flood, pest and disease outbreak) damaged to</p>

PROJECT SUMMARY	INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
2. Capacity of government officials, fishermen and processing companies is developed.	f. Baseline survey and project plan for each partner is prepared.	f. Progress Reports/ Project Completion Report	fishery production happens.
	g. Capacity development plan and training modules are developed for the pilot project.	g. Progress Reports/ Project Completion Report	
	h. Expansion strategy of the pilot is prepared.	h. Progress Reports/ Project Completion Report	
	a. Training materials are developed.	a. Progress Reports/ Project Completion Report	
	b. Trainings to master trainers are conducted xx times in total.	b. Progress Reports/ Project Completion Report	
	c. Trainings to partner fishermen are conducted xx times in total.	c. Progress Reports/ Project Completion Report	
	d. No of fishermen who have access to the government schemes	d. Progress Reports/ Project Completion Report	
	e. No. of facility for capture provided	e. Progress Reports/ Project Completion Report	
	f. Trainings on quality control for processing are conducted xx times in total.	f. Progress Reports/ Project Completion Report	
	3. Marketing strategy for tuna export VC is developed	a. Developed guidelines and manuals for the target market	
b. List of resource persons, institutions and service providers		b. Progress Reports/ Project Completion Report	
c. Meetings among fishermen, processors and government are held xx times in total.		c. Progress Reports/ Project Completion Report	
d. Developed marketing and branding strategy		d. Progress Reports/ Project Completion Report	

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<Output-1>	<Project Implementation Team (PIT)>		
1-1 A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant.	(1) Staff requirement		- Policy of AP government on promoting processing industries will not change.
1-2 District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	- DDF, Fishery (Head of project)		- Interest of processing companies in participating in the pilot remain same.
1-3 Team building and confidence building of PIT and DPCC is conducted.	- Official of APFPS (Marketing coordinator of PPIC)		
1-4 Target fishermen are identified.	- 2 FDO in the project mandal		
1-5 Holding information sessions of the project and matching sessions between fishermen and processing units	- Computer assistant		
1-6 Screening and appraisal of target processing units and making agreement between DOF and processors, processors and fishermen.	(2) Office Space (100 m ²)		
1-7 Joint project planning and baseline survey including market study is conducted with all stakeholders (government, fishermen and private sectors)	(3) Data, information, documents and facilities relevant to the project		
1-8 Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	(4) Running Expenses of PIT		
1-9 Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.			
1-10 Success and lessons learnt of the pilot is shared by developing promotional materials and accepting observation tours for interested fishermen.			
1-11 Strategy and plan for replicating the pilot model are developed by stakeholders.			

ACTIVITIES	INPUTS		IMPORTANT ASSUMPTIONS
<p><Output-2></p> <p>2-1 Fishing grounds location and depth are identified.</p> <p>2-2 Necessary equipment and facilities such as electric shocker and conversion of trawlers to long liners for training are provided to fishermen.</p> <p>2-3 Training for construction and deployment of Fish Aggregation Device (FAD)</p> <p>2-4 Training for capture and on-boat handling</p> <p>2-5 Training for processing such as quality inspection, fresh round and vacuum pack is conducted.</p> <p>2-4 Setup and operation of common facilities utilizing common facility fund.</p>			<p><Pre-conditions></p> <ul style="list-style-type: none"> - Policy of AP government on promoting processing industries will not change. - Interest of processing companies in participating in the pilot remain same.
<p><Output-3></p> <p>3-1 Conduct market survey to identify target markets.</p> <p>3-2 Developing guidelines for fishing, post-harvest, and processing and packing protocols required for exporting to the target market (Japan, Europe, USA, Asia, Middle East).</p> <p>3-3 Marketing activity is supported with sample shipment, branding, material development, participation in trade fair.</p> <p>3-4 AP tuna branding and marketing strategy is developed.</p>			

Attachment 11.2.3 Government Subsidy Schemes in Horticulture and Food Processing in Andhra Pradesh State

1. Assessment of Existing Subsidy Schemes in Andhra Pradesh State

(1) Approval and Fund Management system

Item	APFPS: Food Processing Policy	DoH: MIDH
Experience	4 years	8 years
Budget size	For last four years: annual average INR 200 million For 2016/17, budget of INR1billion is approved	For 2015/16, INR1.1billion For 2016/17, INR 2-2.5 billion
Staff	Four staffs of APFPS and four consultants are in charge of first screening and developing the evaluation reports.	<ul style="list-style-type: none"> ● Additional Director (ADH) in charge of MIDH at state level ● Each district has ADH in charge of MIDH. Horticulture Officers are also involved in promoting schemes and assisting farmers for their application,
Approval system	State Level Empowered Committee (SLEC) headed by Chief Secretary has authority to approve	<ul style="list-style-type: none"> ● Below INR200,000: Approved by Additional Director in the concerned district ● INR200,000-2,500,000: Approved by SLEC headed by Chief Secretary ● Above INR 2,500,000: Approved by National Horticulture Mission at central level
Fund management	APFPS	DoH applies central government for MIDH budget every fiscal year. Approved budget will be disbursed to DoH every quarter. DoH distribute the budget to district departments based on their requirements.

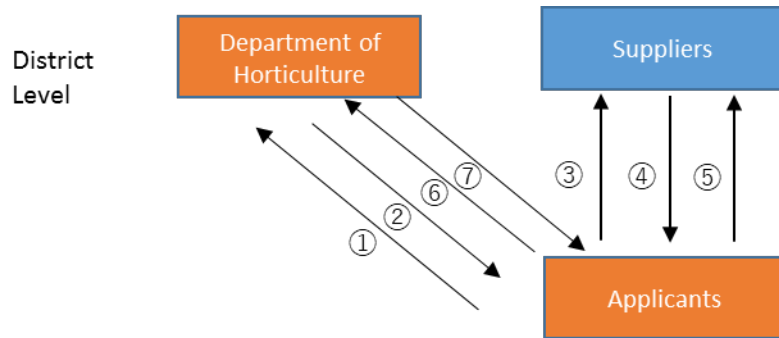
(2) Flow of Fund

Although flow of fund is different depending on the schemes and scale of assistance, basic principles which are common among all scheme are as follows:

- There should be some contribution from beneficiaries
- Subsidy funds are disbursed only after it is confirmed that the approved equipment is procured and received by the beneficiaries. In case of big facilities, the site inspection is required.
- Subsidy funds will be transferred to the bank accounts of beneficiaries. There is no cash transaction between government officials and beneficiaries.

(a) For Small Equipment whose Cost is below INR200,000 (MIDH)

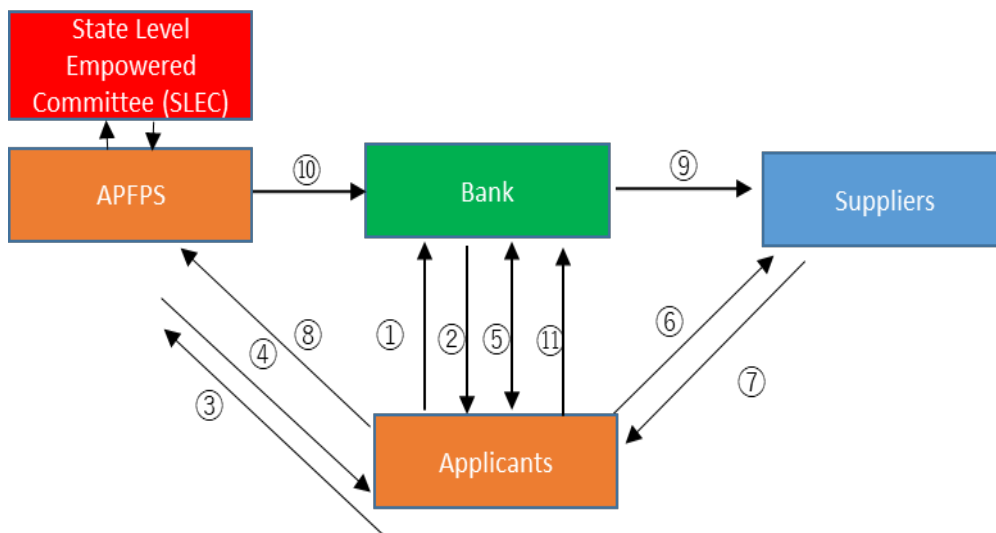
The application procedures and flow of funds for small equipment such as crates are explained below. In case of small equipment, Additional Director, Horticulture (ADH) of District Department has authority to approve the application. It normally takes one month from application to disbursement of fund.



- ① Submission of application
- ② Approval of subsidy after checks as per guidelines
- ③ Placing an order+ Payment of advance
- ④ Supply of required services and goods
- ⑤ Payment of services and goods
- ⑥ Submission of bills
- ⑦ Payment of subsidy to the **beneficiary's account**

(b) For Large Scale Equipment and Facilities (APFPS Scheme)

For the assistance to large scale equipment and facilities, an agreement between a beneficiary and bank on term loan to finance a part of project cost is a prerequisite for application. The applicant has to submit the bank appraisal report. The subsidy fund will be disbursed only after it is confirmed that contribution from the beneficiary and loan amount are spent and the construction or installation work progresses as planned. The funds will be paid not to beneficiary but to supplier of equipment or facilities through the bank.



- ① Application of loan
- ② Approval of loan with appraisal report
- ③ Submission of application with appraisal report
- ④ Approval of subsidy after inspection of site and clearance of State Level Empowered Committee
- ⑤ Loan agreement
- ⑥ Placing an order+ Payment of advance
- ⑦ Supply of required services and goods
- ⑧ Submission of required documents including certificates of chartered engineer
- ⑨ Payment of installments
- ⑩ Payment of subsidy in installments
- ⑪ Repayment of loans

APFPS has authority to approve all the schemes except for Mega Food Park scheme at state level. On the other hand, assistance to large scale facility under MIDH requires the approval by National Horticulture Mission at central level after approval by SLEC at state level. It takes around six months to obtain approval. There have not been many applications for this category either. While APFPS received 33 proposals costing around INR1 billion in 2015/16, DoH received between 10 and 15 applications for this category mainly for cold-storage.

Although both APFPS and DoH has a scheme to assist processing facilities, APFPS is considered to have more experience based on the past achievement, specialization and its appraisal system.

(3) Assessment of Implementation Structure and Capacity

Based on the interview with APFPS and DoH, there has been no case of misuse of subsidy scheme. As the various mechanisms are installed to avoid misuse in the application and disbursement procedures, it is not easy to rig the system.

Rather the inefficiency, long-time and administrative burden associated with the operation of existing scheme are considered more problematic for both beneficiaries and government officials. For beneficiaries, the difficulty to prepare the required contribution is the biggest problem.

In addition, although the existing scheme such as MIDH placed higher priority on small farmers and linkage with market, it is difficult to observe these priorities in practice. It is indicated by the DoH officer that most of horticulture officers at field level who are pressed by achieving the target have been unable to pay enough attention to these priorities.

For processing facilities, the processors have difficulties to obtain the bank loan prerequisite to the subsidy as the bank is very careful to approve the loan. Even if they obtain subsidy, there are many cases where they run out of cash for operation or have a difficulty in obtaining funds for expansion. In addition, for processing agricultural produce, seasonality of raw material supply makes its operation even more difficult.

2. Overview of Mission for Integrated Development of Horticulture (MIDH)

(1) Details of Assistance

No.	Items/ Areas of assistance	Beneficiary	Pattern of assistance
1	Research	Central Govt. Institutes	100% assistance
2	Plantation Infrastructure Development Hitech nursery, small nursery, upgrading of nursery, strengthening of tissue culture unit, seed production - INR 10 lakhs to INR 250 lakhs/ unit	Public Sector	100% assistance
		Pvt. Sector - Farmer/ FPO/ Company/ NGO	35 to 50% assistance (credit linked back ended subsidy) depending on the component/ region. Each component has a maximum limit (cap)
3	Establishment of new Gardens (Area Expansion) - INR 60,000 to INR 5.50 lakhs/ Ha Fruits, Vegetables, Mushrooms, Flowers, Spices, Aromatic plants, Plantation crops	Farmers	40% assistance in 1 to 3 instalments depending on the component and survival of plants
4	Rejuvenation of senile plantation- INR 40,000/Ha	Farmers	50% assistance subject to max. 2 Ha per beneficiary
5	Creation of water resources (community tanks/ farm ponds)- INR 1.50 lakh to INR 25 lakhs/unit	Farmers/ FPO/ Community Groups	100% assistance for farmer/ community group 50% assistance for individual farmers
6	Protected cultivation (Green house, shade net house, plastic/ walking tunnels - up to INR 32 lakhs	Farmers	50% assistance with upper limit (cap), 4000 sq. m max.
7	Precision Farming Development	PFD Centers- Govt.	100% assistance
8	Promotion of IPM and INM Promotion of IPM/INM- INR 4000/ha	Farmers	30% assistance subject max of 4 ha.
9	Disease forecasting unit, biocontrol lab, plant health clinics, leaf/ tissue analysis labs. -INR 6 lakhs to INR 90 lakhs/ unit	Public Sector and Private Sector (FPO/ Company/NGO)	100% assistance to public sector and 50% assistance to pvt. sector
10	Organic Farming (certification/ adoption/ vermicompost unit)- INR 20,000/ha for adoption; INR 1 lakh per unit for vermicompost and INR 5 lakhs per cluster for certification	Farmers/ Farmer cluster	50% assistance
11	Certification of GAP- INR 10000/ha	Farmers	50% assistance
12	Centre for Excellence - INR 1000 lakh/Centre	Public Sector with or without bilateral cooperation	100% assistance
13	Pollination support through bee keeping - INR 1 lakh to INR 20 lakhs	Public Sector & Farmers	100% assistance in case of public sector 40% assistance in case of pvt., farmers
14	Horticulture Mechanization - INR 0.07 to INR 3 lakhs per eqpt	Farmers	25% to 40% depending on the equipment
15	Front line demonstration -INR 25 lakhs;	Public Sector (for imported machinery for demo) - INR 50 lakhs/unit	75% assistance if in farmer's field 100% assistance to public sector, SAU, etc.,
16	Human Resource Development - up to INR 20 lakhs/ unit	Farmers, Public Sector & Private Sector	100% assistance

No.	Items/ Areas of assistance	Beneficiary	Pattern of assistance
17	Integrated Post-Harvest Management (pack house, cold room, mobile precooling unit, cold store, reefer trucks, ripening chamber etc.) - INR 4 lakhs to INR 600 lakh /unit or project	Pvt. sector, farmers, FPOs	35 to 50 % assistance (credit linked back ended subsidy)
18	Establishment of marketing infrastructure for Horticulture Produce (Terminal markets, wholesale markets, rural markets, retail markets, mobile vending machines, QC lab, etc.) - INR 15 lakhs to INR 200 lakhs/ unit	PPP, Pvt. Sector, FPOs/ NGO	25 to 40% subsidy depending on the component and region (credit linked back ended subsidy) 100% assistance for QC lab. For public sector
19	Food Processing Units - INR 800 lakhs/ unit	Private sector, FPO, Company etc.,	50% assistance (credit linked back ended subsidy)
20	Mission Management, State Level, National Level and International programs	Public, Private incl. Farmers	100% assistance project based.

Source: Mission for Integrated Development of Horticulture, Operational Guidelines, April 2014

Summary:

- a) For all activities the MIDH guidelines have indicated the costs
b) Generally the assistance to Public Sector - Government Universities, R & D institutes, Departments, etc., is at 100% assistance level.
c) Generally the assistance to Private sector - Farmers, FPOs, Pvt. Companies, NGOs, etc., is partial assistance varying between 25% to 50% depending on the item of assistance and region. Balance has to be brought in by the Private Sector from own equity, bank loan, etc.,
d) The assistance for infrastructure/ capital expenditures are generally credit linked back ended subsidy.
e) The above is a brief summary of the pattern of assistance. Detailed guidelines are available as MIDH Operational guidelines

(2) Implementation Guidelines of Andhra Pradesh State

The guidelines provide information on processes, formats for all stakeholders at all stages and authority

(a) Identification of Beneficiaries

- Identification of beneficiaries should be done in Grama Sabha through selection committee as per guidelines under each scheme
- Identification of beneficiaries as per targets allotted to be completed at the earliest
- Preference may be given to small and marginal farmers
- Directives of SC ST Act to be implemented (16.6% and 8% funds for SC and ST farmers and 33% for women beneficiaries/ farmers)
- Cluster approach will be adopted for easy monitoring
- Beneficiaries identified should attend the particular training program organized for the purpose

(b) Application

- Approval of DHM (District Horticulture Mission, a part of District Horticulture Department) is a must for issue of administrative sanctions for certain projects
- Online filing of application is a must for release of funds (Hortnet)
- The project proposed under Post-Harvest Management should be linked up with farmer's farms, Agri retail corporate houses, processing units and exporters to minimize the losses/ wastage of produce.
- The project should clearly indicate the benefits accrued to the Small and Marginal Farmers

(c) Implementation

- Progress of the project based activities has to be submitted from time to time
- The monthly progress report should be updated in web site only (<http://hortnet.gov.in>)
- To ensure transparency separate accounts should be maintained in the name of AD (Additional Director) of Horticulture at District level for collection of Non subsidy
- Opening of bank account by the beneficiary is mandatory
- All the releases will be made to the district ADHs (Additional Director (Horticulture)) from Head Office
- Assistance to beneficiaries will be through online transfer from District ADHs. ADH should ensure that the bills produced by the beneficiaries are from registered firms/ companies before release of assistance
- The assistance will be given to only one beneficiary in the family

(3) Implementation Procedures

(a) General (Common to All Components & Activities)

1) Selection of Beneficiaries

- Potential location/ villages is to be identified
- Wide publicity through newspapers, electronic media, pamphlets & display on notice board of Zilla Paraishad (ZP)/Mandal Parishad (MP), Village Panchayats
- Explanation of schemes in the meeting of ZPP/MPP & other meetings
- Submission of application/ proposal in prescribed format to DDH (Deputy Director (Horticulture))/ADH with photograph, copy of pass book, certificate from village revenue officer
- Hos/ ADHs to hold village wise meetings involving progressive farmers, gram sarpanch and village secretary and finalize the list based on norms
- Selected farmers are explained the package of practices
- While finalizing the list directives of SC, ST Act are to be considered (8% of funds for ST/SC farmers, at least 16.5% of SCs and 33% budget for women beneficiaries)
- All applications are to be made online
- Selection and verification of documents; Approval of DHM and Administrative Sanction issued through District Collector
- For any addition/ deletion to the approved list, the approval of DHM is required.

2) List of Documents to Be Submitted by the Applicant

- Application form with full details with latest photograph of the applicant
 - Land records (patter pass book)
 - Sanction letter issued by bank for credit linked back ended subsidy
 - Project Report/ Estimates of civil Structures duly certified
 - Video and photographs of the farm for relevant assistance
 - Annual Plan depending on the activity
-

(b) High Cost Infrastructure such as Processing Facilities

- Beneficiary shall apply to ADH in the prescribed format with documents
- Beneficiary shall enclose bank consent for release of loan amount for establishment of the project under the credit linked back ended subsidy scheme
- Inspection of site by the concerned HO and ADH and submission of recommendation to District Level Executive Committee (DLEC) for sanction
- After consideration by DLEC/ District collector the proposal will be sent to State Horticulture Mission (SHM).
- The proposal will be placed before State Level Executive Committee for sanction of proposal
- After consideration by SLEC of SHM, the proposal will be sent to National Horticulture Mission for approval in Empowered Committee (EC) meeting, New Delhi
- After approval by EC Meeting, administrative sanction will be communicated to the beneficiary/ District Officer and to the Bank which is providing the loan amount
- The subsidy amount will be released in two equal instalments i.e. 1st instalment will be released after completion of 50% of the worked and 2nd instalment will be released after establishment of the project and after physical verification by the District Officer/ Technical Teams

Source: Guidelines for implementation of SHM programs of AP

Note: The above is a brief of the guidelines. A detailed guidelines book providing the guidelines for each of the component is available.

Attachment 11.2.4 TOR for PPIC

1. Role of PPIC

The Pilot Project Implementation Consultant (PPIC) will be responsible for the following aspects of the pilot project:

- Responsible for project planning, implementation and monitoring
- Reporting to State and District Level Committee
- Coordinating with PPMU, DPCC as well as with the PIT
- Supervising and instructing PPIC members in PIT
- Preparation and management of documentation of the project

The Pilot Project Implementation Consultant (PPIC) will be a Company / Agency/ Team which will provide overall support both in terms of technical, and managerial to the Pilot Project Management Unit (PPMU) at state level and Project Implementation Team (PTI) at district level. The PPIC will work very closely with the concerned departmental staff at state and district level. The PPIC will work in consultation and coordination with the various stakeholders including government, producers and private sector partners.

2. Qualification of PPIC

The Company/ Agency shall have experience in providing services to Food Value Chain or allied agribusiness activities and should have handled such projects.

3. Tasks to be carried out

(1) Develop Detailed Project Plan

The PPIC will work with the concerned PPMU and PIT and prepare a detailed project report for all the pilot projects which includes

- a) Baseline survey of the region/ stakeholders of the project including the setting the baseline values and targets of indicators for respective pilot projects.
- b) Strategy for selection of the beneficiaries
- c) Finalization of the areas / components of support and preparation of a detailed project report (DPR) including project implementation plan (PIP) with complete technical and cost details for the project after discussion of proposed activities/ services with the stakeholders identified. (This is to ensure that the infrastructure and services are need based). Care should be taken to see that the overall project cost is within the budget proposed for the pilots.
- d) Facilitate the formation of District Pilot Coordination Committee (DPCC) for each pilot project and assist the Line Department in drawing up the roles and responsibilities of various committee and units involved in the project.
- e) Assist in identification of various stakeholders to be involved in the project (farmers, FPOs, processing industry, exporters and others) as per the requirement and following the guidelines.
- f) Coordinate and conduct all the meetings pertaining to the project – PPMU, DPCC, PIT meetings, stakeholder’s meetings and any other meetings.

(2) Plant & Machinery/ Infrastructure and Services:

- a) PPIC shall prepare an operation manual for common facility fund.
- b) PPIC shall prepare bid/ enquiry documents for all the activities proposed in the project and assist the departments in tendering/ sending enquiries.
- c) Undertake technical as well as financial evaluation of the proposals received with recommendations.
- d) Assist department in placing firm orders/ contract with the selected bidder.

(3) Training & Capacity Building:

Training and capacity building is one of the very important components of the pilot project and the PPIC should ensure that the need-based effective training programs are planned, implemented and monitored. The PPIC shall plan and oversee:

- a) Development of training modules by involving experts/ agencies for different stakeholders across the value chain (farmers, FPOs, processing industry, exporters, government, and others) including manuals, training material, PPTs, films etc.,
- b) Identification of resource organization/ resource personnel for imparting the different training and capacity building programmers planned
- c) Field visits – plan, implement and monitor all the field visits under the project.

(4) Market Related Activities:

PPIC shall plan and oversee all the market related activities such as:

- a) Market survey and market studies
- b) Market development, branding and brand promotion activities
- c) Participation in domestic and international trade fairs and exhibitions
- d) Development of promotional materials – brochures, films etc.
- e) Development of marketing and branding strategy for each target product

(5) Monitoring, Documentation & Reporting:

PPIC shall devise a mechanism and strategy for effective monitoring, documentation and reporting of the financial and physical progress of the activities of the project. The PPIC shall plan and oversee all activities related to this.

- a) Development of IT based monitoring mechanism
- b) Monitoring on progress, effectiveness and outcomes of assistance and sustainability of equipment/facilities provided
- c) Monthly and annual Reports
- d) Photographs, charts and films as evidence and learning tools
- e) Prepare and provide information and reports required for monitoring at the state and district levels.
- f) Document approach and lessons learnt and develop strategy report for replication/ expansion of the project.

4. Key Deliverables

Report	Timing	Content
Operation manual for common facility fund	Within 2 months from the commencement of work	The manual explains how to operate and manage the common facility fund. The manual covers the following issues. <ol style="list-style-type: none"> a) Objectives of fund b) Size of fund c) Eligible items d) Procedures of application e) Evaluation and approval f) Procurement of facilities g) Procedures of disbursement h) Fund management i) Monitoring
Detailed Project Report & Project Implementation Report (including	Within 4 months from the selection of beneficiary pairs for each pilot project	The DPR and PIP shall have complete information including socio-economic conditions of the area, market conditions and target indicators for evaluation based on the result of baseline survey and market survey, marketing strategy including target market, technical

Report	Timing	Content
baseline survey)		specifications of infrastructure/ machinery, write up on the training and capacity building activities proposed, cost particulars, implementation schedule, implementation methodology, project monitoring and documentation methodology and systems, role and responsibilities of different stakeholders and project teams.
Market survey report	Within 1 months from the selection of beneficiary pairs for each pilot project	<ul style="list-style-type: none"> - Objective: To understand the market conditions of target product and decide target market. - Contents: The report shall contain information on the following: <ul style="list-style-type: none"> a) Global market trend (market size, demand and supply, major players, consumer preference etc.) b) Target market analysis (choose three countries in case of export) including demand, price, sales and distribution channels, regulation and quality requirement c) Competition analysis d) Survey on potential partners and resources in the target market
Monitoring Mechanism Report	Within 3 to 4 months from the appointment of the PPIC	<ul style="list-style-type: none"> - Objective: To have a very effective, systematic and uniform monitoring mechanism for project implementation. - Contents: The report shall contain information on the following: <ul style="list-style-type: none"> a) System and methodology to be adopted for monitoring of progress, achievements and sustainability of project activities b) Roles and responsibilities of the stakeholders, agencies and implementing staff involved in monitoring c) Device formats and systems including IT platform for monitoring d) Review of monitoring system and revision if required. e) Draw up schedules for monitoring at various levels.
Progress report	-By 5 th of every month -At the end of every project year	The report will summarize the activities and achievement of each pilot project in the previous month for the monthly report and in a foregoing year for the annual report. The report should contain the following information: <ul style="list-style-type: none"> a) Activities carried out b) Summary of inputs and outputs c) Equipment/ facilities provided and their sustainability plan d) Any changes from the original plan e) Any pending issues of respective projects f) Progress on evaluation indicators g) Any other issues
Project Completion Report	End of the contract period	The report will summarize the support extended to the implementation of the recommendation provided in the course of assignment, outputs including the impact survey to assess the achievement of evaluation indicators based on the result of endline survey, lessons learnt, further actions and support required, plan and issues of sustainability, and strategy and recommendation for scale up/ replication and future roadmap. Matrix outlining issues identified, recommendations provided, implementation status and further actions will be provided as appendices. The report should contain a concise Executive Summary.
Marketing and Branding Strategy	End of each pilot project period	<ul style="list-style-type: none"> - Objective: To propose marketing and branding strategy for target product as AP state. - Contents: The report shall contain information on the following: <ul style="list-style-type: none"> a) 3C (customer, competitor and company), 4P (product, price, place and promotion) analysis b) SWOT analysis c) Branding concept and business model d) Marketing strategy e) Management strategy including coordination mechanism

Source: JICA Survey Team

5. Team Composition

PPIC consists of consultants both at state and district levels as listed below:

Position	Number	Month	Note
State level			
1. Team Leader	1	48	
2. Food Value Chain Expert	1	48	
3. Training & Institutional Development Expert	1	48	
4. Tendering & Procurement Expert	1	48	
5. Marketing Expert	1	48	
6. IT Expert	1	48	
7. Administration & Accountant	1	48	
Sub-total	7	336	
District level			
1. Marketing Coordinator* ¹	3	132	48 x 2, 36 x 1
2. Training Coordinator	4	168	48 x 2, 36 x 2
3. Monitoring Officer	5	216	48 x 3, 36 x 2
4. Administrative & Accounts Executive	5	216	48 x 3, 36 x 2
Sub-total	14	600	
Total	21	936	

*1: To be hired by APFPS with the funds of project

(1) State level

1) Team Leader

The team leader has the overall responsibility of planning, implementation, coordination and monitoring of all the pilot projects proposed and should be/have:

- a) Science/ engineering graduate/ master degree in any subject with at least 10 years' experience in Project Management in agribusiness/ food processing sector and with in-depth knowledge of Horticulture Sector.
- b) Conversant with externally funded/ aided projects such as JICA/ World Bank/ USAID etc.,
- c) Network and working knowledge of the Government Departments, Government Developmental Agencies such as APEDA, MPEDA, Spices Board, Coconut Development Board, etc., and support schemes of these agencies.
- d) Good networking with all stakeholders of the food value chain such as farmer groups, NGOs, processing industry, exporters, professional and resource personnel and other associated agencies.
- e) Overall understanding of the Food Value Chain of many subsectors (horticulture, fisheries, etc.,) and able to oversee planning, implementation and monitoring of food value chain projects.
- f) Good communication skills, leadership skills and team work capabilities

2) Food Value Chain Expert (Fisheries)

The Food Value Chain Expert shall have the responsibility of planning, implementation, coordination and monitoring of food value chain projects related to fisheries projects (Tuna, Shrimp). The Food value chain expert should be/ have:

- a) Fisheries / engineering/ science graduate with at least 8 years of experience and exposure to value chain of fisheries i.e. production, post-harvest management, processing.
- b) Good working relationship with various Government Departments viz., Fisheries Dept, Industry, Food Processing, Marketing, etc.,
- c) Good understanding of the activities of various developmental agencies associated with fisheries crops viz., MPEDA, Fisheries Development Corporation, and other related agencies.

- d) Experience in organizing/ overseeing Trainings, workshops and seminars related to the fisheries/ food processing.
- e) Working experience on Food Value Chain projects will be an added advantage.
- f) Good communication skills, documentation and reporting skills and team work capabilities.

3) Training & Institution Development Expert

The Training & Institution Development Expert, in close coordination with Training Coordinator at district level, will have the responsibility of planning, implementing, coordination and monitoring of all the capacity building programmers – training, workshops, awareness programs, exposure visits etc., related to all the food value chain projects. The expert supervises the work of Training Coordinators at district level. Training & Institution Development Expert should be/have:

- a) Graduate in any discipline with at least 8 years of experience in the field of training and institution development activities relating to agriculture, horticulture, food processing, fisheries and related areas.
- b) Knowledge and experience in planning, implementing and monitoring of trainings, workshops, seminars, exposure trips.
- c) Able to organize and coordinate development of training modules (print/ audio visual/ PPT) required for training various stakeholders in the food value chain viz., producers/ farmers, FPOs, post-harvest handlers, processors, exporters and Govt. Departments.
- d) Good networking with resource organizations, professionals in the field of horticulture, fisheries, food processing, marketing, quality and traceability systems etc.,
- e) Organizing, training skills and good knowledge of English and local language (Terugu) is essential.

4) Tendering & Procurement Expert

The Tendering & Procurement Expert will have the responsibility of all procurement & contracting activities connected with equipment, civil works, manpower hiring, etc., for the food value chain project. The expert should be/ have:

- a) Graduate with experience of about 8 years in tendering, procurement and contract activities.
- b) Good knowledge and experience in handling procurement related to Government projects, external aided projects (JICA, World Bank, USAID etc.,)
- c) Knowledge in preparing procurement/ tender documents including specifications, terms of supply, contract terms etc., tendering, finalization including negotiation skills.
- d) Good knowledge of direct and indirect taxes including sales tax, excise duty & customs, professional tax and income tax and other contractual obligations.

5) Marketing Expert

The Marketing Expert, in close coordination with Training Coordinator at district level, will have the responsibility to plan, implement and monitor all promotion and marketing activities related to the products of the pilot project including conducting market survey at the beginning of project period as well as developing marketing and branding strategy for each target product at the end of project period. The expert supervises the work of Marketing Coordinators at district level. The expert should be/have:

- a) Graduate / post-graduation in marketing with at least 8 years' experience of handling marketing activities of various fresh and processed food products.
 - b) Good knowledge of export markets and market intelligence of various commodities of the pilot project (mango fresh, processed mango, processed tomato, dry and processed chilies, fresh and processed coconut and by-products).
 - c) Knowledge of B to B marketing of food products viz., processing industry, exporters, retail chains, etc.
 - d) Experience in planning, development and implementing various promotional and marketing strategies for food products in export and domestic markets.
-

6) IT Expert

The IT Expert will be responsible for planning, implementing and monitoring all ICT related matters concerning the food value chain projects. Especially the expert will be responsible for developing VC DB for APFPS for their future service by accumulating information collected through the pilot projects. The expert should be/ have:

- a) Graduate in Science / engineering – computer science/ Information Technology/ science with at least 8 years' experience in handling systems as well as software.
- b) Able to guide in cost effective and efficient IT solutions across the value chain/ supply chain.
- c) Able to suggest simple but robust IT solutions/ platforms for use on computer systems, tablets and mobile phones. Have an understanding of use of GIS, portal maintenance and such other matters.

7) Administration & Accountant

The administration and accountant will be responsible of all administrative matters involved in running of an office or a project team. He/she should be/ have:

- a) Commerce graduate with at least 8 years of experience in administrative and accounting capacity in a company/ industry.
- b) Should have experience in all human resource matters including recruitment, appraisal and exit of staff members of the team.
- c) Management of office premises and other assets and consumables at the office including housekeeping and upkeep of the office.
- d) Arrange and coordinate for travel, booking of hotels, venues for visits and programmers related to the project.
- e) Would be responsible for handling of all matters relating to accounting and finance of the project. The accounts & finance executive should be/ have:
- f) Proficient in the use of accounting software such as Tally, Project Finance, etc.,
- g) Knowledge with tax matters such as income tax, service tax etc., Preferable if the candidate also has knowledge about indirect taxes.

(2) District level

1) Marketing Coordinator

The marketing coordinator shall be responsible for all marketing related activities at the field level, including planning, implementing and monitoring of all marketing activities connected with the produce of the food value chain project. The marketing coordinator should be/ have:

- a) Graduate in any field with at least 5 years' experience in handling marketing of agri/ food products – fresh and processed.
- b) Knowledge of market dynamics pertaining to the crops/ produce of the identified food value chain pilot projects.
- c) Knowledge about market intelligence, promotion and marketing of food products.
- d) Knowledge and experience in working with B to B markets in horticultural produce and fisheries products will be preferable.

Marketing Coordinators will be hired by and belong to APFPS with the intension that these coordinators will be retained by APFPS and will serve as a district officer of APFPS. However, PPIC will also be involved in their recruitment.

2) Training Coordinator

The training coordinator will have complete responsibility of coordinating all aspects in conduct of the trainings/ workshops/ exposure visits identified/ planned in the project. The coordinator should be/ have:

- a) Graduate in any discipline with at least 5 years of experience in organizing and coordinating training programs/ workshops and such other capacity building programs at the field level.
- b) Preferable if the coordinator has experience in the area of agriculture/ horticulture/fisheries or related fields.
- c) Provide feedback about the programs and suggest any modifications/ changes required as per field conditions.
- d) Preferable if the candidate has a general understanding of the food value chain pertaining to the horticulture/ fisheries produce.

(a) Monitoring Officer

The monitoring officer will be responsible of monitoring and reporting the project activities at each pilot level. He/she will directly report to Team Leader/Food Value Chain Expert at state level in addition to the project director of each project. The officer is responsible to make monthly progress reports of the project in charge. The officer should be/ have:

- a) Graduate in any discipline with at least 5 years of experience in implementing and monitoring the technical assistance projects at the field level.
- b) Preferable if the officer has experience in the area of agriculture/ horticulture/fisheries or related fields.
- c) Preferable if the candidate has a general understanding of the food value chain pertaining to the horticulture/ fisheries produce.

(b) Administrative & Accounts Executive

The Administrative & Accounts executive shall be responsible to provide complete assistance in maintenance of books of accounts and finance related matters to the horticultural department/ fisheries dept. relating to the project accounts. He/ She shall also have experience in carrying out correspondence independently. The executive should be / have:

- a) Graduate in commerce / BBM with at least 5 years' experience in handling of accounts and administration in any company/ industry.
- b) Knowledge of direct and indirect tax matters and procedures.
- c) Working experience with Tally or such other accounting software.

Attachment 11.2.5 Brief Descriptions of the Examples for Common Facility Fund

The following table is an indicative list for activities and facilities assisted under the fund for new ideas in the horticulture pilot projects. This is not an exhaustive list but proposed based on the interviews and observation on the field and experiences of survey team. The appropriateness and real needs should be examined once the pilot project start.

No	Idea	Approximate cost	Applicable products
1	Farm Mechanisation Centre	INR2,500,000/centre	All products
2	Mobile Soil Testing Laboratory	INR2,500,000/unit	All products
3	Model Demonstration Farm	INR250,000/ha	All products
4	Agricultural Input Centre	INR1,000,000/centre	All products
5	Mobile Training Facility	INR3,000,000/unit	All products
6	Nursery	INR2,500,000/ha	All products
7	Integrated Chili Pack House	INR20,000,000/house	Chili
8	Value Addition Centre	INR5,000,000	Chili
9	Drying Platform and Polyhouse Dryers	INR2,500,000/5 polyhouses	Chili
10	GIS Tagging, Operations and Management	INR8,000,000/pilot	All products especially for chili
11	Youth in Agriculture	INR400,000/program	All products
12	ICT Based Market Information Centre	INR10,000,000/centre	All products
13	Traceability System Development & Management	INR1,000,000/system	All products especially for chili
14	Biological Control Agent Laboratory	INR8,000,000/unit	Coconut
15	Model Ball Copra and Cup Copra Unit	INR2,500,000/ each unit	Coconut

Source JICA Survey Team

Aim, components and approximate cost for each idea are described below.

1. Farm Mechanization Centre

- Aim:

- 1) To establish a Farm Mechanization Centre consisting of various equipment which are generally required for land preparation, planting, crop management, and harvesting.
- 2) To make available various farm machinery / equipment to small and marginal farmers which otherwise cannot be owned because of high cost of individual ownership.
- 3) Provide hiring services for various equipment and implements, reduce labor costs and thus cost of cultivation and ensure better returns to farmers.
- 4) To enthuse educated youth in running the Farm Mechanization Centre as a viable business unit which will catalyze growth of such centers and attract youth in agriculture.

- Components: The indicative list of equipment for the Farm Mechanization Centre would be: Tractor – 35 HP or suitable HP; Power tiller; Set of Agricultural Implements such as Cultivator, Cage Wheel, Disc Harrow, Seed Drill, Accessories; Sprayer – Powered and Manual; Servicing Tools; Tools for repairing of machines. The Farm Mechanization Centre shall also consist of a Shed with lockable room.
- Budgetary Provision: INR 25 lakhs per Centre (includes cost of set of equipment and shed with lockable room) The Farm Mechanization Centre equipment and implements required for each of the Food Value Chain Project will be based on the requirement of the individual crop which shall be decided after the baseline survey for each crop and specific region.

2. Mobile Soil Testing Laboratory

- Aim:
 - 1) To provide mobile soil testing laboratory (laboratory in a vehicle) for undertaking soil health analysis of the farm lands selected for the project and to ensure that the targeted nutrition management (application of fertilizers and nutrients) is based on soil health.
 - 2) Provide hiring services for soil analysis and provide guidance on appropriate nutrition recommendations.
 - 3) To enthuse educated youth in running the mobile soil testing laboratory.



Source: Transchem Agritech Pvt. Ltd.

- Component: This mobile testing laboratory will have facility and equipment to test the major and secondary nutrients of soil namely; Soil pH, Electrical Conductivity, Organic Carbon, Nitrogen, Phosphorus, Potassium, Calcium, Magnesium and Micronutrients such as Iron, Zinc, Copper and Manganese.
- Budgetary Provision: INR 25 lakhs per unit (including vehicle, testing equipment and set of consumables). The actual cost shall be obtained at the time of preparing DPR and PIP during implementation stage.

3. Model Demonstration Farm

- Aim: The demonstrations serve as an effective instrument for adoption/ rapid dissemination of technology. The objectives of the demonstration farm are:
 - 1) To demonstrate various modern/ alternate agricultural techniques such as irrigation techniques, crop management, pest management, intercropping, farm mechanization, etc., under close monitoring.
 - 2) The demonstration farms will act as farms which can be used for exposure visits and training of farmers and other stakeholders.
 - 3) To study and document the resource economics under varying conditions.
- Components: The farmers undertaking demonstration would be given off-farm inputs viz; seed, fertilizers, insecticide, micronutrients etc. by project. The inputs of the recommended varieties having high yielding qualities and the other inputs of high efficacy will be provided. These farmers are supposed to be trained under the training program of the farmers in technology transfer. The field days visit of the farmers to the demonstration plot will be the integral part of the demonstration.
- Budgetary Provision: Average of INR 2.5 lakh per Ha. The actual requirement shall be decided based on the crop requirement at the time of implementation.

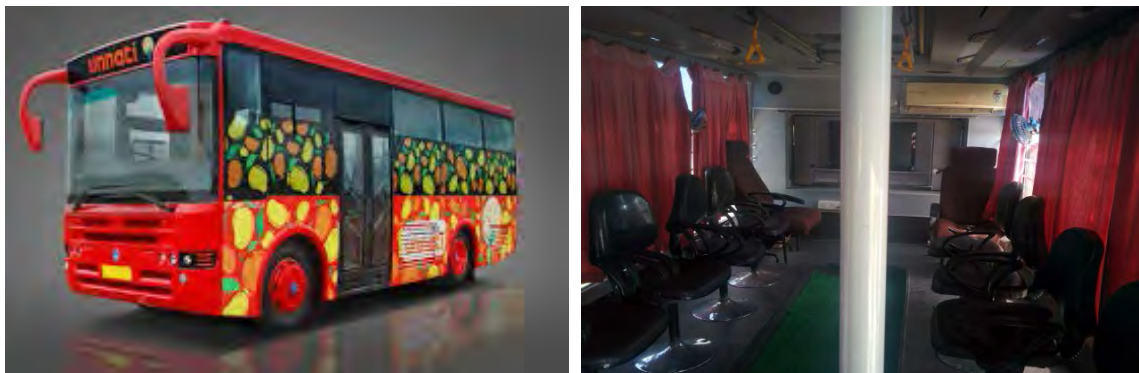
4. Agricultural Input Centre

- Aim: The Agri Input Centre will be a one stop shop for the farmers for all their input needs and to some extent information Centre concerning the agricultural inputs. This shall be managed by the Producers Organization or Educated Youth. The activities of the Agri Input Centre are:
 - 1) Supply genuine farm inputs to the farmers (seeds, fertilizers, pesticides, insecticides, etc.). Along with the farm inputs, the Centre could also supply Irrigation equipment, machinery spares, other farm needs etc.,)
 - 2) The Centre shall also act as knowledge and information Centre concerning agri inputs, good agricultural practices, Integrated crop management, Integrated Pest Management, etc.,
 - 3) The Centre shall act as a place for promotion and exhibition of new inputs and technologies concerning farming.
 - 4) The Agri Input Centre shall work as a viable business entity providing good and useful product and services to the farming community.
 - Components:
 - a) An outlet for Storage, showcasing and selling of inputs (outlet will be provided by FPO. Interiors & furnishing are considered under this project)
 - b) Display boards for knowledge dissemination
 - c) TV Monitor with player for playing Agri related Films developed under this project
 - d) Qualified and trained manpower at the outlet to provide basic technical information to farmers.
 - e) Space for exhibiting new products
-

- Budgetary Provision: INR 10 lakhs per Centre

5. Mobile Training Facility

- Aim: The Mobile Training Facility would be a facility which will take the training to the door steps of the farmers/ villages. The mobile facility can also be used for exposure visits.



Source: Unnati Project of M/s. Jain Irrigation & M/s. Coca Cola

- Components:

a) It will be a bus equipped with audio visual facility, seating arrangement for 20 persons. The facility shall have audio visual/ films as modules for training of farmers on various aspects of farming.

b) The bus shall also have audio visual systems (microphone, speakers, projector & screen) which can be used at the field level.

c) One or two resource persons / subject specialist shall be associated with the mobile training facility

- Budgetary Provision: INR 30 lakhs each

6. Nursery

- Aim: Availability of Genuine planting material and in required quantities to the farmers is an important aspect in development of any horticultural crop.

- 1) To undertake multiplication of planting material under controlled and monitored conditions of the varieties based on market and farmer requirement and agro climatic conditions.
- 2) Make available genuine disease free planting material to the farmers at reasonable cost.
- 3) To promote and undertake hybridization activity in case of coconut.



Source: Cityfarmer.info

Coconut nursery and Mango nursery

- Components and activities: Shall depend on the individual crop requirement. However generally it shall include:
 - a) Hitech nursery with temperature and humidity control, drip, fertigation and fog systems, shade control, etc., for chilies and tomato
 - b) Identification of Seed gardens, mother palm selection, seed nut selection, storage of seeds and nursery and its management in case of coconuts.
 - c) Grafting area, Green house/ Shade net, hardening area for mangoes
 - Budgetary Provision: INR 25 lakhs/ Ha (in accordance with the MIDH cost guidelines)
7. Integrated Chili Pack House
- Aim: The integrated pack house for chilies is a facility to undertake drying, sorting, grading and packing of chilies by the Chilly FPOs meeting export requirement and high end domestic markets. Presently the farmers dry the chilies at the farm level, do minimal sorting/ grading and market it at farm level or at AMC market in used gunny bags which are not of good quality. Further drying (if required), sorting, grading and packing as per export requirement is done by the exporter. The Integrated pack house shall ensure that this activity is done at the production level avoiding grading, sorting and packing at the exporter level. This will ensure better quality and enhance returns to the farmers/ FPOs.



Source: AP industries

Roaster and sieving machine

- Components:
 1. Physical Facilities as common facility to farmers/ FPOs
 - a) Hygienic Drying Yards and Poly House Drying systems;
 - b) Truck and bag weightment equipment;
 - c) Sorting & Grading Conveyors;
 - d) Packaging facility for Gunny/ HDPE bag packing, Vacuum Packing.
 2. Cold Stores – For providing cold storage space for long term storage and selling/ trading based on market demand and pricing, for better realization to farmers.
- Budgetary Provision: INR 200 lakhs per pack house. The size, specification and other technical details shall be decided while preparing the DPR & PIP during the implementation stage.
- 8. Value Addition Centre for Chilies
 - Aim: The market for value added agricultural products are on the increase and Value addition is expected to yield better returns to the farmers on a sustainable basis on the long run. Hence a value addition Centre has been proposed in the project and it will be managed by the FPO / Processing Industry or a Consultative Management Group consisting of stakeholders. Value addition or processing of chilies would provide the following benefits:
 - a) Products convenient to use by the consumers
 - b) Possibility of development of newer products
 - c) Make available seasonal products round the year
 - Components: The value addition Centre for chilies would have the following equipment.
 - a) Sterilizing oven
 - b) Pulveriser
 - c) Blending equipment
 - d) Chili paste making equipment

- e) Chili flake making machine
 - f) Sieving Machine
 - g) Weighing scales
 - h) Packing Machines- Pouch Packing, Pouch Sealing machines
 - I) Bottle filling and capping machine
 - j) Coding Machine for batch code printing
- Budgetary Provision: INR 50 lakhs for equipment (Building is to be provided in the Spices Park Facility by Spices Board)
9. Drying Platform and Polyhouse Dryers
- Aim: Drying Platform & Polyhouse Dryers are suggested in the project to provide high quality and safe product dried under hygienic conditions.



Chilli drying in Solar Tunnel Dryer

Source: CIPHET, India

- Components:
- 1) Drying platforms are raised cement concrete platforms above ground on which chilies are dried. Currently most of the drying is done at the field level using polysheets. Drying on a raised platform has certain advantages such as avoiding soil/ dust contamination, avoiding rain water entry in case of rains and easy turnover and handling on a smooth raised platform.
 - 2) Polyhouse dryer are used for sun drying of chilies under enclosed conditions and in trays/ raised platforms with natural ventilators. There are several aspects concerned the polyhouse dryers which have still not made them very popular such as;
 - Cost of investment on polyhouse dryer
 - Land occupied by polyhouse dryer becomes unusable with the present permanent structure design
 - Drying operations are slightly more labor oriented and requires good operation skills to avoid over drying and charring or spoilage due to moisture condensation.
-

- 3) Design of the polyhouse dryer is required to be made considering the above aspects. This work shall be done by the institutes specialized in Post-Harvest Management such as CIPHET or others and in consultation with the private players who are already using such dryers.
- Budgetary Provision: INR 1.50 lakh per drying platform and INR 25 lakhs for developing 5 pilot polyhouse dryers.
10. GIS Tagging, Operations and Management
- Aim: GIS tagging of the farmers and maintenance of dynamic data has several advantages. the objective of this activity are:
 - 1) Database of all farmers identified under the project are maintained. This includes basic data such as name, village, mandal, land holding, water availability, perennial crops / annual crops grown, crop rotation practices, etc.,
 - 2) It will also capture dynamic data such as sowing date, expected harvesting date and quantity, variety grown, etc., which will be available to the processing industry/ exporter to plan their procurement/ processing activity.
 - 3) Tablets and Mobiles could be used for Basic Crop Management and disease management solutions which could be provided by resource personnel after analyzing the situation of the farm based on the pictures/ info. sent by the farmer/ field officer.
 - 4) This will also help in crop planning, weather advisories, market advisories (prices/ markets), and other information.
 - 5) The activities at the farm level will be interfaced with the District Level Servers for data collation, analysis, planning and execution of various activities.
 - Components:
 - a) IT infrastructure (hardware and software); Tablets for field staff, resource personnel
 - b) Development of Software for maintenance of GIS Tagging
 - c) Data analytics tools
 - d) IT and analytical experts for development and management of the system for the project period
 - Budgetary Provision: INR 80 lakhs per pilot. (The actual cost /estimate shall be obtained while preparing the DPR and PIP while implementing the project.

11. Youth in Agriculture

- Aim: Involving youth in agriculture is viewed as a serious matter at the International and National levels in many countries, as there is tendency of the farming community to give up agriculture as it is not an economically attractive option. In view of the developments in the urban areas, youth are having several other job options which are more attractive and remunerative. Hence there is less and less interest among youth in agriculture. Hence in order to attract youth into
-

agriculture, it is required to create opportunities in agriculture at the village level/ mandal level which involves technology, creation and management of small business entities which can bring in change of face of agriculture.

Some of the activities that could be considered to be managed involving Educated / Rural Youth are:

- 1) Farm Mechanization Centre/ Custom Hiring Centre and Soil Testing Facility as a business entity
 - 2) Human Resource (Labor) Management Services
 - 3) Agri Input Centre involved in supply of genuine farm inputs along with information
 - 4) GIS Tagging and ICT (Information Communication & Technology) related activities
 - 5) Marketing Related Activities (Market Intelligence, Logistics Facilitation, Marketing)
 - 6) Operations and Management of Common Service Facilities set up with FPOs/ Producer Cos.
 - 7) Training Activities at field level
- Components:
- 1) Development of Business Models (at least 5 Nos.) for different activities to be managed by youth.
 - 2) Human resource (about 5 persons) for each pilot
- Budgetary Provision: INR 3 lakhs each for development of each business model and INR 80,000 per man month for operation (salaries, travel etc.). One-year operation cost of INR 1 lakh can be supported under the project.

12. ICT Based Market Information Centre

- Aim: Knowledge, Information and Transparency are components which drive an efficient Food Value Chain and build a long term relationship among the stakeholders very specifically the farmers/ FPOs with the Processing Industry/ Exporters and Trade. Getting right information at the right time is crucial for efficient functioning of markets, especially in the case of agricultural commodities; owing to its perishability, seasonality and bulkiness. The farmer is in need of information regarding various aspects of the crop production from planning phase till marketing. Currently there is lack of information or asymmetric information and farmers knowing little about market conditions and markets for their produce. Availability and Use of Mobiles are ever increasing even among the farming community. It is suggested to consider ICT based Market Information Centre under the project to provide the farmer/ FPO with timely and appropriate information.
- Components:
- 1) IT Infrastructure, Manpower (IT experts, Domain & Marketing Experts, Field Level Staff) and System to devise mechanism to gather dynamic market data from important markets, undertake analysis and provide market intelligence to farmers/ FPOs. The Centre will undertake activity

covering knowledge creation, knowledge identification and capture, knowledge storing, knowledge sharing, knowledge application and use.

- 2) Provide timely information on Prices, Markets and other crucial market intelligence information on mobile or local TV network.
 - 3) Tie-up with major markets / market administration and important National and for providing ground level data.
 - 4) Tie-up with Mobile operators for providing information
 - 5) Maintain digital library of historical and current market related information on the specific crops and its products – Domestic and International.
 - 6) Tie-up with Major National & International Organizations of Importance to the Crop (Production, R & D, Processing, Marketing, Trade etc.,)
 - 7) It is expected that the Govt. will provide building space for such a Centre. The interiors and furnishing required for this activity shall be a part of this project.
- Budget Provision: INR 100 lakhs. (This includes hardware with support for 3 years; RDBMS License & Support; Business Intelligence Software; Cloud Services; Software Development; IT and Business Intelligence Consulting Service; Other related infrastructure and furniture; Tie-up cost with organization/ agencies and Staff). Actual estimate/ cost shall be obtained during the DPR preparation and project implementation stage.

13. Traceability System Development & Management

- Aim: Traceability in food products is an important aspect of any food commodity in ensuring safe food to consumers. This is of high importance in international trade. Since this project emphasizes on export of products to ensure better returns to farmers, traceability which is an important component is suggested for this project.
- Components:
- 1) Undertaking an assessment of the existing situation
 - 2) Preparing a traceability procedure system/ manual
 - 3) Training of stakeholders in the traceability system including farmers, FPOs, processors, exporters, government officials.
 - 4) Creating an electronic information system concerning traceability (hardware and software required)
- Budgetary Provision: INR10 lakhs

14. Biological Control Agent Laboratory

- Aim: Biological control agent has proven to be very effective against some of the major pest & disease associated with coconut palm, easy for use and safe for the environment as compared to
-

chemicals. A biological control agent laboratory (small laboratory) exists at Regional Research Station (RSS), Ambajipeta, East Godavari which have been working on biological control for coconut palms and have received national recognition. Farmers have understood the benefit of biological control on coconuts. However, the existing laboratory has very limited capacity and hence unable to undertake multiplication and supply to meet the demand of the coconut farmers. Hence either Strengthening of the existing laboratory or setting up of a laboratory by FPO under the guidance of the RRS, Ambajipet is considered in this project.

- Components: The laboratory generally consists of the following equipment. The actual requirement shall however be decided in consultation with RRS, Ambajipet during the preparation of DPR & PIP while implementing project.
 - a) Heat converter
 - b) AC with heating & cooling
 - c) Refrigerator
 - d) Hot air oven
 - e) BOD incubator
 - f) Centrifuge
 - g) Laminar flow
 - h) Autoclave vertical
 - i) Semi-automatic Corcyra rearing system.
 - j) Steel rack with compartments
 - k) Christoph cages
 - l) Table & Stools
 - m) Hygrometer and Thermometer
 - n) Grinder-cum-mixer
 - 1) Corcyra egg laying cages
 - o) UV chamber & light
 - p) Exhaust fan
 - q) Vacuum cleaner
 - r) Stereo Binocular microscope
 - s) Balance
 - t) Water distillation unit
- Budgetary Provision: INR 80 lakhs (includes building, equipment and vehicle)- as per the NHM guidelines.

15. Model Ball Copra and Cup Copra Unit

- Aim: Ball Copra and Cup Copra are two main processed/ value added products from coconut which is used for oil extraction (edible, cosmetic & others) and for edible purpose as dry fruit. Conversion to Ball & Cup Copra will work as a mechanism for getting better prices, overcoming the downfall in prices of fresh coconuts as also very good shelf life which enables marketing at

the right time to get better prices. Further promotion of ball copra and cup copra also leads to other enterprises dealing with coir extraction and value added products from coir. Hence this unit is being proposed to be taken up by the CPC.



Source: Coconut Development Board

Ball copra and modern drier for ball copra/ cup copra

- Components:
 - a) Ball Copra Unit consisting of multi-layered structure (2 or 3 stories) where coconut after removal of husk is placed in the ventilated, but rainwater proof building/ structure. This has been included to get a cost effective ball copra unit established using prefabricated steel structure which will be cost effective as also amenable for putting to other use or shifting if felt necessary. This unit does not require any fuel or power for drying. The drying happens over a long period of time (say 5 to 6 months) with the use of ambient air which has certain temperature.
 - b) Modern drier which uses heat generated by burning coconut shell and other farm wastes is used to dry raw coconut into cup copra or ball copra and the drying starts immediately after splitting of the nuts. The copra produced is of higher grade compared to the sun dried copra and fetches better price. The equipment and technology has been developed by Coconut Development Board and it can be used. Drying in this drier happens in about 16 to 32 hours. The capacity of the drier would be about 10,000 nuts per batch.
- Budgetary Provision:
 - a) Ball Copra Unit: INR 25 lakhs (Based on information from Coconut Development Board)
 - b) Modern Copra Drier: INR 25 lakhs (Based on information from Coconut Development Board)

Attachment 11.3.1 Outline of AMTC and Workshop

Particulars	Remarks	Estimate by DoA		Reviewed by JICA Survey Team	
		Remarks	No.	Remarks	No.
1 Construction of AMTC			2		2
1.1 Training Building	Training room	80m ² x 3 rooms		80m ² x 3 rooms	
	Audio-visual room	80m ²		deleted	
	Library	80m ²		deleted	
	Conference hall	300m ² x 2 halls		300m ² x 1 hall	
1.2 Administration Building	Room for Director	50m ² x 5 rooms		30m ² x 2 rooms	
	Administration Staff			50m ² x 2 rooms	
	Faculties, etc.				
	Computer rooms	20m ²		deleted	
1.3 Workshop & Seedling Facility	Workshop for Training	300m ²		300m ²	
	Laboratory for Training	200m ²		deleted	
1.4 Hall & Guest House	Guest House	25m ² x 100 rooms		25m ² x 40 rooms	
	Dinning Hall & Pantry	500m ² , 200seats		500m ² , 200seats	
1.5 Others					
1) Facilities	Elevated water tank	30m ³		30m ³	
	Field for training	0.3ha x 20 plots		0.5ha x 4 plots	
	Pump room	30m ²		30m ²	
	Electricity house with back-up generator	30m ²			
	Fuel centre (with basement fuel tank)	30m ²			
	Water reservoir & Drainage facility	120m x 140m		deleted	
	Paking lot	20m x 40m		deleted	
2) Farm Machinery for Training	Tractor, Planter, Harvester, etc.				
3) Computer Facility and System					
1.6 Contingency					
2 Construction of Workshop			10		10
2.1 Workshop Facility	Warehouse for machine	140m ²		100m ²	
	Docks (workshops)	7m x 7m (3 docks)		7m x 7m (2 docks)	
	Parking lot for machines	420m ²		300m ²	
	Stocks	7m x 7m		7m x 7m	
2.2 Tools & Equipment	Tool sets				
	Hoist crane	3 tons		deleted	
	High pressure washing machine, etc.				
Sub-total (1+2)					
3 Farm Machienry for CHUs*1	Package for rice and ID Crops				
4 Farm Machienry for Training Activities					LS
5 Training for Users (6 years)					LS
6 Activities by Local Consultants					LS

Source: JICA Survey Team, based on data from DoA

Attachment 11.3.2 Crop-wise Package of Farm Machinery

(1) for Rice CSU

Farm Machinery	Unit Price (Rs.)	No.	Amount (Rs.)
Tractor(45hp) + Rotary	1,000,000	2 units	2,000,000
Transplanter 8 rows riding type	1,800,000	2 units	3,600,000
Combine Harvester	2,400,000	2 units	4,800,000
Transportation Truck	2,100,000	1 unit	2,100,000
Automatic Seeder	300,000	1 unit	300,000
Seedling Tray	60	15,000 箱	900,000
Tools for Maintenance	300,000	1 set	300,000
Total			14,000,000

(2) for Maize CSU

Farm Machinery	Unit Price (Rs.)	No.	Amount (Rs.)
Tractor(55hp) + Rotary	1,200,000	1 unit	1,200,000
Maize Planter (Tractor Drawn)	200,000	1 unit	200,000
Harvester for Maize	2,800,000	1 unit	2,800,000
Tools for Maintenance	300,000	1 set	300,000
Total			4,500,000

(3) for Pulses CSU

Farm Machinery	Unit Price (Rs.)	No.	Amount (Rs.)
Tractor(55hp) + Rotary	1,200,000	1 unit	1,200,000
Pulse Planter (Tractor Drawn)	200,000	1 unit	200,000
Harvester for Pulse	300,000	1 unit	300,000
Tools for Maintenance	300,000	1 set	300,000
Total			2,000,000

(4) for Sugarcane CSU

Farm Machinery	Unit Price (Rs.)	No.	Amount (Rs.)
Tractor(55hp) + Rotary	1,200,000	1 unit	1,200,000
Plough	150,000	1 unit	150,000
Power Weeder	150,000	1 unit	150,000
Sugarcane Planter (Tractor Drawn)	200,000	1 unit	200,000
Sugarcane Harvester	10,000,000	1 unit	10,000,000
Tools for Maintenance	300,000	1 set	300,000
Total			12,000,000

Attachment 11.3.3 Breakdown of Consulting Services

(1) Local Experts as Counterparts for Japanese Experts

Year	No. of Experts			Total	Period (M/M)	Total MM
	Farm Machinery	Mechanic	Agronomist			
2018	2	2	1	5	6	30
2019	2	2	1	5	6	30
2020	2	2	1	5	6	30
2021	2	2		4	6	24
2022	2	2		4	6	24
Total	10	10		23		138

Remuneration of Indian Expert (Rs./MM)		300,000
Total Consulting services (yen)		41,400,000

(2) Baseline Survey

Period	months	3
No. of Senior Experts	Sociologist	persons 2
	Agronomist	persons 4
No. of Enumerators	persons	12
Monthly consulting fee (INR)	Senior Experts	per month 300,000
	Junior experts	per month 200,000
Total for Baseline Survey (INR)		12,600,000

(3) Preparation of Detailed Plan for Promotion of Farm Mechanisation

Period	months	3
No. of Senior Experts	Engineer	persons 2
	Agronomist	persons 2
	Farm Machinery	persons 2
No. of Junior Experts	persons	10
Monthly Consulting fee (INR)	Senior Experts	per month 300,000
	Junior experts	per month 200,000
Total for Detailed Plan (INR)		11,400,000

(4) Total of (1) to (3) 65,400,000

(5) Miscellaneous (8% of (4)) 5,232,000

(6) Total 70,632,000

Attachment 11.3.4 Tentative Manpower Cost for AMTCs and Workshops

Facility	Section	Position	No.	Manpower Cost (INR)		
				Monthly Rate	Annual Rate	Total
AMTC for Rice	Officer in Charge of AMTC Rice		1	40,000	480,000	480,000
	Administration Section	Office Manager	1	30,000	360,000	360,000
		Accountant	1	20,000	240,000	240,000
		Computer Assistant	1	20,000	240,000	240,000
		Office Attendant	2	10,000	120,000	240,000
		Night Watchman	2	10,000	120,000	240,000
	CSU Section	SMS	1	30,000	360,000	360,000
		AEO	1	30,000	360,000	360,000
	Training Section	Senior Trainer	1	30,000	360,000	360,000
		Trainer (Agriculture and operation)	3	20,000	240,000	720,000
	Workshop Section	Senior Mechanic / Operator	1	30,000	360,000	360,000
		Mechanic / Operator	2	20,000	240,000	480,000
	Total			17		4,440,000
	AMTC for ID Crops	Officer in Charge of AMTC ID Crops		1	40,000	480,000
Administration Section		Office Manager	1	30,000	360,000	360,000
		Accountant	1	20,000	240,000	240,000
		Computer Assistant	1	20,000	240,000	240,000
		Office Attendant	2	10,000	120,000	240,000
		Night Watchman	2	10,000	120,000	240,000
CSU Section		SMS	1	30,000	360,000	360,000
		AEO	1	30,000	360,000	360,000
Training Section		Senior Trainer	1	30,000	360,000	360,000
		Trainer (Agriculture and operation)	3	20,000	240,000	720,000
Workshop Section		Senior Mechanic / Operator	1	30,000	360,000	360,000
		Mechanic / Operator	2	20,000	240,000	480,000
Total			17	290,000	4,440,000	
Workshop		10 locations	Mechanic / Operator (2)	20	20,000	240,000
Total			54		13,680,000	

Source: JICA Survey Team

Attachment 11.4.1 Comparison of Micro Irrigation System

	Rain Gun (portable)	Sprinkler (portable)	Drip
Number of required Units for one ha of ID Crop	3	10	5
Coverage Area by one unit (ha)	30 m radius, 0.3 ha (approx.)	18 m radius, 0.1 ha (approx.)	0.2 ha (max.)
Irrigation time/unit (hr)	5 minutes	15 minutes	1 hour
Required Equipment	Pump (High Head & Discharge)	Pump (Medium Head & Discharge)	Pump (Low Head & Discharge)
Unit Cost (Rs.)	100,000	120,000	150,000
Life Time	10-12 years	10-12 years	5-6 years
Appropriate Crops	Field crops like Pulses, Oilseeds, Vegetables, Sugarcane, Cotton, Cereals, Tea, Coffee and Fodder crops.	Field crops like Pulses, Oilseeds, Vegetables, Sugarcane, Cotton, Cereals, Tea, Coffee and Fodder crops.	Row crops like Sugarcane, Cotton, Banana, Strawberry, Vegetables, Spices, Biofuel Crops, Floriculture, etc.
Application Efficiency (%)	70%	80%	90%
Advantages	Larger area can be covered.	Larger area can be covered.	Suitable for all crops.
	Filtration unit may not be required because of larger nozzle size.	Filtration unit may not be required because of larger nozzle size.	Less operating pressure is required as compared to sprinkler irrigation, consequently low head and power are enough.
			Fertigation is applicable.
Shortcomings	Wind may distort the water while operation.	Wind may distort the water while operation.	Water clogging may occur due to soil particles or any other debris.
	Evaporation losses may be high.	Evaporation losses may be high.	Proper filtration unit is compulsory required.
	Big droplet size may damage the crops during flowering stage	Big droplet size may damage the crops during flowering stage	
	High operating pressure is required, accordingly power-consuming pump is required.	High operating pressure is required, accordingly power-consuming pump is required.	

Source: JICA Survey Team

Attachment 12.2.1 GAP Analysis between JICA Guideline and Legislation in India

Items	JICA Guideline (Environmental and Social Considerations Required for Intended Projects)	Environmental Legislation in India	The measure to be held in the current project
1. Underlying Principles	<p>1. The earliest possible environmental assessment to incorporate the avoidance/minimization /mitigation of the impact into the project plan.</p> <p>2. Quantitative and qualitative analysis covering social and environment harmonizing economic, financial, institutional, social and technical analysis.</p> <p>3. Provision of alternatives and mitigation measures in consideration. EIA report for the large adverse impact.</p> <p>4. Organizing a committee of experts for the particularly large adverse impacts)</p>	<p>Prior Environmental Clearance for the provided projects in the EIA Notification 2006 and its amendments are mandatory obtained.</p> <p>The contents in the Environmental Study are proposed in the Notification; 1. Introduction, 2. Project Description, 3. Description of the Environment, 4. Anticipated Environmental Impacts Mitigation Measures, 5. Analysis of Alternatives, 6. Environmental Monitoring Program, Additional Studies, Project Benefits, 10. EMP. 11. Summary & conclusion, 12. Disclosure of Consultant engaged.</p> <p>Guidelines for EIA preparation in major sectors were published by MoEF. However, recent guideline for the irrigation has not been published. (Provision of alternative is also included in the contents).</p> <p>Expert Appraisal Committees (EAC) in central government level, Expert Appraisal Committees (SEAC) in state level review the Study.</p> <p>Although there is no particular description of Strategic Environmental Assessment in the notification, there are some cases which conducted the study when the Donor has regulation on it. In Technical EIA Guidance manual For Industrial Estate made some introduction of SEA.</p>	<p>Required process should be proposed to the implementation agency.</p>
2. Examination of Measures	<p>1. Examination of the multiple alternatives to avoid, minimize mitigate of the impact.)</p> <p>2. Preparation of appropriate follow up plans and systems such as monitoring plans and environmental management plans.</p>	<p>As mentioned above, provision of alternative analysis, management and monitoring systems are required in the notification 2006.</p> <p>The monitoring result should be submitted to the authorities (EIAA/SEIAA) depending on the project scale.</p>	<p>No particular large gap in between.</p>
3. Scope of Impacts to Be Assessed	<p>1. Impacts on human health and safety, as well as on the natural environment, transmitted through air, water, soil, waste, accidents, water usage, climate change, ecosystems, fauna and flora, including trans-boundary or global scale impacts.</p> <p>2. Examining derivative, secondary, and cumulative impacts indivisible from the project.</p>	<p>Environmental Standards are provided by Environmental (Protection) Rule1986and other relevant legislations such as Air (Prevention and Control of Pollution) Act 1981, The Noise Pollution (Regulation and Control) Rules, 2000 and Water (Prevention and Control of Pollution) Act in central level.</p> <p>Also, environmental standards in state level are provided by each state government based on above mentioned Acts. In case of the AP state, the standards are in public at the Homepage of the Andhra Pradesh Pollution Control Board.</p> <p>No special description on the assessment of secondary or cumulative impact in the Notification 2006.</p>	<p>No particular large gap in between.</p>
4. Compliance with Laws, Standards, and Plans	<p>1. Compliance with Laws, Standards, Policies and Plans.</p> <p>2. Avoidance of the protected and conservation area of natural or cultural heritage designated by laws and ordinances.</p>	<p>In most cases, with the EIA Notification, Forest (conservation) Act 1980, Wildlife (Protection) Act 1972, The C.R.Z notification 1991 should be followed for the land matter.</p> <p>Also, the selection of the project site should follow the Environment (Siting for Industrial Projects) Rules1999 which limits the projects</p>	

		activities in the notified areas.	
5. Social Acceptability	1. Adequate social coordination for their acceptance. In case of the large impact, sufficient consultation with local stakeholders via information disclosure at early stage to be incorporated into project plan.) 2. Consideration of the vulnerable people	Regarding the public consultation, III.Stage(3)-Public Consultation in article7,"Stages in the Prior Environmental Clearance Process for New Projects" in the Notification 2006 provides the requirement. However, in the same section,"the modernization of the irrigation projects" is listed as a project which is not required public consultation here. Consideration to the vulnerable peoples if project involves them as project affected people (PAPs) is described in the RTFCTLA 2013. However, the description mainly focuses on the SC and ST in the country as typical vulnerable people.	No particular large gap in between.
6. Ecosystem and Biota	1. Avoidance of the degradation of the natural resource 2. Avoidance of the illegal logging	Besides the EIA Notification 2006, relevant legislation such as Wildlife (protection) Act, Forest (conservation Act limit the development activities. Especially for the tree felling are strictly controlled even in the private land to be obtained prior permission.	No particular large gap in between.
7. Involuntary Resettlement	1. Avoidance and minimization of the involuntary resettlement 2. Sufficient compensation to PAPs with timely manner 3. Appropriate participation of PAPs throughout the planning, implementation and monitoring of the RAPs with the appropriate grievance mechanisms 4. At large scale involuntary resettlement, advance information disclosure to the PAPs should be made with the understandable way covering the elements in the World Bank Safeguard Policy, OP 4.12, Annex A.)	Related to the resettlement and land acquisition, Right to fair compensation and transparency in land acquisition 2013(RTFCTLA 2013) enacted since January 2014. The act provides prior compensation based on the socio economic survey.	No particular large gap in between.
8. Indigenous Peoples	1. Avoidance and minimizing impacts to indigenous people 2. Respect for Indigenous people's right obtaining their consent in a process of free, prior and informed consultation 3. Adequate measure to the adverse impact for indigenous people as Indigenous Peoples Plan with understandable way covering the elements of the World Bank Safeguard Policy, OP4.10, Annex B.	In article 41 in RTFCTLA 2013, avoidance of the land acquisition of Scheduled area(defined in schedule 5 in the Constitution) as much as possible Also, special consideration for the land acquisition schedule cast(SC) or Scheduled Tribe(ST) are provided in the RTFCTLA 2013, such as prior sufficient consensus of the people, preparation of development plan((3), (4), (5) in article 41).	No particular large gap in between.
9. Monitoring	1. Adequate monitoring of the predicted mitigation measures and occurrence of unforeseeable situation. 2. Feasible monitoring plan at planning 3. Available monitoring process to local project stakeholders 4. Resolving problems through an occasion of the discussion and examination in public with the sufficient stakeholder's participation	In case of environmental assessment, the EIA notification 2006 provides post environmental clearance monitoring (half yearly) in article 10. Also, in case of the resettlement, RTFCTLA2013 provides implementation of monitoring by committees in national or state level (Chapter VII).	No particular large gap in between.

Source: JICA Survey Team based on JICA Guideline for Environmental and Social Considerations, EIA Notification 2006 and its amendments

**Attachment 12.2.2 Environmental Screening Format (Draft version at March 2016;
This should be finalized/updated based on the progress of the project study)**

Name of Proposed Project:

Andhra Pradesh Irrigation and Livelihood Improvement Project (APILIP)-II

Project Executing Organization, Project Proponent or Investment Company:

Department of Water Resources, Government of Andhra Pradesh

Name, Address, Organization, and Contact Point of a Responsible Officer:

Name:

Address:

Organization:

Tel:

Fax:

E-Mail:

Date:

Signature:

Check Items

Please write “to be advised (TBA)” when the details of a project are yet to be determined.

Question 1: Address of Project Site

Whole 13 districts in Andhra Pradesh State

Question 2: Scale and contents of the project (approximate area, facilities area, production, electricity generated, etc.)

2-1. Project profile (scale and contents)

There are 3 major components in the project. The detail project contents will be determined at the early stage in project implementation. Those brief descriptions are shown below.

Table 1 Major Project component

Component	Description
Component 1: Modernisation of Medium and Minor Irrigation Projects	All 13 districts of Andhra Pradesh State -Modernisation works for medium and minor irrigation facilities. The major works include the rehabilitation of tank such as replacement of sluice shutter, installation/amplification/repair of surplus weir, bund strengthening by widening and raising, de-silting and rehabilitation of canal such as strengthening of feeder canals, canal re-sectioning, and repair of structures.
Component 2: Participatory Irrigation Management (PIM)	-Target area will be in and around the proposed medium irrigation clusters. -Target number of WUA is 604 (approximately 253,000 farmers) in the irrigation areas.
Component 3: Promotion of Farmer Producers Organisation (FPO)	-Target area will be in and around the proposed medium irrigation clusters. -Target number of FPOs is 20 (approximately 20,000 farmers).
Component 4: Livelihood Support Programme of Animal Husbandry and Fishery Sector 4.1 Animal Husbandry 4.2 Fishery	-Target area will be in and around the proposed medium irrigation clusters. 4.1 Animal husbandry improvement activities in the whole state 4.2 Inland fishery improvement activities in West Godavari
Component 4: Pilot Programmes 5.1 Food Value Chains for Strategic Crops 5.2 Farm Mechanisation for Paddy Cultivation	-Pilot programmes targeted for the state and develop mechanisms to increase the competitiveness of the food industry and water management. The programmes contain the following:

Component	Description
	5.1 Food value chains development activities mainly targeting the Chittoor District area.
	5.2 Farm mechanisation targeting the Northern Region (Srikakulam, Vizianagaram, and Visakhapatnam districts), East Godavari and West Godavari districts.

Source: JICA Survey Team

2-2. How was the necessity of the project confirmed?

Is the project consistent with the higher program/policy?

YES: Please describe the higher program/policy.

(To be advised (TBA))

NO

2-3. Did the proponent consider alternatives before this request?

YES: Please describe outline of the alternatives

(With/Without project are considered, especially in terms of the cost effectiveness.)

NO

2-4. Did the proponent implement meetings with the related stakeholders before this request?

Implemented Not implemented

If implemented, please mark the following stakeholders.

Administrative body

Local residents

NGO

Others ()

The proposed construction project consists of only rehabilitation of the existing irrigation facilities as its sub-projects and the information on the project have been shared through those operation.

Question 3:

Is the project a new one or an ongoing one? In the case of an ongoing project, have you received strong complaints or other comments from local residents?

New Ongoing (with complaints) Ongoing (without complaints)

Other

(The irrigation facilities have been operated and contributed already to the local economy. No particular complaints for the projects implementation.)

Question 4:

Is an Environmental Impact Assessment (EIA), including an Initial Environmental Examination (IEE), required for the project according to a law or guidelines of a host country? If yes, is EIA implemented or planned? If necessary, please fill in the reason why EIA is required.

Necessity (Implemented Ongoing/planning)

()

Not necessary

Other ()

Question 5:

In the case that steps were taken for an EIA, was the EIA approved by the relevant laws of the host country? If yes, please note the date of approval and the competent authority.

Approved without a supplementary condition

Approved with a supplementary condition

Under appraisal

(Date of approval: Competent authority:)

Under implementation

Appraisal process not yet started

Other (Implementation agency should officially confirm requirement on environmental clearance to the competent agency of the environment in AP state, Pollution Control Board after finalizing project schemes. In case of the modernization of the medium irrigation project, which has 2,000ha or more command area, requires Environmental clearance based on EIA notification 2006.

However, in case of the project “without any increase in pollution load and, or without any additional water and or land requirement”, the process can be simplified when the proponent provides, “a self certification, stating that the proposal shall not involve any additional pollution load, waste generation or water requirement”, to the regulatory authority. (Amendment of EIA notification 2006(S.O. 195, 2009))

Question 6:

If the project requires a certificate regarding the environment and society other than an EIA, please indicate the title of said certificate. Was it approved?

Already certified

Title of the certificate: (No objection Certificate from Local Government authority -Union Chairman)

Requires a certificate but not yet approved

Not required

Other

(As mentioned above.)

Question 7:

Are any of the following areas present either inside or surrounding the project site?

Yes No

If yes, please mark the corresponding items.

National parks, protection areas designated by the government (coastline, wetlands, reserved area for ethnic or indigenous people, cultural heritage)

Primeval forests, tropical natural forests

Ecologically important habitats (coral reefs, mangrove wetlands, tidal flats, etc.)

Habitats of endangered species for which protection is required under local laws and/or international treaties

Areas that run the risk of a large scale increase in soil salinity or soil erosion

Remarkable desertification areas

Areas with special values from an archaeological, historical, and/or cultural points of view

Habitats of minorities, indigenous people, or nomadic people with a traditional lifestyle, or areas with special social value

A medium project, Siva-Basham medium irrigation scheme, is partly fell into the area of the Nagarjunasagar-Srisailam Sanctuary, (Nagarjunasagar-Srisailam Tiger Reserve), in Kurnool District. The proposed project may contain some maintenance works for the facilities. Those are road improvement(part of the current 4km maintenance road), additional field office(approx.5mx5m in 2F) on the top of the Dam body serving as a store shed in the ground floor, solar system illumination, 0.7km of canal lining and standby generator installation. The impact of the work is very limited however adequate permission should be taken.

Question 8:

Does the project include any of the following items?

Yes No

If yes, please mark the appropriate items.

Involuntary resettlement (scale: households persons)

- Groundwater pumping (scale: TBA m³/year)
- Land reclamation, land development, and/or land-clearing (scale: 95hectars)
- Logging (scale: hectars)

Question 9:

Please mark related adverse environmental and social impacts, and describe their outlines.

- Air pollution
- Water pollution
- Soil pollution
- Waste
- Noise and vibrations
- Ground subsidence
- Offensive odors
- Geographical features
- Bottom sediment
- Biota and ecosystems
- Water usage
- Accidents
- Global warming
- Involuntary resettlement
- Local economies, such as employment, livelihood, etc.
- Land use and utilization of local resources
- Social institutions such as social infrastructure and local decision-making institutions
- Existing social infrastructures and services
- Poor, indigenous, or ethnic people
- Misdistribution of benefits and damages
- Local conflicts of interest
- Gender
- Children's rights
- Cultural heritage
- Infectious diseases such as HIV/AIDS
- Other ()

Outline of related impact:

Andhra Pradesh is located in the eastern coast of the southern India and is bordered by Maharashtra, Chhattisgarh and Orissa in the north, the Bay of Bengal in the east, Tamil Nadu to the south and Karnataka to the west. In the State as a whole, three distinct physical zones can be discerned, viz., i) the coastal plains, ii) the Eastern Ghats and iii) the Western pen plains. The coastal plains stretch along the State's coast from the northernmost point in Srikakulam district to the southernmost point in Nellore district. In the middle of this region is located the shallow fresh water lake of Kolleru covering an area of about 260 sq. km. during rainy season.

Natural Environment:

Irrigation Project is principally been planning to select only rehabilitation of existing Medium/Minor irrigation facilities, which can be assumed no additional impact. However, the detail information for sub-projects are not available yet.

A medium project, Siva Basham Irrigation is located partly within Nagarjunasagar-Srisailam Wildlife Sanctuary (tiger Reserve) and some small scale rehabilitation works is proposed and this is required a permission from Forestry Department. Also, some minor tanks are in Scheduled area.

Social Environment:

Irrigation Project is principally been planning to select only rehabilitation of existing irrigation facilities and impact may be limited.

There are some Scheduled Areas (5th schedule in the Constitution) in AP state in Srikakulam,

Vizianagaram, Visakhapatnam, East Godavari and West Godavari districts and some irrigation projects are fell into those mandals.

Pollution control:

No particular large impact is envisaged. However, pollution related to construction work such as air pollution, water pollution and noise from the heavy machineries should be considered to minimize impact to surrounding communities with the mitigation measure following the environmental standard.

Question 10:

In the case of a loan project such as a two-step loan or a sector loan, can sub-projects be specified at the present time? TBA

Yes No

(To be advised –TBA)

Question 11:

Regarding information disclosure and meetings with stakeholders, if JICA’s environmental and social considerations are required, does the proponent agree to information disclosure and meetings with stakeholders through these guidelines?

Yes No

(To be advised –TBA)

Table A9.4 Draft JICA Environmental Checklist for Andhra Pradesh Irrigation and Livelihood Improvement Project (APILIP)-II((Draft version at March 2016; This should be finalized/updated based on the progress of the project study)

Category	Environmental Item	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
			No: N	(Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process?	(a) No	(a) ,(b),(c),(d)
		(b) Have EIA reports been approved by authorities of the host country's government?	(b) No	Any report has not been prepared related to the proposed project, at the moment. The irrigation modernization project may require some process in Environmental Clearance; with Central or State level authority prior to the implementation.
		(c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?	(c) No	
		(d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(d) No	
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders?	(a)N	(a) ,(b)
		(b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(b)N	The irrigation schemes have been operated for long period.

Category	Environmental Item	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
			No: N	(Reasons, Mitigation Measures)
				The rehabilitation will be made based on the requests of stakeholders.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a)Y	(a) The project rehabilitation of the existing facilities and economical evaluation for the rehabilitation were evaluated whether the work contribute further economical benefit in terms of the with/without project.
2 Pollution Control	(1) Water Quality	(a) Are considerations given to water pollution of the surrounding water bodies, such as rivers and groundwater by effluents or leachates from agricultural lands? Are adequate use/disposal standards for fertilizers, agrochemicals, and livestock wastes established? Is a framework established to increase awareness of the standards among farmers?	(a)Y	(a)Management skills for irrigation area including chemical application and livestock improvement are provided to the farmers in the command area.
		(b) Is a monitoring framework established for water pollution of rivers and groundwater?	(b)N	(b)No large water pollution is envisaged from the project activities.
	(2) Wastes	(a) Are wastes properly treated and disposed of in accordance with the country's regulations?	(a)Y	(a) Referring the standard, National Building Code of India 2005 and Standards in AP pollution Control Board, the appropriate waste management should be done at the construction works.
	(3) Soil Contamination	(a) Is there a possibility that impacts in irrigated lands, such as salinization of soils will result?	(a)N	(a)The project only focuses rehabilitation of the existing facilities and .
		(b) Are adequate measures taken to prevent soil contamination of irrigated lands by agrochemicals, heavy metals and other hazardous substances?	(b)Y	(b)Rehabilitation works include some slope protection of existing facilities such as liner in the canal and slope drainage. Through the agriculture extension, knowledge of adequate chemical application will be transferred to increase crop values.
		(c) Are any agrochemicals management plans prepared? Are any usages or any implementation structures organized for proper use of the plans?	(c)	(c) Detail activities will be determined at project implementation.
	(4) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	(a)N	(a)As one of the activities in the pilot project, advanced water use technique will be implemented using available ground water. The amount will be considered referring the current ground water condition not to affect it.
	(5) Odor	(a) Are there any odor sources? Is there a possibility that odor problems will occur to the inhabitants?	(a)N	(a)Particular problem on odor has not been identified.

Category	Environmental Item	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
			No: N	(Reasons, Mitigation Measures)
3 Natural Environment	(1) Protected Areas	(a) Is the project site or discharge area located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a)Y	(a) A project, Siva Basham Medium Irrigation, in Kurunool a part of the existing facilities are fell into the Nagarjuna-Sagar Srisailam WLS (Nagarjuna-Sagar Srisailam Tiger Reserve). Work includes a kind of maintenance, the impact is very limited. According the authority, it can be permissive in case of rehabilitation. Some minor projects may involve scheduled tribal area although the details are not available yet. Although the impact of the project is limited, adequate coordination with the responsible organization for scheduled tribal, Integrated Tribal Development Agency may require.
		(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?	(a) N	(a)The construction works only includes rehabilitation of the existing irrigation facilities and no new land acquisition is required.
	(2) Ecosystem	(b) Does the project site or discharge area encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?	(b) N	(b), (c),(d),(e) Particular problem on endangered species has not been identified.
		(c) Is there a possibility that the project will result in the loss of breeding and feeding grounds for valuable wildlife? If they are lost, are there substitutes for the grounds near the original locations?	(c) N	
		(d) Is there a possibility that overgrazing will cause ecological degradation, such as impacts on wildlife habitats and desertification?	(d) N	
		(e) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?	(e) Y	
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?	(a)N	(a) No new land acquisition is expected.
		(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?	(b)-	(b)In case of the resettlement/land acquisition will be involved, adequate process should be taken based on the governmental act, RTTFC 2013 Act.

Category	Environmental Item	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
			No: N	(Reasons, Mitigation Measures)
		(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?	(c)-	(c)In the case, Resettlement Plan should be prepared.
		(d) Is the compensations going to be paid prior to the resettlement?	(d)	(d)
		(e) Is the compensation policies prepared in document?	(e)	(e)
		(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?	(f)	(f)
		(g) Are agreements with the affected people obtained prior to resettlement?	(g)	(g)
		(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?	(h)	(h)
		(i) Are any plans developed to monitor the impacts of resettlement?	(i)	(i)
		(j) Is the grievance redress mechanism established?	(j)	(j)
	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?	(a)	(a)
		(b) Is proper allotment made for rights to agricultural land use? Is there a possibility that the allotment will result in inequitable distribution or usurpation of land and available resources?	N	(b)
		(c) Are proper allotments, such as water rights allotment in the project area made? Is there a possibility that the allotments will result in inequitable distribution or usurpation of water rights and available resources?	(b)	(c)
		(d) Is there a possibility that the amount of water used (surface water, groundwater) by the project will adversely the downstream fisheries and water uses?	(c)	(d)
		(e) Is there a possibility that water-borne or water-related diseases (e.g., schistosomiasis, malaria, filariasis) will be introduced? Is adequate consideration given to public health education, if necessary?	(d)	(e)
			(e)	Currently, at the time of the JICA Survey, the particular impacts has not been identified.

Category	Environmental Item	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
			No: N	(Reasons, Mitigation Measures)
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) Particular problem on Heritage has not been identified.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) The project includes only rehabilitation of the existing facilities which have been operated for long period in the rural area in AP state.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?	(a) Y	(a) No particular impact to affect culture and lifestyle of ethnic minorities and indigenous peoples.
		(b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(b) Y	(b) Rights of the minorities , categorized as Scheduled Tribe and Scheduled Caste, are strictly respected in the countries.
				Some minor projects may involve scheduled tribal area although the details are not available yet. Although the impact of the project is limited, adequate coordination with the responsible organization for scheduled tribal, Integrated Tribal Development Agency may require when the project involve those area.
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?	(a)	(a),(b),(c),(d) This should be considered at the Detailed Project Report preparation.
		(b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials?	(b)	
		(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?	(c)	
		(d) Are appropriate measures taken to ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?	(d)	
	5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?	(a)
(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?			(b)	(b)

Category	Environmental Item	Main Check Items	Yes: Y	Confirmation of Environmental Considerations
			No: N	(Reasons, Mitigation Measures)
		(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(c)	(c) The construction work should follow the Indian construction standard. Large impacts during construction work are not anticipated.
		(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?	(a) Y	(a) The proponent should have responsibility to monitor environmental condition associated with projects.
		(b) What are the items, methods and frequencies of the monitoring program?	(b)	(b), (c), (d)
		(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?	(c)	-The Monitoring Plan should be established and strictly observed by the responsible bodies, especially for the items to be classified what the monitoring is required.
		(d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(d)	-The detail description should be compiled at the Environmental Clearance.
				-DoWR should organize required measure for the monitoring in detail prior to the implementation.
				- The report should be conducted based on the legislation.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry checklist should also be checked.	(a)	(a),(b)
		(b) For the projects including construction of large-scale weirs, reservoirs, and dams, where necessary, pertinent items described in the Hydropower, Dams and Reservoirs checklist should also be checked.	(b)	The project involves only rehabilitation of the existing facilities. No large impacts related to large-scale weirs, reservoirs and dams are associated.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a)	(a) The construction projects for irrigation principally contain only rehabilitation of medium and minor projects. No large adverse impact is anticipated related to transboundary or global issues.

1) Regarding the term “Country's Standards” mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made.

In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).

2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

Attachment 12.3.1 Preliminary Environmental Evaluation for APILIP-II

Classification	No.	Items	Reason and Description	Rating
Social Environment	1	Involuntary resettlement	Planning phase, Construction phase: The irrigation scheme of the proposed project is only focusing rehabilitation of existing facilities and no any involuntary resettlement and new land acquisition is expected in principle. However, it may be required further confirmation whether the resettlement and land acquisition are avoided on detail project planning at the detail design stage, because the project scheme is still under consideration at preliminary designing stage.	C
	2	Local economy such as employment and livelihood, etc.	Planning phase, Construction phase: The project is expected to increase working opportunity for construction work in irrigation facilities. Operation phase: The project is expected to increase income of the relevant farmers through improvement of the irrigation facilities, providing technical assistance, value chain.	B+
	3	Land use and utilization of local resources	Planning phase, Construction phase: Due to malfunction of the irrigation facilities, some areas are facing flood in rainy season and also water shortage for agriculture purpose. With the proper function of the facilities, land use can be better. There is a gap between target command area and actual command area in where the irrigation water is available. Through the modernization the gap is expected to be solved.	B+
	4	Social institutions	Planning phase, Construction phase & Operation phase: The project activities include organizational enforcement. The activities are expected to improve the management capacities of the local organization related to the agriculture.	B+
	5	Existing social infrastructures and services	Construction phase: The project is expected to improve the function of the irrigation facilities through rehabilitation. Though the agriculture improvement activities, situation of agriculture related infrastructure may be improved such crop storage, primary processing area etc.	B+
	6	The poor, indigenous and ethnic people	Planning phase, Construction phase: Particular negative impact by rehabilitation of irrigation facilities and technical assistance on agriculture extension and value chain has not been identified. However, some construction works on irrigation facility rehabilitation will be implemented in an areas notified as scheduled areas where the scheduled tribes (defined in the 5th schedule in the Constitution) populated. Those are in AP state in Srikakulam, Vizianagaram, Visakhapatnam, East Godavari and West Godavari districts. Some minor tank irrigation projects are fell into Madugula mandal in Vishakhapatnam, Addateegala and Gangavaram mandals in East Godavari which are declared as a mandal fully covered by scheduled area. Because the project scales, rehabilitation of minor tanks, large scale impact may not be associated. However, adequate countermeasure should be taken based on the sufficient understanding with the people when some impacts/issue will be identified. At the implementation of the project activities, adequate understandings of the people as stakeholders should be taken based on the social survey. Also, in case of the impacts to the people will	C/B+

Classification	No.	Items	Reason and Description	Rating
			be found, particular countermeasure should be taken. Though the project activities, livelihood of the local peoples including the vulnerable people may improved.	
	7	Misdistribution of benefit and damage	Planning phase: Adequate benefit sharing among the peoples should be considered at the operation baseline survey.	C
	8	Historical and cultural heritage	No particular impact is identified at the moment. The most activities will be implemented in existing farm land.	D
	9	Local conflict of interests	Planning phase: Increase water availability may decrease risk for local conflict on the water use. As below, the use of the water resource should be shared adequately. Water use is one of the crucial matters in the area because of the trend of the water availabilities.	B+
	10	Water usage or water rights and rights of common	Planning phase, Construction phase & Operation phase: Water use for Irrigation and river water should be considered adequately to avoid conflicts between users in deferent levels. There are some interstate dispute on the Krishna River, Godavari River and Pennnar River. The Krishna water dispute between Maharashtra, Karnataka and Andhra Pradesh, The Tungabhadra water dispute between Andhra Pradesh and Karnataka, The Godavari river water dispute between Andhra Pradesh, Madhya Pradesh, Chhattisgarh, Orissa and Karnataka. Increase water availability may decrease risk for local conflict on the water use. As below, the use of the water resource should be shared adequately. Water use is one of the crucial matters in the area because of the trend of the water availabilities.	B-/B+
	11	Sanitation	Operation phase: No particular negative impact on the sanitation.	D
	12	Hazardous (risk) infectious diseases such as HIV/AIDS	Operation phase: A temporary influx of migrant labor during the construction period may increase the risk of sexual transmitted diseases, etc.	B-
Natural Environment	13	Topography and geographic features	Construction phase: No significant modification on the topography and geological feature is expected.	-
	14	Groundwater	Operation phase: Use of groundwater should be confirmed at the designing. Ground water for the	C
	15	Soil erosion	No large soil erosion is anticipated because the area is generally flat. However, during the construction, water turbidity in downstream may increase.	B-
	16	Hydrological situation	Planning phase, Construction phase: Improvement of the currently damaged water stock facilities such as Dam and Tank may decrease amount of the water flow in downstream. Adequate flow should be supply to downstream.	B-
	17	Coastal zone	There is no coastal zone in project area.	D
	18	Fauna and flora and biodiversity	Planning phase, Construction phase: No large impact is anticipated at the moment. There are 13 legally protected areas such as National Parks and Wildlife sanctuaries, in the State of AP. The important fauna and flora species are strictly protected in the locations. Operation phase: Water flow to the downstream should be considered. Increase water availabilities in the medium reservoirs/minor tanks may provide temporally habit for natural animals.	B-/ B+

Classification	No.	Items	Reason and Description	Rating
	19	Protected Area	A existing medium project, Siva-Basham medium irrigation scheme, is partly fell into the area of the Nagarjunasagar-Srisailam Sanctuary, (Nagarjunasagar-Srisailam Tiger Reserve), in Kurnool District. The proposed project may contain some maintenance works for the facilities. Those are road improvement(part of the current 4km maintenance road), additional field office(approx.5mx5m in 2F) on the top of the Dam body serving as store shed the ground floor, solar system illumination, 0.7km of canal lining and standby generator installation. The impact of the work is very limited however adequate permission should be taken. Similarly the avoidance of the impact to existing protected area should be confirmed at detail design stage.	C
	20	Meteorology	No particular impact is identified at the moment.	D
	21	Landscape	No particular impact is identified at the moment.	D
	22	Global warming	No particular impact is identified at the moment.	D
Pollution	23	Air pollution	Construction phase: During construction, the suspended dust and gas emission from the construction machinery is expected even it may be in limited area.	B-
	24	Water contamination	Construction phase: Associated with earthwork in the construction turbidity of the water will be likely increased at the downstream even temporally.	B-
	25	Soil contamination	Construction phase: During construction, accidental spillage of toxic chemicals such as fuel, lubricants, and solvents may cause soil contamination even it may be in limited area.	B-
	26	Waste	Construction phase: During construction and operation, the project owner should implement adequate handling of waste (including sludge).	B-
	27	Noise and vibration	Construction phase: During construction period noise pollution will be generated by the use of vehicles, stone crushing, generators etc.	B-
	28	Ground subsidence	Because the project Ground modification and ground water exploitation is not planned and no any impact is anticipated. Activities related to the some groundwater use are expected to fulfil the shortage of the water within the command area referring the ground water monitoring.	D
	29	Offensive odor	No particular impact is identified at the moment.	D
	30	Bottom sediment	Construction phase: The impact should be confirmed at design phase. Some irrigation projects may involve desilting of existing tank, excavating the bottom. Most cases, the work will be conducted in dry season when the tanks are dried up and no particular impacts are identified.	D
	31	Accidents	Construction phase: During construction, operation of heavy vehicles and machineries may increase risk of traffic accidents of residents and labours in and around the proposed project sites.	B-

Rating: A-: Serious impact is expected, if any measure is not implemented to the impact; B-: Some impact is expected, if any measure is not implemented to the impact; C: Extent of impact is unknown (Examination is needed. Impact may become clear as study progresses.); D: No impact is expected; A+:

Remarkable effect is expected due to the project implementation itself and environmental improvement caused by the project. B+: Some effect is expected due to the project implementation itself and environmental improvement caused by the project.

Source: JICA Study Team

Attachment 12.3.2 Tentative Mitigation Measure for the potential Impact in APILIP-II

Classification	No.	Items	Rating	Reason and Description	Possible Mitigation Measure
Social Environment	1	Involuntary resettlement	C	Planning phase, Construction phase: The irrigation scheme of the proposed project is only focusing rehabilitation of existing facilities and no any involuntary resettlement and new land acquisition is expected in principle. However, it may be required further confirmation at the detail design stage, because the project scheme is still under consideration at preliminary designing stage.	The new land acquisition should be avoided at detail designing stage.
	2	The poor, indigenous and ethnic people	C	Planning phase, Construction phase: Particular negative impact by rehabilitation of irrigation facilities and food park construction has not been identified. However, some work will be implemented in an areas notified as scheduled areas where the scheduled tribes (defined in the 5th schedule in the Constitution) populated, are in AP state in Srikakulam, Vizianagaram, Visakhapatnam, East Godavari and West Godavari districts. Some minor tank irrigation projects are fell into Madugula mandal in Vishakhapatnam, Addateegala and Gangavaram mandals in East Godavari which are declared as a mandal fully covered by scheduled area. Because the project scales, rehabilitation of minor tanks, large scale impact may not be associated. However, adequate countermeasure should be taken based on the sufficient understanding with the people when some impacts/issue will be identified.	At the implementation of the project activities, adequate understandings of the people as stakeholders should be taken based on the social survey. Also, in case of the impacts to the people will be found, particular countermeasure should be taken. Framework should be developed for Forest Dweller Development Plan referring a sample framework.
	3	Misdistribution of benefit and damage	C	Planning phase: Adequate benefit sharing among the peoples should be considered at the operation baseline survey.	Based on the baseline survey, the opinions among the different groups should be considered at the implementation.
	4	Local conflict of interests	B-	Planning phase: As below, the use of the water resource should be shared adequately. Water use is one of the crucial matters in the area because of the trend of the water availabilities.	At the project level through the project activities in the organizational enhancement, the situation can be clear and the result should be reflected in the project implementation.
	5	Water usage or water rights and rights of common	B-	Water use for Irrigation and river water should be considered adequately to avoid conflicts between users in deferent levels. There are some interstate dispute on the Krishna River, Godavari River and Pennnar River. The Krishna water dispute between Maharashtra, Karnataka and Andhra Pradesh, The Tungabhadra water dispute between Andhra Pradesh and Karnataka,	Through the DPR preparation, the situation will be clear in project management level. At the project level, through the project activities in the organizational enhancement, the situation can be clear and the result should be reflected in the project implementation.

Classification	No.	Items	Rating	Reason and Description	Possible Mitigation Measure
				The Godavari river water dispute between Andhra Pradesh, Madhya Pradesh, Chhattisgarh, Orissa and Karnataka.	
	6	Hazardous (risk) infectious diseases such as HIV/AIDS		Operation phase: A temporary influx of migrant labor during the construction period may increase the risk of sexual transmitted diseases, etc.	Appropriate instruction should be made to the project workers.
Natural Environment	7	Groundwater	C	Operation phase: Use of groundwater should be confirmed at the planning.	Coordination with Ground Water Department, adequate ground water monitoring should be taken.
	8	Soil erosion	B-	No large soil erosion is anticipated because the project site for the irrigation is generally flat. However, during the construction, water turbidity in downstream may increase.	Adequate slope protection should be planned at the construction works.
	9	Hydrological situation	B-	Planning phase, Construction phase: Improvement of the currently damaged water stock facilities such as Dam and Tank may have a risk for decrease water flow in downstream. Adequate flow should be supply to downstream following the water allocation.	Through the project activities in the organizational enhancement, adequate management of the water is expected.
	10	Fauna and flora and biodiversity	B-	Planning phase, Construction phase: No large impact is anticipated at the moment. There are 13 legally protected areas such as National Parks and Wildlife sanctuaries, in the State of AP. Operation phase: Water flow to the downstream should be considered.	Further confirmation should be made at detail design stage (DPR). Through the project activities in the organizational enhancement, adequate management of the water is expected.
Pollution	11	Air pollution	B-	Construction phase: During construction, the suspended dust and gas emission from the construction machinery is expected even it may be in limited area.	Depending on the scale of the project, this should be considered to be minimized following the construction standard.
	12	Water contamination	B-	Construction phase: Associated with earthwork in the construction turbidity of the water will be likely increased at the downstream even temporally.	Depending on the scale of the project, this should be considered to be minimized following the construction standard.
	13	Soil contamination	B-	Construction phase: During construction, accidental spillage of toxic chemicals such as fuel, lubricants, and solvents may cause soil contamination.	Depending on the scale of the project, this should be considered to be minimized following the construction standard.
	14	Waste	B-	Construction phase: During construction and operation, the project owner should implement adequate handling of waste (including sludge).	Depending on the scale of the project, this should be considered to be minimized following the construction standard.

Classification	No.	Items	Rating	Reason and Description	Possible Mitigation Measure
	15	Noise and vibration	B-	Construction phase: During construction period noise pollution will be generated by the use of vehicles, stone crushing, generators etc.	Depending on the scale of the project, this should be considered to be minimized following the construction standard.
	19	Accidents	B-	Construction phase: During construction, operation of heavy vehicles and machineries may increase risk of traffic accidents of residents and labours in and around the proposed project sites.	Depending on the scale of the project, this should be considered to be minimized following the construction standard.

Source: JICA Study Team

Attachment 12.3.3 Forest Dwellers Development Framework (Sample)

This Framework is presented as a sample for preparation of Forest Dwellers Development Plan in case of the project involves Forest Dwellers at project activities. Also, this should be revised based on the result of JICA survey and detail design. (March 2016)

1. Introduction

Forest Dwellers Development Framework (FDDF) is an instrument for the Project Executing Agency to ensure the interests of the forest dwellers are protected in project design as well as implementation of project and sub-projects. This framework has been prepared based on the JICA's Guidelines for Environmental and Social Considerations and with reference to the World Bank's Operational Manual – OP 4.10 for the Indigenous Peoples (the World Bank Safeguards Policy).

The Guidelines of JICA on ESC, April 2010 – Appendix 1 clearly states that any adverse impacts of a project on the indigenous peoples are to be avoided when feasible by exploring all viable alternatives. When adverse impacts can't be avoided then effective measures must be taken to minimize the impacts and to compensate indigenous peoples for their losses. All the rights of the indigenous peoples in relation to land and resources must be respected and efforts must be made to obtain the consent of indigenous peoples in a process of free, prior and informed consultation. An Indigenous Peoples Plan must be prepared to determine the measures to be taken up for minimization of the adverse impacts of the Project on the Indigenous Peoples. This Plan shall be prepared in consultation with the Indigenous Peoples with reference to the Annex B of World Bank Safeguard Policy, OP 4.10.

The FDDF is a part of Environmental and Social Management Framework of the Project specially designed to ensure the rights of forest dwellers are protected in all the stages of project designing and implementation. It shall guide the Project Executing Agency to prepare the Forest Dwellers Development Plan at the village/ habitation level, wherever the Project interventions are going to significantly affect the forest dwellers.

The Forest Dwellers Development Framework has been presented in the following sections:

1. Introduction to the FDDF
2. Defining the forest dwellers
3. Project description and categorization
4. Legal framework for the protection of rights of forest dwellers
5. Administration of tribal areas
6. Status of forest dwellers in Jharkhand/ Project area
7. Potential impacts and risks of Project interventions on the forest dwellers and measures to be taken up for mitigation of potential negative impacts and risks
8. FDDF Activities and Implementation Schedule
9. Institutional arrangement for implementation of FDDF
10. Preparation of Forest Dwellers Development Plan

2. Defining the Forest Dwellers

In common parlance it is understood that whoever is staying within the forest or close to the forest and depend on the forestland, forest products and forestry development activities for socio-economic-cultural and religious purposes, is considered as a forest dwellers. Forest dwellers have not been constitutionally defined. The Forest Right Act 2006 made an attempt to define the forest dwellers as below:

The Preamble to the FRA - "to recognize and vest the forest rights and occupation in forest land in forest dwelling Scheduled Tribes and other traditional forest dwellers who have been residing in such forests

for generations but whose rights could not be recorded; to provide for a framework for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land.”

Sections 2(c) and (o) of the Act define the eligibility of STs and Other Traditional Forest Dwellers as:

2(c) forest dwelling Scheduled Tribes means the members or community of the Scheduled Tribes who primarily reside in and who depend on the forests and forest lands for bona fide livelihood needs and includes the Scheduled Tribe pastoralist communities.

2(o) Other traditional forest dweller means any member or community who has for at least three generations prior to 13th day of December 2005 primarily resided in and who depends on the forest or forest land for bona fide livelihood needs (Explanation – For the purpose of this clause, ‘generation’ means a period comprising of twenty five years).

The Scheduled Tribes in India are also commonly referred as Adivasi – meaning the original inhabitants of the land or the indigenous people. But the Constitution of India does not use the term Adivasi or Indigenous People. Communities based on their primitive traits, geographical isolation, economic backwardness, shyness of contact with community at large and cultural distinctiveness are categorized and notified by the President of India under Art 342 of Constitution of India as Scheduled Tribes. Initially 744 communities have been notified as Scheduled Tribe. ST is an administrative term used for administering constitutional privileges, protection and benefits meant for specific section of peoples who have been historically considered disadvantaged and backward.

For the scope and purpose of the Project the forest dwellers shall include communities belonging to ST, SC and OBC, who live in and around forest and depend on forestland and forest resources for livelihood and cultural purposes.

3. Project Description and categorization

The Project – APILIP-II shall provide rehabilitation of the Medium and Minor Irrigation Facilities, promote capacity building of operation and management in famers and extension services and also provides pilot programs for enhancing food production in 13districts in the state. The important components and sub-projects have been mentioned below:

Table 1 Details of the Sub-Projects

Major Project component

Component	Description
Component-1 Modernisation of Medium and Minor Irrigation Projects	All AP State, 13 districts Modernization works for the Medium and Minor Irrigation facilities. The major works includes rehabilitation of tank such as replacement of sluice shutter, installation / amplification / repair of surplus weir, bund strengthening by widening and raising, de-silting and rehabilitation of canal such as strengthening of feeder canals, canal re-sectioning, repair of structures.
Component-2 Capacity Building for O&M and Agriculture Extension Services	-Target area will be selected within the project period. -Tentative targets are approximately 190 thousands farmers in the irrigation areas.
Component-3 Pilot Programmes	Pilot Programmes target to AP state and develop mechanisms to increase the competitiveness of the food industry. The programs contains followings;
3.1 Food Value Chains for Strategic Crops	3.1 Food Value Chains development mainly targetting Chittoor District area
3.2 Farm Mechanisation for Paddy Cultivation	3.2 Farm Mechanisation targetting Northern AP, Srilakuram, Visianagram, Vishakapatnam, East Godavari and West Godavari
3.3 Conjunctive Use of Surface Water and Groundwater	3.3 Inland Fishery in West Godavari
3.4 Improvement of Inland Fishery	3.5 Animal Husbandry in whole AP state
3.5 Improvement of Animal Husbandry	

Source: JICA Data collection Survey Team

Due to shortage of the project information at the moment of the Data Collection Survey, the Project can be categorized as FI. The Project shall be implemented by Project Executing Agency and the precise number of beneficiaries in different locations and exact locations of project interventions are to be identified during the implementation of the Project. The Project shall have positive environmental and social impacts in the project area as it is going to work with marginal and small farmers from ST, SC and Backward Communities to help them through the project activities. There may be some environmental and social risks, which shall be analyzed during the preparation of sub-projects implementation plans. The Project shall not have any adverse impact on the forest, protected areas, heritage sites etc. It does not involve huge new construction activities those are subject to land acquisition, involuntary displacement and resettlement etc. No activities shall be promoted on the forestland and other protected areas.

Since Andhra Pradesh historically includes a land of forest and forest dwellers formally called “Agency Area”, the need for preparation of Forest Dwellers Development Framework as part of the necessary actions as per the requirements of JICA ESC Guidelines of April 2010 in case of the impacts to them are anticipated. Although the project is not going to adversely impact them the FDDF shall assist the Project Executing Agency to proactively protect the rights of the forest dwellers and involve them in the project implementation.

4. Legal framework and safeguards for the Forest Dwellers

The Scheduled Tribes hold the major constituency of the forest dwellers in the state. The Constitution of India has laid down number of safeguards for them. It provides social, economic and political guarantees to the STs and SCs. Some of the provisions/ guarantees have been mentioned below:

- Equality before law [Article 14]
- The State to make special provisions for the advancement of any socially and educationally backward classes of citizens or for the Scheduled Castes and the Scheduled Tribes [Article 15(4)]
- Equality of opportunity for all citizens in matters relating to employment or appointment to any office under the State [Article 16]. The State to make provisions for reservation in appointment, posts in favour of any backward class citizens which in the opinion of the State is not adequately represented in the services under the State [Article 16(4)]. The State to make provisions in matters of promotion to any class or classes of posts in the services in favour of the Scheduled Castes and the Scheduled Tribes [Article 16 (4A) and 16(4B)]
- Appointment of a Commission to report on the administration of the Scheduled Areas and the welfare of the Scheduled Tribes in the States [Article 339(1)]
- Specify the tribes or tribal communities to be Scheduled Tribes [Article 342]
- The State to promote with special care the educational and economic interests of the weaker sections of the society and in particular, of the Scheduled Castes and Scheduled Tribes and shall protect them from social injustice and all forms of exploitation [Article 46]
- Grants-in-aid from the Consolidated Fund of India each year for promoting the welfare of the Scheduled Tribes and administration of Scheduled Areas [Article 275(1)]
- Reservation of seats for STs and SCs in Lok Sabha [Article 330]; Reservation of seats in State Legislatures [Article 337]; Reservation of seats in Panchayats [Article 243D] and Reservation of seats in Municipalities/ Urban Local Bodies [Article 243T]
- Creation of Agencies for monitoring the safeguards for the STs and SCs – National Commission for ST and National Commission for SC [Article 338 and 338A]

Some of the laws for the safeguards of the forest dwellers have been mentioned below:

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 - This Act popularly known as Forest Rights Act (FRA) recognizes rights of forest dwellers (ST and other Traditional Forest Dwellers) on forest land and forest resources. The forest dwellers can submit their claims for individual entitlement over forestland cultivated by them as well as for community forest rights. Rights under FRA which are claimed by a village community such as rights of nistar or those used during Zamindari/other intermediary regimes, right of access, use and disposal of non-timber forest produce (NTFP), and rights over the products of water bodies and grazing grounds, are referred to as Community Forest Rights.

The Panchayats (Extension to Scheduled Areas), Act 1996 - The Act extends the provisions of Panchayats contained in Part IX of the Constitution to the Schedule Areas. The Act redefines a village based on its people and their customs and traditions. It empowers the Gram Sabha to ensure people centric governance and govern the common property resources.

5. Administration of Tribal Areas

5.1 Scheduled Areas under 5th Schedule of the Constitution

The Fifth Schedule under article 244 (2) of the Constitution defines Scheduled Areas as areas declared by the President to be Scheduled Areas after consultation with the Governor of the concerned State. The criteria for declaring any area as Scheduled Area under the Fifth Schedule are:

- Preponderance of tribal population,
- Compactness and reasonable size of the area,
- Available administrative entity such as district, block or taluk, and
- Economic backwardness of the area as compared to neighbouring areas.

The Governor of a State having Scheduled Areas is empowered to make regulations in respect of prohibition or restriction in transfer of land from tribals and to regulate the business of money lending to the members of STs. In making any such regulation, the Governor may repeal or amend any Act of Parliament or of the Legislature of the State, which is applicable to the area in question. The Governor may by public notification direct that any particular Act of Parliament or Legislature of the State shall not apply to a Scheduled Area or any part thereof in the State or shall apply to such area subject to such expectations and modifications as may be specified. Tribes Advisory Council shall be set up in States having Scheduled Areas. The TAC consists of more than twenty members of whom, as nearly as may be, three fourth are from the representatives of Scheduled Tribes in the Legislative Assembly of the State. The role of TAC is to advise the State Government on matters pertaining to the welfare and advancement of the Scheduled Tribes in the State as may be referred to it by the Governor.

Table 2 Fifth Schedule Areas of Andhra Pradesh

<p>(1) Visakhapatnam Agency area 1[excluding the areas comprised in the villages of Agency Lakshmipuram, Chidikada, Konkasingi, Kumarapuram, Krishnadevipeta, Pichigantikothagudem, Golugondapeta, Gunupudi, Gummudukonda, Sarabhupalapatnam, Vadurupalli, Pedajaggampeta] 2[Sarabhupathi Agraharam, Ramachandrarajupeta Agraharam, and Kondavatipudi Agraharam in Visakhapatnam district.</p> <p>(2) East Godwari Agency area 2[excluding the area comprised in the village of Ramachandrapuram including its hamlet Purushothapatnam in the East Godavari district].</p> <p>(3) West Godawari Agency area in West Godavari district.</p> <p>1. Inserted by the Madras Scheduled Areas (Cesser) Order, 1951 2. Inserted by the Andhra Scheduled Areas (Cesser) Order, 1955</p>

5.2 ITDAs/ ITDPs, Modified Area Development Approach (MADA) Pockets and clusters

The Tribal Welfare Department is the nodal department for welfare of ST, SC, OBC and Minorities in AP state, however it under reorganizing after the bifurcation to 2 states. Tribal Welfare Commissioner is responsible for the implementation and supervision of all the schemes taken up at the field level for the tribals.

During 5th Five Year Plan the Tribal Sub Plan (1975-) in AP was introduced for development of tribals. Integrated Tribal Development Agencies were created to implement Integrated Tribal Development Programmes. The ITDA project areas are generally contiguous areas of the size of a Tehsil or Block or more in which the ST population is 50 percent or more of the total population. Due to the demographic profile of the tribal people in these regions, however, the ITDPs in Assam, Karnataka, Tamil Nadu, and West Bengal may be smaller or not contiguous. Andhra Pradesh and Orissa have opted for an Agency model under the Registration of Societies Act and the ITDPs there are known as ITD Agencies (ITDAs).

In Andhra Pradesh, there are 8 ITDAs/ ITDPs. Since the 8th Five Year Plan (1992-97), the concept of Tribal Sub Plan (TSP) has been modified by extending the coverage to the entire ST population outside the scheduled areas, but including those who live in contiguous areas. Three criteria are laid down for identification of tribal pockets under Modified Area Development Approach(MADA). These include (i) a minimum population of 10,000 (ii) 50% of ST population in the pockets (iii) contiguity of villages in the pockets. There are 41 MADA pockets in AP to emphasize development of tribals outside the Scheduled Areas. There are also 17 cluster and 6 Particularly Vulnerable Tribal Groups (PVTG) projects have been implemented in AP in addition to the MADA pockets, outside the Scheduled Areas.

5.3 Programmes for welfare of ST, SC and OBCs in the country

The State has major emphasis on creation of educational facilities, health support systems, employment opportunities and infrastructure development for enhancement of socio-economic status of the forest dwellers (ST, SC and OBCs). The Tribal Welfare Department is the nodal Department for welfare of ST, SC and OBCs in AP. Major Programs in the AP state are :

Table 3 Programs of Welfare Department for ST, SC and OBC

- | |
|---|
| 1. TIRBAL SUB PLAN |
| 2. RESIDENTIAL EDUCATION TO ALL |
| 3. ECONOMIC SUPPORT SCHEMES: |
| 4. SKILL DEVELOPMENT: |
| 5. INFRASTRUCTURE WORKS: |
| 6. POST MATRIC SCHOLARSHIPS: |
| 7. EDUCATIONAL INSTITUTIONS (HOSTELS & ASHRAM SCHOOLS): |
| 8. PREMATIC SCHOLARSHIPS: |
| 9. GIRIJAN COOPERATIVE CORPORATION (GCC) LTD.: |

(source: TRIBAL WELFARE DEPARTMENT IMPORTANT ACHIEVEMENTS 2015-16 UP TO OCTOBER, 2015)

In addition to the Tribal Welfare Department, other Departments do implement activities for the development of ST, SC and OBCs. The flagship programs of Government of India have their own share of activities targeting the ST, SC and OBCs. Most important among them are the MGNREGS, IAY, NRLM, PMGSY, NRHM, NHM, TSC, SSA etc.

6. Status of Forest Dwellers

6.1 Basic information on the forest dwellers

6.2 Basic information on the forest dwellers in AP

Table 4 Some basic information on forest dwellers

Total population of the state	49.39 millions
Scheduled tribes (ST) population in State	2.63 millions
Scheduled caste (SC) population in State	8.45 millions
% of ST population	5.3

% of SC population	17.1
Particularly vulnerable tribal groups (PVTGs: former Primitive Tribal Groups)	6
Literacy Rate – All communities	67.4 %
Literacy Rate – ST	5.3%
Literacy Rate – SC	17.1%

Source: Compiled from Census, 2011

AP is the one of tribal rich state in the country as one of the 11 major states. The more than 50% of Scheduled Areas of the country are located among those 11 major states. 34 scheduled tribes are living in AP. Out of total 34 tribes in AP, 7 tribes are classified as Particularly vulnerable tribal groups (PVTGs) who have unique life style as traditional include a pre-agricultural system of existence, that is practice of hunting and gathering, zero or negative population growth, extremely low level of literacy in comparison with other tribal groups.

Table 5 Tribes of Andhra Pradesh

No.	Tribes	No.	Tribes
1	Andh, Sadhu Andh	18	Koya, Doli Koya, Gutta Koya, Kammara Koya, Musara Koya, Oddi Koya, Pattidi Koya, Rajah, Rasha Koya, Lingadhari Koya (ordinary), Kottu Koya, Bhine Koya, Rajkoya
2	Bagata	19	Kulia
3	Bhil	20	Malis
4	Chenchu	21	Manna Dhora
5	Gadabas, Bodo Gadaba, Gutob Gadaba, Kallayi Gadaba, Parangi Gadaba, Kathera Gadaba, Kapu Gadaba	22	Mukha Dhora, Nooka Dhora
6	Gond, Naikpod, Rajgond, Koitur	23	Nayaks
7	Goudu	24	Pardhan
8	Hill Reddis	25	Porja, Parangiperja
9	Jatapus	26	Reddidora
10	Kammara	27	Rona, Rena
11	Kattunayakan	28	Savaras, Kapu Savaras, Maliya Savaras, Khutto Savaras
12	Kolam	29	Sugalis, Lambadis, Banjara
13	Konda Dhoras, Kubi	30	Valmiki
14	Konda Kapus	31	Yenadis, Chella Yenadi, Kappala Yenadi, Manchi Yenadi, Reddi Yenadi
15	Kondareddis	32	Yerukulas, Koracha, Dabba Yerukula, Kunchapuri Yerukula, Uppu Yerukula
16	Kondhs, Kodi, Kodhu, Desaya Kondhs, Dongria Kondhs, Kuttiya Kondhs, Tikiria Kondhs, Yenity Kondhs, Kuvinga	33	Nakkala, Kurvikaran
17	Kotia, Benthoriya, Bartika, Dulia, Holva, Sanrona, Sidhopaiko	34	Dhulia

Source: JICA Survey Team

Table 6 List of Particularly vulnerable tribal groups (PVTGs)

No.	Tribals	Districts
1	Chenchu	Guntur district
2	Gadabas, Bodo Gadaba, Gutob Gadaba, Kallayi Gadaba, Parangi Gadaba, Kathera Gadaba, Kapu Gadaba	Vishakapatnam
3	Kondareddis	East Godavari
4	Kondhs, Kodi, Kodhu, Desaya Kondhs, Dongria Kondhs, Kuttiya Kondhs, Tikiria Kondhs, Yenity Kondhs, Kuvinga	Visakhapatnam
5	Porja	Visakhapatnam
6	Savara	Srikakulam, Vizianagaram

(<http://publishing.cdlib.org/ucpressebooks/view?docId=ft8r29p2r8&chunk.id=d0e195&toc.depth=100&brand=ucpress>)

6.3 Problems of the forest dwellers

7. Potential impact and risk of the Project interventions on the Forest Dwellers

7.1 Positive impact on Forest Dwellers

Due to the project planning, the detail impacts for the Forest Dwellers caused by the proposed Project are not specified so far. The key impacts of the Project based on the similar project cases based on the field survey on the forest dwellers are as followings:

- Some of the forest dwellers shall have the opportunity to participate in the Project and there would be an increase in production of vegetable resulting in higher level returns to them from the sale of vegetables.
- There would be judicious use of land, water, fertilizers, pesticides etc. because of the project interventions safeguarding the environment.
- Higher volumes of production of vegetables would enhance the access of farmers to better markets. The volume would attract the market to come to the village.
- The Project would build the capacity of the farmers to adopt new technology and package of practices in farming.
- The Project would create opportunities for wage employment in the village, which might reduce the incidences of labour migration to far off places.

7.2 Potential risks/ negative impact on Forest Dwellers

- The Project is not likely to have any negative impact on the forest dwellers but they may not compete with other farmers to participate in the Project.
- Basic eligibility criteria for selection of target farmers may exclude the interested forest dwellers in case of the following situations:
 - Small and marginal farmers/ family members who are not part of any SHG as the Project is going to work with existing SHGs
 - Small and marginal farmers who don't have wells and lifting devices – the farmers who have wells and pumps shall be selected for proposed Project, and
 - Small and marginal farmers who can't afford to invest or take loan to pay for the contribution part – the farmers have to invest some amount of the total cost of the proposed Project. This would lead to exclusion of poor farmers, who are interested for vegetable farming.
- The elite and influential farmers may become the priority beneficiaries of the Project. They may influence the decisions of the SHGs and project's farmer group.
- How far the SHGs shall have control over Project farmers group in a village to adhere to the environmental and social norms and standards is questionable?
- In some cases, forest dwellers, who subsist mostly on cultivation of forestland and/or collection and sale of forest produces, shall be excluded by the Project.
- The Project shall be working with the SHGs to promote the Project. There is hardly any role of traditional village organization until unless there is any conflict, which could not be settled by the SHGs and Project farmers group.

7.3 Proactive measures for mitigation of potential risks/ negative impact

- The eligible farmers who are not part of any SHG may be included in the existing SHGs or new SHGs may be formed under different schemes of APLIP-2. So the Project, in some cases, might have to support new SHGs or one year old SHGs, who fulfill the requirements and complete the process of gradation. Necessary emphasis shall have to be given to these SHGs for institution development.

- Adequate efforts have to be taken for social mobilization and institution development of SHGs to address the concerns of elite capture and effective coordination between the SHGs and project's farmer group. The Field Organisers and CRPs have to consistently work with the SHGs and Project farmers groups for institution development.
- For the small and marginal farmers, who don't have wells, the Executing Agency may help them to dig wells sourcing funds from other schemes such as Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS).
- Farmers, who don't have pumps, may be provided loan from the revolving fund or linked to the financial institutions/ support agencies to procure pump.
- The CRPs and FOs may help the forest dwellers to access right over forestland under Forest Rights Act 2006 and then subsequently they may be supported under the Project for vegetable cultivation. If the land is not suitable for Project/ vegetable cultivation then the Executing Agency may help them access benefits from other projects and schemes. The forest dwellers who can't be associated with the Project as target farmers may be given priority to work in the farms as wage labour; the Project may promote them as entrepreneurs to supply different farm inputs and also help in primary processing and marketing; since the project's farmer group shall have a better access to market it may help the forest dwellers to market their forest produces (NTFPs).

8. FDDF – Activities and Project Implementation Schedule

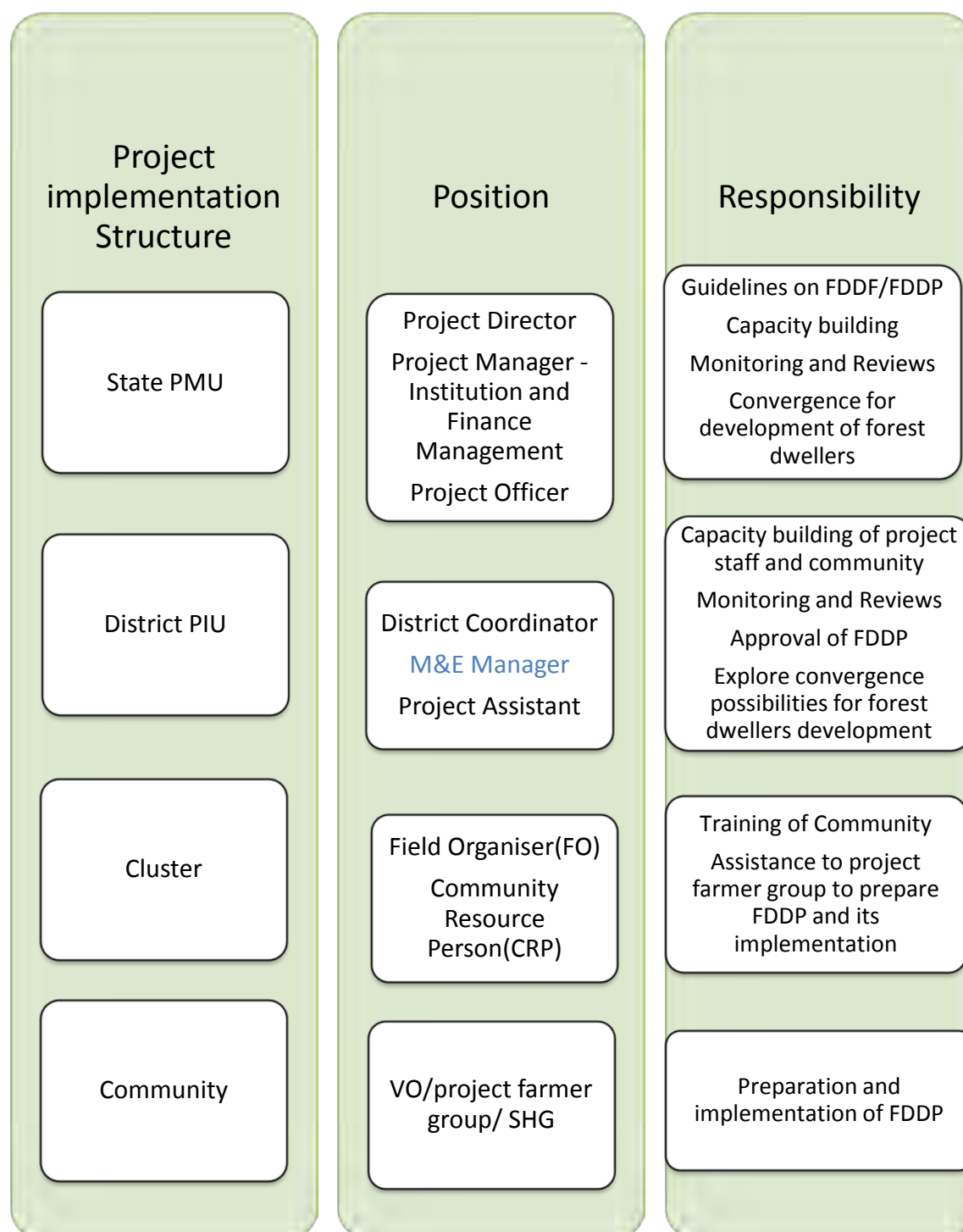
The State PMU has to develop the overall framework for Forest Dwellers Development including the operational strategies. It has to emphasize capacity building of Project Staff at all levels for proper implementation of FDDF. The following activities shall be carried out by the Project Executing Agency for implementation of FDDF.

Table 7 Project Implementation Schedule (Tentative)

Sl.	Activity	Project Implementation Schedule						
		Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7
1	Finalisation of Forest Dwellers Development Framework and the strategies to be followed							
2	Guidelines for preparation of Forest Dwellers Development Plan							
3	Training of Project Staff on implementation of FDDF and preparation of FDDP							
4	Training of Community - VOs/ project's farmer group s/SHGs on preparation and implementation of FDDPs							
5	Preparation of FDDP at the community level							
6	Approval of FDDPs at the District level and preparation of plan for convergence, efforts for fund mobilization for implementation of FDDPs							
7	Monitoring and Reporting by the Project Staff on the preparation and implementation of FDDPs and implementation of FDDF							

9. Institutional Arrangement for Implementation of FDDF

9.1 Institutional arrangement



9.2 Responsibility and functions of Project Implementing Agencies

The following table presents the responsibilities and functions of different institutions associated with the Project for implementation of FDDF.

Table 8 Responsibilities and Functions at different level

Sl.	Organizations/ Agencies	Responsibility	Detailed functions/ activities
1	I-State level PMU	<ol style="list-style-type: none"> 1. Ensure that the Forest Dwellers Development Framework is implemented properly 2. Ensure adequate budgetary provisions are made for capacity building of Project Staff, preparation of FDDP and its implementation 	<ol style="list-style-type: none"> 1. Prepare and circulate of guideline for preparation of forest dwellers development plan 2. Organise orientation programmes for the DPMUs and other Project Staff on the preparation of forest dwellers development plan 3. Monitor with the DPMUs the progress of preparation of FDDPs 4. Clarify the process of approval of FDDPs 5. Guide the DPMUs to compile the recommendations/ mitigation measures to be taken up for the safeguarding the rights of forest dwellers 6. Create budgetary provisions for implementation of recommendations/ mitigation measures and place funds with DPMUs. In case of non-availability of funds, efforts should be made to source funds from other schemes, projects (through convergence) 7. Periodically monitor the progress of implementation of FDDPs – it should be included in the project monitoring system and procedures 8. Ensure the periodical progress reporting formats of the Project include segregated data on implementation of forest dwellers development plan 9. Include forest dwellers development aspects in the scope of work and ToR of Impact Assessment/ Evaluations
2	I- District level PMU	<ol style="list-style-type: none"> 1. Ensure FDDF is implemented in the Project Area 2. Ensure that the Project Staff are capacitated to implement FDDF and prepare Forest Dwellers Development Plan 3. Ensure all the target villages prepare FDDP (if required and implement these plans 4. Ensure adequate funds are sourced for implementation of FDDP (from the Project as well as through convergence with other agencies/ programmes) 	<ol style="list-style-type: none"> 1. Prepare the Annual Action Plans incorporating the activities for FDDF 2. Circulate the guidelines and manuals on FDDP to all the Project Staff 3. Organise training programmes for the Project Staff on the methods and processes involved in preparation of FDDP 4. Facilitate organisation of training programmes for the communities/ leaders on preparation and implementation of FDDP 5. Monitor the progress of preparation of FDDP and organise necessary support services to the Project Staff in preparation of these plan 6. Review the FDDPs and provide necessary guidance for improvements and take necessary action for approval of these plans 7. Monitor the implementation of FDDPs and suggest measures to be taken up 8. Facilitate compilation of recommendations and mitigation measures suggested in FDDPs 9. Estimate the requirement of funds for implementation of FDDPs 10. Negotiate with the State PMU and other Departments/ Agencies for sourcing of funds 11. Ensure progress related data related to the FDDP are collected from the villages/ target groups and built into the Project 12. Prepare reports incorporating data on the progress of FDDPs submit them to the State PMU
3	VO/ Project farmers group	<ol style="list-style-type: none"> 1. Prepare and implement of FDDP 	<ol style="list-style-type: none"> 1. Prepare the FDDP as part of their Project Plan with the active participation of the SHGs and forest dwellers and with the help of CRP and FO 2. Implement the FDDP with the help of Stake holder group(SHG), CRP, FO and other Departments, PRIs 3. Periodically review the progress of work and assist the Project Staff and Experts in conducting reviews and evaluations 4. Support the CRP and FO in preparation of periodical progress reports
4	SHG	<ol style="list-style-type: none"> 1. Ensure preparation of FDDP 	<ol style="list-style-type: none"> 1. Give priority to the poor forest dwellers to participate in the project activities

	2. Ensure proper selection of Project beneficiaries giving emphasis to forest dwellers	<ol style="list-style-type: none"> 2. Work with the Project farmers group to prepare activity plan including FDDP 3. Assist the Project farmers group to implement FDDP and work with the Project Staff and Gram Panchayat to mobilize resources for implementation of FDDP 4. Monitor the progress of implementation of FDDP 5. Provide reports on forest dwellers to the DPMU as and when required
--	--	--

Source: JICA Survey Team

9.3 Responsibility of different Project Staff in implementation of FDDF

Table 9 Responsibilities of Project Staff

Sl.	Staff	Responsibility
1	Chief Operating Officer, State PMU	<ol style="list-style-type: none"> 1. Finalize the FDDF and manual for preparation of forest dwellers development plan and get them approved by the Executive Committee 2. Oversee capacity building of the Project Staff at all levels to implement FDDF 3. Facilitate creation of budgetary provisions for implementation of FDDF 4. Oversee the implementation of FDDF and provide guidance to the Project Staff at the State PMU 5. Periodically monitor the implementation of FDDF 6. Liaise with other Departments and Projects for convergence to implement activities identified in the FDDPs 7. Periodically update APILIP-II Executive Committee, AP Government and JICA on the progress of work relating to FDDF
2	Project Manager - Institution and Finance Management – State PMU	<ol style="list-style-type: none"> 1. Prepare the guidelines and manual for preparation of FDDP in consultation with other Project Staff and PMC 2. Circulate the guidelines to the DPMUs after approval by APILIP-II 3. Plan for capacity building of Project Staff to prepare and implement FDDP 4. Provide necessary guidance to DPMUs in preparation of FDDP and its implementation 5. Work with the Project Officer to develop monitoring mechanism for monitoring of preparation of FDDP; reporting on the progress of preparation and implementation of FDDP; compilation of FDDP – recommendation and mitigation measures etc. 6. Review the FDDPs and provide necessary guidance to DPMUs for preparation of FDDPs properly 7. Periodically update State PMU on the progress of work relating to FDDF/ FDDP 8. Work under the guidance of COO, State PMU to explore possibilities for convergence with other projects and schemes to implement different activities proposed in FDDP
3	Project Officer – State PMU	<ol style="list-style-type: none"> 1. To work under the guidance of Project Manager - Project Manager - Institution and Finance Management and PMC to prepare monitoring and reporting mechanism and formats 2. To compile the recommendations / mitigation measures/ activities proposed in FDDPs with the help of Project Assistants at the District PMUs 3. To compile progress reports on FDDF/FDDP
4	I-District Coordinator - District PMU	<ol style="list-style-type: none"> 1. Prepare the Annual Action Plans incorporating the activities for FDDF in consultation with all the Project Staff at the DPMU 2. Circulate the guidelines and manuals on FDDP to all the Project Staff 3. Facilitate organisation of training programmes for the Project Staff on the methods and processes involved in preparation of FDDP 4. Facilitate organisation of training programmes for the communities/ leaders on preparation and implementation of FDDP 5. Monitor the progress of preparation of FDDP with the help of District M&E Manager 6. Review the FDDPs and provide necessary guidance for improvements and take necessary action for approval of these plans 7. Monitor the implementation of FDDPs and suggest measures to be taken up with the help of District M&E Manager 8. Estimate the requirement of funds for implementation of FDDPs with the help of District M&E Manager and Project Assistant 9. Negotiate with the State PMU and other Departments/ Agencies for sourcing of funds 10. Ensure progress related data related to the FDDP are collected from the villages/ target groups and built into the Project

Sl.	Staff	Responsibility
		11. Prepare reports incorporating data on the progress of FDDPs submit them to the State PMU
5	District M & E Manager – District PMU	1. To periodically monitor the progress of preparation and implementation of FDDPs
6	Project Assistant – District PMU	1. To compile data on the progress of preparation and implementation of FDDPs 2. To compile data from the FDDPs to find out the activities to be carried out in the project and through convergence 3. To prepare progress reports on FDDP/ FDDP as and when required
7	Field Organiser	1. To orient project's farmer group, VOs, SHGs on the preparation of Activity Plan and FDDP (Methods and processes) – FDDP is a part of Activity Plan 2. To assist the farmers groups/ VOs to prepare FDDP 3. To assist the VO and project's farmer group to implement the FDDP 4. To assist the SHGs, project's farmer group and VOs to negotiate with Gram Panchayat and Line Departments to mobilize funds for implementation of FDDP 5. To prepare periodical progress reports on activities concerning forest dwellers and submit them to District PMU
8	CRP	1. To mobilize project's farmer group and SHGs to prepare the activity Plan including FDDP and provide necessary support to them 2. To mobilize the forest dwellers to participate in the preparation of FDDP 3. To mobilize the forest dwellers to participate in the Project activities 4. To establish close coordination with Field Organiser for preparation of activity Plan and implementation of activities for the forest dwellers 5. To prepare progress reports and submit to District PMU through the Field Officer

JICA Survey Team

10. Preparation of Forest Dwellers' Development Plan

10.1 Process of preparation of Forest Dwellers Development Plan

The Forest Dwellers Development Plan shall be prepared at the Village Organisation/ project's farmer group level and it should be a part of the Project Plan to be prepared at the Village Organisation/ project's farmer group level. The plan shall be prepared by the CRPs and VO/ project's farmer group under the guidance of the FO and with active participation of forest dwellers of the village/ habitation. The steps for preparation of FDDP have been explained below:

Table 10 Methods and Processes for preparation of FDDP

Step	Methods/ Processes	Responsibility
1 – Screening - Whether FDDP is necessary or not?	Collection basic information on the village/habitation; status of forest dwellers; possibility of forest dwellers' participation in the project; potential impact of the project on forest dwellers etc. Consultation with VO, SHGs and project's farmer group on the need for FDDP	FO and CRP jointly
2 – If FDDP is necessary then – Social Assessment	Participatory Rural Appraisal tools	CRP under the guidance of FO and with the support of VO/ project's farmer group / SHGs
3 – Consultation with Forest Dwellers for identification of mitigation measures and other support activities	Community Workshop Focus Group Discussions	CRP under the guidance of FO
4 – Drafting of the Plan		CRP and FO
5 – Approval of the Plan by VO/ project's farmer group	Meeting of VO/ project's farmer group	CRP

JICA Survey Team

Table 11 Social Assessment Framework

Step	Aspects to be covered	Methodology to be followed
Analysis of Social Context	<ul style="list-style-type: none"> Demographic details – population, sex ratio, literacy etc. Social diversity - castes, social interaction processes Gender Social, economic, cultural, political and historical factors – well-being analysis, poverty situation, occupations, income and expenditure, health, education, analysis of institutions etc. 	<ul style="list-style-type: none"> Social Mapping Socio-economic baseline survey – Household level (sample basis) Historical timeline and trend analysis Review of available secondary data on the area/ village – Block and Gram Panchayat
Analysis of the natural resource environment	<ul style="list-style-type: none"> Land, water, forest and other resources used and managed by the Forest Dwellers Dependency on forest Status of agriculture 	<ul style="list-style-type: none"> Resource mapping Transect walk Focus Group Discussions with the resource users
Stakeholders' Analysis	<ul style="list-style-type: none"> Identification of stakeholders Procedures for consultation with the forest dwellers at different stages of planning and implementation 	<ul style="list-style-type: none"> Community workshops
Free, prior and informed consultations for potential effects of the Project on the forest dwellers	<ul style="list-style-type: none"> Potential social and environmental effects – positive and adverse Mitigation measures 	<ul style="list-style-type: none"> Focus Group Discussions

JICA Survey Team

10.2 Contents of a forest dwellers development plan

(1) Basic Information

- Defining the forest dwellers in the context of the Village/ habitation
- Baseline information on the demographic, social, economic and cultural characteristics of the forest dwellers
- Baseline information on the natural resources (land, water and forest) managed and used by the forest dwellers

(2) Summary of the Social Assessment and Free, Prior and Informed Consultation with Forest Dwellers

- Identification of key project stakeholders
- Consultation with the forest dwellers following culturally appropriate processes
- Assessment of the potential adverse and positive effects of the project

(3) Action plan for measures to avoid and/or mitigate the potential adverse effects on Forest Dwellers and measures for proactive involvement of forest dwellers in the Project

- Measures to be taken up for avoiding and/ or mitigating the potential adverse effects of the Project
- Activities to be carried out for supporting the forest dwellers to participate in the Project

(4) Cost estimates and financing plan

- Activities wise budget and possible sources of finance

(5) Monitoring of implementation of the plan

10.3 Forest Dwellers Development plan – suggested template

(1) Basic information

a. Village/ Habitation and Households

1	Name of the Village/ Habitation:	2	Name of Gram Panchayat:
3	Name of the Block:	4	Name of the District:
5	Households - Total: ST: SC: OBC: Gen:	6	Population - Total: ST: SC: OBC: Gen:

b. Definition and Status of Forest Dwellers

- i. Community to define who is a forest dweller?
- ii. Identification of forest dwellers in the Village/ Habitation

Category	Total Families	Total population			No of BPL families	Families submitted claims under FRA*	Total families got patta under FRA	
		Male	Female	Total			No	Area (Acres)
ST								
Other Traditional Forest Dwellers (Caste wise)								
Total								

Note: Whether claim submitted for Community Forest Rights? Yes/No. If yes, then what is the status?

*FRA – Forest Rights Act 2006

c. Sources of livelihood of the Forest Dwellers

Sl.	Primary / Main Source of livelihood	Number of Households	Problems related to livelihood
1	Agriculture – Only Kharif		
2	Agriculture – Kharif and Rabi		
3	Agriculture – Kharif, Rabi and Summer		
4	Forestry – sale of NTFP, fuel wood, timber etc.		
5	Livestock – poultry, dairy, goatery etc.		
6	Wage labour – within or near the village		
7	Wage labour – outside the village – migration		
8	Small business		
9	Service/Job		
10	Any other – specify		

d. Resources used and managed by the Forest Dwellers

Sl.	Type of resource	Unit	Quantity	Current use and management by the Forest Dwellers
1	Forest (Reserve or Protected Forest)	Ha		
2	Agriculture land – un-irrigated	Ha		

Sl.	Type of resource	Unit	Quantity	Current use and management by the Forest Dwellers
3	Agriculture land – irrigated	Ha		
4	Water resources – Wells	No		
5	Water resources – Tube wells	No		
6	Water resources – Ponds	No		
7	Water resources – any other - specify			
8	Any other resource – Specify			

(2) Summary of the Social Assessment and Free, Prior and Informed Consultation with Forest Dwellers

a. Consultation with different stakeholders

Sl.	Key Stakeholders/ groups	Problems identified by the stakeholders/ group	Suggested interventions
1			
2			
3			

b. Potential social and environmental impact of project interventions on the forest dwellers

Activities to be carried out by Project Farmers Groups	Positive environmental and social impact on the forest dwellers	Negative environmental and social impact on the forest dwellers
Project Package		
Any other activity		

(3) Action plan for measures to avoid and/or mitigate the potential adverse effects on Forest Dwellers and measures for proactive involvement of forest dwellers in the Project

Sl.	Activities	Physical target	Benefits

(4) Cost estimates and financing plan

Sl.	Activities	Physical Target	Cost Estimate in Rs.	Possible sources for support - Departments/Agencies/ Schemes

(5) Monitoring of implementation of the plan

Sl.	Activities for monitoring	Time frame	Responsibility

Attachment 12.5.1a Cyclone Disasters in Andhra Pradesh State (1977 to 2014)

Sl. No	Year of Cyclone /Heavy Rains	Period of Cyclone /Heavy rains	Event	No. of districts affected	Population affected (in lakhs)	Human deaths	Live-stock loss	Houses damaged	Crop area damaged (ha)	Estimated Loss (Rs. in Cr.)
1	1977	28 Oct. - 1 Nov. 1977	Severe Cyclonic Storm	8	34	10,000	250,000	1,014,800	1,351,000	172
2	1977	15-20 Nov. 1977	Severe Cyclonic Storm with core of hurricane							
3	1978	Aug. 1978		16	0.49	52	1,465	22,000	951,000	150
4	1979	15-13 May 1979	Heavy Rains /Floods Severe Cyclonic Storm with core of hurricane winds	10	37.4	706		748,000		243
5	1979	24-25 Nov. 1979	Cyclonic Storm							
6	1980	16-18 Oct. 1980	Severe Cyclonic Storm with core of hurricane							
7	1982	16-18 Oct. 1982	Cyclonic Storm							
8	1983	Aug. 1983	Heavy Rains /Floods	8	1.58	58	1,726	94,218	714,000	90
9	1983	3-5 Oct. 1983	Cyclonic Storm							
10	1984	11-15 Nov. 1984	Severe Cyclonic Storm with core of hurricane winds	3	19	7	3,976	8,244	192,000	56
11	1985	10-11 Oct. 1985	Cyclonic Storm							
12	1985	11-13 Dec. 1985	Severe Cyclonic Storm	11	11.75	16	4	3,196	214,000	41
13	1986	Aug. 1986	Heavy Rains/Floods	13	21.15	309	22,000	423,000	853,200	1,687
14	1987	15-16 Oct. 1987	Cyclonic Storm							
15	1987	2-3 Nov. 1987	Severe Cyclonic Storm	10	32.04	119		110,550	961,000	126
16	1987	12-13 Nov. 1987	Severe Cyclonic Storm							
17	1988	Jul. 1988	Heavy Rains /Floods	11	23.43	88	4,233	48,694	406,000	245
18	1989	Jul. 1989	Heavy Rains /Floods	22	89.44	232	10,905	227,000	593,000	914
19	1989	3-6 Nov. 1989	Cyclonic Storm							
20	1989	5-8 Nov. 1989	Severe Cyclonic Storm with core of hurricane winds							
21	1990	5-10 May 1990	Severe Cyclonic Storm with core of hurricane winds	14	77.81	817	27,625	1,439,659	563,000	2,137
22	1990	Aug. 1990	Heavy Rains/Floods	10	12.45	50		76,420	173,000	180
23	1991	11-15 Nov. 1991	Cyclonic Storm	9	0.18	192		97,470	409,000	367
24	1993	Oct/Nov & Dec 1993	Cyclonic Storm	5					37,000	71
25	1994	July/Aug/Sept. 1994	Heavy Rains /Floods	6	2.81	12			52,000	130
26	1994	29-31 Oct. 1994	Severe Cyclonic Storm	7	2.86	3		79,172	452,000	626
27	1995	May-95	Severe Cyclonic Storm with core of hurricane winds	10	2.56	26	3,260	43,179	320,000	472
28	1995	6-18 Oct. & 9-10 Nov. 1995	Heavy Rains /Floods	19	2.3	229	3,663	146,525	665,000	917
29	1996	12-16 Jun. 1996	Cyclonic Storm	10	0.22	100	1,607	21,517	15,000	129
30	1996	Aug. & Sept. 1996	Heavy Rains /Floods	13	0.21	140	188	12,100	134,000	159
31	1996	1-3 Oct. 1996	Heavy Rains /Floods	14	0.27	61	154	18,058	449,000	263
32	1996	17-21 Oct. 1996	Heavy Rains /Floods	11	87.37	338	146,621	130,731	1,128,000	843
33	1996	6-7 Nov. 1996	Severe Cyclonic Storm with core of hurricane winds	4	80.62	1,077	19,856	616,553	511,000	6,129
34	1996	28 Nov. - 7 Dec. 1996	Severe Cyclonic Storm with core of hurricane winds	3	0.37	27	293	7,569	21,000	54
35	1997	23-26 Sept. 1997	Severe Cyclonic Storm	6	9.47	40	93	7,725	135,000	256
36	1998	Sep.-Oct. 1998	Heavy Rains /Floods	22	16.34	260	5,126	150,196	1,405,000	2,525
37	1998	13-15 Nov. 1998	Very Severe Cyclone Storm	5	0.68	16	5,874	13,543	339,000	306
38	1999	16-17 Oct. 1999	Cyclonic Storm	1	1.89	3	388	3,425		238
39	2000	22-31 Aug. 2000	Heavy Rains / Floods	17	1.98364	207	6,156	99,800	178,000	966
40	2001	15-17 Oct. 2001	Heavy Rains / Flash Floods	5		119		111,340		
41	2003	15-16 Dec. 2003	Cyclonic Storm/ Flash Floods	6	42.68	44	102,324	17,147	265,741	766
42	2005	18-19 Sept. 2005	Heavy Rains / Flash Floods	10	350	107	14,416	118,618	551,966	2,698
43	2006	2-5 Aug. 2006	Cyclone Storm/ Floods	10	13.84	165	20,530	276,567	219,897	3,455
44	2006	14-22 Sept. 2006	Heavy Rains	8	0.23	52	4,849	29,837	219,950	188
45	2006	28 Oct.- 4 Nov. 2006	Ogni Cyclone	5	13.85	41	350,000	95,218	384,550	7,173
46	2007	21 Jun. - 24 Jun. 2007	Heavy Rains	16	8.35	50	47,172	195,456	51,587	1,296
47	2007	17-22 Sept. 2007	Heavy Rains/Floods	15	2.4	77	745	33,241	62,000	
48	2007	5-7 Oct. 2007	Heavy Rains/Floods	6	0.94	9	3,126	9,246	16,405	1,156
49	2007	29 Oct. - 1 Nov. 2007	Heavy Rains/Floods	4	27.32	36	0	611,907	23,000	
50	2008	9-13 Feb. 2008	Heavy Rains/Floods	11	0.13	4	3,000	122	292,854	741
51	2008	22-29 Mar. 2008	Unseasonal Heavy Rains and Consequent Floods	22	0.014	36	1,643	3,556	227,507	930
52	2008	3-11 Aug. 2008	Heavy Rains/ Floods	15	44.28	130	6,692	44,364	196,038	1,116
53	2008	14-16 Nov. 2008	Khaimuk - Cyclone	9	1	0	37	1,190	59,287	36
54	2008	25-30 Nov. 2008	Nisha - Cyclone	5	1	9	28	8,258	220,000	80
55	2009	29 Sept. - 4 Oct. 2009	Floods due to unprecedented Rains	13	20.72	90	49,686	259,095	226,092	12,456
56	2010	17-22 May 2010	Laila - Cyclone	14	17.8	22	2,075	14,298	26,686	1,603
57	2010	Southwest Monsoon	Heavy Rains/ Floods	22	8.95	65	7,236	11,022	277,000	5,777
58	2010	29 Oct. - 8 Nov. 2010	Heavy Rains/ Floods/JAL Cyclone	13	16.98	63	1,140	20,554	483,000	2,497
59	2010	5-8 Dec. 2010	Heavy Rains/ Floods	15	8.16	21	3,026	3,169	1,208,000	2,739
60	2013	19-23 Nov. 2013	Helen-Cyclone	5		6			130,000	1,629
61	2014	8 Oct. - 14 Nov. 2014	HudHud-Cyclone	4	8.9	61	3,521,033	40,379	238,000	70,000

Attachment 12.5.1b

District-wise, Year-wise Nos. of Mandals Declared as Drought Affected (1984-85 to 2014-15)

District	Total Mandals	Year-wise																													
		1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14
Kadapa	51	12	17	50	50					46	31	37		50		51	5	51	51	32	49		33				51	51	43	16	48
Chittoor	66	15	17	66						29	32	66		32		65	45	65	65	42	56		37				66	49	28	33	42
Prakasam	56	11	33	32	56					4		52		56		56		43	56	39	53		32				56	56	35	4	54
Anantapur	63	16	50	63						25	9	53		63		63		63	63	62	53		63				63	63	63	63	63
Nellore	46	15	14	46	14									43	36	46	18	46	46	40	40						46	9	9	2	7
Kurnool	54	13	13	40	8								53		54	53		52	54	31	46		30				49	54	36		12
Vizianagaram	34		9		34								15	4	2	34	34	17	34	34	11	6					19	15		5	
Srikakulam	38				37									12		11	37	36	16	38	28	11	8				26	30			
East Godavari	60	7	21								18			17		5	11	45	53	3	20						58	14			
Guntur	57	5									3			37		7		53	57	1	24						55	41	4		4
Visakhapatnam	43		22		39							26			41	28		42	42	7	7						42	31			
West Godavari	46	7	5		24						17				10			24	42	10	25						46	15			
Krishna	50	8			22							13			20				33	50	13	21					49	32			
TOTAL :	664	109	201	297	284						100	117	173	198	13	487	444	112	589	641	302	408	195			626	460	218	123	230	

Source: Andhra Pradesh State Development Planning Society (APSDPS)

Attachment 12.5.2 Climate Change

(1) Intended Nationally Determined Contributions (INDC) by GOI

The framework Convention of climate Change was adopted at the United Nations Headquarters, New York on the 9 May 1992. In accordance with Article 20, it was open for signature at Rio de Janeiro from 4 to 14 June 1992, and thereafter at the United Nations Headquarters, New York, from 20 June 1992 to 19 June 1993. By that date, the Convention had received 166 signatures. The Convention entered into force on 21 March 1994, in accordance with Article 23, that is on the ninetieth day after the date of deposit of the fiftieth instrument of ratification, acceptance, approval or accession.

India signed the convention on 10 Jun 1992, ratified on 1 Nov 1993 and entry into force on 21 Mar 1994. India Submits its Climate Action Plan as Intended Nationally Determined Contributions (INDC) on October 2015, Ahead of 2015 Paris Agreement to express its direction of the action to be taken for climate change. India declared a voluntary goal of reducing the emissions intensity of its GDP by 20–25%, over 2005 levels, by 2020, despite having no binding mitigation obligations as per the Convention. A slew of policy measures were launched to achieve this goal. India’s on-going mitigation and adaptation strategies and actions are detailed in the Intended Nationally Determined Contributions (INDC), along with the expected direction of activities in the near future. The actions presented in the plan are;

Table 1 Actions in the INDC presented by India

1.	Mitigation Strategies
	- Clean and Efficient Energy System
	- Enhancing Energy Efficiency in Industries:
	- Developing Climate Resilient Urban Centers
	- Promoting Waste to Wealth Conversion
	- Safe, Smart and Sustainable Green Transportation Network
	- Planned Afforestation
	- Abatement of Pollution
	- Citizens and Private Sector Contribution to Combating Climate Change
2.	Adaptation Strategies
	- Agriculture
	- Water
	- Health
	- Coastal Regions & Islands
	- Disaster Management
	- Protecting Biodiversity & Himalayan Ecosystem
	- Rural Livelihoods Security
	- Adaptation Actions under State Action Plans on Climate Change
	- Knowledge Management & Capacity Building

Source: INDIA’S INTENDED NATIONALLY DETERMINED CONTRIBUTION in UNFCCC
(<http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>)

(2) National Action Plan on Climate Change (NAPCC)

On June 30, 2008, Prime Minister Manmohan Singh released India’s first National Action Plan on Climate Change (NAPCC) outlining existing and future policies and programs addressing climate mitigation and adaptation. The plan identifies eight core “national missions” running through 2017 and directs ministries to submit detailed implementation plans to the Prime Minister’s Council on Climate

Change by December 2008. Those are; 1) National Solar Mission, 2) National Mission for Enhanced Energy Efficiency, 3) National Mission on Sustainable Habitat, 4) National Water Mission, 5) National Mission for Sustaining the Himalayan Ecosystem, 6) National Mission for a “Green India”, 7) National Mission for Sustainable Agriculture and 8) National Mission on Strategic Knowledge for Climate Change.

Table 2 National Action Plan in India

<ol style="list-style-type: none">1. National Solar Mission: Promoting the development and use of solar energy for power generation and other uses with the ultimate objective of making solar competitive with fossil-based energy options with a goal of increasing production of photovoltaics to 1000 MW/year; and at least 1000 MW of solar thermal power generation. Also, other objectives include the establishment of a solar research center, increased international collaboration on technology development, strengthening of domestic manufacturing capacity, and increased government funding and international support.2. National Mission for Enhanced Energy Efficiency: Current initiatives are expected to yield savings of 10,000 MW by 2012. Mandating specific energy consumption decreases in large energy-consuming industries, with a system for companies to trade energy-savings certificates; Energy incentives, including reduced taxes on energy-efficient appliances; and Financing for PPP to reduce energy consumption through demand-side management programs in the municipal, buildings and agricultural sectors.3. National Mission on Sustainable Habitat: To promote energy efficiency as a core component of urban planning, the plan calls for: Extending the existing Energy Conservation Building Code; A greater emphasis on urban waste management and recycling, including power production from waste; Strengthening the enforcement of automotive fuel economy standards and using pricing measures to encourage the purchase of efficient vehicles; and Incentives for the use of public transportation.4. National Water Mission: With water scarcity projected to worsen as a result of climate change, the plan sets a goal of a 20% improvement in water use efficiency through pricing and other measures.5. National Mission for Sustaining the Himalayan Ecosystem: The plan aims to conserve biodiversity, forest cover, and other ecological values in the Himalayan region, where glaciers that are a major source of India’s water supply are projected to recede as a result of global warming.6. National Mission for a “Green India”: Goals include the afforestation of 6 million hectares of degraded forest lands and expanding forest cover from 23% to 33% of India’s territory.7. National Mission for Sustainable Agriculture: The plan aims to support climate adaptation in agriculture through the development of climate-resilient crops, expansion of weather insurance mechanisms, and agricultural practices.8. National Mission on Strategic Knowledge for Climate Change: To gain a better understanding of climate science, impacts and challenges, the plan envisions a new Climate Science Research Fund, improved climate modeling, and increased international collaboration. It also encourages private sector initiatives to develop adaptation and mitigation technologies through venture capital funds.

Source: Ministry of Environment, Forest and Climate Change (<http://envfor.nic.in/ccd-napcc>)

(3) State Action Plan on Climate Change for Andhra Pradesh

With the formulation of a national policy on CC, it has become imperative to achieve coherence between strategies and actions at national and State levels. Most of the adaptation challenges such as coastal zone disasters, droughts, adverse effect on human health, depleting water resources, are experienced at the State level and programmes aimed at improving the adaptive ability are also undertaken and implemented at State level. A draft State Action Plan was prepared in 2012, before the bifurcation with Telangana and was submitted but not approved by the central government yet and some modification is ongoing.

Objectives in the draft Action Plan are;

- Inclusive and sustainable development of the State that protects the vulnerable sections of society from adverse effects of CC
- Improved ecological sustainability

- Provide a framework to undertake actions that deliver benefits for growth and development while mitigating and adapting to CC

- Prioritize adaptation/mitigation options for the State and identify financing options

- Engineering new and innovative policies/mechanisms to promote sustainable development

Also, the climate change strategy and action plan have been based on 5 main guiding principles:

- Adaptation to short-term climate variability and extreme events serves as a starting point for reducing vulnerability to longer-term climate change.

- Adaptation policies and interventions are assessed in the State developmental context.

- Adaptation occurs at different levels in society, including the local level.

- The adaptation strategy and the process by which it is implemented are equally important.

- Mitigation measures, in line with the NAPCC, are proposed in certain key sectors.

Major CC issues for the State arise in the agriculture and forestry sectors and in relation to the long coastline. Agriculture is severely affected by variability in rainfall and temperature patterns, while rising sea levels and extreme events of marine origin, such as cyclones, pose problems for the coastal areas. Besides these, other critical areas of concern are food security, increasing number of climate vulnerable habitats (like slums or village dwellings) and climate vulnerable infrastructure (like roads and bridges which may be washed away by floods).

For the 11 Critical Sectoral Issues (Agriculture, Coastal Zone Management, Forestry and Biodiversity, Energy, Industries, Transportation, Health, Urban Development, Tourism, Rural Development and Research in Climate Change) in the State, the report analyzed the required actions and Agriculture related issue is shown as follows;

Table 3 Analysis on the draft State Action Plan on Climate Change for Andhra Pradesh

Critical Sectoral Issues	Key Interventions
<p>1. Agriculture</p> <ul style="list-style-type: none"> • Decrease in winter rainfall has a negative impact on winter crops(Rabi crops), especially in the rainfed areas • Temperature fluctuations affect Rabi crops severely • Decrease in area under crops on account of insufficient rainfall, particularly in the South- West Monsoon period • Dryland areas of the State have annual rainfall less than 550 mm and farming is not viable • Loss in fertility of soil in many areas due to excessive use of fertilizers and pesticides. 	<ul style="list-style-type: none"> • Development and dissemination of new crop varieties resilient to heat, photo and water stress • Replacement of inorganic fertilisers by bio-fertilisers • Assured credit facility, including for tenant farmers • Insurance against crop failures (not just for the bank loan component) • Extension work for change of cropping timings and patterns, efficiency of water use, weather advisories to farmers, information on market prices etc. • Intensive research work on stable agriculture in the context of climate change, in all its aspects • Establishment of field centres, data banks and germplasm banks • Standardization of fuel efficient irrigation pump sets • Retrofitting existing pump sets for higher energy efficiency

Source: State Action Plan on Climate Change for Andhra Pradesh

Attachment 13.3.1 Summary of Project Cost

Item		Component in Project Concept Note*	F/C Portion (Yen mil.)	L/C Portion (Rs. mil.)	Total Amount (Yen mil.)	Total Amount (Rs. mil.)	Share	
1. Modernisation of Medium and Minor Irrigation Projects								
1.1	Medium Irrigation Projects	A	0	8,611	14,553	8,611		
1.2	Minor Irrigation Projects	A	0	3,466	5,857	3,466		
Sub-total			0	12,077	20,410	12,077	52.6%	
2. Participatory Irrigation Management (PIM)								
2.1	Participatory Irrigation Management (PIM)	B	0	615	1,040	615		
Sub-total			0	615	1,040	615	2.7%	
3. Promotion of Farmers Producer Organisations (FPOs)								
3.1	Promotion of Farmers Producer Organisations (FPOs)	C	0	833	1,408	833		
Sub-total			0	833	1,408	833	3.6%	
4. Livelihood Support Programme for Animal Husbandry and Fishery Sectors								
4.1	Animal Husbandry	C	0	242	410	242		
4.2	Fishery	C	0	218	368	218		
Sub-total			0	460	778	460	2.0%	
5. Pilot Programmes								
5.1	Food Value Chain for Strategic Crops	C	0	589	995	589		
5.2	Farm Mechanisation	C	0	306	518	306		
Sub-total			0	895	1,513	895	3.9%	
6 Project Management								
6.1	Support to PMU	D	0	434	733	434		
6.2	Capacity Building	D	0	342	577	342		
6.3	Monitoring and Evaluation	D	0	58	97	58		
6.4	Thematic Study and Action Research	D	0	20	34	20		
Sub-total			0	853	1,442	853	3.7%	
Sub-total of Items 1 to 6			0	15,734	26,591	15,734	68.6%	
7. Price Escalation (L/C: 3.7%)				0	2,052	3,468	2,052	
8. Physical Contingency (5%)				0	889	1,503	889	
Sub-total of Items 1 to 8 (Eligible Portion)			0	18,675	31,561	18,675	81.4%	
9. Consulting Services (PMC)								
9.1	Base Cost	D	1,009	223	1,386	820		
9.2	Price Escalation (F/C: 1.6%, L/C: 3.7%)	D	57	34	114	68		
9.3	Physical Contingency (5%)	D	53	13	75	44		
Sub-total			1,119	270	1,575	932	4.1%	
Sub-total of Items 1 to 9 (Eligible Portion)			1,119	18,945	33,136	19,607	85.4%	
10. Administration and Other Costs								
10.1	Administration Cost (5%)	GoAP Share	0	980	1,657	980		
10.2	Tax and Duty (VAT: 5%, Service Tax: 14.5%)	GoAP Share	162	986	1,829	1,082		
10.3	Interest during Construction (1.4%)	GoAP Share	2,091	0	2,091	1,238		
10.4	Front End Fee (0.20%)	GoAP Share	70	0	70	42		
Sub-total			2,324	1,967	5,648	3,342	14.6%	
Grand Total of Items 1 to 10			3,443	20,911	38,784	22,949	100.0%	

Note: *) Project Concept Note for APILIP-II to be funded by JICA under Phase II (2016-17 to 2020-21), DoWR/GoAP
Source: JICA Survey Team

Attachment 13.3.2 Cost Breakdown for Modernisation of Medium and Minor Irrigation Projects

Activity	Unit Cost (INR)	Quantity	Amount (INR)	Description
1 Modernisation of Medium and Minor Irrigation Project				
1.1 Medium Irrigation Project				
a) Batch 1	4,506,400,000	1 Set	4,506,400,000	12 Medium Irrigation Projects
b) Batch 2	4,104,800,000	1 Set	4,104,800,000	8 Medium Irrigation Projects
Sub-total			8,611,200,000	
1.2 Minor Irrigation Project				
a) Batch 1	979,000,000	1 Set	979,000,000	119 Minor Irrigation Projects
b) Batch 2	2,486,600,000	1 Set	2,486,600,000	330 Minor Irrigation Projects
Sub-total			3,465,600,000	
Grand Total			12,076,800,000	

Source: JICA Survey Team

Attachment 13.3.3 Costs Sorted by Scope of Works in Sample Medium Irrigation Projects

Work Item	Unit	Vottigedda Reservoir			Thammileru Reservoir			Krishnapuram Reservoir			
		Quantity	Cost (Rs)	Unit Cost (Rs/m)	Quantity	Cost (Rs)	Unit Cost (Rs/m)	Quantity	Cost (Rs)	Unit Cost (Rs/m)	
Dam body	Dam body only	m	2,152	14,705,904	6,834	6,400	41,029,981	6,411	-	-	-
	Dam with Toe drain	m	-	-	-	6,400	81,660,350	12,759	-	-	-
Spillway	Gate only	m	48.8	5,359,364	109,823	38.7	2,575,255	66,544	-	-	-
	Gate with D/S wall	m	48.8	10,018,427	205,296	-	-	-	36.6	16,312,870	445,707
Head regulator	nos	2	3,266,204	1,633,102	3	4,010,784	1,336,928	-	-	-	
Main canal	Earth canal	m	-	-	-	21,865	32,479,009	1,485	-	-	-
	C.C Lining canal	m	17,788	253,881,675	14,273	-	-	-	8,935	95,677,410	10,708
	Side Wall canal	m	-	-	-	2,470	24,526,331	9,930	1,030	21,475,839	20,850
Distributary	Earth canal	m	15,500	59,891,866	3,864	21,206	7,739,472	365	-	-	-
	C.C Lining canal	m	7,000	53,359,099	7,623	-	-	-	21,950	73,956,868	3,369
	Side Wall canal	m	-	-	-	2,000	22,541,075	11,271	-	-	-
Tank	Bund with related structures and canals	nos	-	-	-	10	25,648,289	2,564,829	16	37,554,678	2,347,167

Source: JICA Survey Team

Attachment 13.3.4 Unit Cost Estimate for Medium Irrigation Project

Work Item	Unit	Sample Projects			Supplementary DPR				Average	Unit Cost at 2015/16 Price Level	Remarks		
		Vottigedda Reservoir	Thammileru Reservoir	Krishnapuram Reservoir	Peddankalam Anicut Project	Veeraraghavani Kota Anicut System Project	Pennar kumudavathi Project	Narayanapuram Anicut Project					
1) Dam Body	1-1) Without Toe Drain	(INR/m)	6,834	6,411	-				6,623	7,405	Including various works on dam		
	1-2) With Toe Drain	(INR/m)	-	12,759	-				12,759	14,265			
2) Spillway	2-1) Gate	(INR/m)	109,823	66,544	-				-	88,184	98,590	325,502	363,911
	2-2) Downstream Protection	(INR/m)	205,296	-	445,707				1,485,015	1,660,247	Including various works on head regulator		
3) Head Regulator		(INR/no.)	1,633,102	1,336,928	-								
4) Headworks*	4-1) Gate and Other Works	(INR/m)							18,713	244,217	22,882	105,112	97,731
	4-2) Offtake Regulator	(INR/no.)					3,189,852	1,036,500		2,113,176	2,362,531		
5) Canal	5-1) Main Canal (Earth Works Only Portion)	(INR/m)	-	1,485	-					1,485	1,660	Including related structures	
	5-2) Main Canal (CC Lining Portion)	(INR/m)	14,273	-	10,708					12,491	13,965		
	5-3) Main Canal (Sidewall Portion)	(INR/m)	-	9,930	20,850					15,390	17,206		
	5-4) Distributory (Earth Works Only Portion)	(INR/m)	3,864	365	-					2,115	2,365	Including related structures	
	5-5) Distributory (CC Lining Portion)	(INR/m)	7,623	-	3,369					5,496	6,145		
	5-6) Distributory (Sidewall Portion)	(INR/m)	-	11,271	-					11,271	12,601		
6) System-fed Tank		(INR/no.)	-	2,564,829	2,347,167					2,455,998	2,745,806		

Price Escalation Rate (2014/15 - 2015/16)
11.8%

Note: * As headworks is not included in the sample projects, four DPRs which contain headworks have been employed for unit cost estimate.

Projects	1. Dam Body		2. Spillway		3. Head Regulator	4. Headworks		5. Canal						6. System-fed Tank	7. Miscellaneous	Total	
	1-1. Without Toe Drain	1-2. With Toe Drain	2-1. Gate	2-2. Downstream Protection		4-1. Gate and Other Works	4-2. Offtake Regulator	5-1. Main Canal (Earth Works Only Portion)	5-2. Main Canal (CC Lining Portion)	5-3. Main Canal (Sidewall Portion)	5-4. Distributory (Earth Works Only Portion)	5-5. Distributory (CC Lining Portion)	5-6. Distributory (Sidewall Portion)				
Unit Cost (Rs.)	(INR/m)	(INR/m)	(INR/m)	(INR/m)	(INR/m)	(INR/m)	(INR/no.)	(INR/m)	(INR/m)	(INR/m)	(INR/m)	(INR/m)	(INR/m)	(INR/no.)	L/S (Actual)		
01	Peddankalam Anicut	0	0	0	0	11,800,404	0	13,172,100	237,754,125	0	62,566,075	68,670,375	0	0	1,278,000	395,300,000	
02	Vottigedda Reservoir	16,441,201	0	0	11,200,601	3,651,616	0	0	283,839,713	0	66,959,106	59,655,473	0	0	0	441,800,000	
03	Vengalaraya Sagaram	30,138,350	0	5,126,680	0	0	0	0	243,828,900	0	0	221,220,000	0	0	0	500,400,000	
04	Peddagedda Reservoir	0	30,370,185	5,521,040	0	0	0	1,992,000	47,481,000	34,412,000	5,676,000	380,990,000	5,040,400	192,206,420	0	703,700,000	
05	Andra Reservoir	0	26,960,850	4,732,320	0	3,320,494	0	0	1,992,000	58,653,000	36,132,600	6,149,000	46,702,000	160,032,700	0	344,700,000	
06	Torrighedda Pumping Scheme	0	0	0	0	0	0	0	0	0	0	248,841,775	0	0	46,562,000	311,800,000	
07	Thammileru Reservoir Scheme	0	91,296,271	2,879,135	0	4,484,057	0	0	36,311,532	0	27,420,438	8,652,730	0	25,200,922	28,674,787	225,000,000	
08	Mopadu Reservoir System	0	23,822,550	45,055,630	0	1,660,247	0	0	11,852,400	279,300,000	0	0	54,076,000	0	8,237,418	861,000	424,900,000
09	Veeraraghavani Kota Anicut System	0	0	0	0	0	32,669,637	4,725,062	13,280,000	0	0	0	0	0	5,491,612	56,200,000	
10	Krishnapuram Reservoir	0	0	0	18,237,789	0	0	0	0	106,967,344	24,009,988	0	82,683,778	0	41,986,130	273,900,000	
11	Araniar Reservoir	0	51,354,000	4,732,320	0	6,640,988	0	0	0	136,857,000	18,582,480	0	86,030,000	15,121,200	24,712,254	23,065,000	367,100,000
12	Buggavanka	15,254,300	0	5,619,630	0	3,320,494	0	0	0	300,107,850	0	0	334,226,550	0	8,237,418	666,800,000	
13	Upper Pennar	25,954,525	0	0	46,944,519	3,320,494	0	0	9,229,600	187,549,950	0	7,423,735	19,055,645	0	16,474,836	316,000,000	
14	Pennar Kumudvathi	0	0	0	0	0	15,733,872	4,725,062	7,743,900	85,814,925	0	0	0	0	19,220,642	21,985,000	155,300,000
16	Maddigedda Reservoir	5,553,750	0	0	20,379,016	1,660,247	0	0	18,251,700	0	50,929,760	71,051,695	0	0	0	167,900,000	
18	Narayanapuram Anicut	0	0	0	0	0	39,006,891	4,725,062	0	1,019,445,000	33,379,640	37,840,000	0	3,780,300	0	1,138,200,000	
20	Raiwada Reservoir	42,578,750	0	0	43,669,320	3,320,494	16,389,450	2,362,531	0	163,390,500	17,206,000	0	221,220,000	16,381,300	123,561,270	59,254,000	709,400,000
21	Siva Bhashyam Sagar	5,746,280	0	0	22,198,571	3,320,494	13,111,560	4,725,062	0	0	68,824,000	0	0	176,414,000	0	23,478,000	317,900,000
22	Muniyeru	0	0	0	0	0	0	0	70,792,360	595,551,390	0	0	0	0	0	666,400,000	
23	DR & DM Channels	0	0	0	0	0	0	0	36,769,000	67,032,000	190,126,300	0	0	46,623,700	87,865,792	428,500,000	

Attachment 13.3.6 Summary - Construction Cost of Irrigation Project by Cluster

Medium Irrigation Project					Minor Irrigation Project			Total		Accumulation	
Rank	SN.	Project	Command Area (ha)	Construction Cost (INR million)	Nos.	Command Area (ha)	Construction Cost (INR million)	Command Area (ha)	Construction Cost (INR million)	Command Area (ha)	Construction Cost (INR million)
01	13	Upper Pennar	4,066	316	5	391	26	4,457	342	4,457	342
02	08	Mopadu Reservoir System	5,147	425	1	186	11	5,333	436	9,790	778
03	06	Torrigeedda Pumping Scheme	5,998	312	16	2,515	149	8,513	461	18,303	1,239
04	07	Thammileru Reservoir Scheme	3,711	225	19	2,008	125	5,719	350	24,022	1,589
05	23	DR & DM Channels	10,117	429	0	0	0	10,117	429	34,139	2,018
06	14	Pennar Kumudvathi	2,479	155	11	3,287	185	5,766	340	39,905	2,358
07	22	Muniyeru	6,648	666	12	1,669	100	8,317	766	48,222	3,124
08	11	Araniar Reservoir	2,226	367	26	3,132	192	5,358	559	53,580	3,683
09	10	Krishnapuram Reservoir	2,479	274	9	829	53	3,308	327	56,888	4,010
10	02	Vottigeedda Reservoir	6,746	442	10	1,046	65	7,792	507	64,680	4,517
11	03	Vengalaraya Sagaram	9,996	500	2	509	29	10,505	529	75,185	5,046
12	20	Raiwada Reservoir	6,111	709	31	2,114	143	8,225	852	83,410	5,898
13	18	Narayanapuram Anicut	14,995	1,138	18	1,919	120	16,914	1,258	100,324	7,156
14	01	Peddankalam Anicut	3,113	395	8	672	44	3,785	439	104,109	7,595
15	09	Veeraraghavani Kota Anicut System	2,267	56	7	599	39	2,866	95	106,975	7,690
16	16	Maddigeedda Reservoir	1,214	168	9	564	39	1,778	207	108,753	7,897
17	05	Andra Reservoir	3,603	345	22	1,710	113	5,313	458	114,066	8,355
18	12	Buggavanka	3,926	667	8	941	58	4,867	725	118,933	9,080
19	21	Siva Bhashyam Sagar	4,894	318	0	0	0	4,894	318	123,827	9,398
20	04	Peddageedda Reservoir	4,858	704	4	299	20	5,157	724	128,984	10,122
-	99	Isolated	-	-	231	32,576	1,956	32,576	1,956	161,560	12,078
Total			104,594	8,611	449	56,966	3,467	161,560	12,078	-	-

Source: JICA Survey Team

Attachment 13.3.7 Cost Breakdown for PIM Support

Activity		Unit Cost (INR 000)	Quantity		Amount (INR 000)
1	Capacity Building of Department officers				
	1.1	Development of guideline			
	1.1.1	650	1	State	650
	1.1.2	201	1	State	201
	1.1.3	35	13	District	455
	1.2	Training programmes for department officers			
	1.2.1	50	1	State	50
	1.2.2	260	13	District	3,380
	1.2.3	290	6	State	1,740
	1.2.4	706	4	State	2,824
		5,465	1	State	5,465
		295	13	District	3,835
Sub-Total					9,300
2	Capacity development and monitoring of SOs in charge				
	2.1	20	13	District	260
	2.2	30	13	District	390
	2.3	40	13	District	520
	2.4	280	13	District	3,640
	2.5	20	39	District	780
	2.6	20	26	District	520
	2.7	20	13	District	260
	2.8	20	13	District	260
	2.9	290	13	District	3,770
	2.10.	28	156	District	4,368
Sub-Total					14,768
3	Capacity development of WUA for Minor irrigation (to be implemented by SOs)				
	Baseline survey				
	3.1	90	449	WUA	40,410
	WUA support				
	3.2	Initial awareness/preparation			
	3.2.1	9	449	WUA	3,817
	3.2.2	38	449	WUA	17,062
	3.3	Organizational development support			
	3.3.1	2	205	SO	308
	3.3.2	111	449	WUA	49,839
	3.3.3	2	4,490	WUA	8,980
	3.3.4	5	449	WUA	2,245
	3.4	Fund generation and financial management			
	3.4.1	2	287	SO	431
	3.4.2	7	449	WUA	2,919
	3.4.3	60	449	WUA	26,940
	3.4.4	4	449	WUA	1,796

Activity		Unit Cost (INR 000)	Quantity		Amount (INR 000)
3.4.5	Skill development trainings for Fund generation activities	19	898	WUA	16,613
3.4.6	Financial management skill trainings	19	1,347	WUA	24,920
3.4.7	Handholding support and mentoring	2	4,490	WUA	8,980
3.5	Maintenance works by WUA				
3.5.1	Internal preparation for development of the support programmes	2	410	SO	615
3.5.2	O&M Management skill training (planning and maintenance work management)	19	1,347	WUA	24,920
3.5.3	Orientation and guidance on maintenance activities by WUA to general body members	12	449	WUA	5,388
3.5.4	O&M Technical skill development training (on site)	19	1,347	WUA	24,920
3.5.5	Handholding support and mentoring on O&M activities	2	4,490	WUA	8,980
3.6	Water budgeting and preparation of Agriculture Development Plan (crop planning)				
3.6.1	Internal preparation for the support programmes	3	82	SO	246
3.6.2	Training programme on water budgeting and crop planning	56	898	WUA	49,839
3.6.3	Support on actual water budgeting and planning practice	5	2,694	WUA	13,470
3.7	Optimal use of tank water (collaboration with other stakeholders)				
3.7.1	Internal preparation for development of the support programmes	3	41	SO	123
3.7.2	Awareness and orientation workshop	9	449	WUA	3,817
3.7.3	Support periodical meeting among stakeholders	3	2,694	WUA	8,082
3.7.4	Handholding support on actual operation	2	2,694	WUA	5,388
3.8	Exposure and learning experiences				
3.8.1	Internal preparation for experience sharing and exposure visit	15	41	SO	615
3.8.2	Convergence meeting	54	123	SO	6,642
3.8.3	Exposure to successful examples	233	41	SO	9,533
3.9	Introduction and awareness raising on Government schemes				
3.9.1	Awareness Workshop on Government schemes	3	1,347	WUA	4,041
3.9.2	Support in applying for the government schemes	2	6,735	WUA	13,470
3.1	Refresher training				
3.10.	Refresher training / additional training	8	1,347	WUA	10,776
3.11	Social Audit Boards				
3.11.1	Election of Social Audit Board (V.O/SHG)	2	449	WUA	898
3.11.2	Training of the Social Audit Board	27	449	WUA	12,123
3.11.3	Practical support of Social Audit Board	2	2,245	WUA	4,490
3.11.4	Consultation meeting to share audit result	5	1,347	WUA	6,735
Administration cost					
3.12	Administrative Works of SO (including cost for participating the training for NGO provided by the project)	150	41	SO	6,150
Sub-total					426,517
4	Capacity development of WUA for Medium irrigation (to be implemented by SOs)				
For WUA under medium irrigation					
4.1	Baseline Survey on the WUA command area	90	160	WUA	14,400
WUA support					
4.2	Initial awareness/preparation				
4.2.1	Orientation meeting on project activities	9	160	WUA	1,360
4.2.2	Awareness on Irrigation management (Kalajatha)	38	160	WUA	6,080

Activity		Unit Cost (INR 000)	Quantity		Amount (INR 000)
4.3	Organizational development support				
4.3.1	Internal preparation for development of the support programmes	2	100	PC	150
4.3.2	Training on concept of PIM and WUA intuitional management	111	160	WUA	17,760
4.3.3	Follow-up monitoring handholding support after training	2	1,600	WUA	3,200
4.3.4	Dissemination workshop of roles of water users	5	160	WUA	800
4.4	Fund generation and financial management				
4.4.1	Internal preparation for development of the support programmes	2	140	PC	210
4.4.2	Orientation and option presentation	7	20	PC	130
4.4.3	Activity material support	60	160	WUA	9,600
4.4.4	Support planning of activities by WUA	4	160	WUA	640
4.4.5	Skill development trainings Fund generation activities	19	320	WUA	5,920
4.4.6	Financial management skill trainings	19	480	WUA	8,880
4.4.7	Handholding support and mentoring	2	1,600	WUA	3,200
4.5	Maintenance works by WUA				
4.5.1	Internal preparation for development of the support programmes	2	200	PC	300
4.5.2	O&M Management skill training (planning and maintenance work management)	19	480	WUA	8,880
4.5.3	Orientation and guidance on maintenance activities by WUA to UW general body members	12	160	WUA	1,920
4.5.4	O&M Technical skill development training (on site)	19	480	WUA	8,880
4.5.5	Handholding support and mentoring on O&M activities	2	1,600	WUA	3,200
4.6	Water budgeting and preparation of Agriculture Development Plan (crop planning)				
4.6.2	Training programme on water budgeting and crop planning	56	320	WUA	17,760
4.6.3	Support on actual water budgeting and planning practice	5	960	WUA	4,800
4.6.1	Internal preparation for the support programmes	3	40	PC	120
4.7	Optimal use of tank water (collaboration with other stakeholders)				
4.7.1	Internal preparation for development of the support programmes	3	20	PC	60
4.7.2	Awareness and orientation workshop	9	160	WUA	1,360
4.7.3	Support periodical meeting among stakeholders	3	960	WUA	2,880
4.7.4	Handholding support on actual operation	2	960	WUA	1,920
4.8	Exposure and learning experiences				
4.8.1	Internal preparation for experience sharing and exposure visit	15	20	PC	300
4.8.2	Sharing of success stories by farmers organizations.	54	60	PC	3,240
4.8.3	Exposure to successful examples	233	20	PC	4,650
4.9	Introduction and awareness raising on Government schemes				
4.9.1	Awareness Workshop on Government schemes	3	480	WUA	1,440
4.9.2	Support in applying for the government schemes	2	2,400	WUA	4,800
4.1	Refresher training				
4.10.	Refresher training / additional training	8	480	WUA	3,840
4.11	Social Audit Boards				
4.11.1	Election of Social Audit Board (V.O/SHG)	2	160	WUA	320
4.11.2	Training of the Social Audit Board	27	160	WUA	4,320
4.11.3	Practical support of Social Audit Board	2	800	WUA	1,600

Activity		Unit Cost (INR 000)	Quantity		Amount (INR 000)
4.11.4	Consultation meeting to share audit result	5	480	WUA	2,400
4.12	Administration cost				
4.12.1	Administrative Works of SO (including cost for participating the training for NGP provided by the project)	150	20	PC	3,000
For Support and Capacity Development of PC					
4.13	Establishment of PC office management and O&M of medium irrigation by PC				
4.13.1.	Training on Project level management, office management and O&M	56	20	PC	1,110
4.13.2.	Monthly PC meetings	2	240	PC	480
4.13.3.	Project level consultation meetings for water cess with Revenue for reconciliation and issue of water tax proceedings	7	60	PC	420
4.13.4.	Seasonal Water budgeting and Crop Planning for medium irrigation	10	120	PC	1,200
4.13.5.	Seasonal O&M planning meeting	10	140	PC	1,400
4.14	Social Audit Boards				
4.14.1	Election of Social Audit Board (V.O/SHG)	2	20	PC	40
4.14.2	Training of the Social Audit Board	37	20	PC	740
4.14.3	Practical support of Social Audit Board	2	100	PC	200
4.14.4	Consultation meeting to share audit result	5	60	PC	300
4.15	Exposure visit				
4.15.1	Internal preparation for experience sharing and exposure visit	20	20	PC	400
4.15.2	External Exposure visit on water management & other activities	210	20	PC	4,200
Sub-Total					164,810
Grand total					615,395

Activity	Unit Price (INR)	Quantity	Amount (INR)	Description
1	Capacity Building of Department officers			
1.1	Development of guideline			
1.1.1	Review of existing training module of WUA and preparation of a new guideline and modules (under consultation with a project consultant)			
	Outsourced staff	5,000	120 person/day	600,000
	Materials	50,000	1 ls	50,000
	Sub-total			650,000
1.1.2	Dissemination and explanation of the Guideline and training modules to at State and District officers			
	Traveling and accommodation	7,000	23 person/day	161,000
	Resource person	15,000	2 person/day	30,000
	Materials	10,000	1 ls	10,000
	Sub-total			201,000
1.1.3	Dissemination and explanation of the Guideline and training modules to at SEs level			
	Traveling and accommodation	1,000	10 person/day	10,000
	Resource person	15,000	1 person/day	15,000
	Materials	10,000	1 ls	10,000
	Sub-total			35,000
1.2	Training programmes for department officers			
1.2.1	Preparation of training programme for Dept. officers.			
	Materials	50,000	1 ls	50,000
	Sub-total			50,000

Activity	Unit Price (INR)	Quantity	Amount (INR)	Description	
1.2.2	Training of DEE, AEE on WUA development and Support				
Traveling and accommodation	1,000	100	person/day	100,000	5 day training at each district Participants : DEEs, AEE, SPIU Consultants
Resource person	15,000	10	person/day	150,000	
Materials	10,000	1	ls	10,000	
Sub-total				260,000	
1.2.3	Training of DEE, AEE on O&M and technical guidance (1) System for water management recording				
Traveling and accommodation	4,000	37.5	person/day	150,000	2-3 day training at state headquarters (or a model site) *2 times in each batch Participants: 2 DoWR officer form each district and 5 DoWR officers from State
Resource person	15,000	7.5	person/day	112,500	
Venue	2,000	2.5	day	5,000	
Materials	1,000	15	person	15,000	
Lunch	200	37.5	ls	7,500	
Sub-total				290,000	
1.2.4	Training of DEE, AEE on O&M and technical guidance (2) System for Irrigation water management planning				
Traveling and accommodation	3,250	140	person/day	455,000	4 day training at state headquarters (or a model site) *6 times (once a year after construction in batchwise) Participants: 3 DoWR officer and 3 irrigation advisory board members form each district and 5 DoWR officers from State
Resource person	15,000	12	person/day	180,000	
Venue	2,000	4	day	8,000	
Materials	1,000	35	person	35,000	
Materials /Lunch	200	140	ls	28,000	
Sub-total				706,000	
2	Capacity development and monitoring of SOs in charge				
2.1	Pre-orientation meeting on project activities				
Resource person	15,000	1	person/day	15,000	A half-day workshop at each district with SOs that are interested in (Candidate SOs)
Materials/Lunch	5,000	1	ls	5,000	
Sub-total				20,000	
2.2	Selection and appointment of SOs				
Materials	30,000	1	ls	30,000	
Sub-total				30,000	
2.3	Workshop on outline of the project and Basics about agreement, TOR and roles of the SO in the project				
Resource person	15,000	2	person/day	30,000	1 day workshop at each district for SO representatives of the selected SOs
Materials/Lunch	10,000	1	ls	10,000	
Sub-total				40,000	
2.4	Training of SO staffs on the Training module for WUA				
Traveling and accommodation	1,000	80	person/day	80,000	5 day training at each district for SO staffs in charge, and DEE & AEEs in charge
Resource person	15,000	10	person/day	150,000	
Materials/Lunch	50,000	1	ls	50,000	
Sub-total				280,000	
2.5	Monitoring workshop				
Resource person	15,000	1	person/day	15,000	1 day workshop * 3times/year in each district for SO staffs in charge, and DEE & AEEs in charge
Materials/Lunch	5,000	1	ls	5,000	
Sub-total				20,000	
2.6	Refresher training / additional training				
Resource person	15,000	1	person/day	15,000	1 day training * 3 times (one per year) in each district for SO staffs in charge, and DEE & AEEs in charge
Materials/Lunch	5,000	1	ls	5,000	
Sub-total				20,000	
2.7	Experience sharing workshop				
Resource person	15,000	1	person/day	15,000	1 day workshop * once a year in each district for SO staffs in charge, and DEE & AEEs in charge
Materials/Lunch	5,000	1	ls	5,000	
Sub-total				20,000	
2.8	Evaluation workshop				
Resource person	15,000	1	person/day	15,000	

Activity	Unit Price (INR)	Quantity	Amount (INR)	Description
Materials/Lunch	5,000	1 ls	5,000	One day workshop at the end in each district for SO staffs in charge, and DEE & AEEs in charge
Sub-total			20,000	
2.9 Training of Community Resource Persons				
Traveling and accommodation	500	280 person/day	140,000	5 day training at each district for CRP (6 per Medium, 2 per minor)
Resource person	15,000	5 person/day	75,000	
Materials/Lunch	75,000	1 ls	75,000	
Sub-total			290,000	
2.10. Financial support for CRP				
Traveling and accommodation	500	56 person	28,000	Remuneration per month per district
Sub-total			28,000	
3 Capacity development of WUA for Minor irrigation (to be implemented by SOs)				
Baseline survey				
3.1 Baseline Survey on the WUA comand area				
SO staff	1,500	40 person/day	60,000	20 days * 2 staffs
Transportation	500	40 person/day	20,000	
Materials/Lunch	10,000	1 ls	10,000	
Sub-total			90,000	
WUA support				
3.2 Initial awareness/preparation				
3.2.1 Orientation meeting on project activities				
SO staff	1,500	2 person/day	3,000	Open gathering at each target village for Villagers in target area
Transportation	500	1 person/day	500	
Resource person	0	0		
Materials/Lunch	5,000	1 ls	5,000	
Sub-total			8,500	
3.2.2 Awareness on Irrigation management (Kalajatha)				
SO staff	1,500	5 person/day	7,500	Open gathering at each target village for Villagers in target area
Transportation	500	1 person/day	500	
Materials/Lunch	30,000	1 ls	30,000	
Sub-total			38,000	
3.3 Organisational development support				
3.3.1 Internal preparation for development of the support programmes				
SO staff	1,500	5 person/day	7,500	-
Materials/Lunch	0	1 ls	0	
Sub-total			7,500	
3.3.2 Training on concept of PIM and WUA institutional management				
SO staff	1,500	12 person/day	18,000	6 day training for each WUA conducted at village for WUA MC, TC, women members (around 20)
Transportation	500	6 person/day	3,000	
Resource person	5,000	1 person/day	5,000	
Materials/Lunch	60,000	1 ls	60,000	
Sub-total			86,000	
3.3.3 Follow-up monitoring handholding support after training				
SO staff	1,500	10 person/day	15,000	Field visit after training
Transportation	500	10 person/day	5,000	
Sub-total			20,000	
3.3.4 Dissemination workshop of roles of water users				
SO staff	1,500	1 person/day	1,500	A half-day field workshop for WUA general body members
Transportation	500	1 person/day	500	
Materials/Lunch	3,000	1 ls	3,000	
Sub-total			5,000	
3.4 Fund generation and financial management				
3.4.1 Internal preparation for development of the support programmes				

Activity	Unit Price (INR)	Quantity	Amount (INR)	Description
SO staff	1,500	7 person/day	10,500	Internal preparation
Sub-total			10,500	
3.4.2 Orientation and option presentation				
SO staff	1,500	2 person/day	3,000	Open workshop for WUA general members
Transportation	500	1 person/day	500	
Materials/Lunch	3,000	1 ls	3,000	
Sub-total			6,500	
3.4.3 Activity material support				
Materials/Lunch	60,000	1 ls	60,000	
Sub-total			60,000	
3.4.4 Support planning of activities by WUA				
SO staff	1,500	1 person/day	1,500	On-site support
Transportation	500	1 person/day	500	
Materials/Lunch	2,000	1 ls	2,000	
Sub-total			4,000	
3.4.5 Skill development trainings for Fund generation activities				
SO staff	1,500	2 person/day	3,000	On-site support
Transportation	500	1 person/day	500	
Resource person	5,000	1 person/day	5,000	
Materials/Lunch	10,000	1 ls	10,000	
Sub-total			18,500	
3.4.6 Financial management skill trainings				
SO staff	1,500	2 person/day	3,000	One-day training at village for WUA MC, TC, women members, finance sub-committee (around 20)
Transportation	500	1 person/day	500	
Resource person	5,000	1 person/day	5,000	
Materials/Lunch	10,000	1 ls	10,000	
Sub-total			18,500	
3.4.7 Handholding support and mentoring				
SO staff	1,500	10 person/day	15,000	Periodical site visit
Transportation	500	10 person/day	5,000	
Sub-total			20,000	
3.5 Maintenance works by WUA				
3.5.1 Internal preparation for development of the support programmes				
SO staff	1,500	10 person/day	15,000	Internal preparation
Sub-total			15,000	
3.5.2 O&M Management skill training (planning and maintenance work management)				
SO staff	1,500	2 person/day	3,000	One-day training at village for WUA MC, TC, women members (around 20)
Transportation	500	1 person/day	500	
Resource person	5,000	1 person/day	5,000	
Materials/Lunch	10,000	1 ls	10,000	
Sub-total			18,500	
3.5.3 Orientation and guidance on maintenance activities by WUA to general body member				
SO staff	1,500	1 person/day	1,500	Open workshop at village conducted by WUA for general body members
Transportation	500	1 person/day	500	
Materials/Lunch	10,000	1 ls	10,000	
Sub-total			12,000	
3.5.4 O&M Technical skill development training (on site)				
SO staff	1,500	2 person/day	3,000	On-site practice
Transportation	500	1 person/day	500	
Resource person	5,000	1 person/day	5,000	
Materials/Lunch	10,000	1 ls	10,000	
Sub-total			18,500	
3.5.5 Handholding support and mentoring on O&M activities				

Activity		Unit Price (INR)	Quantity		Amount (INR)	Description
	SO staff	1,500	10	person/day	15,000	Periodical site visit
	Transportation	500	10	person/day	5,000	
	Sub-total				20,000	
3.6 Water budgeting and preparation of Agriculture Development Plan (crop planning)						
3.6.1 Internal preparation for the support programmes						
	SO staff	1,500	4	person/day	6,000	Internal preparation
	Sub-total				6,000	
3.6.2 Training programme on water budgeting and crop planning						
	SO staff	1,500	6	person/day	9,000	Two-day training at village for WUA MC, TC, women members (around 20)
	Transportation	500	3	person/day	1,500	
	Resource person	5,000	3	person/day	15,000	
	Materials/Lunch	30,000	1	ls	30,000	
	Sub-total				55,500	
3.6.3 Support on actual water budgeting and planning practice						
	SO staff	1,500	1	person/day	1,500	On-site practice (actual planning before use of tank) with WUA general members
	Transportation	500	1	person/day	500	
	Materials/Lunch	3,000	1	ls	3,000	
	Sub-total				5,000	
3.7 Optimal use of tank water (collaboration with other stakeholders)						
3.7.1 Internal preparation for development of the support programmes						
	SO staff	1,500	2	person/day	3,000	Internal preparation
	Sub-total				3,000	
3.7.2 Awareness and orientation workshop						
	SO staff	1,500	2	person/day	3,000	Open workshop at village to WUA general members, Fishermen society, other stakeholders who use tank for different purpose
	Transportation	500	1	person/day	500	
	Materials/Lunch	5,000	1	ls	5,000	
	Sub-total				8,500	
3.7.3 Support periodical meeting among stakeholders						
	SO staff	1,500	1	person/day	1,500	Periodical meeting organized by Tank users' Committee
	Transportation	500	1	person/day	500	
	Materials/Lunch	1,000	1	ls	1,000	
	Sub-total				3,000	
3.7.4 Handholding support on actual operation						
	SO staff	1,500	1	person/day	1,500	Periodical site visit
	Transportation	500	1	person/day	500	
	Sub-total				2,000	
3.8 Exposure and learning experiences						
3.8.1 Internal preparation for experience sharing and exposure visit						
	SO staff	1,500	5	person/day	7,500	Internal preparation
	Transportation	500	5	person/day	2,500	
	Materials/Lunch	5,000	1	ls	5,000	
	Sub-total				15,000	
3.8.2 Convergence meeting						
	SO staff	1,500	2	person/day	3,000	One-day workshop at district level with WUAs, District level relevant depts.
	Transportation	500	2	person/day	1,000	
	Materials/Lunch	50,000	1	ls	50,000	
	Sub-total				54,000	
3.8.3 Exposure to successful examples						
	SO staff	1,500	6	person/day	9,000	3 days exposure visit to successful WUA within AP for WUA MC members (16 participants and 2 saffs)
	Transportation	500	15	person/day	7,500	
	Accommodation/meals	3,000	72	person/day	216,000	
	Sub-total				232,500	
3.9 Introduction and awareness raising on Government schemes						

Activity	Unit Price (INR)	Quantity	Amount (INR)	Description
3.9.1 Awareness Workshop on Government schemes				
SO staff	1,500	1 person/day	1,500	1 day workshop at village (*3 times) for WUA general body members and villagers
Transportation	500	1 person/day	500	
Materials/Lunch	1,000	1 ls	1,000	
Sub-total			3,000	
3.9.2 Support in applying for the government schemes				
SO staff	1,500	15 person/day	22,500	On-site support to willing farmers, groups in the village
Transportation	500	15 person/day	7,500	
Sub-total			30,000	
3.10 Refresher training				
3.10. Refresher training / additional training				
SO staff	1,500	1 person/day	1,500	1 day training (*3 times) for WUA members and other stakeholders (depending on the contents)
Transportation	500	1 person/day	500	
Resource person	5,000	1 person/day	5,000	
Materials/Lunch	1,000	1 ls	1,000	
Sub-total			8,000	
3.11 Social Audit Boards				
3.11.1 Election of Social Audit Board (V.O/SHG)				
SO staff	1,500	1 person/day	1,500	Half-day meeting with WUA members
Transportation	500	1 person/day	500	
Sub-total			2,000	
3.11.2 Training of the Social Audit Board				
SO staff	1,500	4 person/day	6,000	2 day training for Social Auditing Board, WUA members
Transportation	500	2 person/day	1,000	
Resource person	5,000	2 person/day	10,000	
Materials/Lunch	10,000	1 ls	10,000	
Sub-total			27,000	
3.11.3 Practical support of Social Audit Board				
SO staff	1,500	5 person/day	7,500	Actual auditing in field, once per season with Social Auditing Board, WUA members
Transportation	500	5 person/day	2,500	
Sub-total			10,000	
3.11.4 Consultation meeting to share audit result				
SO staff	1,500	1 person/day	1,500	Half-day meeting once per season with WUA members
Transportation	500	1 person/day	500	
Resource person	0	0 person/day	0	
Materials/Lunch	3,000	1 ls	3,000	
Sub-total			5,000	
Administration cost				
3.12 Administrative Works of SO (including cost for participating the training for NGP provided by the project)				
Administration cost	150,000	1 ls	150,000	Administration cost per SO
Sub-total			150,000	
For Support and Capacity Development of PC				
4.13 Establishment of PC office management and O&M of medium irrigation by PC				
4.13.1. Training on Project level management, office management and O&M				
SO staff	1,500	6 person/day	9,000	3 day training at medium scheme level for PC members and WUA presidents under medium irrigation
Transportation	500	3 person/day	1,500	
Resource person	5,000	3 person/day	15,000	
Materials/Lunch	30,000	1 ls	30,000	
Sub-total			55,500	
4.13.2. Monthly PC meetings				
SO staff	1,500	12 person/day	18,000	Monthly meeting conducted by PC for PC members and WUA presidents under medium irrigation
Transportation	500	12 person/day	6,000	
Sub-total			24,000	

Activity	Unit Price (INR)	Quantity	Amount (INR)	Description
4.13.3. Project level consultation meetings for water cess with Revenue for reconciliation and issue of water tax proceedings				
SO staff	1,500	1 person/day	1,500	Half-day meeting once per season at Project level with DEE, AEO, Revenue Officer, PC
Transportation	500	1 person/day	500	
Materials/Lunch	5,000	1 ls	5,000	
Sub-total			7,000	
4.13.4. Seasonal Water budgeting and Crop Planning for medium irrigation				
SO staff	1,500	1 person/day	1,500	One-day meeting once per season conducted with initiative of PC (with PC members and WUA presidents under medium irrigation)
Transportation	500	1 person/day	500	
Resource person	5,000	1 person/day	5,000	
Materials/Lunch	3,000	1 ls	3,000	
Sub-total			10,000	
4.13.5. Seasonal O&M planning meeting				
SO staff	1,500	1 person/day	1,500	One-day meeting once per season (after season) conducted with initiative of PC (with PC members and WUA presidents under medium irrigation)
Transportation	500	1 person/day	500	
Resource person	5,000	1 person/day	5,000	
Materials/Lunch	3,000	1 ls	3,000	
Sub-total			10,000	
4.14 Social Audit Boards				
4.14.1 Election of Social Audit Board (V.O/SHG)				
SO staff	1,500	1 person/day	1,500	Half-day meeting with PC members and WUA members under medium irrigation
Transportation	500	1 person/day	500	
Sub-total			2,000	
4.14.2 Training of the Social Audit Board				
SO staff	1,500	4 person/day	6,000	2 day training for Social Auditing Board, PC members
Transportation	500	2 person/day	1,000	
Resource person	5,000	2 person/day	10,000	
Materials/Lunch	20,000	1 ls	20,000	
Sub-total			37,000	
4.14.3 Practical support of Social Audit Board				
SO staff	1,500	1 person/day	1,500	Actual auditing in field, once per season with Social Auditing Board, PC members
Transportation	500	1 person/day	500	
Sub-total			2,000	
4.14.4 Consultation meeting to share audit result				
SO staff	1,500	1 person/day	1,500	Half-day meeting once per season by PC members with WUA members under medium irrigation
Transportation	500	1 person/day	500	
Materials/Lunch	3,000	1 ls	3,000	
Sub-total			5,000	
4.15 Exposure visit				
4.15.1 Internal preparation for experience sharing and exposure visit				
SO staff	1,500	5 person/day	7,500	Internal preparation
Transportation	500	5 person/day	2,500	
Materials/Lunch	10,000	1 ls	10,000	
Sub-total			20,000	
4.15.2 External Exposure visit on water management & other activities				
SO staff	1,500	10 person/day	15,000	5 days exposure visit to successful WUA in other states for PC, and WUA MC under medium irrigation (8 participants and 2 staffs)
Transportation	3,000	15 car/day	45,000	
Accommodation/meals	3,000	50 person/day	150,000	
Sub-total			210,000	

Attachment 13.3.8 Strengthening of Extension Service Function

(Unit: INR. 000)

Particulars of Activities	Unit Cost	No.	per year	Years	Amount	Remarks	Trainers	Trainees	
1. Strengthening of Extension Service Function of DOA					173,600				
1.1 Recruitment of Outsource Personnel	-	-	-	-	-				
1.1.1 State Coordinating Officer	1,200.0	1	person	1	6	7,200	for 6 years		
1.1.2 Personnel to be equal to AEO	26.0	67	person	12	6	125,420	for 6 years		
1.2 District-wise Capacity Development of Extension Staff on the Project Activities									
1.2.1 Orientation workshop (state level)	105.5	1		1	1	110	PMU, PMC		
1.2.2 Training on management of extension activities	39.5	13		1	1	510	State, PMC, District(JDA, DDA, ADA)	District / Mandal staff	
1.2.3 Peer learning workshop	39.5	13		1	1	510	State, PMC, District(JDA, DDA, ADA)	District / Mandal staff	
1.3 Annual monitoring and evaluation									
1.3.1 Confirmation on outcome of each extension activity	39.5	13		1	6	3,080	13 Districts in 6 years	State, PMC, District(JDA, DDA, ADA)	District / Mandal staff
1.3.2 Formulation of Extension Plan for the following year	39.5	13		1	6	3,080	13 Districts in 6 years	State, PMC, District(JDA, DDA, ADA)	District / Mandal staff
1.3.3 Modification of Agricultural Development Plan (by WUA)	39.5	13		1	6	3,080	13 Districts in 6 years	State, PMC, District(JDA, DDA, ADA)	District / Mandal staff
1.4 Preparation of Information, Education and Communication Materials for Dissemination									
1.4.1 Posters / Calender / Banners	73.0	13		1	3	2,850	sach District		
1.4.2 Wall writings	1.2	604		1	1	720	sach WUA		
1.4.3 Publication of handouts and manuals	150.0	13		1	5	9,750	sach District		
1.4.4 Preparation of video programmes	100.0	1		1	1	100			
1.4.5 Displays of agricultural shows / fairs	52.0	13		1	1	680	sach District		
1.5 Capacity Development of Extension Staff	57.0	13		1	6	4,450	State, PMC, District(JDA, DDA, ADA)	District / Mandal staff	
1.6 Strengthening of Research-Extension-Farmers Linkages	92.5	13		1	5	6,010	13 Districts in 6 years	State, PMC, Research, University, District	Extension staff, farmers
1.7 Joint Field Visit of Researchers and Extension Staff	85.0	13		1	5	5,530	13 Districts in 6 years	State, PMC, Research, University, District	Extension staff, farmers
1.8 Exposure / Study Visits	259.0	1		1	2	520	PMC	State, District	
2. Strengthening of Extension Service Function of DOH					159,500				
2.1 Recruitment of PMU staff	-	-	-	-	-				
2.1.1 State Coordinating Officer	1,200.0	1	person	1	6	7,200	for 6 years		
2.1.2 Personnel to be equal to HO	26.0	67	person	12	6	125,420	for 6 years		
2.2 District-wise Capacity Development of Extension Staff on the Project Activities									
2.2.1 Orientation workshop	105.5	1		1	1	110	PMU, PMC	Sate, District	
2.2.2 Training on management of extension activities	39.5	13		1	1	510	State, PMC, District (DDH, ADH)	District / Mandal staff	
2.2.3 Peer learning workshop	39.5	13		1	1	510	State, PMC, District (DDH, ADH)	District / Mandal staff	
2.3 Annual monitoring and evaluation									
2.3.1 Confirmation on outcome of each extension activity	39.5	13		1	6	3,080	13 Districts in 6 years	State, PMC, District (DDH, ADH)	District / Mandal staff
2.3.2 Formulation of Extension Plan for the following year	39.5	13		1	6	3,080	13 Districts in 6 years	State, PMC, District (DDH, ADH)	District / Mandal staff
2.3.3 Modification of Agricultural Development Plan (by WUA)	39.5	13		1	6	3,080	13 Districts in 6 years	State, PMC, District (DDH, ADH)	District / Mandal staff
2.4 Preparation of Information, Education and Communication Materials for Dissemination									
2.4.1 Posters / Calender / Banners						0			
2.4.2 Wall writings						0			
2.4.3 Publication of handouts and manuals						0			
2.4.4 Preparation of video programmes						0			
2.4.5 Displays of agricultural shows / fairs						0			
2.5 Capacity Development of Extension Staff	57.0	13		1	6	4,450	State, PMC, District(JDA, DDA, ADA)	District / Mandal staff	
2.6 Strengthening of Research-Extension-Farmers Linkages	92.5	13		1	5	6,010	13 Districts in 6 years	State, PMC, Research, University, District	Extension staff, farmers
2.7 Joint Field Visit of Researchers and Extension Staff	85.0	13		1	5	5,530	13 Districts in 6 years	State, PMC, Research, University, District	Extension staff, farmers
2.8 Exposure / Study Visits	259.0	1		1	2	520	PMC	State, District	
Grand Total						333,100			

Note: Refer Attachment-10.8.2.3 for details of unit cost

Attachment 13.3.9 Recruitment of Outsource Persons : State Coordinating Officer

(1) DoA

Position	Duration	Months	Monthly Remuneration	Annual Allowance	Amount (INR)
1 State Coordinating Officer	January 2018 to December 2023	72	75,000	300,000	7,200,000
Total			75,000	300,000	7,200,000

(2) DoH

Position	Duration	Months	Monthly Remuneration	Annual Allowance	Amount (INR)
1 State Coordinating Officer	January 2018 to December 2023	72	75,000	300,000	7,200,000
Total			75,000	300,000	7,200,000

Source: JICA Survey Team, based on information from DoA and DoH

Attachment 13.3.10 Recruitment of Outsource Persons: Mandal-wise Extension Staff

(1) DoA

District	Unit	No. of Persons	Duration	Month	Rate (INR/month)	Amount (INR)
1 Srikakulam	MM	12	January 2018 to December 2023	72	26,000	22,464,000
2 Vizianagaram	MM	10	January 2018 to December 2023	72	26,000	18,720,000
3 Vishakapatnam	MM	11	January 2018 to December 2023	72	26,000	20,592,000
4 East Godavari	MM	4	January 2018 to December 2023	72	26,000	7,488,000
5 West Godavari	MM	4	January 2018 to December 2023	72	26,000	7,488,000
6 Krishna	MM	2	January 2018 to December 2023	72	26,000	3,744,000
7 Guntur	MM	-	-	-	-	-
8 Prakasam	MM	2	January 2018 to December 2023	72	26,000	3,744,000
9 Kurnool	MM	4	January 2018 to December 2023	72	26,000	7,488,000
10 Ananthapur	MM	3	January 2018 to December 2023	72	26,000	5,616,000
11 Kadapa	MM	2	January 2018 to December 2023	72	26,000	3,744,000
12 Nellore	MM	7	January 2018 to December 2023	72	26,000	13,104,000
13 Chittoor	MM	6	January 2018 to December 2023	72	26,000	11,232,000
Total		67		864	312,000	125,424,000

(2) DoH

District	Unit	No. of Persons	Duration	Month	Rate (INR/month)	Amount (INR)
1 Srikakulam	MM	12	January 2018 to December 2023	72	26,000	22,464,000
2 Vizianagaram	MM	10	January 2018 to December 2023	72	26,000	18,720,000
3 Vishakapatnam	MM	11	January 2018 to December 2023	72	26,000	20,592,000
4 East Godavari	MM	4	January 2018 to December 2023	72	26,000	7,488,000
5 West Godavari	MM	4	January 2018 to December 2023	72	26,000	7,488,000
6 Krishna	MM	2	January 2018 to December 2023	72	26,000	3,744,000
7 Guntur	MM	-	-	-	-	-
8 Prakasam	MM	2	January 2018 to December 2023	72	26,000	3,744,000
9 Kurnool	MM	4	January 2018 to December 2023	72	26,000	7,488,000
10 Ananthapur	MM	3	January 2018 to December 2023	72	26,000	5,616,000
11 Kadapa	MM	2	January 2018 to December 2023	72	26,000	3,744,000
12 Nellore	MM	7	January 2018 to December 2023	72	26,000	13,104,000
13 Chittoor	MM	6	January 2018 to December 2023	72	26,000	11,232,000
Total		67		864	312,000	125,424,000

Source: JICA Survey Team, based on information from DoA and DoH

Attachment 13.3.11 Unit Cost for Strengthening of Extension Service Function of DoA / DoH

for 1.2 District-wise Capacity Development of Extension Staff on the Project Activities
for 2.2 District-wise Capacity Development of Extension Staff on the Project Activities

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
for 1.2.1 Orientation Workshop (state level)						
for 2.2.1 Orientation Workshop (state level)						
1	Hiring of Venue	Hall	1	20,000	1	20,000
2	Boarding and lodging of Participants	Persons	20	1,500	2	60,000
3	Travel and Conveyance to Participants	Persons	20	800	1	16,000
4	Lunch and Tea	Persons	20	200	1	4,000
5	Folder, stationery and learning material	Nos.	20	200	1	4,000
6	Documentation and Reporting	Event	1	1,500	1	1,500
Total						105,500
for 1.2.2 Training on management of extension activities						
for 2.2.2 Training on management of extension activities						
1	Hiring of Venue	Hall	1	20,000	1	20,000
2	Travel and Conveyance to Participants	Persons	20	500	1	10,000
3	Lunch and Tea	Persons	20	200	1	4,000
4	Folder, stationery and learning material	Nos.	20	200	1	4,000
5	Documentation and Reporting	Trainings	1	1,500	1	1,500
Total						39,500
for 1.2.3 Peer learning workshop						
for 2.2.3 Peer learning workshop						
1	Hiring of Venue	Hall	1	20,000	1	20,000
2	Travel and Conveyance to Participants	Persons	20	500	1	10,000
3	Lunch and Tea	Persons	20	200	1	4,000
4	Folder, stationery and learning material	Nos.	20	200	1	4,000
5	Documentation and Reporting	Event	1	1,500	1	1,500
Total						39,500

Source: JICA Survey Team

for 1.3 Annual Monitoring and Evaluation
for 2.3 Annual Monitoring and Evaluation

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
for 1.3.1 Confirmation on outcome of each extension activity						
for 2.3.1 Confirmation on outcome of each extension activity						
1	Hiring of Venue	Hall	1	20,000	1	20,000
2	Travel and Conveyance to Participants	Persons	20	500	1	10,000
3	Lunch and Tea	Persons	20	200	1	4,000
4	Folder, stationery and learning material	Nos.	20	200	1	4,000
5	Documentation and Reporting	Event	1	1,500	1	1,500
Total						39,500
for 1.3.2 Formulation of Extension Plan for the following year						
for 2.3.2 Formulation of Extension Plan for the following year						
1	Hiring of Venue	Hall	1	20,000	1	20,000
2	Travel and Conveyance to Participants	Persons	20	500	1	10,000
3	Lunch and Tea	Persons	20	200	1	4,000
4	Folder, stationery and learning material	Nos.	20	200	1	4,000
5	Documentation and Reporting	Event	1	1,500	1	1,500
Total						39,500
for 1.3.3 Modification of Agricultural Development Plan						
for 2.3.3 Modification of Agricultural Development Plan						
1	Hiring of Venue	Hall	1	20,000	1	20,000
2	Travel and Conveyance to Participants	Persons	20	500	1	10,000
3	Lunch and Tea	Persons	20	200	1	4,000
4	Folder, stationery and learning material	Nos.	20	200	1	4,000
5	Documentation and Reporting	Event	1	1,500	1	1,500
Total						39,500

Source: JICA Survey Team

for 1.4. Preparation of Information, Education and Communication Material for Dissemination

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
for 1.4.1 Preparation of Design & Contents for Posters / Calendar / Banners						
1	(3 items per year, initial 3 years)					
2	Design and contents of posters by outsourcing	Design	3	6,000		18,000
3	Printing of posters	no.	1,000	55		55,000
	Total for 1 year)					73,000
	Total for 3 years)					219,000
for 1.4.2 Wall writings						
1	Labor & material charges for writing on wall (30 sq. ft)	Wall	2	350		700
2	Fixing of posters in project village	no.	1	500		500
	Total for one wall					1,200
	Total for 604 walls					724,800
for 1.4.3 Publication of handouts and manuals						
1	Publication of Handouts and Manuals (10 kinds in a year, 5 years)	prints	10	15,000		150,000
	Total for 1 year					150,000
	Total for 5 year					750,000
for 1.4.4 Preparation of video programmes (one output in the 5th year)						
1	Preparation of video film/ documentary (one output)	videos	1	100,000		100,000
	Total					100,000
for 1.4.5 Displays of agricultural shows / fairs (3 fairs in 1st y, 2 fairs in 2nd to 6th year)						
1	Arrangement of venue and display	Fair	1	35,000		35,000
2	Cultural program	Fair	1	6,000		6,000
3	Prize distribution and felicitation	Fair	1	6,000		6,000
4	Inauguration, Refreshment and Ceremonials	Fair	1	5,000		5,000
	Total (one District)					52,000
	Total (13 Districts)					676,000

Source: JICA Survey Team

for 1.5 Capacity Development of Extension Staff

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
1	Hiring of Venue	Hall	1	20,000	1	20,000
2	Travel and Conveyance to Participants	Persons	20	500	1	10,000
3	Lunch and Tea	Persons	20	200	1	4,000
4	Folder, stationery and learning material	Nos.	20	200	1	4,000
5	Honorarium to Resource Persons	Persons	2	5,000	1	10,000
6	Travel - Conveyance for Resource Persons	Persons	2	3,000	1	6,000
7	Documentation and Reporting	Trainings	1	3,000	1	3,000
	Total					57,000

Source: JICA Survey Team

for 1.6 Strengthening of Research-Extension-Farmers Linkages

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
1	Hiring of Venue	Hall	1	20,000	1	20,000
2	Lodging arrangement for Participants	Persons	5	1,500	2	15,000
3	Travel and Conveyance to Participants	Persons	25	500	1	12,500
4	Lunch and Tea	Persons	25	200	2	10,000
5	Folder, stationery and learning material	Nos.	25	200	1	5,000
6	Honorarium to resource persons	Persons	3	5,000	1	15,000
7	Travel and Conveyance to Resource Persons	Persons	3	3,000	1	9,000
8	Documentation and Reporting	Event	1	3,000	2	6,000
	Total					92,500

Source: JICA Survey Team

for 1.7 Joint Field Visit of Researchers and Extension Staff

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
1	Transportation charges &	Persons	1	10,000	2	20,000
2	Travel and Conveyance to Participants	Persons	20	500	1	10,000
3	Lodging arrangement for Participants	Persons	20	1,500	2	60,000
4	Lunch, Dinner and Tea	Persons	20	400	2	16,000
5	Folder, stationery and learning material	Nos.	20	300	1	6,000
6	Documentation and Reporting	Event	1	3,000	1	3,000
	Total					85,000

Source: JICA Survey Team

for 1.8 Exposure / Study Visits

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
1	Transportation charges &	Persons	1	10,000	5	50,000
2	Travel and Conveyance to Participants	Persons	20	500	1	10,000
3	Lodging arrangement for Participants	Persons	20	1,500	5	150,000
4	Lunch, Dinner and Tea	Persons	20	400	5	40,000
5	Folder, stationery and learning material	Nos.	20	300	1	6,000
6	Documentation and Reporting	Event	1	3,000	1	3,000
	Total					259,000

Source: JICA Survey Team

for 2.4 Preparation of Information, Education and Communication Material for Dissemination

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
for 2.4.1 Preparation of Design & Contents for Posters / Calendar / Banners						
1	(5 items per year, initial 3 years)					
2	Design and contents of posters by outsourcing	Design	15	6,000		0
3	Printing of posters	no.	1,000	55		0
	Total					0
for 2.4.2 Wall writings						
1	Labor & material charges for writing on wall (30 sq. ft)	Wall	2	350		0
2	Fixing of posters in project village	no.	604	500		0
	Total					0
for 2.4.3 Publication of handouts and manuals						
1	Publication of Handouts and Manuals (10 in a year, 3 years)	prints	30	15,000		0
	Total					0
for 2.4.4 Preparation of video programmes						
1	Preparation of video film/ documentary (5 outputs)	videos	5	100,000		0
	Total					0
for 2.4.5 Displays of agricultural shows / fairs						
1	Arrangement of venue and display	Fair	13	35,000		0
2	Cultural program	Fair	13	6,000		0
3	Prize distribution and felicitation	Fair	13	6,000		0
4	Inauguration, Refreshment and Ceremonials	Fair	13	5,000		0
	Total					0

Source: JICA Survey Team

for 2.5 Capacity Development of Extension Staff

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
1	Hiring of Venue	Hall	1	20,000	1	20,000
2	Travel and Conveyance to Participants	Persons	20	500	1	10,000
3	Lunch and Tea	Persons	20	200	1	4,000
4	Folder, stationery and learning material	Nos.	20	200	1	4,000
5	Honorarium to Resource Persons	Persons	2	5,000	1	10,000
6	Travel - Conveyance for Resource Persons	Persons	2	3,000	1	6,000
7	Documentation and Reporting	Trainings	1	3,000	1	3,000
	Total					57,000

Source: JICA Survey Team

for 2.6 Strengthening of Research-Extension-Farmers Linkages

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
1	Hiring of Venue	Hall	1	20,000	1	20,000
2	Lodging arrangement for Participants	Persons	5	1,500	2	15,000
3	Travel and Conveyance to Participants	Persons	25	500	1	12,500
4	Lunch and Tea	Persons	25	200	2	10,000
5	Folder, stationery and learning material	Nos.	25	200	1	5,000
6	Honorarium to resource persons	Persons	3	5,000	1	15,000
7	Travel and Conveyance to Resource Persons	Persons	3	3,000	1	9,000
8	Documentation and Reporting	Event	1	3,000	2	6,000
	Total					92,500

Source: JICA Survey Team

for 2.7 Joint Field Visit of Researchers and Extension Staff

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
1	Transportation charges &	Persons	1	10,000	2	20,000
2	Travel and Conveyance to Participants	Persons	20	500	1	10,000
3	Lodging arrangement for Participants	Persons	20	1,500	2	60,000
4	Lunch, Dinner and Tea	Persons	20	400	2	16,000
5	Folder, stationery and learning material	Nos.	20	300	1	6,000
6	Documentation and Reporting	Event	1	3,000	1	3,000
	Total					85,000

Source: JICA Survey Team

for 2.8 Exposure / Study Visits

Sr.No.	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
1	Transportation charges &	Persons	1	10,000	5	50,000
2	Travel and Conveyance to Participants	Persons	20	500	1	10,000
3	Lodging arrangement for Participants	Persons	20	1,500	5	150,000
4	Lunch, Dinner and Tea	Persons	20	400	5	40,000
5	Folder, stationery and learning material	Nos.	20	300	1	6,000
6	Documentation and Reporting	Event	1	3,000	1	3,000
	Total					259,000

Source: JICA Survey Team

Attachment 13.3.12 Disbursement Schedule for Strengthening of Extension Service Function

(Unit: INR 000)

Particulars of Activities	Unit Cost	2017		2018		2019		2020		2021		2022		2023		Tora
		No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	
1. Strengthening of Extension Service Function of DOA																173,600
1.1 Recruitment of Outsource Personnel																
1.1.1 State Coordinating Officer	1200		1	1,200	1	1,200	1	1,200	1	1,200	1	1,200	1	1,200	1	7,200
1.1.2 Personnel to be equal to AEO	26		804	20,904	804	20,904	804	20,904	804	20,904	804	20,904	804	20,904	804	125,420
1.2 District-wise Capacity Development of Extension Staff on the Project Activities																
1.2.1 Orientation workshop (state level)	105.5		1	106												110
1.2.2 Training on management of extension activities	39.5		13	514												510
1.2.3 Peer learning workshop	39.5		13	514												510
1.3 Annual monitoring and evaluation																
1.3.1 Confirmation on outcome of each extension activity	39.5		13	514	13	514	13	514	13	514	13	514	13	514	13	3,080
1.3.2 Formulation of Extension Plan for the following year	39.5		13	514	13	514	13	514	13	514	13	514	13	514	13	3,080
1.3.3 Modification of Agricultural Development Plan (by WUA)	39.5		13	514	13	514	13	514	13	514	13	514	13	514	13	3,080
1.4 Preparation of Information, Education and Communication Materials for Dissemination																
1.4.1 Posters / Calender / Banners	73				13	949	13	949	13	949						2,850
1.4.2 Wall writings	1.2				449	539	155	186								720
1.4.3 Publication of handouts and manuals	150		13	1,950	13	1,950	13	1,950	13	1,950	13	1,950				9,750
1.4.4 Preparation of video programmes	100										1	100				100
1.4.5 Displays of agricultural shows / fairs	52				3	156	2	104	3	156	2	104	3	156	3	680
1.5 Capacity Development of Extension Staff	57		13	741	13	741	13	741	13	741	13	741	13	741	13	4,450
1.6 Strengthening of Research-Extension-Farmers Linkages	92.5				13	1,203	13	1,203	13	1,203	13	1,203	13	1,203	13	6,010
1.7 Joint Field Visit of Researchers and Extension Staff	85				13	1,105	13	1,105	13	1,105	13	1,105	13	1,105	13	5,530
1.8 Exposure / Study Visits	259						1	259	1	259						520
2. Strengthening of DoH																159,500
2.1 Recruitment of PMU staff																
2.1.1 Personnel to be equal to HO	1200		1	1,200	1	1,200	1	1,200	1	1,200	1	1,200	1	1,200	1	7,200
2.1.1 Personnel to be equal to HO	26		804	20,904	804	20,904	804	20,904	804	20,904	804	20,904	804	20,904	804	125,420
2.2 Capacity Development of Extension Staff on Monitoring and Evaluation																
2.2.1 Orientation workshop	105.5		1	106												110
2.2.2 Training on management of extension activities	39.5		13	514												510
2.2.3 Peer learning workshop	39.5		13	514												510
2.3 Annual monitoring and evaluation																
2.3.1 Confirmation on outcome of each extension activity	39.5		13	514	13	514	13	514	13	514	13	514	13	514	13	3,080
2.3.2 Formulation of Extension Plan for the following year	39.5		13	514	13	514	13	514	13	514	13	514	13	514	13	3,080
2.3.3 Modification of Agricultural Development Plan (by WUA)	39.5		13	514	13	514	13	514	13	514	13	514	13	514	13	3,080
2.4 Preparation of Information, Education and Communication Materials for Dissemination																
2.4.1 Posters / Calender / Banners	0															
2.4.2 Wall writings	0															
2.4.3 Publication of handouts and manuals	0															
2.4.4 Preparation of video programmes	0															
2.4.5 Displays of agricultural shows / fairs	0															
2.5 Capacity Development of Extension Staff	57		13	741	13	741	13	741	13	741	13	741	13	741	13	4,450
2.6 Strengthening of Research-Extension-Farmers Linkages	92.5				13	1,203	13	1,203	13	1,203	13	1,203	13	1,203	13	6,010
2.7 Joint Field Visit of Researchers and Extension Staff	85				13	1,105	13	1,105	13	1,105	13	1,105	13	1,105	13	5,530
2.8 Exposure / Study Visits	259						1	259	1	259						520
Grand Total			0	52,992	56,983	57,096	56,962	55,543	53,545	333,100						

Note: Refer Attachment-13.3.6 for details of unit cost
Source: JICA Survey Team

Attachment 13.3.13 Promotion of Farmers Producer Organisations (FPOs)

(Unit: INR_000)

Particulars of Activities	Unit Cost	No.	per year	Years	Amount	Remarks	Trainers	Trainees	
1. Promotion of FPO					26,700				
1.1 Preparatory stage									
Group formation	30.0	13	Districts	1	1	400	1 time each District	AEO, MPO	
1.2 Identification of potential area for FPO									
Survey on potential of forming FPO	45.0	13	Districts	1	1	600	1 time each District	AEO, MPO	
1.3 Formation of FPO									
Introductory traqing for SO	552.0	1	State	1	1	600	1 time at state headquarter	DoA	NGO in charge of FPO formation support
Support on aggregeation of farmers groups to form FPO	48.0	20	FPO	1	1	1,000	(1 formation WS, 1 basic training) * 1FPO per Medium Irrigation Project	SO	FPO
1.4 Support for establishing FPO / business formation									
Business training	145.0	20	FPO	1	1	2,900	5 day training per FPO * 1FPO per Medium	SO	FPO
Follow-up support on business planning	65.0	20	FPO	1	2	2,600	Periodical follow-up in total 20 days per FPO (for two years)	SO	FPO
Marketing support	140.0	20	FPO	1	2	5,600	Total marketing support with initial minor material support for marketing	SO	FPO
Production development support	90.0	20	FPO	1	1	1,800	Periodical support and initial minor infrastructure	SO	FPO
Minor infrastructure support	500.0	20	FPO	1	1	10,000		SO	FPO
Organic certification	57.5	20	FPO	1	1	1,200	1FPO per Medium Irrigation Project	SO	FPO
2. Initial awareness/preparation (Preparatory work)					10,900				
2.1 Internal preparation	-	-	-	-	-	-	Modification of training materials in Districts	-	
2.2 Training of trainers	39.0	13.0	Districts	1	2	1,000	Disseminated to Mandal level	District	AEO, HO, MPEO, master farmers
2.3 Orientation on extension activities	5.5	604	WUAs	1	1	3,300		AEO, HO, MPEO	Farmers in each scheme
2.4 Formulation of farmers' groups and selesion of master farmers	5.5	604	WUAs	1	1	3,300		AEO, HO, MPEO	Farmers in each scheme
2.5 Capacity building for farmers' groups	5.5	604	WUAs	1	1	3,300		AEO, HO, MPEO	Farmers in each scheme
3. Farm Management (class room training)					2,900				
3.1 Internal preparation	-	-	-	-	-	-	Modification of training materials in Districts	-	
3.2 Training of trainers	58.0	13	Districts	1	1	800	2 times each District a year and for 2 years	District	AEO, HO, MPEO, master farmers
3.3 Training on budgeting / book keeping / monitoring	3.5	604	WUAs	1	1	2,100	1 time each District a year and for 2 years	AEO, HO, MPEO	Master farmers in each scheme
4. Fundamental Techniques (class room training)					34,400				
4.1 Internal preparation	-	-	-	-	-	-	Modification of training materials in Districts	-	
4.2 Disemination of training modules at District level	-	-	-	-	-	-	To be iseminated to Mandal level	-	
4.3 Training of Trainers	58.0	13	Districts	1	1	800	1 time each District a year and for 2 years	District	AEO, HO, MPEO, master farmers
4.4 Water use and fertilizer application	7.0	604	WUAs	1	1	4,200	1 time each District a year and for 2 years	AEO, HO, MPEO	Master farmers in each scheme
4.5 Rain water harvesting techniques	7.0	604	WUAs	1	1	4,200	1 time each District a year and for 2 years	AEO, HO, MPEO	Master farmers in each scheme
4.6 Micro-irrigation Technology (O&M)	7.0	604	WUAs	1	1	4,200	1 time each District a year and for 2 years	AEO, HO, MPEO	Master farmers in each scheme
4.7 Promotion of organic farming	7.0	604	WUAs	1	1	4,200	1 time each District a year and for 2 years	AEO, HO, MPEO	Master farmers in each scheme
4.8 Promotion of vermi-composting	7.0	604	WUAs	1	1	4,200	1 time each District a year and for 2 years	AEO, HO, MPEO	Master farmers in each scheme
4.9 Promotion of GAP	7.0	604	WUAs	1	1	4,200	1 time each District a year and for 2 years	AEO, HO, MPEO	Master farmers in each scheme
4.10 Promotion of IPM and INM	7.0	604	WUAs	1	1	4,200	1 time each District a year and for 2 years	AEO, HO, MPEO	Master farmers in each scheme
4.11 Seed village programme	7.0	604	WUAs	1	1	4,200	1 time each District a year and for 2 years	AEO, HO, MPEO	Master farmers in each scheme
5. Demonstration and field school (hands-on training)					221,000				
5.1 Internal preparation	-	-	-	-	-	-	Modification of training materials in Districts	-	
5.2 Disemination of training modules at District level	-	-	-	-	-	-	To be iseminated to Mandal level	-	
5.3 Training of Trainers	38.0	13	Districts	1	2	1,000	1 time each District a year and for 2 years	District	AEO, HO, MPEO, master farmers
5.4 Rice	45.5	604	WUAs	1	2	55,000	1 time each District a year and for 2 years	AEO, HO, MPEO	Farmers in each scheme
5.5 Upand crops (Maize, GN, Pulses, Sugarcane)	45.5	604	WUAs	1	2	55,000	1 time each District a year and for 2 years	AEO, HO, MPEO	Farmers in each scheme
5.6 Upand crops (fodder crops or others)	45.5	604	WUAs	1	2	55,000	1 time each District a year and for 2 years	AEO, HO, MPEO	Farmers in each scheme
5.7 Vegetables (Chilli / Tomato / Other crops)	45.5	604	WUAs	1	2	55,000	1 time each District a year and for 2 years	AEO, HO, MPEO	Farmers in each scheme
6. Exposure and learning experiences (hands-on training)					136,600				
6.1 Internal preparation	-	-	-	-	-	-	Modification of training materials in Districts	-	
6.2 Disemination of training modules at District level	-	-	-	-	-	-	To be iseminated to Mandal level	-	
6.3 Training of Trainers	50.5	13	Districts	1	2	1,300	1 time each District a year and for 2 years	District	AEO, HO, MPEO, master farmers
6.4 IPM and Organic Pest Management	37.3	604	WUAs	1	2	45,100	1 time each District a year and for 2 years	AEO, HO, MPEO	Farmers in each scheme
6.5 Successful examples on farming practices	37.3	604	WUAs	1	2	45,100	1 time each District a year and for 2 years	AEO, HO, MPEO	Farmers in each scheme
6.6 Post-harvest techniques	37.3	604	WUAs	1	2	45,100	1 time each District a year and for 2 years	AEO, HO, MPEO	Farmers in each scheme
7. Demonstration and exposure visit on farm mechanization (hands-on training)					67,800				
7.1 Internal preparation	-	-	-	-	-	-	Modification of training materials in Districts	-	
7.2 Disemination of training modules at District level	-	-	-	-	-	-	To be iseminated to Mandal level	-	
7.3 Taining of Trainers	39.0	13	Districts	1	2	1,000	1 time each District a year and for 2 years	District	AEO, HO, MPEO, master farmers
7.4 Demonstration of machinery activities in farmers' fields	18.0	604	WUAs	1	2	21,700	1 time each District a year and for 2 years	AEO, HO, MPEO	Farmers in each scheme
7.5 Exposure visit to successful examples	37.3	604	WUAs	1	2	45,100	1 time each District a year and for 2 years	AEO, HO, MPEO	Farmers in each scheme
Grand Total					500,300				

Note:Refer Attachment-10.8.2.# for details of unit cost
Source: JICA Survey Team

Attachment 13.3.14 Cost Breakdown for FPO promotion

1.1 Group formation (cost per district)

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Transportation	Day	1	500	30	15,000
Stationaries	ls	1	15,000	1	15,000
Total:					30,000

1.2 Suevey on potential of forming FPO (cost per district)

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Transportation	Day	1	500	30	15,000
Survey materials and report	ls	1	30,000	1	30,000
Total:					45,000

1.3 Formation of FPO

1) Introductory training for SO

Particular	Unit	No	Rate (INR)	Times	Amount (INR)
Lunch, Tea and Snack	Persons	50	200	4	40,000
Accommodation	Persons	50	1,800	4	360,000
Transportation	Day	1	500	4	2,000
Resource person	Persons	2	15,000	4	120,000
Training materials	ls	1	30,000	1	30,000
Total:					552,000

2) Support on aggregation of farmers groups to form FPO (cost per FPO)

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
SO staff	Persons	1	1,500	8	12,000
Transportation	No.	2	500	8	8,000
Resource person	Persones	1	3,000	8	24,000
Training materials	ls	1	4,000	1	4,000
Total:					48,000

1.4 Support for establishing FPO / business formation

1) Business training

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
SO staff	Persons	2	1,500	5	15,000
Lunch, Tea and Snack	Persons	20	200	5	20,000
Resource person	Persons	1	15,000	5	75,000
Folder and Stationery	Nos.	20	100	5	10,000
Others	ls	1	25,000	1	25,000
Total:					145,000

2) Follow-up support on business planning

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
SO staff	Persons	1	1,500	30	45,000
Transportation	Nos.	1	500	30	15,000
Others	ls	1	5,000	1	5,000
Total:					65,000

3) Marketing Support

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
SO staff	Persons	2	1,500	20	60,000
Transportation	Nos.	2	500	20	20,000
Marketing materials	ls	1	60,000	1	60,000
Total:					140,000

4) Production development support

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
SO staff	Persons	2	1,500	15	45,000
Transportation	Nos.	2	500	15	15,000
Materials	ls	1	30,000	1	30,000
Total:					90,000

5) Minor Infrastructure support

Particular	Unit	No	Rate (INR)	Time	Amount (INR)
Minor infrastructure	No.	1	500,000	1	500,000
Total:					500,000

6) Products certification (e.g. organic certification)

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
SO support staff	Persons	1	1,500	5	7,500
Documentation	Nos.	1	50,000	1	50,000
Total:					57,500

Attachment 13.3.15 Cost Breakdown for Farmer Support Programme

for 2.2 Training of Trainers for Initial Awareness/Preparation

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Lunch, Tea and Snack	Persons	30	200	1	6,000
Folder and Stationery	Nos.	30	100	1	3,000
Others	Is	1	30,000	1	30,000
Total:					39,000

for 2.3 Orientation on Extension Activities

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	100	50	1	5,000
Folder and Stationery	Nos.	100		1	0
Others	Is	1	500	1	500
Total:					5,500

for 2.4 Formulation of Farmers' Groups and Selection of Master Farmers

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	100	50	1	5,000
Folder and Stationery	Nos.	100		1	0
Others	Is	1	500	1	500
Total:					5,500

for 2.5 Capacity Building for Farmers' Groups

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	100	50	1	5,000
Folder and Stationery	Nos.	100		1	0
Others	Is	1	500	1	500
Total:					5,500

for 3.2 Training of Trainers for Farm Management

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Lunch, Tea and Snack	Persons	30	200	2	12,000
Folder and Stationery	Nos.	30	100	2	6,000
Others	Is	1	40,000	1	40,000
Total:					58,000

for 3.3 Training of Budgeting / Bookkeeping / Monitoring for Farmers

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	30	50	1	1,500
Folder and Stationery	Nos.	30	50	1	1,500
Others	Is	1	500	1	500
Total:					3,500

for 4.3 Training of Trainers for Fundamental Techniques

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Lunch, Tea and Snack	Persons	30	200	2	12,000
Folder and Stationery	Nos.	30	100	2	6,000
Others	Is	1	40,000	1	40,000
Total:					58,000

for 4.4 Training on Water use and fertilizer application

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	30	50	1	1,500
Folder and Stationery	Nos.	30	0	1	0
Pamphlet	Is	1	5,000	1	5,000
Others	Is	1	500	1	500
Total:					7,000

Source: JICA Survey Team

for 4.5 Training on Rain Water Harvesting Techniques

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	30	50	1	1,500
Folder and Stationery	Nos.	30	0	1	0
Pamphlet	Is	1	5,000	1	5,000
Others	Is	1	500	1	500
Total:					7,000

for 4.6 Training on Micro-irrigation Technology (O&M)

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	30	50	1	1,500
Folder and Stationery	Nos.	30	0	1	0
Pamphlet	Is	1	5,000	1	5,000
Others	Is	1	500	1	500
Total:					7,000

for 4.7 Training on Promotion of Organic Farming

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	30	50	1	1,500
Folder and Stationery	Nos.	30	0	1	0
Pamphlet	Is	1	5,000	1	5,000
Others	Is	1	500	1	500
Total:					7,000

for 4.8 Training on Promotion of Vermi-Composting

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	30	50	1	1,500
Folder and Stationery	Nos.	30	0	1	0
Pamphlet	Is	1	5,000	1	5,000
Others	Is	1	500	1	500
Total:					7,000

for 4.9 Training on Promotion of GAP

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	30	50	1	1,500
Folder and Stationery	Nos.	30	0	1	0
Pamphlet	Is	1	5,000	1	5,000
Others	Is	1	500	1	500
Total:					7,000

for 4.10 Training on Promotion of IPM and INM

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	30	50	1	1,500
Folder and Stationery	Nos.	30	0	1	0
Pamphlet	Is	1	5,000	1	5,000
Others	Is	1	500	1	500
Total:					7,000

for 4.11 Training on Seed Village Programme

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Tea and Snack	Persons	30	50	1	1,500
Folder and Stationery	Nos.	30	0	1	0
Pamphlet	Is	1	5,000	1	5,000
Others	Is	1	500	1	500
Total:					7,000

for 5.3 Training of Trainers for Demonstration and Field School

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Lunch, Tea and Snack	Persons	30	200	2	12,000
Folder and Stationery	Nos.	30	100	2	6,000
Others	Is	1	20,000	1	20,000
Total:					38,000

Source: JICA Survey Team

for 5.4 Demonstration and Field School for Rice Cultivation

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Rent for Land	0.3ha	1	3,000	1	3,000
Snack and Tea	Persons	50	50	10	25,000
Printed matters, folder and stationery	Nos.	50	50	1	2,500
Materials (Seeds, organic fertilizer)	Is	1	10,000	1	10,000
Others	Is	1	500	10	5,000
Total:					45,500

for 5.5 Demonstration and Field School for Upland Crops Cultivation

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Rent for Land	0.3ha	1	3,000	1	3,000
Snack and Tea	Persons	50	50	10	25,000
Printed matters, folder and stationery	Nos.	50	50	1	2,500
Materials (Seeds, organic fertilizer)	Is	1	10,000	1	10,000
Others	Is	1	500	10	5,000
Total:					45,500

for 5.6 Demonstration and Field School for Upland Crops Cultivation

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Rent for Land	0.3ha	1	3,000	1	3,000
Snack and Tea	Persons	50	50	10	25,000
Printed matters, folder and stationery	Nos.	50	50	1	2,500
Materials (Seeds, organic fertilizer)	Is	1	10,000	1	10,000
Others	Is	1	500	10	5,000
Total:					45,500

for 5.7 Demonstration and Field School for Vegetables Cultivation

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Rent for Land	0.3ha	1	3,000	1	3,000
Snack and Tea	Persons	50	50	10	25,000
Printed matters, folder and stationery	Nos.	50	50	1	2,500
Materials (Seeds, organic fertilizer)	Is	1	10,000	1	10,000
Others	Is	1	500	10	5,000
Total:					45,500

for 6.3 Training of Trainers for Exposure Visit and Learning Experiences

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Lunch, Tea and Snack	Persons	35	200	1	7,000
Folder and Stationery	Nos.	35	100	1	3,500
Others	Is	1	40,000	1	40,000
Total:					50,500

for 6.4 Exposure Visits for IPM and Organic Pest management

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Travel expenses	Is	1	10,000	2	20,000
Lunch, Tea and Snack	Persons	15	300	2	9,000
Printed matters, folder and stationery	Nos.	15	50	1	750
Boarding and Lodging	Persons	15	500	1	7,500
Total:					37,250

Source: JICA Survey Team

for 6.5 Exposure Visits for Successful Examples on Farming Practices

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Travel expenses	Is	1	10,000	2	20,000
Lunch, Tea and Snack	Persons	15	300	2	9,000
Printed matters, folder and stationery	Nos.	15	50	1	750
Boarding and Lodging	Persons	15	500	1	7,500
Total:					37,250

for 6.6 Exposure Visits for Post-harvest Techniques

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Travel expenses	Is	1	10,000	2	20,000
Lunch, Tea and Snack	Persons	15	300	2	9,000
Printed matters, folder and stationery	Nos.	15	50	1	750
Boarding and Lodging	Persons	15	500	1	7,500
Total:					37,250

for 7.3 Training of Trainers for Farm Mechanization

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Lunch, Tea and Snack	Persons	30	200	1	6,000
Folder and Stationery	Nos.	30	100	1	3,000
Others	Is	1	30,000	1	30,000
Total:					39,000

for 7.4 Demonstration of Machinery Activities in Farmers Fields

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Printed matters, folder and stationery	Nos.	50	50	5	12,500
Materials (Seeds, fertilizer, etc.)	Is	1	10,000	1	5,000
Others	Is	1	500	1	500
Total:					18,000

for 7.5 Exposure Visits to Successful Examples

Particular	Unit	No	Rate (INR)	Days	Amount (INR)
Travel expenses	Is	1	10,000	2	20,000
Lunch, Tea and Snack	Persons	15	300	2	9,000
Printed matters, folder and stationery	Nos.	15	50	1	750
Boarding and Lodging	Persons	15	500	1	7,500
Total:					37,250

Source: JICA Survey Team

Attachment 13.3.16 Disbursement Schedule for Promotion of Farmer Producer Organizations

(Unit: INR,000)

Particulars of Activities	Unit Cost	2017		2018		2019		2020		2021		2022		2023		Tora
		No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	
1. Promotion of FPO																26,700
1.1 Preparatory stage																0
Group formation	30.0					8	240	5	150							400
1.2 Identification of potential area for FPO																0
Survey on potential of forming FPO	45.0					8	360	5	225							600
1.3 Formation of FPO																0
Introductory traqing for NGO	552.0							1	552							600
Support on aggregation of farmers groups to form FPO	48.0							10	480	10	480					1,000
1.4 Support for establishing FPO / business formation																0
Business training	145.0							10	1450	10	1,450					2,900
Follow-up support on business planning	65.0							10	650	20	1,300	10	650			2,600
Marketing support	140.0							10	1400	20	2,800	10	1,400			5,600
Production development support	90.0									10	900	10	900			1,800
Minor infrastructure support	500.0									10	5,000	10	5,000			10,000
Organic certification	57.5									10	575	10	575			1,200
2. Initial awareness/preparation (preparatory work)																10,900
2.1 Internal preparation	-															0
2.2 Training of trainers	39.0			13	507	13	507									1,000
2.3 Orientation on extension activities	5.5			119	655	421	2,316	64	352							3,300
2.4 Formulation of farmers' groups and selesion of master farmers	5.5			119	655	421	2,316	64	352							3,300
2.5 Capacity building for farmers' groups	5.5			119	655	421	2,316	64	352							3,300
3. Farm Management (class room training)																2,900
3.1 Internal preparation	-															0
3.2 Training of trainers	58.0			13	754											800
3.3 Training on budgeting / book keeping / monitoring	3.5					119	417	421	1,474	64	224					2,100
4. Fundamental Techniques (class room training)																34,400
4.1 Internal preparation	-															0
4.2 Disemination of training modules at District level	-															0
4.3 Training of Trainers	58.0					13	754									800
4.4 Water use and fertilizer application	7.0			119	833	421	2,947	64	448							4,200
4.5 Rain water harvesting techniques	7.0			119	833	421	2,947	64	448							4,200
4.6 Micro-irrigation Technology (O&M)	7.0			119	833	421	2,947	64	448							4,200
4.7 Promotion of organic farming	7.0			119	833	421	2,947	64	448							4,200
4.8 Promotion of vermi-composting	7.0			119	833	421	2,947	64	448							4,200
4.9 Promotion of GAP	7.0			119	833	421	2,947	64	448							4,200
4.10 Promotion of IPM and INM	7.0			119	833	421	2,947	64	448							4,200
4.11 Seed village programme	7.0					119	833	421	2,947	64	448					4,200
5. Demonstration and field school (hands-on training)																221,000
5.1 Internal preparation	-															0
5.2 Disemination of training modules at District level	-															0
5.3 Training of Trainers	38.0					13	494	13	494							1,000
5.4 Rice	45.5			119	5,415	540	24,570	485	22,068	64	2,912					55,000
5.5 Upand crops (Maize, GN, Pulses, Sugarcane)	45.5			119	5,415	540	24,570	485	22,068	64	2,912					55,000
5.6 Upand crops (fodder crops or others)	45.5			119	5,415	540	24,570	485	22,068	64	2,912					55,000
5.7 Vegetables (Chilli / Tomato / Other crops)	45.5			119	5,415	540	24,570	485	22,068	64	2,912					55,000
6. Exposure and learning experiences (hands-on training)																136,600
6.1 Internal preparation	-															0
6.2 Disemination of training modules at District level	-															0
6.3 Training of Trainers	50.5					13	657	13	657							1,300
6.4 IPM and Organic Pest Management	37.3			119	4,439	540	20,142	485	18,091	64	2,387					45,100
6.5 Successful examples on farming practices	37.3			119	4,439	540	20,142	485	18,091	64	2,387					45,100
6.6 Post-harvest techniques	37.3			119	4,439	540	20,142	485	18,091	64	2,387					45,100
7. Demonstration and exposure visit on farm mechanization (hands-on training)																67,800
7.1 Internal preparation	-															0
7.2 Disemination of training modules at District level	-															0
7.3 Taining of Trainers	39.0					13	507	13	507							1,000
7.4 Demonstration of machinery activities in farmers' fields	18.0			119	2,142	540	9,720	485	8,730	64	1,152					21,700
7.5 Exposure visit to successful examples	37.3			119	4,439	540	20,142	485	18,091	64	2,387					45,100
Grand Total					3,226		59,106		221,239		185,679		30,873			500,300

Source: JICA Survey Team

Attachment 13.3.17 Cost Breakdown for Livelihood Support Programme

(1) Animal Husbandry

Sl. No.		Unit Cost (Rs.)	Quantity	Amount (Rs.)	Description
	Livestock based Livelihood Promotion in 1 Irrigation Cluster				Assumed as 30 Villages per Irrigation Cluster
1	Develop livelihood plan				
1.1	Staff Training	100,000	3 Persons	300,000	To conduct all activities and trainings. 1 trainers for 10 villages
1.2	Training of Praveet&Gopalmitra	50,000	6 Persons	300,000	To support all activities and trainings. 2 staffs for 10 villages
1.3	Developing Livelihood Plan	15,000	30 Villages	450,000	Cost being Rs.60,000
1.4	Exposure visit for farmers	5,000	600 Persons	3,000,000	20 farmers of 30 villages.
1.5	Receive exposure visits	1,000	600 Persons	600,000	20 farmers from other 30 villages.
	Sub Total			4,650,000	
2	Enhancing Productivity of Animals				
2.1	Promotion of Fodder cultivation and balance feed				
1)	Demonstration of Silage making	2,800,000	3 Unit	8,400,000	90% share. One in 10 villages.
2)	Demonstration of New variety fodder cultivation	12,000	60 Nos	720,000	30 villages X 2times
3)	Demonstration of Ration balancing activities	1,500,000	3 Unit	4,500,000	75% share. One in 10 villages
4)	Training on Fodder Cultivation	2,000	300 Persons	600,000	10 farmers X 30 Villages
5)	Training on Use of Balance Feed	2,000	300 Persons	600,000	10 farmers X 30 Villages
6)	Training on Productivity Enhancement related to Dairy	2,000	300 Persons	600,000	10 farmers X 30 Villages
2.2	Promotion of Sheep Rearing				
1)	Training on Good Practices in Sheep Rearing	2,000	300 Persons	600,000	10 farmers X 30 Villages
	Sub Total			16,020,000	
3	Promotion of Livestock based income generation activities				
3.1	Promotion of Backyard poultry rearing				
1)	Demonstration of Chick hatchery	200,000	3 Units	600,000	One in 10 village
2)	Training on chick hatchery	30,000	3 Persons	90,000	For above 3.1 1)
3)	Training on rearing of Improved Backyard Poultry	2,000	300 Persons	600,000	10 farmers X 30 Villages
4)	Provision of chicks	3,000	300 Persons	900,000	40 chicks/person. 75% share, 10 Farmers X 30 Villages
3.2	Promotion of Vermi-compost and Urine distillate				
1)	Demonstration of Vermi-compost and Urine distillate	2,000	60 Units	120,000	2 units (1 for vermi compost and 1 for urine distillate) x 30 villages
2)	Training on Vermin Composting	2,000	60 Persons	120,000	2 farmers x 30 villages
3)	Training on Urine distillate	2,000	60 Persons	120,000	2 farmers x 30 villages
4)	Provision of equipment for Vermi-compost from dunk	3,000	60 Unit	180,000	75% share. 2 farmers x 30 villages
5)	Provision of equipment for Urine distillate unit	3,000	60 Unit	180,000	75% share. 2 farmers x 30 villages
	Sub Total			2,910,000	
4	Project Management				
4.1	Support staff at state level	3,900	36 Months	140,400	Rs.3,900/month (Rs.35,150/month divided into 9 clusters)
4.2	Support staff at district level	35,150	36 Months	1,265,400	Rs.35,150/month
4.3	Livestock expert	22,200	36 Months	799,200	Rs.22,200/month (Rs.200,000/month divided into 9 clusters)
4.4	Travel/transportation	32,000	36 Months	1,152,000	
	Sub Total			3,357,000	
	Total for 1 Irrigation Cluster			26,937,000	
	Total for 9 Irrigation Clusters			242,433,000	

Note: Monitoring and Evaluation; Dissemination Workshop; Publications, Project Steering could be included in overall cost
Source: JICA Survey Team

(2) Fishery

Sl. No.		Unit Cost (INR)	Quantity	Amount (INR)	Description
	Fisheries Livelihoods promotion for one Irrigation Cluster				
1	Develop livelihood plan				
1.4	Staff Training	100,000	3 Persons	300,000	To conduct all activities and trainings. 1 trainers for 10 villages
1.1	Developing livelihood Plan	50,000	4 Units	200,000	4 fishermen cooperative societies (FCSs)
1.2	Training on Management of Cooperatives	100,000	8 Trainings	800,000	2 times/FCS x 4 FCSs
1.3	Exposure Visits	5,000	160 persons	800,000	20 persons/FCS x 4 FCSs x 2times
1.3	Receive exposure visits	1,000	160 Persons	160,000	20 persons x 8 times
	Sub Total			2,260,000	
2	Support of income generating activities for Inland Fisheries Cooperatives/Groups				
2.1	Income generation activities under Medium Irrigation Project				
1)	Rearing Tanks or Captive Nursery Tanks	400,000	1 Nos	400,000	Could be multiple tanks of smaller size
2)	Bore Well with Solar Pump	250,000	1 Nos	250,000	For the above tank
3)	Placement cum training of youth keen on Aquaculture	30,000	5 Persons	150,000	Training for Rearing tanks
4)	Development of Landing Site cum Rest Shed	2,000,000	1 Nos	2,000,000	Site to be jointly decided
5)	Training on Fish Cultivation Practices	100,000	3 Nos	300,000	3 times (stocking, catching of young and adult fish)
6)	Small Boats - for feeding and fishing	100,000	5 Boats	500,000	User fee to be charged as O&M fund
7)	Demonstration of cage culture	4,000,000	1 Coops	4,000,000	Raft, storage/watchman house on the raft, net cages 24 sets
8)	Revolving Fund for buying feed and fish seed for coopes	500,000	1 Coops	500,000	Could be given as per requirement in phases
	Sub Total			8,100,000	
2.2	Income generation activities under Minor Irrigation Projects				
1)	Tank within Tank	400,000	3 Nos	1,200,000	Ino per MIP Project; 1ha or 10 % of water area
2)	Bore Well with Solar Pump	250,000	3 Nos	750,000	For the above tanks
3)	Office cum Community Hall	800,000	3 Nos	2,400,000	For Low Cost Rest Shed for Watch and Ward, Office Management, Training, Keeping Gears, etc
4)	Training on Fish Cultivation Practices	100,000	3 Nos	300,000	3 times (stocking, catching of young and adult fish)
5)	Drag/Gill Net	100,000	6 Coops	600,000	Two per Coop as they deal with multiple MIPs
	Sub Total			5,250,000	
2.3	Income generation activities for Women group				
1)	Start assistance for ornamental fish project for Women group	200,000	1 group	200,000	Construction of small concrete tanks and aquarium tanks, purchase of air pumps
2)	Training on Fish Cultivation Practices	100,000	1 Nos	100,000	3 times (stocking, catching of young and adult fish)
	Sub Total			300,000	
3	Marketing				
3.1	Establishment of Fish Market - Mandal and Small Towns	1,000,000	1 Markets	1,000,000	Detail to be estimated One for one cluster
3.2	Establishment of Fish Parlours - in nearby city	200,000	2 Parlours	400,000	Operate by enterprenurs on PPP mode Two for one cluster
3.3	Promotion of eating fish	1,000,000	1 Lump sum	1,000,000	Details to be estimated
3.4	Improved storing and distribution with cooling materials	40,000	10 Nos	400,000	For existing fish vendors - associated with project area
	Sub Total			2,800,000	
4	Project Management				
4.1	Support staff at state level	3,900	36 Months	140,400	Rs.3,900/month (Rs.35,150/month divided into 9 clusters)
4.2	Support staff at district level	35,150	36 Months	1,265,400	Rs.35,150/month
4.3	Fisheries expert	22,200	36 Months	799,200	Rs.22,200/month (Rs.200,000/month divided into 9 clusters)
4.4	Community Facilitators of Support Organisation (SO)	60,000	36 Months	2,160,000	Rs.20,000/month per facilitator x 3 persons
4.5	Travel/transportation	32,000	36 Months	1,152,000	
	Sub Total			5,517,000	
	Total for 1 Irrigation Cluster			24,227,000	
	Total for 9 Irrigation Clusters			218,043,000	

Note: Monitoring and Evaluation; Dissemination Workshop; Publications, Project Steering could be included in overall cost
Source: JICA Survey Team

Attachment 13.3.18 Cost Breakdown for Food Value Chain for Strategic Crops

(1) Mango: Processing

Activity	Budget item	Unit cost (INR)	Quantity	Cost (INR)	Fund responsible agency	Note	
1-1	A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant (PPIC).	NA			DOH		
1-2	District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	NA			DOH		
1-3	Team building and confidence building of PIT is conducted.	NA					
1-4	Holding information sessions of the project and matching sessions between farmers and processing units	Workshop	100,000	5	500,000	DOH	
1-5	Screening and appraisal of target processing units	NA			DOH		
1-6	Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)	Workshop	50,000	6	300,000	DOH	
		Data aggregation and summarize as a report	150,000	2	300,000	DOH	
1-7	Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	Workshop (identification)	50,000	2	100,000	DOH	
		Resource person for resource development	250,000	8	2,000,000	DOH	
		Material (including audio visual) development	1,000,000	1	1,000,000	DOH	
1-8	Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	Workshop	50,000	2	100,000	DOH	
		Data aggregation and summarize as a report	150,000	1	150,000	DOH	
1-9	Success and lessons learnt of the pilot is shared by developing promotional materials and organizing observation tours for interested farmers.	designing and printing materials	500,000	1	500,000	DOH	2,000 copies
		Facilitation observation visit	60,000	6	360,000	DOH	Facilitate visits from farmers group in other areas.
1-10	Strategy and plan for replicating the pilot model are developed by stakeholders.	Workshops	100,000	4	400,000	DOH	
Sub-total					5,710,000	5,710,000	
2-1	Trainings to agronomists of processing units, lead farmers and horticulture officers (including GAP, food safety, post harvest handling and responsible contract farming) are conducted.	Training	104,000	10	1,040,000	DOH	
2-2	Trainings to all participating farmers are conducted.	Training	87,000	80	6,960,000	DOH	25 pax/training*40 2 cycles
		Plant material for processing variety	4,500	1,000	4,500,000		4,500/ha, 1000ha
		Exposure trip to successful case	95,000	4	380,000	DOH	12 pax/3days
2-3	Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)	Workshop	50,000	40	2,000,000	DOH	50 pax/20 =1,000 target farmers 2 cycles
2-4	Training for quality management and productivity improvement such as 5S, Kaizen for the processors is conducted.	Training	87,000	6	522,000	APFPS	Japanese short-term expert will support as resource person
2-5	Setup and operation of common facility utilizing common facility fund.	Proposed common facility	10,000,000	1	10,000,000	DOH	
Sub-total					25,402,000	25,402,000	
3-1	Conduct survey to identify target markets and market analysis survey (potential buyers, required specifications, procedures, certificates etc.) is conducted.	Marketing study (market identification)	500,000	1	500,000	APFPS	Outsourced conducted with marketing expert
		Detail market survey	3,000,000	1	3,000,000	APFPS	Outsourced conducted with marketing expert
		Workshop	100,000	2	200,000	APFPS	
3-2	Collect information and establish linkages with necessary resources for developing AP brand such as research institutions, testing laboratories, business service providers including financial institutions and legal advisors and supporting industries.	Workshop	100,000	3	300,000	APFPS	
3-3	Develop guidelines for contract farming, cultivation and post harvest protocols, export procedures, controlling chemical residues and other necessary procedures required for exporting to the target market.	Develop guideline	1,000,000	1	1,000,000	APFPS	Outsourced to external expert
		Workshop	50,000	10	500,000	APFPS	5 sessions to sensitize the guideline/CPC
		GAP certification support	150,000	6	900,000	APFPS	Support 3 lead farmers/CPC to get certificate
3-4	Marketing activity is supported with branding, material development, participation in trade fair etc.	Workshop	100,000	3	300,000	APFPS	
		Material development	1,000,000	1	1,000,000	APFPS	Leaflet design and 2,000 copies
		Participation for trade fair (overseas)		1	0	APFPS	Same as fresh mango
		Participation for trade fair (domestic)		2	0	APFPS	ditto
	Stall fee		2	0	APFPS	ditto	
3-5	Develop a platform for mango farmers, processors and concerned government officials to exchange information and opinions on the mango processing industry.	Workshop	100,000	4	400,000	APFPS	
3-6	AP mango branding and marketing strategy is developed.	Workshop	100,000	3	300,000	APFPS	
		Strategy development	1,500,000	1	1,500,000	APFPS	Outsourced support
Sub-total					9,900,000	9,900,000	
TOTAL (Activity Cost)					41,012,000		

Source: JICA Survey Team

(2) Mango: Fresh Export

Activity	Budget item	Unit cost (INR)	Quantity	Cost (INR)	Fund responsible agency	Note
1-1	A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant (PPIC).	NA			DOH	
1-2	District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	NA			DOH	
1-3	Team building and confidence building of PIT is conducted.	NA				
1-4	Holding information sessions of the project and matching sessions between farmers and processing units	Workshop	5	500,000	DOH	
1-5	Screening and appraisal of target processing units and making agreement between DOH and exporters, exporters and farmers.	NA			DOH	
1-6	Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)	Workshop	6	300,000	DOH	
		Data aggregation and summarize as a report	2	300,000	DOH	
		Workshop (identification)	2	100,000	DOH	
1-7	Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	Resource person for resource development	2	500,000	DOH	
		Material (including audio visual) development	1	1,000,000	DOH	Same module will be used as processed mango. GAP and traceability are developed separately.
1-8	Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	Workshop	2	100,000	DOH	
		Data aggregation and summarize as a report	1	150,000	DOH	
1-9	Success and lessons learnt of the pilot is shared by developing promotional materials and organizing observation tours for interested farmers.	designing and printing materials	1	500,000	DOH	2,000 copies
		Facilitation observation visit	6	360,000	DOH	Facilitate visits from farmers group in other areas.
1-10	Strategy and plan for replicating the pilot model are developed by stakeholders.	Workshops	4	400,000	DOH	
	Sub-total			4,210,000	4,210,000	
2-1	Trainings to master trainers, lead farmers and horticulture officers (including GAP, food safety, post harvest handling, responsible contract farming) are conducted.	Training	10	1,040,000	DOH	
2-2	Trainings to all participating farmers are conducted.	Training	10	870,000	DOH	20 pax/training* 5 cycles
		Exposure trip	4	380,000	DOH	
2-3	Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)	Workshop	10	500,000	DOH	20 pax/5 =100 target farmers 2 cycles
2-4	Training for quarantine officials on inspection skills of fresh mango is conducted.	Training	6	522,000	APFPPS	Japanese short-term expert will support as resource person
2-5	Setup and operation of common facilities utilizing common facility fund.	Proposed common facilities	1	1,000,000		
	Sub-total			4,312,000	4,312,000	
3-1	Conduct survey to identify target markets and market analysis survey (potential buyers, required specifications, procedures, certificates etc.) is conducted.	Marketing study (market identification)	1	500,000	APFPPS	Outsourced conducted with marketing expert
		Detail market survey	1	3,000,000	APFPPS	Outsourced conducted with marketing expert
		Workshop	2	200,000	APFPPS	
3-2	Collect information and establish linkages with necessary resources for developing AP brand such as research institutions, testing laboratories, business service providers including financial institutions and legal advisors and supporting industries.	Workshop	3	300,000	APFPPS	
3-3	Develop guidelines for contract farming, cultivation and post harvest protocols, export procedures, controlling chemical residues and other necessary procedures required for exporting to the target market.	Develop guideline	1	1,000,000	APFPPS	Outsourced to expert
		Workshop	10	500,000	APFPPS	5 sessions to sensitize the guideline/FPO
		GAP certification support	20	3,000,000	APFPPS	Support 10 lead farmers/FPO to get certificate
3-4	Marketing activity is supported with branding, material development, participation in trade fair etc.	Workshop	3	300,000	APFPPS	
		Material development	1	1,000,000	APFPPS	Leaflet design and 2,000 copies
		Participation for trade fair (overseas)	1	2,000,000	APFPPS	
		Participation for trade fair (domestic)	2	190,000	APFPPS	
		Stall fee	2	400,000	APFPPS	
3-5	Develop a platform for mango farmers, processors and concerned government officials to exchange information and opinions on the mango processing industry.	Workshop	4	400,000	APFPPS	
3-6	AP mango branding and marketing strategy is developed.	Workshop	3	300,000	APFPPS	
		Strategy development	1	1,500,000	APFPPS	Outsourced support
	Sub-total			14,590,000	14,590,000	
	TOTAL (Activity Cost)			23,112,000		

Source: JICA Survey Team

(3) Tomato

Activity	Budget item	Unit cost (INR)	Quantity	Cost (INR)	Fund responsible agency	Note	
1-1	A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant (PPIC).	NA			DOH		
1-2	District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	NA			DOH		
1-3	Team building and confidence building of PIT is conducted.	NA			DOH		
1-4	Holding information sessions of the project to adjust the conditions of activities and matching sessions between farmers and processing units	Workshop	100,000	5	500,000	DOH	
1-5	Screening and appraisal of target processing units and making agreement with selected processing units.	NA			DOH		
1-6	Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)	Workshop	50,000	6	300,000	DOH	
		Data aggregation and summarize as a report	150,000	2	300,000	DOH	
1-7	Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	Workshop (identification)	50,000	3	150,000	DOH	
		Resource person for resource development	250,000	8	2,000,000	DOH	
		Material (including audio visual) development	4,000,000	1	4,000,000	DOH	8 subjects
1-8	Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	Workshop	50,000	2	100,000	DOH	
		Data aggregation and summarize as a report	150,000	1	150,000	DOH	
1-9	Success and lessons learnt of the pilot is shared by developing promotional materials and organizing observation tours for interested farmers.	designing and printing materials	100,000	1	100,000	DOH	2,000 copies
		Facilitation observation visit	95,000	5	475,000	DOH	Facilitate visits from farmers group in other areas.
1-10	Strategy and plan for replicating the pilot model are developed by stakeholders.	Workshops	100,000	1	100,000	DOH	
Sub-total					8,175,000		
2-1	Trainings to agronomists of processing units, lead farmers and horticulture officers on cultivation techniques (including GAP, food safety and post harvest handling) are conducted.	Training	104,000	10	1,040,000	DOH	Japanese short-term expert for cultivation technique for processing variety
2-2	Trainings to all participating farmers on cultivation techniques (including GAP, food safety and post harvest handling) are conducted.	Training	87,000	40	3,480,000	DOH	25 pax/training* 20 2 cycles
		Plant material	25,000	500	12,500,000	DOH	25,000/ha, 500ha
		Exposure trip	95,000	4	380,000	DOH	
2-3	Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)	Workshop	50,000	40	2,000,000	DOH	25 pax/20 =500 target farmers 2 cycles
2-4	Training for quality management and productivity improvement such as 5S, Kaizen for the processors is conducted.	Training	87,000	6	522,000	APFPS	Same as Processing Mango
2-5	Setup and operation of common facility utilizing common facility fund.	Proposed common facility	5,000,000	1	5,000,000	DOH	
Sub-total					24,922,000		
3-1	Conduct survey to identify target markets and market analysis survey (potential buyers, required specifications, procedures, certificates etc.) is conducted.	Marketing study (market identification)	500,000	1	500,000	APFPS	Outsourced conducted with marketing expert
		Detail market survey (domestic)	1,000,000	1	1,000,000	APFPS	Outsourced conducted with marketing expert
		Workshop	100,000	2	200,000	APFPS	
3-2	Collect information and establish linkages with necessary resources for developing AP brand such as research institutions, testing laboratories, business service providers including financial institutions and legal advisors and supporting industries.	Workshop	100,000	3	300,000	APFPS	
3-3	Develop guidelines for contract farming, cultivation and post harvest protocols, export procedures, controlling chemical residues and other necessary procedures required for exporting to the target market.	Develop guideline	1,000,000	1	1,000,000	APFPS	Outsourced to expert
		Workshop	50,000	10	500,000	APFPS	5 sessions to sensitize the guideline/FPO
		GAP certification support	150,000	6	900,000	APFPS	Support 3 lead farmers/FPO to get certificate
3-4	Marketing activity is supported with branding, material development, participation in trade fair etc.	Workshop	100,000	3	300,000	APFPS	
		Material development	500,000	1	500,000	APFPS	Leaflet design and 2,000 copies
		Participation for trade fair (domestic)	95,000	4	380,000	APFPS	
		Stall fee	200,000	2	400,000	APFPS	
3-5	Develop a platform for tomato farmers, processors and concerned government officials to exchange information and opinions on the tomato processing industry.	Workshop	100,000	3	300,000	APFPS	
3-6	AP tomato branding and marketing strategy is developed.	Workshop	100,000	3	300,000	APFPS	
		Strategy development	500,000	1	500,000	APFPS	Outsourced support
Sub-total					7,080,000		
TOTAL (Activity Cost)					40,177,000		

Source: JICA Survey Team

(4) Chili

Activity	Budget item	Unit cost (INR)	Quantity	Cost (INR)	Fund responsible agency	Note	
1-1	A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant (PPIC).	NA					
1-2	District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	NA					
1-3	Team building and confidence building of PIT is conducted.	NA					
1-4	Target Farmer Producer Organizations (FPO) are identified (or mobilize farmers to form FPO) and capacity is enhanced.	Workshop	100,000	6	600,000	DOH	
		Capacity building training	119,000	12	1,428,000	DOH	Institutional building, management skills, business planning etc.
1-5	Holding information sessions of the project and matching sessions between farmers and processing units	Workshop	100,000	4	400,000	DOH	
1-6	Screening and appraisal of target processing units and making agreement between DOH and processors, processors and farmers.	Workshop	50,000	20	1,000,000	DOH	
1-7	Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)	Workshop	50,000	12	600,000	DOH	3 times session for 1 FPO
		Data aggregation and summarize as a report	150,000	4	600,000	DOH	Outsourced
1-8	Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	Workshop (identification)	50,000	4	200,000	DOH	
		Resource person for resource development	250,000	16	4,000,000	DOH	
		Material (including audio visual) development	4,000,000	2	8,000,000	DOH	8 subjects
1-9	Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	Workshop	50,000	4	200,000	DOH	
		Data aggregation and summarize as a report	150,000	2	300,000	DOH	
1-10	Success and lessons learnt of the pilot is shared by developing promotional materials and accepting observation tours.	designing and printing materials	100,000	2	200,000	DOH	2,000 copies
		Facilitation observation visit	95,000	10	950,000	DOH	Facilitate visits from farmers group in other areas.
1-11	Strategy and plan for replicating the pilot model are developed by stakeholders.	Workshop	100,000	2	200,000	DOH	
Sub-total					18,678,000		
2-1	Trainings to master trainers (agronomists of processing units, lead farmers and horticulture officers) on cultivation and post-harvest techniques (including GAP, crop planning, soil health management, food safety and drying) are conducted.	Training	104,000	20	2,080,000	DOH	
2-2	Trainings to all participating farmers on cultivation techniques (same as 2-1) are conducted.	Training	87,000	200	17,400,000	DOH	20 pax/training* 100 =2000 target farmers 2 cycles
		Exposure trip	95,000	8	760,000	DOH	
2-3	Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)	Workshop	50,000	80	4,000,000	DOH	50 pax/session*40 =2000 target farmers 2 cycles
2-4	Training for quality management and productivity improvement such as 5S, Kaizen for the processors is conducted.	Training	87,000	12	1,044,000	APFPS	1 session for each processor/2 cycle
2-5	Setup and operation of common facilities utilizing common facility fund	Proposed common facility	20,000,000	1	20,000,000		
Sub-total					45,284,000		
3-1	Conduct market survey to identify target markets.	Marketing study (identify)	500,000	1	500,000	APFPS	Outsourced conducted with marketing expert
		Detail market survey	3,000,000	1	3,000,000	APFPS	Outsourced conducted with marketing expert
		Workshop	100,000	2	200,000	APFPS	
3-2	Develop guidelines for procurement, cultivation and post harvest protocols, export procedures, controlling chemical residues and other necessary procedures required for exporting to the target market.	Develop guideline	1,000,000	1	1,000,000	APFPS	Outsourced to expert
		Workshop	50,000	20	1,000,000	APFPS	5 sessions to sensitize the guideline/FPO
		GAP certification support	150,000	20	3,000,000	APFPS	Support 10 lead farmers/FPO to get certificate
3-3	Sessions to enhance the public awareness on the danger of chemical residue and aflatoxin are conducted.	Workshop	100,000	3	300,000	APFPS	1/year
3-4	Marketing activity is supported with branding, material development, participation in trade fair etc.	Workshop	100,000	6	600,000	APFPS	
		Material development	1,000,000	1	1,000,000	APFPS	Leaflet design and 2,000 copies
		Participation for trade fair(overseas)	2,000,000	1	2,000,000	APFPS	
		Participation for trade fair(domestic)	95,000	2	190,000	APFPS	
		Stall fee	200,000	2	400,000	APFPS	
3-5	AP chili branding and marketing strategy is developed.	Workshop	100,000	6	600,000	APFPS	
		Strategy development	1,500,000	1	1,500,000	APFPS	Outsourced support
Sub-total					15,290,000		
TOTAL (Activity Cost)					79,252,000		

Source: JICA Survey Team

(5) Coconut

Activity	Budget item	Unit cost (INR)	Quantity	Cost (INR)	Fund responsible agency	Note
1-1 A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant (PPIC).	NA				DOH	
1-2 District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	NA				DOH	
1-3 Team building and confidence building of PIT is conducted.	NA					
1-4 Target Coconut Producer Companies (CPCs) are identified (or mobilize farmers to form CPCs) and capacity is enhanced.	Workshop	100,000	3	300,000	DOH	
	Capacity building training	119,000	6	714,000	DOH	Institutional building, management skills, business planning etc
1-5 Joint project planning and baseline survey including market study is conducted with all stakeholders (government, farmers and private sectors)	Workshop	100,000	2	200,000	DOH	
1-6 Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	Workshop	50,000	10	500,000	DOH	
1-7 Joint sessions for supply chain management are conducted for concerned stakeholders to enhance linkage between CPCs and private partners (processors, exporters etc.)	Workshop	50,000	6	300,000	DOH	3 times session for 1 CPC
	Data aggregation and summarize as a report	150,000	2	300,000	DOH	Outsourced
1-8 Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	Workshop (identification)	50,000	2	100,000	DOH	
	Resource person for resource development	250,000	8	2,000,000	DOH	
	Material (including audio visual) development	4,000,000	1	4,000,000	DOH	8 subjects
1-9 Success and lessons learnt of the pilot is shared by developing promotional materials and organizing observation tours for interested farmers.	Workshop	50,000	2	100,000	DOH	
	Data aggregation and summarize as a report	150,000	1	150,000	DOH	
1-10 Strategy and plan for replicating the pilot model are developed by stakeholders.	designing and printing materials	100,000	1	100,000	DOH	2,000 copies
	Facilitation observation visit	95,000	5	475,000	DOH	Facilitate visits from farmers group in other areas.
1-11 Strategy and plan for replicating the pilot model are developed by stakeholders.	Workshop	100,000	1	100,000	DOH	
Sub-total				9,339,000		
<hr/>						
2-1 Trainings to master trainers (lead farmers, horticulture officers, research institute etc.) on cultivation and post-harvest techniques (including GAP, crop planning, soil health management, harvesting, husking, food safety etc.) are conducted.	Training	104,000	10	1,040,000	DOH	
2-2 Trainings to all participating farmers on cultivation techniques (same as 2-1) are conducted.	Training	87,000	50	4,350,000	DOH	40 pax/training* 25 =1,000 target farmers 2 cycles
	Exposure trip	95,000	4	380,000	DOH	
2-3 Access to existing schemes for farm inputs are supported (awareness of the schemes, training of documentation, develop credit mechanism)	Workshop	50,000	50	2,500,000	DOH	40 pax/session*25 =1,000 target farmers 2 cycles
2-4 Necessary inputs for processing facilities are provided for group activities of CPCs.	Support for processing units	2,500,000	4	10,000,000	DOH	
2-5 Setup and operation of common facilities utilizing common facility fund	Proposed common facility	10,000,000	1	10,000,000	DOH	
Sub-total				28,270,000		
<hr/>						
3-1 Conduct market survey to identify target markets and coconut products.	Marketing study (identification)	500,000	1	500,000	APFPS	Outsourced conducted with marketing expert
	Detail market survey	3,000,000	1	3,000,000	APFPS	Outsourced conducted with marketing expert
	Workshop	100,000	2	200,000	APFPS	
3-2 Collect information and establish linkages with necessary resources for developing AP brand such as research institutions, testing laboratories, business service providers including financial institutions and legal advisors and supporting industries.	Develop guideline	1,000,000	1	1,000,000	APFPS	Outsourced to expert
	Workshop	50,000	10	500,000	APFPS	5 sessions to sensitize the guideline/CPC
	GAP certification support	150,000	6	900,000	APFPS	Support 3 lead farmers/CPC to get certificate
3-3 Marketing activity is supported with branding, material development, participation in trade fair etc.	Workshop	100,000	3	300,000	APFPS	
	Material development	1,000,000	1	1,000,000	APFPS	Leaflet design and 2,000 copies
	Participation for trade fair(overseas)	400,000	2	800,000	APFPS	2 pax
	Participation for trade fair(domestic)	95,000	2	190,000	APFPS	
	Stall fee	200,000	2	400,000	APFPS	
3-4 AP coconut branding and marketing strategy is developed.	Workshop	100,000	3	300,000	APFPS	
	Strategy development	1,500,000	1	1,500,000	APFPS	Outsourced support
Sub-total				10,590,000		
TOTAL (Activity Cost)				48,199,000		

Source: JICA Survey Team

(6) Shrimp

Activity	Budget item	Unit cost (INR)	Quantity	Cost (INR)	Fund responsible agency	Note	
1-1	A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant (PPIC).	NA					
1-2	District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	NA					
1-3	Team building and confidence building of PIT is conducted.	NA					
1-4	Target shrimp farmers clusters are identified.	NA					
1-5	Holding information sessions of the project and matching sessions between farmers and processing units.	Workshop	100,000	1	100,000	DOF	
1-6	Screening and appraisal of target processing units and making agreement between DOF and processors, processors and shrimp farming clusters.	Workshop	50,000	5	250,000	DOF	
1-7	Joint project planning and baseline survey including market study is conducted with all stakeholders (government, shrimp farming clusters and private sectors) .	Workshop Questionnaire/interview survey Develop Good	50,000	6	300,000	DOF	3 times session for 1 zone Current aquaculture practice (Socio economic survey) AP standard is presumed to be higher than GAP
		Data aggregation and summarize as a report Finalize GAP and AP	1,000,000	1	1,000,000	DOF	Outsourced
1-8	Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	Workshop (identification)	50,000	1	50,000	DOF	
		Resource person for resource development	250,000	4	1,000,000	DOF	
		Material (including audio visual development)	4,000,000	1	4,000,000	DOF	8 subjects
1-9	Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	Workshop	50,000	2	100,000	DOF	
1-10	Success and lessons learnt of the pilot is shared by developing promotional materials and accepting observation tours for interested shrimp farming clusters.	Data aggregation and summarize as a report	150,000	1	150,000	DOF	
		designing and printing materials	100,000	1	100,000	DOF	2,000 copies
1-11	Strategy and plan for replicating the pilot model are developed by stakeholders.	Facilitation observation visit	95,000	5	475,000	DOF	Facilitate visits from farmers group in other areas.
		Workshop	100,000	1	100,000	DOF	
Sub-total					7,625,000		
2-1	Necessary inputs and facilities for training such as healthy and high quality shrimp seed, appropriate feed and demonstration facility are provided to shrimp farming clusters.	Subsidy for quality seed and feed acquirement	5,000,000	1	5,000,000	DOF	Provision of high quality seed at INR4,000/ha/year x 1 years and high quality feed INR1,000/ha/year x 1 years.
		Demonstration of GAP	500,000	20	10,000,000	DOF	Cost include water quality tester, cost of rearing bottom mud, quality seed, and quality feed
2-2	Training on scientific rearing practices for capture, pond environment monitoring methods and shrimp health monitoring methods is provided to shrimp farming clusters.	Training	87,000	200	17,400,000	DOF	-5 sessions/ cluster x 20 clusters = 100 sessions/year
2-3	Accredited aqua lab for disease surveillance and export requirement is developed.	Aqua lab	20,000,000	1	20,000,000	DOF	Details to be surveyed and estimated. Facilities to be owned by MPEDA and operated by private companies.
2-4	Setup and operation of common facilities utilizing common facility fund.	Proposed common facility	10,000,000	1	10,000,000	DOF	
Sub-total					62,400,000		
3-1	Conduct market survey to identify target markets.	Marketing study (identify)	500,000	1	500,000	APFPS	Outsourced conducted with marketing expert
		Detail market survey	3,000,000	1	3,000,000	APFPS	Outsourced conducted with marketing expert
		Workshop	100,000	1	100,000	APFPS	
3-2	Develop guidelines for post harvest, and processing and packing protocols required for exporting to the target market (Japan, Europe, USA, Asia, Middle East) .	Develop guideline	1,000,000	1	1,000,000	APFPS	Outsourced to expert
		Workshop	50,000	10	500,000	APFPS	5 sessions to sensitize the guideline/FPO
		GAP certification support	150,000	20	3,000,000	APFPS	Support 10 lead farmers/FPO to get certificate
3-3	Marketing activity is supported with sample shipment, branding, material development, participation in trade fair etc.	Workshop	100,000	3	300,000	APFPS	
		Material development	1,000,000	1	1,000,000	APFPS	Leaflet design and 2,000 copies
		Participation for trade fair(c	2,000,000	1	2,000,000	APFPS	
		Participation for trade fair(c	95,000	2	190,000	APFPS	
3-4	AP shrimp branding and marketing strategy is developed.	Stall fee	200,000	2	400,000	APFPS	
		Workshop	100,000	3	300,000	APFPS	
3-4	AP shrimp branding and marketing strategy is developed.	Strategy development	1,500,000	1	1,500,000	APFPS	Outsourced support
		Workshop	100,000	3	300,000	APFPS	
Sub-total					13,790,000		
TOTAL (Activity Cost)					83,815,000		

Source: JICA Survey Team

(7) Tuna

Activity	Budget item	Unit cost (INR)	Quantity	Cost (INR)	Fund responsible agency	Note
1-1	A district level project implementation team (PIT) to implement the project is formed by the leading organization with the help of Pilot Project Implementation Consultant (PPIC)	NA				
1-2	District Pilot Coordination Committee (DPCC) to coordinate stakeholders of the pilot is established by PIT.	NA				
1-3	Team building and confidence building of PIT is conducted.					
1-4	Target fishermen are identified.	Workshop	6	600,000	DOF	
		Capacity building training	8	832,000	DOF	Institutional building, management skills, business planning etc.
1-5	Holding information sessions of the project and matching sessions between fishermen and processing units	Workshop	4	440,000	DOF	
1-6	Screening and appraisal of target processing units and making agreement between DOF and processors, processors and fishermen's.	Workshop	10	500,000	DOF	
1-7	Joint project planning and baseline survey including market study is conducted with all stakeholders (government, fishermen's and private sectors)	Workshop	6	300,000	DOF	3 times session for 1 group Current socio economics situation of fishermen will be obtained
		Data aggregation and summarize as a report	4	600,000	DOF	Outsourced
1-8	Capacity development plan and training module are identified or developed jointly by stakeholders and PIT.	Workshop (identification)	2	100,000	DOF	
		Resource person for resource development	8	2,000,000	DOF	
		Material (including audio visual) development	1	4,000,000	DOF	8 subjects
1-9	Joint endline survey is conducted to evaluate the result of pilot by all stakeholders.	Workshop	2	100,000	DOF	
		Data aggregation and summarize as a report	1	150,000	DOF	
1-10	Success and lessons learnt of the pilot is shared by developing promotional materials and accepting observation tours for interested fishermen.	designing and printing materials	1	100,000	DOF	2,000 copies
		Facilitation observation visit	5	475,000	DOF	Facilitate visits from farmers group in other areas.
1-11	Strategy and plan for replicating the pilot model are developed by stakeholders.	Workshop	1	100,000	DOF	
Sub-total				10,297,000		
2-1	Fishing grounds location and depth are identified.	Survey	40	4,000,000	DOF	Outsourced. INR100,000/day includes the cost of hiring boat and hiring researchers.
2-2	Necessary equipment and facilities such as electric shocker and conversion of trawlers to long liners for training are provided to fishermen.	Conversion of trawlers to long liners	5	3,500,000	DOF	First year only.
		Fish Aggregation Device (FAD)	30	15,000,000	DOF	First year only.
		Dropline	25	2,500,000	DOF	First year only. Five droplines for each boat.
		Electric shocker	5	2,000,000	DOF	First year only.
		Electric line hauler	5	2,000,000	DOF	First year only.
2-3	Training for construction and deployment of FAD	Training	6	600,000	DOF	Two sessions each/year
2-4	Training for capture and on-board handling	Training	21	2,100,000	DOF	3 sessions /month. 3 months for the first year, two months for the second and third year. 21 sessions
2-5	Training for processing	Quality inspection and grading	6	1,200,000	DOF	Train at least two Fisheries officers. Details and quantities will be decided later.
		Cutting, freezing, and packing	60	5,220,000	DOF	30 sessions for the first year, 15 sessions each for the second and third year.
2-6	Setup and operation of common facilities utilizing common facility fund	Proposed common facility	1	2,250,000		
Sub-total				38,120,000		
3-1	Conduct market survey to identify target markets.	Marketing study (identify)	1	500,000	APPFS	Outsourced conducted with marketing expert
		Detail market survey	1	3,000,000	APPFS	Outsourced conducted with marketing expert
		Workshop	2	200,000	APPFS	
3-2	Developing guidelines for fishing, post harvest, and processing and packing protocols required for exporting to the target market (Europe, USA, Asia, Middle East) .	Develop guideline	1	1,000,000	APPFS	Outsourced to expert
		Workshop	10	500,000	APPFS	5 sessions to sensitize the guideline/FPO
3-3	Marketing activity is supported with sample shipment, branding, material development, participation in trade fair etc.	Workshop	3	300,000	APPFS	
		Material development	1	1,000,000	APPFS	Leaflet design and 2,000 copies
		Sample shipment	50	5,000,000	APPFS	shipment cost is about US\$2-4/kg
		Participation for trade fair	10	4,000,000	APPFS	
3-4	AP tuna branding and marketing strategy is developed.	Workshop	3	300,000	APPFS	
		Strategy development	1	1,500,000	APPFS	Outsourced support
Sub-total				17,300,000		
TOTAL (Activity Cost)				65,717,000		

Source: JICA Survey Team

(8) Pilot Project Implementation Consultant (PPIC)

Item	Number required	Unit cost/month (INR)	Month	Total (INR)
State level				
Team Leader	1	300,000	48	14,400,000
Food Value Chain Expert	1	200,000	48	9,600,000
Training & Institutional Development Expert	1	200,000	48	9,600,000
Tendering & Procurement Expert	1	200,000	48	9,600,000
Marketing Expert	1	200,000	48	9,600,000
IT Expert	1	200,000	48	9,600,000
Administration & Accountant	1	100,000	48	4,800,000
			-	-
Travel			-	-
Outstation travel- 12 trips per month (2 persons)		75,000	48	3,600,000
Local travel- 2 vehicles		90,000	48	4,320,000
			-	-
Boarding & Lodging			-	-
24 man-days x INR3,500 per day		84,000	48	4,032,000
Communication, stationery & documentation		30,000	48	1,440,000
Sub Total (a)				79,152,000
District level				
Training Coordinator	4	80,000	168	13,440,000
Monitoring officer	5	40,000	216	8,640,000
Administrative & Accounts Executive	5	40,000	216	8,640,000
Local travel - car	6	225,000	252	56,700,000
Communication, stationery & documentation	6	75,000	252	18,900,000
Sub Total (b)				106,320,000
Total of (a) + (b)				185,472,000

Source: JICA Survey Team

(9) Additional Human Resource for Government

Staff to be provided/ hired by the Depts as nodal officers for the FVC Project						
Sl.No.	Department	Area of Activity	No. required	Unit cost/ month (INR)	Month	Cost (INR)
1	Horticulture	Horticulture coordinator	4	40,000	204	8,160,000
2	Fisheries	Fishery Development Officer	4	40,000	168	6,720,000
3		Computer Assistant	2	20,000	84	1,680,000
4	APFPS	Marketing Coordinator	3	40,000	132	5,280,000
Total						21,840,000

Note: All these officers will be either provided by the Departments or hired by the Department on Contract for the Project and later associated with the FPO/CPC

Source: JICA Survey Team

Attachment 13.3.19 Original and Reviewed Budget for Implementation of AMTC

(Unit: INR,000)

Particulars	Remarks	Estimate by DoA				Reviewed by JICA Survey Team				Reviewed by JICA Survey Team with FF mission			
		Remarks	Unit Cost	No.	Amount	Remarks	Unit Cost	No.	Amount	Remarks	Unit Cost	No.	Amount
1 Construction of AMTC			200,000	2	400,000		69,000	2	138,000		69,000	2	138,000
1.1 Training Building	Training room	80m ² x 3 rooms	22,000			80m ² x 3 rooms	12,000			80m ² x 3 rooms	12,000		
	Audio-visual room	80m ²				deleted				deleted			
	Library	80m ²				deleted				deleted			
	Conference hall	300m ² x 2 halls				300m ² x 1 hall				300m ² x 1 hall			
1.2 Administration Building	Room for Director		50m ² x 5 rooms			30m ² x 2 rooms			30m ² x 2 rooms				
	Administration Staff					50m ² x 2 rooms			50m ² x 2 rooms				
	Faculties, etc.												
	Computer rooms	20m ²				deleted			deleted				
1.3 Workshop & Seedling Facility	Workshop for Training	300m ²	18,000			300m ²	11,000			300m ²	11,000		
	Laboratory for Training	200m ²				deleted				deleted			
1.4 Hall & Guest House	Guest House	25m ² x 100 rooms	50,000			25m ² x 40 rooms	25,000			25m ² x 40 rooms	25,000		
	Dinning Hall & Pantry	500m ² , 200seats				500m ² , 200seats				500m ² , 200seats			
1.5 Others			90,000				20,000				20,000		
1) Facilities	Elevated water tank	30m ³				30m ³				30m ³			
	Field for training	0.3ha x 20 plots				0.5ha x 4 plots				0.5ha x 4 plots			
	Pump room	30m ²											
	Electricity house with back-up generator	30m ²				30m ²				30m ²			
	Fuel centre (with basement fuel tank)	30m ²											
	Water reservoir & Drainage facility	120m x 140m				deleted				deleted			
	Paking lot	20m x 40m				deleted				deleted			
2) Farm Machinery for Training	Tractor, Planter, Harvester, etc.												
3) Computer Facility and System													
1.6 Contingency			20,000				1,000				1,000		
2 Construction of Workshop			8,000	10	80,000		4,000	10	40,000		4,000	10	40,000
2.1 Workshop Facility	Warehouse for machine	140m ²	4,000			100m ²	3,000			100m ²	3,000		
	Docks (workshops)	7m x 7m (3 docks)				7m x 7m (2 docks)				7m x 7m (2 docks)			
	Parking lot for machines	420m ²				300m ²				300m ²			
	Stocks	7m x 7m				7m x 7m				7m x 7m			
2.2 Tools & Equipment	Tool sets		4,000				1,000				1,000		
	Hoist crane	3 tons				deleted				deleted			
	High pressure washing machine, etc.												
Sub-total (1+2)					480,000				178,000				178,000
3 Farm Machienny for CHUs*1	Package for rice and ID Crops				932,000				932,000				0
4 Farm Machienny for Training Activities*1									31,450				31,450
5 Training for Users (6 years)*1					-				27,000				27,000
6 Activities by Local Consultants					70,000				70,000				70,000
7 Contingency	8% of 1 to 5				119,000				99,000				0
Total					1,601,000				1,337,450				306,450

Note: *1=refer Attachment 13.3.20 on Expenditures on Farm Machinery and Training Activities

Source: JICA Survey Team, based on data from DoA

Attachment 13.3.20 Expenditures on Farm Machinery for Training Activities

1. Farm Machinery for Training Activities

Item	Unit	Unit Price (INR)	AMTC for Rice		AMTC for ID Crops	
			Total No. of Machinery	Amount (INR)	Total No. of Machinery	Amount (INR)
Tractor (45hp)	unit	800,000	2	1,600,000		
Rotary for 45hp tractor	unit	200,000	2	400,000		
Tractor (55hp)	unit	1,000,000			2	2,000,000
Rotary for 55hp tractor	unit	200,000			2	400,000
Ploough	unit	150,000			1	150,000
Transplanter 8 rows riding type	unit	1,800,000	2	3,600,000		
Seedling Tray	box	60	15,000	900,000		
Maize Planter (Tractor Drawn)	unit	200,000			2	400,000
Pulse Planter (Tractor Drawn)	unit	200,000			2	400,000
Sugarcane Planter (Tractor Drawn)	unit	200,000			2	400,000
Power Weeder	unit	150,000			2	300,000
Combine Harvester for Rice	unit	2,400,000	1	2,400,000		
Harvester for Maize	unit	2,800,000			1	2,800,000
Harvester for Pulse	unit	300,000			1	300,000
Harvester for Sugarcane	unit	10,000,000			1	10,000,000
Transportation Truck	unit	2,100,000	1	2,100,000	1	2,100,000
Automatic Seeder	unit	300,000	2	600,000		
Tools of maintenance	set	300,000	1	300,000	1	300,000
Total for each AMTC				11,900,000		19,550,000
Grand Total					31,450,000	

Source: JICA Survey Team, based on the information from DOA

2. Price of Major Farm Machinery of Various Manufacturers collected by JICA Survey Team

Item	Unit	Unit Price*1 (INR)	Current Price of Various Farm Machinery as of 2014/15		
			Japanese	India (1)	India (2)
Tractor (45hp)	unit	800,000	INR. 700,000*3 Kubota		
Tractor (55hp)	unit	1,000,000			
Rotary	unit	200,000		INR. 96,000*2 JK	INR 110,000*2 Mahindra
Plough	unit	150,000			
Transplanter 8 rows riding type	unit	1,800,000	1,670,000*2 Kubota INR 1,660,000 Yanmar	195,000*2 Indian Company	INR 1,200,000*3 Khukje
Maize Planter (Tractor Drawn)	unit	200,000			
Pulse Planter (Tractor Drawn)	unit	200,000			
Sugarcane Planter (Tractor Drawn)	unit	200,000			
Power Weeder	unit	150,000		INR 86,000*2 Bengal Tools	
Combine Harvester for Rice	unit	2,400,000	INR 2,150,000*2 52hp Kubota	INR 2,120,000*2 74hp Mahindra & Mahindra	INR 1,670,000*2 55hp John Deere
Harvester for Maize	unit	2,800,000			
Harvester for Pulse	unit	300,000			
Harvester for Sugarcane	unit	10,000,000			
Automatic Seeder	unit	300,000	INR 198,000*3 Kubota		

Note:

*1: Proposed by DoA 2015/16

*2: Approved price in DoA 2014/15, Farm Mechanisation Approved Prices, 2014-15

*3: Current price of dealers in AP

Source: JICA Survey Team

3. Crop-wise Requirement of Farm Machinery

Item	Unit	Rice		Maize		Pulses		Sugarcane		Total No.	Unit Price (Rs.)	Total Amount (Rs.)
		No. in One Package	Total No. of Machinery	No. in One Package	Total No. of Machinery	No. in One Package	Total No. of Machinery	No. in One Package	Total No. of Machinery			
Custom Service Unit (CSU)	no.	45		15		33		14		107	-	-
Tractor (45hp)	unit	2	90							90	800,000	72,000,000
Rotary for 45hp tractor	unit	2	90							90	200,000	18,000,000
Tractor (55hp)	unit			1	15	1	33	1	14	62	1,000,000	62,000,000
Rotary for 55hp tractor	unit			1	15	1	33	1	14	62	200,000	12,400,000
Ploough	unit							1	14	14	150,000	2,100,000
Transplanter 8 rows riding type	unit	2	90							90	1,800,000	162,000,000
Seedling Tray	box	15,000	675,000							675,000	60	40,500,000
Maize Planter (Tractor Drawn)	unit			1	15					15	200,000	3,000,000
Pulse Planter (Tractor Drawn)	unit					1	33			33	200,000	6,600,000
Sugarcane Planter (Tractor Drawn)	unit							1	14	14	200,000	2,800,000
Power Weeder	unit							1	14	14	150,000	2,100,000
Combine Harvester for Rice	unit	2	90							90	2,400,000	216,000,000
Harvester for Maize	unit			1	15					15	2,800,000	42,000,000
Harvester for Pulse	unit					1	33			33	300,000	9,900,000
Harvester for Sugarcane	unit							1	14	14	10,000,000	140,000,000
Transportation Truck (4-5t)	unit	1	45							45	2,100,000	94,500,000
Automatic Seeder	unit	1	45							45	300,000	13,500,000
Tools of maintenance	set	1	45	1	15	1	33	1	14	107	300,000	32,100,000
											Total	931,500,000

Source: DoA

4. Unit Cost for Training Activities in AMTC for Land Preparation and Planting

(1) Boarding and Lodging of Participants in One Training with 2 Groups

	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
1	Boarding and lodging of Participants	Persons	20	800	12	192,000
2	Travel and Conveyance to Participants	Persons	20	800	1	16,000
	Total					208,000

(2) Training on Field Operation in One Training with 2 Groups

	Particular	Unit	hr/day	Days	Rate (INR/day)	Amount (INR)
1	Land preparation by tractor	2	3	2	2,880	34,560
2	Transplanting by transplanter	2	3	2	840	10,080
	Total					44,640 (45,000)

(3) Training Schedule (land preparation and transplanting)

Day	Subject	AM	PM
1	Movement	-	-
2	Tractor operation	Opeining	Class room training
3	Tractor operation	Field training	Field training
4	Tractor operation	Field training	Field training
5	Transplanting	Class room training	Class room training
6	Transplanting	Field training	Field training
7	Transplanting	Field training	Field training
8	Resting		
9	Seedling preparation	Class room training	Class room training
10	Seedling preparation	Field training	Field training
11	Seedling preparation	Field training	Field training
12	Movement	Closing	-

Assumption

- (1) Fuel consumption
- | | | |
|--------------|----------|-----------|
| Tractor | 8 lit/hr | (4 hr/ha) |
| Transplanter | 2 lit/hr | (5 hr/ha) |

(2) Cost for Training on Machinery Operation

Rotavating	No. of machinery	2 nos
	Daily operation hour	3 hr
	Unit fuel consumption	8 lit/hr/tractor
	Total fuel consumption	48 lit
	Daily cost for fuel	2,880 INR (INR 60/lit)
Transplanting	No. of machinery	2 nos
	Daily operation hour	3 hr
	Unit fuel consumption	2 lit/hr/tractor
	Total fuel consumption	12 lit
	Daily cost for fuel	840 INR (INR 70/lit)

5. Unit Cost for Training Activities in AMTC for Harvesting

(1) Boarding and Lodging of Participants in One Training with 2 Groups

	Particular	Unit	No	Rate (INR)	Days / Times	Amount (INR)
1	Boarding and lodging of Participants	Persons	20	800	7	112,000
2	Travel and Conveyance to Participants	Persons	20	800	1	16,000
	Total					128,000

(2) Training on Field Operation in One Training with 2 Groups

	Particular	Unit	hr/day	Days	Rate (INR/day)	Amount (INR)
1	Harvesting by combine harvester	1	3	3	3,600	32,400
	Total					32,400 (32,000)

(3) Training Schedule (harvesting)

Day	Subject	AM	PM
1	Movement	-	-
2	Harvesting	Opeining	Class room training
3	Harvesting	Class room training	Class room training
4	Harvesting	Field training	Field training
5	Harvesting	Field training	Field training
6	Harvesting	Field training	Field training
7	Movement	Closing	-

Assumption

(1) Fuel consumption Combine Harvester 20 lit/hr (2 hr/ha)

(2) Cost for Training on Machinery Operation

Harvesting	No. of machinery	1 nos
	Daily operation hour	3 hr
	Unit fuel consumption	20 lit/hr/tractor
	Total fuel consumption	60 lit
	<u>Daily cost for fuel</u>	<u>3,600 INR (INR 60/lit)</u>

Attachment 13.3.22 Cost Breakdown for Project Management

Activity	Unit Cost (INR)	Quantity	Amount (INR)	Description
6 Project Management				
6.1 Support to PMU				
a) PSC/PMU advisors				
Payment to Advisor Group Members (Honorarium)	20,000,000	1 L.S.	20,000,000	
b) PMU Consultants- Individual				
Remuneration (PMU)	50,000	600 Month	30,000,000	= 10 persons x 6 years
Remuneration (DIU)	40,000	1,440 Month	57,600,000	= 4 units x 6 persons x 5 years
Travel cost	1,000,000	1 L.S.	1,000,000	
Vehicle rental : 6 nos	35,000	360 Month	12,600,000	= 6 nos
Office rental : 5 nos	40,000	300 Month	12,000,000	= 5 nos
Communication	12,000	60 Month	720,000	
Office supply	12,000	60 Month	720,000	
Office furniture	2,000,000	1 L.S.	2,000,000	
Report preparation	50,000	60 Month	3,000,000	
c) PMU Consulting firms / NGOs				
Consulting Firms - National Experts (Pro-B)	300,000	420 Month	126,000,000	= 3 persons (2 Construction engineer and 1 Mechanical engineer) x 20 projects x 7 month
Domestic Travel (round trip)	12,000	420 Trip	5,040,000	= 3 persons x 20 projects x 7 times
Perdiem and Accomodation Cost	50,000	420 Month	21,000,000	= 3 persons x 20 projects x 7 month
Car Rent in AP	90,000	140 Month	12,600,000	= 20 projects x 7 month
d) Equipment and furniture				
Sedan	1,300,000	21 Nos	27,300,000	PMU-4 nos ,Medium-1 nos, Minor-6 nos
4WD	1,500,000	47 Nos	70,500,000	PMU-8 nos, Medium-20 nos, Minors-14 nos, PMC-5nos
Computer	100,000	78 Nos	7,800,000	Divisions-54 nos, SPI Units-12 nos, PMU-12 nos
PC Tablet	25,000	34 Nos	850,000	Divisions-18 nos, SPI Units-8 nos, PMU-8 nos
AC	50,000	36 Nos	1,800,000	Divisions-18 nos, SPI Units-4 nos, PMU-14 nos
Photo Copier	250,000	35 Nos	8,750,000	Divisions-18 nos, SPI Units-4 nos, PMU-13 nos
Furniture	200,000	21 Nos	4,200,000	
Radio Communion	50,000	88 Nos	4,400,000	Divisions-72 nos, SPI Units-4 nos, PMU-12 nos
Survey equipment	500,000	6 Nos	3,000,000	Divisions-5 nos, SPI Units-1 nos
Miscellaneous	1,000,000	1 L.S.	1,000,000	
			Sub-total	433,880,000
6.2 Capacity Building				
a) Exposure visits and study tours (Domestic)	600,000	15 L.S.	9,000,000	Members per batch=10, No of days = 5, Batches per year =3, Project period = 5 years, Total batches= 15
b) Seminars	500,000	5 Nos	2,500,000	No of Days =1 , No of participants= 100, Total no of Seminars=5
c) Workshops	400,000	10 Nos	4,000,000	No of Days =2 , No of participants= 100, Total no of Work shops=5
d) Publication of information, education and communication materials	2,500,000	1 L.S.	2,500,000	
e) AP state training centre	60,000,000	1 Nos	60,000,000	
f) WUA facilities	1,700,000	155 WUA	263,500,000	Post harvest storage cum WUA office building & drying yards at 115 WUAs in 20 medium irrigation project
			Sub-total	341,500,000
6.3 Monitoring and Evaluation				
a) Environmental monitoring				
Surface and ground water pollution	2,400,000	1 L.S.	2,400,000	
Stream gouging survey	960,000	1 L.S.	960,000	
Piezo meter monitoring	700,000	1 L.S.	700,000	
Biodiversity assessment	1,296,000	1 L.S.	1,296,000	
b) Benchmark survey				
Baseline Survey: Household (2100 samples)	800	2,100 sample	1,680,000	
Mid-term Evaluation Survey (2100 samples)	800	2,100 sample	1,680,000	
Project-end Evaluation Survey (2100 samples)	800	2,100 sample	1,680,000	
c) Water benchmarking and water audit				
d) Management information System (MIS)				
Project Website Development	10,000,000	1 L.S.	10,000,000	
Water Benchmarking and Water Auditing	10,000,000	1 L.S.	10,000,000	
Updating Monitoring and Evaluation System	10,000,000	1 L.S.	10,000,000	
Atlas (Revised) only for AP	16,000,000	1 L.S.	16,000,000	
			Sub-total	56,396,000
6.4 Thematic Study and Action Research				
a) Value chain analysis	5,000,000	1 L.S.	5,000,000	
b) Private sector leadership analysis	5,000,000	1 L.S.	5,000,000	
c) Analysis of storage, transport and other regulations, and procedures for global standards	5,000,000	1 L.S.	5,000,000	
d) AP agriculture promotion video film	5,000,000	1 L.S.	5,000,000	
			Sub-total	20,000,000
			Grand-total	851,776,000

Source: JICA Survey Team

Attachment 13.3.23 Costs for Consulting Services (PMC)

(Unit: INR. 000)

Items	Unit	Q'ty	F/C Portion (Yen)		L/C Portion (Rs)		Total (Yen)	Total (Rs)
			Rate	Amount	Rate	Amount	Amount	Amount
			A Remuneration					
A1	International Experts (Pro-A)	M/M	291	3,000	873,000		873,000	516,568
A2	National Experts (Pro-B)	M/M	411			300	123,300	208,377
A3	Supporting Staffs	M/M	568			50	28,400	47,996
	Sub-total				873,000		151,700	1,129,373
B Direct Costs								
B1	International Travel (round trip)							
	• International Experts (Pro-A)	Trip	82	350	28,700		28,700	16,982
	• Excess Baggage	kg	100	6	600		600	355
	• Travel Documents	Time	35	3	105		105	62
B2	Domestic Travel (round trip)							
	• International Experts (Pro-A)	Trip	82			12	984	1,663
	• National Experts (Pro-B)	Trip	55			12	660	1,115
	• Excess Baggage	kg	274			0.3	82	139
	• Car Rent in Delhi	car-day	246			3	738	1,247
B3	Perdiem and Accomodation Cost							
	• International Experts (Pro-A)	Month	291	300	87,300		87,300	51,657
	• National Experts (Pro-B)	Month	411			50	20,550	34,730
B4	Procurement of Vehicles							
	• Vehicles	No.	5			1,500	7,500	12,675
	• Insurance	Vehicle	5			90	450	761
B5	O&M of Vehicles	car-month	320			40	12,800	21,632
B6	Car Rent in AP	car-day	360			3	1,080	1,825
B7	Trains in AP	Trip	702			1	702	1,186
B8	International Communications	Month	72			25	1,800	3,042
B9	Domestic Communication	Month	72			50	3,600	6,084
B10	Office Rent (120m2)	Month	72			120	8,640	14,602
B11	Office Running Cost	Month	72			80	5,760	9,734
B12	Office Furniture and Equipment	LS	1			2,000	2,000	3,380
B13	Report Preparation	Month	72			20	1,440	2,434
B14	Overseas Training	Person	30	650	19,500	80	2,400	23,556
	Sub-total				136,205		71,186	256,510
	Grand Total				1,009,205		222,886	1,385,883

Source: JICA Survey Team

Attachment 13.4.1 Annual Fund Requirement

Annual Fund Requirement

Base Year for Cost Estimation: Apr. 2016 FC & Total: million JPY
 Exchange Rates: INR = JPY 169 LC : million INR
 Price Escalation: FC: 1.6% LC: 3.7%
 Physical Contingency 5%
 Physical Contingency for Consultant 5%

Item	Total			2016			2017			2018			2019			2020			2021			2022			2023			
	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total	FC	LC	Total	
A. ELIGIBLE PORTION																												
I) Procurement / Construction	0	18,675	31,561	0	0	0	0	286	484	0	2,852	4,819	0	7,698	13,010	0	5,643	9,536	0	1,606	2,714	0	445	752	0	144	244	
1.1 Medium Irrigation Projects Batch1	0	4,506	7,616	0	0	0	0	0	0	0	901	1,523	0	2,253	3,808	0	1,352	2,285	0	0	0	0	0	0	0	0	0	
1.2 Medium Irrigation Projects Batch2	0	4,105	6,937	0	0	0	0	0	0	0	410	694	0	1,437	2,428	0	1,642	2,775	0	616	1,041	0	0	0	0	0	0	
1.3 Minor Irrigation Projects Batch1	0	979	1,655	0	0	0	0	0	0	0	294	496	0	685	1,158	0	72	0	0	25	0	0	0	0	0	0	0	
1.4 Minor Irrigation Projects Batch2	0	2,487	4,202	0	0	0	0	0	0	0	373	630	0	1,243	2,101	0	870	1,471	0	0	0	0	0	0	0	0	0	
2. Participatory Irrigation Management	0	615	1,040	0	0	0	0	0	0	0	65	114	0	240	405	0	160	270	0	105	177	0	43	73	0	0	0	
3. Promotion of Farmer producers Organisations	0	833	1,408	0	0	0	0	0	0	0	54	91	0	111	189	0	272	460	0	250	423	0	95	160	0	50	85	
4.1 Animal Husbandry	0	242	410	0	0	0	0	0	0	0	0	0	0	27	45	0	81	136	0	81	136	0	54	91	0	0	0	
4.2 Fishery	0	218	368	0	0	0	0	0	0	0	0	0	0	24	41	0	73	123	0	73	123	0	48	82	0	0	0	
5.1 Food Value Chain for Strategic Crops	0	589	995	0	0	0	0	0	0	0	140	236	0	200	338	0	111	187	0	94	160	0	44	74	0	0	0	
5.2 Farm Mechanization	0	306	518	0	0	0	11	19	0	125	212	0	75	127	0	24	41	0	24	41	0	24	41	0	22	38		
5.3 Conjunctive Use of Surface Water and Ground	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6 Project Management	0	853	1,442	0	0	0	0	252	426	0	161	271	0	279	471	0	63	106	0	33	55	0	33	55	0	34	58	
Base cost for JICA financing	0	15,734	26,591	0	0	0	263	444	0	2,526	4,268	0	6,574	11,111	0	4,647	7,854	0	1,275	2,155	0	341	576	0	107	180		
Price escalation	0	2,052	3,468	0	0	0	10	16	0	190	322	0	757	1,279	0	727	1,228	0	254	429	0	83	140	0	31	52		
Physical contingency	0	889	1,503	0	0	0	0	14	23	0	136	229	0	367	620	0	269	454	0	76	129	0	21	36	0	7	12	
II) Consulting services	1,119	270	1,575	0	0	0	82	12	103	280	51	367	249	51	334	210	51	295	165	48	247	109	40	178	24	16	51	
Base cost	1,009	223	1,386	0	0	0	77	11	96	258	45	335	226	43	299	187	42	258	145	39	210	95	31	147	20	12	40	
Price escalation	57	34	114	0	0	0	1	0	2	8	3	14	11	5	19	12	7	23	12	8	25	9	8	22	2	3	8	
Physical contingency	53	13	75	0	0	0	4	1	5	13	2	17	12	2	16	10	2	14	8	2	12	5	2	8	1	1	2	
Total (I + II)	1,119	18,945	33,136	0	0	0	82	298	587	280	2,903	5,186	249	7,749	13,344	210	5,693	9,831	165	1,654	2,960	109	485	929	24	160	295	
B. NON ELIGIBLE PORTION																												
a) Procurement / Construction	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base cost for JICA financing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Price escalation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Physical contingency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b) Land Acquisition	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Base cost	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Price escalation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Physical contingency	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
c) Administration cost	0	980	1,657	0	0	0	17	29	0	153	259	0	395	667	0	291	492	0	88	148	0	27	46	0	9	15		
d) VAT	0	947	1,601	0	0	0	0	15	25	0	145	245	0	367	655	0	285	481	0	83	140	0	24	41	0	8	14	
e) Service Tax	162	39	228	0	0	0	13	2	15	41	7	53	36	7	48	30	7	43	24	7	36	16	6	26	3	2	7	
Total (a+b+c+d+e)	162	1,967	3,486	0	0	0	12	34	70	41	306	558	36	790	1,370	30	583	1,015	24	177	324	16	58	113	3	19	36	
TOTAL (A+B)	1,282	20,911	36,622	0	0	0	94	333	656	321	3,209	5,744	285	8,538	14,714	240	6,276	10,847	189	1,831	3,284	125	543	1,042	27	179	330	
C. Interest during Construction	2,091	0	2,091	0	0	0	7	0	7	74	0	74	258	0	258	395	0	395	438	0	438	455	0	455	465	0	465	
Interest during Construction (Const.)	2,091	0	2,091	0	0	0	7	0	7	74	0	74	258	0	258	395	0	395	438	0	438	455	0	455	465	0	465	
Interest during Construction (Consult.)	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
D. Front End Fee	70	0	70	0	0	0	0	0	0	70	0	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
GRAND TOTAL (A+B+C+D)	3,443	20,911	38,784	0	0	0	101	333	663	466	3,209	5,889	542	8,538	14,972	635	6,276	11,242	627	1,831	3,722	580	543	1,497	492	179	795	
E. JICA finance portion (A)	1,119	18,945	33,136	0	0	0	82	298	587	280	2,903	5,186	249	7,749	13,344	210	5,693	9,831	165	1,654	2,960	109	485	929	24	160	295	
F. State finance portion incl. IDC (B+C+D)	2,324	1,967	5,648	0	0	0	19	34	76	185	306	703	294	790	1,628	425	583	1,410	462	177	762	471	58	568	468	19	500	

Administration Cost = 5%
 VAT = 5% of the expenditure in local currency of the eligible portion
 Service Tax = 15%

Attachment 14.2.1 Economic Crop Budget under Present and Proposed Conditions

(1) Rice (Rabi)

Present Condition							Proposed Condition						
Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha	Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha
A Seeds / Agro-chemicals							A Seeds / Agro-chemicals						
Seeds / Seedlings	kg	30.0	0.97	29.1	74	2,156	Seeds / Seedlings	kg	30	0.97	29.1	62	1,797
Nursery bed							Nursery bed 200 m2						
Organic materials (no buying)	kg						Organic materials (no buying)	kg					
Urea	kg	7.0	0.97	6.8	5	34	Urea	kg	7	0.97	6.8	11	74
SSP	kg	6.0	0.97	5.8	15	86	SSP	kg	6	0.97	5.8	15	90
MOP	kg	16.0	0.97	15.5	5	77	MOP	kg	16	0.97	15.5	4	61
Main field							Main field						
Urea	kg	7.0	0.97	6.8	247	1,677	Urea	kg	7	0.97	6.8	272	1,845
SSP	kg	6.0	0.97	5.8	247	1,438	SSP	kg	6	0.97	5.8	371	2,156
MOP	kg	16.0	0.97	15.5	62	958	MOP	kg	16	0.97	15.5	64	997
Micro-nutrient (ZnSO4)	kg	25.0	0.97	24.3	49	1,198	Micro-nutrien (ZnSO4)	kg	25	0.97	24.3	49	1,198
Pesticide (Acephate)	kg	350.0	0.97	339.5	1	419	Pesticide (Chlorpyrifos)	L	240	0.97	232.8	4	863
Fungicide (Wettable Sulphur)	kg	44.0	0.97	42.7	15	633	Pesticide (Phorate granules) 10G	kg	40	0.97	38.8	31	1,198
							Herbicide (Butachlor)	kg	160	0.97	155.2	3	479
Sub-total						8,676	Sub-total						10,757
B Labour Cost							B Labour Cost						
Land Preparation (Tractor: ploguhing / cultivation / puddling)	time	800.0	0.69	552.0	7	4,090	Land Preparation (Tractor: ploguhing / cultivation / puddling)	time	800	0.69	552.0	7	4,090
Nursery preparation	man-day	300.0	0.69	207.0	2	511	Nursery preparation	man-day	300	0.69	207.0	5	1,023
Removing of seedlings / Planting	man-day	200.0	0.69	138.0	25	3,409	Planting	man-day	200	0.69	138.0	25	3,409
Weeding	man-day	200.0	0.69	138.0	25	3,409	Weeding	man-day	200	0.69	138.0	25	3,409
Irrigation	man-day	300.0	0.69	207.0	2	511	Irrigation	man-day	300	0.69	207.0	2	511
Application of agro-chemicals (pesticide)	man-day	300.0	0.69	207.0	2	511	Application of pesticide/fungicide/weedicide	man-day	300	0.69	207.0	7	1,534
Application of fertilizer	man-day	300.0	0.69	207.0	2	511	Application of fertilizer	man-day	300	0.69	207.0	5	1,023
Harvesting	man-day	200.0	0.69	138.0	25	3,409	Harvesting	man-day	200	0.69	138.0	25	3,409
Heaping / Threshing / Winnowing / Bagging	man-day	300.0	0.69	207.0	15	3,068	Heaping / Threshing / Winnowing / Bagging	man-day	300	0.69	207.0	15	3,068
Transport	ls	500.0	0.69	345.0	2	852	Transport	ls	500	0.69	345.0	2	852
Sub-total						20,281	Sub-total						22,326
Total (A+B)						28,957	Total (A+B)						33,084
C Yield							C Yield						
Price	ton	14103	0.97	13679.5			Price	ton	14103	0.97	13,679.5		
Gross Income						79,095	Gross Income						92,282
Net Income (C-(A+B))						50,138	Net Income (C-(A+B))						59,198

Source: JICA Survey Team

(2) Rice (Kharif)

Present Condition							Proposed Condition						
Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha	Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha
A Seeds / Agro-chemicals							A Seeds / Agro-chemicals						
Seeds / Seedlings	kg	30	0.97	29.1	74	2,156	Seeds / Seedlings	kg	30	0.97	29.1	62	1,797
Nursery bed							Nursery bed 200 m2						
Organic materials (no buying)	kg	6	0.97	5.8	49	288	Organic materials (no buying)	kg					
Urea	kg	7	0.97	6.8	5	34	Urea	kg	7	0.97	6.8	11	74
SSP	kg	6	0.97	5.8	15	86	SSP	kg	6	0.97	5.8	15	90
MOP	kg	16	0.97	15.5	5	77	MOP	kg	16	0.97	15.5	4	61
Main field							Main field						
Urea	kg	7	0.97	6.8	148	1,006	Urea	kg	7	0.97	6.8	222	1,509
SSP	kg	6	0.97	5.8	247	1,438	SSP	kg	6	0.97	5.8	371	2,156
MOP	kg	16	0.97	15.5	62	958	MOP	kg	16	0.97	15.5	64	997
Micro-nutrient (ZnSO4)	kg	25	0.97	24.3	49	1,198	Micro-nutrient (ZnSO4)	kg	25	0.97	24.3	49	1,198
Pesticide (Phorate Granule)	kg	40	0.97	38.8	20	767	Pesticide (Phorate granules)	kg	40	0.97	38.8	31	1,198
Pesticide (Monocrotophos)	L	330	0.97	320.1	1	395	Pesticide (Monocrotophos)	L	330	0.97	320.1	1	395
							Herbicide (Butachlor)	kg	160	0.97	155.2	3	479
Sub-total						8,402	Sub-total						9,955
B Labour Cost							B Labour Cost						
Land Preparation (Tractor: ploguhing / cultivation)	acre	800	0.69	552.0	7	4,090	Land Preparation (Tractor: ploguhing / cultivation)	time	800	0.69	552.0	7	4,090
Nursery preparation	man-day	300	0.69	207.0	2	511	Nursery preparation	man-day	300	0.69	207.0	5	1,023
Removing of seedlings / Planting	man-day	200	0.69	138.0	25	3,409	Planting	man-day	200	0.69	138.0	25	3,409
Weeding	man-day	200	0.69	138.0	25	3,409	Weeding	man-day	200	0.69	138.0	25	3,409
Irrigation	man-day	300	0.69	207.0	2	511	Irrigation	man-day	300	0.69	207.0	5	1,023
Application of pesticide/fungicide/weedicide	man-day	300	0.69	207.0	5	1,023	Application of pesticide/fungicide/weedicide	man-day	300	0.69	207.0	7	1,534
Application of fertilizer	man-day	300	0.69	207.0	5	1,023	Application of fertilizer	man-day	300	0.69	207.0	5	1,023
Harvesting	man-day	200	0.69	138.0	25	3,409	Harvesting	man-day	200	0.69	138.0	25	3,409
Heaping / Threshing / Winnowing / Bagging	man-day	300	0.69	207.0	15	3,068	Heaping / Threshing / Winnowing / Bagging	man-day	300	0.69	207.0	15	3,068
Transport	ls	500	0.69	345.0	2	852	Transport	ls	500	0.69	345.0	2	852
Sub-total						21,304	Sub-total						22,838
Total (A+B)						29,706	Total (A+B)						32,792
C Yield							C Yield						
Price	ton	14,103	0.97	13,679.5			Price	ton	14,103	0.97	13,679.5		
Gross Income						65,908	Gross Income						79,067
Net Income (C-(A+B))						36,202	Net Income (C-(A+B))						46,275

Source: JICA Survey Team

(3) Maize

Present Condition						
Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha
A Seeds / Agro-chemicals						
Seeds / Seedlings	kg	25	0.97	24.3	20	479
Main field						
Urea	kg	7	0.97	6.8	247	1,677
SSP	kg	6	0.97	5.8	371	2,156
MOP	kg	16	0.97	15.5	247	3,833
Gypsum	kg	2	0.97	1.9	494	958
Micro-nutrient (ZnSO4)	kg	25	0.97	24.3	49	1,198
Pesticide (Chlorpyrifos)	L	240	0.97	232.8	1	288
Pesticide (Phorate granules)	kg	40	0.97	38.8	25	958
Pesticide (Monochrotophos)	L					
Herbicide (Atrazine 50% WP)	kg	196	0.97	190.1	2	470
Herbicide 2-4-D	kg	1,400	0.97	1,358.0	1	1,677
Sub-total						13,695
B Labour Cost						
Land Preparation (Tractor: harrow / cultivation)	time	800	0.69	552.0	5	2,727
Sowing	man-day	200	0.69	138.0	15	2,045
Weeding	man-day					
Hoeing	man-day	200	0.69	138.0	10	1,363
Irrigation	man-day	300	0.69	207.0	10	2,045
Application of pesticide/fungicide/weedicide	man-day	300	0.69	207.0	7	1,534
Application of fertilizer	man-day	300	0.69	207.0	10	2,045
Harvesting	man-day	200	0.69	138.0	25	3,409
Drying / Shelling	man-day	200	0.69	138.0	25	3,409
Transport	ls	500	0.69	345.0	2	852
Sub-total						19,429
Total (A+B)						33,124
C Yield						
Price	ton	12,000	0.97	11,640.0		
Gross Income						86,136
Net Income (C-(A+B))						53,012

Source: JICA Survey Team

Proposed Condition						
Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha
A Seeds / Agro-chemicals						
Seeds / Seedlings	kg	25	0.97	24.3	20	479
Main field						
Urea	kg	7	0.97	6.8	543	3,690
SSP	kg	6	0.97	5.8	494	2,875
MOP	kg	16	0.97	15.5	133	2,070
Gypsum	kg					
Micro-nutrient (ZnSO4)	kg	25	0.97	24.3	49	1,198
Pesticide (Chlorpyrifos)	L	240	0.97	232.8	1	288
Pesticide (Phorate granules)	kg	40	0.97	38.8	25	958
Pesticide (Monochrotophos)	L	330	0.97	320.1	1	395
Herbicide (Atrazine 50% WP)	kg	196	0.97	190.1	2	470
Herbicide 2-4-D	kg	1,400	0.97	1,358.0	1	1,677
Sub-total						14,100
B Labour Cost						
Land Preparation (Tractor: harrow / cultivation)	ls	800	0.69	552.0	5	2,727
Sowing	man-day	200	0.69	138.0	15	2,045
Weeding	man-day					
Hoeing	man-day	200	0.69	138.0	10	1,363
Irrigation	man-day	300	0.69	207.0	15	3,068
Application of pesticide/fungicide/weedicide	man-day	300	0.69	207.0	15	3,068
Application of fertilizer	man-day	300	0.69	207.0	5	1,023
Harvesting	man-day	200	0.69	138.0	25	3,409
Drying / Shelling	man-day	200	0.69	138.0	25	3,409
Transport	ls	500	0.69	345.0	2	852
Sub-total						20,963
Total (A+B)						35,063
C Yield						
Price	ton	12,000	0.97	11,640.0		8.6
Gross Income						100,628
Net Income (C-(A+B))						65,565

(4) Ground Nut

Present Condition						
Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha
A Seeds / Agro-chemicals						
Seeds / Seedlings	kg	50	0.97	48.5	198	9,584
Main field						
Urea	kg	7	0.97	6.8	62	419
SSP	kg	6	0.97	5.8	198	1,150
MOP	kg	16	0.97	15.5	62	958
Gypsum	kg	2	0.97	1.9	494	958
Micro-nutrient (ZnSO4)	kg					
Rhizobium inoculum	200g					
Pesticide (Imidacloprid)	L	700	0.97	679.0	0	335
Fungicide (Mancozeb)	kg					
Herbicide (Fluchloralin)	L	800	0.97	776.0	2	1,917
Sub-total						15,322
B Labour Cost						
Land Preparation (Tractor: ploughing / harrowing)	time	800	0.69	552.0	4.9	2,727
Sowing	man-day	200	0.69	138.0	24.7	3,409
Weeding	man-day	200	0.69	138.0	14.8	2,045
Irrigation	man-day	300	0.69	207.0	2.5	511
Application of pesticide/fungicide/weedicide	man-day	300	0.69	207.0	4.9	1,023
Application of fertilizer	man-day	300	0.69	207.0	2.5	511
Harvesting	man-day	200	0.69	138.0	24.7	3,409
Shelling	man-day	200	0.69	138.0	24.7	3,409
Transport	ls	500	0.69	345.0	2.5	852
Sub-total						17,895
Total (A+B)						33,217
C Yield						
Price	ton	50,000	0.97	48,500.0		
Gross Income						71,877
Net Income (C-(A+B))						38,660

Source: JICA Survey Team

Proposed Condition						
Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha
A Seeds / Agro-chemicals						
Seeds / Seedlings	kg	50	0.97	48.5	198	9,584
Main field						
Urea	kg	7	0.97	6.8	74	503
SSP	kg	6	0.97	5.8	247	1,438
MOP	kg	16	0.97	15.5	79	1,227
Gypsum	kg	2	0.97	1.9	494	958
Micro-nutrient (ZnSO4)	kg	25	0.97	24.3	25	599
Rhizobium inoculum	200g	250	0.97	242.5	2	599
Pesticide (Imidacloprid)	L	700	0.97	679.0	0	335
Fungicide (Mancozeb)	kg	275	0.97	266.8	1	329
Herbicide (Fluchloralin)	L	800	0.97	776.0	2	1,917
Sub-total						17,489
B Labour Cost						
Land Preparation (Tractor: ploughing / harrowing)	time	800	0.69	552.0	5	2,727
Sowing	man-day	200	0.69	138.0	25	3,409
Weeding	man-day	200	0.69	138.0	15	2,045
Irrigation	man-day	300	0.69	207.0	2	511
Application of pesticide/fungicide/weedicide	man-day	300	0.69	207.0	5	1,023
Application of fertilizer	man-day	300	0.69	207.0	2	511
Harvesting	man-day	200	0.69	138.0	25	3,409
Shelling	man-day	200	0.69	138.0	25	3,409
Transport	ls	500	0.69	345.0	2	852
Sub-total						17,895
Total (A+B)						35,384
C Yield						
Price	ton	50,000	0.97	48,500.0		2.0
Gross Income						95,836
Net Income (C-(A+B))						60,452

(5) Pulses (Black Gram)

Present Condition						
Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha
A Seeds / Agro-chemicals						
Seeds / Seedlings	kg	100	0.97	97.0	40	3,833
Main field						
Urea	kg					
SSP	kg					
DAP	kg					
MOP	kg					
Rhizobium inoculum	kg					
Fungicide (Captan)	kg					
Pesticide (Monocrotophos)	L	330	0.97	320.1	1	395
Fungicide (Mancozeb)	kg					
Herbicide (Pendimethalin)	L					
Sub-total						4,229
B Labour Cost						
Land Preparation (Tractor: cultivating)	time					
Sowing	man-day	300	0.69	207.0	2	511
Weeding	man-day	200	0.69	138.0	10	1,363
Irrigation	man-day					
Application of monocrotophos	man-day	300	0.69	207.0	2	511
Application of fertilizer	man-day					
Harvesting	man-day	200	0.69	138.0	20	2,727
Bagging / Transport	man-day	300	0.69	207.0	5	1,023
Transport	ls					
Sub-total						6,135
Total (A+B)						10,364
C Yield						
Price	ton	75,000	0.97	72,750.0		
Gross Income						35,939
Net Income (C-(A+B))						25,574

Source: JICA Survey Team

Proposed Condition						
Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha
A Seeds / Agro-chemicals						
Seeds / Seedlings	kg	100	0.97	97.0	40	3,833
Main field						
Urea	kg					
SSP	kg					
DAP	kg	24	0.97	23.3	25	575
MOP	kg					
Rhizobium inoculum	200 g	250	0.97	242.5	2	599
Fungicide (Captan)	kg	500	0.97	485.0	0.2	120
Pesticide (Monocrotophos)	L	330	0.97	320.1	1	395
Fungicide (Mancozeb)	kg	270	0.97	261.9	1	323
Herbicide (Pendimethalin)	L	325	0.97	315.3	4	1,168
Sub-total						7,014
B Labour Cost						
Land Preparation (Tractor: cultivating)	time					
Sowing	man-day	300	0.69	207.0	2	511
Weeding	man-day	200	0.69	138.0	15	2,045
Irrigation	man-day	300	0.69	207.0	2	511
Application of pesticide/fungicide/weedicide	man-day	300	0.69	207.0	5	1,023
Application of fertilizer	man-day					
Harvesting	man-day	200	0.69	138.0	20	2,727
Bagging / Transport	man-day	300	0.69	207.0	5	1,023
Transport	ls					
Sub-total						7,840
Total (A+B)						14,854
C Yield						
Price	ton					0.9
Gross Income	ton	75,000	0.97	72,750.0		62,929
Net Income (C-(A+B))						48,075

(6) Sugarcane

Present Condition						
Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha
A Seeds / Agro-chemicals						
Sets	no.	2.5	0.97	2.4	9,880	23,959
Main field						
Urea	kg	7	0.97	6.8	371	2,516
SSP	kg	6	0.97	5.8	371	2,156
MOP	kg	16	0.97	15.5	247	3,833
Micro-nutrient (ZnSO4)	kg	25	0.97	24.3	49	1,198
Pesticide (Malathion)	L	900	0.97	873.0	2	2,156
Fungicide (Carbendazim)	kg	375	0.97	363.8	5	1,797
Herbicide (Atrazine)	kg	196	0.97	190.1	4	704
Sub-total						38,320
B Labour Cost						
Land Preparation (Tractor: ploughing / Cultivation)	hr	800	0.69	552.0	10	5,454
Planting	man-day	200	0.69	138.0	25	3,409
Weeding	man-day	200	0.69	138.0	12	1,704
Earthing	man-day	300	0.69	207.0	10	2,045
Irrigation	man-day	300	0.69	207.0	15	3,068
Propping & tying plants	man-day	300	0.69	207.0	12	2,556
Application of pesticide/weedicide	man-day	300	0.69	207.0	5	1,023
Application of fertilizer	man-day	300	0.69	207.0	5	1,023
Harvesting	man-day	200	0.69	138.0	25	3,409
Collection and Heaping	man-day	300	0.69	207.0	10	2,045
Transport	ls	10,000	0.69	6,900.0	2	17,043
Sub-total						42,778
Total (A+B)						81,098
Yield	ton					74
Price	ton	2,200.0	0.97	2,134.0		
Gross Income						158,129
Net Income (C-(A+B))						77,031

Source: JICA Survey Team

Proposed Condition						
Particulars	Unit	Financial Price INR/unit	CF	Economic Price INR/unit	Quantity Unit/ha	Amount INR/ha
A Seeds / Agro-chemicals						
Sets	no.	2.5	0.97	2.4	9,880	23,959
Main field						
Urea	kg	7	0.97	6.8	543	3,690
SSP	kg	6	0.97	5.8	618	3,594
MOP	kg	16	0.97	15.5	185	2,875
Micro-nutrient (ZnSO4)	kg	25	0.97	24.3	49	1,198
Pesticide (Malathion)	L	900	0.97	873.0	2	2,156
Fungicide (Carbendazim)	kg	375	0.97	363.8	5	1,797
Herbicide (Atrazine)	kg	196	0.97	190.1	5	939
Sub-total						40,208
B Labour Cost						
Land Preparation (Tractor: ploughing / Cultivation)	ls	800	0.69	552.0	10	5,454
Planting	man-day	200	0.69	138.0	25	3,409
Weeding	man-day	200	0.69	138.0	12	1,704
Earthing	man-day	300	0.69	207.0	10	2,045
Irrigation	man-day	300	0.69	207.0	15	3,068
Propping & tying plants	man-day	300	0.69	207.0	12	2,556
Application of pesticide/weedicide	man-day	300	0.69	207.0	5	1,023
Application of fertilizer	man-day	300	0.69	207.0	5	1,023
Harvesting	ls	200	0.69	138.0	37	5,113
Collection and Heaping	man-day	300	0.69	207.0	10	2,045
Transport	ls	10,000	0.69	6,900.0	2	17,043
Sub-total						44,482
Total (A+B)						84,690
C Yield						
Price	ton					86
Gross Income	ton	2,200	0.97	2,134.0		184,484
Net Income (C-(A+B))						99,794

Attachment 14.2.2 Economic Cost and Benefit Stream

EIRR:	23.5%	Net Present Value (INR Million) (at 10% Discount Rate)			B/C Ratio
Net Present Value (NPV)	20,824	Benefit	Cost	B-C	
		34,113	13,289	20,824	2.57

(Unit: INR Million)

Year in Order	Year	Economic Cost			Economic Benefit	Net Cash Flow
		Initial Investment	Replacement O & M	Total Cost		
1	2017	329	0	329	0	-329
2	2018	2633	0	2,633	0	-2,633
3	2019	6903	0	6,903	0	-6,903
4	2020	4,855	0	4,855	0	-4,855
5	2021	1,213	146	1,359	509	-850
6	2022	275	146	421	3,814	3,393
7	2023	116	146	263	5,595	5,333
8	2024	0	146	146	6,165	6,018
9	2025	0	146	146	6,329	6,182
10	2026	0	146	146	6,329	6,182
11	2027	0	146	146	6,329	6,182
12	2028	0	146	146	6,329	6,182
13	2029	0	146	146	6,329	6,182
14	2030	0	1,318	1,318	6,329	5,011
15	2031	0	146	146	6,329	6,182
16	2032	0	146	146	6,329	6,182
17	2033	0	146	146	6,329	6,182
18	2034	0	146	146	6,329	6,182
19	2035	0	146	146	6,329	6,182
20	2036	0	146	146	6,329	6,182
21	2037	0	146	146	6,329	6,182
22	2038	0	146	146	6,329	6,182
23	2039	0	146	146	6,329	6,182
24	2040	0	1,318	1,318	6,329	5,011
25	2041	0	146	146	6,329	6,182
26	2042	0	146	146	6,329	6,182
27	2043	0	146	146	6,329	6,182
28	2044	0	146	146	6,329	6,182
29	2045	0	146	146	6,329	6,182
30	2046	0	146	146	6,329	6,182

Source: JICA Survey Team

Economic Cost and Benefit Stream (Cost up by 10%)

EIRR:	21.8%	Net Present Value (INR Million) (at 10% Discount Rate)			B/C Ratio
Net Present Value (NPV)	130,591	Benefit	Cost	B-C	
		34,113	14,618	19,495	2.33

(Unit: INR Million)

Year in Order	Year	Economic Cost			Economic Benefit	Net Cash Flow
		Initial Investment	Replacement O & M	Total Cost		
1	2017	362	0	362	0	-362
2	2018	2,896	0	2,896	0	-2,896
3	2019	7,593	0	7,593	0	-7,593
4	2020	5,341	0	5,341	0	-5,341
5	2021	1,334	161	1,495	509	-986
6	2022	302	161	463	3814	3,351
7	2023	128	161	289	5595	5,307
8	2024	0	161	161	6165	6,004
9	2025	0	161	161	6329	6,168
10	2026	0	161	161	6329	6,168
11	2027	0	161	161	6329	6,168
12	2028	0	161	161	6329	6,168
13	2029	0	161	161	6329	6,168
14	2030	0	1,450	1,450	6329	4,879
15	2031	0	161	161	6329	6,168
16	2032	0	161	161	6329	6,168
17	2033	0	161	161	6329	6,168
18	2034	0	161	161	6329	6,168
19	2035	0	161	161	6329	6,168
20	2036	0	161	161	6329	6,168
21	2037	0	161	161	6329	6,168
22	2038	0	161	161	6329	6,168
23	2039	0	161	161	6329	6,168
24	2040	0	1,450	1,450	6329	4,879
25	2041	0	161	161	6329	6,168
26	2042	0	161	161	6329	6,168
27	2043	0	161	161	6329	6,168
28	2044	0	161	161	6329	6,168
29	2045	0	161	161	6329	6,168
30	2046	0	161	161	6329	6,168

Source: JICA Survey Team

Economic Cost and Benefit Stream (Cost up by 20%)

EIRR:	20.4%	Net Present Value (INR Million) (at 10% Discount Rate)			B/C Ratio
Net Present Value (NPV)	128,344	Benefit	Cost	B-C	
		34,113	15,947	18,166	2.14

(Unit: INR Million)

Year in Order	Year	Economic Cost			Economic Benefit	Net Cash Flow
		Initial Investment	Replacement O & M	Total Cost		
1	2017	395	0	395	0	-395
2	2018	3,160	0	3,160	0	-3,160
3	2019	8,283	0	8,283	0	-8,283
4	2020	5,826	0	5,826	0	-5,826
5	2021	1,455	176	1,631	509	-1,122
6	2022	330	176	506	3,814	3,309
7	2023	139	176	315	5,595	5,280
8	2024		176	176	6,165	5,989
9	2025		176	176	6,329	6,153
10	2026		176	176	6,329	6,153
11	2027		176	176	6,329	6,153
12	2028		176	176	6,329	6,153
13	2029		176	176	6,329	6,153
14	2030		1,581	1,581	6,329	4,747
15	2031		176	176	6,329	6,153
16	2032		176	176	6,329	6,153
17	2033		176	176	6,329	6,153
18	2034		176	176	6,329	6,153
19	2035		176	176	6,329	6,153
20	2036		176	176	6,329	6,153
21	2037		176	176	6,329	6,153
22	2038		176	176	6,329	6,153
23	2039		176	176	6,329	6,153
24	2040		1,581	1,581	6,329	4,747
25	2041		176	176	6,329	6,153
26	2042		176	176	6,329	6,153
27	2043		176	176	6,329	6,153
28	2044		176	176	6,329	6,153
29	2045		176	176	6,329	6,153
30	2046		176	176	6,329	6,153

Source: JICA Survey Team

Economic Cost and Benefit Stream (Benefit 10% Down)

EIRR:	21.7%	Net Present Value (INR Million) (at 10% Discount Rate)			B/C Ratio
Net Present Value (NPV)	117,307	Benefit	Cost	B-C	
		30,702	13,289	17,413	2.31

(Unit: INR Million)

Year in Order	Year	Economic Cost			Economic Benefit	Net Cash Flow
		Initial Investment	Replacement O & M	Total Cost		
1	2017	329	0	329	0	-329
2	2018	2633	0	2,633	0	-2,633
3	2019	6903	0	6,903	0	-6,903
4	2020	4855	0	4,855	0	-4,855
5	2021	1213	146	1,359	458	-901
6	2022	275	146	421	3,433	3,012
7	2023	116	146	263	5,036	4,773
8	2024		146	146	5,548	5,402
9	2025		146	146	5,696	5,549
10	2026		146	146	5,696	5,549
11	2027		146	146	5,696	5,549
12	2028		146	146	5,696	5,549
13	2029		146	146	5,696	5,549
14	2030		1,318	1,318	5,696	4,378
15	2031		146	146	5,696	5,549
16	2032		146	146	5,696	5,549
17	2033		146	146	5,696	5,549
18	2034		146	146	5,696	5,549
19	2035		146	146	5,696	5,549
20	2036		146	146	5,696	5,549
21	2037		146	146	5,696	5,549
22	2038		146	146	5,696	5,549
23	2039		146	146	5,696	5,549
24	2040		1,318	1,318	5,696	4,378
25	2041		146	146	5,696	5,549
26	2042		146	146	5,696	5,549
27	2043		146	146	5,696	5,549
28	2044		146	146	5,696	5,549
29	2045		146	146	5,696	5,549
30	2046		146	146	5,696	5,549

Source: JICA Survey Team

Economic Cost and Benefit Stream (Benefit 20% Down)

EIRR:	19.8%	Net Present Value (INR Million) (at 10% Discount Rate)			B/C Ratio
Net Present Value (NPV)	101,776	Benefit	Cost	B-C	
		27,290	13,289	14,001	2.05

(Unit: INR Million)

Year in Order	Year	Economic Cost			Economic Benefit	Net Cash Flow
		Initial Investment	Replacement O & M	Total Cost		
1	2017	329	0	329	0	-329
2	2018	2633	0	2,633	0	-2,633
3	2019	6903	0	6,903	0	-6,903
4	2020	4855	0	4,855	0	-4,855
5	2021	1213	146	1,359	407	-952
6	2022	275	146	421	3,052	2,630
7	2023	116	146	263	4,476	4,214
8	2024		146	146	4,932	4,785
9	2025		146	146	5,063	4,916
10	2026		146	146	5,063	4,916
11	2027		146	146	5,063	4,916
12	2028		146	146	5,063	4,916
13	2029		146	146	5,063	4,916
14	2030		1,318	1,318	5,063	3,745
15	2031		146	146	5,063	4,916
16	2032		146	146	5,063	4,916
17	2033		146	146	5,063	4,916
18	2034		146	146	5,063	4,916
19	2035		146	146	5,063	4,916
20	2036		146	146	5,063	4,916
21	2037		146	146	5,063	4,916
22	2038		146	146	5,063	4,916
23	2039		146	146	5,063	4,916
24	2040		1,318	1,318	5,063	3,745
25	2041		146	146	5,063	4,916
26	2042		146	146	5,063	4,916
27	2043		146	146	5,063	4,916
28	2044		146	146	5,063	4,916
29	2045		146	146	5,063	4,916
30	2046		146	146	5,063	4,916

Source: JICA Survey Team

Economic Cost and Benefit Stream (Cost up by 10%, Benefit down by 10%)

EIRR:	20.1%	Net Present Value (INR Million) (at 10% Discount Rate)			B/C Ratio
Net Present Value (NPV)	115,060	Benefit	Cost	B-C	
		30,702	14,618	16,084	2.10

(Unit: INR Million)

Year in Order	Year	Economic Cost			Economic Benefit	Net Cash Flow
		Initial Investment	Replacement O & M	Total Cost		
1	2017	362	0	362	0	-362
2	2018	2,896	0	2,896	0	-2,896
3	2019	7,593	0	7,593	0	-7,593
4	2020	5,341	0	5,341	0	-5,341
5	2021	1,334	161	1,495	458	-1,037
6	2022	302	161	463	3,433	2,970
7	2023	128	161	289	5,036	4,747
8	2024		161	161	5,548	5,387
9	2025		161	161	5,696	5,535
10	2026		161	161	5,696	5,535
11	2027		161	161	5,696	5,535
12	2028		161	161	5,696	5,535
13	2029		161	161	5,696	5,535
14	2030		1,450	1,450	5,696	4,246
15	2031		161	161	5,696	5,535
16	2032		161	161	5,696	5,535
17	2033		161	161	5,696	5,535
18	2034		161	161	5,696	5,535
19	2035		161	161	5,696	5,535
20	2036		161	161	5,696	5,535
21	2037		161	161	5,696	5,535
22	2038		161	161	5,696	5,535
23	2039		161	161	5,696	5,535
24	2040		1,450	1,450	5,696	4,246
25	2041		161	161	5,696	5,535
26	2042		161	161	5,696	5,535
27	2043		161	161	5,696	5,535
28	2044		161	161	5,696	5,535
29	2045		161	161	5,696	5,535
30	2046		161	161	5,696	5,535

Source: JICA Survey Team

Economic Cost and Benefit Stream (Cost up by 20%, Benefit down by 20%)

EIRR:	17.0%	Net Present Value (INR Million) (at 10% Discount Rate)			B/C Ratio
Net Present Value (NPV)	97,281	Benefit	Cost	B-C	
		27,290	15,947	11,344	1.71

(Unit: INR Million)

Year in Order	Year	Economic Cost			Economic Benefit	Net Cash Flow
		Initial Investment	Replacement O & M	Total Cost		
1	2017	395	0	395	0	-395
2	2018	3,160	0	3,160	0	-3,160
3	2019	8,283	0	8,283	0	-8,283
4	2020	5,826	0	5,826	0	-5,826
5	2021	1,455	176	1,631	407	-1,224
6	2022	330	176	506	3,052	2,546
7	2023	139	176	315	4,476	4,161
8	2024		176	176	4,932	4,756
9	2025		176	176	5,063	4,887
10	2026		176	176	5,063	4,887
11	2027		176	176	5,063	4,887
12	2028		176	176	5,063	4,887
13	2029		176	176	5,063	4,887
14	2030		1,581	1,581	5,063	3,481
15	2031		176	176	5,063	4,887
16	2032		176	176	5,063	4,887
17	2033		176	176	5,063	4,887
18	2034		176	176	5,063	4,887
19	2035		176	176	5,063	4,887
20	2036		176	176	5,063	4,887
21	2037		176	176	5,063	4,887
22	2038		176	176	5,063	4,887
23	2039		176	176	5,063	4,887
24	2040		1,581	1,581	5,063	3,481
25	2041		176	176	5,063	4,887
26	2042		176	176	5,063	4,887
27	2043		176	176	5,063	4,887
28	2044		176	176	5,063	4,887
29	2045		176	176	5,063	4,887
30	2046		176	176	5,063	4,887

Source: JICA Survey Team

Economic Cost and Benefit Stream (Benefit down 10% Cost up 20%)

EIRR:	18.7%	Net Present Value (INR Million) (at 10% Discount Rate)			B/C Ratio
Net Present Value (NPV)	112,813	Benefit	Cost	B-C	
		30,702	15,947	14,755	1.93

(Unit: INR Million)

Year in Order	Year	Economic Cost			Economic Benefit	Net Cash Flow
		Initial Investment	Replacement O & M	Total Cost		
1	2017	395	0	395	0	-395
2	2018	3,160	0	3,160	0	-3,160
3	2019	8,283	0	8,283	0	-8,283
4	2020	5,826	0	5,826	0	-5,826
5	2021	1,455	176	1,631	458	-1,173
6	2022	330	176	506	3,433	2,927
7	2023	139	176	315	5,036	4,721
8	2024		176	176	5,548	5,372
9	2025		176	176	5,696	5,520
10	2026		176	176	5,696	5,520
11	2027		176	176	5,696	5,520
12	2028		176	176	5,696	5,520
13	2029		176	176	5,696	5,520
14	2030		1,581	1,581	5,696	4,114
15	2031		176	176	5,696	5,520
16	2032		176	176	5,696	5,520
17	2033		176	176	5,696	5,520
18	2034		176	176	5,696	5,520
19	2035		176	176	5,696	5,520
20	2036		176	176	5,696	5,520
21	2037		176	176	5,696	5,520
22	2038		176	176	5,696	5,520
23	2039		176	176	5,696	5,520
24	2040		1,581	1,581	5,696	4,114
25	2041		176	176	5,696	5,520
26	2042		176	176	5,696	5,520
27	2043		176	176	5,696	5,520
28	2044		176	176	5,696	5,520
29	2045		176	176	5,696	5,520
30	2046		176	176	5,696	5,520

Source: JICA Survey Team

Economic Cost and Benefit Stream (Benefit down 20% Cost up by 10%)

EIRR:	18.3%	Net Present Value (INR Million) (at 10% Discount Rate)			B/C Ratio
Net Present Value (NPV)	99,529	Benefit	Cost	B-C	
		27,290	14,618	12,673	1.87

(Unit: INR Million)

Year in Order	Year	Economic Cost			Economic Benefit	Net Cash Flow
		Initial Investment	Replacement O & M	Total Cost		
1	2017	362	0	362	0	-362
2	2018	2,896	0	2,896	0	-2,896
3	2019	7,593	0	7,593	0	-7,593
4	2020	5,341	0	5,341	0	-5,341
5	2021	1,334	161	1,495	407	-1,088
6	2022	302	161	463	3,052	2,588
7	2023	128	161	289	4,476	4,187
8	2024		161	161	4,932	4,771
9	2025		161	161	5,063	4,902
10	2026		161	161	5,063	4,902
11	2027		161	161	5,063	4,902
12	2028		161	161	5,063	4,902
13	2029		161	161	5,063	4,902
14	2030		1,450	1,450	5,063	3,613
15	2031		161	161	5,063	4,902
16	2032		161	161	5,063	4,902
17	2033		161	161	5,063	4,902
18	2034		161	161	5,063	4,902
19	2035		161	161	5,063	4,902
20	2036		161	161	5,063	4,902
21	2037		161	161	5,063	4,902
22	2038		161	161	5,063	4,902
23	2039		161	161	5,063	4,902
24	2040		1,450	1,450	5,063	3,613
25	2041		161	161	5,063	4,902
26	2042		161	161	5,063	4,902
27	2043		161	161	5,063	4,902
28	2044		161	161	5,063	4,902
29	2045		161	161	5,063	4,902
30	2046		161	161	5,063	4,902

Source: JICA Survey Team

Attachment 14.5.1 Project Status Report

(Note) The portion with “(P/R and PCR)”, “(P/R)”, and “(PCR)” should be filled in Progress Reports (P/R) and/or Project Completion Reports (PCR).

1: Project Description (Relevance)

1-1 Project Objective

Original:

The development objective of APILIP-II is to improve livelihoods of farmers in the command areas of old irrigation projects by increasing agriculture productivity and actual irrigated area through (i) modernisation of old irrigation systems for improvement of irrigation efficiency, (ii) institutional development and capacity building of WUAs for participatory irrigation management, and FPOs for integrated farming system and other agriculture activities, and (iii) support for local poor in animal husbandry and fishery communities leading viable livelihoods.

The challenges towards sector reform in the state focusing on food value chain development for strategic crops and farm mechanisation on a pilot basis are also objective as well.

Modified objective and its reason(s):(P/R and PCR)

1-2 Necessity and Priority of the Project

-Consistency with development policy, sector plan, national/regional development plans and demand of target group and the recipient country.

Original:

(1) Consistency with the National Plan and Development Strategy

The National 12th Five-Year Plan emphasises that the growth must not only be rapid but also more inclusive and environmentally sustainable to: (i) reduce poverty; (ii) improve regional equality across states and within states; (iii) improve conditions of SCs (Scheduled Castes), STs (Scheduled Tribes), OBCs (Other Backward Castes), and minorities; (iv) close the gender gap; (v) generate attractive employment opportunities for the youth; (vi) resource usage efficiency and technology to ensure sustainability of natural resources; and (vii) adaptation to climate change and improvements in total factor productivity.

Besides, the current Government of India has laid a five-point agenda to enhance agriculture development, i.e.: (i) to give agriculture technology to farmers from laboratory to land by farm mechanisation; (ii) to use digitised multimedia for training progressive farmers; (iii) to promote water conservation by coordinating the weather and water cycle ‘per drop, more crop’; (iv) to promote allied sectors animal husbandry and fisheries ‘have a blue revolution.’; and (v) to develop herbal medicines. In addition, farmers and commodity interest groups need to be linked to the global market for “smaller land, shorter time, and more productivity”.

Taking the above into account, it can be said that the proposed APILIP-II coincides with the national plan and strategy.

(2) Consistency with the State Development Policy and Strategy

The Government of Andhra Pradesh (GoAP) has put top priority on primary sector mission out of seven missions launched as a part of long-term vision. A strategy paper for Mission on Primary Sector - Agriculture Transformation in Andhra Pradesh - published in October 2014 attempts to design a strategy to transform the agriculture and allied sector, and then to operationalise it in a phased manner. The focus is essentially on (a) increasing productivity of the primary sector; (b) mitigating the impact of droughts through water conservation and micro-irrigation; (c) postharvest management to reduce wastage; and (d) establishment of processing, value addition capacity, and supply chain of identified crops. As adaptation measures for climate changes, GoAP has initiated various projects and programmes for water conservation and management in the state including modernisation of medium and minor irrigation projects as shown in Table 12.5.4. Thus, the proposed APILIP-II, which is consistent with the state development policy and plan, is noteworthy to be implemented.

(3) Necessity of Irrigation Modernisation in Andhra Pradesh State

Andhra Pradesh State has about 42,000 tanks covering over 0.966 million ha of farmlands of which about 6,200 tanks are considered as minor irrigation tanks. The gap ayacut of the minor irrigation projects is estimated at roughly 40% on average against the irrigation potential created (1.037 million ha) to date. Meanwhile, the same major and medium irrigation projects is assessed at around 25% on average against the irrigation potential created (2.789 million ha) so far. The main reasons for increasing gap ayacut (over 1.1 million ha) are lack of proper maintenance of head works and canals and inadequate control and regulation on irrigation structures. Accordingly, such irrigation projects need to be improved to reduce the gap ayacut by raising water use efficiency along with institutional development and capacity building of WUAs/farmers by the proposed APILIP-II.

(4) Necessity of Institutional Development and Capacity Building in the Project

Irrigation schemes have deteriorated due to lack of proper management and ownership. To maximise the benefit of modernisation of the irrigation schemes, capacity development of WUA, as well as establishment of supporting system for adequate O&M, is crucial. Even though the GoAP has been trying to develop participatory irrigation management (PIM) since the 1990s, WUA's functions were interrupted during the previous government scheme. It is a critical time to revive PIM by reformation of WUA and enhancement of WUA's capacity by establishing a strategy in a newly established GoAP.

The concept of farmer producer organisation (FPO) has been promoted all over the country in recent years. FPO has a potential to improve situation of small and marginal farmers by reducing risk and expenses of farmers and enhancing marketing power through collective practices. The GoAP takes strong initiatives to promote FPOs and has started several programmes. In line with the government policy, it is effective to support their initiatives. To actually make FPO promotion benefit the farmers in the target area, adequate steps and approach are required. Project intervention in FPO promotion including comprehensive support from the foundation setting through agriculture extension activities can help the government develop a suitable approach of FPO support in irrigated areas.

(5) Necessity of Livelihood Programme in Andhra Pradesh State

There are thousands of tanks developed in Andhra Pradesh State providing water to local people not only for domestic and irrigation uses but also for inland fisheries and animal husbandry. Some of the traditional governance systems (caste/kinship-based, with geographical origin, and also being important in case of migrant/settler community) are still in place to provide governance in agriculture, fisheries, and animal husbandry communities at the local level. Those who belong to historically disadvantaged groups are officially designated as scheduled castes (SC) in India. Some measures have to be taken up for unbenefited local groups living in and around the proposed irrigation projects. Such social consideration shall be built in the project design of APILIP-II.

(6) Necessity of Food Value Chain for Strategic Crops in Andhra Pradesh State

Andhra Pradesh State is one of the leading states in agriculture and horticulture produces and has a good potential to become an agribusiness hub in Southeast India. Among others in Andhra Pradesh State, the crops selected by the JICA Survey Team (mango, tomato, chilli, coconut, shrimp, and tuna) are the most prospective produces for international market as well as domestic market. However, there is still a big room to improve the total food value chain in Andhra Pradesh State such as enhancement of productivity, motivation of producers, awareness in quality, food safety and traceability, agribusiness infrastructure and private investment, and close coordination and linkage among producers, transporters, processing companies, traders, and also government officials in charge. Thus, development of food value chain coincides with national and state policies and needs to be incorporated into the proposed APILIP-II.

(7) Necessity of Farm Mechanisation in Andhra Pradesh State

There are three major reasons to promote farm mechanisation: (i) severe shortage of agriculture labour in the peak seasons of transplanting/planting and harvesting, (ii) steep rise in labour wages due to increasing migrant workers under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), and (iii) aging of farming communities and issues of their successors. To overcome these problems, farm mechanisation attracting the educated youths in farming communities needs to be introduced by the proposed APILIP-II.

(8) Consistency with the JICA's Policy and Development Assistance Plan to India

It also coincides with the JICA's country analysis paper for India stating that poverty alleviation and food security are the main issues of agriculture sector in India, which can be overcome by means of (i) countermeasures for water shortage, (ii) development of rural infrastructure, and (iii) investment on research and development of agriculture technology. Moreover, the JICA's development assistance plan to India puts emphasis on eradication of poverty and improvement of environment. Income and employment generation of the local poor is top priority. Thus, the proposed APILIP-II can be justified to apply for the Japanese official development assistance (ODA).

Actual: (P/R, PCR)

Attachment(s): required only when they are revised.

1-3 Rationale of the Project Design

- Timing, scale, technology of the project

Original: (P/M)

The proposed APILIP-II will widely cover agriculture and allied sectors, which require an integrated development approach, i.e., (i) horizontal integration with centre on PMU forming cross- departmental platform, and (ii) vertical integration from production to processing and marketing in unit of a medium irrigation cluster. The project can be judged relevant for implementation by the followings.

(1) Selection of target medium and minor irrigation projects

Twenty out of 21 medium irrigation projects have been selected in consideration of (i) maturity of project, (ii) water availability, (iii) status of irrigation system, and (iv) farmer's organisation, benefit-cost (BC) ratio, with cut-off items of land acquisition, and BC ratio below 1.0.

Four hundred forty-nine out of 485 minor irrigation projects have been selected in consideration of (i) maturity of project, (ii) water availability, (iii) status of irrigation system, and (iv) farmer's organisation, benefit-cost (BC) ratio, with cut-off items of command area less than 40 ha, system tank, land acquisition, and BC ratio below 1.0.

Therefore, 20 medium irrigation projects and their nearby minor irrigation projects will form clusters for the integrated agriculture development under the project.

(2) Selection of target crops for food value chain development

Six agricultural produces, namely: mango, chilli, tomato, coconuts, shrimp, and tuna, have been selected taking into account the (i) production capacity, (ii) possibility of value addition, (iii) market trend, (iv) access to processing industries and export market, and (v) possible linkage with irrigation project. Quality, food security, and traceability of these strategic produces will be improved targeting high value domestic and export market to advanced countries first on a pilot basis.

(3) Project scope

Modernisation of irrigation projects consisting of (i) 20 medium irrigation projects and (ii) 449 minor irrigation projects, which will be executed in phases: Batch-1: 12 medium and 119 minor and Batch-2: 8 medium and 330 minor. Moreover, 155 units of multi-purpose community centres and other agriculture infrastructure will be procured and constructed under the project. Livelihood support to local poor in animal husbandry and inland fishery communities will be implemented by phase: Batch-1: 3 medium irrigation clusters and Batch-2: 6 medium irrigation clusters. Furthermore, technical advice for participatory irrigation management (PIM) and promotion of farmers producers organisations (FPOs) will be provided by the project.

In addition, the food value chain development for strategic crops through public-private partnership (PPP) and farm mechanisation on a pilot basis will be implemented under the project.

(4) Project period

The project period will be for nine years from 2017 and will be divided into three phases, namely: (i) Preparatory phase: first year mainly for establishment of project management unit (PMU), detailed project report (DPR), preparation and its sanction, procurement of contractors for modernisation of irrigation projects, and procurement of Project Management Consultant (PMC); (ii) Implementation phase: second to seventh year mainly for all project activities; and (iii) Closing phase: eighth to ninth year mainly for contingency and follow-up activities.

(5) Project organisation

The project executing agency is the Department of Water Resources (DoWR), Government of Andhra Pradesh (GoAP).

DoWR/GoAP will set up (i) one state Project Steering Committee (PSC), (ii) one state PMU, and (iii) 13 District Implementation Units (DIUs) with PMU individual consultants, consulting firms, and non-governmental organisations (NGOs). In addition, two Pilot Project Management Units (PPMUs) will be set-up for pilot programmes under PMU.

Each department concerned is responsible for the proposed activities within its scope of services under control and management by PMU. PSC will be functioned as a decision making body for the overall project implementation.

(6) Project management consultant

PMC will be employed for the period of six years from second year to assist PMU in the overall project management and technical advice for modernisation of irrigation projects, institutional development and capacity building programme, livelihood support programme, and pilot programmes.

(7) Environmental and social considerations

There would be no land acquisition and resettlement taken place in the Project. It is however environmental and forest clearance shall be obtained from the relevant department and/or authority in compliance with the Central Water Commission's (CWC) guideline if necessary. Moreover, environmental checklist, monitoring plan and forest dwellers development framework if required shall be prepared and monitored in accordance with the JICA environmental guideline.

(8) Project sustainability

The project itself builds in a mechanism to ensure project sustainability. In concrete terms, institutional development and capacity building of water user associations (WUAs) and farmers producer organisations (FPOs) coincide with the national and state policies and plans. This programme will be continuously supported by GoAP even after the project is over.

(9) Project evaluation and impact

The economic internal rate of return (EIRR) of the project is estimated at 24.4%, which is economically good enough to justify the project. Aside from that the annual incremental net return of the project will reach to INR 6,329 million from the ninth year of the project and similarly, the annual net farm income will increase to INR 379,359/ha (with project condition) from INR 280,617/ha (without project condition). Moreover, this project is social and environment friendly due to the following reasons: (i) land acquisition and resettlement are not required, (ii) canal lining itself has adaptation measures for climate change, and (iii) groundwater recharge by rainwater harvesting tank and farm ponds.

Taking the abovementioned reasons into account, it can be said that the proposed APILIP-II is technically viable, economically feasible, institutionally sustainable, and environmentally friendly.

Actual: (P/R,PCR)

2: Project Implementation (Efficiency)

2-1 Project Scope

Table 2-1-1a Comparison of Original and Actual Location

Location	<p>Original: (P/M) State of Andhra Pradesh 13 districts. Srikakulam, Vizianagaram, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Prakasam, Nellore, Kadapa, Kurnool, Ananthapur and Chittoor Attachment 1: Project Location Map</p>	<p>Actual: (P/Rand PCR) Attachment(s): Map</p>
-----------------	---	--

Table 2-1-1b Comparison of Original and Actual Scope

Items	Original	Actual
1. Modernisation of Medium and Minor Irrigation Projects		
1. Medium Irrigation Projects	1. 20 projects (CA = 104,594 ha)	
2. Minor Irrigation Projects	2. 499 projects (CA = 56,966 ha)	
2. Institutional Development and Capacity Building Programme		
1. Participatory Irrigation Management (PIM)		
a) Revision of guideline and capacity building of government officers		
b) Equipping supporting organisations		
c) Capacity development of WUAs (Minor irrigation projects)		
d) Capacity development of PCs and WUAs (Medium irrigation projects)		
2. Promotion of Farmers Producer Organisations (FPOs)		
a) Agriculture extension programmes		
b) Preparation for FPO formation		
c) Support for establishing FPOs		
3. Livelihood Support Programme of Animal Husbandary and Fishry Sector		
1. Animal Husbandry		
a) Development of livelihood plan		
b) Enhancement of productivity of animals		
c) Promotion of livestock-based income generation activities		
2. Fishery		
a) Development of livelihood plan		
b) Support for fish production activities		
c) Support for marketing activities		
4. Pilot Programmes		
1. Food Value Chain for Strategic Crops (Mango (fresh & processing), Tomato, Chilli, Coconut, Shrimp and Tuna)		
a) Development of mechanism to assist entire value chain		
b) Capacity development of government officers, producers, producer groups, and other stakeholders		
c) Development of marketing and brand strategy		

<p>2. Farm Mechanization</p> <ul style="list-style-type: none"> a) Establishment of agricultural mechanisation and technology Centre (AMTC): 2 AMTCs b) Establishment of workshop: 10 units c) Training of custom service units (CSUs): 107 CSUs d) Procurement of farm machinery for training purpose: 2 units each for rice and ID crops. 		
5. Project Management		
<ul style="list-style-type: none"> 1. Support to PMU/DIU <ul style="list-style-type: none"> a) PSC/PMU advisors b) PMU/DIU Consultants- Individual c) PMU/DIU Consulting firms / NGOs d) Equipment and furniture 2. Capacity Building <ul style="list-style-type: none"> a) Exposure visits and study tours (Domestic) b) Seminars and workshops c) Publication of information, education and communication materials d) AP state training and research institute e) Multi-purpose WUA office 3. Monitoring and Evaluation <ul style="list-style-type: none"> a) Environmental monitoring b) Benchmark and evaluation survey c) Water benchmarking and water audit d) Management information System (MIS) 4. Thematic Study and Action Research <ul style="list-style-type: none"> a) Value chain analysis b) Private sector leadership analysis c) Analysis of storage, transport and other regulations, and procedures for global standards d) AP agriculture promotion video film 		
6. Consulting Services (PMC)		
<p>PMC will assist the PMU/DIU in the overall project management as follows..</p> <ul style="list-style-type: none"> a) Guidance for the overall project monitoring and management b) Inter-departmental coordination and close communication c) Development and review of annual work plan and monitoring of the work progress at the state level d) Facilitation of convergence among the departments concerned at the state level e) Construction management, technical guidance and monitoring f) Fund management g) Technical support (training and awareness programme, etc.) h) Liaison between PMU and JICA 		
7. GoAP Share		
<ul style="list-style-type: none"> a) Project administration b) Taxes and duties c) Interest during Construction (2%) d) Front end fees (0.02%), etc. 		

2-1-2 Reason(s) for the modification if there have been any.

(P/R and PCR)

2-2 Implementation Schedule

Table 2-2-1 Comparison of Original and Actual Schedule

Items	Original	Actual
Loan Agreement	December 2016	
Establishment of PMU/PSC/DIU	January 2017 to June 2017	<i>(P/R,PCR)</i>
Selection of Consultants	January 2017 to December 2017	As of (Date of Revision) Please state not only the most updated schedule but also other past revisions chronologically.
Modernisation of Medium and Minor Irrigation Projects	January 2018 to June 2021 (excluding 2 years DLP)	
Institution Development and Capacity Building	July 2018 to December 2023	
Livelihood Support Program	January 2019 to December 2022	
Pilot Programmes	July 2018 to June 2023	
Consulting Services	January 2018 to December 2023	
Project Completion	December 2023	
Loan Closing	December 2025	

2-2-2 Reasons for any changes of the schedule, and their effects on the project.

(P/R and PCR)

2-3 Project Cost

2-3-1

Table 2-3-1a Comparison of Original and Actual Cost BY ITEM

Breakdown of Cost (Mil. Yen)	Foreign Currency Portion			Local Currency Portion			Total		
	Total	JICA Portion	Others	Total	JICA Portion	Others	Total	JICA Portion	Others
•Modernisation of Medium and Minor Irrigation Projects	0	0	0	20,410	20,410	0	20,410	20,410	0
•Participatory Irrigation Management	0	0	0	1,040	1,040	0	1,040	1,040	0
•Promotion of Farmer producers Organisations	0	0	0	1,408	1,408	0	1,408	1,408	0
•Livelihood Support Programme for Animal Husbandry and Fishery Sectors	0	0	0	778	778	0	778	778	0
•Pilot Programmes	0	0	0	1,513	1,513	0	1,513	1,513	0
•Project Management	0	0	0	1,442	1,442	0	1,442	1,442	0
•Price Escalation	0	0	0	3,468	3,468	0	3,468	3,468	0
•Physical Contingency	0	0	0	1,503	1,503	0	1,503	1,503	0
•Consulting Services	1,119	1,119	0	456	456	0	1,575	1,575	0
•Administration Cost	0	0	0	1,657	0	1,657	1,657	0	1,657
•Tax and Duty	162	0	162	1,667	0	1,667	1,829	0	1,829
•Interest during	2,091	0	2,091	0	0	0	2,091	0	2,091

Breakdown of Cost (Mil. Yen)	Foreign Currency Portion			Local Currency Portion			Total		
	Total	JICA Portion	Others	Total	JICA Portion	Others	Total	JICA Portion	Others
construction									
• Front End Fee	70	0	70	0	0	0	70	0	70
Total	3,443	1,119	2,324	35,340	32,017	3,323	38,784	33,136	5,648

(Note) Total figures are not necessarily tallied due to half adjustment.

1. Exchange Rate: US\$1=INR 67.0=INR113.1, INR 1 = JPY 1.69

2. Price Escalation (a) Foreign Currency Portion: 1.6% p.a.

(b) Local Currency Portion: 3.7% p.a.

3. Physical Contingency: 5.0%

4. Base Year for Cost Estimation: April, 2016

Breakdown of Cost	Actual								
	Foreign Currency Portion			Local Currency Portion			Total		
	Total	JICA Portion	Others	Total	JICA Portion	Others	Total	JICA Portion	Others
Item	()	()	()	()	()	()	()	()	()
(P/R,PCR)									
Total									

(Note): Exchange Rate: US\$1=INR =¥ (INR 1=¥)

Base Year for Cost Estimation:

Table 2-3-1b Comparison of Original and Actual Cost BY YEAR

Breakdown of Cost	Original			Actual		
	Total	JICA Portion	Others	Total	JICA Portion	Others
Fiscal Year	(Mil. Yen)	(Mil. Yen)	(Mil. Yen)	()	()	()
2017	663	587	76	(P/R,PCR)	(P/R,PCR)	(P/R,PCR)
2018	5,889	5,186	703			
2019	14,972	13,344	1,628			
2020	11,242	9,831	1,410			
2021	3,722	2,960	762			
2022	1,497	929	568			
2023	795	295	500			
Total	38,784	33,136	5,648			

(Note): Total figures are not necessarily tallied due to half adjustment.

1. Exchange Rate: US\$1=INR 67.0=INR 113.1, INR 1 = JPY 1.69

You can use any currencies in this chart, i.e. you may use your local currency as well as Yen for each figure.

If there were the portion of the financial resources such as of World Bank, ADB and so forth, other than your own budget, please fill in another column between “JICA Portion” and “Others” and fill in the figures of them

2-3-2 Reason(s) for the wide gap between the original and actual, if there have been any, the remedies you have taken, and their results.

(P/R, PCR)

2-4 Organizations for Implementation

2-4-1 Executing Agency:

Organization's role, financial position, capacity, cost recovery etc,
Organization Chart including the unit in charge of the implementation and number of employees.

Original:

Executing Agency:

Original:

Executing Agency:

Department of Water Resources (DoWR) of Government of Andhra Pradesh (GoAP)

Organization's Role

GoAP will set up the Project Steering Committee (PSC) and Project Management Unit (PMU) at state level, and District Project Implementation Unit (DIU) at district level. In principle, the Departments of Planning (DoP), Water Resources (DoWR), Agriculture (DoA), Horticulture (DoH), Animal Husbandry and Fisheries (DoAHF), Mines & Geology & Food Processing (DoMGFP), Finance (DoF) and also Andhra Pradesh Food Processing Society (APFPS) will be the members of these committee and units.

The organizations will play the following roles.

Project Steering Committee (PSC)

- Decision Making Body at State Policy Level
- Provide strategic direction and define enabling policy
- Approve the annual work plan and fund allocation proposed by PMU
- Review the annual work progress
- Establish appropriate convergence platforms and institution arrangement

Project Management Unit (PMU)

- Management Body at State Level
- Develop and review the annual work plan, and monitor the work progress at state level
- Facilitate convergence among the departments concerned at state level
- Provide technical guidance
- Fund management

District Implementation Unit (DIU)

- Implementation Body at District Level
- Monitor and evaluate the work progress at district level
- Trouble shooting
- Ensure capacity building support system
- Facilitate convergence at filed level

Actual, if changed: (P/R and PCR)

2-4-2 Contractor(s)/ Supplier(s), and Consultant(s) and Their Performance:

2-4-2-1 Procurement and Consultant

Table 2-4-1: Procurement of Contractor(s)/Supplier(s) and Consultant(s)

Contract Package	Selection Method	
	Original: (P/M)	Actual: (P/R and PCR)
1 Contractor(s)	Local competitive bidding (LCB) for	

		modernization of medium and minor irrigation projects, buildings such as offices and workshops and other civil works	
2	Supplier(s)	Local competitive bidding (LCB) or price quotation or direct contract basis for farm machinery, tools and equipment for fishery and animal husbandary such as boats, cold storages in accordance with relevant regulations	
3	Consultant(s) - Project Management Consultant - Other National consultants and NGOs	- Short-list method for selecting an international engineering consultant by international competitive bidding (ICB). - Local competitive bidding (LCB) for supervision consultants for construction works and so on.	

2-4-2-2 Performance

<i>(P/R and PCR)</i> Name(s) and Nationality(s) of the Contractor(s)/ Supplier(s):
Evaluation:
Name(s) and Nationality(s) of the Consultant(s):
Evaluation:

2-5 Photographs of Output of the project (P/R and PCR): Attachment

3: Benefit Derived from the Project (Effectiveness)
--

3-1 Operational and physical condition of each facility developed/supplied by the project.

Facilities	Description of condition	Problems, its Background and Remedial Action Plan
<i>(P/R and PCR)</i>	<i>(P/R and PCR)</i>	<i>(P/R and PCR)</i>

3-2 Precautions (Measures To Be Adopted/Points Which Require Special Attention)

Risks and issues, if any, which may affect the project implementation and outcome, and planned countermeasures to be adapted.

(Note) Please state environmental and social impacts (e.g., land acquisition, resettlement, HIV awareness and prevention program, gender consideration and EIA clearance) and Environmental Checklist or report of monitoring indicator in the following section “3-3 Environmental and Social Impacts”.

Original issues and Countermeasure(s)	Actual issues and Countermeasure(s)
- Delay in PMU formation will affect the implementation of the Project. Therefore, PMU shall be formed by March 2017, and	<i>(P/R and PCR)</i>

<p>staff recruitment shall be completed by December 2017 for DMU.</p> <p>- Delay in procurement of consultant (PMC) will affect the implementation of the Project. Therefore, the consultant shall be employed by December 2017 or even before.</p> <p>- Overall Project Management Plan shall be prepared by March 2017.</p> <p>- All the sanctions for Batch-1 (12 medium and 119 minor irrigation projects) and for Batch-2 (8 medium and 330 minor irrigation projects) should be obtained by December 2017 and June 2018 respectively.</p> <p>- Proper budget allocation and management is required by the Executing Agency and PMU at the time of establishment of PMU for initial implementation of the Project.</p>	
---	--

3-3 Environmental and Social Impacts

Original issues and Countermeasure(s)	Actual issues and Countermeasure(s)
<p>- No land acquisition and resettlement will be required in the project.</p> <p>- Preparation of Environment Impact Assessment report and obtaining an Environmental Clearance for the Project may be required.</p>	<p>(P/R and PCR)</p>

3-4 Qualitative and Quantitative Data of Monitoring Indicators

Indicators	Original (Yr 2016)	Present (Yr ____)	Target (Yr 2025)
I: Operational Indicators			
1. Number of irrigation beneficiary farmers	160,000 93,000 253,000		<ul style="list-style-type: none"> ➤ Medium irrigation: 160,000 ➤ Minor irrigation: 93,000 ➤ Total: 253,000
2. Irrigation potential (IP) utilised in ha*1	69,000 39,000 108,000		<ul style="list-style-type: none"> ➤ Medium irrigation: 104,000 ➤ Minor irrigation: 57,000 ➤ Total: 161,000
3. Gap ayacut (=IP created/ IP utilised) in %*1	33 29		<ul style="list-style-type: none"> ➤ Medium irrigation: 0 ➤ Minor irrigation: 0
4. Water use efficiency in %*1	35 35		<ul style="list-style-type: none"> ➤ Medium irrigation: 60 ➤ Minor irrigation: 60
5. Water cess (tax) collection in %*2	44 8		<ul style="list-style-type: none"> ➤ Medium irrigation: 50 ➤ Minor irrigation: 50
6. WUAs trained	-		➤ No. of WUAs: 604
7. FPO established	-		➤ No. of FPOs: 20
8. Annual husbandry communities trained	-		➤ No. of communities: 36
9. Fishery communities trained	-		➤ No. of communities: 27
10. Farmers trained under FVC pilot programme	-		<ul style="list-style-type: none"> ➤ Mango (process): 1,000 ➤ Mango (fresh export): 100 ➤ Tomato: 500 ➤ Chilli: 2,000 ➤ Coconut: 1,000 ➤ Tuna: 225 ➤ Shrimp: 1,000

11. Farmers trained for farm mechanisation	-	-	➤ No. of farmers	1,070
II: Effective Indicators				
1. Total cropped area of major crops in ha	25,692		➤ Paddy (Kharif):	59,477
	4,622		➤ Paddy (Rabi):	4,275
	77,600		➤ ID crops:	181,864
2. Yield of major crops in ton/ha	4.8		➤ Paddy (Kharif):	5.8
	5.8		➤ Paddy (Rabi):	6.7
	7.4		➤ Maise (Kharif):	8.6
	1.5		➤ Ground Nut (Rabi):	2.0
	0.5		➤ Pulses (Karif to Rabi):	0.9
	74.1		➤ Sugarcane (Karif to Rabi)	86.5
3. Gross annual average farm income in INR/household	8,300		➤ North region:	23,800
	20,800		➤ Central region:	52,000
	5,900		➤ South region:	60,700

(Note 1) *1= Target is set on normal rainfall (not draught and floods) condition.

*2= Target is set in % of water tax collected against water tax assessed by the Tax Revenue Office.

(Note 2) As for gross annual farm income of strategic crops, original and target values will be set based on the baseline survey to be conducted at the beginning of the project.

EIRR	Original: EIRR: 23.5% - Cost: Project direct cost (excluding tax and duties, price escalation, IDC and FEF) and O&M cost - Benefit: Incremental net return by crop produce - Project Life: 30 years	Actual: (PCR) % Cost: Benefit: Project Life: Attachment(s): Supporting data for computing EIRR
-------------	--	---

3-5 Monitoring Plan for the indicators

Monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term and so forth.

Original: (1) Monthly and Quarterly Reporting by PMU (2) Annual Monitoring and Evaluation by PMU (3) Terminal Impact Assessment by PMU (4) Quarterly Reporting to JICA and Yearly Monitoring by JICA JICA would carry out the evaluation activities 2 years and 7 years after the project completion.
Actual: (P/R and PCR)

3-6 Achievement of the Project Objective

(PCR)

4: Operation and Maintenance (O&M) (Sustainability)

4-1 O&M and Management

Organization chart of O&M

Operational and maintenance system (structure and the number, qualification and skill of staff or other conditions necessary to maintain the outputs and benefits of the project soundly, such as manuals, facilities and equipment for maintenance, and spare part stocks etc)

Original:

DoWR has a responsibility of O&M and management of the assets created through the project implementation. To secure the continued O&M and management after the completion of the Project, DoWR shall take the following measures;

- Management and monitoring of O&M funds to be provided by DoWR,
- Management and monitoring of O&M funds to be raised by WUAs,
- Empowerment of PCs/WUAs and farmer groups/FPOs in line with the state's policy and programme.

Actual: (PCR)

4-2 O&M Cost and Budget

The actual annual O&M cost for the duration of the project up to today, as well as the annual O&M budget.

(PCR)

5: Evaluation

5-1 JICA and Borrower/Executing Agency Performance

Please evaluate the performance of the two bodies.

JICA:

(PCR)

Borrower/Executing Agency:

(PCR)

5-2 Overall evaluation

Please describe your evaluation on the overall outcome of the project.

(PCR)

5-3 Lessons Learnt and Recommendations

Please raise any lessons learned from the *project experience*, which might be valuable for the future JICA assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

(PCR)

Attachment 15.5.1 Comparison of Potential Site for Food Park in North Area

Land/FP/IP/SEZ	Chinarapalli	Peddaraopalli	Katakapalli	Kottakki	Bobbili MEP	Growth Center Bobbili	IP Katakapalli	APSEZ consisting of 3 SEZs
1. General	1	2	3	4	8	21	22	15
Location	Kotavalasa, Vizianagaram	Kotakapalli, Vizianagaram	Kothavalasa, Vizianagaram	Ramabhapuram Vizianagaram	Sethanagaram, Vizianagaram	Vizianagaram	Kotavalasa, Vizianagaram	Atchutapuram & Rambilli, Vishakhapatnam
Completion Year	-	-	-	-	Planned but Not approved	01/08/1995	19/10/2006	Operating & Rambilli Under developing
Area (acre)	177.53	528.3	155.47	187.27	80.9	1,150	327	3,213
Type of Industry	-	-	-	-	Sugar	Heavy	Heavy	Multi Product (Vishakhapatnam, Atchutapuram for Heavy/Chemical, Rambilli for Light/FP)
Project Cost (Rs. crores)	-	-	-	-	1,500,000,000	NA	NA	NA
Unit Project Cost (Rs. per m2)	-	-	-	-	4,582	-	-	-
Number of Plots/Area	-	-	-	-	NA	497 (862.77)	7 sections, Not plotted (324.52 ac)	-
Available Plot Area/Occupancy	-	-	-	-	-	Sold out	Sold out	Available at 3 SEZs
Land Sale Unit Cost	-	-	-	-	Rs. 2,500,000 per ac.	-	-	-
Lease Unit Cost & Period	-	-	-	-	Rs. 100,000 per ac. for 99 years	Rs. 840/m2 for 99 years	Rs. 840/m2 for 99 years	NA
O&M Cost per Year	-	-	-	-	NA	NA	NA	NA
2. Basic Infrastructure & Land Acquisition								
Transportation	Road: 1km-SH (Kothavalasa-Vizianagaram), 30km-Vizianagaram, 40km-Vishakhapatnam Port & Airport	Road: abutment of SH (Kothavalasa-Vizianagaram), 36km-Vizianagaram, 34km-Vishakhapatnam Port & Airport	Road: 2km-SH (Araku-Vishakhapatnam), 40km-Vizianagaram, 30km-Vishakhapatnam Port & Airport	Road: 2.5km-NH26, Railway: 17km-Bobbili, Sea Port & Airport: 90km-Vishakhapatnam	Road: 0 km - SH 36, Railway: 5 km-Bobbili, Sea Port: 110 km-Vishakhapatnam, Airport: 110 km-Vishakhapatnam	Road: 0km-SH36, Railway: 2 km-Bobbili, Sea Port: 100 km-Vishakhapatnam, Airport: 100 km-Vishakhapatnam	Road: abutment of SH (Araku-Vishakhapatnam), 40km-Vizianagaram, 24km-Vishakhapatnam Port & Airport	Transportation system is quit convenient since Industrial Corridor 140 km long is developing along NH16
Access Road	1 km long to be improved	Non	2 km long to be improved	2.5 km long to be expanded	Non	Non	Non	-
Resettlement/Acquisition of Land	Required, Farmland and resident exit along Access road	Non	Required, Village exits along access road	Farmland with 6m wide & 1 km long acquired along access road	Non	Non	Individually developed	Unknown
Internal Road with Drainage	Required	Required	Required	Required	Required	Provided	Individually developed	-
Water Source & Supply	Groundwater or Vizianagaram municipal water supply	Groundwater or Vizianagaram municipal water supply	Groundwater or Vizianagaram municipal water supply	Groundwater or 15km-Peddagedda Reservoir	Bore wells: 40 ft. depth	Underground water	Individually developed	Godavari River, 385,000 m3/d
Power Supply & S/S	32 kVA Vizianagaram S/S	32 kVA Vizianagaram S/S	32 kVA Vizianagaram S/S	5km-32 kVA Saur S/S, 17km-220 kVA Growth Center Bobbili S/S	20 MW Coal thermal power plant at Existing Sugar Factory	220/132 kV S/S inside IP	Individually developed	Captive power plants (2 x 500 MW)
CETP & STP	Required	Required	Required	Required	CETP: 500 m3/d	Individually treated	Individually developed	CETP: 200 MLD, STP: 10 MLD to be provided
Solid Waste Management (TSDF)	TSDF required, Local Panchayat	TSDF required, Local Panchayat	TSDF required, Local Panchayat	TSDF required, Municipality Corporation & Bobbili SWMP	TSDF required, Municipality Corporation & SWMP	TSDF required, Municipality Corporation & Bobbili SWMP	Individually developed	TSDF & Sanitary landfill for a 25 year period to be provided
3. O&M System								
Management Office	-	-	-	-	NCS Sugars Ltd.	APIIC Growth Center Bobbili	APIIC Vizianagaram	APIIC Management Office
Common Facility	-	-	-	-	CPC: 3units x 10,000T Cold Storage, 2units x 30,000T Dry Warehouse, 600T Storage Silo, Quality Assurance Lab	-	-	One-Stop-Service Center
PPC/FCC for FP	-	-	-	-	25 FCCs within radius 30km	-	-	-
Scope of Operation	-	-	-	-	30km in radius	-	-	-
4. Evaluation								
1) Accessibility	Moderate	Excellent	Moderate	Excellent	Excellent	Excellent	Excellent	Excellent
2) Securing of Land	No Problem	No Problem	No Problem	No Problem	No Problem	Sold out	Sold out	No Problem
3) Site Condition	Flat Field	Hill with 30 m vertical drop	2 Hills with 50 m vertical drop	Flat Field	Flat Field	Reclaimed	Reclaimed	To be Reclaimed
4) Construction Cost of FP/FPU	Moderate	Costed Land Reclamation	Costed Land Reclamation	Moderate	Not applicable	Not applicable	Not applicable	Moderate
5) Development of Infrastructure	Fully Required	Fully Required	Fully Required	Fully Required	Not applicable	Developed	Individually developed	Excellent
6) Suitability to FP/FPU	Suitable	Suitable	Suitable	Suitable	Suitable	Unsuitable	Unsuitable	Unsuitable at Vishakhapatnam & Atchutapuram, Suitable at Rambilli
7) Environmental Issues	Serious	Non	Serious	Moderate	Non	Non	Non	Unknown
8) Relation among Producers & Consumers	Near Main Markets	Near Main Markets	Near Main Markets	Near Production Sites	Moderate	-	-	-
Overall Assessment	Moderate	Moderate	Unrecommended	Recommendable	Moderate	No Plots	No Plots	Recommendable (Rambilli)
Source: JICA Survey Team								
Note: NA is to be No Answer								

Attachment 15.5.2 Comparison of Potential Site for Food Park in Central Area

Land/FP/IP/SEZ	Bayyaram	Vatru	Ramasingavaram	Godavari MAFP	Krishna MFP	Peddapuram TFP	GMR FAPP
1. General	5	6	7	9	10	11	16
Location	Tallapudi, West Godavari	Pedapadu, West Godavari	Pedavegi, West Godavari	Khargone West Godavari	Agripalli, Krishna	Samarlakota, East Godavari	Kothapalli, East Godavari
Completion Year	-	-	-	to be completed on July 2016	Planned	Planned	Approved
Area (acre)	203	332.5	193.84	55.5	57.45	21.63	267 for Phase I (Total 916)
Type of Industry	-	-	-	Fish	-	Sweetmeats, Pickles, Mango jelly	SEZ based on Agro
Project Cost (Rs. Billion)	-	-	-	Rs. 1.5 Billion	Rs. 1.85 Billion	Rs. 98 Million	NA
Unit Project Cost (Rs. per m2)	-	-	-	6,679	7,952 per m2.	1,120	-
Number of Plots/Area	-	-	-	30 (area: 24.45 ac)	23 (17 ac)	29 (area: 12.56 ac)	50 (area: 240 ac)
Available Plot Area/Occupancy	-	-	-	Available	-	-	Available
Land Sale Unit Cost	-	-	-	Rs 1 crore per ac	NA	NA	NA
Lease Unit Cost & Period	-	-	-	Rs 25/ft2 for 8-10 years	-	-	-
O&M Cost per Year (Rs. per Year)	-	-	-	Around Rs 70 Million estimated	170,000,000	NA	NA
2. Basic Infrastructure & Land Acquisition							
Transportation	4km-SH151 (single lane), Railway: 30km-Kovvur, 88km-Eluru, Airport: 150km-Vijayawada, Seaport: 190km-Kakinada	0km-NH16 (double lane), Railway: 3km-Eluru, Airport: 75km-Vijayawada, Seaport: 240km-Kakinada	20km-NH 16 (double lane), 16km-Eluru - Jangareddygudem SH (single lane), Railway: 40km-Eluru, Airport: 110km-Vijayawada, Seaport: 280km-Kakinada	Road: NH214, Railway: 12km-Bhimavaram, Airport: 125km-Rajahmundry, Seaport: 120km-Kakinada, 280km-Visakhapatnam	16km-NH16, Railway: 30km-Vijayawada; Sea Port: 380km-Visakhapatnam; Airport: 30km-Vijayawada, 300km-Hyderabad	25km-NH16, Railway: 5km-Samarlakota, Port: 22 km-Kakinada, 150 km-Gangavaram and 170 km-Visakhapatnam, Airport: 160 km-Visakhapatnam	Road: 12km-NH16, Railway: 25km-Kakinada & Samalkot, Sea Port: 15 km-Kakinada, 153km-Visakhapatnam, Airport: 480km-Hyderabad, 210km-Vijayawada
Access Road	4km Local road & 1.5 km Rough road	0.5 km long	16 km long widened & paved	by AP	2km Rough road	1.5 km Rough road & 4km local road 4km to be improved	Beech Road to be expanded by ADB
Resettlement/Acquisition of Land	Required	Required	Required	Non	Non	Non	Resettlement place provided by GMR
Internal Road with Drainage	-	-	-	Main Road – 100 feet road with central lighting and greenbelt	15 m wide road	18 m wide x 250m, 12.2 wide x 1320m	9m wide, Single
Water Source & Supply	Lifting water from irrigation canal	Groundwater & Eluru canal	Groundwater	Canal water from irrigation Dept.	Groundwater, 750 m3/d	Bore wells or Samarlakota canal, 90 m3/d	Ground water, Spring near Gollaprolu & Samarlakota canal for Phase 1: 75 MLD
Power Supply & S/S	4km-32/11 kV Saggonda S/S	1.5km-132/33 kV Vatru S/S	2km-33/11 kV Ramasingavaram S/S	5500 kVA	33/11 kV S/S by APSPDCL	33/11 kV Peddapuram S/S with 5 MVA transformer	APTRASCO 132/33 kV Pithapuram S/S (15MW)
CETP & STP	-	-	-	-	150 KL STP	-	NA
Solid Waste Management (TSDF)	Local panchayat	Local panchayat	Local panchayat	Village panchayat waste service	5 solid waste dumping tanks	Local panchayat	Enterprises approved by the state
3. O&M System							
Management Office	-	-	-	Administration Center	Administration Center	Administrative & Service Center	-
Common Facility	-	-	-	CPC	CPC	Storage	Quality Assurance, Food Testing & Product Development Lab
PPC/FCC for FP	-	-	-	2PPCs, 9FCCs	4PPCs, 14FCCs	Non	Non
Scope of Operation	-	-	-	200km along coastline	200km in radius	Not applicable	Not applicable
4. Evaluation							
1) Accessibility	Inferior	Excellent	Moderate	Moderate	Moderate	Moderate	Moderate
2) Securing of Land	No Problem	No Problem	No Problem	No Problem	No Problem	No Problem	No Problem
3) Site Condition	Field with gentle slope in hill	Flat Field	Flat Field	Reclaimed	Hill	Flat Field	Flat Field
4) Construction Cost of FP/FPU	Not Expensive	Not Expensive	Not Expensive	Not Expensive	Not applicable	Not Expensive	Not Expensive
5) Development of Infrastructure	Fully Required (Costly)	Fully Required	Fully Required (Costly)	Developed	Not applicable	Satisfied	Not developed yet at present
6) Suitability to FP/FPU	Moderate	Suitable	Suitable	Suitable	Suitable	Suitable for MSME	Suitable
7) Environmental Issues	Non	Non	Non	Non	Non	Non	Non
8) Relation among Producers & Consumers	Far from Market	Near Main Markets	Near Production Site	Near Production Site & Markets	Near Production Site & Markets	Near Main Market	Near Main Market
Overall Assessment	Unrecommended	Recommendable	Moderate	Recommendable	Recommendable	Recommendable (MSME)	Recommendable

Note: NA is to be No Answer

Source: JICA Survey Team

Attachment 15.5.3 Comparison of Potential Site for Food Park in South Area

Land/FP/IP/SEZ		Bodduvaripalem FP	Pogurupali FP	Srini FP	Sri City	IFFCO Kisan SEZ	Naidupet IP	Naidupet MPSEZ	Mambattu IP II	Piler IP
1. General	No.	12	13	14	17	18	19	25	26	27
Location		Kodavalur, Nelloore	Gudipali, Chittoor	Chittoor	Chittoor & Nelloore	Nelloore	Naidupet, Nelloore	Naidupet, Nelloore	Tada, Nelloore	Piler, Chittoor
Completion Year		Planned	Planning	Oct. 2012	Operating/ Under developing	Operating/ Under developing	Operating	Operating	Operating	Planned
Area (acre)		120.89	460	142.8	Phase I: 7,800 ac, Phase II: 2,000 ac	2000 ac	1,244	2,588	104.54 for MSME, 283.16 in Total	639.00
Type of Industry		FP	Vegetables, Fruits pulp	Vegetables, Fruits pulp	Multi Product IP & SEZ	SEZ based on Agro	Light & FP	Light (Electrical,Pharmaceuticals & Chemicals, Textile) FP & Beverages	MSME	Multi Product
Project Cost (Rs. Billion)		NA	Not determined	122.68	NA	Rs. 6,000,000,000	Rs.2.1 Billion	Rs. 2.7 Billion	Rs.237 Million	NA
Unit Project Cost (Rs. perm2)			Not determined	Rs. 2123 perm2	-	-	Rs. 418 perm2	Rs. 257 perm2	Rs. 560 m2	
Number of Plots/Area		NA	Not determined	22 (area: 46.65 ac)	SEZ: 2,500 ac, DTIZ: 2,500 ac, FTWZ: 500 ac	50 (area: 240 ac)	229	18	63	154 , Area: 460.95
Available Plot Area/Occupancy		-	-	3 + 2 (0.5 ac to 4 ac)	SEZ: 30units DTIZ: 34units, Available	3 units Available	13+46, 50% occupied	3+1, 20% occupied	4+3	
Land Sale Unit Cost		NA	NA	-	NA	-	-	-	-	-
Lease Unit Cost & Period		NA	NA	Rs. 5 Million/ac for 99 years	-	4,000,000/ac for 33 years	-	NA	NA	NA
O&M Cost per Year (Rs. per Year)		NA	NA	Rs. 30 Million per year	NA	NA	NA	NA	NA	NA
2. Basic Infrastructure & Land Acquisition										
Transportation		Road- 0km-NH5, Railway Station: 20 KM-Nelloore, Airport:75 KM- Tirupathi, Seaport:30 KM- Krishnapatnam	15km-NH219, Railway: 15km-Kuppam STN, Sea Port: 200km-Chennai, Airport: 100km-Bangalore	Road: 12km-NH 4, Railway: 30km-Chittoor, Port: 170km-Chennai & Krishna Patnam, Airport: 170km-Chennai, Bengaluru	Road: 0km-NH16, Railway: 1.5km-Teda, 55km-Chennai, Sea Port: 100km-Krishnapatnam, 65km-Chennai, Airport: 75km-Tirupati, 75km-Chennai	Road: 0km-NH16 (S), Railway: 20 km-Nelloore, Sea Port: 50km-Krishnapatnam, 180 km-Chennai, Airport: 139km-Tirupati , 175km-Chennai, 385 km-Bangalore, 515 km-Hyderabad,	Road- 15 KM to NH5, Railway Station – 10 KM Naidupet, Airport- 60 KM Tirupathi, Seaport – 70 KM Krishnapatnam	Road- 15 KM to NH5, Railway Station – 10 KM Naidupet, Airport- 60 KM Tirupathi, Seaport – 70 KM Krishnapatnam	Road- Adjacent to NH5, Railway Station – 9 KM Sullurpet, Airport- 98 KM Chennai, Seaport – 83 KM Chennai	0km-NH71, Railway: 2km-Piler STN, Sea Port: 150km-Krishnapatnam, Airport: 75km-Tirupati
Access Road		18.2m Wide 245m Length	Local Road to be improved	Developed	Not required	Not required	Not applicable	Not applicable	Not applicable	Not required
Resettlement/Acquisition of Land		Non	Non	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Non
Internal Road with Drainage		Approach:4 lane 14m, Balance Roads:2 lane 7m, 3.1km long	Not planned yet	Internal grid connecting all plots, Double 2x2 with ROW:18m	18m wide, Double Lane	18m wide, Double Lane	MR5:4 lane 14m, Balance Roads:2 lane 7m, Drain: 9.9km	MR1:4 lane 18m, MR3&CR1:2 lane 7m, 7.7km Long	Approach:4 lane 14m, Balance Roads:2 lane 7m, 3.1km long	CR (Double) 36m W & MR (Single) 24m W
Water Source & Supply		Groundwater is available	Groundwater available	Bore Wells 4: 5-6 lack l/d	Somsila-Kandreu Reservoir, Rainwater harvest, Groundwater: 77,000 m3/d	13km 2Dia 900mmPipelines- Kanigiri reservoir: 7000MLD	Mamdi Kaluva Canal, Pipe:5.5km	Mamdi Kaluva Canal, Pipe:11km	Groundwater, Pipe:5.5 km	HNS Canal & Pincha River
Power Supply & S/S		132/33 kV Dagadarthi S/S	Pogurupali 33 kV S/S	11 kV	APTRASCO: 450 MW, Solar by Sri City: 8 MW	APTRASCO 132/33 kV S/S (100MW)	132/33 KV SS by APTRANSCO	132/33 KV SS by APTRANSCO	from APTRANSCO 132/ 33 kV SS	from APTRANSCO 132/ 33 kV SS
CETP & STP			Not planned yet	47,000 m3/d	Individually provided	Individually provided	NA	NA	NA	CETP & STP
Solid Waste Management (TSDF)		Industrial Waste - TSDF, Domestic Waste – Municipal Bins	Pogurupali Panchayat	Radam Infrastructure Pvt. Ltd for generator	Ramkyu Enterprise	Individually provided & Municipality	Industrial Waste - TSDF, Domestic Waste – Municipal Bins	Industrial Waste - TSDF, Domestic Waste – Municipal Bins	Industrial Waste - TSDF, Domestic Waste – Municipal Bins	TSDF & Piler Gram Panchayat
3. O&M System										
Management Office			NA	Visitor Center	IFFCO Center	CFC	CFC	CFC	CFC	Admin Building
Common Facility		CPC	CPC	CPC	Business Center & One stop service center, Custom office	Individually provided by unit	NA	Bonded Ware House Zone	NA	R&D training & Testing, Ware housing, Truck Parking
PPCFCC for FP		NA	Not planned yet	4PPCs, 44FCCs+ICC	Non	Non	-	-	-	-
Scope of Operation		-	-	200km in radius	Not applicable	Not applicable	-	-	-	-
4. Evaluation										
1) Accessibility		Excellent	Moderate	Excellent	Excellent	Excellent	Moderate	Moderate	Excellent	Moderate
2) Securing of Land		No Problem	No Problem	No Problem	No Problem	No Problem	Limited	Moderate	No Problem	No Problem
3) Site Condition		Flat Field	Hilly	Reclaimed	Reclaimed/Flat Field	Flat Field	Reclaimed	Reclaimed	Flat Field	Hilly Area with gentle slope
4) Construction Cost of FP/FPU		Not Expensive	Moderate	Not Expensive	Not Expensive	Not Expensive	Not Expensive	Not Expensive	Not Expensive	Costed Land Reclamation
5) Development of Infrastructure		Fully Required	Fully Required (Costly)	Developed	Excellent	Not developed yet at present	Developed	Developed	Fully Required	Fully Required
6) Suitability to FP/FPU		Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable	Suitable
7) Environmental Issues		Non	Non	Non	Non	Non	Non	Non	Non	Non
8) Relation among Producers & Consumers		Near Main Markets	Moderate	Excellent	Near Main Markets	Near Main Market	-	-	-	-
Overall Assessment		Recommendable	Moderate	Recommendable	Recommendable	Recommendable	Moderate	Recommendable	Recommendable (MSME)	Moderate

Source: JICA Survey Team

Note: NA is to be No Answer