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
Advance Version

Volume II
Attachments

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Japan International Cooperation Agency (JICA)

Nippon Koei Co., Ltd.

Kaihatsu Management Consulting, Inc.

Republic of India

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

SN.	Sub-Sector	Recent Policy Decisions
(a)	Agriculture	- 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. Muti 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	- 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.

SN.	Sub-Sector	Recent Policy Decisions
		- Identification of crop specific clusters and promotion of high value Horticulture crops including fruits, vegetables and flowers. - 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	I. <u>Milk Production and Productivity</u> - 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.

SN.	Sub-Sector	Recent Policy Decisions
		- Establishing 5-10 fodder block making in fodder surplus areas (like Godavari districts, Guntur, Krishna) through unemployed youth entrepreneurs- to supply fodder blocks to deficit areas of Rayalseema. - 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 Diary 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). II. Egg Sector - 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. III. Meat Sector - 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	- 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	- 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.

SN.	Sub-Sector	Recent Policy Decisions
		- Warehousing Corporation will access Rs. 2,500 million assistance under Warehouse Infrastructure Fund, announced by the Hon'ble Finance Minister, Govt. of India, for construction of Warehouse of 5,000 MTs and above capacity. - 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	(8)
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/AgricultralStats%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 underIrrigation (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)	(%)	Rank	(1,000 ha)	(%)	Rank
									(1,000 ha)											
Andhra Pradesh	160,205	4.9%	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%																		
Arunachal Pradesh	83,743	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%	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%	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%	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%	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%	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%	1,193	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%	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%	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%	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%	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%	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%	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%	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	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%	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%	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	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%	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%	1,116	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%	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	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%	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%	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%	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%	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%	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	0.0%	-	0	0.0%	-	0	0	0	0.0%	-		0	0.0%	0	0.0%	-	
Chandhigarh**	114	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%	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%	-	
Delhi	1,483	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%	-	
Puducherry	490	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%	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/indexl.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

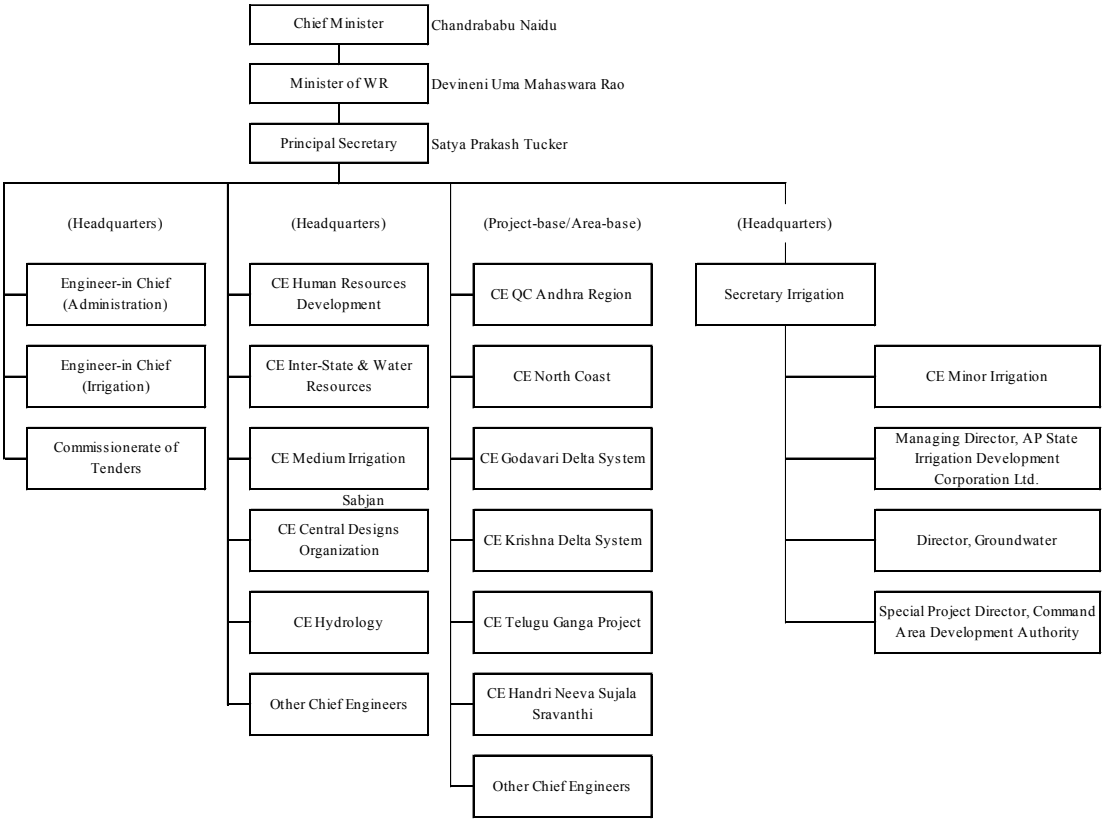
Source: India Water Portal (http://www.indiawaterportal.org/)
Customized Rainfall Information System (http://hydro.imd.gov.in/hydrometweb/)

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

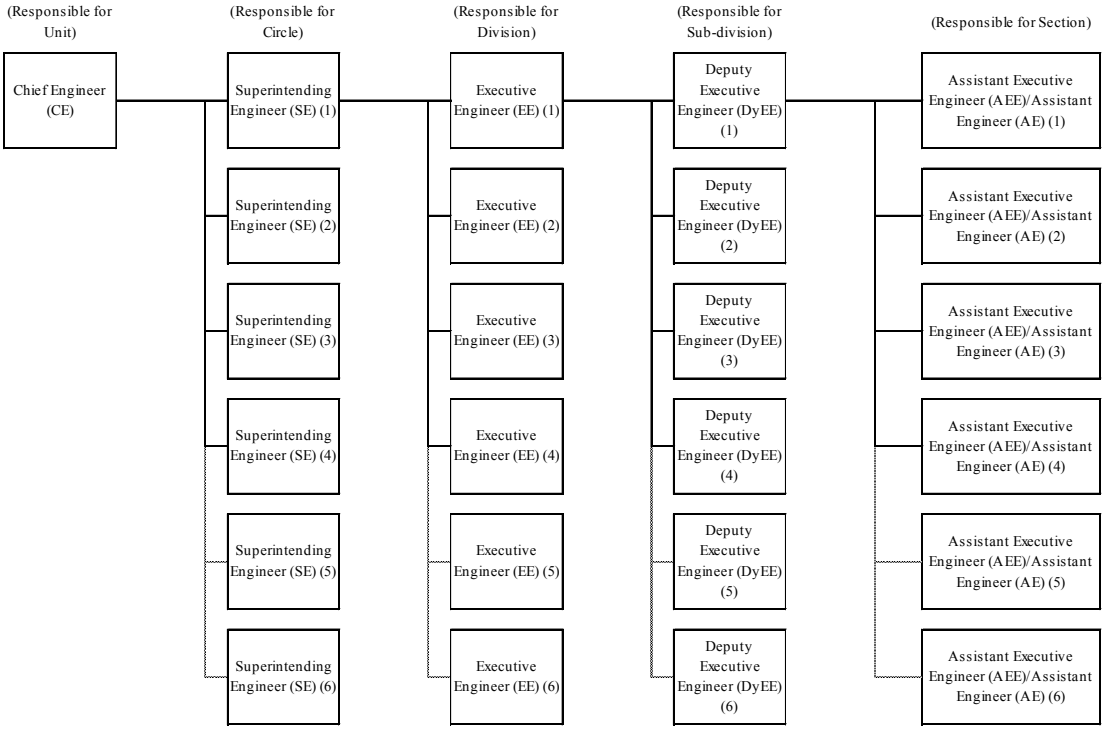
Source: India Water Portal (http://www.indiawaterportal.org/)

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)
- 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.	- 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.	- 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 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	Chitoor	Chitoor	Chitoor	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	Kanigir	Kanigiri	Tomato
5		Giddalur	Giddalur	Tomato
6		Martur	Martur	All Vegetables
7	Nellore	Nellore	Nellore	All Vegetables
8	Chitoor	Madanapalle	Madanapalle	Tomato
9			B.Kothakota	Tomato

No	District	AMC	Market Yard	Commodity
10		Valmikipuram	Valmikipuram	Tomato
11			Gurramkonda	Tomato
12			Chintaparthi	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		Jaggaiahpeta	Jaggaiahpeta
9	Guntur	Krosur	Krosur
10		Narsaraopet	Narsaraopet
11		Piduguralla	Gurajala
12		Chilakaluripeta	Chilakaluripeta
13	Prakasam	Giddalur	Giddalur
14		Maddippadu	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		Jaggaiahpet
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 CORPORACTION	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

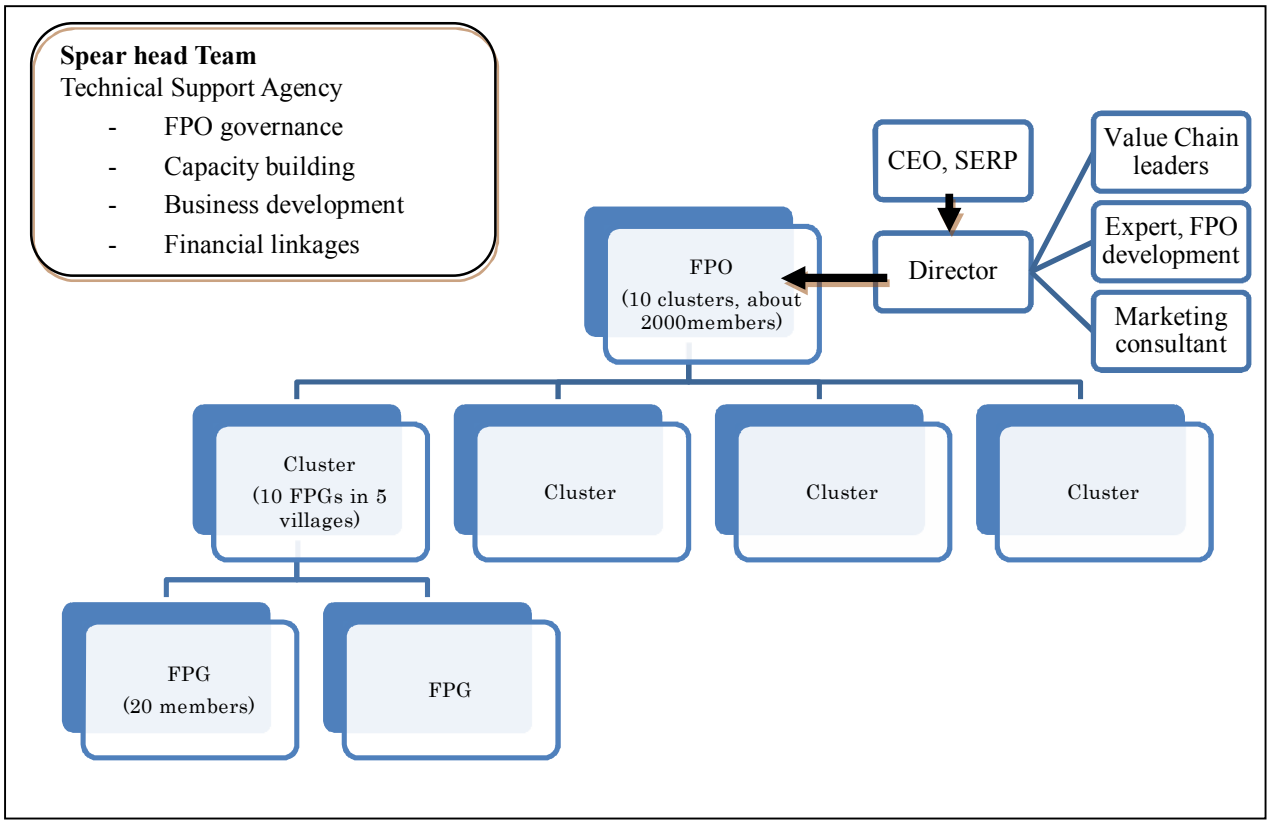
No.	District	RCC Roofs		AC / GCI sheet		Galvalume Sheets		Total	
		Quantity	Capacity	Quantity	Capacity	Quantity	Capacity	Quantity	Capacity
1	Srikakulam	7	4,200	43	24,300	0	0	50	28,500
2	Vizianagaram	10	5,720	38	20,240	0	0	48	25,960
3	Visakhapatnam	11	5,160	14	6,702	0	0	25	11,862
4	East Godavari	24	15,520	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	Visakhapatanm	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

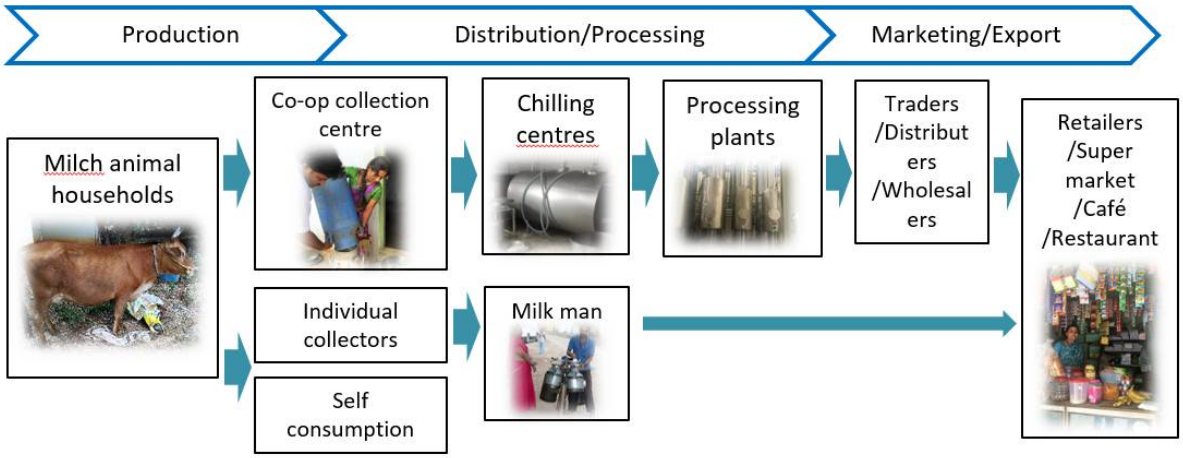
- FPO consists of 10 Clusters from 5 villages, which consists of 10 FPG of 20 members
- Basically FPG members are SHG member, though not all the members become FPG members, depending on their interest. This automatically makes an FPG a women group. FPG membership is only for women but all their family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

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 evolutional 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

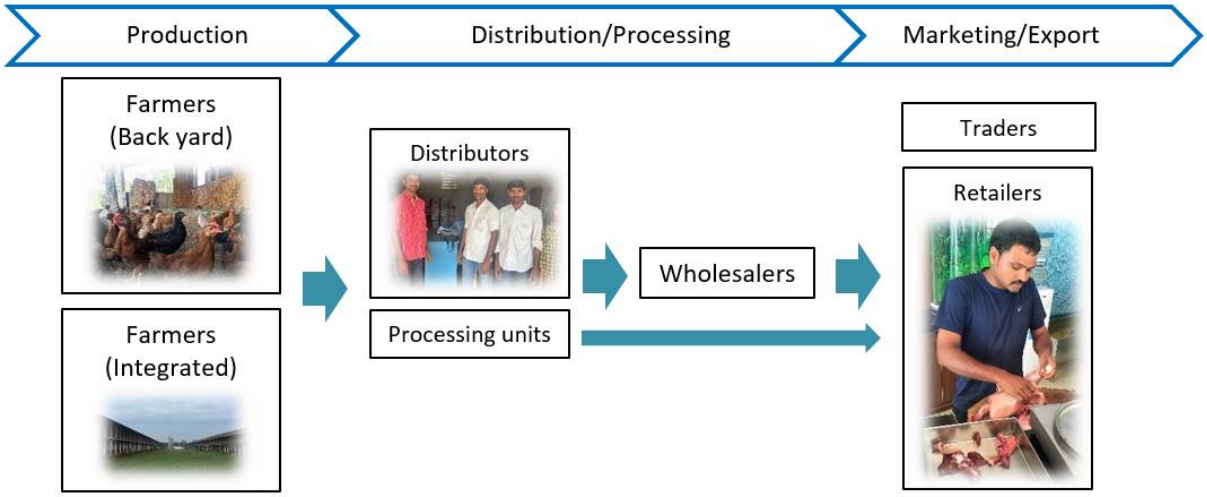
	Current situation	Challenges/Needs
Production	-The 6th state of milk production (8.4 million, 6% of all India). -Presence of Governmental support for breeding and veterinary health care services; and provision of inputs -Supply able to meet demand.	-Expensive feed and fodder price. -Stagnancy in milk 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	-Optimal use of processing infrastructure.	**<Needs>**
Marketing/ Export	-Competitive procurement and market among cooperatives, private sector and informal traders. -The lead organization decides the bench mark price based on procurement cost, processing cost and international demand etc.	-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 potions 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 Porltry

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

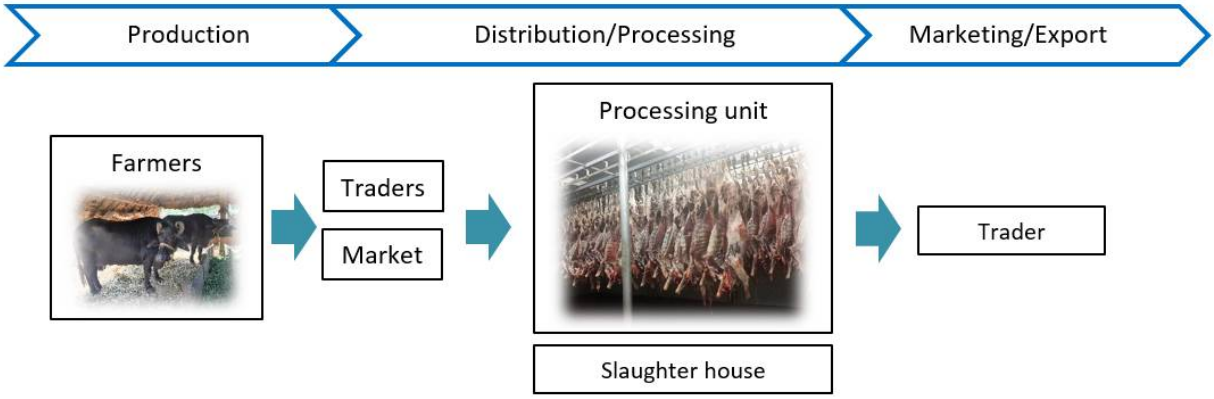
	Current situation	Challenges/Needs
Production	-The 2nd poultry in India (80 million, 11%) -Most of the eggs are produced by large scale units -Integrated farming in case of broiler units. -Increasing interests from Japanese companies -Government promoting backyard poultry	-Increasing feed cost -Unavailability 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. **<Needs>** -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	-Consumers prefer meat as fresh as possible. -Processed and frozen chicken meat is not popular products yet.	**<Needs>**
Marketing/ Export	-East and north east India as key markets -Growth potential for exporting egg; and processed meat and egg products	-Monopolized egg price decision by traders in key market (Kolkata). **<Needs>**

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 buffalos 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

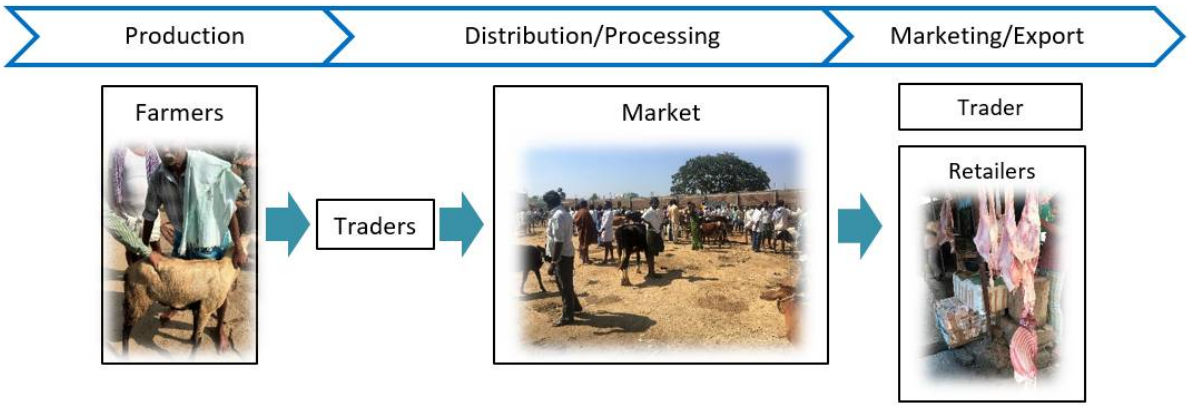
	Current situation	Challenges/Needs
Production	-The 6th among States in buffalo population in India (6.4 million, 6%). -Popular cattle in north and central regions where water resource is rich. -A family keep 2-3 buffaloes in general for milking purpose.	-Unavailability of labour and high cost of labour 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	-Over 10 y/o buffalos 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.	-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	-100% of products for export. -The best exportable product based on the international demand and sufficient supply. -Increasing demand of south east Asian countries.	-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	-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	-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	-Government's veterinary doctor inspects the processed meat at markets if the animal is free from diseases.	-Consumers prefer only meat which processed in front of themselves. **<Needs>**
Marketing/ Export	-Unorganized trading is in practice but the market is competitive and good income realization by farmers. -Demand is higher than supply.	-Only unorganized marketing is in practice. **<Needs>** Involvement of private sector is necessary to develop this potential industry.

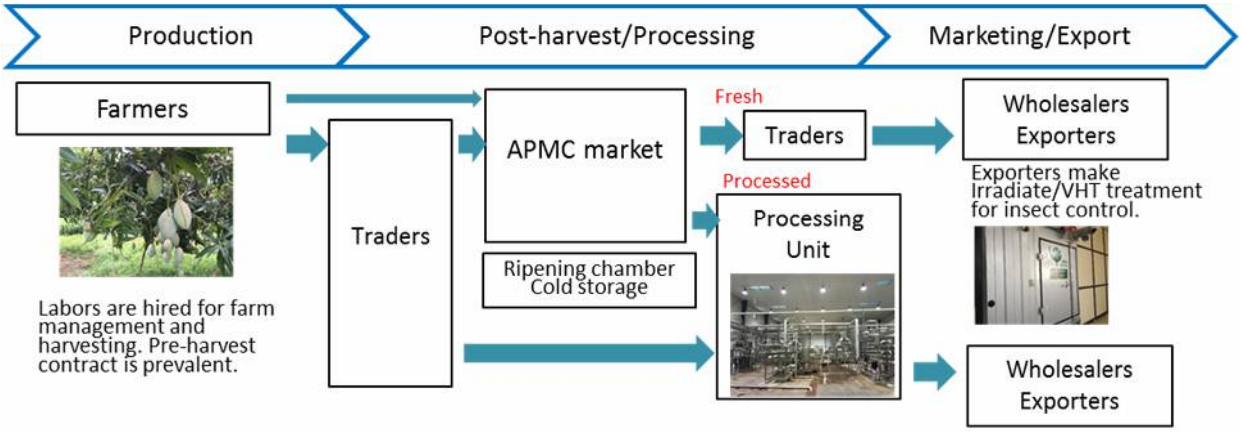
Source: JICA Survey Team

Attachment 6.6.1 Observation Summary of Value Chain of the Selected Produces

(1) Mango

India is the largest mango producing country and AP is the second largest producer in India. Major districts of production are Chittoor, Krishna and Vizianagaram. Despite the high production capacity, AP 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	-India is the world's largest producer of mango and AP 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]	-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	-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 Srini Food Park established procurement network with farmers. Japanese companies buy processed mango from them.	-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	-World fresh 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 2010.	-Brand image of Indian mango is not established. -Competition with other countries such as Kenya, Thailand, and Philippines is increased. -There is no traceability. **<Needs>**

[1] Indian Horticulture Database 2014

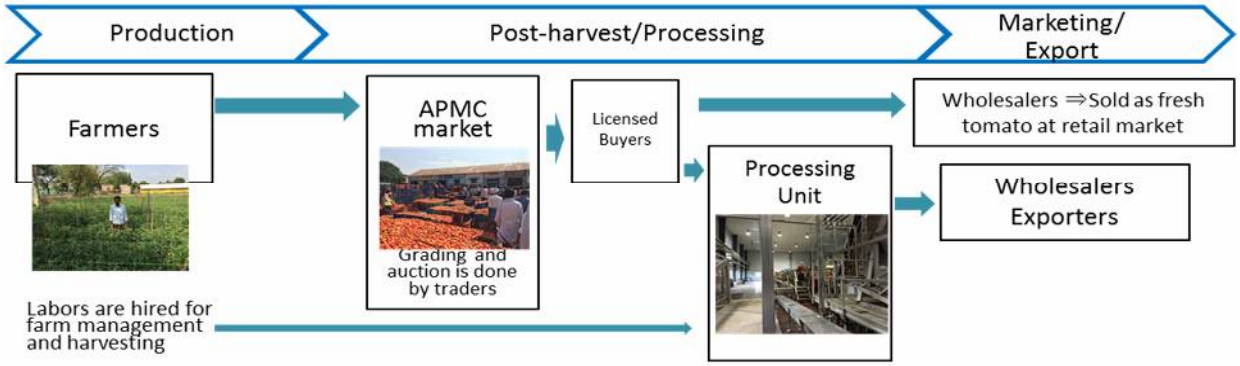
Process	Current situation	Challenges/Needs
	-World mango pulp production increased by 18.6% from 2010 to 2013, 38.8% since 2003. [2] -India' is the world biggest mango pulp producer with the share of more than 60% and it is increasing its share in recent years.	-Support for identifying necessary specification for target market and introduce standards and certificates. -Promote local packaging industry.

Source: JICA Survey Team

(2) Tomato

AP 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 AP is the largest tomato producer in India. AP produces 3,354,470 MT which accounts for 18% of tomato production in India. -Average yield in AP 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 around 100,000MT a year.	-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. -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
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	

[2] FAO STAT (http://faostat3.fao.org/home/E)
[3] Indian Horticulture Database 2014

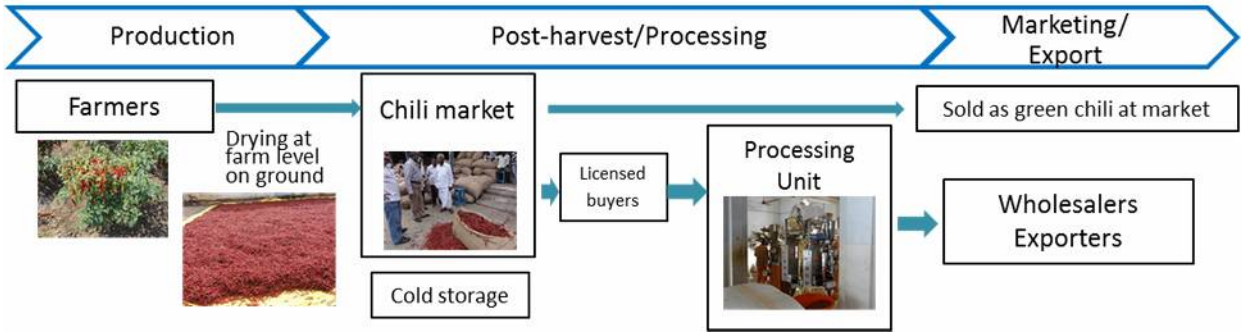
Process	Current situation	Challenges/Needs
	year.	to the processor. -Training for processors for upgrading and standardizing food processing operation such as contract farming, material handling, 5S, Kaizen, and food safety.

Source: JICA Survey Team

(3) Chili

AP 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 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.	-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 dying facility). -Technical support for proper post-harvest handling.
Marketing/ Export	-Chilli market in Guntur is the biggest in Asia with the 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]	-Indian chili has negative reputation in certain countries due to its unsafety. **<Needs>** -Proper quality test laboratory.

[4] FAOSTAT

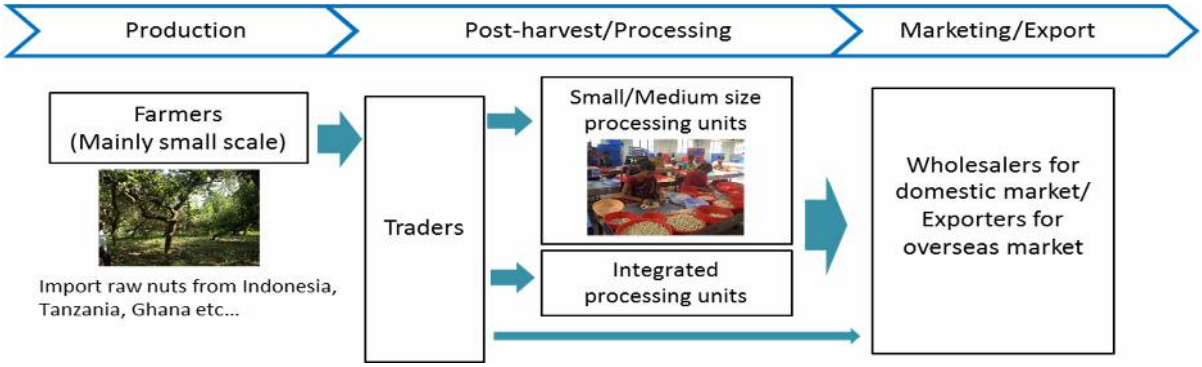
Process	Current situation	Challenges/Needs
	-India controls 60% of the 13,500 MT global spice oleoresins market even as China has emerged as a strong contender in paprika oleoresin, the most in-demand spice oil.[5]	

Source: JICA Survey Team

(4) Cashew

AP 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	-AP'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 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.	-There is no aggregate marketing practice while some FPOs dealing cashew initiated activities. -There is no marketing channel for farmers other than selling to traders at noncompetitive price. -There is few storage facilities to strive price fluctuation.

[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] AP Department of Horticulture

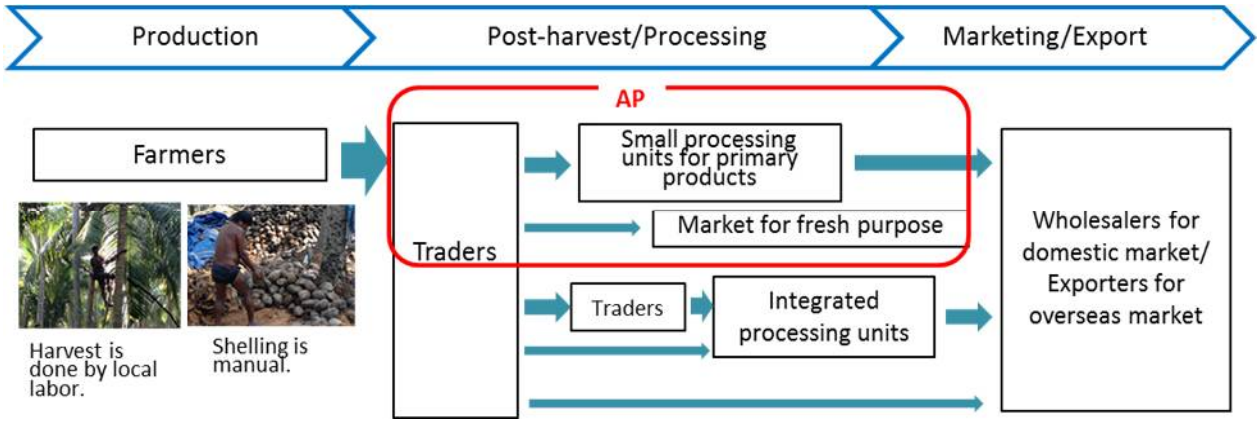
Process	Current situation	Challenges/Needs
	- Low application of mechanization in processing units and most process are done manually. - Processing industry creates local employment especially women as it is highly labor intensive work. -Main product of cashew nuts is kernel and there is not much other value added products.	-Manual processing leads to high production cost. -There is seasonal labor shortage. -Utilization of cashew apple is not explored. **<Needs>** -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	-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.	-Poor market infrastructure and no specialized market facility for cashew. -No mechanism is established for organic certification for cashew to sell at premium price. **<Needs>** -Market platform of cashew trade. -Support for branding of Indian (AP) 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 AP 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 AP 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	-India is the third largest producer (17%) in the world after Indonesia and Philippines. -AP'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 AP 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 skied local labor.	-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	-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).	-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	-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.	-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.

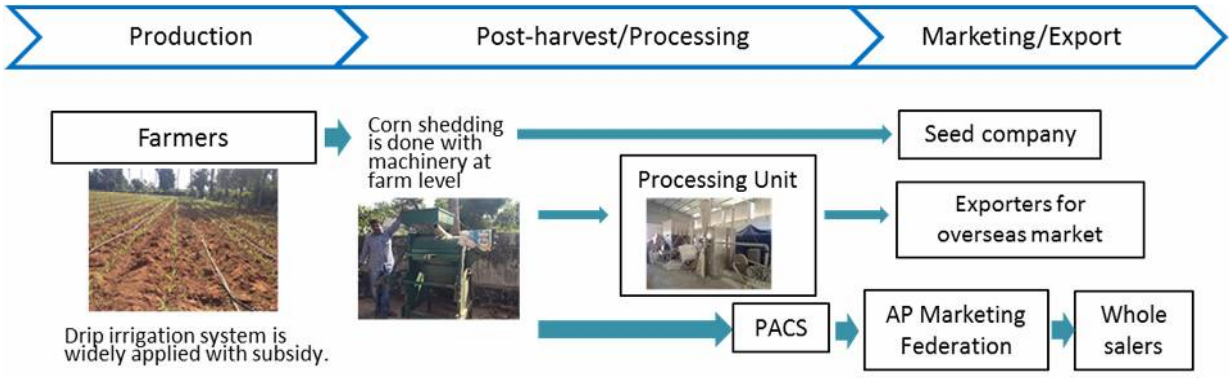
Source: JICA Survey Team

(6) Maize

AP 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	-AP'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 AP 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 AP -Drip irrigation is widely used in the cultivation areas.[10] -MSP is applied for maize and it stabilizes farmers' income.	-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	-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.	-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	-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]	-Marketing opportunity is untapped with big importing countries such as Japan. **<Needs>** -Analysis for required specification of industrial products and support for global marketing.

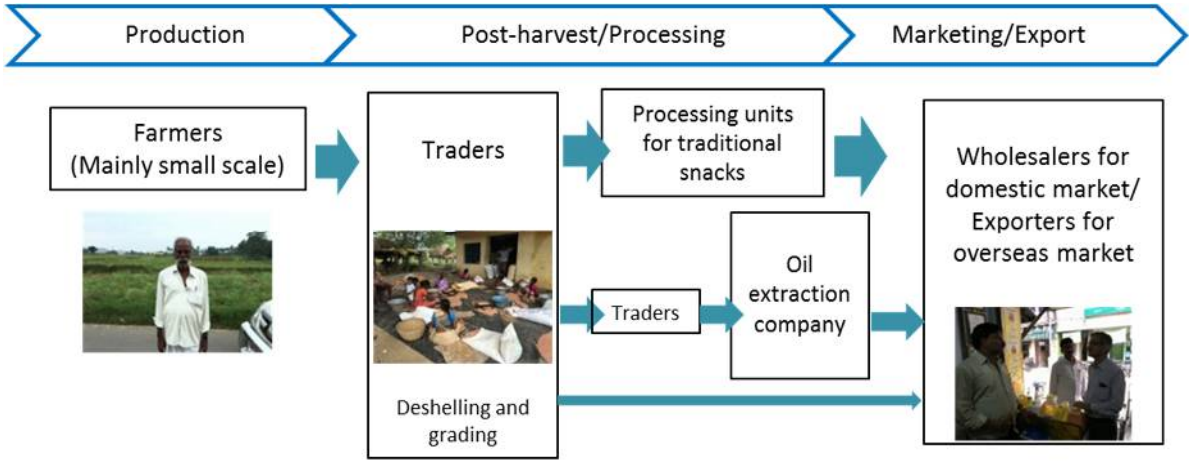
Source: JICA Survey Team

(7) Groundnut

AP 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] AP 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	-AP'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 India[12]. -Average yield of AP is 0.89MT/ha in 2013/14, which is much lower than Indian average of 1.75MT[13]. -Groundnut is grown where irrigation water is not available. It is considered as a chance crop. -Major production areas are Ananthapur, Kurnool and Chittoor.	-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	-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% respectively[14], although it still constitutes 25% of the oilseed crops in India. -There are only a couple of modern oil refineries in the state	-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	-There is no market infrastructure dealing with groundnuts. -Farmers have no option to sell their produce to traders.	-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.

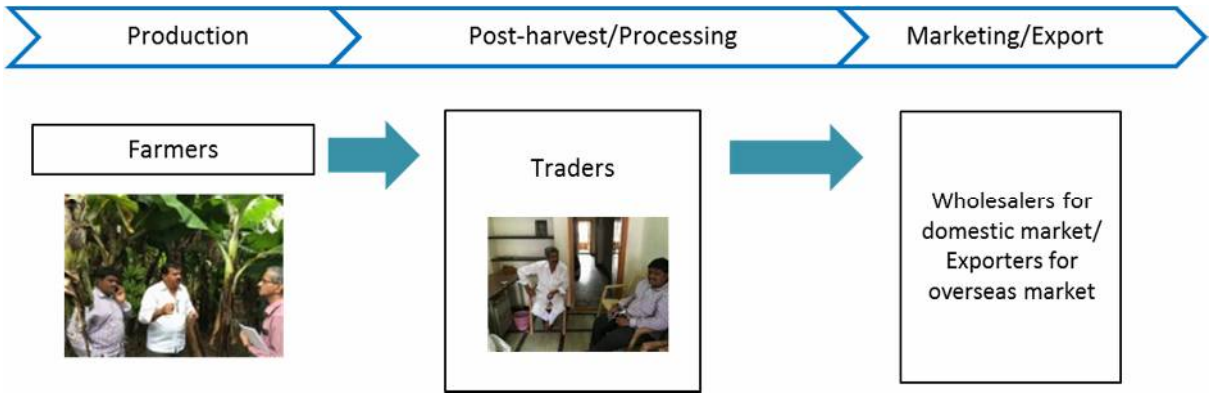
Source: JICA Survey Team

(8) Banana

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

[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	-India is the world's largest producer of banana. AP'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 India[15]. -Average yield of AP is 35MT/ha in 2013/14, which is similar to Indian average of 37MT.[16] -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. -Major production areas are East Godavari, Cadapa, Ananthapur, Vizianagaram and East Godavari.	-Productivity is just below national average and there is scope of improvement.
Post-harvest/ Processing	-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.	-Domestic demand for processed banana is limited (for baby foods, ice creams) and India is not competitive in international market.
Marketing/ Export	-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 2013[17].	-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.

AT-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.

AT-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.

AT-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.

AT-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

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.

AT-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.

AT-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 AT-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 AT-8.

8. Average Household Income and Expenditure

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

AT-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	2.90	0.82	0.09	0.91	2.30	-	2.30	1.59	-	1.59	1.09	0.37	1.46	0.67	0.20	0.87
Cultivated Land (rainfed)	0.38	0.39	0.77	0.07	0.20	0.27	-	0.22	0.22	-	-	-	0.09	0.60	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	2.30	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

AT-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

AT-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	145083.3	79.3	81900.0	63.9	61541.7	51.8	114786	73.7	61541.7	51.8	37208.3	36.7
Fruits	2916.7	1.6	1150.0	0.9	250.0	0.2	40936	26.3	250.0	0.2	583.3	0.6
Others crops	600.0	0.3	1333.3	1.0	3866.7	3.3	0.0	0.0	3866.7	3.3	3333.3	3.3
By-products	246.7	0.1	1240.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Livestock/Dairy	6533.3	3.6	10783.3	8.4	9766.7	8.2	0.0	0.0	9766.7	8.2	9750.0	9.6
Fishing/Aquaculture	0.0	0.0	0.0	0.0	0.0	0.0	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	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	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	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	0.0	0.0	0.0	0.0	0.0	0.0
Wage Labourer (casual work)	3600.0	2.0	2000.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	500.0	0.5
Agricultural Labourer	11433.3	6.2	16900.0	13.2	12383.3	10.4	0.0	0.0	12383.3	10.4	9666.7	9.5
Salary	7333.3	4.0	7000.0	5.5	4133.3	3.5	0.0	0.0	4133.3	3.5	7783.3	7.7
Pension	600.0	0.3	2400.0	1.9	800.0	0.7	0.0	0.0	800.0	0.7	0.0	0.0
Loan	2500.0	1.4	833.3	0.7	26083.3	22.0	0.0	0.0	26083.3	22.0	32533.3	32.1
Others	2185.0	1.2	2600.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	0.0	0.0	0.0	0.0	0.0	0.0	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

AT-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	33.0	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	0.0	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	4.0	6670	5.6	1525	1.6	0	0.0	1525	1.6	1120	1.0
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	10.0	25283	26.3	22550	21.0
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	0.0
Loan repayment	7465	5.1	5433	4.6	6783	7.1	0	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	0.0	0	0.0
Interest payout	240	0.2	40	0.0	1850	1.9	0	0.0	1850	1.9	818	0.8
Remittance	17	0.0	17	0.0	33	0.0	0	0.0	33	0.0	25	0.0
Maintenance/repair to assets	4017	2.7	5127	4.3	1867	1.9	0	0.0	1867	1.9	100	0.1
Insurance	397	0.3	0	0.0	458	0.5	0	0.0	458	0.5	277	0.3
Others	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	147510	100.0	118214	100.0	95982	100.0	132938	100.0	95982	100.0	107369	100.0

Source: JICA Household Survey 2016

9, Post harvest Activities

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

AT-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.

AT-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
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.

AT-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 AT-15.

AT-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.

AT-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 Handiling	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.

AT-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 AT-18.

AT-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:

AT-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:

AT-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:

AT-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 AT-21.

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.

AT-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.

AT-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

AT-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

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.

AT-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).

AT-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.

AT-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.

AT-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	Torrigedda 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	Araniar 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	Krishnaprum 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	Vottigedda Reservoir	Vengalaraya Sagaram	Peddagedda Reservoir	Andra Reservoir	Torrigedda Pumping Scheme	Thammileru 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 & Bal	J.M.Valasa	Salur	Pachipenta	Mentada	Sithanagaram	Chinthalapudi	Pamuru	Lingasamudram	Karvetinagaram
Village		Pedankalam	Rawada	Laxmipuram	Kesali	Andra	Purushottapatnam	Nagireddgudem	Lakshmi Narasapuram	V.R.Kota	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	Y/N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Land Acquisition	Y/N	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		Araniar Reservoir	Buggavanka	Upper Pennar	Pennar Kumudvathi	Maddigedda Reservoir	Narayanapuram Anicut	Raiwada Reservoir	Siva Bhashyam Sagar	Muniyeru	DR & DM Channels
District		Chittoor	Kadapa	Ananthapuramu	Ananthapuramu	East Godavari	Srikakulam	Visakhapatnam	Kurnool	Krishna	Nellore
Mandal		Pichatur Mandal	C. K. Dinne	Ramagiri	Parigi	Addateegala	Burja	Devarapalli	Kothapalle	Vatsavai	Dagadarthi
Village		Pichatur	Ippapenta	Peruru	Konapuram	Addateegala	Narayanapuram	Devarapalli	Kottalacheruvu	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	Y/N	Y		Y	Y	Y	Y	Y		Y	Y
Land Acquisition	Y/N	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		Vottigedda Reservoir		Vengalaraya Sagaram		Peddagedda Reservoir		Andra Reservoir		Torrigedda Pumping Scheme		Thammileru Reservoir Scheme		Mopadu Reservoir System		Veeraraghavani Kota Anicut System		Krishnapuram Reservoir	
District			Vizianagaram		Vizianagaram		Vizianagaram		Vizianagaram		Vizianagaram		East Godavari		West Godavari		Prakasam		Prakasam		Chittoor	
Project Type			Diversion		Dam		Dam		Dam		Dam		Lift		Dam		Dam		Diversion		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**		**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)
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**		**5.3**		**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)	65%	(3.3)	55%	(2.8)	80%	(4.0)	-	(0.0)	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)
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
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**		**28.7**		**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	Araniar Reservoir		Buggavanka		Upper Pennar		Pennar Kumudvathi		Maddigedda Reservoir		Narayanapuram Anicut		Raiwada Reservoir		Siva Bhashyam Sagar		Muniyeru		DR & DM Channels	
District			Chittoor		Kadapa		Ananthapuramu		Ananthapuramu		East Godavari		Srikakulam		Visakhapatnam		Kurnool		Krishna		Nellore	
Project Type			Dam		Dam		Dam		Diversion		Dam		Diversion		Dam		Dam		Dam		Diversion (Escape Water)	
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)
1-2 Project Note is already prepared.	-	(5)			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**		**5.0**		**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)
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
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 (1/13)

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 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												
					(DD-MM-SS)	(DD-MM-SS)	(Y/N)	(ha)	(%)	(MCM)	(month)	(MCM)	(%)	(%)	(Y/N)	(Y/N)	(Rs.)	
01-01	Yetibatti Groyne and Channel Sy	Srikakulam	Sompeta	J.Pottangi	18-54-36	84-31-44	N	546	20%	1.911	2.0	3.710	60%	0%	Y	N	29,850,000	Isolated
01-02	Sankujodu	Srikakulam	Mandasa	Makarajola	18-49-28	84-28-37	N	142	20%	0.495	2.0	3.060	60%	0%	Y	N	8,520,000	Isolated
01-03	Dabarsingi Reservoir	Srikakulam	Mandasa	Gopalasai	18-52-40	84-23-00	N	451	25%	0.077	2.0	0.960	64%	0%	Y	N	24,830,000	Isolated
01-04	Meduri Krishnamma	Srikakulam	Rajam	Boddavalasa	18-23-45	83-41-22	N	85	14%	0.298	1.0	0.580	65%	70%	Y	N	5,510,000	Narayanapuram Anicut
01-05	Dora	Srikakulam	Regidi Amadalavala	Korlavalasa	18-30-08	83-39-51	N	40	10%	0.134	1.0	0.270	66%	70%	Y	N	3,130,000	Narayanapuram Anicut
01-06	Beruvani	Srikakulam	Vangara	T.D.Valasa	18-23-31	83-24-34	N	40	15%	0.122	1.0	0.270	66%	75%	Y	N	3,130,000	Isolated
01-07	Govinda Sagaram	Srikakulam	Kanchili	Dola Govindapuram	19-02-18	84-33-22	N	341	10%	1.193	1.0	2.320	62%	70%	Y	N	19,020,000	Isolated
01-08	Siddi	Srikakulam	Ichapuram	Bellupada	19-07-18	84-41-59	N	142	10%	0.496	2.0	0.960	63%	70%	Y	N	8,520,000	Isolated
01-09	Rangasagaram	Srikakulam	Saravakota	Gorribanda	18-37-18	84-02-39	N	668	5%	2.218	2.0	4.540	60%	70%	Y	N	36,290,000	Isolated
01-10	Pedda	Srikakulam	Saravakota	Vaba	18-36-45	84-04-14	N	44	23%	0.167	1.0	3.440	60%	0%	Y	N	3,340,000	Isolated
01-11	Pedda	Srikakulam	Tekkali	Vrk Puram	18-36-47	84-11-50	N	66	8%	0.231	1.0	0.450	65%	70%	Y	N	4,500,000	Isolated
01-12	Pedda	Srikakulam	Nandigam	Madanapuram	18-41-20	84-16-15	N	51	12%	0.150	1.0	0.350	65%	60%	Y	N	3,710,000	Isolated
01-13	Pedda	Srikakulam	Nandigam	Haridasupuram	18-41-10	84-20-20	N	68	10%	0.239	1.0	0.460	66%	70%	Y	N	4,610,000	Isolated
01-14	Patnaikuni	Srikakulam	Nandigam	Deenabandupuram	18-43-32	84-15-31	N	84	8%	0.296	1.0	0.570	64%	70%	Y	N	5,450,000	Isolated
01-15	Padmanabhasagaram	Srikakulam	Nandigam	Sagarampeta	18-42-20	84-17-40	N	143	6%	0.499	3.0	0.970	64%	60%	Y	N	8,570,000	Isolated
01-16	Bannugai	Srikakulam	Nandigam	Nowgam	18-41-03	84-16-43	N	56	5%	0.196	1.0	0.380	65%	60%	Y	N	3,980,000	Isolated
01-17	Siddisagaram	Srikakulam	Nandigam	Kaputemburu	18-41-31	84-18-20	N	74	7%	0.258	1.0	0.500	66%	70%	Y	N	4,930,000	Isolated
01-18	Kondeti	Srikakulam	Nandigam	Turakalakota	18-42-16	84-20-08	N	43	16%	0.149	1.0	0.290	64%	70%	Y	N	3,290,000	Isolated
01-19	Kotha	Srikakulam	Jalumuru	Yerrannapeta	18-31-53	84-05-06	N	49	35%	0.173	1.0	0.340	64%	0%	Y	N	3,610,000	Isolated
01-20	Pedda	Srikakulam	Jalumuru	Lingalapadu	18-30-14	84-04-01	N	117	38%	0.263	2.0	0.790	63%	0%	Y	N	7,200,000	Isolated
01-21	Neradi Banda -Voora Banda	Srikakulam	Jalumuru	Yerrannapeta	18-31-50	84-05-07	N	71	61%	0.170	1.0	0.480	66%	0%	Y	N	4,770,000	Isolated
01-22	Pedda	Srikakulam	Polaki	Thalasamudram	18-21-34	84-04-10	N	73	62%	0.065	1.0	0.490	64%	0%	Y	N	4,870,000	Isolated
01-23	Peddi Naidu	Srikakulam	Meliaputti	Pedda Padmapuram	18-45-31	84-09-46	N	125	15%	0.438	3.0	0.850	64%	0%	Y	N	7,620,000	Isolated
01-24	Pedda	Srikakulam	Meliaputti	Pedda Padmapuram	18-45-15	84-08-34	N	67	15%	0.234	2.0	0.450	63%	0%	Y	/V	4,560,000	Isolated
01-25	Chintalagating	Srikakulam	Meliaputti	Meliaputti	18-46-34	84-10-32	N	57	16%	0.214	1.0	0.380	64%	0%	Y	N	4,030,000	Isolated
01-26	Siddaptruni	Srikakulam	Meliaputti	Bharinikota	18-46-33	84-10-23	N	52	13%	0.180	1.0	0.350	66%	0%	Y	N	3,760,000	Isolated
01-27	Sekharapatraikuni	Srikakulam	Meliaputti	Shekharapuram	18-46-08	84-13-36	N	97	13%	0.225	2.0	0.660	64%	0%	Y	N	6,140,000	Isolated
01-28	Pedda	Srikakulam	Meliaputti	Karajada	18-46-28	84-21-32	N	99	15%	0.375	2.0	0.670	63%	0%	Y	N	6,250,000	Isolated
01-29	Voora	Srikakulam	Etcherla	Kuppili	18-10-34	83-48-32	N	81	17%	0.263	3.0	0.550	63%	0%	Y	N	5,300,000	Narayanapuram Anicut
01-30	Yellappa	Srikakulam	Etcherla	A.A.Valasa	18-16-13	83-47-18	N	41	12%	0.144	1.0	0.280	64%	0%	Y	N	3,180,000	Narayanapuram Anicut
01-31	Potnuru	Srikakulam	Laveru	Adapaka	18-16-18	83-44-55	N	61	15%	0.212	1.0	0.410	66%	0%	Y	N	4,240,000	Narayanapuram Anicut
01-32	Neelapuvani	Srikakulam	Laveru	Chinnakothakota	18-13-14	83-44-56	N	101	21%	0.354	1.0	0.690	63%	0%	Y	N	6,350,000	Narayanapuram Anicut
01-33	Pydayyavalasa Anicut Across R	Srikakulam	Laveru	Pydayyavalasa	18-17-44	83-43-00	N	304	0%	1.062	1.0	2.060	61%	0%	Y	N	17,070,000	Narayanapuram Anicut
01-34	Gorlevani	Srikakulam	Laveru	Bejjipuram	18-13-15	83-44-55	N	61	20%	0.212	2.0	0.410	63%	0%	Y	N	4,240,000	Narayanapuram Anicut
01-35	Vempalavani	Srikakulam	Laveru	Adapaka	18-13-15	83-44-55	N	81	20%	0.283	2.0	0.550	66%	0%	Y	N	5,300,000	Narayanapuram Anicut
01-36	Arthamuru Anicut Across Konda	Srikakulam	Ranasthalam	Arjunavalasa	18-12-00	83-37-08	N	304	20%	1.062	3.0	2.060	63%	0%	Y	N	17,070,000	Narayanapuram Anicut
01-37	Vijayaramasagaram	Srikakulam	Ranasthalam	Kotapalem	18-07-50	83-44-57	N	121	17%	0.425	2.0	0.820	61%	0%	Y	N	7,410,000	Narayanapuram Anicut
01-38	Ramasagaram	Srikakulam	Ranasthalam	D.Palavalasa	18-09-31	83-37-00	N	101	28%	0.354	3.0	0.690	63%	0%	Y	N	6,350,000	Narayanapuram Anicut
01-39	Lankala	Srikakulam	Ranasthalam	Patharlapalli	18-07-55	83-44-55	N	101	20%	0.354	3.0	0.690	65%	0%	Y	N	6,350,000	Narayanapuram Anicut
01-40	Singasagaram	Srikakulam	G.Sigadam	Niddam	18-22-18	83-42-52	N	152	26%	0.531	3.0	1.030	63%	0%	Y	N	9,040,000	Narayanapuram Anicut
01-41	Salivani	Srikakulam	G.Sigadam	Seetampeta	18-24-44	83-43-26	N	89	18%	0.311	3.0	0.550	61%	0%	Y	N	5,720,000	Narayanapuram Anicut
01-42	Pedda	Srikakulam	Ponduru	Ponduru	18-21-04	83-45-41	N	75	27%	0.262	3.0	0.510	64%	0%	Y	N	4,980,000	Narayanapuram Anicut
01-43	Pedda	Srikakulam	Ponduru	Rapaka	18-21-13	83-46-52	N	57	18%	0.201	3.0	0.390	63%	0%	Y	N	4,030,000	Narayanapuram Anicut
01-44	Nalla System	Srikakulam	Pathapatnam	Labara	18-41-00	84-05-48	N	101	15%	0.211	2.0	0.690	61%	90%	Y	N	6,350,000	Isolated
01-45	Pasi System	Srikakulam	Pathapatnam	Pasigangupeta	18-43-55	84-01-59	N	55	16%	0.223	2.0	0.370	63%	90%	Y	N	3,920,000	Isolated
01-46	Pedda	Srikakulam	Pathapatnam	Singupuram	18-41-09	84-05-07	N	53	15%	0.237	2.0	0.360	65%	90%	Y	N	3,820,000	Isolated
01-47	Yerra	Srikakulam	Pathapatnam	Tiddimi	18-42-15	84-05-47	N	49	16%	0.207	2.0	0.330	64%	90%	Y	N	3,610,000	Isolated
01-48	Pedda	Srikakulam	Pathapatnam	Chakipalli	18-45-27	84-03-44	N	49	16%	0.241	2.0	0.330	63%	90%	Y	N	3,610,000	Isolated
01-49	Krishnasagaram	Srikakulam	Pathapatnam	Gopalapuram	18-40-29	84-07-45	N	51	16%	0.201	2.0	0.340	64%	90%	Y	N	3,710,000	Isolated
01-50	Voora	Srikakulam	Pathapatnam	Makivalasa	18-44-26	84-02-41	N	61	15%	0.087	1.0	0.410	63%	90%	Y	N	4,240,000	Isolated
01-51	Pedda System	Srikakulam	Pathapatnam	Gopalapuram (Chakipa	18-45-29	84-07-29	N	68	15%	0.241	2.0	0.460	65%	90%	Y	N	4,610,000	Isolated
01-52	Pedda	Srikakulam	Pathapatnam	Rowthupuram	18-45-14	84-03-24	N	49	16%	0.196	2.0	0.330	64%	90%	Y	N	3,610,000	Isolated
01-53	Jaggulavani	Srikakulam	Pathapatnam	Korasavada	18-43-19	84-03-22	N	57	16%	0.224	2.0	0.380	63%	90%	Y	N	4,030,000	Isolated
01-54	Asarlasagaram	Srikakulam	Pathapatnam	Temburu	18-37-43	84-07-05	N	344	8%	1.203	2.0	2.340	60%	75%	Y	N	19,180,000	Isolated
01-55	Gudivada	Srikakulam	Palakonda	Lumburu	18-38-10	83-45-00	N	273	39%	0.956	1.0	1.860	61%	0%	Y	N	15,430,000	Isolated
01-56	Veerasagaram	Srikakulam	Palakonda	Navagam	18-38-32	83-45-40	N	44	36%	0.153	1.0	0.300	66%	0%	Y	N	3,340,000	Isolated
01-57	Pedda	Srikakulam	Santhakaviti	Mamidipalli	18-26-25	83-44-19	N	64	50%	0.224	2.0	0.430	64%	0%	Y	N	4,400,000	Narayanapuram Anicut
01-58	Pothunaidu	Srikakulam	Santhabommali	Kakarapalli	18-30-14	84-13-14	N	60	22%	0.260	2.0	0.410	65%	90%	Y	N	4,190,000	Isolated
01-59	Pedda	Srikakulam	Kotabommali	Sowdam	18-29-40	84-04-45	N	195	21%	0.850	1.0	1.330	63%	90%	Y	N	11,320,000	Isolated
01-60	Pedda	Srikakulam	Kotabommali	Tilaru	18-28-27	84-05-15	N	49	24%	0.210	2.0	0.330	63%	90%	Y	N	3,610,000	Isolated
01-61	Pedda	Srikakulam	Kotabommali	Tatiparthi	18-33-41	84-06-16	N	62	21%	0.270	2.0	0.420	60%	90%	Y	N	4,290,000	Isolated
01-62	Ramasagaram	Srikakulam	Kotabommali	Masahebpeta	18-33-06	84-06-59	N	40	25%	0.170	1.0	0.280	64%	90%	Y	N	3,130,000	Isolated
01-63	Jogamayya	Srikakulam	Srikakulam	Venkatapuram	18-23-32	83-56-51	N	49	18%	0.173	1.0	0.340	63%	0%	Y	N	3,610,000	Isolated
01-64	Pedda	Srikakulam	Srikakulam	Alikam	18-22-12	83-56-43	N	63	25%	0.220	2.0	0.430	65%	0%	Y	N	4,350,000	Isolated
01-65	Pedda	Srikakulam	Srikakulam	Thyandemvalasa	18-21-22	83-56-41	N	49	24%	0.173	1.0	0.340	64%	0%	Y	N	3,610,000	Isolated
01-66	Voora	Srikakulam	Srikakulam	Peddapadu	18-18-51	83-55-54	N	49	27%	0.171	1.0	0.330	63%	0%	Y	N	3,610,000	Isolated
01-67	Vorra	Srikakulam	Srikakulam	Kasimvalsa	18-24-11	83-55-26	N	45	24%	0.157	1.0	0.300	64%	0%	Y	N	3,400,000	Isolated
01-68	Vorra	Srikakulam	Srikakulam	Sanivada	18-18-02	83-56-33	N	52	25%	0.183	1.0	0.350	64%	0%	Y	N	3,760,000	Isolated
01-69	Vorra	Srikakulam	Srikakulam	Balivada	18-14-03	83-57-22	N	51	25%	0.177	1.0	0.340	63%	0%	Y	N	3,710,000	Isolated
01-70	Peddagundam	Srikakulam	Srikakulam	Ippili	18-14-57	83-57-43	N	51	25%	0.178	1.0	0.350	65%	0%	Y	N	3,710,000	Isolated
01-71	Nalla	Srikakulam	Gara	Srikurmam	18-16-07	84-00-14	N	45	24%	0.156	1.0	0.300	64%	0%	Y	N	3,400,000	Isolated
01-72	Pedda	Srikakulam	Gara	Korlam	18-16-42	84-03-09	N	42	24%	0.156	1.0	0.290	63%	0%	Y	N	3,240,000	Isolated
01-73	Edula	Srikakulam	Sarubujjili	Chinna Shalantri	18-30-00	83-54-59	N	42	19%	0.148	1.0	0.290	64%	0%	Y	N	3,240,000	Isolated
01-74	Pedda	Srikakulam	Sarubujjili	Sarubujjili	18-32-20	83-55-27	N	76	13%	0.267	3.0	0.520	64%	0%	Y	N	5,030,000	Isolated
01-75	Pedda	Srikakulam	Sarubujjili	Kottha Kota	18-30-22	83-53-46	N	193	20%	0.677	3.0	1.310	62%	0%	Y	N	11,210,000	Isolated
01-76	Sylada	Srikakulam	Sarubujjili	Kondavalasa	18-27-30	83-54-42	N	88	15%	0.310	2.0	0.600	65%	0%	Y	N	5,670,000	Isolated
01-77	Tamara	Srikakulam	L.N.Peta	Embaram	18-25-11	84-01-45	N	107	22%	0.374	3.0	0.730	65%	0%	Y	N	6,670,000	Isolated
01-78	Kanapala	Srikakulam	L.N.Peta	Gottipalli	18-38-42	83-55-17	N	70	14%	0.245	3.0	0.480	65%	0%	Y	N	4,720,000	Isolated
01-79	Laxminaidu	Srikakulam	L.N.Peta	Jagannadapuram	18-38-51	83-55-14	N	58	12%	0.205	3.0	0.400	64%	0%	Y	N	4,080,000	Isolated
01-80	Pedda	Srikakulam	L.N.Peta	Ravichendri	18-47-01	83-26-26	N	82	13%	0.288	3.0	0.560	65%	0%	Y	N	5,350,000	Isolated

Source: JICA Survey Team

Attachment 7.2.5 Data for Selection of Minor Irrigation Projects (2/13)

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 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												
02-01	Gopinadhapatinaikuni	Vizianagaram	Badangi	Tentuvalasa	18-28-12	83-20-47	N	128	28%	0.449	3.0	0.870	87%	0%	Y	N	7,780,000	Peddagedda Reservoir
02-02	Voora	Vizianagaram	Badangi	Mugada	18-30-13	83-23-00	N	40	30%	0.142	3.0	0.270	84%	0%	Y	N	3,130,000	Peddagedda Reservoir
02-03	Kotha	Vizianagaram	Makkuva	D.Sirlam	18-41-56	83-19-17	N	104	30%	0.365	3.0	0.710	86%	0%	Y	N	6,510,000	Vengalaraya Sagaram
02-04	Golusulametta	Vizianagaram	Makkuva	S.Peddavalasa	18-40-04	83-11-39	N	405	30%	0.946	3.0	2.750	87%	0%	Y	N	22,400,000	Vengalaraya Sagaram
02-05	Yellamma	Vizianagaram	Salur	Kondakarakavalasa	18-34-28	83-10-57	N	49	31%	0.172	3.0	0.330	88%	0%	Y	N	3,610,000	Peddagedda Reservoir
02-06	Pandregula Cheruvu	Vizianagaram	Salur	Kothavalasa	18-33-25	83-10-13	N	82	30%	0.287	3.0	0.560	87%	0%	Y	N	5,350,000	Peddagedda Reservoir
02-07	Sangamnaidu	Vizianagaram	Parvathipuram	Kothavalasa	18-47-00	83-26-50	N	75	25%	0.262	3.0	0.510	85%	0%	Y	N	4,980,000	Vottigedda Reservoir
02-08	Voora	Vizianagaram	Parvathipuram	Chinabondapalli	18-46-15	83-23-45	N	53	25%	0.209	3.0	0.360	88%	0%	Y	N	3,820,000	Vottigedda Reservoir
02-09	Jaggunaidu	Vizianagaram	Parvathipuram	Sudigam	18-45-02	83-21-30	N	49	27%	0.170	3.0	0.330	86%	0%	Y	N	3,610,000	Vottigedda Reservoir
02-10	MI Varahalugedda	Vizianagaram	Parvathipuram	Pedamarika	18-49-26	83-23-16	N	344	25%	1.203	3.0	2.340	87%	0%	Y	N	19,180,000	Vottigedda Reservoir
02-11	Tammayya	Vizianagaram	Parvathipuram	Sangamvalasa	18-48-21	83-21-01	N	123	26%	0.430	3.0	0.840	89%	0%	Y	N	7,510,000	Vottigedda Reservoir
02-12	Buradalapati	Vizianagaram	Therlam	Uddavolu	18-31-30	83-36-05	N	69	28%	0.243	3.0	0.470	80%	0%	Y	N	4,660,000	Peddankalam Anicut
02-13	Laxmu Naidu	Vizianagaram	Therlam	Nandigam	18-30-25	83-30-00	N	85	42%	0.320	3.0	0.580	86%	0%	Y	N	5,510,000	Peddankalam Anicut
02-14	Guruvinaidu	Vizianagaram	Therlam	Kusumuru	18-31-55	83-29-18	N	125	29%	0.438	3.0	0.850	88%	0%	Y	N	7,620,000	Peddankalam Anicut
02-15	Tamara	Vizianagaram	Garugubilli	Ullibhadra	18-45-18	83-28-29	N	46	20%	0.162	3.0	0.310	89%	0%	Y	N	3,450,000	Vottigedda Reservoir
02-16	Jagannadhapatnaikuni	Vizianagaram	Garugubilli	Hikkimvalasa	18-43-53	83-29-58	N	42	21%	0.146	3.0	0.280	87%	0%	Y	N	3,240,000	Vottigedda Reservoir
02-17	Konkamayya	Vizianagaram	Garugubilli	Dalaivalasa	18-44-13	83-28-21	N	152	25%	0.533	3.0	1.030	85%	0%	Y	N	9,040,000	Vottigedda Reservoir
02-18	Tamara	Vizianagaram	Balijipeta	Barli	18-37-03	83-28-23	N	66	11%	0.231	3.0	0.450	86%	0%	Y	N	4,500,000	Peddankalam Anicut
02-19	Jangamnaidu	Vizianagaram	Balijipeta	Arasada	18-32-42	83-38-45	N	47	15%	0.164	3.0	0.320	88%	0%	Y	N	3,500,000	Peddankalam Anicut
02-20	Raju	Vizianagaram	Balijipeta	Ampavalli	18-33-05	83-30-56	N	57	14%	0.201	3.0	0.390	88%	0%	Y	N	4,030,000	Peddankalam Anicut
02-21	Tamminaidu	Vizianagaram	Balijipeta	Ampavalli	18-32-58	83-30-58	N	51	12%	0.177	3.0	0.340	86%	0%	Y	N	3,710,000	Peddankalam Anicut
02-22	Surappa	Vizianagaram	Balijipeta	Azzada	18-40-32	83-29-13	N	48	13%	0.169	3.0	0.330	88%	0%	Y	N	3,550,000	Vottigedda Reservoir
02-23	Anasuyavalni	Vizianagaram	Balijipeta	Vantaram	18-32-12	83-32-01	N	172	15%	0.601	3.0	1.170	85%	0%	Y	N	10,100,000	Peddankalam Anicut
02-24	Chintala	Vizianagaram	Balijipeta	Azzada	18-40-37	83-29-36	N	114	14%	0.398	3.0	0.770	89%	0%	Y	N	7,040,000	Vottigedda Reservoir
02-25	Raju	Vizianagaram	Garividi	Yenuguvalasa	18-19-00	83-33-22	N	44	18%	0.193	3.0	0.300	82%	0%	Y	N	3,340,000	Andhra Reservoir
02-26	Tamara	Vizianagaram	Garividi	Bondapalli	18-22-55	83-35-10	N	51	16%	0.223	3.0	0.350	85%	0%	Y	N	3,710,000	Andhra Reservoir
02-27	Lakshmanarao	Vizianagaram	Garividi	Sivaram	18-16-49	83-33-45	N	48	21%	0.211	3.0	0.330	79%	0%	Y	N	3,550,000	Andhra Reservoir
02-28	Seethamma	Vizianagaram	Nellimarla	Kondavelagada	18-11-50	83-24-15	N	209	18%	0.914	3.0	1.420	86%	0%	Y	N	12,050,000	Andhra Reservoir
02-29	Kalam Raju	Vizianagaram	Nellimarla	Thangudubill	18-09-10	83-31-50	N	41	24%	0.179	3.0	0.280	75%	0%	Y	N	3,180,000	Isolated
02-30	Chintala	Vizianagaram	Gurla	Chintalapeta	18-12-38	83-25-45	N	110	17%	0.483	3.0	0.750	82%	0%	Y	N	6,830,000	Andhra Reservoir
02-31	Muthyalamma	Vizianagaram	Gurla	Jammupeta	18-13-10	83-30-55	N	45	20%	0.210	3.0	0.300	74%	0%	Y	N	3,400,000	Isolated
02-32	Pinna	Vizianagaram	Merakamudidam	Merakamudidam	18-25-12	83-27-47	N	48	33%	0.315	3.0	0.320	79%	0%	Y	N	3,550,000	Andhra Reservoir
02-33	Raju	Vizianagaram	Cheepurupalli	Mottapalli	18-18-04	83-37-22	N	46	30%	0.200	3.0	0.310	80%	0%	Y	N	3,450,000	Isolated
02-34	Pedda	Vizianagaram	Cheepurupalli	Peripi	18-16-06	83-35-31	N	42	21%	0.183	3.0	0.290	82%	0%	Y	N	3,240,000	Isolated
02-35	Komatigedda System	Vizianagaram	Denkada	Vedullavalasa	18-03-45	83-26-15	N	81	35%	0.143	3.0	0.550	75%	0%	Y	N	5,300,000	Isolated
02-36	Pedda	Vizianagaram	Denkada	Akkivaram	18-00-30	83-28-07	N	53	23%	0.094	3.0	0.360	80%	0%	Y	N	3,820,000	Isolated
02-37	Palagedda Reservoir	Vizianagaram	Denkada	Pinathadivada	18-03-32	83-27-00	N	90	36%	0.160	3.0	0.610	70%	0%	Y	N	5,770,000	Isolated
02-38	Voora	Vizianagaram	Poosapatirega	Kandivalasa	18-07-13	83-36-17	N	53	21%	0.177	3.0	0.360	79%	0%	Y	N	3,820,000	Isolated
02-39	Pedda	Vizianagaram	Poosapatirega	Kovvada	18-06-10	83-34-30	N	42	26%	0.139	3.0	0.280	75%	0%	Y	N	3,240,000	Isolated
02-40	Pedda	Vizianagaram	Poosapatirega	Rellivalasa	18-05-42	83-31-26	N	235	12%	0.783	3.0	1.600	88%	0%	Y	N	13,430,000	Isolated
02-41	Narasaraju	Vizianagaram	Vizianagaram	Dwarapudi	18-08-00	83-22-00	N	106	25%	0.320	3.0	0.720	85%	0%	Y	N	6,620,000	Andhra Reservoir
02-42	Gopalaraju	Vizianagaram	Vizianagaram	Jonnavalasa	18-05-00	83-23-55	N	181	70%	0.780	3.0	1.230	85%	0%	Y	N	10,580,000	Andhra Reservoir
02-43	Sonappa	Vizianagaram	Vizianagaram	Korukonda	18-04-40	83-20-30	N	105	25%	0.450	3.0	0.720	85%	0%	Y	N	6,560,000	Andhra Reservoir
02-44	Ayyappa	Vizianagaram	Vizianagaram	Korukonda	18-03-30	83-23-10	N	73	21%	0.320	3.0	0.490	85%	0%	Y	N	4,870,000	Andhra Reservoir
02-45	Pedda	Vizianagaram	Vizianagaram	Vizianagaram	18-06-48	83-24-44	N	159	30%	0.840	3.0	1.080	85%	0%	Y	N	9,410,000	Isolated
02-46	Raju	Vizianagaram	Gajpathinagaram	Mutcherla	18-16-53	83-24-37	N	42	19%	0.035	3.0	0.290	80%	0%	Y	N	3,240,000	Andhra Reservoir
02-47	Ramannapatnaykuni	Vizianagaram	Gajpathinagaram	Ramannapeta	18-18-16	83-24-42	N	47	21%	0.040	3.0	0.320	90%	0%	Y	N	3,500,000	Andhra Reservoir
02-48	Ramasagaram	Vizianagaram	Gajpathinagaram	Logisa	18-15-46	83-23-34	N	130	20%	0.095	3.0	0.890	85%	0%	Y	N	7,880,000	Andhra Reservoir
02-49	Dasaripapa	Vizianagaram	Gajpathinagaram	Davallapeta	18-16-22	83-18-44	N	54	20%	0.037	3.0	0.370	85%	0%	Y	N	3,870,000	Andhra Reservoir
02-50	Voora	Vizianagaram	Mentada	Poram	18-23-50	83-16-35	N	40	20%	0.038	3.0	0.270	75%	0%	Y	N	3,130,000	Andhra Reservoir
02-51	Summantha-Sagaram	Vizianagaram	Mentada	Jakkuva	18-21-25	83-16-00	N	67	45%	0.068	3.0	0.460	75%	0%	Y	N	4,560,000	Andhra Reservoir
02-52	Barlavani	Vizianagaram	Mentada	Kantu Buktavalasa	18-20-40	83-18-06	N	42	19%	0.034	3.0	0.290	80%	0%	Y	N	3,240,000	Andhra Reservoir
02-53	Amindari	Vizianagaram	Mentada	Badevalasa	18-21-50	83-17-15	N	41	10%	0.045	3.0	0.280	90%	0%	Y	N	3,180,000	Andhra Reservoir
02-54	Tamara	Vizianagaram	Bondapalli	China Tamarapalli	18-13-54	83-17-25	N	52	21%	0.034	3.0	0.360	75%	0%	Y	N	3,760,000	Andhra Reservoir
02-55	Katri	Vizianagaram	Bondapalli	Garudabilli	18-10-44	83-21-55	N	50	26%	0.032	3.0	0.340	75%	0%	Y	N	3,660,000	Andhra Reservoir
02-56	Raju	Vizianagaram	Bondapalli	B.Rajeru	18-13-24	83-17-22	N	112	20%	0.076	3.0	0.760	70%	0%	Y	N	6,930,000	Andhra Reservoir
02-57	Kshatriya	Vizianagaram	Bondapalli	Kothapalem	18-12-48	83-15-44	N	58	21%	0.055	3.0	0.390	70%	0%	Y	N	4,080,000	Andhra Reservoir
02-58	Akamma	Vizianagaram	L.Kota	Marlapalli	17-58-30	83-08-22	N	43	21%	0.034	3.0	0.290	80%	0%	Y	N	3,290,000	Isolated
02-59	Venkatarayudu	Vizianagaram	L.Kota	Khasapeta	18-01-29	83-10-05	N	112	15%	0.097	3.0	0.760	85%	0%	Y	N	6,930,000	Isolated
02-60	Raju	Vizianagaram	L.Kota	Bhimalli	18-00-50	83-09-23	N	54	15%	0.048	3.0	0.370	85%	0%	Y	N	3,870,000	Isolated
02-61	Vijayaramsagaram	Vizianagaram	L.Kota	L.Kota	18-01-23	83-09-12	N	109	15%	0.093	3.0	0.740	85%	0%	Y	N	6,770,000	Isolated
02-62	Padhmanabha Raju	Vizianagaram	Jami	A.R.Peta	18-01-50	83-17-30	N	731	15%	0.110	3.0	4.960	85%	0%	Y	N	39,620,000	Isolated
02-63	Kanumula	Vizianagaram	Vepada	Veeluparthi	18-00-48	83-03-04	N	78	21%	0.049	3.0	0.530	80%	0%	Y	N	5,140,000	Raiwada Reservoir

Source: JICA Survey Team

Attachment 7.2.5 Data for Selection of Minor Irrigation Projects (3/13)

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 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												
03-01	Matalavani	Visakhapatnam	Devarapalli	Musidipalli	17-56-26	83-01-15	N	106	18%	0.465	3.0	0.930	60%	0%	Y	N	6,620,000	Raiwada Reservoir
03-02	Raju	Visakhapatnam	Devarapalli	Tenugupudi	17-57-37	82-56-55	N	104	15%	0.457	3.0	0.910	60%	0%	Y	N	6,510,000	Raiwada Reservoir
03-03	Reddivani - Peddivani	Visakhapatnam	Devarapalli	A.Kothapalli	17-54-30	82-59-54	N	57	14%	0.251	3.0	0.500	60%	0%	Y	N	4,030,000	Raiwada Reservoir
03-04	Nagarayudu	Visakhapatnam	Devarapalli	Musidipalli	17-56-27	83-01-11	N	104	17%	0.457	3.0	0.910	60%	0%	Y	N	6,510,000	Raiwada Reservoir
03-05	Venkayya	Visakhapatnam	Devarapalli	K.M.Palem	17-56-16	82-57-54	N	106	17%	0.465	3.0	0.930	60%	0%	Y	N	6,620,000	Raiwada Reservoir
03-06	Krishna Sagaram	Visakhapatnam	K.Kotapadu	Chowduvada	17-50-57	83-00-09	N	121	16%	0.531	3.0	1.060	60%	0%	Y	N	7,410,000	Raiwada Reservoir
03-07	Nagarayudu	Visakhapatnam	K.Kotapadu	V.Santapalem	17-56-51	83-02-54	N	99	18%	0.432	3.0	0.860	60%	0%	Y	N	6,250,000	Raiwada Reservoir
03-08	Anna Sagaram	Visakhapatnam	K.Kotapadu	Sureddypalem	17-54-40	83-01-42	N	93	16%	0.407	3.0	0.810	60%	0%	Y	N	5,930,000	Raiwada Reservoir
03-09	Ravibanda	Visakhapatnam	K.Kotapadu	Kintada	17-53-10	83-04-00	N	59	15%	0.257	3.0	0.510	60%	0%	Y	N	4,130,000	Raiwada Reservoir
03-10	Naidu	Visakhapatnam	K.Kotapadu	Koruvada	17-55-50	83-05-15	N	45	18%	0.195	3.0	0.390	60%	0%	Y	N	3,400,000	Raiwada Reservoir
03-11	Patruni	Visakhapatnam	K.Kotapadu	Arle	17-52-51	83-05-05	N	43	16%	0.188	3.0	0.380	60%	0%	Y	N	3,290,000	Raiwada Reservoir
03-12	Lagudu	Visakhapatnam	K.Kotapadu	Singannadora Palem	17-54-10	83-03-08	N	42	14%	0.186	3.0	0.370	60%	0%	Y	N	3,240,000	Raiwada Reservoir
03-13	Korupoluvani	Visakhapatnam	K.Kotapadu	Singannadora Palem	17-54-35	83-02-25	N	42	17%	0.186	3.0	0.370	60%	0%	Y	N	3,240,000	Raiwada Reservoir
03-14	Gompavani	Visakhapatnam	K.Kotapadu	Kintada	17-53-27	83-04-45	N	42	17%	0.186	3.0	0.370	60%	0%	Y	N	3,240,000	Raiwada Reservoir
03-15	Tunga	Visakhapatnam	K.Kotapadu	Varada	17-56-17	83-02-37	N	42	14%	0.186	3.0	0.370	60%	0%	Y	N	3,240,000	Raiwada Reservoir
03-16	Sarvakala	Visakhapatnam	K.Kotapadu	Srungavaram	17-53-43	83-06-12	N	42	14%	0.184	3.0	0.370	60%	0%	Y	N	3,240,000	Raiwada Reservoir
03-17	Sanyasinaidu	Visakhapatnam	K.Kotapadu	Varada	17-56-26	83-02-56	N	42	19%	0.182	3.0	0.360	60%	0%	Y	N	3,240,000	Raiwada Reservoir
03-18	Bandaru	Visakhapatnam	K.Kotapadu	Kintada	17-53-12	83-03-27	N	41	17%	0.179	3.0	0.360	60%	0%	Y	N	3,180,000	Raiwada Reservoir
03-19	Gurupeddivani	Visakhapatnam	K.Kotapadu	Marrivalasa	17-53-15	83-05-40	N	40	15%	0.177	3.0	0.350	60%	0%	Y	N	3,130,000	Raiwada Reservoir
03-20	Seethamma	Visakhapatnam	K.Kotapadu	Gondupalem	17-50-10	83-00-04	N	99	18%	0.432	3.0	0.860	60%	0%	Y	N	6,250,000	Raiwada Reservoir
03-21	Pydamma	Visakhapatnam	K.Kotapadu	K.Kotapadu	17-53-9	83-02-33	N	123	15%	0.540	3.0	1.080	60%	0%	Y	N	7,510,000	Raiwada Reservoir
03-22	Bandaru	Visakhapatnam	K.Kotapadu	Singannadora Palem	17-53-53	83-03-06	N	40	15%	0.177	3.0	0.350	60%	0%	Y	N	3,130,000	Raiwada Reservoir
03-23	Kotha	Visakhapatnam	K.Kotapadu	Singannadora Palem	17-53-36	83-02-56	N	42	43%	0.127	3.0	0.250	60%	0%	Y	N	3,240,000	Raiwada Reservoir
03-24	Gowramma	Visakhapatnam	K.Kotapadu	Gullepalli	17-55-18	83-01-40	N	40	15%	0.177	3.0	0.350	60%	0%	Y	N	3,130,000	Raiwada Reservoir
03-25	Valama	Visakhapatnam	K.Kotapadu	K.J Puram	17-55-19	83-04-10	N	40	15%	0.177	3.0	0.350	60%	0%	Y	N	3,130,000	Raiwada Reservoir
03-26	Jureddyvani	Visakhapatnam	Cheedikada	Turuvolu	17-55-34	82-55-28	N	58	17%	0.255	3.0	0.510	60%	0%	Y	N	4,080,000	Raiwada Reservoir
03-27	Pedda	Visakhapatnam	Madugula	Yerukuvada	17-51-28	82-50-58	N	54	19%	0.235	3.0	0.470	60%	0%	Y	N	3,870,000	Isolated
03-28	Yerrammadeviseri	Visakhapatnam	Madugula	Madugula	17-55-03	82-48-49	N	51	16%	0.225	3.0	0.450	60%	0%	Y	N	3,710,000	Isolated
03-29	Lova	Visakhapatnam	Madugula	Chintaluru	17-52-20	82-48-51	N	64	14%	0.281	3.0	0.560	60%	0%	Y	N	4,400,000	Isolated
03-30	Kanumula	Visakhapatnam	Madugula	Sagaram	17-53-54	82-47-47	N	93	18%	0.407	3.0	0.810	60%	0%	Y	N	5,930,000	Isolated
03-31	Chavada	Visakhapatnam	Madugula	Vommali	17-50-46	82-45-35	N	104	17%	0.455	3.0	0.910	60%	0%	Y	N	6,510,000	Isolated
03-32	Pedda	Visakhapatnam	Madugula	M.Kodudru	17-54-28	82-47-09	N	66	17%	0.287	3.0	0.570	60%	0%	Y	N	4,500,000	Isolated
03-33	Lekkalavani	Visakhapatnam	Madugula	Vanthrla Palem	17-52-21	82-50-44	N	40	18%	0.177	3.0	0.350	60%	0%	Y	N	3,130,000	Isolated
03-34	Revidi	Visakhapatnam	Madugula	Vanthrla Palem	17-52-23	82-50-04	N	40	15%	0.177	3.0	0.350	60%	0%	Y	N	3,130,000	Isolated
03-35	Seetharama Sagaram	Visakhapatnam	Madugula	Vanthrla Palem	17-52-12	82-50-34	N	40	15%	0.177	3.0	0.350	60%	0%	Y	N	3,130,000	Isolated
03-36	Konda	Visakhapatnam	Madugula	Madugula	17-54-53	82-48-55	N	40	18%	0.177	3.0	0.350	60%	0%	Y	N	3,130,000	Isolated
03-37	Padala	Visakhapatnam	Madugula	Pongalipaka	17-52-54	82-49-05	N	104	17%	0.453	3.0	0.910	60%	0%	Y	N	6,510,000	Isolated
03-38	Pedda	Visakhapatnam	Madugula	G.Agraharam	17-51-37	82-50-42	N	40	15%	0.177	3.0	0.350	60%	0%	Y	N	3,130,000	Isolated
03-39	Pillakandivani	Visakhapatnam	Chodavaram	Amberupuram	17-47-52	82-58-45	N	113	18%	0.496	3.0	0.990	60%	0%	Y	N	6,990,000	Raiwada Reservoir
03-40	Yenugubilli	Visakhapatnam	Chodavaram	Narasapuram	17-47-59	82-58-56	N	113	18%	0.496	3.0	0.990	60%	0%	Y	N	6,990,000	Raiwada Reservoir
03-41	Pedda	Visakhapatnam	Chodavaram	M Kothapalli	17-46-12	82-58-42	N	58	16%	0.255	3.0	0.510	60%	0%	Y	N	4,080,000	Raiwada Reservoir
03-42	Pedda	Visakhapatnam	Chodavaram	Thimmannapalem	17-46-12	82-53-40	N	44	16%	0.193	3.0	0.390	60%	0%	Y	N	3,340,000	Isolated
03-43	Raju	Visakhapatnam	Chodavaram	Mycherlapalem	17-52-33	82-55-45	N	40	18%	0.177	3.0	0.350	60%	0%	Y	N	3,130,000	Raiwada Reservoir
03-44	Ramudu Cheruvu	Visakhapatnam	Chodavaram	Thimmannapalem	17-45-59	82-53-41	N	40	15%	0.177	3.0	0.350	60%	0%	Y	N	3,130,000	Isolated
03-45	Simhadri	Visakhapatnam	Butcheyyapeta	Rajam	17-44-12	82-53-32	N	86	16%	0.375	3.0	0.750	60%	0%	Y	N	5,560,000	Isolated
03-46	Anandasagaram	Visakhapatnam	Butcheyyapeta	Chinnappala Palem	17-49-18	82-53-01	N	121	17%	0.531	3.0	1.060	60%	0%	Y	N	7,410,000	Isolated
03-47	Somaraju	Visakhapatnam	Butcheyyapeta	P.Bheemavaram	17-47-20	82-50-47	N	74	15%	0.326	3.0	0.650	60%	0%	Y	N	4,930,000	Isolated
03-48	Swami Naidu	Visakhapatnam	Butcheyyapeta	Turakalapudi	17-43-40	82-50-58	N	117	15%	0.513	3.0	1.030	60%	0%	Y	N	7,200,000	Isolated
03-49	Somayajula	Visakhapatnam	Butcheyyapeta	R.Bheemavaram	17-41-18	82-53-27	N	101	18%	0.442	3.0	0.880	60%	0%	Y	N	6,350,000	Isolated
03-50	Pedda	Visakhapatnam	Butcheyyapeta	Pedapudi	17-41-39	82-49-47	N	67	18%	0.292	3.0	0.580	60%	0%	Y	N	4,560,000	Isolated

Source: JICA Survey Team

Attachment 7.2.5 Data for Selection of Minor Irrigation Projects (4/13)

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 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												
04-01	Karibandavari	East Godavari	Seethanagaram	Nagampalli	17-10-35	81-41-33	N	49	31%	0.410	2.0	0.330	66%	0%	Y	N	3,610,000	Torrigedda Pumping Scheme
04-02	Naila	East Godavari	Seethanagaram	Nallagonda	17-10-11	81-46-26	N	88	30%	0.240	2.0	0.600	65%	0%	Y	N	5,670,000	Torrigedda Pumping Scheme
04-03	Kurmana	East Godavari	Korukonda	Munagala	17-10-13	81-49-35	N	139	35%	0.320	1.5	0.940	62%	0%	Y	N	8,360,000	Torrigedda Pumping Scheme
04-04	Nagabutchanna	East Godavari	Korukonda	Munagala	17-10-13	81-49-35	N	41	34%	0.060	1.5	0.280	67%	0%	Y	N	3,180,000	Torrigedda Pumping Scheme
04-05	Raju	East Godavari	Korukonda	Kapavaram	17-07-58	81-49-59	N	400	35%	0.890	1.0	2.720	60%	0%	Y	N	22,140,000	Torrigedda Pumping Scheme
04-06	Krishamachari	East Godavari	Korukonda	Korukonda	17-10-13	81-49-35	N	187	35%	0.060	1.0	1.270	62%	0%	Y	N	10,890,000	Torrigedda Pumping Scheme
04-07	Chinna Pedda	East Godavari	Korukonda	Koti Kesavaram	17-10-13	81-49-35	N	157	35%	0.220	1.0	1.060	63%	0%	Y	N	9,310,000	Torrigedda Pumping Scheme
04-08	Tammudu	East Godavari	Korukonda	Sreerangapatnam	17-10-13	81-49-35	N	68	34%	0.150	1.0	0.460	64%	0%	Y	N	4,610,000	Torrigedda Pumping Scheme
04-09	Patruni	East Godavari	Korukonda	Koti	17-10-13	81-49-35	N	233	35%	0.490	2.0	1.580	62%	0%	Y	N	13,320,000	Torrigedda Pumping Scheme
04-10	Jaggappa	East Godavari	Korukonda	Dosakayalapalli	17-10-35	81-41-33	N	180	44%	9.100	2.0	0.550	64%	0%	Y	N	10,520,000	Torrigedda Pumping Scheme
04-11	Balaramayya	East Godavari	Korukonda	Jambupatnam	17-07-58	81-49-43	N	146	58%	8.700	2.0	0.470	65%	0%	Y	N	8,730,000	Torrigedda Pumping Scheme
04-12	Kurmanna	East Godavari	Korukonda	Munagala	17-10-13	81-49-35	N	139	35%	7.300	1.5	0.400	66%	0%	Y	N	8,360,000	Torrigedda Pumping Scheme
04-13	Narayarakanna	East Godavari	Korukonda	Raghavapuram	17-10-13	81-49-35	N	239	37%	15.300	1.5	0.350	67%	0%	Y	N	13,640,000	Torrigedda Pumping Scheme
04-14	A.V.	East Godavari	Rajanagaram	Nandarada	17-07-58	81-49-59	N	217	19%	14.200	2.0	0.330	66%	0%	Y	N	12,480,000	Torrigedda Pumping Scheme
04-15	Vissanna	East Godavari	Rajanagaram	Narendrapuram	17-10-13	81-49-35	N	147	17%	9.000	2.0	0.430	65%	0%	Y	N	8,780,000	Torrigedda Pumping Scheme
04-16	Ura	East Godavari	Rajanagaram	Velugubanda	17-10-13	81-49-35	N	85	26%	8.300	2.0	0.410	64%	0%	Y	N	5,510,000	Torrigedda Pumping Scheme
04-17	Mallapadu Reservoir	East Godavari	Addateegala	Mallapadu	17-24-55	82-00-05	N	81	26%	0.340	1.5	0.440	64%	0%	Y	N	5,300,000	Maddigedda Reservoir
04-18	Musurumanu	East Godavari	Addateegala	Mamidipalem	17-32-15	82-02-30	N	69	28%	0.220	1.5	0.440	65%	0%	Y	N	4,660,000	Maddigedda Reservoir
04-19	Dora	East Godavari	Addateegala	Kimmuru	17-21-30	82-07-55	N	59	24%	0.227	1.5	1.230	62%	0%	Y	N	4,130,000	Maddigedda Reservoir
04-20	Dotulavari Calva	East Godavari	Addateegala	Gontuvanipalem	17-22-10	82-07-30	N	51	22%	0.170	1.0	0.990	63%	0%	Y	N	3,710,000	Maddigedda Reservoir
04-21	Ura	East Godavari	Addateegala	Gontuvanipaiem	17-22-15	82-07-32	N	49	18%	0.170	1.0	0.940	63%	0%	Y	N	3,610,000	Maddigedda Reservoir
04-22	Khambamvari	East Godavari	Addateegala	Gondolu	17-26-00	82-04-10	N	64	28%	0.450	1.0	1.620	60%	0%	Y	N	4,400,000	Maddigedda Reservoir
04-23	Ura	East Godavari	Addateegala	Ducharthi	17-35-05	82-03-30	N	61	26%	0.170	2.0	1.470	60%	0%	Y	N	4,240,000	Maddigedda Reservoir
04-24	Goragommi	East Godavari	Gangavaram	Goragommi	17-23-00	81-56-00	N	65	29%	0.220	2.0	1.000	62%	0%	Y	N	4,450,000	Maddigedda Reservoir
04-25	Pidathamamidi Reservoir	East Godavari	Gangavaram	Pidathamamidi	17-21-00	81-58-00	N	65	29%	0.440	1.5	0.570	64%	0%	Y	N	4,450,000	Maddigedda Reservoir

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 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												
05-01	Rachappa	West Godavari	Lingapalem	Dharmajigudem	16-53-40	80-59-20	N	32	25%	0.140	5.0	0.561	62%	0%	Y	N	2,710,000	Thammileru Reservoir
05-02	Talla	West Godavari	Lingapalem	Ayyaparajugudem	16-53-05	81-01-05	N	47	30%	1.478	5.0	4.414	63%	0%	Y	N	3,500,000	Thammileru Reservoir
05-03	Vemanakunta	West Godavari	Lingapalem	Narasannapalem	16-56-25	81-01-55	N	43	30%	1.353	5.0	4.006	65%	0%	Y	N	3,290,000	Thammileru Reservoir
05-04	Ura	West Godavari	Lingapalem	Konijerla	16-54-20	80-58-40	N	115	24%	3.190	5.0	9.571	64%	0%	Y	N	7,090,000	Thammileru Reservoir
05-05	Pedda	West Godavari	Lingapalem	T.Ch.R.Palem	16-55-58	80-57-58	N	202	25%	4.840	5.0	9.680	65%	0%	Y	N	11,680,000	Thammileru Reservoir
05-06	Kamaraju	West Godavari	Lingapalem	Konijerla	16-54-20	80-58-40	N	88	28%	1.748	5.0	5.243	62%	0%	Y	N	5,670,000	Thammileru Reservoir
05-07	Pula	West Godavari	Lingapalem	Chandrannapalem	16-55-10	81-01-58	N	45	33%	1.393	5.0	4.189	65%	0%	Y	N	3,400,000	Thammileru Reservoir
05-08	Bendadi	West Godavari	Chintalapudi	Sivapuram	17-06-47	80-53-15	N	79	24%	2.710	5.0	8.752	64%	0%	Y	N	5,190,000	Thammileru Reservoir
05-09	Ura	West Godavari	Chintalapudi	Ganijerla	17-06-25	80-55-45	N	67	24%	2.478	5.0	9.912	62%	0%	Y	N	4,560,000	Thammileru Reservoir
05-10	Venkatadri	West Godavari	Chintalapudi	Raghavapuram	17-06-58	80-55-05	N	189	25%	4.965	5.0	14.896	63%	0%	Y	N	11,000,000	Thammileru Reservoir
05-11	Nadikattu	West Godavari	Chintalapudi	Mallayagudem	17-04-47	80-56-12	N	100	29%	4.151	5.0	24.908	65%	0%	Y	N	6,300,000	Thammileru Reservoir
05-12	Pedda	West Godavari	Chintalapudi	Pothunuru	17-06-58	80-55-05	N	51	24%	4.904	5.0	14.713	61%	0%	Y	N	3,710,000	Thammileru Reservoir
05-13	Panakala	West Godavari	Chintalapudi	Kanthampalem	17-06-11	80-57-33	N	72	28%	3.868	5.0	19.340	63%	0%	Y	N	4,820,000	Thammileru Reservoir
05-14	Kopulakunta	West Godavari	Chintalapudi	Chintalapudi	17-04-42	80-58-00	N	61	28%	1.896	5.0	5.722	65%	0%	Y	N	4,240,000	Thammileru Reservoir
05-15	Edula	West Godavari	Chintalapudi	Recherla	17-06-23	81-00-55	N	51	29%	0.668	5.0	4.825	64%	0%	Y	N	3,710,000	Thammileru Reservoir
05-16	Medavarapu	West Godavari	Chintalapudi	Settivarigudem	17-07-20	80-59-20	N	166	28%	11.195	5.0	22.391	63%	0%	Y	N	9,780,000	Thammileru Reservoir
05-17	Perumallakunta	West Godavari	Pedavegi	Muttanaveedu	16-48-30	81-02-30	N	53	28%	4.740	5.0	4.999	62%	0%	Y	N	3,820,000	Thammileru Reservoir
05-18	Pedda	West Godavari	Pedavegi	Koppaka	16-43-35	81-01-10	N	426	27%	12.930	5.0	51.718	64%	0%	Y	N	23,510,000	Thammileru Reservoir
05-19	Chinna	West Godavari	Pedavegi	Koppaka	16-43-35	81-01-10	N	64	28%	1.981	5.0	6.069	62%	0%	Y	N	4,400,000	Thammileru Reservoir
05-20	Thummala	West Godavari	Pedavegi	Koppaka	16-43-35	81-01-10	N	37	30%	1.615	5.0	3.467	61%	0%	Y	N	2,970,000	Thammileru 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 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												
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	Paritala	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	Gottumukkala	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	Rammana	Krishna	Chatrai	Chittapur	16-56-13	80-52-17	N	89	33%	0.290	2.0	0.600	64%	0%	Y	N	5,720,000	Thammileru Reservoir
06-06	East(Ganapati)	Krishna	Mylavaram	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	Jaggaiahpeta	Gandri	16-58-22	80-06-42	N	60	35%	0.200	2.0	0.400	64%	0%	Y	N	4,190,000	Muniyeru Irrigation
06-09	Ginni	Krishna	Jaggaiahpeta	Anumanchipalli	16-54-47	80-04-37	Y	191	38%	0.610	2.0	1.300	68%	0%	Y	N	11,100,000	Muniyeru Irrigation
06-10	Shermohammaed	Krishna	Jaggaiahpata	Shermohammaed	16-55-08	80-06-11	N	174	35%	0.590	2.0	1.180	64%	0%	Y	N	10,210,000	Muniyeru Irrigation
06-11	Ura	Krishna	Jaggaiah Peta	Jaggaiah Peta	16-53-10	80-05-45	N	123	38%	0.420	2.0	0.840	63%	0%	Y	N	7,510,000	Muniyeru Irrigation
06-12	Cintalapadu	Krishna	Chandarlapadu	Cintalapadu	16-43-12	80-13-30	N	96	38%	1.370	2.0	0.650	63%	0%	Y	N	6,090,000	Muniyeru Irrigation
06-13	Bobbillapadu	Krishna	Chandalapadu	Bobbillapadu	16-42-54	80-11-45	N	317	38%	1.370	2.0	2.160	62%	0%	Y	N	17,760,000	Muniyeru 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	Muniyeru 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	Muniyeru 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	22,830,000	Muniyeru Irrigation
06-17	Kodanda Rama	Krishna	Vatsavai	Ramachandrapuram	16-57-54	80-09-55	N	81	32%	0.270	2.0	0.550	66%	0%	Y	N	5,300,000	Muniyeru Irrigation
06-18	Ura	Krishna	Vatsavai	Chitela	16-55-52	80-12-18	N	75	36%	0.420	2.0	0.510	64%	0%	Y	N	4,980,000	Muniyeru Irrigation
06-19	Ura	Krishna	Vatsavai	Kanneveedu	16-58-04	80-11-19	N	77	36%	0.490	2.0	0.520	60%	0%	Y	N	5,080,000	Muniyeru Irrigation
06-20	Reddi	Krishna	Vatsavai	Polampalli	17-00-17	80-12-16	N	106	36%	0.510	2.0	0.720	60%	0%	Y	N	6,620,000	Muniyeru 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 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												
07-01	Vipperla West	Guntur	Rompicherla	Vippela Reddypalem	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	Muppalla	Tondepi	16-23-13	80-03-50	N	170	30%	1.340	2.0	1.340	63%	0%	Y	N	10,000,000	Isolated
07-06	Inavolu	Guntur	Nuzendla	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 Anicut	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	Nadimikatwa Anicut	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	Akkadevatha 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 Ayacut	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	Ballikurava	Chennupalli	16-01-29	79-59-10	N	59	47%	1.730	1.0	0.310	50%	0%	Y	N	4,130,000	Isolated
08-03	Konidena Cirkar	Prakasam	Ballikurava	Konidena	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	Rallapalli M.I	Prakasam	Addanki	Rallapalli	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	Pamuru	Malakondapuram	15-06-03	79-34-33	N	186	35%	1.070	1.0	1.260	63%	0%	Y	N	10,840,000	Mopadu Reservoir System
08-06	Pelluru	Prakasam	Ongole	Pelluru	15-27-30	80-02-44	N	325	19%	2.220	1.0	2.210	60%	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	Boddikurapadu M.I	Prakasam	Talluru	Boddikurapadu	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	Mannepalli M.I	Prakasam	Talluru	Mannepalli	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	Ballikurava	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	Ballikurava	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	Addanki	Kalavakur	15-52-42	79-59-43	N	235	58%	3.700	1.5	0.450	52%	0%	Y	N	13,430,000	Isolated
08-13	Gorrepadu M.I	Prakasam	Ballikurava	Gorrepadu	15-57-10	79-55-17	N	88	60%	1.930	1.0	0.320	58%	0%	Y	N	5,670,000	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	Veeraraghavani 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	Veeraraghavani Kota Anicut System
08-16	Puretipalli M.I.	Prakasam	Gudlur	Puretipalli	15-04-19	79-49-48	N	180	3%	3.140	1.0	1.220	63%	0%	Y	N	10,520,000	Veeraraghavani Kota Anicut System
08-17	Naladalapur M.I.	Prakasam	V.V.Palem	Naladalapur	15-08-21	79-49-49	N	59	24%	1.026	1.0	0.400	68%	0%	Y	N	4,130,000	Veeraraghavani Kota Anicut System
08-18	Medaramitlapalem M.I.	Prakasam	Lingasamudramsam	Medaramitlapalem	15-01-42	79-47-27	N	49	31%	1.250	2.0	0.330	67%	0%	Y	N	3,610,000	Veeraraghavani 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	Veeraraghavani 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	Veeraraghavani 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 Ayacut	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	Tupili	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	13-58-35	80-05-44	N	76	32%	0.320	2.0	0.520	66%	0%	Y	N	5,030,000	Isolated
09-05	Tirumuru	Nellore	Vakadu	Tirumuru	13-59-42	80-07-10	N	535	24%	0.960	2.0	3.640	60%	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	Dugaraja Patnam	Nellore	Vakadu	Dugaraja Patnam	13-59-39	80-08-50	N	552	19%	1.430	2.0	3.750	60%	0%	Y	N	30,160,000	Isolated
09-08	Cheemalapadu	Nellore	Vakadu	Cheemalapadu	13-59-26	80-08-30	N	129	29%	0.600	2.0	0.870	64%	0%	Y	N	7,830,000	Isolated
09-09	Putchalapalli	Nellore	Kota	Putchalapalli	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	Viruvuru	Nellore	Varikuntapadu	Viruvuru	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	Iskapalli	Nellore	Varikuntapadu	Iskapalli	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	Dacheruvu	Nellore	Venkatagiri	Dacheruvu	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	Tirumulapuram	Nellore	Udayagiri	Tirumulapuram	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	79-14-01	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	Krishnampalli	Nellore	Udayagiri	Krishnampalli	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	Pullaiah Palli	Nellore	Udayagiri	Pullaiah Palli	14-54-16	79-14-06	N	53	30%	0.460	2.0	0.360	65%	0%	Y	N	3,820,000	Isolated
09-30	Somayajulu	Nellore	Udayagiri	Ariapadia	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 7.2.5 Data for Selection of Minor Irrigation Projects (10/13)

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 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												
10-01	Putlampalli	Kadapa	Kadapa	Putlampalli	14-27-00	78-51-10	N	63	92%	0.443	0.0	0.880	65%	0%	Y	N	4,350,000	Buggavanka
10-02	Utukur	Kadapa	C.K.Dinne	Utukur	14-27-10	78-48-42	N	125	82%	0.888	0.0	1.780	66%	0%	Y	N	7,620,000	Buggavanka
10-03	Kampalli	Kadapa	C.K.Dinne	Kampalli	14-22-11	78-48-8.56	N	97	59%	0.688	0.0	1.370	67%	0%	Y	N	6,140,000	Buggavanka
10-04	Balupalli	Kadapa	C.K.Dinne	Balupalli	14-26-30	78-45-25	N	41	59%	0.292	0.0	0.580	63%	0%	Y	N	3,180,000	Buggavanka
10-05	Koparthi	Kadapa	C.K.Dinne	Koparthi	14-29-45	78-44-45	N	101	59%	0.715	0.0	1.430	64%	0%	Y	N	6,350,000	Buggavanka
10-06	Ganganapalli	Kadapa	Pendlimarri	Ganganapalli	14-26-38	78-42-46	N	45	60%	0.321	0.0	0.640	66%	0%	Y	N	3,400,000	Buggavanka
10-07	Sadipiralla	Kadapa	Kamalapuram	T.Sadipiralla	14-35-42	78-37-42	N	59	59%	0.554	0.0	1.100	65%	0%	Y	N	4,130,000	Buggavanka
10-08	Maddireddipalli	Kadapa	B.Mattam	Maddireddipalli	14-50-10	78-53-34	N	95	72%	0.898	0.0	1.780	66%	0%	Y	N	6,040,000	Isolated
10-09	Lingaladinnepalli	Kadapa	B.Mattam	Lingaladinnepalli	14-53-07	78-52-05	N	93	70%	0.875	0.0	1.750	67%	0%	Y	N	5,930,000	Isolated
10-10	Kammavaripalli	Kadapa	B.Mattam	Kammavaripalli	14-45-18	78-57-07	N	80	60%	0.410	0.0	0.820	63%	0%	Y	N	5,240,000	Isolated
10-11	Nagisettipalli	Kadapa	B.Mattam	Nagisettipalli	14-43-51	79-00-20	N	41	61%	0.384	0.0	0.770	68%	0%	Y	N	3,180,000	Isolated
10-12	Thuvapalli	Kadapa	Mydukur	Thuvapalli	14-45-19	78-46-54	N	143	59%	1.010	0.0	2.000	63%	0%	Y	N	8,570,000	Isolated
10-13	Nandyalampet	Kadapa	Mydukur	Nandyalampet	14-44-01	78-48-45	N	235	60%	1.661	0.0	3.300	63%	0%	Y	N	13,430,000	Isolated
10-14	Goderu	Kadapa	Mydukur	Tippireddipalli	14-51-22	78-47-56	N	113	59%	1.064	0.0	2.130	68%	0%	Y	N	6,990,000	Isolated
10-15	Duvvur	Kadapa	Duvvur	Duvvur	14-52-00	78-40-30	N	59	61%	0.554	0.0	1.100	67%	0%	Y	N	4,130,000	Isolated
10-16	Chintakunta	Kadapa	Duvvur	Chintakunta	14-47-00	78-42-30	N	105	60%	0.989	0.0	1.980	63%	0%	Y	N	6,560,000	Isolated
10-17	Nandalur	Kadapa	Nandalur	Nandalur	14-17-00	79-07-20	N	118	46%	0.838	0.0	1.670	68%	0%	Y	N	7,250,000	Isolated
10-18	Thallapaka	Kadapa	Rajampet	Thallapaka	14-13-40	79-11-30	N	62	60%	0.437	0.0	0.870	63%	0%	Y	N	4,290,000	Isolated
10-19	Vontimitta	Kadapa	Vontimitta	Vontimitta	14-24-95	79-02-00	N	410	60%	2.906	0.0	5.820	68%	0%	Y	N	22,670,000	Buggavanka
10-20	Kothacheruvu	Kadapa	Atloor	Tamballagondi	14-36-45	79-02-37	N	68	59%	0.482	0.0	0.960	67%	0%	Y	N	4,610,000	Isolated
10-21	Kothacheruvu Of Atlur	Kadapa	Atloor	Atloor	14-31-25	79-03-12	N	55	60%	0.392	0.0	0.780	68%	0%	Y	N	3,920,000	Isolated
10-22	C.Boyanapalli	Kadapa	Badvel	C.Boyanapalli	14-43-49	79-03-33	N	60	57%	0.423	0.0	0.850	67%	0%	Y	N	4,190,000	Isolated
10-23	Ramgampalli	Kadapa	Pullampet	Ramgampalli	14-04-18	79-13-34	N	114	60%	0.806	0.0	1.610	68%	0%	Y	N	7,040,000	Isolated
10-24	K.Agraharam	Kadapa	Pullampet	K.Agraharam	14-03-25	79-10-30	N	70	60%	0.493	0.0	0.990	67%	0%	Y	N	4,720,000	Isolated
10-25	Pedda Cheruvu Etc.,	Kadapa	Veeraballi	Gurrappagaripalli	14-07-54	78-51-53	N	206	60%	1.461	0.0	2.920	63%	0%	Y	N	11,900,000	Isolated
10-26	Veerappa Cheruvu Etc.,	Kadapa	Veeraballi	Thatiguntapalli	14-05-35	78-52-32	N	130	60%	1.222	0.0	2.440	66%	0%	Y	N	7,880,000	Isolated
10-27	Boyanapalli Cheruvu To Chintam	Kadapa	B.Mattam	Boyanapalli	14-47-26	78-58-32	N	69	75%	0.649	0.0	1.300	67%	0%	Y	N	4,660,000	Isolated
10-28	Uppu Cheruvu To Thummalapall	Kadapa	B.Mattam	Thummalapalli	14-46-21	78-58-51	N	91	70%	0.859	0.0	1.720	66%	0%	Y	N	5,820,000	Isolated
10-29	Dasabandana Cheruvu To Kamc	Kadapa	B.Mattam	Kammavaripalli	14-45-22	78-57-07	N	121	66%	1.146	0.0	2.290	66%	0%	Y	N	7,410,000	Isolated
10-30	Amagampalli Cheruvu To Mudar	Kadapa	B.Mattam	Amagampalli	14-54-28	78-55-29	N	49	73%	0.458	0.0	0.920	67%	0%	Y	N	3,610,000	Isolated

Source: JICA Survey Team

Attachment 7.2.5 Data for Selection of Minor Irrigation Projects (11/13)

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 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												
11-01	Danthalavanipenta	Kurnool	Chagalamarri	Danthalavanipenta	15-02-30	78-37-30	N	364	30%	0.984	2.0	2.470	63%	0%	Y	N	20,240,000	Isolated
11-02	Thurpucheruvu	Kurnool	Allagadda	Yadavada	15-07-05	78-34-15	N	60	27%	0.850	2.0	0.410	60%	0%	Y	N	4,190,000	Isolated
11-03	Erra Cheruvu	Kurnool	Rudravaram	Mukundapuram	15-11-00	78-33-00	N	68	32%	0.700	2.0	0.460	60%	0%	Y	N	4,610,000	Isolated
11-04	Cheelaboyala Cheruvu	Kurnool	Rudravaram	Alamuru	15-08-15	78-36-15	N	70	34%	0.850	2.0	0.480	60%	0%	Y	N	4,720,000	Isolated
11-05	Chinthalacheruvu	Kurnool	Rudravaram	T.Lingamdinne	15-19-35	78-36-48	N	60	27%	0.250	2.0	0.410	60%	0%	Y	N	4,190,000	Isolated
11-06	Venganampallicheruvu	Kurnool	Rudravaram	Rudravaram	15-14-10	78-36-19	N	40	35%	0.175	2.0	0.270	60%	0%	Y	N	3,130,000	Isolated
11-07	Peddarajucharuvu	Kurnool	Rudravaram	Rudravaram	15-14-46	78-35-58	N	109	40%	0.205	2.0	0.740	60%	0%	Y	N	6,770,000	Isolated
11-08	Machinenipalli(Big)	Kurnool	Rudravaram	Machinenipalli	15-15-28	78-34-02	N	42	43%	0.100	2.0	0.290	60%	0%	Y	N	3,240,000	Isolated
11-09	B.Nagireddypalli M.I	Kurnool	Rudravaram	B.Nagireddypalli	15-16-07	78-34-19	N	114	39%	1.830	2.0	0.780	65%	0%	Y	N	7,040,000	Isolated
11-10	Rallavagu Cheruvu	Kurnool	Rudravaram	Chandaluru	15-13-47	78-33-18	N	85	42%	0.337	2.0	0.580	60%	0%	Y	N	5,510,000	Isolated
11-11	Chinna Rajucheruvu	Kurnool	Rudravaram	Kondamaya Palli	15-15-22	78-35-28	N	116	35%	0.360	2.0	0.790	65%	0%	Y	N	7,140,000	Isolated
11-12	Beeravolu	Kurnool	Rudravaram	Beeravolu	15-21-15	78-36-30	N	44	36%	0.230	2.0	0.300	60%	0%	Y	N	3,340,000	Isolated
11-13	Katamma Cheruvu	Kurnool	Rudravaram	Chinnakambaluru	15-17-06	78-35-50	N	63	44%	0.250	2.0	0.430	60%	0%	Y	N	4,350,000	Isolated
11-14	Kotha Cheruvu	Kurnool	Rudravaram	Rudravaram	15-17-03	78-35-50	N	80	44%	0.280	2.0	0.540	60%	0%	Y	N	5,240,000	Isolated
11-15	Rangareddy	Kurnool	Rudravaram	Rudravaram	15-16-59	78-37-16	N	40	40%	0.180	2.0	0.270	60%	0%	Y	N	3,130,000	Isolated
11-16	Peddacheruvu	Kurnool	Rudravaram	Yellavathula	15-18-01	78-37-50	N	42	43%	0.369	2.0	0.290	60%	0%	Y	N	3,240,000	Isolated
11-17	Gangavaram	Kurnool	Sirivella	Gangavaram	15-25-25	78-34-20	N	41	41%	0.340	2.0	0.280	60%	0%	Y	N	3,180,000	Isolated
11-18	Isukapalli Thuvva Cheruvu	Kurnool	Sirivella	Chennuru	15-23-23	78-32-55	N	51	41%	0.223	2.0	0.350	60%	0%	Y	N	3,710,000	Isolated
11-19	Kypa	Kurnool	Banaganapalli	Kypa	15-19-30	78-16-30	N	71	44%	0.270	2.0	0.480	60%	0%	Y	N	4,770,000	Isolated
11-20	Ramatheertham	Kurnool	Banaganapalli	Ramatheertham	15-27-13	78-16-41	N	110	37%	0.790	2.0	0.750	60%	0%	Y	N	6,830,000	Isolated
11-21	Deekshthula	Kurnool	Owk	Kunukuntla	15-11-05	78-02-05	N	63	44%	0.700	2.0	0.430	60%	0%	Y	N	4,350,000	Isolated
11-22	Mettupalli M.I	Kurnool	Owk	Mettupalli	15-15-01	78-06-12	N	55	36%	0.926	2.0	0.370	60%	0%	Y	N	3,920,000	Isolated
11-23	Pedda Cheruvu	Kurnool	Panyam	Alamuru	15-28-16	78-21-25	N	70	36%	2.120	2.0	0.470	60%	0%	Y	N	4,720,000	Isolated
11-24	Vadagandla	Kurnool	Panyam	Chilakala	15-31-40	78-22-26	N	52	38%	1.300	2.0	0.350	60%	0%	Y	N	3,760,000	Isolated
11-25	Pedda & Chinna	Kurnool	Mahanadi	Basavapuram	15-26-10	78-38-45	N	181	31%	0.699	2.0	1.230	65%	0%	Y	N	10,580,000	Isolated

Source: JICA Survey Team

Attachment 7.2.5 Data for Selection of Minor Irrigation Projects (12/13)

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 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												
12-01	Peruru Big	Ananthapur	Ramagiri	Peruru	14-19-52	77-36-48	N	113	52%	1.890	1.0	0.760	63%	0%	Y	N	6,990,000	Upper Pennar
12-02	Tallimadugu MI	Ananthapur	Kanaganapalli	Tallimadugu	14-22-03	77-30-41	N	80	61%	0.343	1.0	0.220	60%	0%	Y	N	5,240,000	Upper Pennar
12-03	Nallaguttai MI	Ananthapur	Kanaganapalli	Tumucherla	14-31-52	77-28-24	N	70	59%	1.310	1.0	0.480	64%	50%	Y	N	4,720,000	Upper Pennar
12-04	D.Chenampali MI	Ananthapur	Kambadur	D.Chenampali	14-26-45	77-21-00	N	58	66%	0.610	1.0	0.400	64%	60%	Y	N	4,080,000	Upper Pennar
12-05	Jyothi	Ananthapur	Kambadur	Nuthimadugu	14-29-40	77-22-35	N	70	40%	2.070	1.0	0.470	53%	60%	Y	N	4,720,000	Upper Pennar
12-06	Byrasamudrum	Ananthapur	Bramhasamudrum	Byrasamudrum	14-34-53	76-56-57	N	85	31%	1.380	1.0	0.570	66%	60%	Y	N	5,510,000	Isolated
12-07	Baseti	Ananthapur	Gummmagatta	Bupasamudrum	14-40-00	76-56-45	N	69	100%	0.520	1.0	0.470	64%	0%	Y	N	4,660,000	Isolated
12-08	Pulakunta	Ananthapur	Gummagatta	Pulakunta	14-37-40	76-51-15	N	51	100%	30.800	1.0	0.150	66%	0%	Y	N	3,710,000	Isolated
12-09	Kaggallu	Ananthapur	Hindupur	Kaggallu	13-49-44	77-29-35	N	108	64%	1.030	1.0	0.730	64%	65%	Y	N	6,720,000	Pennar Kumudvathi
12-10	Beerapalli	Ananthapur	Hindupur	Beerapalli	13-52-15	77-34-41	N	83	59%	0.550	1.0	0.560	63%	60%	Y	N	5,400,000	Pennar Kumudvathi
12-11	Guddampalli	Ananthapur	Hindupur	Guddampalli	13-51-59	77-32-48	N	57	72%	0.480	1.0	0.390	63%	60%	Y	N	4,030,000	Pennar Kumudvathi
12-12	Santhebidanur	Ananthapur	Hindupur	Santhebidanur	13-44-00	77-31-20	N	187	52%	0.720	1.0	1.270	62%	60%	Y	N	10,890,000	Pennar Kumudvathi
12-13	Chowlur	Ananthapur	Hindupur	Chowlur	13-41-50	77-28-43	N	103	60%	0.160	1.0	0.700	61%	0%	Y	N	6,460,000	Pennar Kumudvathi
12-14	Maluguru	Ananthapur	Hindupur	Maluguru	13-53-00	77-36-40	N	161	73%	1.710	1.0	1.090	61%	0%	Y	N	9,520,000	Pennar Kumudvathi
12-15	Kallur MI	Ananthapur	Lepakshi	Kallur	13-48-30	77-37-00	N	182	37%	40.500	1.0	0.500	60%	60%	Y	N	10,630,000	Pennar Kumudvathi
12-16	Parigi	Ananthapur	Parigi	Parigi	13-53-00	77-29-30	N	1,154	72%	16.080	1.0	7.840	60%	60%	Y	N	61,950,000	Pennar Kumudvathi
12-17	Kodigenahalli	Ananthapur	Parigi	Kodigenahalli	13-51-48	77-28-35	N	87	80%	0.450	1.0	0.590	64%	60%	Y	N	5,610,000	Pennar Kumudvathi
12-18	Utakur	Ananthapur	Parigi	Utakur	13-54-56	77-30-31	N	546	66%	4.900	1.0	3.710	60%	60%	Y	N	29,850,000	Pennar Kumudvathi
12-19	Kotnur	Ananthapur	Hindupur	Kotnur	13-50-52	77-31-43	N	619	39%	2.310	1.0	4.210	60%	60%	Y	N	33,700,000	Pennar Kumudvathi

Source: JICA Survey Team

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

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 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												
13-01	SADDIKOOTIMADUGU	Chittoor	NAGALAPURAM	Rajulakandriga	13-33-58	79-44-58	N	508	21%	1.800	1.0	2.520	76%	0%	Y	N	27,840,000	Aramiar Reservoir
13-02	MARRIMAKULA CHERUVU	Chittoor	NAGALAPURAM	S.S.Puram	13-25-12	79-49-27	N	62	23%	0.360	1.0	0.500	78%	0%	Y	N	4,290,000	Aramiar Reservoir
13-03	VELLURU	Chittoor	NAGALAPURAM	Velluru	13-24-58	79-48-36	N	119	21%	0.690	1.0	0.970	76%	0%	Y	N	7,300,000	Aramiar Reservoir
13-04	VEMBAKAM	Chittoor	NAGALAPURAM	Vembakam	13-24-35	79-49-27	N	222	23%	0.800	1.0	1.120	76%	0%	Y	N	12,740,000	Aramiar Reservoir
13-05	KOTTAKADU	Chittoor	NAGALAPURAM	Kottakadu	13-23-26	79-49-29	N	73	23%	0.430	1.0	0.600	77%	0%	Y	N	4,870,000	Aramiar Reservoir
13-06	T.P.PALEM OLD	Chittoor	NAGALAPURAM	T.P.Palem	13-26-30	79-51-47	N	57	21%	0.380	1.0	0.540	76%	0%	Y	N	4,030,000	Aramiar Reservoir
13-07	KADIVEDU	Chittoor	NAGALAPURAM	Kadivedu	13-27-14	79-50-49	N	127	21%	0.400	1.0	0.560	77%	0%	Y	N	7,720,000	Aramiar Reservoir
13-08	BEERAKUPPAM	Chittoor	NAGALAPURAM	Beerakuppam	13-27-40	79-49-57	N	139	19%	0.570	1.0	0.800	79%	0%	Y	N	8,360,000	Aramiar Reservoir
13-09	GAJASINGARAPURAM	Chittoor	PICHATUR	Keelapudi	13-23-17	79-42-53	N	52	21%	0.128	1.0	0.400	69%	0%	Y	N	3,760,000	Aramiar Reservoir
13-10	ALETI KONA	Chittoor	PICHATUR	Siddirajula Kandriga	13-23-47	79-44-31	N	202	11%	0.400	2.0	0.360	80%	0%	Y	N	11,680,000	Aramiar Reservoir
13-11	S.S.B.PET	Chittoor	PICHATUR	S.S.B.Pet	13-20-00	79-50-32	N	85	16%	0.210	2.0	0.260	80%	0%	Y	N	5,510,000	Aramiar Reservoir
13-12	BANGALA	Chittoor	PICHATUR	Bangala	13-20-16	79-50-00	N	54	26%	0.120	2.0	0.160	69%	0%	Y	N	3,870,000	Aramiar Reservoir
13-13	BHUDERI	Chittoor	PICHATUR	Vengalathur	13-21-20	79-48-06	N	132	17%	0.320	3.0	0.400	87%	0%	Y	N	7,990,000	Aramiar Reservoir
13-14	THULASIKRISHNAPURAM	Chittoor	PICHATUR	Mudiyur	13-24-02	79-44-43	N	194	10%	0.360	1.0	0.280	80%	0%	Y	N	11,260,000	Aramiar Reservoir
13-15	KARURU	Chittoor	PICHATUR	Karuru (Sl.No. 15 Of A	13-21-20	79-48-06	N	83	16%	0.300	2.0	0.370	80%	0%	Y	N	5,400,000	Aramiar Reservoir
13-16	Nindra MI	Chittoor	Nindra	Nindra	13-22-38	79-42-08	N	221	23%	2.265	1.0	2.455	78%	0%	Y	N	12,690,000	Aramiar Reservoir
13-17	Iruguvai MI	Chittoor	Nindra	Iruguvai	13-21-15	79-37-16	N	57	23%	0.227	1.0	0.261	72%	0%	Y	N	4,030,000	Aramiar Reservoir
13-18	Aruru MI	Chittoor	Nindra	Aruru	13-20-53	79-38-58	N	106	25%	0.396	1.0	0.458	75%	0%	Y	N	6,620,000	Aramiar Reservoir
13-19	Melambakam MI	Chittoor	Nindra	Melambakam	13-20-42	79-38-51	N	68	26%	0.198	1.0	0.241	72%	0%	Y	N	4,610,000	Aramiar Reservoir
13-20	Chavarambakam MI	Chittoor	Nindra	Chavarambakam	13-21-30	79-41-40	N	80	21%	0.198	1.0	0.242	72%	0%	Y	N	5,240,000	Aramiar Reservoir
13-21	Kacharavedu MI	Chittoor	Nindra	Kacharavedu	13-21-59	79-41-40	N	75	24%	0.170	1.0	0.223	69%	0%	Y	N	4,980,000	Aramiar Reservoir
13-22	Athuru MI	Chittoor	Nindra	Athuru	13-20-33	79-43-22	N	117	24%	0.566	1.0	0.629	73%	0%	Y	N	7,200,000	Aramiar Reservoir
13-23	D.Kodimbedu MI	Chittoor	Nindra	D.Kodimbedu	13-22-07	79-43-20	N	51	24%	0.227	1.0	0.255	74%	0%	Y	N	3,710,000	Aramiar Reservoir
13-24	Kavanuru Pedda Cheruvu	Chittoor	Nindra	Kavanuru	13-25-27	79-41-52	N	124	25%	0.510	1.0	0.623	76%	0%	Y	N	7,570,000	Aramiar Reservoir
13-25	Agaram MI	Chittoor	Nindra	Agaram	13-22-38	79-42-08	N	80	23%	0.241	1.0	0.269	73%	0%	Y	N	5,240,000	Aramiar Reservoir
13-26	Netteri MI	Chittoor	Nindra	Netteri	13-20-39	79-40-24	N	44	25%	0.170	1.0	0.458	71%	0%	Y	N	3,340,000	Aramiar Reservoir
13-27	Kosalanagaram	Chittoor	Vijayapuram	Kosalanagaram	13-15-21	79-43-54	Y	119	39%	2.040	2.0	1.850	66%	0%	Y	N	7,300,000	Aramiar Reservoir
13-28	Madhavaram	Chittoor	Vijayapuram	Madhavaram	13-16-00	79-41-51	Y	58	38%	1.470	2.0	0.290	63%	0%	Y	N	4,080,000	Aramiar Reservoir
13-29	Tatimakulakona	Chittoor	Vijayapuram	Jagannadhapuram	13-18-11	79-44-01	Y	64	34%	1.270	2.0	0.600	64%	0%	Y	N	4,400,000	Aramiar Reservoir
13-30	Guruswamy	Chittoor	Vijayapuram	M.Agaram	13-17-39	79-39-53	Y	41	34%	1.530	2.0	0.700	63%	0%	Y	N	3,180,000	Aramiar Reservoir
13-31	Kanikalammakona	Chittoor	Vijayapuram	Vijayapuram	13-16-38	79-42-56	Y	73	37%	1.780	2.0	0.680	62%	0%	Y	N	4,870,000	Aramiar Reservoir
13-32	Mangalam	Chittoor	Vijayapuram	Mangalam	13-16-54	79-41-43	Y	68	43%	1.530	2.0	0.650	63%	0%	Y	N	4,610,000	Aramiar Reservoir
13-33	Maharajapuram	Chittoor	Vijayapuram	Maharajapuram	13-13-19	79-45-12	Y	44	36%	1.270	2.0	0.630	63%	0%	Y	N	3,340,000	Aramiar Reservoir
13-34	Restoration Of Mudipalli	Chittoor	Nagari	Mudipalli	13-17-31	79-32-47	Y	302	60%	2.410	2.0	0.830	64%	0%	Y	N	16,960,000	Krishnapuram Reservoir
13-35	Restoration Of Gundraju Kuppan	Chittoor	Nagari	Gundrajakuppam	13-20-54	79-34-04	Y	152	59%	1.420	2.0	0.420	64%	0%	Y	N	9,040,000	Krishnapuram Reservoir
13-36	Satrawada	Chittoor	Nagari	Satrawada	13-19-19	79-32-48	Y	137	60%	0.850	2.0	0.380	65%	0%	Y	N	8,250,000	Krishnapuram Reservoir
13-37	Netham Kandriga	Chittoor	Nagari	Netham Kandriga	13-17-34	79-34-49	Y	137	60%	1.270	2.0	0.380	63%	0%	Y	N	8,250,000	Krishnapuram Reservoir
13-38	Ayanambakam	Chittoor	Nagari	Ayanambakam	13-24-49	79-38-32	Y	142	60%	0.850	2.0	0.390	64%	0%	Y	N	8,520,000	Krishnapuram Reservoir
13-39	Erikambattu	Chittoor	Narayanavanam	Narayanavanam	13-25-55	79-34-29	Y	240	60%	1.560	2.0	0.660	64%	0%	Y	N	13,690,000	Krishnapuram Reservoir
13-40	Nakkala Cheruvu	Chittoor	Narayanavanam	Kasimitta	13-23-12	79-47-41	Y	214	59%	1.420	2.0	0.590	65%	0%	Y	N	12,320,000	Aramiar Reservoir
13-41	Thumbur	Chittoor	Narayanavanam	Thumbur	13-24-52	79-39-12	Y	138	59%	0.790	2.0	0.380	63%	0%	Y	N	8,310,000	Krishnapuram Reservoir
13-42	Sriharipuram New	Chittoor	Vijayapuram	Sriharipuram	13-15-06	79-45-17	Y	500	60%	1.420	2.0	1.370	61%	0%	Y	N	27,420,000	Aramiar Reservoir
13-43	Buchanatham Big	Chittoor	Vijayapuram	Buchivantham	13-18-01	79-38-42	Y	64	30%	0.910	2.0	1.310	63%	0%	Y	N	4,400,000	Aramiar Reservoir
13-44	Pannur	Chittoor	Vijayapuram	Pannur	13-17-22	79-39-21	Y	207	28%	2.210	2.0	1.350	64%	0%	Y	N	11,950,000	Aramiar Reservoir
13-45	Kaliambakam New	Chittoor	Vijayapuram	Kaliyambakam	13-19-34	79-42-23	Y	229	59%	2.120	2.0	1.450	65%	0%	Y	N	13,110,000	Aramiar Reservoir
13-46	Alapakam Big	Chittoor	Vijayapuram	Alapakam	13-20-40	79-41-01	Y	104	60%	1.840	2.0	0.340	63%	0%	Y	N	6,510,000	Aramiar Reservoir
13-47	Ayyappa Reddy Cheruvu	Chittoor	Yerravaripaleem	Kamalla	13-43-56.69	79-10-37	N	648	50%	2.200	2.0	4.400	75%	0%	Y	N	35,230,000	Isolated
13-48	Pakala Big	Chittoor	Pakala	Jayadhevapuram	13-26-03	79-07-13	N	145	41%	1.125	3.0	1.125	59%	0%	Y	N	8,680,000	Isolated
13-49	Ramasamudram Cheruvu	Chittoor	Pakala	Ganugapenta	13-30-16	79-08-48	N	41	29%	0.517	4.0	0.517	58%	0%	Y	N	3,180,000	Isolated
13-50	Venkatarayuni Cheruvu	Chittoor	Chinnagottigallu	T.S. Paleem	13-39-22	79-08-19	N	55	18%	0.280	2.0	0.340	65%	0%	Y	N	3,920,000	Isolated
13-51	Nallasamudram Cheruvu	Chittoor	Yerravaripaleem	Nerabylu	13-45-44	79-10-08	N	112	29%	0.581	2.0	0.581	69%	0%	Y	N	6,930,000	Isolated
13-52	Rayala Cheruvu	Chittoor	RC Puram	Ck Palli	13-29-46	79-22-30	N	329	48%	1.703	2.0	2.044	77%	0%	Y	N	18,390,000	Krishnapuram Reservoir
13-53	Kullapa Reddy Cheruvu	Chittoor	Pakala	Mobbinayanapalli	13-27-35	79-03-16	N	44	23%	0.560	4.0	0.560	58%	0%	Y	N	3,340,000	Isolated
13-54	Mulapalli	Chittoor	Chandragiri	Bheemavaram	13-35-33	79-12-33	Y	259	59%	1.100	0.0	1.800	60%	0%	Y	N	14,690,000	Isolated
13-55	Kumara Ahobilanayani Cheruvu	Chittoor	Nimmanapalle	Nimmanapalle	13-31-51	78-40-40	N	101	23%	1.610	1.0	2.250	72%	100%	Y	N	6,350,000	Isolated
13-56	Konda Vanka Cheruvu	Chittoor	Nimmanapalle	Tavalam	13-33-20	78-41-15	N	120	21%	1.670	1.0	2.340	70%	100%	Y	N	7,360,000	Isolated
13-57	Komativani Cheruvu	Chittoor	Nimmanapalle	Nimmanapalle	13-30-15	78-40-45	N	64	22%	1.250	1.5	1.750	80%	100%	Y	N	4,400,000	Isolated
13-58	Diguvamasapalli Cheruvu	Chittoor	Chittoor	Diguvamasapalli	13-11-26	79-08-59	N	148	22%	0.910	4.0	1.005	85%	0%	Y	N	8,830,000	Isolated
13-59	Arthala Hissa	Chittoor	Chittoor	Arathala	13-10-25	79-10-50	N	57	25%	0.380	4.0	0.385	85%	0%	Y	N	4,030,000	Isolated
13-60	Namahsivaya Chetty Cheruvu	Chittoor	Gudipala	Panatoor	13-03-26	79-08-14	N	122	19%	0.740	5.0	0.830	90%	0%	Y	N	7,460,000	Isolated
13-61	Bommayani Cheruvu	Chittoor	Gudipala	Bommasamudram	13-04-45	79-08-35	N	134	19%	0.710	5.0	0.907	90%	0%	Y	N	8,090,000	Isolated
13-62	Chennarayani Cheruvu	Chittoor	Irala	Baljapalli	13-19-40	79-03-00	N	74	19%	1.200	5.0	0.505	90%	0%	Y	N	4,930,000	Isolated
13-63	Kotha Cheruvu	Chittoor	Irala	Polakala	13-26-06	79-00-53	N	64	25%	1.550	4.0	0.434	85%	0%	Y	N	4,400,000	Isolated
13-64	Ellapalle Pedda Cheruvu	Chittoor	G.D. Nellore	Ellapalle	13-13-41	79-13-45	N	51	18%	0.440	4.0	0.343	85%	0%	Y	N	3,710,000	Krishnapuram Reservoir
13-65	Pedda Cheruvu Of Vepenjeri	Chittoor	G.D. Nellore	Vepenjeri	13-13-35	79-14-12	N	40	18%	0.216	4.0	0.274	85%	0%	Y	N	3,130,000	Krishnapuram Reservoir
13-66	Hissa Pedda Cheruvu	Chittoor	G.D. Nellore	Varathur	13-13-19	79-15-19	N	67	22%	0.620	4.0	0.455	65%	0%	Y	N	4,560,000	Krishnapuram Reservoir
13-67	Rathi Cheruvu	Chittoor	G.D. Nellore	Ambodarapalli	13-10-37	79-13-47	N	46	22%	0.284	4.0	0.310	75%	0%	Y	N	3,450,000	Krishnapuram Reservoir
13-68	Tenepalli Pedda Cheruvu	Chittoor	Puthalapattu	Thimmireddypalli	13-24-00	79-06-45	N	50	30%	0.930	4.0	0.342	84%	0%	Y	N	3,660,000	Isolated
13-69	Diguvapalli Cheruvu & Supply C	Chittoor	Puthalapattu	Potukanuma	13-26-06	79-00-53	N	52	37%	0.133	4.0	0.356	85%	0%	Y	N	3,760,000	Isolated
13-70	Peddy Nayani Cheruvu	Chittoor	Puthalapattu	Akanambattu/P.Kotha	13-22-09	79-06-00	N	60	20%	0.423	4.0	0.406	75%	0%	Y	N	4,190,000	Isolated
13-71	Thati Cheruvu	Chittoor	Puthalapattu	Vavilhota	13-19-16	79-05-00	N	42	24%	0.249	4.0	0.283	78%	0%	Y	N	3,240,000	Isolated
13-72	Ramalinga Samudram Cheruvu	Chittoor	Penumuru	Chintapenta	13-22-11	79-09-39	N	88	32%	0.790	4.0	0.790	80%	0%	Y	N	5,670,000	Krishnapuram Reservoir
13-73	HISSA OF PULIKALLU	Chittoor	Penumuru	Pulikallu	13-19-02	79-11-23	N	109	36%	0.780	4.0	0.780	80%	0%	Y	N	6,770,000	Krishnapuram Reservoir
13-74	Pedda Cheruvu	Chittoor	Penumuru	Guntipalli	13-20-21	79-12-47	N	46	46%	0.135	4.0	0.135	80%	0%	Y	N	3,450,000	Krishnapuram Reservoir
13-75	Pedda Cheruvu	Chittoor	Penumuru	Penumuru	13-22-34	79-11-18	N	53	43%	0.240	4.0	0.240	75%	0%	Y	N	3,820,000	Krishnapuram Reservoir
13-76	Medivanka	Chittoor	Thavanampalli	Muchukalva	13-18-56	78-53-19	N	103	2%	0.370	4.0	0.320	85%	0%	Y	N	6,460,000	Isolated
13-77	Ramana Cheruvu	Chittoor	Thavanamapalli	Sarakallu	13-20-14	78-55-27	N	66	0%	0.750	4.0	0.700	80%	0%	Y	N	4,500,000	Isolated
13-78	Kothacheruvu	Chittoor	Bangarupalem	Thumbapalem	13-15-45	78-49-50	N	361	25%	0.370	4.0	0.820	85%	0%	Y	N	20,080,000	Isolated
13-79	Nunjerla Project	Chittoor	Yadamari	Bhoomireddypalli	13-07-23	78-59-17	N	314	4%	0.440	4.0	0.380	82%	0%	Y	N	17,600,000	Isolated
13-80	Bodham Cheruvu	Chittoor	Yadamari	Kukkalapalli	13-11-35	79-03-20	N	133	15%	0.413	4.0	0.400	86%	0%	Y	N	8,040,000	Isolated

Source: JICA Survey Team

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

Site No.	Name of the Project	1 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	
01-01	Yetibatti Groyne and Channel Syste	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	Kotha	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	Gorlevani	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	Asarlasagaram	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 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	
02-01	Gopinadhapatinaikuni	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	Voora	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	Kotha	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	Voora	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	Anasuyavatni	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	Voora	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	Ramannapatnaykuni	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	Dasaripapa	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	Voora	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 DPR	2-1 Water Allocation	2-2 Tank Capacity	2-3 Full Water Frequency	3-1 Construction 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	
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	Sanyasinaidu	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 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	
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	Kurmanna	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	Matlapadu 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	Khambamvari	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 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	
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 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	
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	Kothuru	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 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	
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 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	
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	Puretipalli 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	Medaramitlapalem 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 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	
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	Kattuvapallli	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	Pullaiah 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 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	
10-01	Putlampalli	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	Koparthi	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	Nagisettipalli	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 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	
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	Peddarajucharuvu	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	Kotha 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 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	
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	VEMBAKAM	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	ALETI 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	Kaliambakam 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 Chervu	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 Chervu	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 Chervu	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	0.0	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	Namahsivaya 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	Kotha 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 Vepenjeri	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	**<Strength>** -India is the world's largest producer of mango and AP is the second largest producer in India. **<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	**<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. **<Weakness>** -Lack of IPM/ICM causes issue of aflatoxin and chemical residue which hinders export to advanced countries.	**<Strength>** -India accounts for nearly 30% of global production. AP is the largest producer of cashew in India. **<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.	**<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 India[2]. **<Weakness>** -Water shortage -High price fluctuation -Farmers not willing to grow processing variety and thus high cost of processing
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	**<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 2010[3]. -Good potential for exporting fresh mangoes to developed countries (current levels are low) **<Processed mangoes>** -World mango pulp production increased by 18.6% from 2010 to 2013, 38.8% since 2003[4]. India' is the world biggest mango	**<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 2013[5]. **<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]	**<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]	**<Tomato paste>** -Tomato paste market in India has grown by 43.4% between 2010 and 2013, and 144.4% between 2003 and 2013[8]. Although tomato paste production increased by more than 10% since 2010[9], it is not very stable. Consequently India is importing tomato paste to satisfy 30% of its demand every year.

[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.economictimes.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
	pulp producer with the share of more than 60% and it is increasing its share in recent years.			
Access to existing processing industries and export market	**<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. **<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.	**<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. **<Weakness>** -Aflatoxin and chemical residues resulted in rejection of Indian chili import in EU or Japan. -Lack of traceability.	**<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. **<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.	**<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. **<Weakness>** -High cost of processing as farmers do not cultivate processing variety. -No linkage between farmers and processers. -No traceability.

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	**<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]	**<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]	**<Strength>** -India is the second largest producer of groundnut in the world. AP is the biggest producer in India. **<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.	**<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

[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
				longer shelf life. **<Weakness>** Productivity is just 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	**<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]	**<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]	**<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 2013[14]. **<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 India[15].	**<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 2013[16].
Access to existing processing industries and export market	**<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.	**<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.	**<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.	**<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.

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 Principal' 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, examination of the project by CWC will be generally restricted to inter-State aspects, basic planning, hydrology and economic viability.		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

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 according 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) form 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.	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.	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.	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.	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.	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.	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/APILIP /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.	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.	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 dyring 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	No mention	No mention	No mention

	survey			
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 piscisulture activities (area, varieties and month wise water requirement), (c)Details of existing pisculture 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 alongwith water requirement (month wise/season wise)	No mention	No mention	Part (Source-3.1, p.52)
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	No mention	No mention	No mention

	courses (Annexure-2).			
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 (Sorce-3.1, p.53)
13.9	Gross water requirement at the canal head.(Annexture-10 Part-II); (a)Irrigation crop-wise (para-6), (b)OPisciculture (patra-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	No mention	No mention	No mention

	be suitably adjusted to match the availability of the supplies and pattern of diversion requirement.			
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 pisiculture, 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, Phosphotus, 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 power/energy generation, type of station i.e. peaking or non-peaking etc. may be discussed.	No mention	No mention	No mention
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	No mention	No mention	No mention

	command area; (a)Total potential, (b)Present use, (c)balance for future utilization			
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 famer's fields, package programs etc., (b)Dissemination of information to the farmers through audi0@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 modernaisation 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)Poulty, (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 & ohases rather than planning completion of the	No mention	No mention	No mention

	project over a long period. Detailed construction programme split into different packages may be given.			
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 MOEF7s 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 modernaisation 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, p.13)	OK (Source-2.1, p.14)	OK (Source-3.1, 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	No mention	No mention	No mention

	measure to overcome or remove the deficiencies			
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 Abstruct 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 Sedimantation		The hydrographic survey was conducted by the Andhra Pradesh Engineering Research Laboratory, Himayathsagar, 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 paseru, 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-I	Ok	
			· H.W.L/F.W.L: 121.62m	Volume-I	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 I	—	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 Upstream 1:1.2~10.0 Downstream 1:2.0~3.5	Volume-I	Ok	JICA Team requested to be confirmed by Design reports
	4.2 Spillway	(1) Food discharge	· Maximum flood discharge: 1507.6 m^3/s	Volume-I	Ok	The calculations are based on the guideline of CWC
		(2) Capacity of Spillway	· Spillway gates: B12.2 H6.4-3nos.	Volume-I	Ok	JICA Team requested to be confirmed by Design reports
			· Spillway length(overflow section): 48.8m	—	Ok	JICA Team calculated
			· Capacity of spillway: 1507.6m^3/s	Volume-I	Ok	ICA Team requested to be checked by Design reports $Q=CBH^{1.5}=1470m^3/s<1507$ NG in case of C=1.8~2.0
	4.3 Intake	(1)Design discharge	· Left side: 1.70 m^3/s	Volume-I	Ok	The calculations are based on the Design reports
			· Right side: 6.40m^3/s	Volume-I		
		(2)Gates	· Left side: B1.2 H1.2m	Volume-I	Ok	The calculations are based on the Design reports
			· Right side: B1.8 H1.8m	Volume-I		
	4.4 Canal	(1)Design discharge	· Left Main canal: 1.70m^3/s	Volume-I	Ok	The calculations are based on the Design reports
			· Right Main canal: 6.40m^3/s			
			· Distributor System: varied	—	Ok	
		(2)Canal length	· Left Main canal: 8.047km	Volume-I	Ok	The calculations are based on the Design reports
			· Right Main canal: 9.756km			
			· Distributor System: 29.5km	Project notes	Ok	The calculations are based on the Design report
		(3)Standard section	· Left Main canal · Right Main canal · Distributor System	Volume-I	Ok	The calculations are based on the Design report
	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 :	**Konkamayya tank of dalaivalasa**	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 :	**Tamara tank of Ullibhadra**	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

Bund: Reshaping

Bund: Reshaping

Sluice: Reconstruction

Supply channel: Reconstruction

Sluice: Reconstruction

Surplus Weir: New construction

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 from1991 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 of 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	· Dam type: Earth dam of zone type	-	Ok	JICA Team confirmed by design drawings
			· Top of bund level: 111.25m	-	Ok	The same as above
			· H.W.L/F.W.L(FTL): 108.204m	Volume-1	Ok	
			· L.W.L(MDDL): 98.602m	Volume-1	Ok	
			· Freeboard of dam: 3.046m(calculated)	-	Ok	JICA Team confirmed by Indian Standards. Freebourd is not less than 2.0m (IS 10635 of WRD)
			· Deep bed level: 87.996m	-	Ok	JICA Team confirmed by design report
			· Dam height: 23.254m	-	Ok	JICA Team calculated
			· Top width of bund: 4.5m	-	—	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 Upstream 1:1.0~3.0 Downstream 1:2.0	-	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) Food discharge	· Maximum flood discharge: 736.m^3/s	Volume-I	Ok	The calculations are based on the guideline of CWC (26000c/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-I - Volume-I	Ok 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-I 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-I 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-I 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-I 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-I 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 :	**Pedda Tnak**	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 :	**Vemanakunta Tnak**	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

Bund: Reshaping

Surplus Weir 1: Reconstruction

Surplus Weir 2: Reconstruction

Gate of sluice : Replacement

Feeder canal: Reconstruction

Field channel: Reconstruction

Source: JICA Survey Team

Check List for Krishnapuram Medium Irrigation Project

Check List for Krishnapuram Medium Irrigation Project in Chittoor District

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	JICA Team recommended after the wrap up meeting as follows; Command area is different between existing and proposed project. Therefore the water balance should be confirmed by calculating water requirement.
	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
			・Top of bund level: 215.0m	Project note	OK	
			・H.W.L/F.W.L: 213.0m	Volume-I	OK	
			・Freeboard of dam: fb=2.0m(JICA Team calculate)	—	OK	JICA Team confirmed by Indian Standards. Freeboard is not less than 2.0m (IS 10635 of WRD)
			・Deep bed level: 194.0m	Project note	OK	
			・Dam height: 21.0m	Project note	OK	
			・Top width of bund: 5.0m	Volume-I	—	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 Upstream 1:2.0~3.0 Downstream .1:2.5	Project note	OK	JICA Team confirmed by Design drawings_
	4.2 Spillway	(1) Food discharge	・Maximum flood discharge: 1060m^3/s	Project note	OK	The calculations are based on the guideline of CWC (37.775C/s)
		(2) Capacity of Spillway	・Spillway gates: B12.2 H6.1- 3nos	Project note	OK	The calculations are based on the Design reports
			・Spillway length(overflow section): 36.6m	—	OK	JICA Team calculated
			・Capacity of spillway: 1069m^3/s	—	Ok	JICA Team checked as below $Q=CBH^{1.5}=1103m^3/s>1069$ OK in case of C=1.8~2.0
	4.3 Intake	(1) Design discharge	・Lest 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
	4.4Canal	(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	The calculations are based on the Design reports
		(3)Standard section	・Left Main canal ・Right Main canal	Project notes	Ok 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 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% x Live storage/day

V=60ℓ/100m/min

2. Identification of leakage

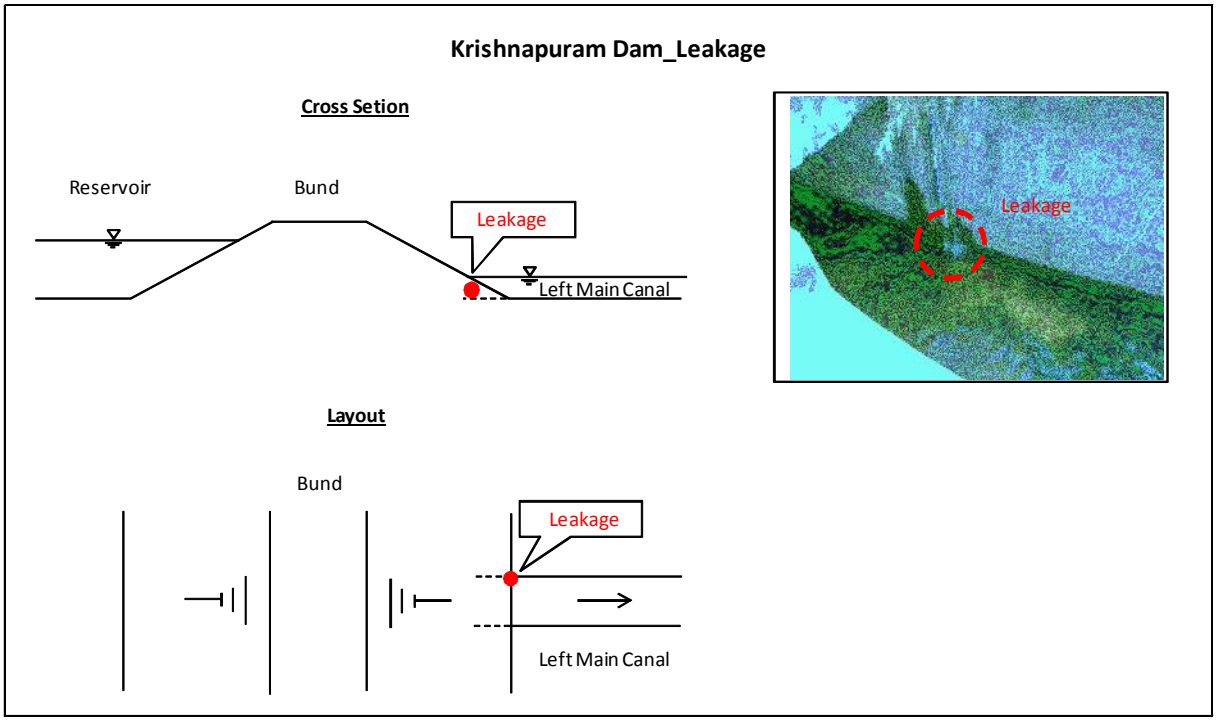
・Observation of ground water by some boring holes

・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 :	**Errikambatta Tnak**	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 :	**Thumburu Tnak**	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

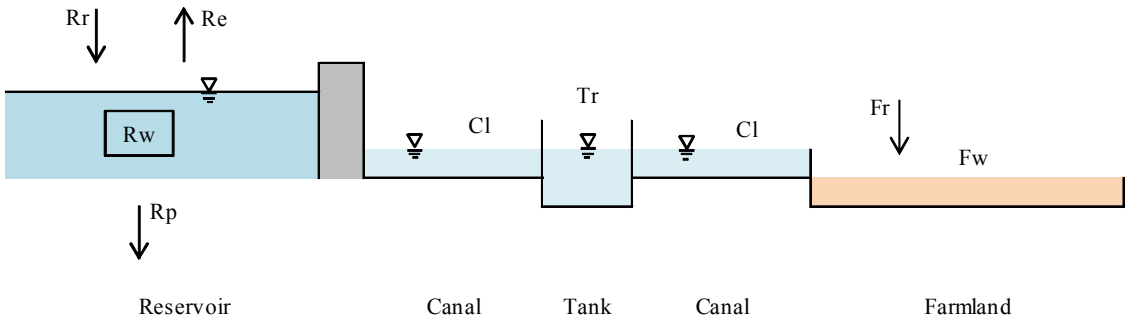
Source: JICA Survey Team

Attachment 8.2.5 Water Balance Study

Vottigedda Medium Irrigation Project

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

Diagram of Water Balance



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] Pulses (mm/crop)	325	325	
[Rabi] Pulses (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 Strorage (MCM) (f.)	25.14	(Source-2.3)
Average Depth (m) (g.)	12.23	(Source-2.3)
Surface Area (million m^2) (h.=f./g.)	2.06	
Balance of Evaporation and Rainfall (MCM) (i.=(e./1000)*h.)	2.21	
Evapolation (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 cops	Month												Area (ha)	Proportion of area
	J	F	M	A	M	J	J	A	S	O	N	D		
	Rabi					Kharif								
[Karif] 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)	Efficincy (%) (d.)	WR (MCM) (e.=c./d.)	Conveyance Loss (MCM)
[Karif] 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, Modernaisation of Vottigedda Reservoir Project Rawad (V), J.M.Valasa(M), Vizianagaram District, p.3
Source-2:	Abstrcat 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, Modernaisation of Vottigedda Reservoir Project Rawad (V) J.M.Valasa(M), Vizianagaram District, p4
Source-2.4:	Abstract and Detailed Estimate CWC Format, Modernaisation 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, Modernaisation of Vottigedda Reservoir Project Rawad (V) J.M.Valasa(M), Vizianagaram District
Source-5 (75%):	Abstract and Detailed Estimate CWC Format, Modernaisation 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 Strorage (MCM) (f.)	25.14	(Source-2.3)
Average Depth (m) (g.)	12.2	(Source-2.3)
Surface Area (million m^2) (h.=f./g.)	2.06	
Balance of Evaporation and Rainfall (MCM) (i.=(e./1000)*h.)	2.21	
Evapolation (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

	25	
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		
	Rabi						Kharif							
[Karif] 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)	Efficincy (%) (d.)	WR (MCM) (e.=c./d.)	Conveyance Loss (MCM)
[Karif] 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

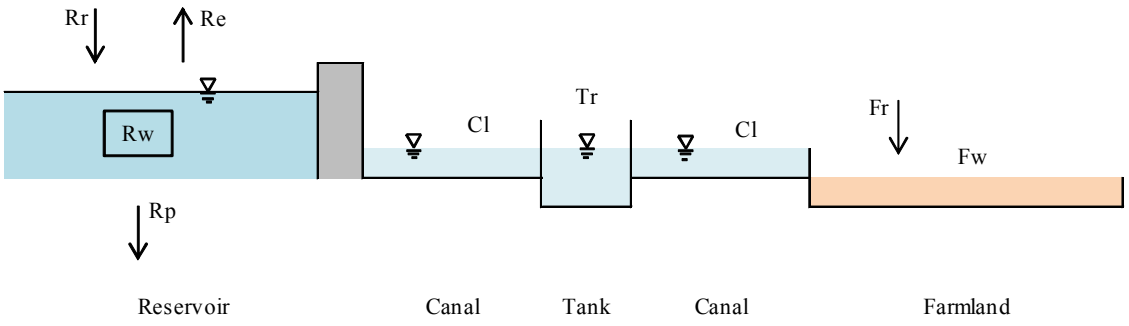
Source-1:	Abstract and Detailed Estimate CWC Format, Modernaisation of Vottigedda Reservoir Project Rawad (V), J.M.Valasa(M), Vizianagaram District, p.3
Source-2:	Abstrcat prepared by DoWR
Source-2.1:	Average of evaporation in India. MoWR URL: http://wrmin.nic.in/forms/list.aspx?lid=284
Source-2.2:	(Reference-2)
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, Modernaisation 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, Modernaisation of Vottigedda Reservoir Project Rawad (V) J.M.Valasa(M), Vizianagaram District
Source-5 (75%):	Abstract and Detailed Estimate CWC Format, Modernaisation 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 Allocatopn (MCM)	34.26	34.26	
Rr: Rainfall on Reservoir (MCM)	7.34	7.34	
Re: Evapolation form 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 prioect	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 Strorage (MCM) (f.)	76.41	(Source-2.3)
Average Depth (m) (g.)	10.10	(Source-2.3)
Surface Area (million m^2) (h.=f./g.)	7.57	
Balance of Evaporation and rainfall (MCM) (i.=(e./1000)*h.)	9.23	
Evapolation (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 cops	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)	Efficincy (%) (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 Strorage (MCM) (f.)	76.41	(Source-2.3)
Average Depth (m) (g.)	10.10	(Source-2.3)
Surface Area (million m^2) (h.=f./g.)	7.57	
Balance of Evaporation and rainfall (MCM) (i.=(e./1000)*h.)	9.23	
Evapolation (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)	Efficincy (%) (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

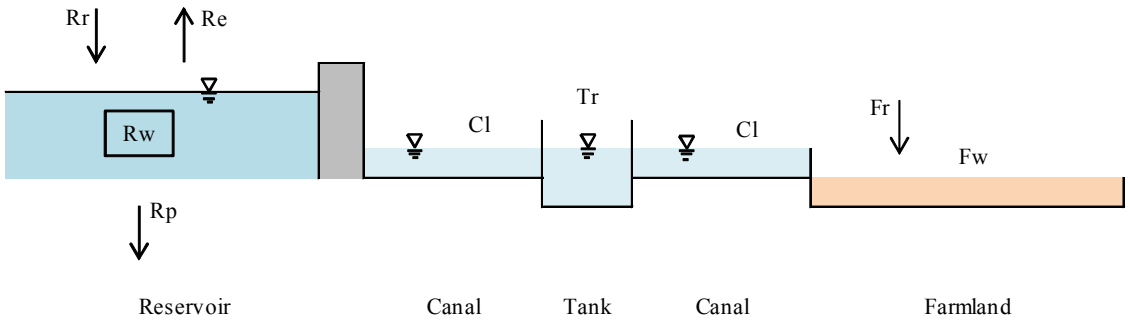
Source-1:	Modernisation of Thammileru Reservoir Project
Source-2:	Prepared by DoWR
Source-2.1:	Average of evaporation in India. MoWR URL: http://wrmin.nic.in/forms/list.aspx?lid=284
Source-2.2:	(Reference-2)
Source-2.3:	Maximum depth = Dam height (23.254m)-Freeboard (3.046m) =20.208m, Average depth = 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 Allocatopn (MCM)	13.08	13.08	
Rr: Rainfall on Reservoir (MCM)	0.45	0.45	
Re: Evapolation form 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 Priest	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 m^2) (h.=f./g.)	0.51	
Balance of Evaporation and Rainfall (MCM) (i.=(e./1000)*h.)	0.68	
Evapolation (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 cops	Month												Area (ha)	Proportion
	J	F	M	A	M	J	J	A	S	O	N	D		
	Rabi					Kharif								
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 Prioect	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 Strorage (MCM) (f.)	4.87	(Source-2.3)
Average Depth (m) (g.)	9.5	(Source-2.3)
Surface Area (million m^2) (h.=f./g.)	0.51	
Balance of Evaporation and Rainfall (MCM) (i.=(e./1000)*h.	0.68	
Evapolation (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 cops	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)	Efficincy (%) (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%)	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%)	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: Volune-I Project Report pn 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.aspx?lid=284
Source-2.2: (Reference-2)
Source-2.3: Maximum depth = Dam hieght (21.0m)-Freeboard (2.0m) = 19.0m, Average depth = 19.0/2 = 9.5 m, Volune-I Project Report on Modernisation Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District p40
Source-2.4: Volune-I Project Report pn 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: Volune-I Project Report pn Modernisation Proposals of Krishnapuram Project in Karvetinagaram Mandal of Chittoor District, p.53
Source-5 (75%): Volune-I Project Report pn 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)
Padd	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	Madhaya/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
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	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-planed 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	South North	More demos, trainings and exposure visits to encourage Farm Mechanization with JICA support. Strengthening existing medium and minor irrigation reservoirs and tanks

Constraints	Related Districts	Countermeasures
fertilizer use		
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				
Particulars	Unit	Price Rs/unit	Quantity Unit/acre	Amount Rs./acre
A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	30	30	900
Nursery bed				
Organic materials (no buying)	kg			
Urea	kg	7	2	10
SSP	kg	6	6	40
MOP	kg	16	2	30
Main field				
Urea	kg	7	100	700
SSP	kg	6	100	600
MOP	kg	16	25	400
Micro-nutrient (ZnSO4)	kg	25	20	500
Pesticide (Acephate)	kg	350	0.5	180
Fungicide (Wettable Sulpher)	kg	44	6	260
Sub-total				3,620
B Labour Cost				
Land Preparation (Tractor: ploguhing / cultivation / pu	time	800	3	2,400
Nursery preparation	man-day	300	1	300
Removing of seedlings / Planting	man-day	200	10	2,000
Weeding	man-day	200	10	2,000
Irrigation	man-day	300	1	300
Application of agro-cchemicals (pesticide)	man-day	300	1	300
Application of fertilizer	man-day	300	1	300
Harvesting	man-day	200	10	2,000
Heaping / Threshing / Winnowing / Bagging	man-day	300	6	1,800
Transport	ls	500	1	500
Sub-total				11,900
Total (A+B)				15,520
C Yield	bag			30
Price	bag	1,100		
Gross Income				33,000
Net Income (C-(A+B))				17,480

Proposed Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/ha	Amount Rs./acre
A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	30	25	750
Nursery bed 200 m2				
Organic materials (no buying)	kg			
Urea	kg	7	4.4	30
SSP	kg	6	6.25	40
MOP	kg	16	1.6	30
Main field	-	-	-	-
Urea	kg	7	110	770
SSP	kg	6	150	900
MOP	kg	16	26	420
Micro-nutrien (ZnSO4)	kg	25	20	500
Pesticide (Chlorpyrifos)	L	240	1.5	360
Pesticide (Phorate granules) 10G	kg	40	12.5	500
Herbicide (Butachlor)	kg	160	1.25	200
Sub-total				4,500
B Labour Cost				
Land Preparation (Tractor: ploguhing / cultivation / pu	time	800	3	2,400
Nursery preparation	man-day	300	2	600
Planting	man-day	200	10	2,000
Weeding	man-day	200	10	2,000
Irrigation	man-day	300	1	300
Application of pesticide/fungicide/weedicide	man-day	300	3	900
Application of fertilizer	man-day	300	2	600
Harvesting	man-day	200	10	2,000
Heaping / Threshing / Winnowing / Bagging	man-day	300	6	1,800
Transport	ls	500	1	500
Sub-total				13,100
Total (A+B)				17,600
C Yield	bag			35
Price	bag	1,100		
Gross Income				38,500
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				
Particulars	Unit	Price Rs/unit	Quantity Unit/ha	Amount Rs./acre
A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	30	30	900
Nursery bed				
Organic materials (no buying)	kg	6	20	120
Urea	kg	7	2	10
SSP	kg	6	6	40
MOP	kg	16	2	30
Main field				0
Urea	kg	7	60	420
SSP	kg	6	100	600
MOP	kg	16	25	400
Micro-nutrient (ZnSO4)	kg	25	20	500
Pesticide (Phorate Granule)	kg	40	8	320
Pesticide (Monocrotophos)	L	330	0.5	170
Sub-total				3,510
B Labour Cost				
Land Preparation (Tractor: ploguhing / cultivation / pu	acre	800	3	2,400
Nursery preparation	man-day	300	1	300
Removing of seedlings / Planting	man-day	200	10	2,000
Weeding	man-day	200	10	2,000
Irrigation	man-day	300	1	300
Application of pesticide/fungicide/weedicide	man-day	300	2	600
Application of fertilizer	man-day	300	2	600
Harvesting	man-day	200	10	2,000
Heaping / Threshing / Winnowing / Bagging	man-day	300	6	1,800
Transport	ls	500	1	500
Sub-total				12,500
Total (A+B)				16,010
C Yield	bag			25
Price	bag	1,100		
Gross Income				27,500
Net Income (C-(A+B))				11,490

Proposed Condition				
Particulars	Unit	Price Rs/unit	Quantity Unit/ha	Amount Rs./acre
A Seeds / Agro-chemicals				
Seeds / Seedlings	kg	30	25	750
Nursery bed 200 m2				
Organic materials (no buying)	kg			
Urea	kg	7	4.4	30
SSP	kg	6	6.25	40
MOP	kg	16	1.6	30
Main field	-	-	-	-
Urea	kg	7	90	630
SSP	kg	6	150	900
MOP	kg	16	26	420
Micro-nutrient (ZnSO4)	kg	25	20	500
Pesticide (Phorate granules)	kg	40	12.5	500
Pesticide (Monocrotophos)	L	330	0.5	170
Herbicide (Butachlor)	kg	160	1.25	200
Sub-total				4,170
B Labour Cost				
Land Preparation (Tractor: ploguhing / cultivation / pu	time	800	3	2,400
Nursery preparation	man-day	300	2	600
Planting	man-day	200	10	2,000
Weeding	man-day	200	10	2,000
Irrigation	man-day	300	2	600
Application of pesticide/fungicide/weedicide	man-day	300	3	900
Application of fertilizer	man-day	300	2	600
Harvesting	man-day	200	10	2,000
Heaping / Threshing / Winnowing / Bagging	man-day	300	6	1,800
Transport	ls	500	1	500
Sub-total				13,400
Total (A+B)				17,570
C Yield	bag			30
Price	bag	1,100		
Gross Income				33,000
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 (Chlorpyriphos)	L	240	0.5	120
Pesticide (Phorate granules)	kg	40	10	400
Pesticide (Monochrotophos)	L			
Herbicide (Atrazine 50% WP)	kg	196	1	200
Herbiside 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
Hoeing	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	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 (Chlorpyriphos)	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
Herbiside 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			
Hoeing	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	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
	kg			0
Herbicide (Fluchloralin)	L	800	1	800
Sub-total				6,400
B Labour Cost				
Land Preparation (Tractor: ploguhing / 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	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: ploguhing / 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	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			
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 monocrolophos	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	kg			200
Price	kg	75		
Gross Income				15,000
Net Income (C-(A+B))				9,630

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	kg			350
Price	kg	75		
Gross Income				26,250
Net Income (C-(A+B))				18,710

Source: JICA Survey Team

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: ploguhing / Cultiv	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 & tieing 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
Yield	kg			30,000
Price	kg	2.2		
Gross Income				66,000
Net Income (C-(A+B))				24,910

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: ploguhing / 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 & tieing 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	kg			35,000
Price	kg	2.2		
Gross Income				77,000
Net Income (C-(A+B))				34,120

Source: JICA Survey Team

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, Vizaianagaram, 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 littles 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.


Picture 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.
- Gopar 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.
- Gopar 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 heath 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 (Jercy 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 littles: 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 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	200	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	23	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

CONSOLIDATED STATEMENT OF FISHERMEN COOP. SOCIETIES

Sl.No	Type of Society	No. of Societies
1	Inland Fishermen Cooperative Societies	1326
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	2288

Source: Fisheries Department, Andhra Pradesh

	Name of District	Inland Fishermen Cooperative Societies		Marine Fishermen Cooperative Societies		Brackish Water Fishermen Cooperative Society		Fisherwomen Cooperative Society		Fishermen Marketing 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	
12	Kadapa	34	1763	0	0	0	0	2	52	0	0
13	Chittoor	43	2527	0	0	0	0	13	327	0	0
	Tot	1326	129939	424	81321	12	762	509	37818	4	2334

Source: Fisheries Department, Andhra Pradesh

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

(Fig. in Tonnes)

Sl. No.	Name of District	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	2014-15
1	Srikakulam	1371	4151	23209	23786	24868	26024	30483	31815	32311	32325	32615	31259	25614	30735	32131	33858	40352	42203	46042	55517
2	Vizianagaram	12339	6056	7864	8131	8373	9310	12430	13357	8689	8184	17033	8080	8444	10110	10947	12688	12868	12957	15446	15607
3	Visakhapatnam	7119	8252	21418	21787	25798	26591	31257	40798	46348	34455	35157	35212	49448	54777	52578	59037	69982	73523	78585	85620
4	East Godawari	6993	8964	20014	21500	21771	22796	34315	34775	48948	42847	28948	46219	49811	53844	52157	58096	68370	80189	79030	85078
5	West Godawari	271	222	2000	2100	2448	2859	6314	7551	10229	6919	8027	4657	2536	1576	1680	1682	7372	7940	9908	10583
6	Krishna Dist	3731	4177	7152	7522	8246	9402	12620	14675	13627	10700	10452	13079	13997	16192	17050	19062	21932	23296	25419	28037
7	Guntur	9175	10509	8367	8554	11903	14736	12492	13181	14903	11488	14448	13434	14487	19623	20075	20133	24816	26751	26818	31460
8	Prakasam	63768	65373	5379	5464	7229	9286	11079	12327	12435	7539	11007	11577	12254	13040	14699	13387	17907	20528	20339	22789
9	Nellore	26015	22699	33640	31279	32118	36155	29771	43054	42473	27124	34380	43596	42224	45027	45227	33883	62873	64198	71751	71558
	TOTAL	**130782**	**130403**	**129043**	**130123**	**142754**	**157159**	**180761**	**211533**	**229963**	**181581**	**192067**	**207112**	**218815**	**244924**	**246544**	**251826**	**326472**	**351585**	**373338**	**406249**

MARINE 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	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
1	Srikakulam	355	388	375	410	421	490	740	803	728	727	710	903	1109	685	1224	723	1050	1103	1316	1446
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	2987	3357	3853	3944	3520	3217	5256	5372	4775	4447	6459	8525	5961	7234	9292	10709	11321	11700
4	East Godawari	3393	3542	1692	1865	1959	1744	2188	7978	5842	4473	2301	6880	6788	9980	8201	9159	12758	16521	15415	16651
5	West Godawari	60	61	127	168	185	306	1137	751	832	633	808	558	67	484	319	317	818	934	1090	1222
6	Krishna Dist	2783	2758	2975	3323	5207	5569	5800	7918	6605	5800	5350	6485	6600	8435	7670	7426	9275	9800	11200	11906
7	Guntur	964	907	917	1118	1186	2118	2331	2001	3885	3478	3182	3957	4542	6194	4525	4389	5571	6597	7042	7454
8	Prakasam	5192	5264	1202	1374	1613	1717	2115	2535	4328	3030	3838	3921	3550	4112	5111	4358	4997	6268	5806	6820
9	Nellore	8121	8356	7003	7884	8875	8980	5796	10897	6113	5350	5176	6087	6539	7214	13034	4574	8461	10078	10733	11053
	TOTAL	**21208**	**21644**	**17504**	**19877**	**23728**	**25343**	**24179**	**36762**	**33963**	**29151**	**26769**	**33599**	**36077**	**46236**	**46606**	**38727**	**52945**	**62764**	**64908**	**69152**

Attachment 8.4.3

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	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	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	1001	1011	1326	3265
4	East Godawari	2329	3696	3796	4573	3298	5707	3832	4508	5852	10187	4189	3628	4618	5501	5243	5621	6254	7876	9183	11373
5	West Godawari	4935	5176	5063	11632	3439	3775	2983	3878	5371	10127	7947	8061	24260	1161	1674	8318	18187	18367	26864	31550
6	Krishna Dist	10127	13477	14094	13402	10865	12328	14104	13517	7172	2450	14700	11272	5336	6305	6350	12061	9001	16344	10391	13801
7	Guntur	3139	3128	3238	4542	4360	4151	5253	5283	4030	2227	5139	2732	1707	2835	5746	3135	4056	3960	6575	7594
8	Prakasam	2172	1746	1966	4047	4234	4947	4311	4343	3547	4531	4827	4903	2814	2727	2731	4610	4785	9763	7420	10301
9	Nellore	3769	2641	2598	5988	5371	6139	5476	6489	6625	2738	4340	6543	7923	7333	8530	8546	12340	11973	25415	26319
	TOTAL	**27140**	**30377**	**31320**	**44858**	**32269**	**37844**	**36604**	**38501**	**33339**	**32973**	**41973**	**37811**	**46885**	**26341**	**30659**	**43378**	**56179**	**69871**	**88036**	**105162**

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	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
1	Srikakulam	1132	1152	1287	1596	1854	2533	3184	3043	2575	3171	4315	3665	3423	5648	7093	6934	8376	8602	9594	10255
2	Vizianagaram	15414	15505	2954	3790	3895	4013	3906	5064	3290	5779	6668	4199	4764	5871	6503	7287	8050	8661	9256	10300
3	Visakhapatnam	10345	10373	1068	1103	2568	2845	9545	2239	2865	3437	1894	1934	2806	6116	2738	4361	6932	6630	8050	8461
4	East Godavari	1845	1870	12094	12783	15824	11821	15664	12142	11844	10225	9620	8764	11168	20176	19999	21884	25547	30053	28524	30771
5	West Godavari	21740	22109	41302	45706	76367	84172	101232	208130	249635	256282	258372	207373	248051	304459	300055	594593	350018	432250	471369	548807
6	Krishna	4355	4433	31915	37596	57770	87165	98980	163382	207468	176000	201265	234895	246529	300812	369600	347277	391661	430917	486600	535542
7	Guntur	2117	2153	3332	4107	7404	6641	7962	6066	6710	6672	6146	8053	8754	13698	17086	18991	24980	26029	27237	30381
8	Prakasam	5311	5374	1815	2133	6228	3555	6052	3164	132	91	779	4438	3263	6448	7405	7476	9670	10257	13748	17924
9	Nellore	20980	21150	11078	12099	12172	18861	18260	16814	13703	14702	14112	16426	22727	27173	25889	21217	34067	37288	50437	46259
10	Kurnool	13523	13745	2505	2803	3328	1061	3708	2525	460	1830	10265	17495	12990	17596	18274	18743	20501	21740	24506	24123
11	Kadapa	9036	9184	1926	2027	2689	3771	5010	3605	1427	912	804	2075	2833	3929	591	2510	4028	4361	775	3269
12	Anantapur	1387	1410	8539	9887	11719	11128	12115	9402	8705	10525	2250	2073	2724	3609	3730	3697	2866	3576	4740	6600
13	Chittoor	5120	5203	2680	3938	5047	1215	3939	3251	1223	1999	1334	2316	1264	1329	3545	780	1613	2133	4872	4125
	TOTAL	**112305**	**113661**	**122495**	**139568**	**206865**	**238781**	**289557**	**438827**	**510037**	**491625**	**517824**	**513706**	**571296**	**716864**	**782508**	**1055750**	**888309**	**1022497**	**1139708**	**1276817**

Attachment 8.4.3

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	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
1	Srikakulam	398	403	410	447	480	795	963	736	560	698	315	635	407	664	514	531	1062	1069	1408	1657
2	Vizianagaram	4860	5102	1242	1600	1960	1298	543	328	319	365	892	381	438	598	700	806	951	1037	1139	1210
3	Visakhapatnam	894	1050	402	514	430	351	564	833	1402	749	635	876	797	1220	437	1634	6162	4380	6007	7130
4	East Godawari	419	431	4118	4614	1730	3080	4364	3692	6468	2054	4719	488	7235	9346	6794	5714	9220	10123	10301	15528
5	West Godawari	4082	4136	3839	4810	8000	9751	5820	8913	12823	11055	4767	14782	22675	15723	6809	3353	12631	14835	17943	20454
6	Krishna Dist	989	998	2224	2295	6941	7500	9100	10980	8567	2708	3190	4378	8671	10856	10200	11021	15293	15003	26084	24585
7	Guntur	310	314	1161	1387	1840	3598	2401	508	786	629	722	860	867	829	915	1661	1973	3049	3704	3326
8	Prakasam	604	638	448	880	1681	2531	3819	620	46	56	202	510	363	519	943	1718	2172	2627	3042	7050
9	Nellore	4004	4142	6231	6556	11313	11662	15332	22946	22397	15517	20089	26891	23078	27313	24586	7635	29205	29483	32981	40081
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	Chittor	0	0	0	0	0	0	0	0	1	0	2	5	10	0	0	6	2	0	11	0
	TOTAL	**16560**	**17214**	**20075**	**23103**	**34375**	**40566**	**42906**	**49572**	**53417**	**33874**	**35554**	**49849**	**64596**	**67121**	**51917**	**34130**	**78781**	**81733**	**102793**	**121198**

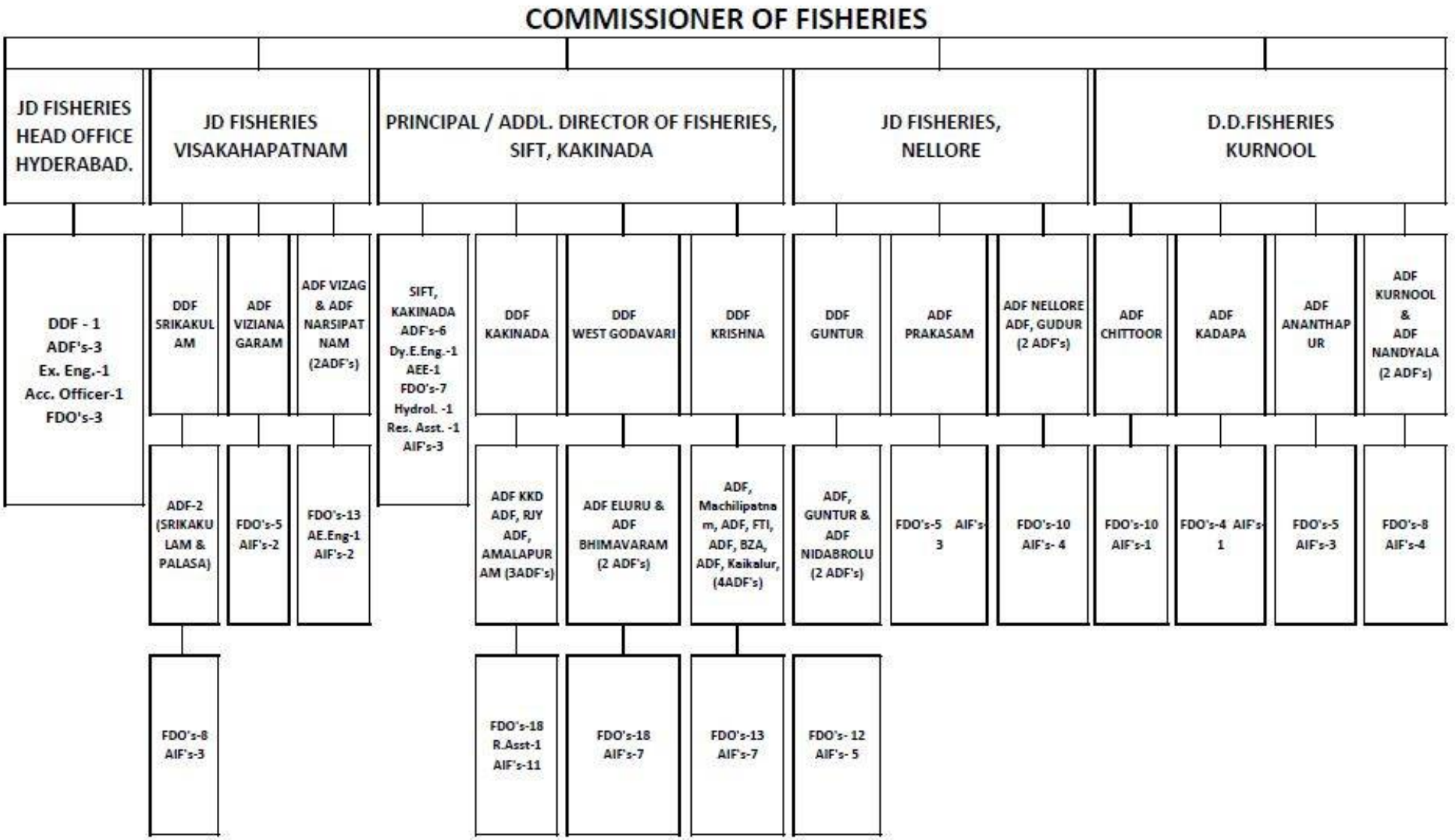
ABSTRACT OF FISH AND PRAWN PRODUCTION FROM 1995-96 TO 2014-2015 (Andhra Pradesh)

(Tonnes)

Sl. No.	Name of District	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
1	Srikakulam	3393	6299	25504	26494	27901	30300	35635	36663	36459	37271	38260	36762	30691	37908	41097	42551	51321	53472	59093	69696
2	Vizianagaram	32750	26809	12289	13946	14681	15117	17450	19425	12692	14637	25332	13060	14096	17210	18746	21376	22666	23491	26955	28155
3	Visakhapatnam	19093	20205	26214	27133	33049	34049	45247	47290	56308	44355	42877	42804	59572	70917	61929	72800	93369	96253	105289	116176
4	East Godawari	14979	18503	41714	45335	44582	45148	60363	63095	78954	69786	49777	65978	79620	98847	92394	100474	122149	144762	142453	159401
5	West Godawari	31088	31704	52331	64416	90439	100863	117486	229223	278890	285016	279921	235430	297589	323403	310537	608263	389026	474326	527174	612616
6	Krishna Dist	21985	25843	58360	64138	89029	121964	140604	210472	243439	197658	234957	270109	281133	342600	410870	396847	447162	495360	559694	613871
7	Guntur	15705	17011	17015	19708	26693	31244	30439	27039	30314	24494	29637	29036	30357	43179	48347	48309	61396	66386	71376	80215
8	Prakasam	77047	78395	10810	13898	20985	22036	27376	22989	20488	15247	20653	25349	22244	26846	30889	31549	39531	49443	50355	64884
9	Nellore	62889	58988	60550	63806	69849	81797	74635	100200	91311	65431	78097	99543	102491	114060	117266	75855	146946	153020	191317	195270
10	Kurnool	13523	13745	2505	2803	3328	1061	3708	2531	508	1873	10269	17534	13030	17629	18284	18773	20580	21833	24635	24253
11	Kadapa	9036	9184	1926	2027	2689	3771	5010	3615	1427	912	804	2075	2833	3929	591	2510	4034	4361	775	3269
12	Anantapur	1387	1410	8539	9887	11719	11128	12115	9402	8705	10525	2267	2078	2739	3630	3740	3718	2891	3610	4784	6647
13	Chittor	5120	5203	2680	3938	5047	1215	3939	3251	1224	1999	1336	2321	1274	1329	3545	786	1615	2133	4883	4125
	ANDHRA PRADESH	**307995**	**313299**	**320437**	**357529**	**439991**	**499693**	**574007**	**775195**	**860719**	**769204**	**814187**	**842078**	**937669**	**1101486**	**1158235**	**1423812**	**1402686**	**1588450**	**1768783**	**1978578**

Source: Fisheries Department, Andhra Pradesh

Attachment 8.4.3



Source: Fisheries Department, Andhra Pradesh

Attachment 8.6.1 Irrigated Crops

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, Chittor
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 year[1]. Supply of water is a major problem, as there is little rainfall and groundwater in the major cultivation areas. The cost of bowling 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 Chittor 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. Srini 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

[1] Interview with farmers and DOH

percent 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 ago-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 For ripening INR2.5/kg will be added.	Buying price: INR20~40/kg	Retail price: INR30~60/kg
			Packhouse, VHT →	Exporter
			For export, treatment fee of INR15/kg will be added. Inspection fee is also added.	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

(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

[3] National Horticulture Board (2013-2014)

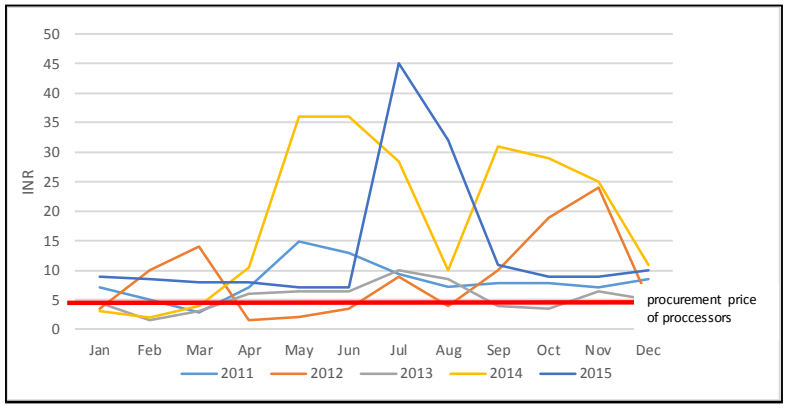
tomato farmers utilize Madanapalle market, and 200 trucks ship tomato all over the country every day. [4]There are 109 commission agents and 30 licensed traders in Madanapalle market.[5]

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. [6]The 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
	Farmer	Processing companies		Exporter/Manufacture
Price in Rabi	Selling price: INR4.5-5/kg	Selling price: INR65/kg (paste) (8kg of tomato is required to make 1kg past. Buying price: INR40/kg)		Price varies for products/country

Source: JICA Survey Team

3) Market situation

[4] Brief note on the Agricultural Market Committee, Madanapalle
[5] Interview at the APMC office
[6] Interview with multiple processing companies in Chittor

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 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 Chittor, 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 famers income. It will also help develop a traceability norm which is becoming important also in India.

Table Tomato paste import to India (tons)

	Chine	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

(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 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.[7]

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

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

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.

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.

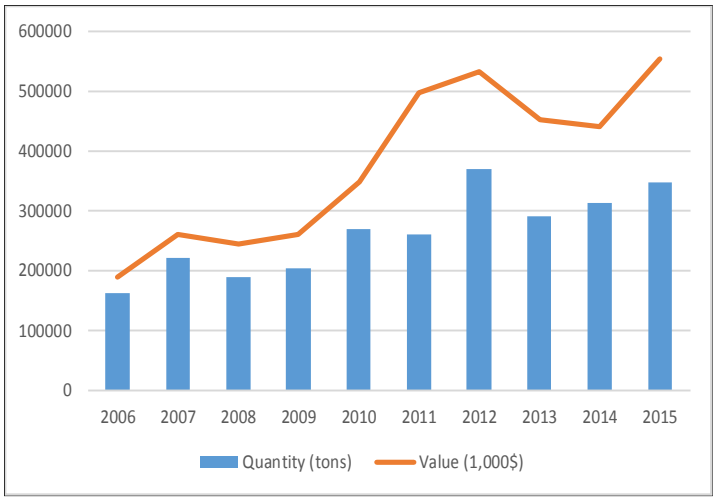
Price structure of chili VC

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
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 6,000~9,600[8]. 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 units[9]. 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.

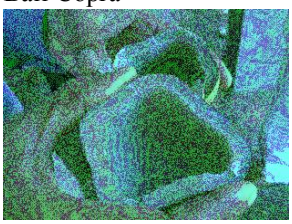
[8] Hearing from Coconut Development Board and DOH in East Godavari
[9] Annual Report of Coir Board (2015)

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 AP[10].

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.

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

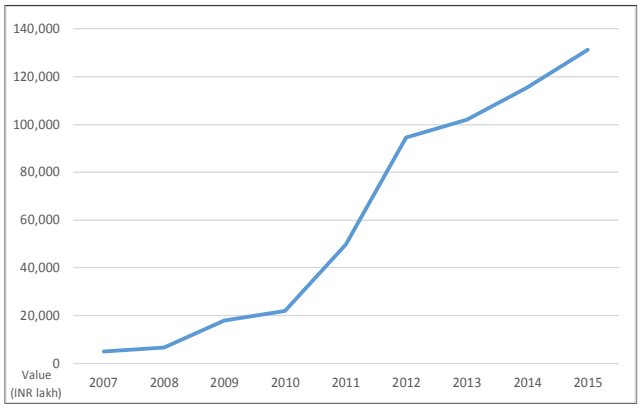
Source: JICA Survey Team

3) Market situation

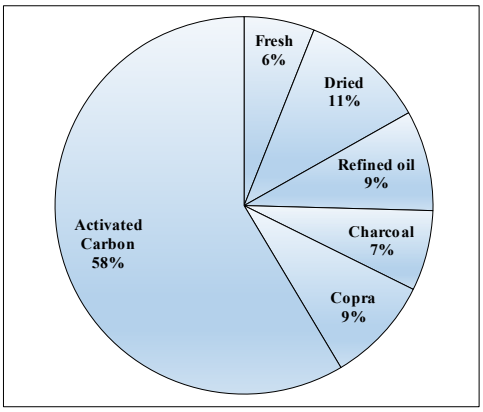
While there are always good domestic demands for various coconut products for edible, industrial and religious purpose in the country, export demand is also steadily increasing. As Figure below shows the export value of coconuts products have increased more than 20 times in the past decades. Export of activated carbon produced by coconut shell which started from 2010 accounts for 58 percent in value

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

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



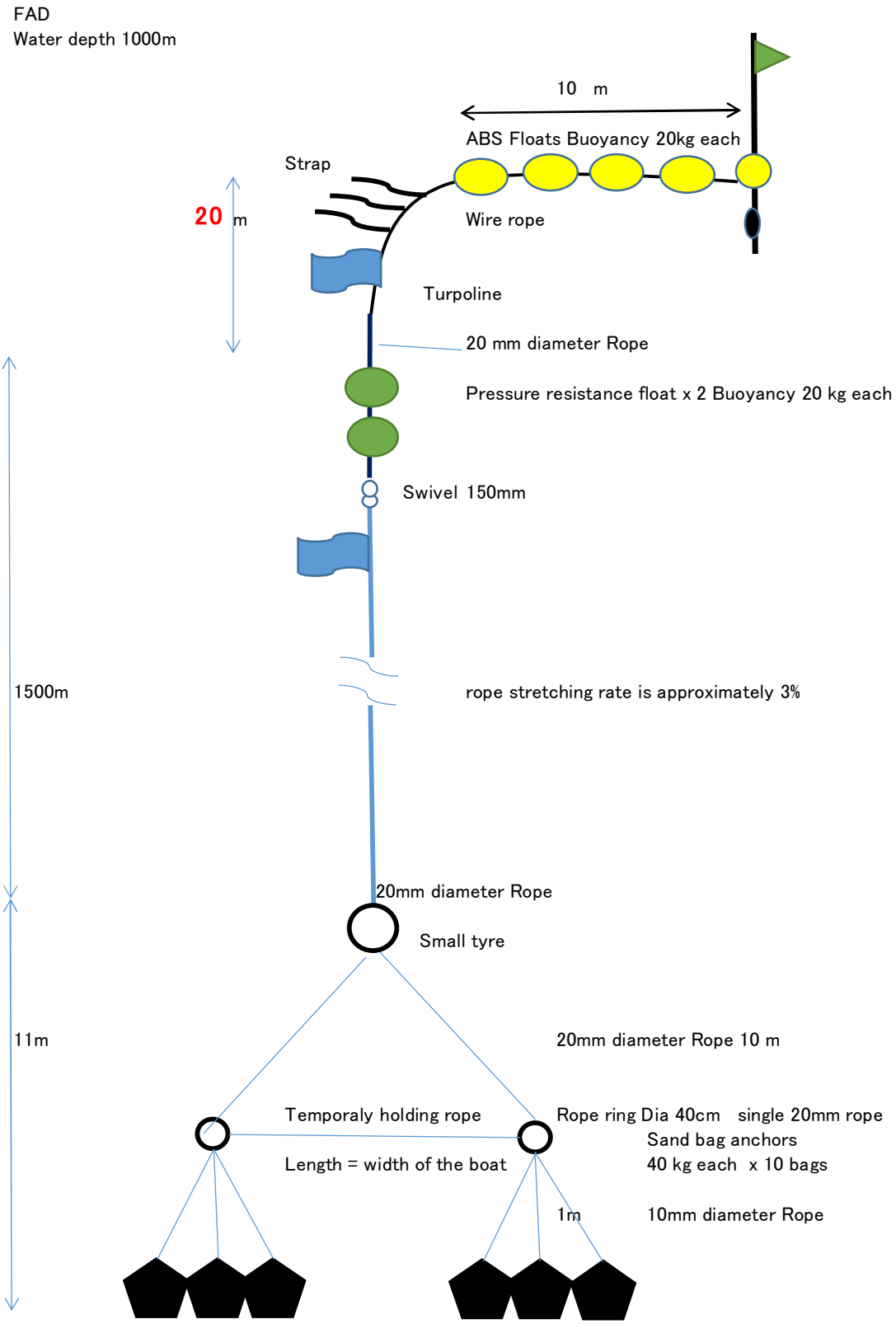
Percentage of Indian exported coconut products (2014)

Source: Coconut Development Board

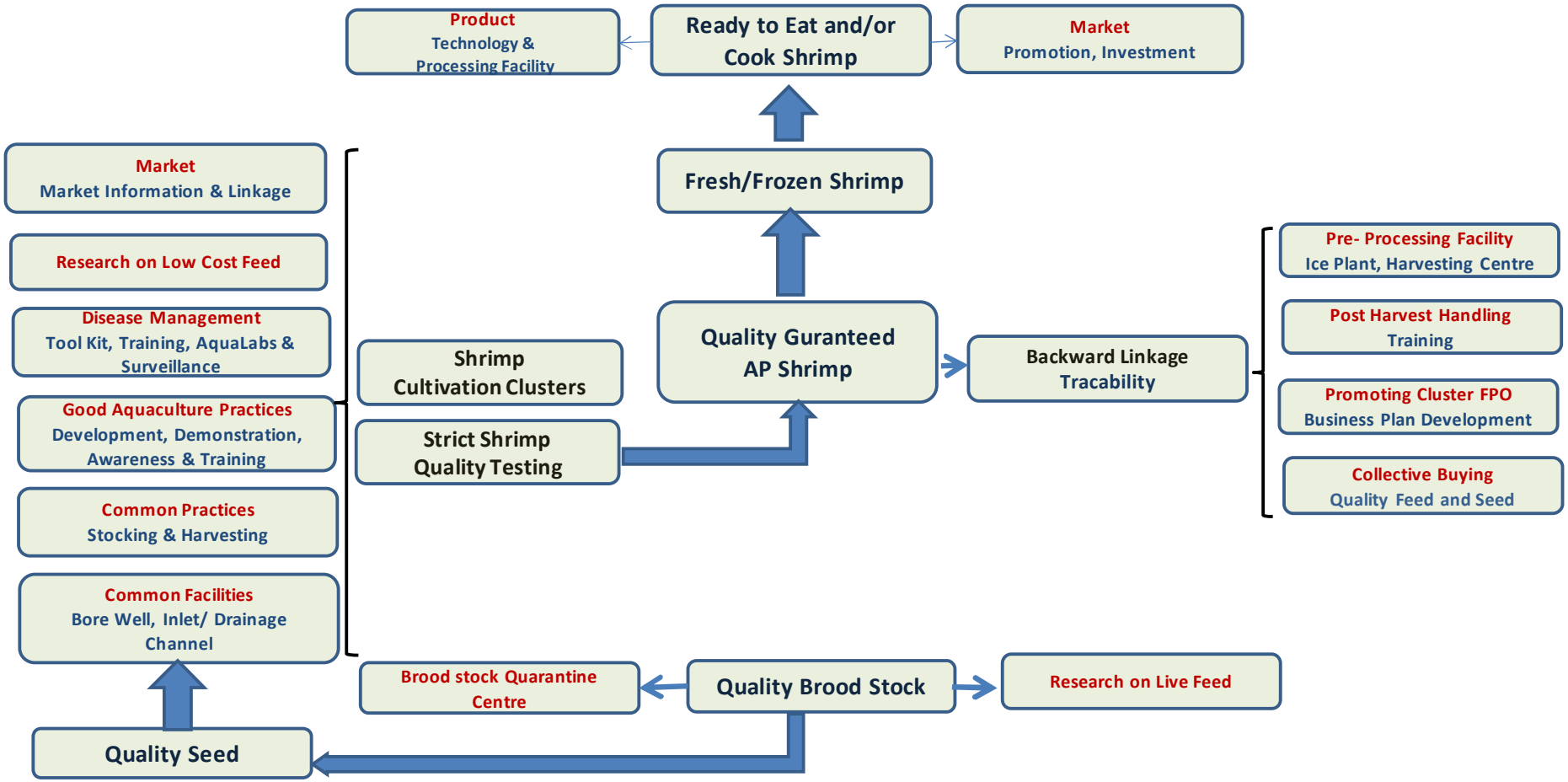
Attachment 8.6.3 Collaboration for Strengthening Shrimp Value Chain

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 Sustainaable Aquaculture (NaCSA)
Demonstration of Good Aquaculture Practices	National Centre for Sustainaable Aquaculture (NaCSA)
Promoting Shrimp Cultivation Cluster/Zones	National Centre for Sustainaable 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 acredited aqua lab for disease surveilance 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

Example of Fish Aggregation Devices for Small Scale Fisheries



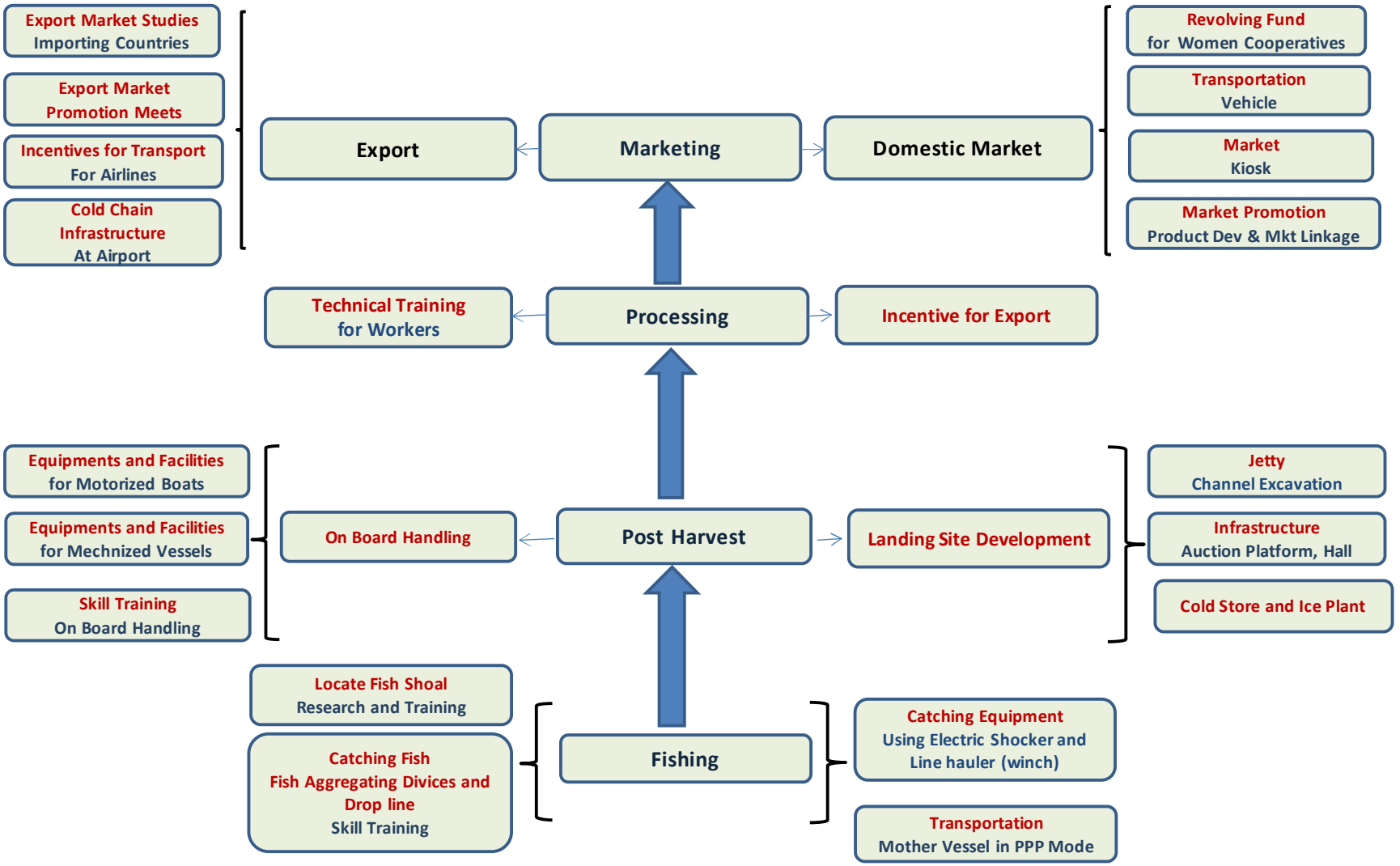
Shrimp VC Flow Chart



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 Asquaculture Practices	Demonstration of Good Aquaculture Practices
	Inadequate awareness among farmers on sustainable aquaculture practices	Creating awareness on Good Aquaculture Practices in Shrimp Cluster
	Inadequate expertize with small farmers on scientific rearing of shrimps	Training on scientific rearining 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
	Inadquate 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 tracability; Potential for high end export market	Facilitating supply chain development to focus on tracability
	Supply chain development would enable getting shrimp of disired quality like less use of antibiotics, less antioxidants in feed thereby meeting buyer requirement	Demonstration of innovative practices (link to buyers' requirment)
Harvesting/ Marketing	Detorioration 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 linkange through buyer sellers meets
Processing	Supply chain development could be strengthened by setting of preprocessing facilities in production clusters	Pre processing facilities (Hygene 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 acredited aqua lab for disease surveilance 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 reay 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 Tuna Value Chain Flow Chart



Tuna 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 electrick 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 unhygenic 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 utlize 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 unhygenic 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).

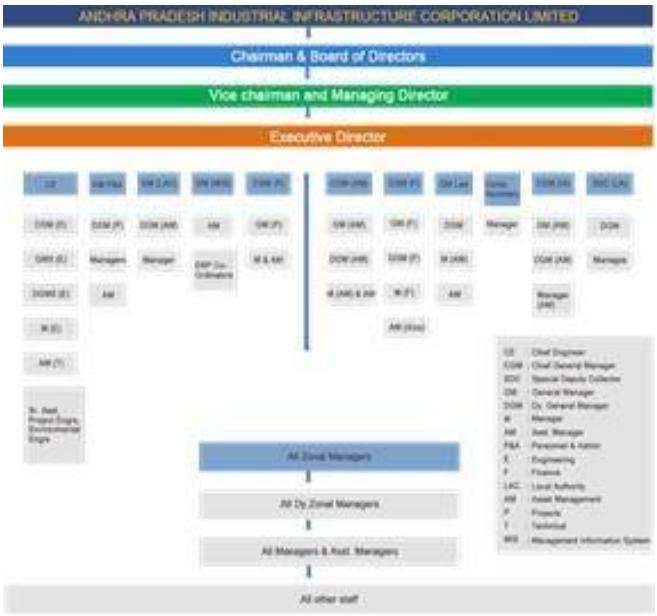


Figure 8.7.1 Organisation Structure

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 Bobbilli

Growth Center Bobbilli, with an area of 1,149.81 acre (465 ha), is located along SH36 between Ramathadrapuram and Bobbilli, 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 isINR 840 per m^2 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 Bobbilli Solid Waste Management Park (SWMP) according to APPCB (Pollution Control Board) norms.

Figure 8.7.2 Layout Plan of Growth Center Bobbilli

(b) IP Kantakapalli

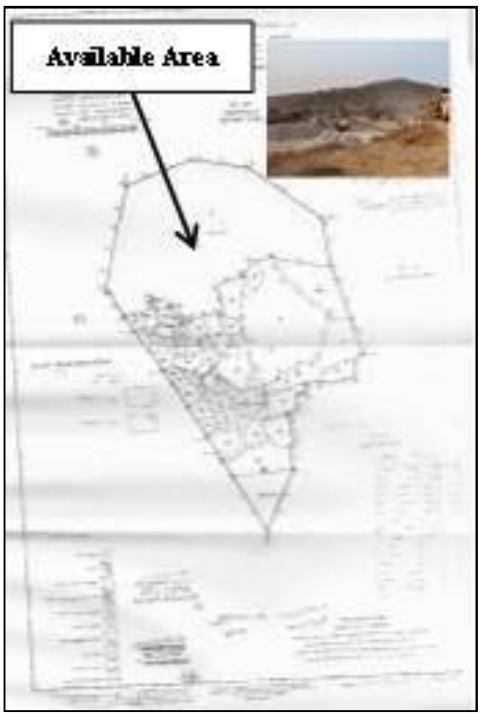
IP with an area of 327.46 acre is located in Komavalasa southwest of Vizianagaram, 40 km away and Vishakhapatnam is situated 24 km far away from IP. Heavy industries are occupied in IP. Basic infrastructures such as roads with drainage, borewells, sewerage, and power supply shall be developed by each 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 Bobbilli Town.

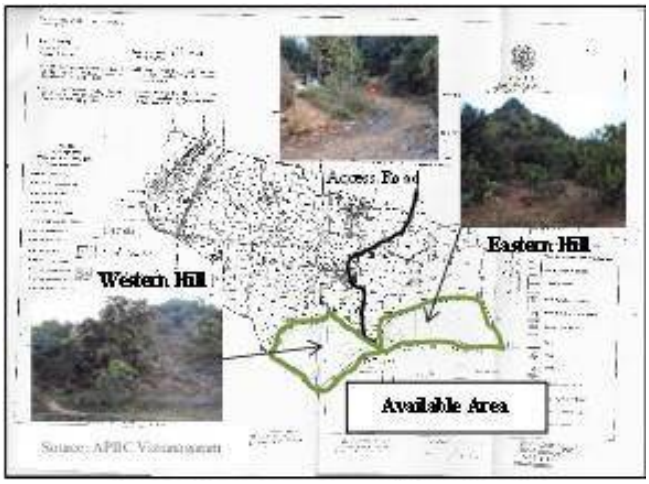
Source: JICA Survey Team

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 Chinarapalli 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.

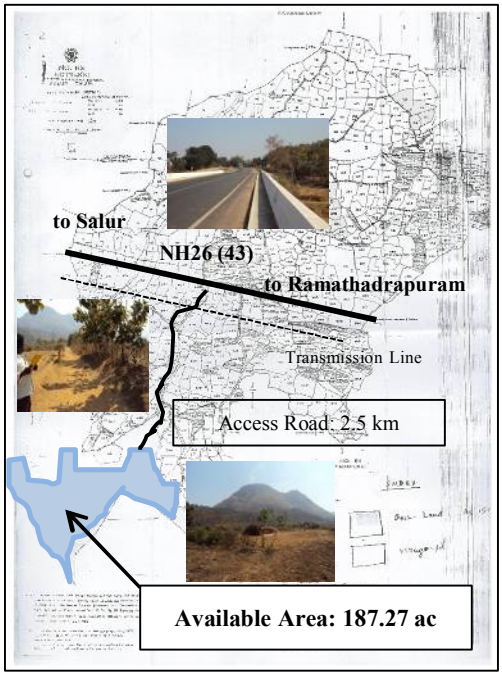
(c) Katakapalli in Kothavalasa Mandal

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 Bobbilli. 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 Bobbilli 17 km away.



Source: APIIC Vizianagaram

Figure 8.7.6 Area Map of Kottakki

Closed to public

Figure 8.7.7 Area Map of Bobbilli Mega Food Park

(3) Food Park in North Area

(a) Bobbilli Mega Food Park

Closed to public

(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)

Source: APIIC

Figure 8.7.8 Location of PCPIR

➢ 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.

Six SEZs are located within PCPIR with an area of 640 km^2 as indicated in Figure 8.7.8. 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.

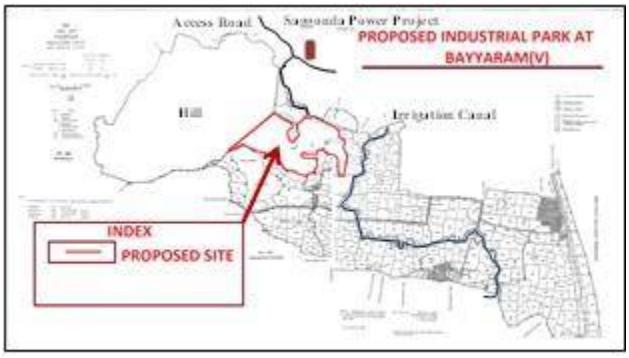
(2) Land Bank in Central Area

There are three available lands identified by APIIC in West Godavari District. The three featuredcandidate 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 Vatlru

(b) Vatlru in Pedapadu Mandal

Available arealocated at the southwest side of Eluru Town about 3 km away, will be around 332.5 acre in Vatlru 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 Vatlru S/S which is 1.5 km long. Vatlru 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 inRamasingavaram 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.

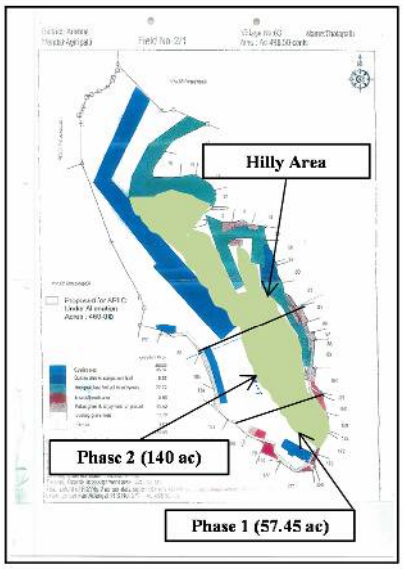
Source: APIIC Eluru

Figure 8.7.10 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) inThotapalli 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.



Source: APIIC Vijayawada

Figure 8.7.12 Area Map (Area: 460 ac)

Source: APIIC Vijayawada

Figure 8.7.13 Layout Plan (Area: 57.45 ac)

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 ona 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 m^3/day for industrial water and 250 m^3/day for fire water, 400 m^3 overhead tank
- Sewerage System: separate sewer system, sewage treatment plant of 150 m^3/day capacity, Common Effluent Treatment Plant (CETP) of capacity 500 m^3/day with 42 m^3/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.

Source: APIIC Kakinada

Figure 8.7.14 Layout Plan of Peddapuram Traditional Food Park

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 m^3/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 andAgri 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 kmNH216, 20 kmNH16
- 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). Kakinada SIR's site except for FAPP is not developed and the site is still an open space and/or habitat.

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 m^2. 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/m^2. 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.

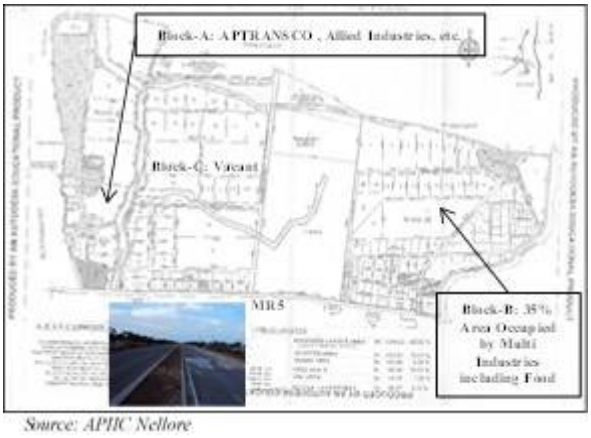


Figure 8.7.16 Layout Plan of Naidupet IP

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 kmtoTirupathi 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/m^2. 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/m^2. 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 IPlocated 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.

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 (CETP) for industrial wastewater, and sewerage treatment plant for domestic wastewater.

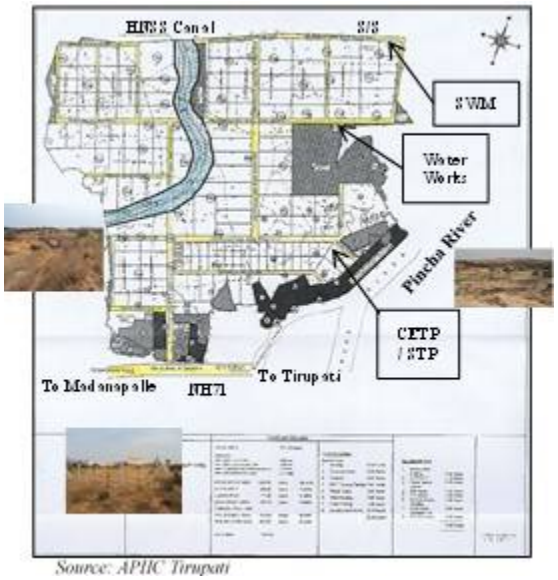


Figure 8.7.18 Layout Plan of Piler IP

(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

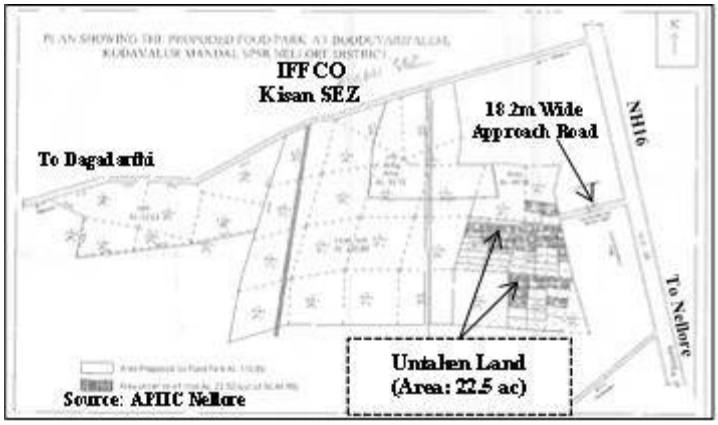


Figure 8.7.19 Area Map of Bodduvaripalem FP

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.

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 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.

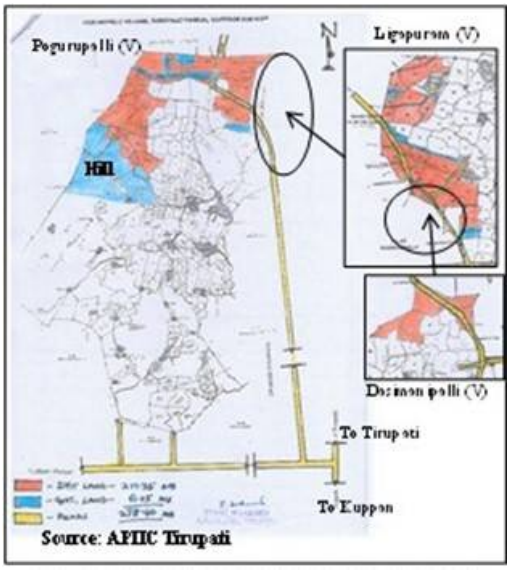


Figure 8.7.20 Area Map of Pogurupalli FP

(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 m^2. 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.

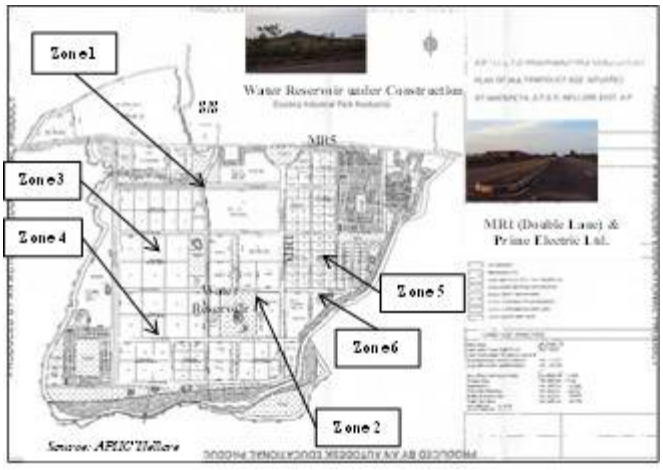


Figure 8.7.21 Layout Plan of Naidupet MPSEZ

Closed to public

Figure 8.7.22 Layout Plan of IFFCO Kisan SEZ

(b) IFFCO Kisan SEZ andAgro Park

IFFCO Kisan SEZ andAgro Park is planned for agribusiness which is 20 km north of Nellore. The site is situated along NH5 with sixlanes. 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.

(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.

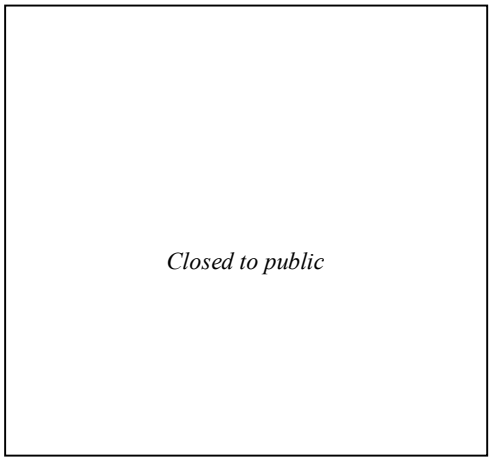


Figure 8.7.23 Layout Plan of Krishnapatnam SEZ

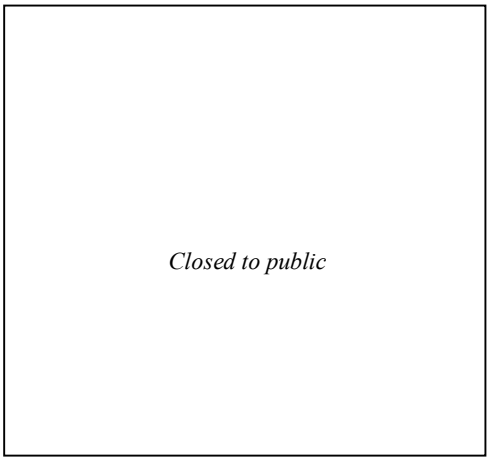


Figure 8.7.24 Layout Plan of Sri City

(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 twoFPUs are placed in SEZ and 34 units including threeFPUs in DTZ as shown in Figure 8.7.24. As Sri City is directly linked to NH16, Sri City is conveniently locatedsuch 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 75km to Tirupati Airport.

(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.

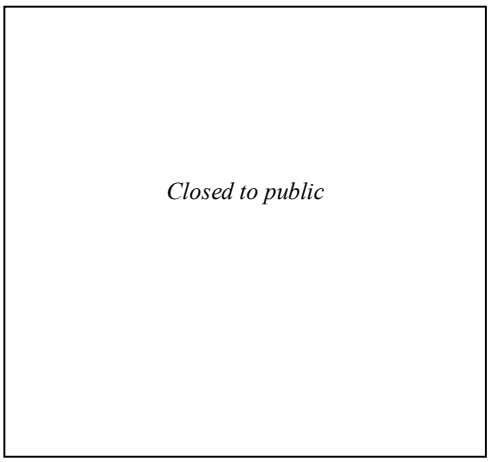
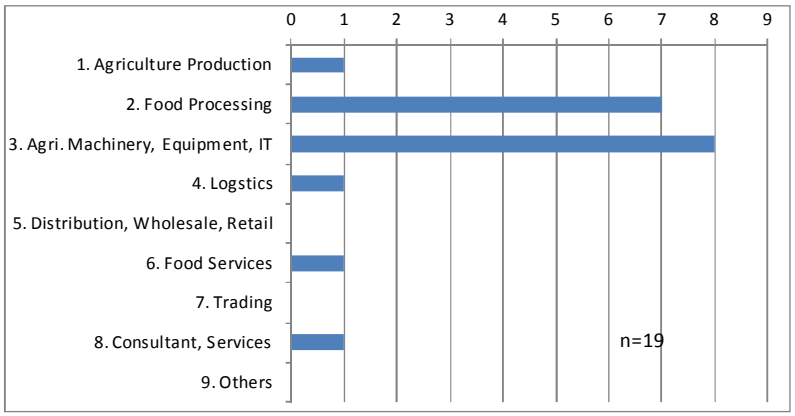


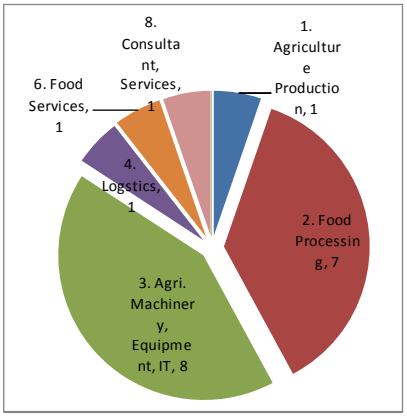
Figure 8.7.25 Area Map of Jain Irrigation UMFP

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. Logstics, 5. Distribution, Wholesale and Retail, 6. Food Services, 7. Trading, 8. Consultant, Services
Number of reply	: 19 companies

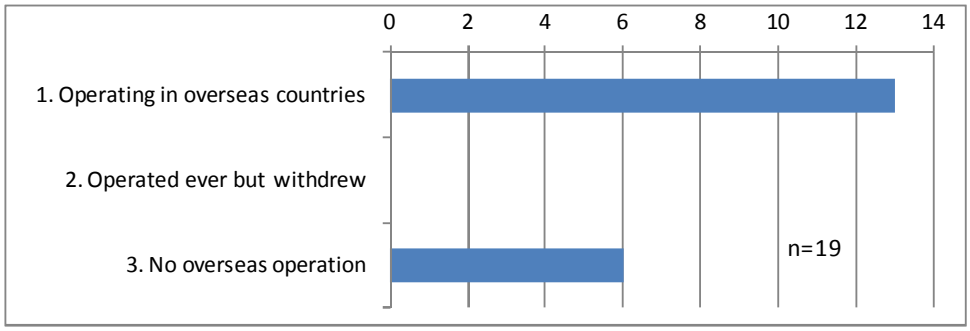
Number of replied companies per category





I. Current Situation of Business Operation in Overseas Countries

Question 1 Current status of operation in overseas countries

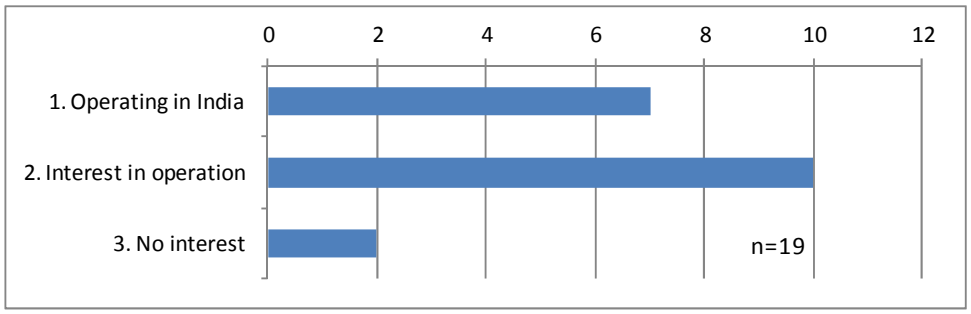


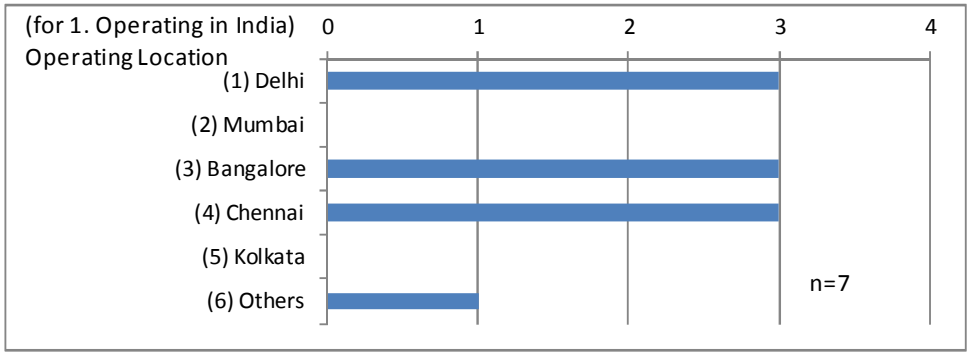
Countries in operation: China=9, North America=7, India=5, Europe=4, Africa=2, Others=2 (Austraria, World)

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

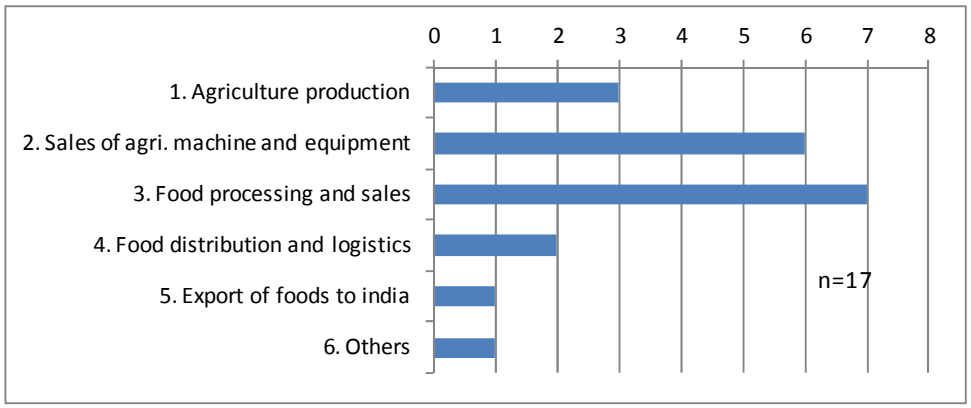
Question 2 Current status of operation in India





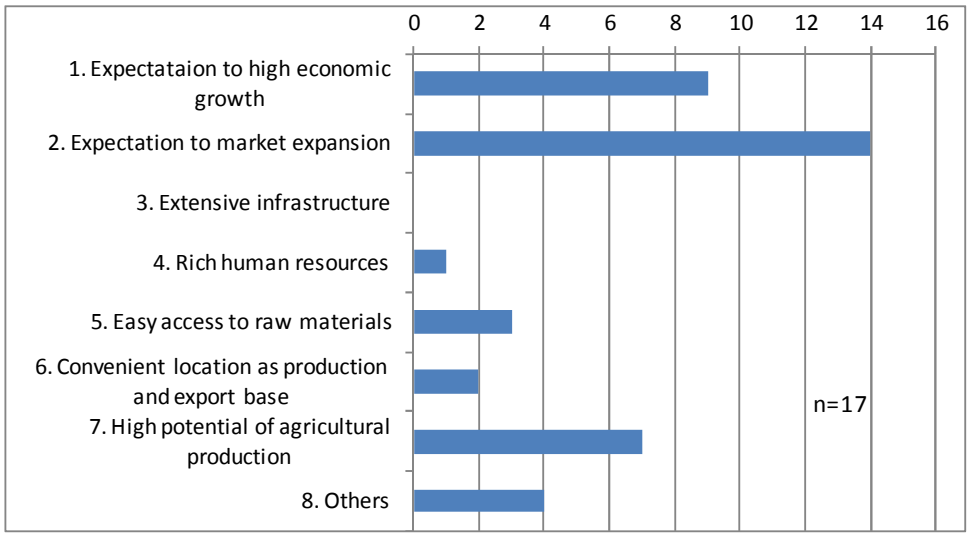
7 companies have already advanced in India and additional 10 companies show the interests in operation in India. For 7 operating companies, the locations in operation are; : Delhi=3, Bangalore=3, Chennai=3, Others=1(Oddisa).

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.

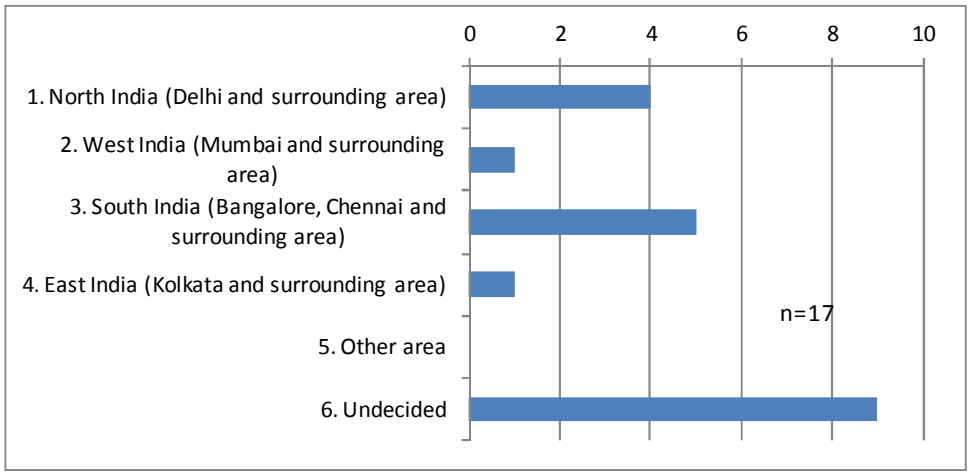
Question 4 Reason to choose India as business operation (multiple answers)



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

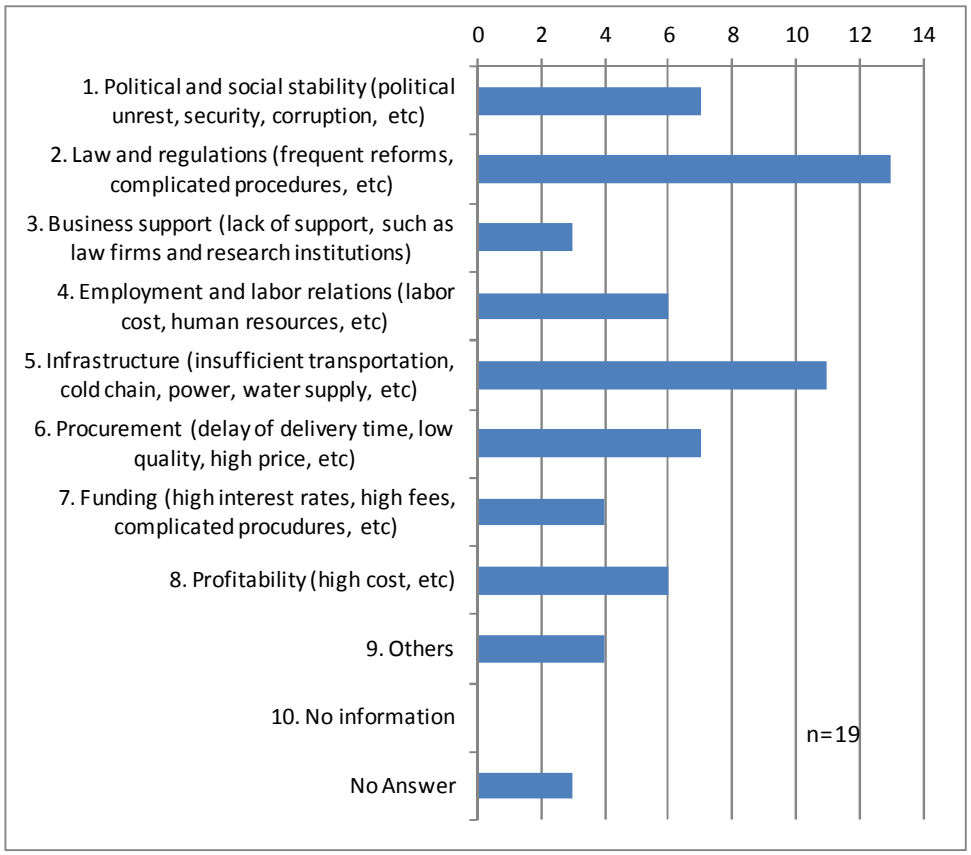
Main reasons to choose India as business operation were "2. Expectation to market expansion" (14 companies, 82%) and "1. Expectation to high economic growth" (9, 53%), Japanese companies show expectation on Indian market in terms of market size and stable growth. Some companies also has expectations 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)



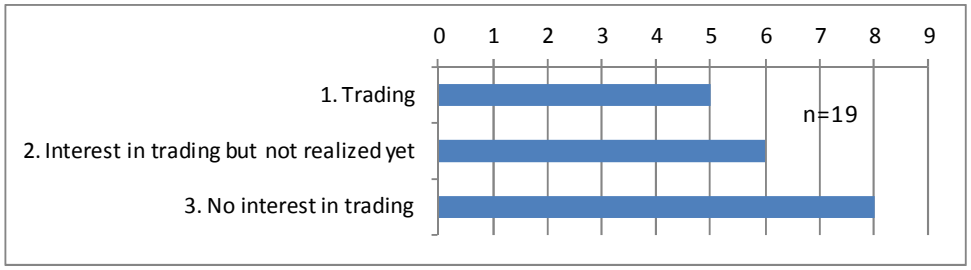
Others: difficult to find partner company, trouble on contract agreement, lack of support organization, depend on decision of parent company

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.

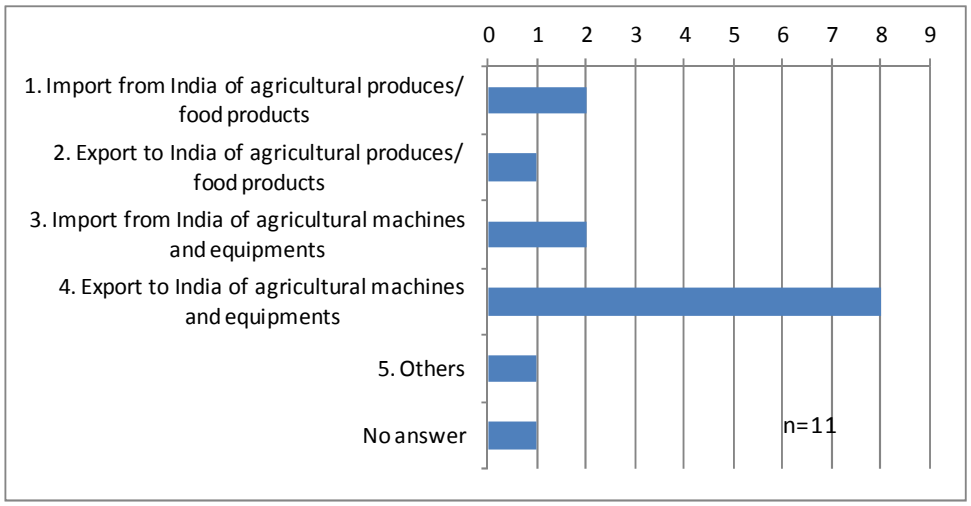
III. Direct Trade* with India

(*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



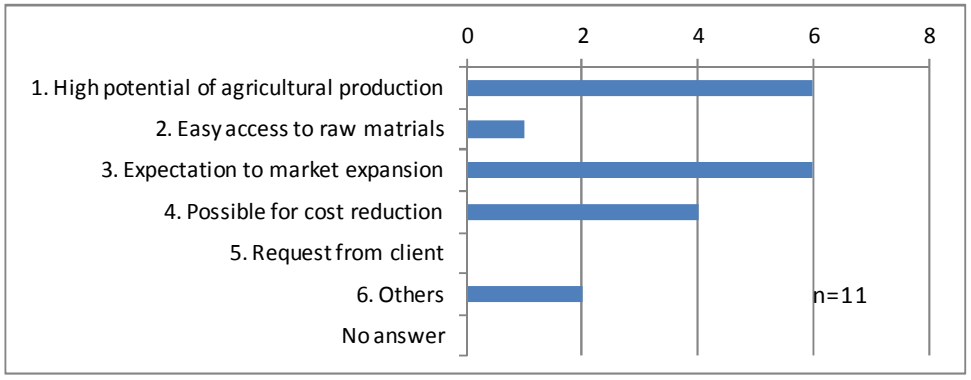
Question 8 Business area of trading in operation/ with interests (multiple answers)



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.

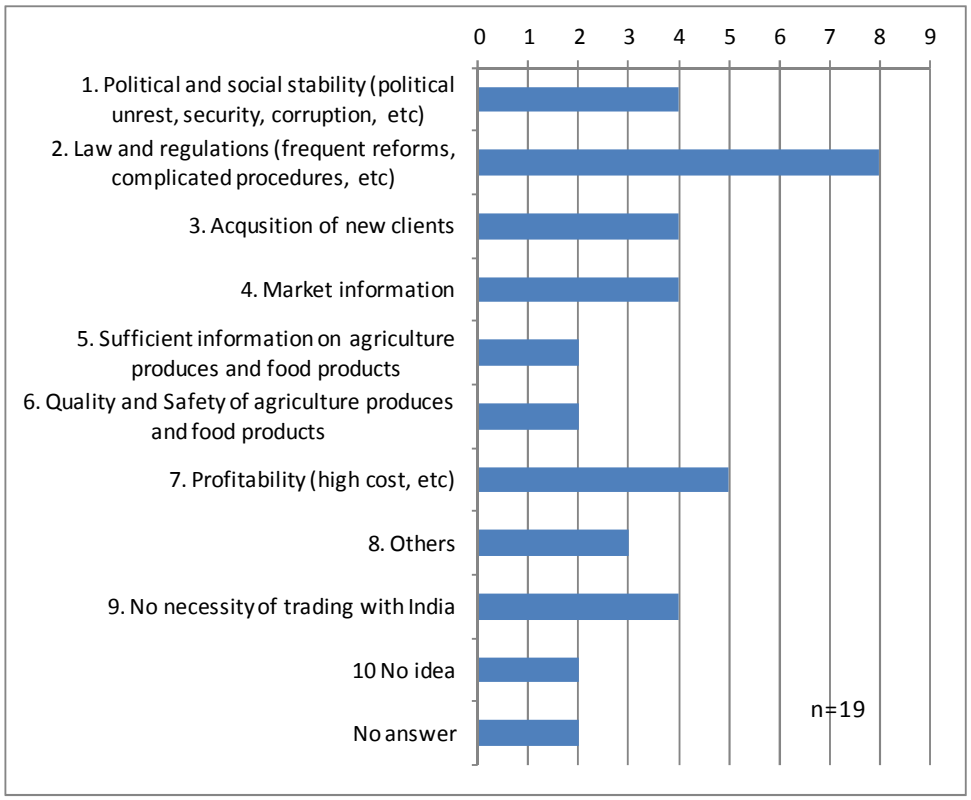
Question 9 Reason of trading with India (multiple answers)



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)

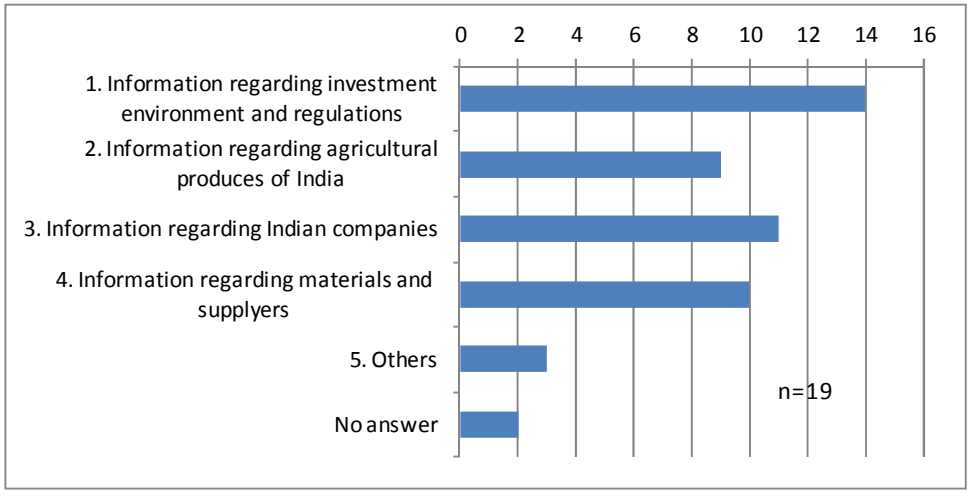


Others: high competition with local companies, low competitiveness due to high taxes, searching JV companies

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

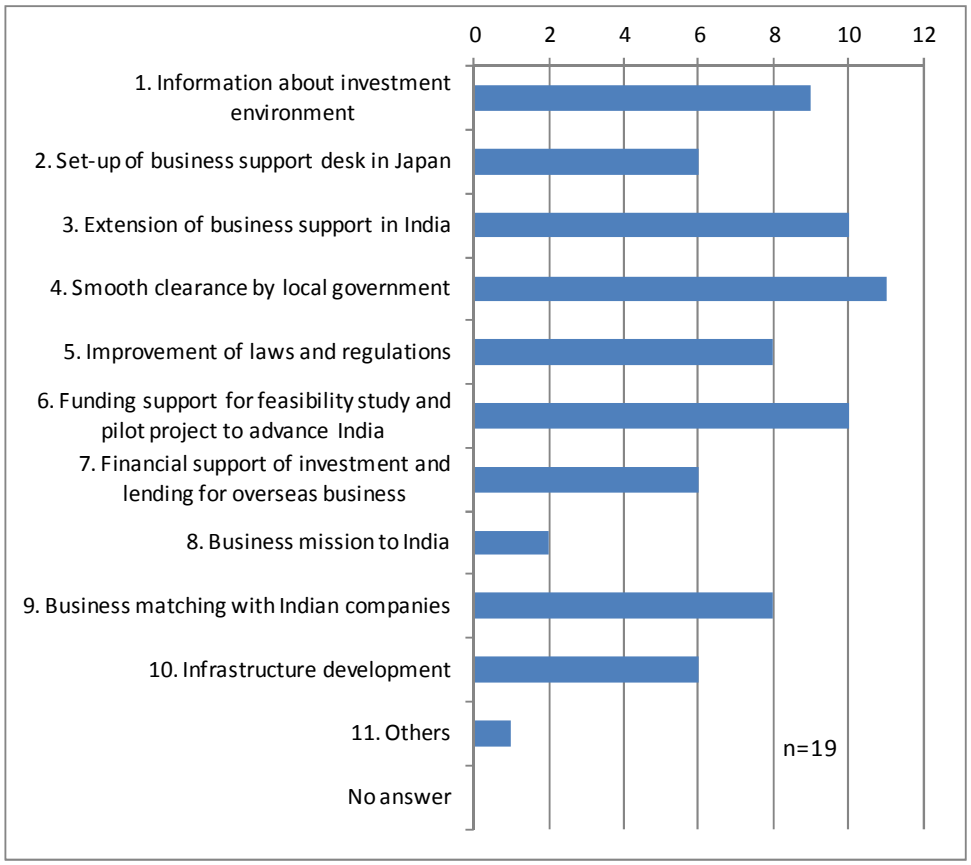
Question 11Expected information to be provided by Government (multiple answers)



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; frexible 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%).