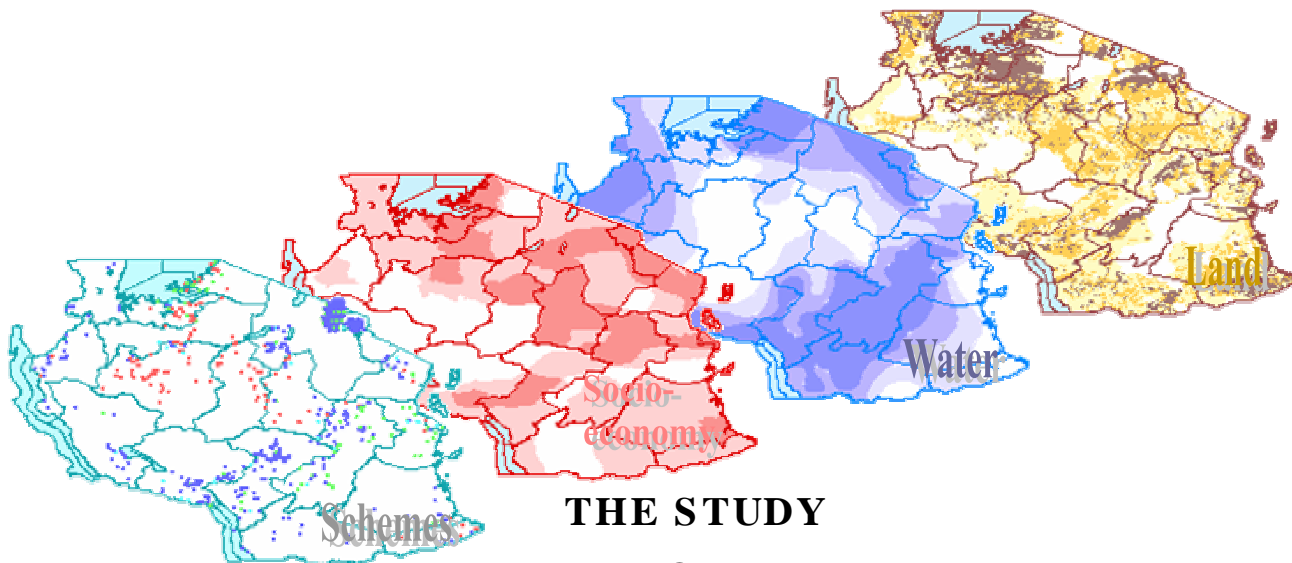


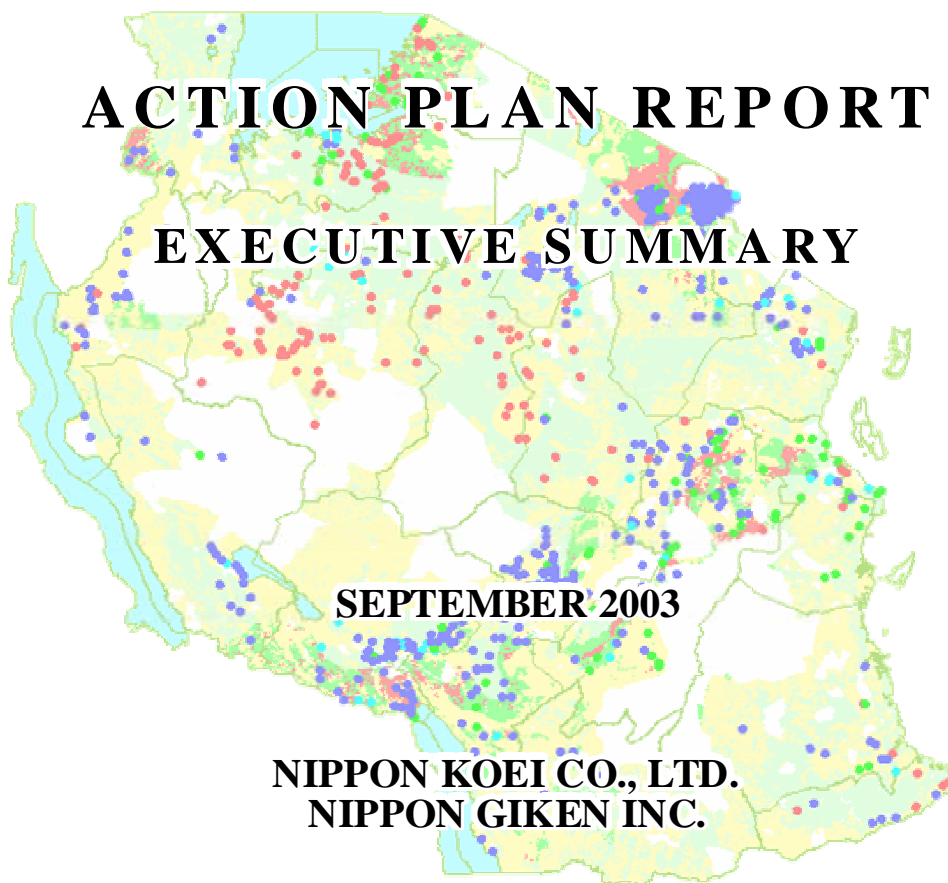
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
MINISTRY OF AGRICULTURE AND FOOD SECURITY (MAFS)



**THE STUDY
ON
THE NATIONAL IRRIGATION MASTER PLAN
IN
THE UNITED REPUBLIC OF TANZANIA**



**ACTION PLAN REPORT
EXECUTIVE SUMMARY**



SEPTEMBER 2003

**NIPPON KOEI CO., LTD.
NIPPON GIKEN INC.**

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**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
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Exchange Rate
$\text{US\$1.0} = \text{J¥118.23} =$ Tsh. 1,063.70
US\$ = United State Dollars
J¥ = Japanese Yen
Tsh. = Tanzania Shillings
As of July 4, 2003

LIST OF REPORTS

EXECUTIVE SUMMARY

VOLUME-I: MAIN REPORT

VOLUME-II: APPENDIXES 1/2

Appendix A: Project Proposal and Project Design Matrix for Priority Programmes

Appendix B: Project Proposal and Project Design Matrix for Model Irrigation Schemes

Appendix C: Analysis of Model Irrigation Schemes

VOLUME-III: APPENDIXES 2/2

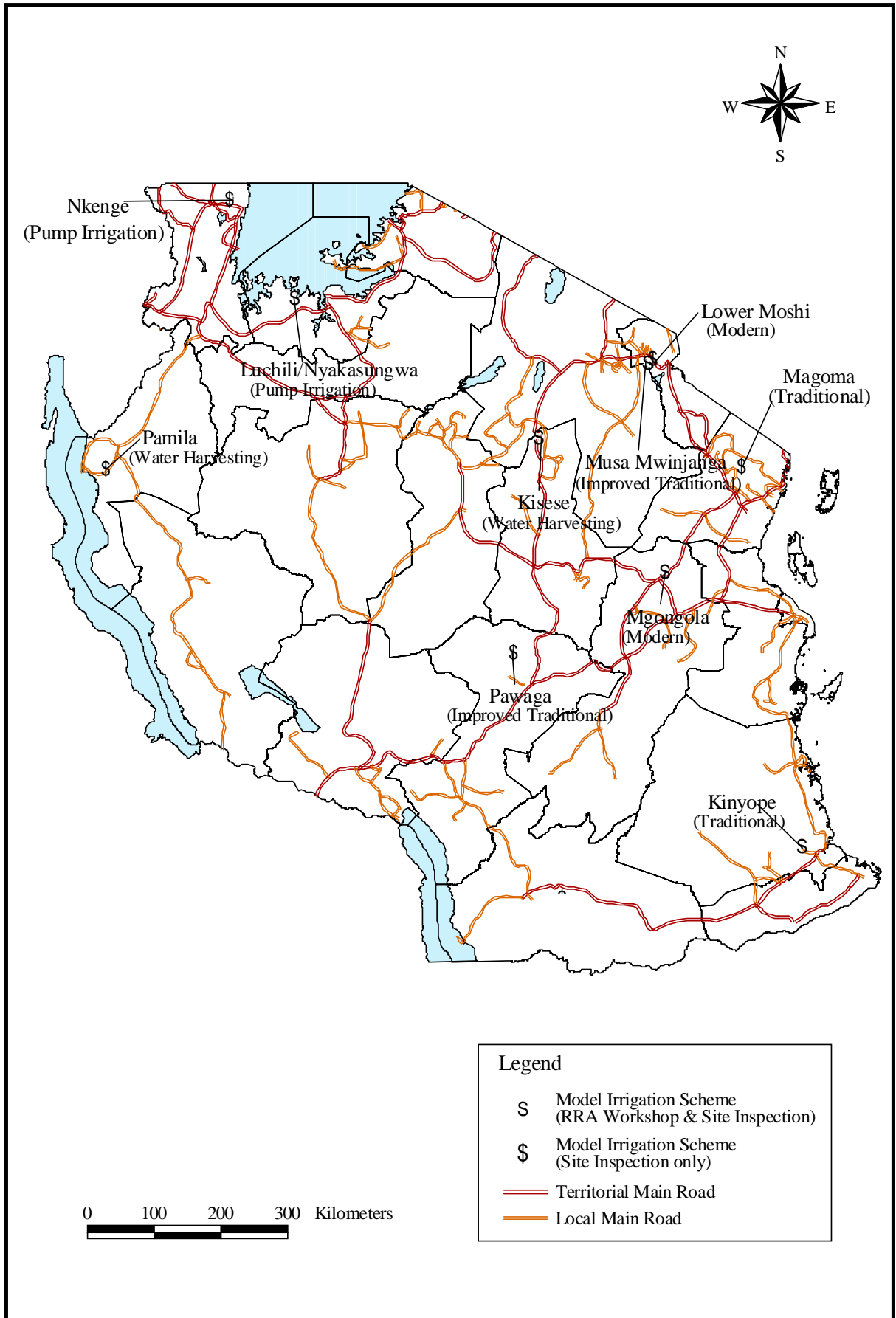
Appendix D: Economic and Financial Evaluation for Model Irrigation Schemes

Appendix E: Rapid Rural Appraisal Reports for the Selected Model Irrigation Schemes

Appendix F: Report on Preliminary Environmental Assessment



LOCATION MAP



Model Irrigation Schemes in Mainland

**THE STUDY
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ACTION PLAN REPORT

EXECUTIVE SUMMARY

1 INTRODUCTION

(1) Authority

This Action Plan Report was prepared in accordance with the Scope of Work for the Study agreed between the Ministry of Agriculture and Food Security, the United Republic of Tanzania (MAFS) and the Japan International Cooperation Agency (JICA) on April 10, 2001.

(2) Objectives of the Study

The Study is to be executed phase-wise in three stages of Phase 1 to Phase 3. The Action Plan Report is the product of Phase 2 Study, presenting the results of problem analysis and special study for major issues, and the Action Plan for the selected Priority Programmes of the Subject-wise Improvement Programme and Model Irrigation Schemes of the Scheme-wise Development Programme, and also the technology transfer for the counterpart personnel during the Phase 2 Study period in Tanzania.

(3) Steering Committee Meetings

On December 17, 2002, the Steering Committee meeting was held for the Inception Report 2 for Phase 2, attended by staff of Ministry of Water and Livestock Development, Vice Presidents' Office, Prime Minister Office, PORALG, and MAFS. The JICA Tanzania Office and DANIDA sent the staff to the Meeting. In the meeting, it was in principle agreed by the Steering Committee. Similarly, the Draft Action Plan Report was discussed at the Steering Committee meeting on August 4, 2003. After discussion on the Draft Action Plan Report with the attendants, it was also agreed by the Steering Committee.

2 CURRENT SITUATIONS OF RELEVANT DEVELOPMENT PLANS/PROJECTS**(4) Agricultural Sector Development Programme (ASDP)**

The ASDP presents a sector-wide framework for overseeing the institutional, expenditure and investment development of the agricultural sector. Following the five strategic areas of intervention identified in the ASDS, the ASDP proposes the three Sub-Programmes. Irrigation development is included in Sub-component “Irrigation and Water Development” in Component A1: Investment and Implementation through the Implementation of DADPs and DDPs in Sub-Programme A. Three priority Task Forces were identified as the core of ASDP formulation. The Task Force is the top of a three-tiered system, and followed by Working Groups and further by Formulation Teams. The Working Group 2 “Irrigation Development” belongs to the Task Force 1. The given TOR to the Working Group 2 is to review the current performance of the existing irrigation schemes and the introduction of low cost technology for irrigation with a sector wide approach. In Sub-Programme A, the first DADP was prepared by each District Office, and submitted to the ICC in March 2003.

(5) Review on Relevant Institutional and Legal Programmes

In parallel with the decentralization movement since the 1990s, the government is pursuing a series of sector specific reforms. The water sector reform is one of them. In July 2002 the government issued the National Water Policy. Under the policy the role of Central Government and its institutions are focused on law making, policy formulation, standard setting and quality control, monitoring, capacity building and enforcing compliance. On the other hand, the LGA has the task and overall responsibility for the actual delivery of public services to the local people. In spite of the LG policy and legal framework on the role and responsibilities of LGA, the National Water Policy and legislation are rather silent in this regard. Therefore, the Water Policy and legislation call for comprehensive review and amendment in order to be in line with the government policy on decentralization. The review and subsequent amendment of Water Policy and legislation will ensure:

- Change of the current deconcentrated governance to devolved governance by relocating in law the responsibility relating to provision of basic local service to the appropriate level of LGA; and
- Removal of the existing conflict between the Water Policy and legislation, and the Policy Paper on Local Government Reform by giving the LGAs mandate to set local priorities and operational decisions on water resources management and delivery.

(6) Current Situations of Relevant Projects

The relevant projects to irrigation development are ASPS, RBMSIIP and PIDP. The ASPS (Phase-I) includes five components. Development of small-scale irrigation is one of five components. This component includes not only implementation of irrigation schemes, but also preparation of guidelines mentioning a participatory approach to planning and implementation of schemes and improvement of the legal framework for registration of IAs. The RBMSIIP is also implemented phase-wise in two stages: Phase I and II. The Phase I will be completed by December 2003 and the Phase II is planned to follow without interruption. The included elements in the Phase II irrigation component are to (i) prepare a comprehensive irrigation policy, (ii) execute scheme improvement on a catchment/sub-catchment basis, (iii) establish a proper scheme management system, (iv) promote private involvement in providing support services, and (v) promote irrigation activities in Lower Rufiji. The PIDP was effective on February 18, 2000 and will be completed by March 31, 2006. The irrigation component of the PIDP aims at completion of 22 irrigation schemes. Out of them 16 schemes were completed by October 2002, and the remaining are on-going. These on-going projects should be incorporated in DADPs.

3 DEVELOPMENT PROGRAMME FOR THE YEAR 2017

(7) Development Scenario

In consideration of the phasing, new critical interventions proposed in the ASDS, and full use of possible available financial resource, the following stage-wise development scenario was elaborated in the Master Plan:

Stage-wise Irrigation Development Scenario			
	Short Term (2003 -2007)	Medium Term (by 2012)	Long Term (by 2017)
Development Target	To Establish Sustainable Irrigation Development System by 2017		
Key Issue for each Term	Reform	Decentralization	Self-reliance
Subject-wise Improvement			
Strategic Approach	<ul style="list-style-type: none"> - Reform of environment for promotion of decentralization and involvement of private sector - Establishment of appropriate technologies on irrigation development in cost-effective concept - Dissemination of concept of river basin approach - Establishment of irrigation development system by participatory approach 	<ul style="list-style-type: none"> - Actualization of irrigation development by LGA's initiatives under decentralization - Application of appropriate technologies on irrigation development in cost-effective concept - Establishment of environmental protection method on irrigation - Establishment of farmers-oriented irrigation development system 	<ul style="list-style-type: none"> - Establishment of easy access system from farmers on technical support - Spread of environmental protection method established - Establishment of self-reliant irrigation development by private sector-oriented with public sector partnership
Activities	Prepare and apply tailor-made improvement programme for project sustainability		
Scheme-wise Development			
Strategic Approach	Expand the irrigated area through development of irrigation schemes in effective use of national resources		
Activities	Give priority to rehabilitation of small-scale irrigation and water harvesting schemes		
Expected Annual Growth Rate of GDP	5.8 % to 6.0 %		

(8) Subject-wise Improvement Programme

The Subject-wise Improvement Programme is to build the foundation for establishment of self-reliant irrigation development by an appropriate public sector and private sector partnership, to contribute to improvement of agricultural productivity and profitability by (i) supporting scheme implementation, (ii) enhancing the effects produced by irrigation, (iii) sustaining irrigation efficiency, and (iv) improving irrigation practices when hindered. The Subject-wise Improvement Programme presents 37 Programmes consisting of 29 Short Term Programmes and eight Medium Term Programmes, which were classified based on (i) common Programmes for all irrigation schemes, (ii) fundamental issues for irrigation schemes, (iii) harmonization with the Stage-wise Development Scenario, (iv) sound linkage with proposed styles of the scheme implementation in future, and (v) orderly relation of each Programme in consideration of the whole context of the Subject-wise Improvement Programme.

(9) Scheme-wise Development Programme

The development programme for irrigation schemes was prepared based on the results of priority ranking of inventorized irrigation schemes and review on possibly available financial source. The development programme was, however, finally expressed for each term on the development area basis, mainly due to the limited data and information of irrigation schemes inventorized at the master plan level, lack of application of a bottom-up approach reflecting village government intension, and use of results of the existing inventory survey conducted under RBMSIIP in 1995. The inventory survey indicates that the 1,428 irrigation schemes and estimated 854,300 ha of irrigation area. Prioritization of the inventorized irrigation schemes was carried out in due consideration of five elements for sustainability of the irrigation development: *Economically Sound, Technically Appropriate, Sociologically sustainable, Environmentally Friendly and Institutionally Reliable*, Based on the results of prioritization of irrigation schemes and possibly available development budget, the irrigation development areas for three different time periods are estimated as follows:

Accumulated Irrigation Development Area

Type of Irrigation Schemes to Be Developed	Short Term	Medium Term	Long Term
	2003 - 2007	by 2012	by 2017
(a) Rehabilitation of Traditional Irrigation Schemes	180,000 ha	216,000 ha	274,000 ha
(b) Development of Water Harvesting Schemes	42,000 ha	57,000 ha	68,000 ha
(c) New Smallholder Schemes	44,000 ha	52,000 ha	63,000 ha
Total	266,000 ha	325,000 ha	405,000 ha

Source: JICA Study Team

(10) Involved Conditions of Government and Relevant Parties for Irrigation Development Target for each Term

Involved conditions of government and relevant parties for irrigation development targeted for respective terms in the stage-wise development scenario are as follows:

Involved Conditions of Government and Relevant Parties for Irrigation Development Target for Each Term

Description	Short Term Target	Medium Term Target	Long Term Target
	Irrigation Development by Farmers' Participatory	Farmers-oriented Irrigation Development	Self-reliant Irrigation Development
(1) Technical Self-reliance			
Government			
Private Sector			
Farmers			
Private Firms			
(2) Financial Self-reliance			
Government			
Private Sector			
Farmers			
Private Firms	-		
(3) Strengthening of institution and organization necessary for attaining the targets			
<ul style="list-style-type: none"> - Definition on roles and responsibility of Irrigation Section, LGA, and IAs under decentralization (Strengthening/reform of DITS, Zonal Irrigation Offices and LGA) - Legal framework strengthening for IAs (legal status, land tenure, water right, ownership and responsibility of irrigation infrastructure) - Institutional strengthening for raising technical ability (extension services and training) - Institutional strengthening for raising financial capability (collection of water fee and O & M cost, micro-finance) - Promotion and support programme of private sector (creation of attractive climate for investment, Incentive of tax for BOT introduction, long and stable security of tenure) 			

Note:

: Large involvement

: Medium involvement

: Small involvement

(11) Cost Estimate for Implementation and O & M

The total implementation cost for the Master Plan is estimated at US\$ 593.9 million is broken down to US\$ 23.0 million for the subject-wise improvement, US\$ 553.1 million for the scheme-wise development and US\$ 17.8 million for on-going irrigation projects. The operation and maintenance cost is assumed to be US\$ 20.0 million for the GOT and US\$ 39.9 million for the farmers.

4 OBJECTIVES OF AND BASIC APPROACH TO ACTION PLAN

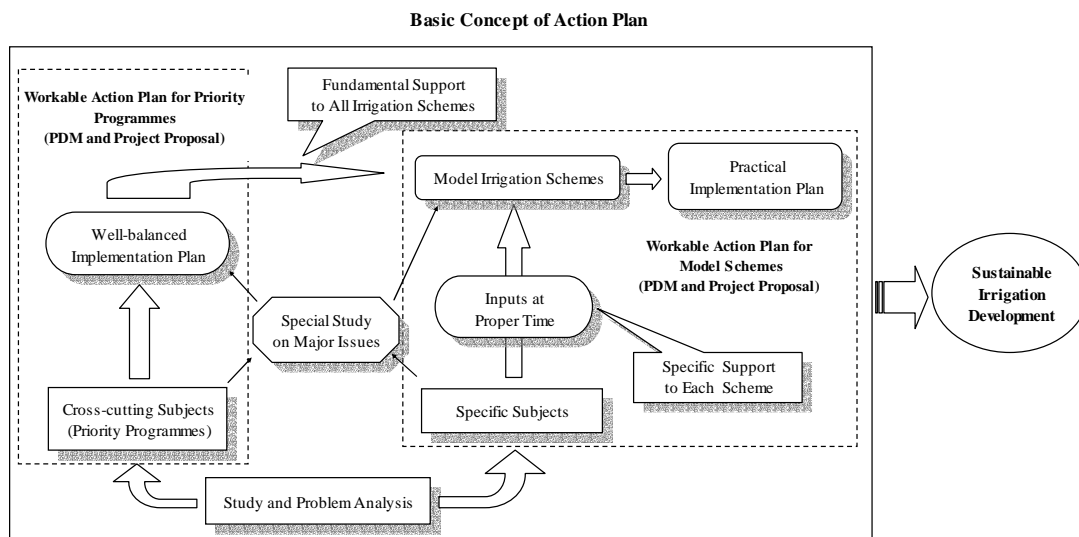
(12) Objectives

The purpose of the Action Plan is to clarify 5W1H (Who, Why, When, Where, What, How) on implementation of the selected Priority Programmes for Subject-wise Improvement Programme and Model Irrigation Schemes for Scheme-wise Development. The Action Plan also clarifies the proper combination among the selected Priority Programmes in implementation, which are most fundamental and cross-cutting issues for almost all irrigation schemes, and the

appropriate input time of specific subjects in the implementation of each Model Irrigation Scheme.

(13) Basic Concept

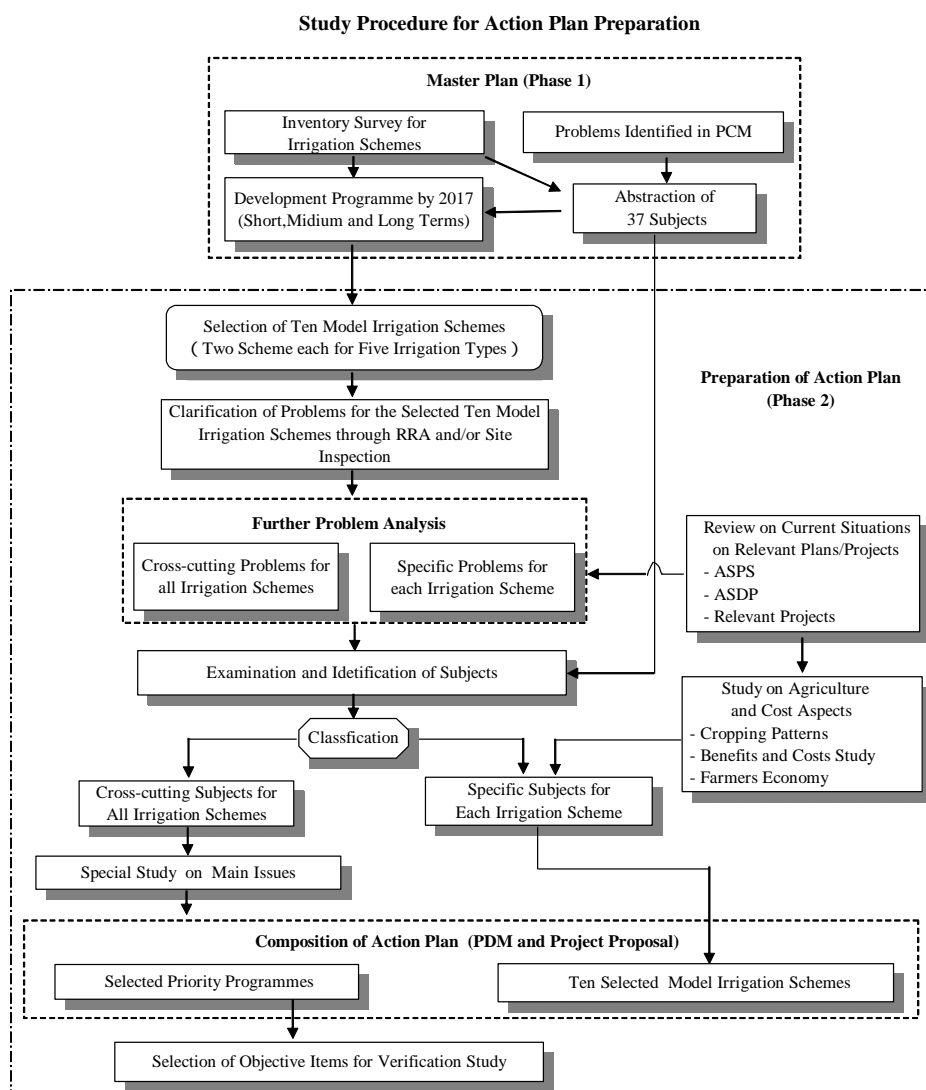
The workable Action Plan for the selected Priority Programmes and Model Irrigation Schemes shall be worked out based on the following basic concept:



- (a) Action Plan is prepared for the selected Priority Programmes from the Subject-wise Improvement Programme and for the selected Model Irrigation Schemes from the Scheme-wise Development Programme.
- (b) The selected Priority Programmes are many in number, and have a close relation with each other. Implementation order of each programme should thus be carefully determined, to heighten the effect of each programme and finally to strengthen the support to the scheme development.
- (c) The number of Model Irrigation Schemes is determined at ten in total, through discussion with the DITS of MAFS based on the number of irrigation types prevailing in the Mainland and the available time for the Action Plan study. Thus, two Model Irrigation Schemes are selected for each of the five irrigation types. Respective Model Irrigation Schemes come up against specific problems. In preparation of the implementation plan for the selected Model Irrigation Schemes, therefore, care should be paid to timely inputs of supporting Programmes to settle the specific problems.

(14) Study Procedure for Action Plan Formulation

Based on the said basic approach, the Action Plan for the selected Priority Programmes of the Subject-wise Improvement Programme and the Model Irrigation Schemes of the Scheme-wise Development Programme, were prepared in the following study procedure:



(15) Selection of Model Irrigation Schemes

Selection purposes of the Model Irrigation Schemes are to show the workable Action Plan for each of them, taking into account suitable application time of the specific subject Programmes, and to confirm the selected Priority Programmes of the Subject-wise Improvement Programme, based on the results of RRA and/or site inspection for them. The ten Model Irrigation Schemes were selected from 626 schemes to be implemented by 2017 based on the following conditions and criteria:

Conditions and Criteria for Model Irrigation Scheme Selection

Condition	Criteria
Two each from the following irrigation types	- High demonstration effect to other similar schemes
- Traditional schemes	- Rehabilitation and/or expansion scheme
- Improved traditional schemes	- No overlapping with other donors/agencies projects
- Water harvesting schemes	- No concentration on specific area and region
- Modern schemes	- Good access to the site
- Pump schemes	- Availability of topographic maps (1/50,000)
	- Adequate data and information by previous study

Table below shows the ten Model Irrigation Schemes with their expected effects as models, which were finally selected under initiatives of MAFS.

Finally Selected Model Irrigation Schemes

Irrigation Type	Region	District	Scheme Name	Expected Effect as Model
Traditional Scheme	Lindi	Lindi Rural	Kinyope	Typical improvement of traditional scheme at low cost
	Tanga	Korogwe	Magoma	Improvement in flooded area
Improved Traditional Scheme	Kilimanjaro	Hai	Musa Mwinjanga	Low-cost rehabilitation of traditional scheme once improved
	Iringa	Iringa Rural	Pawaga	Rehabilitation of large-scale traditional scheme once improved
Water Harvesting Scheme	Kigoma	Kigoma Rural	Pamila	Pilot scheme of new water harvesting technology
	Dodoma	Kondoa	Kisese	Appropriate approach to water harvesting scheme for vegetable cultivation in large area
Modern Scheme	Kilimanjaro	Moshi Rural	Lower Moshi	Measures to resolve water conflict in river basin
	Morogoro	Morogoro Rural	Mgongola	Expansion scheme centering pilot scheme
Pump Scheme	Mwanza	Sengerema	Luchili-Nyakasungwa	Effective approach to pump scheme using lake water
	Kagera	Bukoba	Nkenge	Use of groundwater and surface water in conjunction

5 ANALYSIS ON MODEL IRRIGATION SCHEMES AND SELECTION OF PRIORITY PROGRAMMES

(16) Problem Tree and Objective Tree

RRA and/or site inspections were carried out for the ten selected Model Irrigation Schemes, aiming to (i) clarify operation and maintenance activities including water management and financial sources, (ii) grasp present activities of farmers' organizations and their relation with government authorities, and (iii) collect data and agricultural information. The results of these field works lead to the core problem of "Unstable irrigation water supply to field", so that the core objective of "Realization of stable irrigation water supply to field" is determined. The analysis identifies the common problems and their development approaches follow:

Development Approaches to Common Problems

Common Problems	Development Approaches
- Deterioration of irrigation infrastructures	- Construction, rehabilitation and improvement of irrigation infrastructures
- Insufficient maintenance works by farmers - Lack of farmers' skills for water distribution	- Enhancement of farmers' skills for operation and maintenance of irrigation infrastructures
- Insufficient management skill of IA, such as financial management, leadership, and decision making	- Strengthening of IA management capacity

(17) Linkage of Identified Issues from Field Survey and Subject-wise Improvement Programme

The field works mentioned above clarified many problems in each scheme. The clarified problems for each scheme are given in Table-1.

Institutional Issues

Based on the analysis of the problems identified above, the following countermeasures were proposed:

Summary of Countermeasures for Each Scheme

Countermeasures	Scheme									
	Kinyope	Magoma	Pawaga	Musa Mwinjamaga	Mgongola	Lower Moshi	Kisese	Pawaga	Nkenge	Luchili-Nyakasungwa
Support for organizing IA										
Support for IA registration										
Technical Training of IA management										
New legal framework for IA										
Introduction of competitive bottom up approach										
Backstop for bottom up movement by the government										
Harmonization mechanism of the government										

Source : JICA Study Team

The table obviously indicates that “Technical Training of IA management” is most common countermeasure for the schemes. However, “Backstop for bottom up movement by the government” is the most essential and fundamental countermeasure among the listed countermeasures, in other words, the most

Table-1 Clarified Problems and Issues for Model Irrigation Schemes

Scheme	Institution	Irrigation and Drainage
Kinyope	Top-down intervention of the district cooperative officer in the registration of IA	Fragile existing intake weirs.
	The farmers' insufficient skill of managing an IA: no bylaw and regulations, poor financial management, no women leaders, high rate of fee non-payment, and etc.	Water conflict among farmers on water abstractions.
		Ineffective water distribution due to lack of canal system.
		Lack of knowledge on water management on "canal irrigation".
		Water stagnant due to poor drainage system
		Poor knowledge on a participatory gabion weir construction due to less dissemination to farmers.
	No compilation on data and information on the previously implemented works.	
Magoma	Non registered IA.	No irrigation practice in the rainy season due to area inundation.
	The farmers' insufficient skill of managing an IA: no bylaw and regulations, poor financial management, no women leaders, high rate of fee non-payment, and etc.	Farmers' burden to repeat to construct intake weir every cultivation season.
Pawaga	Non registered IA.	Huge sedimentation diverted into canal due to improper facilities designing.
	No financial report. The farmers don't have sufficient experiences of managing an IA.	No capability of farmers on repair for gabion weir.
	Irrigation sub blocks are not identical to the boundaries of the IA subgroups	Insufficient water supply due to use on natural channels as irrigation canals.
		Difficult water management due to canal network based on administrative boundaries.
	Poor drainage due to double function irrigation canal and drain.	
Musa Mwinjanga	Organizing an IA is on going under supervision of the district cooperative officer and the Zonal Irrigation Office	Unstable existing intake weir.
	The farmers' insufficient skill of managing IA.	No systematic water management.
		In efficient irrigation system due to no consistency in repair works.
		Improper operation of intake gates on the main canals due to poor design.
	Water stagnant due to poor drain.	
Mgongola	Non registered WUA. In addition, the registered cooperative was established by some members of the WUA through top-down intervention of the district cooperative officer. The cooperative doesn't work well, however.	Water conflict with outside irrigation water users.
	The bylaw and the regulations are not well understood by the members. Poor participation of members in WUA activities such as operation and maintenance activities of irrigation facilities, meeting and etc.	Water stagnant due to no flood protection facility and poor drain.
Lower Moshi	Non registered IAs.	Critical water conflict with other outside irrigation water users.
	No concrete future plans for registration.	No protection of water right obtained.
	Neither cooperative nor association is necessarily an optimum organizational form for the IA.	Improper rotational irrigation.
	The differences between the cooperative and the association including their application procedures are not clearly understood by the farmers.	No even water use in the same river basin.
	Water right issue needs coordination of the responsible stakeholders including relevant governmental organizations	
Kisese	No IA, but a small group of vegetable cultivation at present.	Less water source.
	The management of IA is still insufficient. There is no general meeting. The bylaw and the regulations are not well understood by the members.	Poor existing intake facility.
		Insufficient knowledge on irrigation.
Pamila	No IA, but informal irrigators' sub groups. However, the farmers don't have sufficient experiences of managing an IA.	Very fragile existing weirs.
	Insufficient technical training opportunities for the farmers	Superficial farmers' experience in irrigation.
		Ineffective irrigation canal system .
		Water stagnant due to poor drainage system..
Nkenge	No IA. The farmers don't have any experiences of managing an IA.	Deterioration of existing pump equipment
		High pump operation cost for farmers.
		Lack of ownership on operation and maintenance of irrigation facilities.
		Insufficient support to farmers by LGAs.
Luchili-Nyakasungwa	Non registered IA and its poor management. Its activities are stagnant because of no irrigation at present.	Deterioration of installed pump equipment and irrigation facilities.
		Improper design on pump station and its related facilities.
	Weak ownership and financial base of farmers	High pump operation cost for farmers.

Source : JICA Study Team

important cross-cutting issue for the ten selected Model Irrigation Schemes in the institutional aspect. In addition, the examination of the Programmes of the Subject-wise Improvement Programme previously identified in the Master Plan study, was undertaken, so that three programmes of the “A-3: IA Strengthening Programme” were added to 37 programmes abstracted in the Master Plan study, taking into consideration the need of IA strengthening:

Linkage of Countermeasures with Components of Subject-wise Improvement Programme

Category	A: Institutional Aspects					B: Systemizing Aspects
	A-1: DITS Institutional Improvement Programme	A-2: - LGA Institutional Strengthening Programme for Irrigation Development	-			B-1: DITS Working Mandate Formulation Programme
Original Programme						
Additional Sub-programme	-	-	A-3: IA Strengthening Programme			-
Sub-components added	-	-	New Legal Framework for IA Establishment Study	IA Organizing and Registration Support Manual	IA Management Training for Farmers	-
Countermeasures						
Support for organizing IA	-	-	-		-	-
Support for IA registration	-	-	-		-	-
Technical Training of IA management	-	-	-	-		-
New legal framework for IA	-	-			-	-
Introduction of competitive bottom up approach	-	-	-	-		-
Backstop for bottom up movement by the government			-	-		-
Harmonization mechanism of the government			-	-	-	-

Source: JICA Study Team
: Priority in execution

Irrigation and Drainage Issues

As well, the same analysis was made for the irrigation and drainage problems identified, and necessary countermeasures for them are summarized as follows:

Summary of Countermeasure for Each Scheme

Countermeasures	Schemes									
	Kinyope	Magoma	Pavaga	Musa Mwinjagama	Mgongola	Lower Moshi	Kisese	Pamila	Nkenge	Luchili-Nyakasungwa
Establishment of proper technical manuals										
Utilization of contractors in proper manner	-	-	-	-	-	-	-	-	-	-
Establishment of proper O & M Manual	-	-	-	-	-	-	-	-	-	-
Preparation of necessary provisions on IA	-	-	-	-	-	-	-	-	-	-
Achievement of proper river-basin management	-	-	-	-	-	-	-	-	-	-
Attainment of good participation	-	-	-	-	-	-	-	-	-	-
Strengthening of roles of LGA	-	-	-	-	-	-	-	-	-	-
Confirmation of standard roles of donors and NGO	-	-	-	-	-	-	-	-	-	-
Strengthening of capabilities of LGA and/or DITS	-	-	-	-	-	-	-	-	-	-

Source: JICA Study Team

This table shows that the most cross-cutting issue for the ten selected Model

Irrigation Schemes in irrigation and drainage aspects is the “Establishment of proper technical manuals”.

(18) Selection of Priority Programmes

The Priority Programmes were selected from 40 identified Programmes in consideration of the current progress of ASDP implementation, the cross-cutting countermeasure obtained through RRA and the strategic targets for the Short Term development programme presented in the Master Plan, such as (i) reform of environment for promotion of decentralization and improvement of the private sector, (ii) establishment of appropriate technologies on irrigation development in a cost-effective concept, (iii) dissemination of the concept of a river basin approach, and (iv) establishment of an irrigation development system by participatory approach. Tabulated below are the selected 18 Priority Programmes:

Selected Priority Programmes among the Subject-wise Improvement Programmes

No.	Ref.	Programmes
1	A1	DITS Institutional Improvement Programme
2	A2	LGA Institutional Strengthening Programme for Irrigation Development
3	A3.1	New Legal Framework for IA Establishment Study
4	A3.2	IA Organizing and Registration Support Manual
5	A3.3	IA Management Training for Farmers
6	B1	Regularization of Irrigation Administration and DITS Working Mandate Formulation Programme
7	B2	Contract Management System Improvement programme
8	C1	Survey and Investigation Guideline Establishment Programme
9	C2.1	Planning Guideline Establishment Programme
10	C2.2	Designing Guideline Establishment Programme
11	C3.1	O&M Guideline Establishment Programme
12	C4	Farmers' Participation in Irrigation Development Programme
13	C5	Village Irrigation Development Guideline Establishment Programme
14	C7	Establishment of DADP Formulation Guideline for Irrigated Agriculture Development
15	D2	Technical Manuals Handling Guideline Establishment Programme
16	D3	Information and Database Improvement Programme
17	E1.5	Environmental Assessment Study for Irrigation Practice in Tanzania
18	E1.6	Study of River-Basin Approach in Irrigation Development

Source: JICA Study Team

6 SPECIAL STUDY ON MAJOR ISSUES IDENTIFIED IN PROBLEM ANALYSIS

(19) Scheme Implementation Process

Until now irrigation schemes were implemented by donors' initiatives, so that the donors were very influential in decision making through almost all processes of scheme implementation as shown below:

Donors' Influence on Scheme Implementation

Stakeholders	Scheme implementation process						
	Scheme selection	Site survey and planning	F/S	D/D	Tendering	Implement-tation	O&M
Donors/NGOs							
IS/ZIU							
District council							
District staff							
Farmers							
Legal entity*							
Contractor**							

Note: The shaded squares on the above matrix means a degree of importance among relevant stakeholders in each implementation process (Strong shade indicates the more important role.).

*: "Legal entity" means a farmers' group which is in force as a legal unit

** : "Contractor" includes contractors who are engaged in construction works, and consultants who are engaged in consulting services

On the contrary, the GOT intends to give initiatives to LGAs, farmers and legal entities of farmers, and to activate outsourcing for the private sectors as shown below:

Donors' Influence on Scheme Implementation in ASDS Guidelines

Stakeholders	Scheme implementation process						
	Scheme selection	Site survey and planning	F/S	D/D	Tendering	Implement-tation	O&M
Donors/NGOs							
DITS/ZIU							
District council							
DPDT*							
Farmers							
Legal entity**							
Contractor***							

Note1: This is not proposed for all types of irrigation projects, but for farmer-manageable irrigation schemes with a scale which Districts are able to handle

Note2: The shaded squares on the above matrix means a degree of importance among relevant stakeholders in each implementation process (Strong shade indicates the more important role.).

*: "DPDT" means District Project Development Team which is established by assigning LGAs staff when scheme is projected

** : "Legal entity" means a farmers' group which is in force as a legal unit

***: "Contractor" includes contractors who engage in construction works, and consultants who engage in consulting services

Taking into consideration the new attempt, e.g. VLP cycle management in Songea District and the ADSP implementation focusing on DADPs, a new process is proposed in the Action Plan. Notable challenges given in the new proposed implementation process from current method are enumerated as follows:

Changes from Current Method

No.	Remarkable Points of Improvement in Small Irrigation Scheme Implementation
Strengthening of Institution and Organization	
1	LGAs are mainstreamed in the process of planning, designing and construction of the scheme
2	Some procedures of scheme preparation to be done through mutual collaboration with local parties concerned are incorporated in the DADP formulation process
3	Preparation of organization of farmers legal entity is assumed to commence as early as possible after confirming scheme outline
4	It is preconditioned that a tender board consisting of adequate personnel is established prior to tender holding
5	Sound tendering and award system has to be introduced for proper contractor selection
6	Monitoring strokes is systemized in the stage of operation and maintenance after construction works completed
Promotion of Farmers' Participation	
7	Farmers participate in the scheme implementation in any stages as satisfying a demand
8	The routines of participatory cycle management like VLP are applied into the implementation process
9	Farmers contribution is given in any scheme implementation through allowable ways of contribution
10	Farmers contribution is mostly achieved through engaging construction works of minor canals etc. which separated from the contractors' works under the supervising by the District engineer, otherwise participating contractors' construction works of main canal etc. under the proper arrangement of supervising consultant
Activation of Private Sector	
11	Proper F/S and D/D is carried out by way of engagement of consultants as required
12	Engagement of contractor in the construction works of scheme is preconditioned for the scheme implementation instead of force account management

(20) Irrigators' Association

A well-organized IA is one of crucial factors for successful irrigation development. Through the Master Plan study, however, the following problems were identified:

- Insufficient legal framework of IA
- Farmers' insufficient ability or lack of experiences of IA management
- Necessity of efficient technical training services for IA member farmers

A new legal framework exclusively for the IA should be established, as it is necessary for securing the farmers' ownership and self-reliable irrigation development. At least, the following issues should be clearly included and defined in the new framework:

- Its main activities are operation and maintenance of the irrigation facilities. In that sense, the IA is a non-profit organization.
- The compulsory participation of all irrigators in the IA is a prerequisite of irrigation development.
- The MAFS should become a competent authority of the IA, that is to say, the registrar of the IA.
- The MAFS should hold an appropriate coordination function of the water right for irrigation development with the Ministry of Water and Livestock Development.

As for the management of the IA, the identified problems were as follows:

- Poor participation of members in the IA activities, such as operation and maintenance activities of irrigation facilities, meeting and etc.
- Lack of leadership of the IA executive committee.
- Poor awareness of the IA's importance and roles among farmers.
- Insufficient financial management ability

As the countermeasures, preparing a management manual of the IA and training program for the leaders is necessary.

(21) Farmers' Participation and Bottom up Approach

Farmers themselves are the main actors for successful farmers-oriented irrigation development. However, the present situation is far different from that and the farmers' initiative seems rather weak. The high risk associated with farming is the fundamental reason for the farmers' passive or defensive attitudes toward new investments including irrigation development. The high risk has been brought about by several interactive causes, which can be categorized into the following two: (i) the hardly manageable factors and (ii) the policy factors. The hardly manageable factors and policy factors include the following:

Hardly Manageable Factors	Policy Factors
- Severe natural conditions: tropical climate, endemic diseases such as malaria, schistosomiasis, sleeping sickness and etc., relatively low average life expectancy, the spread of HIV/AIDS.	- Poor rural infrastructure: poor conditions of irrigation facilities, rural electrification, access roads, domestic water supply, and etc
- Population: low population density, sparsely distributed population	- Instability of the macro economy: fluctuation of macro economic environment (inflation rate, foreign exchange rate, interest rate, terms of trade, and etc.)
	- State intervention in the economy: suppression of producers' price, and etc.
	- Underdeveloped rural financial institutions for the farmers: insufficient means of avoiding the high production risk for the farmers

Responding to the high risk, the farmers consequently intend to minimize the income fluctuation rather than to maximize the income. The lack of farmers' ownership and passive & defensive attitude toward new investment activities may be natural results of the high farming risk.

Therefore, alleviating their high farming risk is a prerequisite for successful promotion of farmers' participation and strengthening of their ownership in the construction of irrigation facilities. Although the hardly manageable factors can not be easily manageable, the governments should manage the policy factors properly, and their adverse effects on farming should be decreased as much as possible. However, the task is beyond the mandate of the irrigation sub-sector itself. The inter-ministerial approach and coordination is thus quite necessary for the management of the policy factors.

In the irrigation sub-sector, it is essential that farmers realize that construction of irrigation facilities itself is an important countermeasure toward mitigation of such high farming risk and improvement of their income and poverty alleviation. Besides, the following countermeasure should be executed to strengthen the farmers' participation and ownership:

- Introduction of a new method for bottom-up and competitive project formation and selection
- Farmers' initiative strengthening
- Efficient support for the farmers' bottom up movement by the government

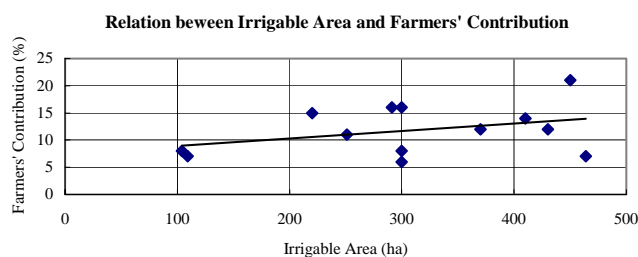
(22) Farmers' Roles in Scheme Implementation

Planning and Design Stage

The farmers' participation in the planning and design stage is positively to take part in meetings, workshops and survey and investigation executed by the government staff, to manifest their intention properly. In the planning stage, an important issue is firmly to ensure the farmers' will on contribution to investment costs and on payment for operation and maintenance cost for irrigation schemes to be implemented. The presently used effective approach is the method of Village Level Planning (VLP) successfully applied in Songea District. This is due bottom-up and/or participatory approach. On the other hand, the government issued the Guidelines for Participatory Improvement to Farmer Initiated and Managed Smallholder Irrigation Schemes, which was prepared under ASPSP-IC, to promote farmers' participation in planning and design stage. The guidelines focus on execution of "participatory action planning", "participatory diagnostic study", and "participatory design and feasibility study". The farmers' participation in the planning and design stage should be executed based on a combination of the VLP method and the guidelines.

Construction Stage

The said guidelines show the expected minimum contribution from farmers of at least 100% of the unskilled labour and 100% of locally available construction materials. According to the RBMSIIP experience, the farmers' contribution ranges from 5 to 20% of total construction cost as shown in graph right.



The farmers' contribution to the project at construction stage is crucial toward the next stage of operation and maintenance, which is the most important for project

sustainability. The government should monitor and analyze the conditions of farmers' contribution, and establish the rules to be mentioned in the Irrigation Regulation.

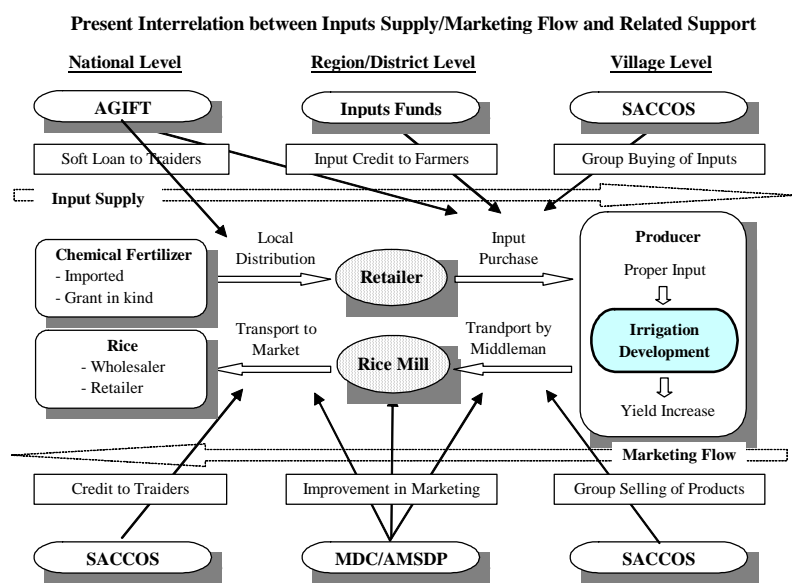
Operation and Maintenance Stage

Now, the government transferred all duties on operation and maintenance for irrigation and drainage facilities to the beneficial farmers groups concerned. The most irrigation schemes, however, show a regrettable fact that the operation and maintenance works are not properly conducted by farmers groups, mainly due to lack of farmers' ownership resulting in weak farmers' groups and low collection rate of water charge. It is therefore essential to strengthen farmers' ownership through a participatory approach from the planning time. A preliminary farm budget analysis was conducted for typical farm households in land holding size in the 10 selected Model Irrigation Schemes. The results show that the required annual O & M cost would occupy only 0.3 % to 7 % of net reserve after project implementation, which is within affordable extent for them. However, as stated frequently in the Master Plan, the irrigation by itself could not realize remarkable increase of agricultural production without assistance from other sub-sectors for agricultural inputs, extension services, marketing and micro finance. Therefore, a comprehensive approach should be made in close inter-coordination with other sub-sectors, to increase farm income as planned.

(23) Agricultural Inputs Supply and Marketing of Farm Products

Based on the survey results of the Model Irrigation Schemes, it was revealed that "Ensuring of Inputs" and "Establishment of Proper Approach to Marketing with Price Control" are the most common issues as conceivable countermeasures to solve the major

problems of farmers in agricultural aspects. In fact, proper inputs supply and marketing are crucial to uphold the effect of irrigation development. The present interrelation between inputs supply/marketing flow and related

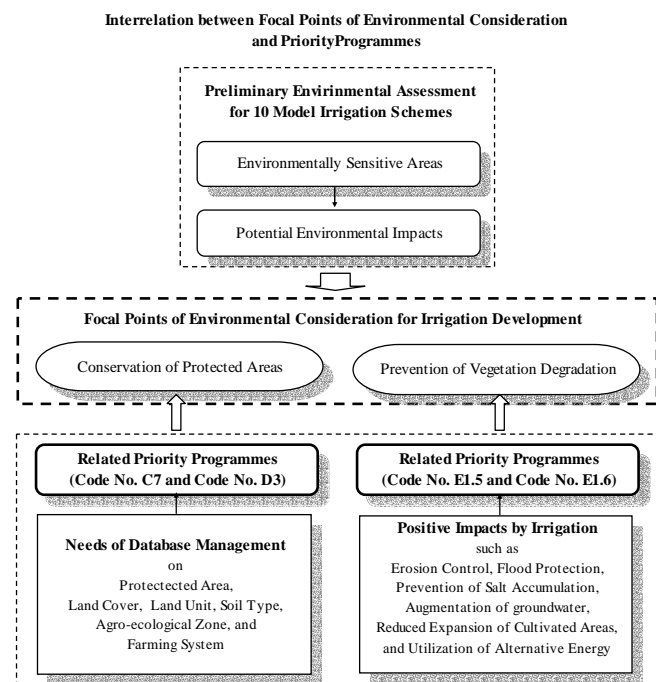


Source: JICA Study Team

support services is summarized in the figure shown above. The major recommendations for the improvement of present interrelation are strengthening of AGITF, provision of credit facilities, promotion of farmers' group formation, promotion of MDC/AMSDP to improve marketing, capacity building of farmers on marketing skills, support services for middleman/traders/processors and so on.

(24) Environmental Consideration

The results of preliminary environmental assessment for ten Model Irrigation Schemes, clarified that the focal points that need environmental consideration for the irrigation development are the conservation of protected area and the prevention of vegetation degradation. The conservation of protected areas can effectively be achieved through the proper management of databases that were collected in course of the Master Plan study. The prevention of vegetation degradation can be performed through the positive impacts of irrigation development as environmental conservation effects that were already emphasized in the Master Plan study. The interrelation between the focal points of environmental consideration for irrigation development and Priority Programmes is summarized in the figure shown above.



Source : JICA STUDY Team
 Note
 Code No.C7 : Establishment of DADP Formulation Guideline for Irrigated Agriculture Development
 Code No.D3 : Information and Database Improvement Programme
 Code No.EI.5 : Environmental Assessment Study for Irrigation Practice in Tanzania
 Code No.EI.6 : Study on River-Basin Approach in Irrigation Development

(25) Irrigation Regulations

The Irrigation Regulation is essential for optimum management of irrigation schemes. On commencement of the Master Plan implementation, it should be prepared urgently. The articles of Irrigation Regulation are largely divided into two parts. One is for the government and the other for the private sector. The role of the government in irrigation development is changed from an active participant to a facilitator playing a regulatory role as providing support services and technical assistance. The private sector is classified into the IAs and the private companies. The IAs, which are direct beneficiaries, are now expected and encouraged to play a

much greater part in all stages of irrigation development. The Irrigation Regulation is therefore required to show concrete descriptions of the functions and duties of both the government and the IAs for irrigation development including farmers' contribution. Then, in consideration of the above-mentioned functions and roles of each agency, effective supervision formation for implementation of irrigation projects should be considered for the following three cases such as (i) irrigation scheme covering more than one region, (ii) irrigation schemes covering more than one district within one region, and (iii) irrigation schemes located in one district. In any case, it is necessary to establish an irrigation committee. The matters discussed above should be mentioned in the Irrigation Regulations. The investment by the private companies in irrigated farming will be one of important alternatives in the future. The MAFS in cooperation with relevant government agencies should prepare favorable and attractive legal and institutional framework for the private investors. Based on this legal and institutional framework, functions and roles of the private investors should be mentioned in the Irrigation Regulations.

7 ACTION PLANS FOR PRIORITY PROGRAMMES AND MODEL IRRIGATION SCHEMES

(26) Basic Concept for Preparation of Action Plan for Priority Programmes of the Subject-wise Improvement Programme

The basic concept for preparation of the Action Plan which will be implemented in the Short Term (2003 to 2007), is to create an appropriate environment toward sustainable irrigation development from economically sound, technically appropriate, sociologically sustainable, environmentally friendly and institutionally reliable viewpoints, aiming to attain (i) reform of the environment for decentralization, (ii) involvement of the private sector, (iii) establishment of irrigation development systems by participatory approach, (iv) establishment of Appropriate Technologies on irrigation development in cost effective manner, and (v) dissemination of the concept of a river basin approach. These are the strategic targets in the Short Term proposed in the Master Plan.

(27) Action Plan for Priority Programmes of the Subject-wise Improvement Programme

Priority Programme	Objectives
(a) DITS Institutional Improvement Programme (Code No.A1)	- To diagnose the organizational structure and management of the DITS, in particular, focusing on its appropriateness for implementation of NIMP. - To implement the institutional improvement of the DITS based on the diagnosis so that it can execute its mandates successfully.
(b)LGA Institutional Strengthening	- To diagnose the organizational structure and management

Programme for Irrigation Development (Code No. A2)	of the LGAs, mainly focusing on the appropriateness of DALDOs for implementation of NIMP. - To implement the institutional improvement of the DALDOs based on the diagnosis, so that they can execute their mandates successfully.
(c) New Legal Framework for IA Establishment Study (Code No. A3.1)	- To make a recommendation of a new legal framework for the IA, which bestows an appropriate legal status on the IA - To define its rights and liability for irrigation development
(d) IA Organizing and Registration Support Manual (Code No. A3.2)	- To make a support manual for organizing and registration of IA, so that the extension service officers of the LGAs can provide the farmers with necessary information on organizing and registration of IA and guide them properly. - To provide a training programme of the extension service officers.
(e) IA Management Training for Farmers (Code No. A3.3)	- To prepare a training programme of the IA management. - To provide IA leaders with the training services, so that they can improve their management skills and manage their organizations successfully for realization of the sustainable self-reliant irrigation development.
(f) Regularization of Irrigation Administration and DITS Working Mandate Formulation Programme (Code No. B1)	- To regularize irrigation administration - To standardize mandates of DITS in accordance with the irrigation regulation.
(g) Contract Management System Improvement Programme (Code No. B2)	- To establish or improve the management system of contracts, which covers contract works and sub-contract tasks on irrigation development.
(h) Survey and Investigation Guideline Establishment Programme (Code No. C1)	- To prepare a practical Survey and Investigation Guideline which is convenient for conducting necessary site surveys and investigations for the sake of fulfilling high-quality planning and designing of new irrigation schemes and rehabilitating existing irrigation schemes
(i) Planning Guideline Establishment Programme (Code No. C2.1)	- To prepare a comprehensive and practical Planning Guideline which is convenient for planning of both new irrigation schemes and rehabilitation irrigation schemes.
(j) Design Guideline Establishment Programme (Code No. C2.2)	- To prepare a practical Design Guideline which is convenient for fulfilling proper designing of new irrigation schemes and rehabilitation irrigation schemes.
(k) Operation and Maintenance Guideline Establishment Programme (Code No. C3.1)	- To prepare a practical Operation and Maintenance Guideline which is convenient for conducting proper operation and maintenance of irrigation systems.
(l) Farmers' Participation in Irrigation Development Programmes (Code No.: C4)	- To enhance farmers' participation in irrigation, so that irrigation schemes are properly and continuously managed by farmers' themselves.
(m) Village Irrigation Development Guideline Establishment Programme (Code No. C5)	- To prepare proper guidelines for village irrigation developments like small-scale farmer-managed irrigation developments so as to be easier for LGAs use
(n) Establishment of DADP Formulation Guidelines for Irrigated Agriculture Development Programmes (Code No. C7)	- To prepare a proper guidelines of DADP formulation for irrigated agriculture from technical and economical viewpoints.
(o) Technical Manuals Handling Guideline Establishment Programme (Code No. D2)	- To establish a teaching source for properly handling all technical references and information which are definitely important for improving and heightening irrigation technology.
(p) Information and Database Improvement Programme (Code No. D3)	- To establish or improve information systems and databases related to irrigation development, which are definitely necessary for monitoring the progress of irrigation

	development.
(q) Environmental Assessment Study for Irrigation Practice in Tanzania (Code No.E1.5)	- To conduct an environmental assessment study to correctly justify causal relationships between irrigation water use and environmental issues on water and land.
(r) Study of River-Basin Approach in Irrigation Development (Code No. E1.6)	- To conduct a planning study to correctly justify how to introduce a river-basin approach for irrigation water users.

(28) Basic Concept for Preparation of Action Plan for Model Irrigation Schemes of Scheme-wise Development Programme

The Action Plan for the Model Irrigation Schemes is prepared under the following development concept:

Development Concept to Model Irrigation Schemes

Description	Development Concept
Technical Self-reliance	<ul style="list-style-type: none"> - Planning and design of irrigation infrastructures taking into consideration farmers' capacity of O & M and water management. - Raising of technical knowledge of farmers on O & M and water management, providing appropriate training to them.
Financial Self-reliance	<ul style="list-style-type: none"> - Formulation of rehabilitation / improvement plan of irrigation infrastructure considering farmers' affordability for O & M. - Preparation of agricultural development plan, which leads to improvement of farmers' profitability, encouraging them to introduce vegetable farming.
Institutional/Organizational Strengthening	<ul style="list-style-type: none"> - Institutional strengthening for raising organizational management of IA, such as leadership, decision-making, and conflict resolution. - Institutional strengthening for raising financial management by IA, such as collection of water fee and O & M cost. - Promotion of farmers' participation in project implementation during planning, design, and construction periods.

(29) Action Plan for Model Irrigation Schemes of Scheme-wise Development Programme

(a) Overall Goal	Improve agricultural productivity and profitability
(b) Project Purpose	Ensure to supply stable irrigation water to the farms
(c) Outputs	<ul style="list-style-type: none"> - Strengthen capacity of IA management. - Rehabilitate or improve irrigation infrastructures. - Enhance skill of farmers for operation and maintenance of irrigation infrastructures.

The 'objectively verifiable indicators' will be: (i) 80% or more farmers participate in maintenance works by the end of the project, (ii) rehabilitation is completed by the specified year, and (iii) 100% of committee members are trained for O&M by the end of the project. To achieve the outputs mentioned above, the following activities were worked out:

Objectives and Activities

Objectives	Activities
(a) Capacity of IA management is strengthened.	- Raise farmers' awareness to the project implementation.
	- Re-organize structure of IA.
	- Enhance leadership of committee members.

	<ul style="list-style-type: none"> - Strengthen decision making of IA. - Prepare by-laws and regulation. - Enhance financial management capacity of IA. - Promote to register IA.
(b) Irrigation infrastructures are rehabilitated or improved	<ul style="list-style-type: none"> - Conduct survey and investigation with farmers' participation. - Conduct EIA. - Carry out design works. - Make agreement on the project implementation including Programmes of rehabilitation / improvement works and farmers' contribution to the works - Proceed pre-implementation activities including tendering and its evaluation. - Construct irrigation infrastructures with farmers' participation. - Turn-over O&M of completed irrigation facilities to IA. - Raise farmers' awareness to the project implementation.
(c) Skill of farmers for operation and maintenance of irrigation infrastructures is enhanced	<ul style="list-style-type: none"> - Prepare irrigation schedule and maintenance plan. - Conduct water distribution. - Conduct maintenance works. - Enhance skills to mediate and resolve water disputes among members and with outside people - Monitor performance of scheme

Proposed Infrastructures for each Scheme

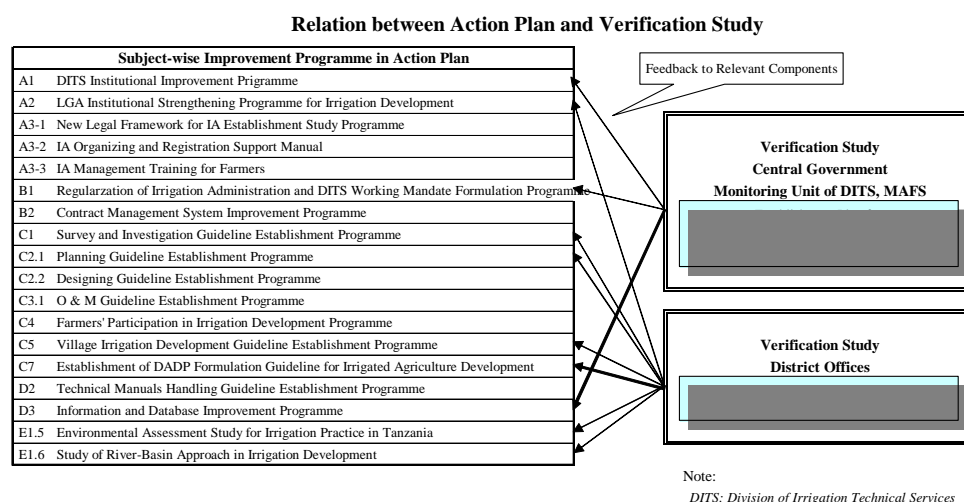
Scheme	Proposed Infrastructures
(a) Kinyope	<ul style="list-style-type: none"> - Construction of Intake weirs (13 ea.) - Construction of main irrigation canal (unlined, length of 20,000 m) - Construction of secondary irrigation canal (unlined, length of 22,000 m) - Construction of turnouts (50 ea.) - Construction of farm ditches (length of 48,000 m) - Construction of drainage canal (length of 10,000 m)
(b) Magoma	<ul style="list-style-type: none"> - Construction of intake weir (1 site) - Construction of main irrigation canal (unlined, length of 10,000 m) - Construction of secondary irrigation canal (unlined, length of 11,000 m) - Construction of drainage canal (length of 10,000 m) - Construction of turnouts with intake ponds for treadle pump use (20 ea.) - Construction of partial flood dike (length of 2,000 m)
(c) Pawaga	<ul style="list-style-type: none"> - Remodelling of gabion weir (1 site) - Construction of silt extractor 1 (1 site) - Remodelling of irrigation channels (unlined, length of 10,400 m) - Construction of division structures (6 ea.) - Construction of drainage canals (length of 10,000 m)
(d) Musa Mwinjanga	<ul style="list-style-type: none"> - Reconstruction of intake weir (1 site) - Partly remodelling of canal alignment (length of 8,000 m) - Improvement of division structures (12 ea.) - Construction of drainage canal (length of 6,000 m)
(e) Mgongola	<ul style="list-style-type: none"> - Remodelling of intake weir (1 site) - Remodelling of diversion canal (unlined, 1,200 m) - Construction of main irrigation canal (unlined, 2,400 m) - Construction of secondary irrigation canal (unlined, 19,100 m) - Construction of drainage canal (13,100 m) - Construction of flood dike (9,800 m) - Construction of related structures (Lump Sum)
(f) Lower Moshi	(a) Existing Lower Moshi Project (1,100 ha paddy field only)

	<ul style="list-style-type: none"> - Rehabilitation of two intake weirs (intake/scouring sluice gates: 4 ea.) - Repairing of canal lining (Lump Sum) - Repairing of drains(Lump Sum) - Repairing of related structures(Lump Sum) <p>(b)Expanded Area (460 ha in total)</p> <ul style="list-style-type: none"> - Construction of intake facilities (8 ea.) - Improvement of existing canals (26 km) - Construction of drains (21 km) - Rehabilitation/construction of farm roads (30 km) - Construction of related structures (244 ea.) - Construction of flood dike (16 km)
(g) Kiseke	<ul style="list-style-type: none"> - Construction of intake weirs (3 sites) - Construction of irrigation canal (unlined, length of 17,900 m) - Construction of storage reservoir (1 site with capacity of 2,60 m3) - Construction of drainage canal (length of 8,000 m)
(h) Pamila	<ul style="list-style-type: none"> - Construction of farm-bunds (totally 30 ha) - Construction of drainage canal (length of 1,300 m) - Construction of farm-passes (length of 2,500 m) - Procuring of equipment for verifying the new water harvesting method (Lump Sum)
(i) Nkenge	<ul style="list-style-type: none"> - Remodelling pump house and related intake facilities (1 site) - Installation of pump and its accessories (1 set) - Reconstruction of irrigation canal (unlined, length of 2,100 m) - Reconstruction of drainage canal (length of 1,600 m) - Construction of small dam (1 site) - Diversion canal related to the small dam reservoir (length of 1,500 m)
(j)Luchili-Nyakasungwa	<ul style="list-style-type: none"> - Remodelling of pump system (1 site) - Re-installation of pump facilities (1 set) - Replacement of delivery pipe (length of 1,890 m) - Repair of existing canal system (Lump Sum)

(30) Implementation Plan

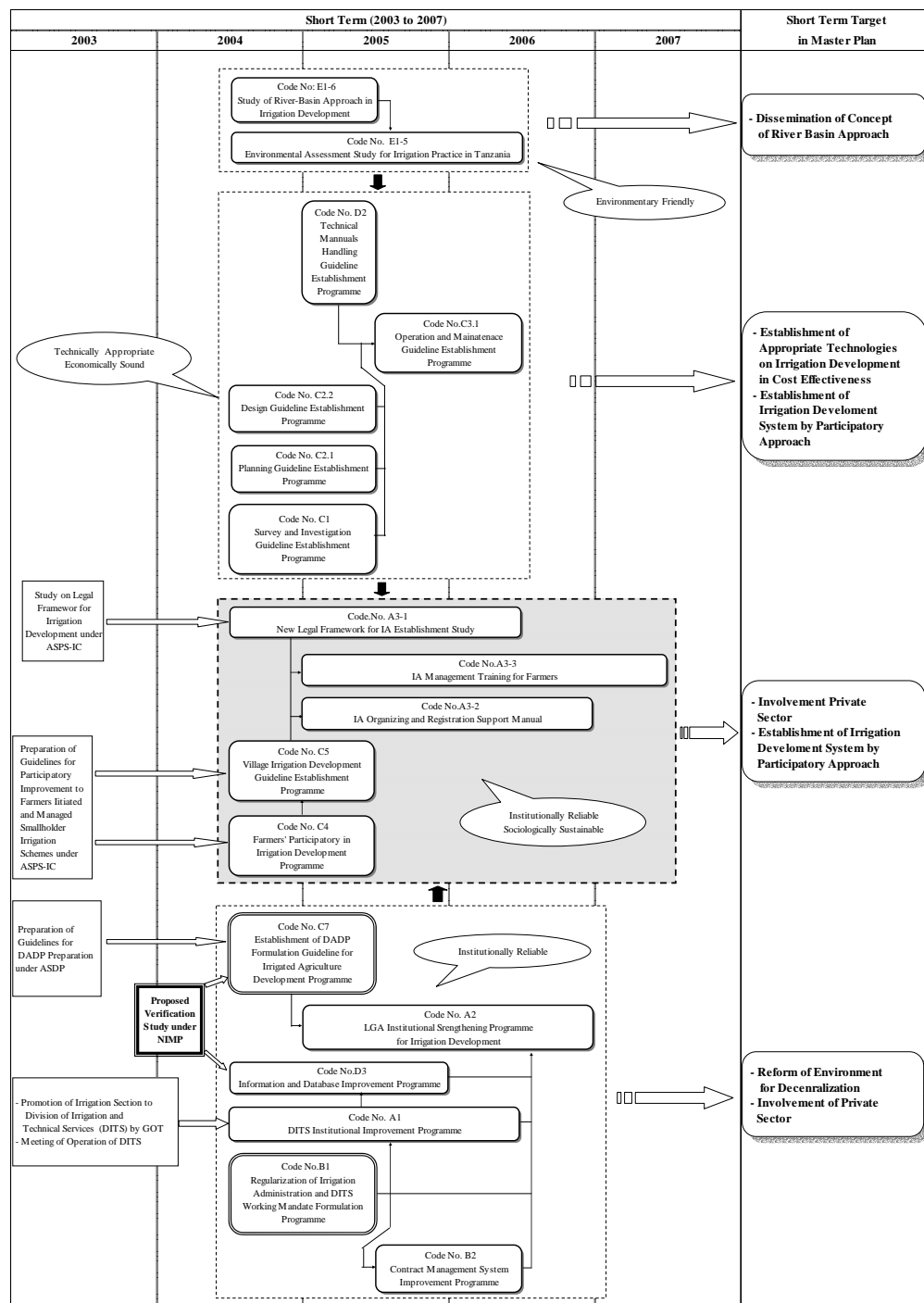
18 Selected Priority Programmes

The programmes of these 18 selected Priority Programmes are conceived from Economically Sound, Technically Appropriate, Sociologically Sustainable, Environmentally Friendly and Institutionally Reliable viewpoints.



The implementation plan for these items was worked out focusing on (i) commencement of fiscal year when new budget is available, (ii) relation of on-going and completed programmes closely related to them, and (iii) IA as main actor for irrigation development in addition to five conditions mentioned in the Master Plan. The plan also shows the relation between the Programmes and the proposed Verification Study to be conducted later. The plan is illustrated on the next page.

Illustrated Implementation Plan of Priority Programmes of Subject-wise Improvement Programme



Scheme-wise Development Programme in Short Term (2003 to 2007)

The implementation plan for the Scheme-wise Development Plan in the Short Term was prepared on the regional area basis. The plan also shows development areas for three irrigation types such as (i) rehabilitation of traditional irrigation schemes, (ii) water harvesting schemes, and (iii) new smallholder irrigation schemes.

Accumulated Irrigation Development Area on Regional Area Basis

Unit: ha

Region	by 2002*	Short Term (2003 - 2007)					
		2003	2004	2005	2006	2007	
Arusha	51,186	51,374	51,383	51,541	51,625	53,825	
Coast	1,133	3,085	3,380	3,380	3,380	5,380	300,000 ha
Dar es Salaam	4	4	4	4	4	4	
Dodoma	4,313	4,313	4,313	4,313	4,313	4,313	290,000 ha
Iringa	6,306	6,424	6,424	6,424	6,424	6,424	
Kagera	15	15	15	15	15	15	280,000 ha
Kigoma	4,800	4,800	4,800	4,800	4,800	5,800	
Kilimanjaro	45,738	46,548	46,738	47,428	49,038	49,448	270,000 ha
Lindi	1,406	1,406	4,206	4,206	4,206	8,264	
Mara	611	661	661	661	661	2,351	260,000 ha
Mbeya	35,249	35,249	35,249	36,189	39,289	39,289	
Morogoro	25,144	28,921	30,806	32,496	34,856	35,546	250,000 ha
Mtwara	2,690	2,690	2,690	2,690	2,690	2,690	
Mwanza	1,108	6,865	9,365	10,152	11,702	11,922	240,000 ha
Rukuwa	5,236	6,436	7,936	8,306	8,606	8,606	
Ruvuma	198	198	198	198	433	433	230,000 ha
Shinyanga	2,500	4,000	6,100	6,500	8,500	10,100	
Singida	2,055	2,655	3,155	5,195	5,195	5,195	220,000 ha
Tabora	3,121	3,121	3,121	3,121	3,121	3,121	
Tanga	8,626	8,876	8,876	11,476	11,500	11,500	200,000 ha
Total	201,439	217,641	229,420	239,095	250,358	265,226	
Development Area to be Increased		16,202	11,779	9,675	11,263	14,868	
For Irrigation Type							
Rehabilitation of Traditional Schemes	152,103	155,703	161,682	167,717	173,610	179,778	
Development Area to be Increased		3,600	5,979	6,035	5,893	6,168	
Water harvesting Schemes	13,489	21,389	27,189	30,829	36,199	41,619	
Development Area to be Increased		7,900	5,800	3,640	5,370	5,420	
New Smallholder Schemes	35,847	40,549	40,549	40,549	40,549	43,829	
Development Area to be Increased		4,702	0	0	0	3,280	

Source: Master Plan Report prepared by JICA Study Team in 2002.

Note:

* : Developed Area (191,900 ha by 2001) + Developed Area under On-going Project in 2002

8 RECOMMENDATIONS

(31) Support on Irrigation Scheme Formulation Process in DADP

Under the decentralization policy, each District Office prepared the DADP, which included lots of irrigation schemes. The irrigation development will be duly started based on the DADPs. However, through the site inspection for many irrigation schemes and the discussion with district staff on DADPs, it was found that the development plans of irrigation schemes were not clear, especially from technical and economical viewpoints, and also there was no definite criteria on selection of appropriate irrigation schemes. In the consecutive activities for irrigation development, the planning of irrigation schemes, including selection of appropriate

irrigation schemes, is the most fundamental activity as a starting point toward sustainable irrigation development. To improve this situation, it is recommended that practical guidelines on the proper process of scheme formulation should be prepared, and capacity building should be provided for district staff concerned simultaneously. Besides, it is recommended that a simple data base system should be established at the DITS of MAFS, to support the District Offices by providing necessary data and information for irrigation scheme formulation.

(32) Strengthening of IA

IA is a main actor for operation, maintenance and management of irrigation schemes. However, most IAs are too weak institutionally, financially and technically to fulfill the above activities. Based on the results of RRA and site inspection executed for Model Irrigation Schemes, the Action Plan study proposes the IA Strengthening Programme. In this connection, the ASPS has started the study on improvement of legal framework for irrigation development, aiming to provide an appropriate, comprehensive and coherent legal framework for irrigation development based on the results of the in-depth review of existing legal framework. In view of the above, it is recommended that the IA Strengthening Programme, as well as improvement of legal framework based on the ASPS report, should be started as early as possible to establish the firm IA indispensable for sustainable irrigation development.

(33) Promotion of Farmers' Managed Irrigation Scheme Development

The Master Plan delineates the development scenario by 2017, with a target of irrigation development areas of 405,000 ha by 2017. In order to fulfill this target, irrigation development should be carried out steadily. In general, the large-scaled irrigation scheme, which is more than about 500 ha as discussed with the MAFS staff, require more complicated activities on operation, maintenance and management than the small-scaled ones, and need more time for creating proper environment for its successful implementation. While the small-scaled irrigation scheme, especially farmers' managed irrigation scheme could be comparatively easily handled by farmers under less support by the GOT. The farmers' managed irrigation schemes are thus recommendable to start urgently in cooperation with other sub-sectors on agricultural inputs, extension services, marketing and micro-finance, to heighten the irrigation effect more.