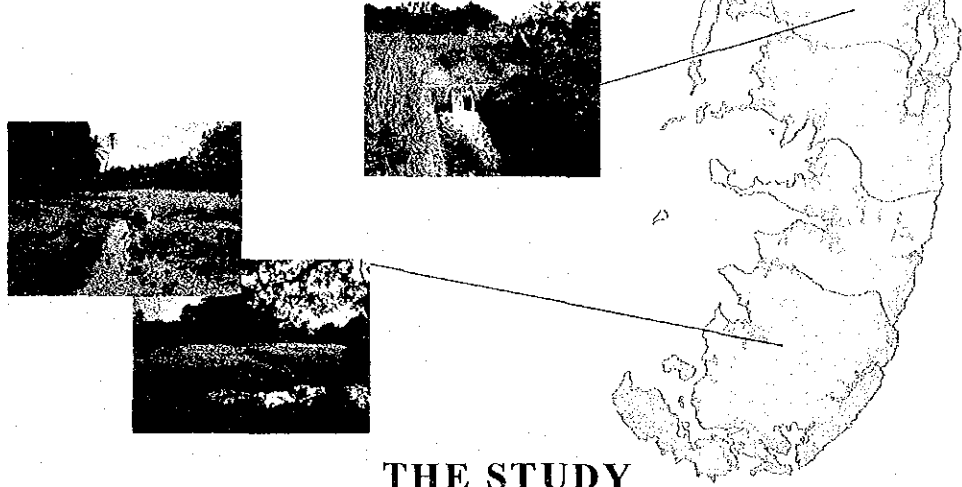


JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
MINISTRY OF AGRICULTURE, NATURAL RESOURCES,  
ENVIRONMENT AND COOPERATIVES (MANREC)



THE STUDY  
ON  
THE ZANZIBAR IRRIGATION MASTER PLAN  
IN  
THE UNITED REPUBLIC OF TANZANIA

MASTER PLAN  
VOLUME-II: APPENDICES

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**MASTER PLAN  
VOLUME-II: APPENDIXES**

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***Appendix A***  
***Inventory Survey and Analysis***

**THE STUDY  
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THE UNITED REPUBLIC OF TANZANIA**

**MASTER PLAN**

**APPENDIX A**

**INVENTORY SURVEY AND ANALYSIS**

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## APPENDIX A

### INVENTORY SURVEY AND ANALYSIS

#### CHAPTER 1 INVENTORY SURVEY

##### 1.1 Methodology

An inventory survey for the existing irrigation schemes to be rehabilitated or improved and the new schemes to be constructed has been started so as to obtain further information in addition to the existing one. The inventory survey has been conducted centering the Division of Agriculture, Rice Cultivation & Inputs using a questionnaire form. In this survey, attention has been paid on grasping the community based irrigation schemes, which have generally been overlooked so far.

##### 1.2 Questionnaire

The questionnaire for the inventory survey is prepared by the Study Team. The survey covers not only conditions of irrigation facilities, but also situations of farmers' organizations and marketing. The inventory survey form is given in Attachment 1. Items to be surveyed, which are prepared by making reference with those in RBMSIIP and PIDP of the main island, are summarized as follows:

- (1) Location, Administrative Information and Scheme History
- (2) Irrigation and Drainage
  - Physical conditions
  - Proposed plan
  - Topography
  - Soils
  - Water resources
  - Drainage and floods
  - Access road
- (3) Agriculture and Land Use
  - Cultivation area
  - Crop production
  - Farming calendar
  - Farm size distribution
  - Land capability for irrigation and crop suitability

- Major constraints in crop production
- (3) Farmers Supporting System
  - Post harvest
  - Input supply
  - Extension service
- (4) Farmers' Organization
  - General information
  - Institution
  - Office bearers
  - Activities
  - Training
- (5) Operation and Maintenance
  - Operation
  - Maintenance
  - Settlement of irrigation disputes
- (6) Environment
  - River water quality
  - Sedimentation in reservoir
  - Water borne diseases

### **1.3 Execution of the Inventory Survey**

The inventory survey has been almost completed by the end of June 2002. In order to analyze the inventory survey data, computerized database has been prepared by the Study Team using the Microsoft Excel. All the data collected by the inventory survey are encoded. Since many questionnaires had to be answered in a short time, it was anticipated that there would be improper answers. Therefore, the initial results of the inventory survey were verified in cooperation with the counterparts of MANREC. The verification of the survey results was completed by the end of July 2002.

## CHAPTER 2 PRESENT SITUATION OF INVENTORIZED SCHEMES

### 2.1 Inventory Survey

The inventory survey of the irrigation schemes was carried out in order to grasp the present situation and proposed plan of irrigation schemes including location, history, irrigation and drainage, agriculture and land use, farmers' supporting system, farmers' organization, operation and maintenance, and environment. The schemes to be inventorized are selected by MANREC.

The inventorized schemes are 57 in total, covering about existing irrigated area of some 340 ha, and 8,500 ha of potential irrigable area in both the Unguja and Pemba Islands as follows:

**Inventorized Schemes**

Island / Region	Nos. of Schemes	Existing Area (ha)	Potential Area (ha)
<b>Unguja</b>	<b>18</b>	<b>268</b>	<b>6,629</b>
North	6	-	2,468
South	9	54	2,512
Urban West	3	214	733
<b>Pemba</b>	<b>39</b>	<b>74</b>	<b>1,892</b>
North	18	68	707
South	21	6	1,185
<b>Total</b>	<b>57</b>	<b>342</b>	<b>8,521</b>

Source: Inventory survey conducted by ZIMP

The general features of those inventorized schemes are summarized hereinafter and the relevant details are compiled in Table 2.1.1.

### 2.2 Classification of Inventorized Schemes

According to the type of irrigation, the inventorized schemes are classified into 3 categories, namely, gravity type by small dams, gravity type by diversion weir, and pump by groundwater, as shown below.

**Classification of Inventorized Schemes by Type of Irrigation**

Islands	Type of Scheme	Nos. of Schemes	Potential Area (ha)
Unguja	Gravity by Dam	4	1,200
	Gravity by Diversion weir	5	505
	Pump by Groundwater	9	4,924
	<b>Sub-total</b>	<b>18</b>	<b>6,629</b>
Pemba	Gravity by Dam	39	1,892
	Gravity by Diversion weir	-	-
	Pump by Groundwater	-	-
	<b>Sub-total</b>	<b>39</b>	<b>1,892</b>
Zanzibar Total	Gravity by Dam	43	3,092
	Gravity by Diversion weir	5	505
	Pump by Groundwater	9	4,924
	<b>Total</b>	<b>57</b>	<b>8,521</b>

Source: Inventory survey conducted by ZIMP



Surface water is main water resource of irrigation schemes in Zanzibar, especially in the Pemba Island. Meanwhile, some 75 % of potential areas in the Unguja Island are expected to be fed by groundwater.

Out of 57 schemes, 32 schemes have a potential area of less than 50 ha, with a total potential area of 750 ha. The irrigation schemes are categorized by size of irrigation area as shown below.

**Classification of Inventorized Schemes by Size of Potential Area**

Islands	Type of Scheme	Nos. of Schemes	Potential Area (ha)
Unguja	Small-scale (Less than 50 ha)	3	46
	Medium-scale (50 – 200 ha)	3	341
	Large -scale (More than 200 ha)	12	6,242
	Sub-total	18	6,629
Pemba	Small-scale (Less than 50 ha)	29	704
	Medium-scale (50 – 200 ha)	9	641
	Large -scale (More than 200 ha)	1	547
	Sub-total	39	1,892
Zanzibar Total	Small-scale (Less than 50 ha)	32	750
	Medium-scale (50 – 200 ha)	12	982
	Large -scale (More than 200 ha)	13	6,789
	Total	57	8,521

*Source: Inventory survey conducted by ZIMP*

9 existing irrigation schemes with an area of some 340 ha in operation are expected to be extended to about 2,100 ha rehabilitating or improving such irrigation facilities as diversion weir, pump, and irrigation canal. Some 4,000 ha of rainfed area have a potential for future new irrigation scheme.

**Classification of Inventorized Schemes by Proposed Works**

Islands	Type of Scheme	Nos. of Schemes	Potential Area (ha)
Unguja	Rehabilitation of Existing Scheme	4	1,890
	Restoration of Abandoned Scheme	4	1,668
	Newly Proposed Scheme	10	3,071
	Sub-total	18	6,629
Pemba	Rehabilitation of Existing Scheme	5	254
	Restoration of Abandoned Scheme	6	773
	Newly Proposed Scheme	28	865
	Sub-total	39	1,892
Zanzibar Total	Rehabilitation of Existing Scheme	9	2,144
	Restoration of Abandoned Scheme	10	2,441
	Newly Proposed Scheme	38	3,936
	Total	57	8,521

*Source: Inventory survey conducted by ZIMP*

It is reported that the irrigation canal shall be rehabilitated or improved providing partial lining and diversion structure. Further, the results of the inventory survey indicate that most of the pump irrigation schemes are constrained by shortage of fund for the scheme operation as well as breakdown of the pump.

The results of scheme classification are summarized below.

**Classification of Inventorized Schemes with Potential Area**

Required Works	Type of Irrigation	Small-scale		Medium-scale		Large-scale		Total	
		Nos.	Area (ha)	Nos.	Area (ha)	Nos.	Area (ha)	Nos.	Area (ha)
Rehabilitation Improvement of Existing Schemes	Dam	4	140	1	114	-	-	5	254
	Diversion weir	1	12	1	120	-	-	2	132
	Pump	-	-	-	-	2	1,758	2	1,758
	Sub-total	5	152	2	234	2	1,758	9	2,144
Restoration of Abandoned Schemes	Dam	2	46	3	180	3	1,197	8	1,423
	Diversion weir	-	-	-	-	-	-	-	-
	Pump	-	-	1	168	1	850	2	1,018
	Sub-total	2	46	4	348	4	2,047	10	2,441
Proposed New Schemes	Dam	23	518	5	347	2	550	30	1,415
	Diversion weir	1	20	1	53	1	300	3	373
	Pump	1	14	-	-	4	2,134	5	2,148
	Sub-total	25	552	6	400	7	2,984	38	3,936
Total	Dam	29	704	9	641	5	1,747	43	3,092
	Diversion weir	2	32	2	173	1	300	5	505
	Pump	1	14	1	168	7	4,742	9	4,924
	Total	32	750	12	982	13	6,789	57	8,521

Source: Inventory survey conducted by ZIMP

## **CHAPTER 3 ANALYSIS OF INVENTORIZED DATA**

### **3.1 Necessity of Cross-Checking**

The inventory survey was carried out in June 2002, and the data verification and analysis were made in June 2002. As a result, the inventorized schemes for the Study became 57 in total.

However, it was observed that most of the schemes are not supported by the basic studies or feasibility studies. Thus, in most cases, the answered questionnaires involve a lot of questionable data or are completely lacking in such basic data as potential irrigable area, project costs, which are needed to estimate irrigation benefit as well as EIRR. In order to solve the problem and to formulate the scheme-wise development programs by the year 2020, the cross checking and supplement were required; in particular, potential irrigable area, development costs, irrigation benefits and Economic Internal Rate of Return (EIRR) were cross-checked and supplemented.

### **3.2 Cross-Checking of Potential Areas**

It was expected that the cross-checking of the potential areas of the inventorized schemes are conducted by balancing estimated available river discharge and diversion irrigation water requirement of each inventorized scheme. The estimate of available water discharge need data of catchments area at diversion point. However the cross-checking of the data were in difficulty because of lack of the data of catchment area in the inventory survey. It was assumed, therefore, that the potential area answered in the inventory survey is to be the future irrigable area in the rainy season. Further, the irrigable area in the dry season was verified. Judging from the topographic conditions, usable water resources, potential land resources and other past study reports, these schemes of which total potential area is estimated at 8,521 ha, are considered as a maximum potential area for irrigation development in Zanzibar. Features of 57 irrigation schemes are summarized as follows:

**Potential Area for Irrigation Development**

Scheme Name	Water Resources	Potential Area (ha)		Scheme Name	Water Resources	Potential Area (ha)	
		Rainy	Dry			Rainy	Dry
<b>Unguja</b>							
Chaani	Surface Water	250	250	Koani	Surface Water	20	20
Kibokwa	Surface Water	250	250	Mchangani	Surface Water	300	200
Kilombero	Groundwater	850	373	Mwera	Surface Water	12	12
Kipange	Surface Water	400	400	Ubago	Groundwater	14	14
Mahonda	Surface Water	300	150	Mtende	Groundwater	330	165
Upenja	Groundwater	418	314	Muyuni	Groundwater	586	293
Bambi	Groundwater	168	168	Bumbwi sudi	Groundwater	560	450
Cheju	Groundwater	1,198	479	Mtwango	Surface Water	120	120
Ksima	Groundwater	800	560	Tomondo	Surface Water	53	27
Sub-total		4,634	2,944			1,995	1,301
Total of Unguja						6,629	4,244
<b>Pemba</b>							
Bule	Surface Water	12	12	Kwamavi	Surface Water	22	22
Chwaka	Surface Water	17	17	Kwapweza	Surface Water	62	27
Kinyakuzi	Surface Water	40	30	Mabieni	Surface Water	35	18
Kinyasini	Surface Water	23	9	Mlemele	Surface Water	73	68
Makwararani	Surface Water	114	31	Ngue	Surface Water	5	-
Matangatwani	Surface Water	19	7	Tibirinzi	Surface Water	25	7
Mgongombe	Surface Water	41	-	Donge Manyiga	Surface Water	19	7
Mshashani	Surface Water	25	15	Egeani	Surface Water	12	5
Mwanasoa	Surface Water	32	10	Giriana	Surface Water	33	14
Ngiwa	Surface Water	76	33	Kiguni	Surface Water	16	8
Saniga	Surface Water	38	21	Kimbuni	Surface Water	21	11
Gando	Surface Water	24	8	Kwamachigi	Surface Water	51	8
Kwalempona	Surface Water	53	14	Kwamkoba	Surface Water	93	42
Mangwena	Surface Water	29	6	Machigini	Surface Water	547	17
Mipopooni	Surface Water	65	20	Makunge	Surface Water	54	26
Mleteni	Surface Water	31	9	Maotwe	Surface Water	13	13
Tungamaa	Surface Water	33	20	Masingini	Surface Water	15	8
Weni	Surface Water	35	-	Masumbwini	Surface Water	29	7
Dobi	Surface Water	25	12	Machagapwaga	Surface Water	10	8
				Mizingani	Surface Water	25	6
Sub-total		732	409	Sub-total		1160	187
Total of Pemba						1,892	596
<b>Grand Total of Zanzibar</b>						<b>8,521</b>	<b>4,840</b>

Source: JICA Study Team

### 3.3 Estimation of Project Costs

Through the classification and analysis of rehabilitation, improvement and construction costs, it has been found out that the works widely vary in scale from minor repair works to significant improvement or re-construction works. The minor repair works are replacement of intake gates, repair of small canal structures. Significant works include a total replacement or newly construction of diversion weirs and dams, replacement of pumps, and construction of new canals for newly irrigated areas. There are other improvement works such as concrete lining of the existing earth canals, and improvement or extension of drainage canals and farm roads.

The project costs for rehabilitation, improvement and construction for each category were assumed and supplemented based on the previous performance of irrigation development because few data were obtained through the inventory survey.

Unit Project Costs by Type of Works

Unit : US\$/ha

Type of Irrigation	Rehabilitation	Restoration	New Construction
Gravity by Dam	3,000	5,000	6,000
Gravity by Diversion weir	2,000	2,500	3,000
Pump by Groundwater	2,500	4,000	5,000

Source: JICA Study Team

### 3.4 Estimation of Irrigation Benefits

#### 3.4.1 General

The irrigation benefits were defined as the difference of net crop production values between future with and without project conditions, and were calculated according to the following equations.

- Net crop production values =  
{ (unit yield of paddy x economic farm gate prices) - production cost per ha }  
+ { (unit yield of maize x economic farm gate prices) - production cost per ha }  
+ { (unit yield of beans x economic farm gate prices) - production cost per ha }
- Irrigation benefits =  
net crop production value (under with-project conditions)  
- net crop production value (under without-project conditions)

Basic information for estimation of irrigation benefits is shown in Clause 3.2 of Appendix C.

#### 3.4.2 Cropping Pattern and Land Use

The potential areas of inventorized schemes were assumed to be the future irrigated areas under with-project condition for both rehabilitation and new schemes. The present irrigation areas (actually irrigated area) in the rehabilitation schemes were assumed to be future irrigation areas under without-project condition for rehabilitation schemes. The balance in area between the potential area and the actually irrigated area was assumed to be the incremental irrigation area by the rehabilitation schemes. On the other hands, the balance between the potential areas and the present rainfed areas was assumed to be the incremental irrigated area by the new schemes. The present and future cropping patterns with intensities were assumed by region based on the results of the inventorized survey and other existing data and information.

#### 3.4.3 Unit Yield of Crops

Regional average unit yields of paddy, maize, and beans per ha under rainfed condition, present irrigated condition were estimated on the basis of the results of the inventorized survey and the agricultural statistics. Further, yield of those crops under future irrigated cultivation were assumed taking into account the recommended farming practice by MAFS in the main land. Regional average unit yields under present irrigated condition and rainfed condition were assumed to be those under without-project condition.

#### 3.4.4 Crop Budget

Economic farm gate prices of the traded farm inputs and products (paddy, maize and beans) as well as crop production costs (seeds, fertilizer, and chemical, labor) are collected from MAFS in the main land.

### 3.5 Calculation of EIRRs

The economic internal of returns (EIRRS) were calculated on the basis of supplemented costs and estimated benefits under the following basic assumptions:

- Conversion factor to economic construction cost is 0.8.
- Conversion factor of agricultural inputs and labor force are based on the report on "The Study on the Smallholder Irrigation Projects in Central Wami River Basin, Morogoro" in 1998.
- Economic annual O&M cost is 1.0 % of the economic construction cost,
- Constriction period is 3 years for small-scale schemes, 4 years for medium-scale schemes, and 5 years for large-scale schemes,
- Build-up period is 3 years after completion of construction works
- Project economic life is 30 years

- Replacement cost is estimated at 1% of the economic construction cost in every 10 years after completion of the construction works.

The supplemented financial cost data were converted to economic costs by applying a conversion factor of 0.8. The summary of EIRR is shown in the following tables.

**Results of EIRR Calculation**

**Unit : Nos. of Schemes**

Type of Irrigation	Less than 8%	8 - 12 %	12 - 16 %	16 - 20 %	More than 20 %	Total
Gravity by Dam	4	16	12	9	2	43
Gravity by Diversion weir	0	0	1	0	4	5
Pump by Groundwater	0	5	1	3	0	9
Total	4	21	14	12	6	57

*Source: JICA Study Team*

## ***Table***



Table 2.1.1 List of inventorized Schemes

SERIAL NO	REGION	DISTRICT	NAME	Present Condition	Typo of Irrigation	Scheme Scale	Irrigated Area (ha)	Potential Area (ha)
1101	NORTH - UNGUJA	NORTH 'A' - UNGUJA	Chaani	3 Rained	1 Reservoir	3 Large		250
1102	NORTH - UNGUJA	NORTH 'A' - UNGUJA	Kibokwa	2 Abandoned	1 Reservoir	3 Large		250
1201	NORTH - UNGUJA	NORTH 'B' - UNGUJA	Kilonbero	2 Abandoned	3 GW	3 Large		850
1202	NORTH - UNGUJA	NORTH 'B' - UNGUJA	Kipange	2 Abandoned	1 Reservoir	3 Large		400
1203	NORTH - UNGUJA	NORTH 'B' - UNGUJA	Mahonda/Chechele	3 Rained	1 Reservoir	3 Large		300
1204	NORTH - UNGUJA	NORTH 'B' - UNGUJA	Upenja	3 Rained	3 GW	3 Large		418
1301	SOUTH - UNGUJA	CENTRAL	Dambi	2 Abandoned	3 GW	2 Medium		168
1302	SOUTH - UNGUJA	CENTRAL	Cheju Irrigation Scheme	1 Existing	3 GW	3 Large	42	1198
1303	SOUTH - UNGUJA	CENTRAL	Kisima Mchanga	3 Rained	3 GW	3 Large		800
1304	SOUTH - UNGUJA	CENTRAL	Koani/Ubango	3 Rained	2 Diversion	1 Small		20
1305	SOUTH - UNGUJA	CENTRAL	Mchangani	3 Rained	2 Diversion	3 Large		300
1306	SOUTH - UNGUJA	CENTRAL	Mwera	1 Existing	2 Diversion	1 Small	12	12
1307	SOUTH - UNGUJA	CENTRAL	Ubago	3 Rained	3 GW	1 Small		14
1401	SOUTH - UNGUJA	SOUTH	Mtende	3 Rained	3 GW	3 Large		330
1402	SOUTH - UNGUJA	SOUTH	Muyini	3 Rained	3 GW	3 Large		586
1501	URBAN WEST	WEST	Bumbwi Sudi	1 Existing	3 GW	3 Large	136	560
1502	URBAN WEST	WEST	Mtwango Irrigation Scheme	1 Existing	2 Diversion	2 Medium	78	120
1503	URBAN WEST	WEST	Tomondo, Kijitoupele and Kwarara	3 Rained	2 Diversion	2 Medium		53
2601	NORTH - PEMBA	MICHEWENI	Bule	3 Rained	1 Reservoir	1 Small		12
2602	NORTH - PEMBA	MICHEWENI	Chwaka	3 Rained	1 Reservoir	1 Small		17
2603	NORTH - PEMBA	MICHEWENI	Kinyakuzi	1 Existing	1 Reservoir	1 Small	8	40
2604	NORTH - PEMBA	MICHEWENI	Kinyasini	3 Rained	1 Reservoir	1 Small		23
2605	NORTH - PEMBA	MICHEWENI	Makwararani	1 Existing	1 Reservoir	2 Medium		114
2606	NORTH - PEMBA	MICHEWENI	Matangatwani	3 Rained	1 Reservoir	1 Small		19
2607	NORTH - PEMBA	MICHEWENI	Mgong'ombe	3 Rained	1 Reservoir	1 Small		41
2608	NORTH - PEMBA	MICHEWENI	Mshashani	3 Rained	1 Reservoir	1 Small		25
2609	NORTH - PEMBA	MICHEWENI	Mwanasoza	3 Rained	1 Reservoir	1 Small		32
2610	NORTH - PEMBA	MICHEWENI	Ngwia	3 Rained	1 Reservoir	2 Medium		76
2611	NORTH - PEMBA	MICHEWENI	Saniga	1 Existing	1 Reservoir	1 Small	16.4	38
2701	NORTH - PEMBA	WETE	Gando	3 Rained	1 Reservoir	1 Small		24
2702	NORTH - PEMBA	WETE	Kwalempona	2 Abandoned	1 Reservoir	2 Medium	13.6	53
2703	NORTH - PEMBA	WETE	Mangwena	1 Existing	1 Reservoir	1 Small	10	29
2704	NORTH - PEMBA	WETE	Mipoponi	2 Abandoned	1 Reservoir	2 Medium	13.6	65
2705	NORTH - PEMBA	WETE	Mleteni	3 Rained	1 Reservoir	1 Small		31
2706	NORTH - PEMBA	WETE	Tungamaa	1 Existing	1 Reservoir	1 Small	6	33
2707	NORTH - PEMBA	WETE	Weni	3 Rained	1 Reservoir	1 Small		35
2801	SOUTH - PEMBA	CHAKE CHAKE	Dobi	3 Rained	1 Reservoir	1 Small		25
2802	SOUTH - PEMBA	CHAKE CHAKE	Kwanavi	3 Rained	1 Reservoir	1 Small		22
2803	SOUTH - PEMBA	CHAKE CHAKE	Kwapwweza	2 Abandoned	1 Reservoir	2 Medium		62
2804	SOUTH - PEMBA	CHAKE CHAKE	Mabieni	3 Rained	1 Reservoir	1 Small		35
2805	SOUTH - PEMBA	CHAKE CHAKE	Mlemele	3 Rained	1 Reservoir	2 Medium		73
2806	SOUTH - PEMBA	CHAKE CHAKE	Ngue	3 Rained	1 Reservoir	1 Small		5
2807	SOUTH - PEMBA	CHAKE CHAKE	Tibirizi	3 Rained	1 Reservoir	1 Small	6	25
2901	SOUTH - PEMBA	MKOANI	Donge Manyiga	3 Rained	1 Reservoir	1 Small		19
2902	SOUTH - PEMBA	MKOANI	Egeani	3 Rained	1 Reservoir	1 Small		12
2903	SOUTH - PEMBA	MKOANI	Giriama	3 Rained	1 Reservoir	1 Small		33
2904	SOUTH - PEMBA	MKOANI	Kiguni	3 Rained	1 Reservoir	1 Small		16
2905	SOUTH - PEMBA	MKOANI	Kimbuni	2 Abandoned	1 Reservoir	1 Small		21
2906	SOUTH - PEMBA	MKOANI	Kwanashigi	3 Rained	1 Reservoir	2 Medium		51
2907	SOUTH - PEMBA	MKOANI	Kwanikoba	3 Rained	1 Reservoir	2 Medium		93
2908	SOUTH - PEMBA	MKOANI	Machigini/Gae la Mtungi	2 Abandoned	1 Reservoir	3 Large		547
2909	SOUTH - PEMBA	MKOANI	Makunge	3 Rained	1 Reservoir	2 Medium		54
2910	SOUTH - PEMBA	MKOANI	Maotwe	3 Rained	1 Reservoir	1 Small		13
2911	SOUTH - PEMBA	MKOANI	Masingini	3 Rained	1 Reservoir	1 Small		15
2912	SOUTH - PEMBA	MKOANI	Maumbwini	3 Rained	1 Reservoir	1 Small		29
2913	SOUTH - PEMBA	MKOANI	Mchangapwaga	3 Rained	1 Reservoir	1 Small		10
2914	SOUTH - PEMBA	MKOANI	Mizingani	2 Abandoned	1 Reservoir	1 Small		25

*Attachment*

Japan International Cooperation Agency (JICA)

The Study  
on  
The National Irrigation Master Plan  
in  
The United Republic of Tanzania

**Questionnaire for Inventory Survey  
( Part 1)**

*This form is to be filled for each irrigation scheme*

"N.A." should be filled if the answer is not applicable

"-" should be filled if no answer is obtained.

**1 Information on Survey**

1101 Name of enumerator \_\_\_\_\_

1102 Survey period \_\_\_\_\_

1103 Professional category of enumerator \_\_\_\_\_

**2 General**

2101 Name of Scheme \_\_\_\_\_

2102 Type of Scheme

Traditional irrigation scheme,  Water-harvesting,

Modern irrigation scheme,  Improved traditional irrigation scheme

2103 Co-ordinates \_\_\_\_\_

2104 Ward \_\_\_\_\_

2105 District \_\_\_\_\_

2106 Region \_\_\_\_\_

2107 Zone \_\_\_\_\_

2108 No. of Village(s) in the scheme \_\_\_\_\_

2109 Name of Village(s) (for medium or small schemes only)

(1) \_\_\_\_\_ (2) \_\_\_\_\_

(3) \_\_\_\_\_ (4) \_\_\_\_\_

(5) \_\_\_\_\_ (6) \_\_\_\_\_

(7) \_\_\_\_\_ (8) \_\_\_\_\_

(9) \_\_\_\_\_ (10) \_\_\_\_\_

(11) \_\_\_\_\_ (12) \_\_\_\_\_

- 2110 No. of farmers in the commanding area \_\_\_\_\_  
2111 No. of farmers' organisation in the scheme \_\_\_\_\_

**3 Scheme History**

- 3101 Construction Year of the scheme: \_\_\_\_\_  
3202 Improvement/Rehabilitation Year of the scheme, if any: \_\_\_\_\_  
Project Name \_\_\_\_\_  
Financial source \_\_\_\_\_

3203 Are improvement / rehabilitation works being carried out ?

Yes  No  No answer

If yes, answer to the following questions:

- Project(Scheme) Name \_\_\_\_\_  
Financial source \_\_\_\_\_  
Period (year) : from \_\_\_\_\_ to \_\_\_\_\_

**4 Irrigation and Drainage**

**41 Physical Conditions**

4101 Problems/Reasons

For the existing scheme, describe the main physical problems envisaged if any.
For the abandoned scheme, describe the main physical reasons.

4102 Proposed Plan

Describe the proposals for rehabilitation/improvement of existing or abandoned schemes and for development of new scheme.

Rehabilitation/improvement of existing schemes.
Rehabilitation/improvement of abandoned schemes
Development of new schemes

4103 Location and Layout

Prepare a sketch of the project site using the 1:50,000 map, including present irrigation system and/or proposed works if possible.

4104 Topography

(1) Has a topographic survey been conducted for the scheme?

Yes     No     No answer

If yes, by whom has the survey been conducted ?

\_\_\_\_\_

(2) If topographic survey data are not available, try to estimate the following:

Area presently irrigated (ha.) : \_\_\_\_\_

Potentially Irrigable Area (ha.) : \_\_\_\_\_

Micro-relief : Regular/ Slightly Undulating/ Undulating/  
Broken

Average slopes : Flat (<0.5%) / Mild (0.5–2.0%) / Moderate  
(2.0 – 4.0%) / Steep (>4.0%)

4105 Soils

(1) Has a soil survey been conducted for the scheme?

Yes     No     No answer

If yes, by whom has the survey been conducted ?

\_\_\_\_\_

(2) If soil survey data are not available, answer to the following:

Prevalent Soil Types : Light (Sandy) / Medium(Loams) / Heavy(Clays)

Is drainage impeded by soil characteristics (such as waterlogging)?

Yes     No     No answer

Is there evidence of salinity/alkalinity problems?

Yes     No     No answer

If yes, reply to condition of salinity/alkalinity.

Serious,     Fair,     Little,     No answer

4106 Water Resources

(1) Has a hydrological study been carried out for the existing/proposed water resource?

Yes     No     No answer

If yes, when and by whom has the study been conducted ?

\_\_\_\_\_

(2) If no hydrological study reports are available, answer to the following:

Type of water resources: \_\_\_\_\_

Name of river: \_\_\_\_\_

Its catchment area at the existing/proposed intake site : \_\_\_\_\_

(3) Does a gauging station exist in the catchment or a neighboring catchment ?

Yes     No     No answer

If yes, describe its details in the following table:

Items	Description
Average annual rainfall	
Available flows	In wet season: _____ lit /sec. In dry season: _____ lit /sec.
Water quality	Electrical conductivity value in wet and dry seasons, if possible. In wet season : _____ In dry season : _____
Other water users	Number and size of abstractions upstream and downstream if possible. Upstream

	Number : _____, Size : _____ Downstream Number : _____, Size : _____ Is there any water conflict? ( ) Yes, ( ) No, ( ) No answer If yes, reply to the following: When : _____ Why : _____
Present Water Right	For existing/abandoned schemes, is there a water right? ( ) Yes, ( ) No, ( ) No answer If yes, reply to the following: Officially registered : ( ) Yes, ( ) No Traditional: ( ) Yes, ( ) No If yes, amount of water right: _____

4107 Drainage and Floods

(1) Is the existing/proposed irrigable area inundated by floods in wet season?

Yes     No     No answer

(2) If yes, identify the following:

Cause of flood : \_\_\_\_\_

Area affected by flood : \_\_\_\_\_

Frequency of flood : \_\_\_\_\_

4108 Guidelines for Describing Existing/Proposed Works

(1) Dam

Capacity of Reservoir		Mill.m3		Inundated Area		ha.	
Height		m		Length		m	
Type				Volume		m3	
Construction Cost(as of when)		Tsh. ( )		Name of Contractor			
Availability of Construction Materials (Good/Fair/None)							
Rock		Earth(fill)		Sand		Gravel	
						Clay	
							River Bed
Abutment Slope in Left Bank				%		Abutment Slope in Right Bank	
						%	
Responsibility of O&M						Annual Cost for O&M	
						Tsh	
Remarks							

If possible, prepare a sketch with a plan and a cross section of the river at the existing/proposed dam site on a separate sheet.

(2) Intake (Diversion Weir)

Height		m	Length		m
Construction Material			Gate (s)		
Construction Cost (as of when)	Tsh.	( )	Name of Contractor		
Responsibility of O&M			Annual Cost for O&M	Tsh.	
Remarks					

If possible, prepare a sketch with a plan and a cross section of the river at the existing/proposed intake site on a separate sheet.

(3) Pump Station

Type of Pump		Capacity		lit/sec.
Net Head		m	Power source	
Delivery Pipe	(material)		(length) m	(diameter) mm
Construction Cost (as of when)	Tsh.	( )	Name of Contractor	
Responsibility of O&M			Annual Cost for O&M	Tsh.
Remarks				

If possible, include prepare with a plan and a cross section of the river at the existing/proposed pump site on a separate sheet.



(4) Wells

Type of Well		Capacity	lit/sec.
No. of Wells		Groundwater Level	m
Method of Lifting		Power source	
Type of Aquifer			
Dimension of Well	(material)	(depth) m	(diameter) mm
Construction Cost(as of when)	Tsh. ( )	Name of Contractor	
Responsibility of O&M		Annual Cost for the O&M	Tsh
Remarks			

(5) Major Canal

Top Width	m	Bottom Width	m
Depth	m	Length	m
Canal Gradient	%	Flow Capacity	lit/sec.
Construction Material		Lining (provided or not)	
Type of Excavation			
Rock	%	Weathered Rock	%
		Earth	%
		Others	
Construction Cost (as of when)	Tsh. ( )	Name of Contractor	
Responsibility of O&M		Annual Cost for O&M	Tsh
Remarks			

(6) Minor Canal

Top Width		m		Bottom Width		m	
Depth		m		Length		m	
Canal Gradient		%		Flow Capacity		lit/sec.	
Construction Material				Lining (provided or not)			
Type of Excavation							
Rock	%	Weathered Rock	%	Earth	%	Others	
Construction Cost (as of when)		Tsh. ( )		Name of Contractor			
Responsibility of O&M				Annual Cost for O&M		Tsh	
Remarks							

(7) On-Farm

Type of Irrigation				Irrigated Area		ha.	
No. of Farmers				Name of WUA			
Dimension of Minor Canal							
(type)	(width)	m	(length)	m	(depth)	m	
Construction Cost (as of when)		Tsh. ( )		Name of Contractor			
Responsibility of O&M				Annual Cost for O&M		Tsh	
Land Consolidation							
Land Levelling		( Yes / No )		Average Earth Movement		m <sup>3</sup> /ha.	
Remarks							

(8) Drainage System

Existence of Drainage System	( Yes / No )	Drained Area	ha.
Dimension of Drainage Canal			
(type)	(width) m	(length) m	(depth) m
Construction Cost (as of when)	Tsh. ( )	Name of Contractor	
Who perform its O&M		Annual Cost for the O&M	Tsh
Remarks			

(9) Access Road

Existence of Access Roads	( Yes / No )	Covered Area	ha.
Traffic Volume (No. of cars and parsons/day)		Distance to all-weather road	km.
Dimension of Road	(material)	(length) m	(width) m
Construction Cost(as of when)	Tsh. ( )	Name of Contractor	
Who perform its O&M		Annual Cost for the O&M	Tsh
Remarks (include present condition of the road)			

## 5 Agriculture and Land Use

## 51 Cultivation Area in last 3 years

Year and Season	Paddy	Upland Crops
2001 Dry	ha	ha
2000/01 Wet	ha	ha
2000 Dry	ha	ha
1999/00 Wet	ha	ha
1999 Dry	ha	ha
1998/99 Wet	ha	ha
1998 Dry	ha	ha

## 52 Crop Production

Kind of crop	Area cropped	Average Yield	Irrigated or Rainfed	Water source if irrigated
(1)				
(2)				
(3)				
(4)				
(5)				

## 53 Farming Calendar

Wet season Paddy	from		to	
Dry season Paddy	from		to	
Upland Crops				
1.	from		to	
2.	from		to	
3.	from		to	
4.	from		to	

## 54 Land Tenure (Farm Size Distribution)

Land hold (ha)	Area (ha)	Number of Farmer
Tenant		
0-1		
1-3		
3-5		
5-10		
10-20		
20-50		
50-100		
100-		
Total		

**55 Land Capability for Irrigation and Crop Suitability**

Soil Type	Land capability for irrigation	Paddy	Crop suitability			
			Upland Crop			
			(1)	(2)	(3)	(4)

**56 Major Constraints in Crop Production**

Problems/Difficulties	Solutions/Measures Suggested	Remarks

**6 Farmers Supporting System**

**61 Post Harvest**

Crop	Harvest Method	Storage Method	Storage Facility	Selling Method
(1)				
(2)				
(3)				
(4)				
(5)				

**62 Input Supply**

Kind of Input	Obtained from where	Purchasing Method	Availability and Source of Loan	Availability of Subsidy
Fertilizer				
Chemical				
Machinery				
Others ( )				

**63 Extension Service**

1) Are you a member of any organizations or cooperatives?	
2) Which organization provides you with technical assistance?	
3) How frequently do you have technical assistance?	
4) What kind of support do you get from them?	

**7 Farmers' Organization (FO)**

**71 General**

- 7101 Name of FO \_\_\_\_\_
- 7102 Name of schemes covered by FO (1) \_\_\_\_\_  
 (2) \_\_\_\_\_  
 (3) \_\_\_\_\_  
 (4) \_\_\_\_\_
- 7103 Number of D-canals covered by FO \_\_\_\_\_

**72 Institution**

- 7201 No. of Field canal Groups, if any \_\_\_\_\_
- 7202 Date of formation \_\_\_\_\_
- 7203 Is the FO registered under Cooperative Act or Association Act ?

(a) Cooperative Act

Yes  No  No answer

If yes, answer to the following questions

Registration number \_\_\_\_\_

Date of registration \_\_\_\_\_

(b) Association Act

Yes  No  No answer

If yes, answer to the following questions

Registration number \_\_\_\_\_

Date of registration \_\_\_\_\_

- 7204 Present number of members of FO M \_\_\_\_\_ F \_\_\_\_\_
- 7205 Total No. of farmers within FO area \_\_\_\_\_
- 7206 Total number of non-farmers within FO area \_\_\_\_\_
- 7207 Do you have federation of FOs ?

Yes  No  No answer

**73 Office Bearers**

7301 Office bearers

	Available	Not Available	No answer
Leader	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Secretary	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treasurer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Auditor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## 7302 Selection of office bearers

	Open election	Secret ballot	Consensus	No answer	N.A.
Leader	( )	( )	( )	( )	( )
Secretary	( )	( )	( )	( )	( )
Treasurer	( )	( )	( )	( )	( )
Auditor	( )	( )	( )	( )	( )

## 7303 Frequency of election of office bearers

- ( ) Yearly  
 ( ) Every two years  
 ( ) Others \_\_\_\_\_  
 ( ) No answer

## 7304 Do existing committees have subcommittees?

( ) Yes ( ) No ( ) No answer

If yes, answer to the following questions :

What kind of subcommittees are organised in FO ?

- ( ) Water management  
 ( ) Agriculture  
 ( ) Marketing  
 ( ) Women's' affairs  
 ( ) Others \_\_\_\_\_  
 ( ) No answer

## 74 Activities

## 7401 Frequency of meetings

	Weekly	Monthly	Quarterly	Half Yearly	Yearly	According to needs	No meeting	No answer
General meeting	( )	( )	( )	( )	( )	( )	( )	( )
Committees	( )	( )	( )	( )	( )	( )	( )	( )
F canal Group	( )	( )	( )	( )	( )	( )	( )	( )

## 7402 Is a result of discussion documented?

	Always documented	Documented according to needs	Not Documented	No answer
General meeting	( )	( )	( )	( )
Committees	( )	( )	( )	( )
Field canal Group	( )	( )	( )	( )

## 7403 Issues discussed and decision made (Multiple answers, give 3 main topics)

- ( ) Water Shortage  
 ( ) Drainage problems  
 ( ) Encroachment problems

- ( ) Broken structures
- ( ) Illicit tapping
- ( ) Poor participation in O&M
- ( ) Land disputes
- ( ) Marketing problems
- ( ) Stray cattle problem
- ( ) Pests & diseases
- ( ) Irrigation service charge
- ( ) Change of by-laws and regulation
- ( ) Others \_\_\_\_\_
- ( ) No answer

7404 Problems in conducting effective general meetings (Multiple answers)

- ( ) Poor participation of farmers
- ( ) Poor participation of officers
- ( ) Farmers pay less attention on issues discussed
- ( ) Farmers bring minor issues for general meetings
- ( ) Some issues remain unsolved even after several discussions
- ( ) Poor knowledge on writing good minutes and submission
- ( ) Insufficient capability to conduct meetings smoothly
- ( ) Lack of time to have meetings
- ( ) Others \_\_\_\_\_
- ( ) No answer

7405 Describe leader's opinion to improve the quality of meetings

\_\_\_\_\_

\_\_\_\_\_

7406 Have by-laws and regulations been adopted ?

Yes     No     No answer

7407 Collection of O&M fee

(1) Is registration fee collected ?

Yes     No     No answer

If yes, answer to the following questions

Person collecting the fee \_\_\_\_\_

Amount to be paid \_\_\_\_\_

(2) Is monthly / annual membership fee collected ?

Yes     No     No answer

If yes, answer to the following questions

Person collecting the fee \_\_\_\_\_

Amount to be paid \_\_\_\_\_

No. of farmers paid in this year \_\_\_\_\_

(3) Does FO have a bank account ?



- No, Cash in hands only
- Yes
- Others \_\_\_\_\_
- No answer

(4) Is a book-keeping prepared ?

Yes     No     No answer

If yes, answer to the following questions

Person collecting the fee \_\_\_\_\_

Amount to be paid \_\_\_\_\_

No. of farmers paid in this year \_\_\_\_\_

7408 Linkage to other agencies / FOs

	Excellent	Good	Fair	Poor	No answer
Zonal Irrigation Office (ZIO)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Basin Water Office (BWO)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Central Water Board (CWB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
District	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ward	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Village	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non Governmental Organisation (NGO)					
Other FO	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**75 Training**

7501 Present situation

Description	available and satisfactory	available but unsatisfactory	not available	No answer
O & M	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accounting System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paddy Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Upland Crops Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7502 Future requirement

Description	Needed	Not needed	No answer
O & M	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Accounting System	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water Management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paddy Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Upland Crops Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**8 O & M of Irrigation Scheme**

**81 Operation**

8101 Daily water distribution is carried out by :

	Completely by FO	Completely by Village Govern	Joint operation by Village G & FO	No answer
Intake	( )	( )	( )	( )
Main Canals	( )	( )	( )	( )
Minor Canals	( )	( )	( )	( )
Field Canals	( )	( )	( )	( )

8102 Is a cultivation meeting held ?

Yes  No  No answer

8103 Problems faced in obtaining water (Multiple answer)

- Insufficient water resources
- Imbalance water supply between fields
- Too much water in fields
- Defects in the irrigation system
- Illicit tapping
- Poor drainage
- Poor maintenance
- Others \_\_\_\_\_
- No answer

**82 Maintenance Works**

8201 Who identifies the place to be repaired / rehabilitated ?

	Farmers	Farmers leader	Government Officials	Joint Operation	No answer	N.A
Intake	( )	( )	( )	( )	( )	( )
Main Canals	( )	( )	( )	( )	( )	( )
Minor Canals	( )	( )	( )	( )	( )	( )
Field Canals	( )	( )	( )	( )	( )	( )

8202 Methods to identify the maintenance work (multiple answers possible)

- Walk through surveys with Officials and farmers in the area
- through surveys by Irrigation Officers
- Gather request from farmer
- After discussion of FO meetings
- Individual farmer directly goes to the officials
- Others \_\_\_\_\_
- No answer

8203 Involvement of farmers in the maintenance work (Multiple answers)

- Clearing of intake

- Desilting of canals
- Clearing of canals
- Bank forming of canals
- Repair of canal structures
- Cleaning of drainage canals
- Others \_\_\_\_\_
- No answer

8204 Major reasons to deteriorate the system (Multiple answers)

- Poor maintenance
- Damages by wild animal
- Over discharge of canal
- Encroachment of reservation area
- Illegal tapping of water
- Damages by farmers
- Floods
- Illegal cultivation
- Others \_\_\_\_\_
- No answer

8205 Is regular maintenance carried out before water issue ?

<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> No answer
------------------------------	-----------------------------	------------------------------------

If yes, answer to the following questions

- every cultivation
- every year
- once in several years
- no maintenance
- Others \_\_\_\_\_
- No answer

8206 Government' support in O&M by (Multiple answers)

- Zonal Irrigation Office (ZIO)
- Basin Water Office (BWO)
- District
- Ward
- Village
- Others \_\_\_\_\_
- No answer

8207 Present Involvement of Government officials in O&M

Description	available and satisfactory	available but unsatisfactory	not available	No answer
Preparation of annual maintenance programme	( )	( )	( )	( )
Execution of annual maintenance programme	( )	( )	( )	( )
Collecting irrigation service charge	( )	( )	( )	( )
Awareness on O&M to farmers	( )	( )	( )	( )
Collection of information on O&M	( )	( )	( )	( )

Organise O&M	( )	( )	( )	( )
O&M of field canals	( )	( )	( )	( )
O&M of main and minor canals	( )	( )	( )	( )
Settlement of irrigation disputes	( )	( )	( )	( )
Carry out irrigation rotation	( )	( )	( )	( )
Settle stray cattle problem	( )	( )	( )	( )
Impose legal powers	( )	( )	( )	( )

8208 Future Involvement of Government officials in O&M

Description	Needed	Not needed	No answer
Preparation of Annual Maintenance Programme	( )	( )	( )
Implementation of annual maintenance programme	( )	( )	( )
Collecting irrigation service charge	( )	( )	( )
Awareness on O&M to farmers	( )	( )	( )
Collection of information on O&M	( )	( )	( )
O&M of field canals	( )	( )	( )
O&M of main and minor canals	( )	( )	( )
Settlement of irrigation disputes	( )	( )	( )
Carryout irrigation rotation	( )	( )	( )
Settle stray cattle problem	( )	( )	( )
Impose legal powers	( )	( )	( )

8209 Rehabilitation work by FO

Is there any contracts for improvement / rehabilitation between the Government and and FO ?

Yes     No     No answer

If yes, answer the following questions:

(1) Approximate contract amount Tsh. \_\_\_\_\_

(2) Who carries out the work

- by the FO Chairman
- by the FO Secretary
- by the FO Treasurer
- by farmers in the area
- by a trader in the area
- by an outside contractor
- by government officials
- Others \_\_\_\_\_
- No answer

(3) What kind of works is undertaken ?

- Repair of irrigation canal
- Repair of irrigation structures
- Repair of gates
- Others \_\_\_\_\_

( ) No answer

8210 Annual O&M budget

by Government

Tsh. ....

by FO

Tsh. ....

**83 Settlement of irrigation disputes**

Description	Discuss at FO Meetings	Representative of farmer attend	Discuss with the Govn't Officials	Take legal action	No answer
1 Irrigation disputes	( )	( )	( )	( )	( )
2 Water Shortages	( )	( )	( )	( )	( )
3 Broken structures	( )	( )	( )	( )	( )
4 Illicit Tapping	( )	( )	( )	( )	( )
5 Poor participation of meetings	( )	( )	( )	( )	( )
6 Encroachment	( )	( )	( )	( )	( )

**9 Environment**

**91 River water quality**

- ( ) Serious
- ( ) Fair
- ( ) Little
- ( ) Good /No Problem
- ( ) No answer

**92 Sedimentation in reservoir**

- ( ) Serious
- ( ) Fair
- ( ) Little
- ( ) Good /No Problem
- ( ) No answer

**93 Water-borne diseases**

- ( ) Serious
- ( ) Fair
- ( ) Little
- ( ) Good /No Problem
- ( ) No answer

Japan International Cooperation Agency (JICA)

The Study  
on  
The National Irrigation Master Plan  
in  
The United Republic of Tanzania

**Questionnaire for Inventory Survey**  
( Part 2: Irrigation Development Activities by Local Government (District) )

*This form is to be filled for each irrigation scheme*

"N.A." should be filled if the answer is not applicable

"-" should be filled if no answer is obtained.

**1 Information on Survey**

- 101 Name of enumerator \_\_\_\_\_  
102 Survey period \_\_\_\_\_  
103 Professional category of enumerator \_\_\_\_\_

**2 General**

- 201 Name of interviewed (your) district \_\_\_\_\_  
202 Name of region \_\_\_\_\_  
203 Name of interviewee \_\_\_\_\_  
204 Position of the interviewee in the district office \_\_\_\_\_  
205 Name of section in the district office which deals with irrigation development  
\_\_\_\_\_
- 206 Number of staff of the district concerning to irrigation development  
\_\_\_\_\_
- 207 What are activities taken by your irrigation section ? (If yes, put  $\checkmark$ )  
( ) Planning for village irrigation schemes  
( ) Construction for village irrigation schemes  
( ) Financial support for the scheme implementation  
( ) Technical assistance for villagers on their irrigation practice  
( ) Arbitration of farmers' conflict in irrigation water use  
Others \_\_\_\_\_
- 208 How much of annual district's budget was allocated for the activities in irrigation development in 2000/01 ?  
\_\_\_\_\_

**3 Information on Irrigated Condition in the District**

Hereinunder, salient features of village irrigation schemes are inquired. Village irrigation scheme means smaller irrigation system operated by villagers, excluding irrigation schemes being in the hand of zonal irrigation office concerned.

301 Fill out blanks for on-going village irrigation schemes concerning to your district office.

Irrigation Type	Number of village schemes	Total irrigated area (ha.)	Major crops harvested
Offtaking water from streams by weirs			
Storage water by impounding			
Water harvesting			
Lifting groundwater by pumps			
Watering by springs etc.			

302 Fill out features of village irrigation projects supported by donors or NGOs, if any.

Name of village irrigation project	Number of village schemes implemented under the project	Name of Donor or NGO supported

303 Fill out blanks for planning village irrigation schemes concerning to your district office.

Irrigation Type	Number of village schemes	Total irrigated area (ha.)	Major crops harvested
Offtaking water from streams by weirs			
Storage water by impounding			
Water harvesting			
Lifting groundwater by pumps			
Watering by springs etc.			

304 Fill out features of village irrigation schemes planned to be supported by donors or

NGOs, if any.

Name of village irrigation project	Number of village schemes implemented under the project	Name of Donor or NGO concerned

305 Fill out blanks for future potential of village irrigation scheme implementation concerning to your district office.

Irrigation type	Number of village schemes	Total irrigated area (ha.)	Major crops harvested
Offtaking water from streams by weirs			
Storage water by impounding			
Water harvesting			
Lifting groundwater by pumps			
Watering by springs etc.			

**4 Others**

401 What are major constraints of district in irrigation promotion by farmers initiatives ?

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402 What is desire for zonal irrigation office or central government for your convenience of irrigation promotion ? If identified, write down below.

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403 Others (If you have opinion on irrigation development, write down below.)

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***Appendix B***  
***Macro-economy, Government Policies and***  
***Aid Policies of Donors***

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

**MASTER PLAN**

**APPENDIX B**

**MACRO-ECONOMY, GOVERNMENT POLICIES, AND AID POLICIES OF  
DONORS**

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## APPENDIX B

### MACRO-ECONOMY, GOVERNMENT POLICIES, AND AID POLICIES OF DONORS

#### CHAPTER 1 MACRO-ECONOMIC SITUATION

##### 1.1 General

Zanzibar became independent on 10 December 1963, two years after mainland Tanganyika. A declaration of unity with Tanganyika was signed on 12 April 1964 and the two countries now constitute the United Republic of Tanzania. Zanzibar consists of two islands, Unguja and Pemba, and a number of sparsely populated small islands, with total land area of 2,643 km<sup>2</sup> (Unguja 1,658km<sup>2</sup>, Pemba 985km<sup>2</sup>). (United Nations "Common Country Assessment") The 1988 census estimated a population of 641,000. Table below shows future population by district. Total population will be 1,486 thousand with average annual growth at 3.30% between 2015 – 2020.

**Projected Population by District**

	1995	Growth Rate	2000	Growth Rate	2005	Growth Rate	2010	Growth Rate	2015	Growth Rate	2020
North A	70,000	2.22%	78,000	2.22%	87,000	2.22%	97,000	2.22%	109,000	2.22%	121,000
North B	44,000	2.53%	50,000	2.53%	57,000	2.53%	64,000	2.53%	73,000	2.53%	82,000
Central	61,000	4.29%	75,000	4.29%	92,000	4.29%	114,000	4.29%	141,000	4.29%	174,000
South	28,000	1.41%	30,000	1.41%	32,000	1.41%	34,000	1.41%	37,000	1.41%	39,000
West	72,000	5.02%	92,000	5.02%	117,000	5.02%	150,000	5.02%	191,000	5.02%	244,000
Town	203,000	3.67%	243,000	3.67%	291,000	3.67%	348,000	3.67%	417,000	3.67%	499,000
Wete	91,000	2.63%	104,000	2.63%	118,000	2.63%	135,000	2.63%	154,000	2.63%	175,000
Micheweni	71,000	2.22%	80,000	2.22%	89,000	2.22%	99,000	2.22%	111,000	2.22%	123,000
Chake Chake	71,000	2.43%	80,000	2.43%	90,000	2.43%	102,000	2.43%	115,000	2.43%	129,000
Mkoani	82,000	2.74%	93,000	2.74%	107,000	2.74%	122,000	2.74%	140,000	2.74%	160,000
<b>Total</b>	<b>793,000</b>	<b>3.13%</b>	<b>925,000</b>	<b>3.17%</b>	<b>1,080,000</b>	<b>3.21%</b>	<b>1,265,000</b>	<b>3.26%</b>	<b>1,488,000</b>	<b>3.30%</b>	<b>1,746,000</b>

*(Source: National Land Use Plan Planning Policies October 1994 Dept. of Statistics)  
Population Data are rounded by JICA Study Team*

About 60% of the people live in Unguja and 40% live in Pemba. 58.2% live in rural areas and 23.9% in the coral rag areas. According to National Land Use Plan prepared in 1994, there are migration movements, from Pemba to Unguja, from rural areas to urban areas and deep soil areas. This unbalance migration and subsequent population distribution can be attributed to the unbalanced economic opportunity distribution between Unguja and Pemba, rural and urban, and deep soil and coral rag.

In 1988 the government launched its first economic recovery programme (FERP), then in 1992 the second economic recovery programme (SERP), which

transformed the economy to a progressively reliance on market mechanism and private initiative, complementing the reforms of the Union government. But when the Union government came to terms with IMF to introduce structural adjustment, Zanzibar's economy was in a severe economic downturn, due mainly to the collapse of the export price of clove, which had contributed almost the whole of Zanzibar's export earnings.

Mr. Salmin Amour, following the victory in the first multiparty elections in 1995 for his second term presidency, which is widely held to have been fraudulent, began suppression of the main opposition political party. This led to regular outbreaks of politically motivated violence and the suspension of most bilateral foreign aid to Zanzibar. Again following the disputed elections in October 2000, political tensions between the ruling party and the opposition party escalated, which ultimately exploded into violent clashes between the security forces and the supporters of the opposition party over the weekend of January 27 – 28, 2001 resulting in several people's deaths. Shocked by the clashes, talks to resolve the crisis began and reached a conclusion and agreement between the parties in mid-October 2001 to seek for long-term solution to the crisis.<sup>1</sup> Many bilateral donors boycotted their aid to Zanzibar from 1995 to 2000, although multilateral donors (World Bank, ADB and Gulf states) continued to provide aid to minimize the macro level impact of "aid-boycott" by bilateral agencies.<sup>2</sup>

## **1.2 Development Policy Framework**

### **1.2.1 Overall Policy Framework**

#### **(1) Zanzibar Vision 2020**

To disclose its commitment to eradicate absolute poverty in the country, the government prepared the Zanzibar Vision 2020 in January 2002 and as its implementation plan the government prepared Zanzibar Poverty Reduction Plan (ZPRP) at the same time.

The immediate economic policy of the government is aimed at boosting economic growth and breaking out of poverty trap in a setting of improved macroeconomic stability. This follows the commitment of the government to withdraw from direct involvement in the production sector and allow for the private sector to be the principal agent of the economy. The budgetary mechanisms are aimed to facilitate the transformation of these ideas. The long-term development goal of the

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<sup>1</sup> EIU Country Profile 2001

<sup>2</sup> United Nations Common Country Assistance for Zanzibar July 2001

government is to build a strong, diversified, resilient and competitive economy which can effectively cope with challenges of development and confidently adopt to the changing market and technological conditions in the world economy.

With regard to the diversification and transformation of the economy, the Vision notes that “the process of economy’s diversification should be directed at the modernization of agriculture, tourism, fishing and the strengthening of industry, internal and international trade sector.” Especially, improvement of agricultural infrastructure and development of crop production is seemingly highest priority (both export crop and food crop). Measures for promotion of crop production adopted in the Vision are as follows:

- To encourage sustainable irrigation system based on integrated development approach, community participation, genuine demand by farmers and sustainable use of natural resources and the environment.
- Provide access to productive resources, opportunities and progress towards more socially just forms of agriculture for ensuring basic food security for the country by improving standards of nutrition, increasing output and quality of food commodity.

## (2) Zanzibar Poverty Reduction Plan (ZPRP)

To achieve the goals of the Vision, the government prepared ZPRP in January 2002, not only as an implementing plan and strategies of Zanzibar Vision 2020, but also as its operational plan based on the utilization of the country’s financial resources as well as providing a climate to attract external resources. Guiding principles of ZPRP are as follow:

- enhanced role of the market in allocating resources;
- private sector led development;
- enhanced government’s competence and role in providing leadership through public policy for economic and social stability;
- continuity and predictability of the environment in which socio-economic decisions are taking place.

Specific achievements by 2020 envisaged in ZPRP are as follows:

- To attain a high and sustainable economic growth. Expected average growth: 5 – 6% between 2000 and 2005; rising to 7 – 8% by 2010; and reaching to 9 – 10% by 2020.
- To realize high level of employment in the modern sector: 50% in tourism and free zones; 20% in agriculture; and 30% in all other sectors.
- Per capita income: from current level of US\$ 200 per annum (US\$ 177 in

2000) to that of middle-income countries.

- To diversify the country's economy and transfer to semi-industrialized with combined contribution of tourism, trade, manufacturing and construction to total GDP over 60%.
- To improve quality of life. Life expectancy should have risen from 48 to 65 years. To improve and maintain high education standards and promote skill development cost effectively. To attain universal education by raising the primary school enrollment from 84.2% in 1997 to 100% by 2005. The transition rate to the second cycle of secondary education should reach 100% by 2020.

### 1.2.2 Agriculture Sector Policy

A new Agriculture Sector Policy was formulated in February 2000 by the Ministry of Agriculture, Natural Resources, Environment and Cooperatives (MANREC) with the assistance of FAO. In this new policy the role of the Ministry will be confined to public support functions, policy implementation and management and promotion of an enabling environment for private sector production sector, trade and investment. Farmers, fisheries and entrepreneurs will carry out all commercial activities. As the government has decided to concentrate its efforts in the fight against poverty as articulated in the targets of ZPRP, the government needs to tackle challenges in agriculture which will have a greatest impact on the country's poverty reduction. Those challenges in agriculture are as follow:

- Low level of technology in use (hand hoe, low yield varieties).
- Unsupportive land tenure system.
- Insufficient access to key resources and services such as inputs, credit, extension services.
- Limited market access for agricultural produce.
- Lack of capacity to process agricultural produce locally.
- Dependence on rain-fed agriculture.
- Unsupportive rural infrastructure (feeder roads, ports, etc.)

In view of the prevailing policies and above constraints, ZPRP put the highest priority on the following activities associated with agricultural sector:

- Community based projects for both empowerment and meeting community determined priorities;
- Agriculture and natural resources projects which strengthen extension, provide improved planting material for pest and disease resistant food crops, develop workable credit schemes and improve involvement of farmers, fishermen in development processes, micro and small scale enterprises development

schemes through appropriate NGO and private sector sources.

In order to increase productivity in the agricultural sector (crops, livestock, fisheries and forestry), promotion of investment in rain harvesting structure and systems is pointed out in ZPRP as specific actions required. Thus, development of agricultural investment programme is called for, and irrigation (or water management) is a priority component in the programme.

### 1.2.3 Zanzibar National Water Policy (ZNWP)

The government prepared the draft ZNWP in 1999. The objective of the ZNWP is to provide guidance on access to clean and safe water for all people and other water users to fulfill the needs of expanding social and economic activity. To achieve this objective, the following goals were set:

- Public ownership of resources to ensure that all Zanzibaris have access to this resource all the time;
- Protection of water resources and quality and use in accordance with conservation principles;
- Inter-sectoral linkages for coordinated resource development and management;
- Definition of the roles of different stakeholders including beneficiaries, donors, ministries and institutions;
- Development and provision of water supply and sanitation in a sustainable manner, with a demand responsive outlook; and
- Institutional development and local capacity building.

Taking into consideration these goals, the government elaborated the five issues including policies and strategies for future water resources management. Of these, the following are closely related to irrigation development:



### Major Issues, Policies and Strategies Relevant to Irrigation Development

Issue	Policy	Strategy
(1) Ownership of water resources	Water is a basic resource which shall remain public all the time.	- Establishment of Water Resources Management Board (WRMB).
(2) Satisfaction of basic need for water	Priority in use of water resources is given to satisfaction of basic needs of the population.	- Water allocation by the WRMB. - Cross subsidy in tariff structure in favour of domestic category.
(3) Water funds	Self-financing by water institutions is applied.	- Collection of revenue from the consumers - Donor finance for transition period - Introduction of local loans - Government subsidies for transition period - Encouragement of community contribution - Execution of concession agreements
(4) Environmental protection	Development of water resources should not be harmful to environment.	- Setting regulations in respect of water against any pollution. - Setting up standards and technical procedures to be used in water abstraction - Systematic collection and compilation of data related to water issue. - Issuing of water rights and granting permits for water exploration and abstraction.
(5) Water as an economic and social good	Water should be always recognized as an economic good as well as social good.	- Promotion of economic growth, poverty alleviation and improvement of public health. - Appropriate water resource allocation based on maximization of benefits to community and fair share to users by integrated approach. - Water resources management in promotion of conservation and no negative environmental impact. - Participation and integration of various social and economic sectors. - Promotion of more commercial operational principles and increased autonomy to responsible institutions.

Source: the ZIDP

The draft ZNWP also sets the responsibilities for the relevant sectors. The responsibilities given to the MANREC on irrigation development are as follows:

- Develop water resources for irrigation.
- Control water use in all irrigation systems in accordance with the laid down water rights and regulations as provided by the WRMB.
- Provide statistics on water requirements for all agricultural activities.
- Raise awareness of farmers on proper use of land, proper care of sources of water, forestry, and their environmental protection.
- Promote use of surface water for irrigation activities.
- Encourage private participation in harvesting and storage of rainwater for agricultural purposes.

#### 1.2.4 Environmental Policy

A comprehensive environmental study was conducted by the Zanzibar Integrated Lands and Environmental Management Project in 1990, and the results were compiled into a report titled *An Environmental Policy and Programme for Zanzibar*. The report was finalized in 1991, following modification of the policy and its adoption by the Zanzibar Revolutionary Council.

The report pointed out the need for preparation of an integrated land use plan to contribute to the protection of the environment by working out a well-balanced zoning of land and resources for appropriate uses. Emphasis was placed on the need to improve the management of rural lands, which is highly related to irrigation development. The report also indicated the need to control environmental factors on public health problems to reduce health risks related to irrigation and stagnant water. Furthermore, the report revealed the legislation of lands since Zanzibar has a complex land tenure system and land tenure had a profound influence on how people look after their lands. Security of tenure could encourage farmers to control soil erosion.

In order to maintain sound environment conditions, the report proposed the following activities:

- Maintain a well organized environmental information bank.
- Provide an environmental input into planning process based on a national environmental policy.
- Monitor the state of environment and organize research.
- Tackle immediate environmental problems and stimulate others to action for environmental protection.
- Promote awareness of, and training in, environmental issues.

The Environmental Management for Sustainable Development Act was prepared in 1996. The Act aims to

- (a) maintain basic ecological process of land, water and air
- (b) ensure the environmentally sound and healthy quality of life of the people of Zanzibar, present and future
- (c) promote the sustainable use of renewable natural resources
- (d) promote the rational use of nonrenewable natural resources
- (e) preserve the biological and cultural diversity of Zanzibar's lands and seas; and
- (f) strengthen the institutional capabilities for protecting the environment.

Of these, items (a) and (c) are closely related to irrigation and need to be considered in the planning and design of the irrigation development.

### 1.3 Recent Overall Economic Performance

Overall problem of the government economic management has been the sharp swing of the performance of agriculture sector (crops, fishing and livestock), which accounts for between 32 to 35% of GDP, employs more than 60% of the population, especially in rural areas, and is dominated by clove production. Although unstable, GDP growth rate picked up to an average of 4.0% per annum during 1990 – 2000; and further moderate recovery is seen in its recent annual GDP growth rate; 4.5% in 1999 and 4.0% in 2000. But GDP growth did not result in any substantial change in per-capita income both in Tsh and US\$ basis, as seen in the table below. Zanzibar needs concerted efforts to address poverty problem. Inflation in Zanzibar fell sharper than the Mainland since 1998. Inflation rate is declining from 29.0% in 1995 to 6.5% by the end of 2000. This has been achieved largely through reduced domestic financing in pursuit of tight fiscal policy.

**Major Economic Indicators**

Description	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
GDP at constant (1985) prices (Tsh. mil)	3,315	3,854	4,881	5,010	5,240	6,759	7,241	7,540	7,578	7,917	8,607
Real GDP growth (%)	3.4	4.8	3.0	3.3	3.5	5.2	7.2	4.1	0.5	4.5	4.2
Per capita GDP at factor cost (thousand Tsh)	15	26	48	59	74	103	130	149	152	159	178
(US\$)	98	102	110	135	147	166	218	238	234	216	222
Consumer price change (% change, year on year)	40.7	26.3	20.0	23.2	222.9	29.0	18.7	12.7	8.0	5.5	6.5
Population (thousand)	680	700	722	744	765	787	811	835	861	887	916
<b>Sectoral Contribution (%)</b>	<b>1990</b>	<b>1991</b>	<b>1992</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>
Agriculture, Livestock & Natural Resources	48.4	48.1	42.9	43.2	37.9	40.9	40.4	39.7	36.9	38.1	36.4
Manufacturing	7.9	6.5	6.3	5.0	5.7	5.9	5.7	6.0	6.1	5.9	5.7
Water and Power	1.3	1.4	1.2	1.4	1.4	1.5	1.4	1.3	1.3	1.8	1.5
Construction & Quarrying	3.8	6.4	10.4	10.6	14.4	10.8	10.5	10.4	8.3	7.6	3.9
Trade & Tourism	25.0	24.6	25.9	27.3	30.2	19.8	20.7	19.8	20.0	21.0	20.0
Transport & Communication	1.4	1.8	2.5	2.8	3.4	3.9	5.3	5.3	5.1	5.5	6.0
Finance & Insurance	2.0	5.0	4.5	3.5	3.1	4.2	3.6	2.2	2.4	3.3	3.3
Public Administration & Others Services	15.2	15.0	15.3	17.1	17.3	18.5	18.5	20.9	24.4	21.9	23.0
Less: Bank Charges	-5.0	-1.8	-1.6	-2.2	-1.8	-1.6	-1.1	-0.4	-0.1	-1.2	-0.1

(Source: Annual Plans 1990/91 – 2000/01 Ministry of Planning and Investment)

### 1.4 Sectoral Performance Review

#### 1.4.1 Overall Review

Agriculture sector used to take nearly half of Zanzibar's total GDP; in 1990, for instance, the sector's contribution was 48.4%. There is a clear diminishing trend over the years in the sector's contribution; in 2000 it is 36.4%. The most positive aspect of the development of total GDP has been the sustained growth of other sectors, especially, non-clove sector, reflecting a pick up of demand of trade goods, strong growth in construction sector and tourism and service sector. By contrast,

the agriculture sector experienced and altering periods of growth and decline related to weather and price factors. However, the sector retains significant influence on the entire economy till now. For instance, in 1999 the agriculture sector grew at 7.0%, especially clove production boomed, and GDP bounced from 0.5% in 1998 to 4.5%. Table of GDP growth rates by sector is provided below:

**GDP Annual Growth Rates by Sector**

Sector	1995	1996	1997	1998	1999	2000
Agriculture	-1.0	13.1	-4.9	-4.5	7.0	-0.7
Mining and Quarrying	4.9	0.5	0.5	-6.3	-1.7	29.3
Manufacturing and Handicraft	6.7	5.1	3.6	-0.9	2.1	4.0
Electricity and Water Supply	6.7	11.3	10.3	7.9	9.7	4.8
Construction	6.6	4.0	3.8	19.8	4.7	14.9
Wholesale & Retail Trade, Restaurants and Tourism	11.8	16.6	13.6	9.5	5.5	5.8
Transport and Communications	13.5	0.6	8.2	7.3	7.4	3.1
Finance and Insurance	31.1	5.9	31.9	10.5	36.9	2.8
Public Administration and Other Services	1.6	1.5	1.5	1.5	1.5	1.5
GDP (Factor Cost)	5.2	7.1	4.1	0.5	4.5	4.2

(Source: ZPRP Background Paper Dept. of Statistics, Zanzibar)

#### 1.4.2 Agriculture Sector

Agriculture sector comprising of crops, livestock, fisheries and forestry, is the leading sector of the economy of Zanzibar. It contributes 36.4% of GDP in 2000, employs about 60% of total labor force and provides 30% of total tax revenue. In rural areas, most families rely on agriculture and fishing activities for their livelihood, hence the agriculture sector is among priority sectors in ZPRP.

Real GDP growth rate of agriculture sector was negative 0.7% in 2000, from a positive 7.0% in 1999. The reason of this low activity is mainly attributed to adverse weather conditions, which affected production of cash crops, especially cloves whose production declined by 77.0%. Seaweed production, second major export crop, also decreased by 24.5%.

**Main Indices of Agriculture Sector**

	1996	1997	1998	1999	2000
Value Added at current factor cost (Tsh. mil.)	42,531	49,596	48,306	53,879	59,385
Annual Real GDP Growth Rate (%)	13.1	-4.9	-4.5	7.0	-0.7
% of Agriculture in GDP at factor cost (%)	29.1	26.6	25.2	25.9	24.7

(Source: Bank of Tanzania Annual Report 2000/01)

In Zanzibar, a rich variety of spices is grown and clove is the most important export crop contributing over 50% of foreign exchange earnings. Fruits (particularly mango and rambutan), spices and essential oil crops have shown a high potential for export and are included in the crop diversification programme. Food crops cover about 60% of the total cultivated land. Common food crops

grown include cassava, rice, banana, sweet potatoes, legumes and maize. Production trend of food crops is given below.

### Production of Main Food Crops – 1990/91 – 1999/00

(unit: tons)

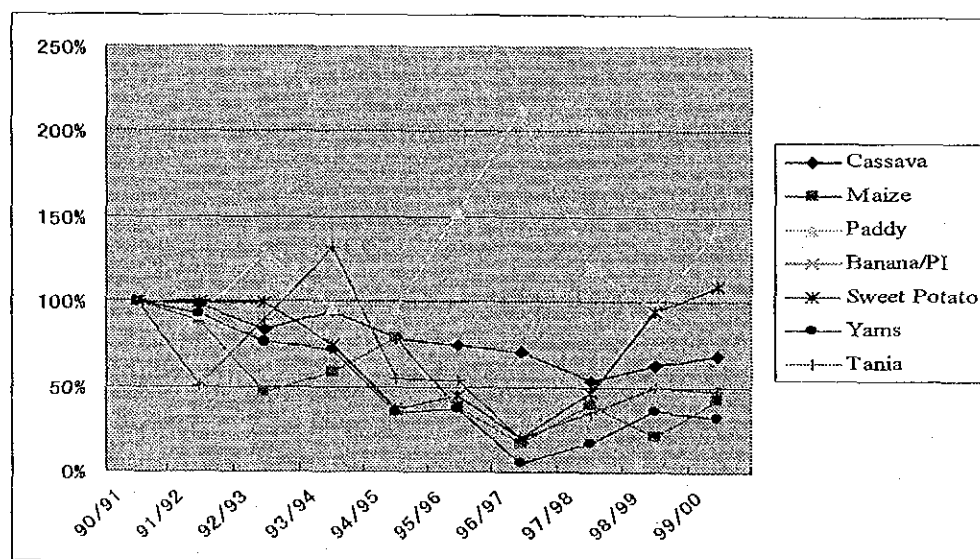
Crop	1990/91	91/92	92/93	93/94	94/95	95/96	96/97	97/98	98/99	99/00
Cassava	179,352	175,826	149,122	168,340	141,128	133,940	126,948	96,768	112,624	122,846
Maize	1,392	1,235	645	812	1,093	522	229	551	286	591
Paddy	12,186	11,258	15,580	11,690	11,719	18,607	26,045	14,462	11,741	17,542
Banana/PI	46,672	23,184	18,476	20,472	16,626	21,824	15,796	11,508	24,745	28,865
Sorghum	563	443	445	272	139	113	68	52	0	265
Sweet Potato	34,735	34,405	34,600	26,011	12,853	15,432	6,941	16,044	32,865	37,887
Yams	5,478	5,074	4,199	3,940	1,889	2,000	246	932	1,972	1,742
Tania	7,862	3,946	7,017	10,340	4,312	4,180	1,528	2,752	3,908	3,733
GC/Cow Peas	1,599	796	589	950	473	563	0	511	0	516
Pigeon Peas	261	206	133	208	97	125	90	132	28	34
Goundnuts	166	206	269	245	370	228	0	49	51	101
Total	290,266	256,579	231,075	243,280	190,699	197,534	177,891	143,761	188,220	214,122

(Source: MALNR, Zanzibar; Zanzibar Report on the Implementation of the World Food Summit Plan of Action)

A figure of annual production of seven major crops selected from those in the table above is shown below, from which the following developments are seen.

- 1) Moderate decreasing trend is seen for all crops, except paddy, till 1996/97.
- 2) Production volume of all crops are volatile yearly, especially paddy and maize.
- 3) Production of paddy and sweet potato in 1999/00 exceeded those in 1990/91, which is the base year; especially production of paddy is 44% over 1990/91. Production of other crops in 1999/00 are less than those in 1990/91.
- 4) Production of maize, yam, tania in 1999/00 are less than 50% of those in 1990/91, which is significant decrease.
- 5) While production volume of cassava is the largest in tonnage among the selected crops and its volatility is the least of all, moderate decreasing trend has not yet reverted.

### Major Food Crop Production



(Source: JICA Study Team)

### 1.4.3 Trade and Tourism

Since Investment and Liberalization Acts were endorsed in Zanzibar in the late 1980s, trade and tourism sector has become increasingly an income-generating sector. The most recent reform measures since FERP are as follows:

- Establishment of Zanzibar Investment Promotion Agency (ZIPA) in 1991 to promote Zanzibar as an investment center. ZIPA operates under Investment Act No. 2 of 1986.
- Initiation of selected Economic Zones for the production of goods for export under Export Processing System since 1992;
- Initiation of a Free Port System of operation since 1998.

The sector provides basic commodities to the markets, and promotes the expansion of the economic activity of private sector. The sector boosted the number of tourists from 25 thousand in 1991 to almost 95 thousand in 2000.

## 1.5 Sector Economic Analysis

### 1.5.1 Fiscal Balance and Deficit Financing

Fiscal performance of the Government of Zanzibar was until recently very weak, but in the past three years tight government expenditure under the cash budget system has minimized the deficit. Another reason of the improvement of the fiscal balance is that there was no borrowing from the domestic banking system. After subvention from the Union Government, fiscal balance showed a surplus in 1999/00 and 2000/01. In the budgeting process of 2000/01, the government hoped to increase total revenue to 34.1% of GDP, but it ended only in 23.7%. Zanzibar's revenue collection is still inadequate compared to its expenditure needs.

Development expenditure, which suddenly dropped to 6.4% of total expenditure in 1995/96 from 45.8% in the previous year, is only a fraction of total expenditure since 1996/97. The reason of this sudden decrease is not mentioned in ZPRP, but general economic decline in Zanzibar during these years seemingly caused this down turn and neglect of development expenditure. Another reason for this might be the impact of the "aid-boycott" by many bilateral agencies from 1995 to 2000. According to the Common Country Assessment for Zanzibar of United Nations (July 2001), project implementation at the grassroots levels were halted by the "aid-boycott" of bilateral donors assisting in health, water and education, malaria control, sanitation of Stone Town, etc. – affecting negatively the delivery of services which are beneficial to the majority poor, although Zanzibar continued to get aid from the Gulf states, UN agencies, and ADB and some other donors.

The government increased its amount by 71% to Tsh. 1.0 billion in 2000/01 from the previous year's Tsh. 0.6 billion. Although its share is still low, 2.4% of total expenditure, this increase is considered to reflect the government's commitment to the growth and poverty reduction.

#### Government Finance

(unit: million Tsh.)

	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Total Revenue	13,618	19,146	19,808	37,286	37,691	71,596	43,848
of which, Import taxes	9,804	14,965	12,431	22,733	22,687	37,425	20,609
Total Expenditure	27,268	13,893	19,833	38,394	34,710	63,064	43,139
Recurrent	14,767	13,004	19,073	37,759	34,221	62,466	42,112
(% of total expenditure)	(54.2%)	(93.6%)	(96.2%)	(98.3%)	(98.6%)	(99.1%)	(97.6%)
Development	12,501	889	760	635	360	599	1,027
(% of total expenditure)	(45.8%)	(6.4%)	(3.8%)	(1.7%)	(1.4%)	(0.9%)	(2.4%)
Balance before Grants	-14,166	5,173	-25	-1,108	2,981	-437	-4,466
Grants	516	80	0	0	0	8,968	5,175
Cash Adjustments	-1,312	-29,937	-8,076	8,104	-609	n.a.	n.a.
Overall Balance	-14,962	-24,684	-8,101	6,996	-1,123	8,531	709
Financing (net)							
Foreign	3,753	968	0	0	0	0	0
Domestic	11,209	23,716	8,101	-6,996	1,123	-8,531	-709

(Source: EIU Country Profile 2001; for 1998/99 – 2000/01 ZPRP Background Paper)

#### 1.5.2 Sectoral Budget Allocation

Public expenditure is the key for poverty reduction, and its trend should reflect how sincerely the politicians and the government are committed to the visions and targets they have decided by themselves. Table below shows the composition of the budget by sector.

#### Percentage of Sectoral Budget

(unit: %)

Sector	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02
Administration	9.7	13.0	10.2	10.7	12.6	11.8
Finance and Economy	45.3	24.9	42.7	32.2	32.2	30.8
Education	13.1	18.5	12.4	12.8	15.9	13.9
Health and Social Welfare	8.5	12.3	8.5	9.4	8.3	10.3
Agriculture	5.3	6.6	5.2	4.8	6.0	5.2
Justice	7.2	11.4	9.2	11.0	11.0	10.2
Infrastructure	4.8	6.8	4.8	5.7	5.7	7.0
Others	6.1	6.5	6.4	9.8	10.3	10.7

(Source: ZPRP)

Expenditure allocation to agriculture sector has remained relatively stable in its allocation but remains low, at only 5.2% of the recurrent budget in 2001/02. ZPRP suggests that more resource allocation to agriculture sector should be considered, particularly extension (including irrigation) and research services, which are the main vehicles for poverty reduction and increased agricultural productivity.

### 1.5.3 Trade Balance

In pursuit of liberalized trade policy, trade balance has been worsening due to sharp increase in imports compared with exports. But since 2000/01 both imports and exports have decreased due partly to low levels of economic activities. According to Bank of Tanzania's annual report, the fall in clove exports is largely explained by cyclical factors, but low prices offered to farmers is also a factor of the fall, which led to smuggling of clove to the neighboring countries.

#### Trade Balance

(unit: US\$ million)

Year	Export	Import	Trade Balance
1995/96	4.38	60.58	-56.2
1996/97	6.08	65.79	-59.71
1997/98	7.49	81.64	-74.16
1998/99	3.97	101.89	-97.92
1999/00	35.7	104.0	-68.3
2000/01	6.3	69.9	-63.6
2001/02	16.1	68.1	-51.91

(Source: ZPRP Background Paper; for 1999/00 and 2000/01 Bank of Tanzania's Annual Report 2000/01)

### 1.5.4 Status of Poverty in Zanzibar

Status of poverty in Zanzibar is analyzed in Chapter II of ZPRP based on the last Population Census conducted in 1988 and a Household Budget Survey held in 1991. According to ZPRP, the highest income per capita level was in Unguja West, and lowest was North B also in Unguja, which is closely followed by Micheweni in Pemba. In general, Pemba is worse off than Unguja as shown in the table below.

#### Average Income by District -- 1991: Index average = 100

Unguja						Pemba			
North A	North B	Central	South	West	Zanzibar Town	West	Micheweni	Chake Chake	Mkoani
87	61	112	88	142	126	88	64	138	95

(Source: ZPRP)

Dependence on agriculture is higher in Pemba with nearly 60% of household having field compared to just over 30% in Unguja. Pemba is also clearly worse off than Unguja in terms of possession of durable goods.

Similarly, other indices of poverty consisting of human capability, mortality, nutrition, access to basic social services like water and sanitation show clear sign of moderate and severe poverty in certain district.