Department of Rural Water Supply (DRWS)
Ministry of Water (MoW)
The United Republic of Tanzania

The Study on Rural Water Supply in Mwanza and Mara Regions in the United Republic of Tanzania

Final Report
SUMMARY REPORT

September 2006

JAPAN INTERNATIONAL COOPERATION AGENCY

KOKUSAI KOGYO CO., LTD.

In this report, the project cost is estimated using the May 2006 price and at an exchange rate of 1 US$= 114.58 Japanese Yen = 1181 Tanzania Shilling.

PREFACE

In response to a request from the Government of Tanzania, the Government of Japan decided to conduct a development study on Rural Water Supply in Mwanza and Mara Regions in the United Republic of Tanzania and entrusted the study to Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Toshiyuki Matsumoto of KOKUSAI KOGYO CO., LTD. between April 2005 and July 2006.

The team held discussions with the officials concerned of the Government of Tanzania and conducted field surveys in the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of this project and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Tanzania for their close cooperation extended to the study.

September 2006

Ariyuki Matsumoto
Deputy Vice President
Japan International Cooperation Agency

Independent Administrative Agency Japan International Cooperation Agency
Mr. Ariyuki Matsumoto, Deputy Vice President

September 2006

Letter of Transmittal

As the Water Supply Plan for the Mwanza and Mara regions in the Republic of Tanzania has now come to an end, the Final Report of the plan is presented here.

This report mainly includes a summary of the results, from the study team of specialists from Kokusai Kogyo Co., Ltd, of the formulation of the Priority Project and the Water Supply Plan carried out in the Mwanza and Mara regions of Tanzania over a period of 17 months from April 2005 until August 2006.

As described in detail in the report, the Water Supply Plan was formulated for 428 villages and 57 existing pipeline water supply facilities in the Mwanza and Mara regions. Water sources were selected for these 428 villages based on the hydrological conditions of the villages and the positional relationship between the villages and Lake Victoria, and water supply rates were established. A plan was formulated for the repair and expansion of the existing pipeline water supply facilities. In regard to the priority project, planning was carried out for wells with hand pumps and pipeline water supply facilities selected from the villages and facilities set out in the water supply plan.

I would like to extend my deepest gratitude to the kindness and cooperation given to the study group by the Department of Rural Water Supply of Ministry of Water, the Lake Victoria Basin Water Office as well as the regions of Mwanza and Mara and all the people related to the districts.

I would like to express my warm appreciation for the valuable advice and guidance provided for carrying out the study by your Agency, the Embassy of Japan in Tanzania and the JICA Tanzania Office.

It is hoped that the result of the study will be that the continuous water supply, made possible by the water supply plan, will be utilized in future in the Mwanza and Mara regions.

The Study on Rural Water Supply in Mwanza and Mara Regions in the United Republic of Tanzania
Toshiyuki Matsumoto, Team Leader

Executive Summary

1. Background of the Project and the Current Condition of Water Supply

The project regions, both Mwanza and Mara, have a good economic environment due to the well facilitated fishery base and suitable agricultural land with favorable rainfall. Mwanza ranks in the top five out of 21 regions in terms of contribution to the national GDP (Mara ranks 12th). It means that the Mwanza and Mara regions are important areas in terms of the socio-economical conditions of Tanzania. However, high population growth has caused an increase in the demand for water and the HESAWA project (1985-2002) has ceased the assistance for water supply, thus water coverage to the served population has decreased and the current water supply rate for the two regions is 49% in Mwanza and 45% in Mara (Source of 2004 by NRWSSP, Jan. 2006). Taking such unfavorable access to safe water into consideration and in order to achieve the national target set forth by the "National Water Policy", the Government of Tanzania requested technical assistance from the Government of Japan in August 2004 for the review of the Master Plan and the implementation of a Feasibility Study for a future water supply project.

The current conditions for water supply in the Mwanza and Mara regions show that more than 70% of all water sources in the two regions are traditional dug wells and shallow wells (among 515 surveyed village). The proportion of deep wells is 14% in Mwanza, and 7% in Mara. Lake water accounts for a proportion of 9% in Mara, and that of 3% in Mwanza. Most of the water supply facilities in the two regions are aged, having been constructed in the 1960s and 1970s, and a survey of the piped water schemes revealed 63% of the water supply facilities utilizing lake water are not functional (among 57 piped water schemes).

In regard to the organizational/institutional aspects, as for the technical matters, it is supposed that command comes down from the MoW, through the regional water advisor to the District Water Engineer Office. However, there are many low functions of water supply facilities, and the shortage of skilled technicians in DWE offices leads to ineffective and untimely management of water supply. The lack of guidance from DWE causes poor maintenance of water facilities by VWC and user groups. Therefore, in regard to the concepts of the institutional reforms for rural water supply along with the 2002 NAWAPO and the RWSSP, the institutional reforms are still on the way and in transitional periods, and thus there are wide gaps between what the policies intended and the actual practices in the Study area.

2. Water Sources

The water sources existing in the Mwanza and Mara regions can generally be classified as surface water, groundwater and rain water. The surface water sources from which water is collected include rivers, streams, Lake Victoria, and small-scale dams, while the groundwater sources include springs, shallow wells, and deep wells (Boreholes). Finally, it was decided that water sources are available for groundwater, spring water and lake water from Lake Victoria in the Study area. The important factors in considering water sources are (1) Sustainability for water use, (2) Availability through out the year, and (3) Safety of water quality.

(1) Surface Water Potential

In regard to the river, Mara River is a potential water source to be developed considering its constant discharge though out the year. However, River water is not considered for use as a rural water supply because of its unreliability due to seasonal variations in water volume,

risks of the water quality and high cost for filtration of the water supply facility. There is no issue with the potential amount of lake water for water supply of the project because the current total development amount from the water supply plan is 1.6% of the total water balance (positive value) of the lake. The water quality of intake points of lake water is generally safe except for a few bacteria. Lake water is considered as a potential source of water for villages within some 9 km from the lake in consideration with the cost effectiveness of project.

(2) Groundwater Potential

In general, the two groundwater sources identified in the area are stratum aquifer and fissure water. Stratum aquifers can be divided into two categories including shallow aquifers and medium aquifers.

Two types of aquifer, medium depth stratum and deep depth fissure water, are considered as exploitable groundwater sources based on the yield, geological structure and water quality.

The medium depth stratum consists of coarse Precambrian rock units mainly composing the secondary deposits or weathered granite and distributes from 20m to 50m in depth from the surface. An estimated yield of between 5 to 15 l/min is most common. Water Quality is good in general. Some wells are sensitive to the rain and seasonal fluctuation of the quality can be observed.

The deep depth fissure water consists of Granite, Nyanzan rock units (Precambrian rock units) and at depth of 20m to 100m. The exploitable area is near the existing lineaments. The only measure to estimate the yield is the inventory of surrounding wells. High values of more than 70 l/min can be achieved if it captures water bearing coarse grained fissure zone. The Water Quality is characterized by a high EC value with various ions. Most of the values of parameters are not more than the WHO guideline, but some parameters, for example, Fluoride and NO_3^- concentrations exceed the allowable limit, but does not exceed the upper limit of Tanzania.

Potential for development of the water source is mainly concentrated at the granite area, with high density of the lineament. The high potential area is described as the zone which is defined as the area, such as 1) High density lineament area, 2) Existence of medium and high yielding well, 3) Geological discontinuity such as fault and/or geological boundary.

3 Water Supply Plan

There are 205 selected target villages in the Mwanza region and 223 villages in the Mara region, totaling 428 villages in the study area. Also, the number of existing piped schemes for the water supply plan is identified as a total of 57 piped schemes, consisting of 37 in the Mwanza region and 20 in the Mara region. The priority project, which is the construction of water supply facilities in the implementation phase, will be completed by the year 2010. The final completed year of the overall water supply plan is basically 2025. The water supply plan is grouped into the following types, such as 1) Spring Protection, 2) Medium and deep well with hand pump, 3) Newly installed piped scheme, and 4) Expanded and rehabilitated existing piped scheme. The summary of water supply plan for 428 villages and 57 existing piped schemes is shown in Table 1. Especially, the selection of water sources of piped scheme are carried out based on the distance from the coast of Lake Victoria or groundwater potential. It is indicated the specification regarding the water supply facilities.

Table 1: Summary of Water Supply Plan

REGION	District	Administrative population in 2025	Number of Hand pump	*Population to be served in 2025 by HP	Number of Newly piped scheme	Population to be served in 2025 by Newly piped scheme	Number of Existing piped scheme	Population to be served in 2025 by existing piped scheme	Total population to be served in 2025
MWANZA	Misungwi	131,268	43	16,334	4	14,263	5	44,539	75,136
	Sengerema	865,378	195	61,997	20	158,194	7	173,967	394,158
	Kwimba	265,408	66	20,701	2	8,964	6	95,812	125,477
	Magu	239,951	80	33,106	2	8,089	7	65,630	106,825
	Geita	593,127	242	69,614	5	61,665	4	99,214	230,493
	Ukerewe	340,226	6	1,500	7	19,006	8	148,329	168,835
	Nyamagana & Illemela	17,337	11	7,084	0	0	0	0	7,084
	Mwanza Total	2,452,695	643	210,336	40	270,181	37	627,491	1,108,008
MARA	Bunda	235,053	94	34,697	6	15,712	4	91,552	141,961
	Musoma (Rural)	392,404	230	72,009	14	65,602	5	85,109	222,720
	Tarime	671,786	766	218,965	4	17,398	9	73,697	310,060
	Serengeti	140,930	136	45,101	0	0	2	21,510	66,611
	Mara Total	1,440,173	1226	370,772	24	98,712	20	271,868	741,352
Total		3,892,868	1,869	581,108	64	368,893	57	899,359	1,849,360

*Including served population by spring at each one site in Geita & Serengeti

The estimated project cost for water supply plan is summarized in Table 2 in consideration with the compositions, conditions, and the feature of types.

Table 2: Summary of Project Cost for Water Supply Plan

P/J No.	Type of plan	Construction cost (US$)	Engineering service (15%)	Administration expenses* (5%)	Contingency (10%)	Total (US$)	Remarks
1	Priority Project (Piped scheme and HP)	15,156,000	2,273,000	151,000	-	17,580,000	45 villages (289 wells and 8 piped schemes)
2	Medium & Deep Wells with Hand Pump	20,231,000	3,035,000	1,011,000	2,023,000	26,300,000	1580 wells
3	New Installed Piped Schemes using Lake Victoria water	35,309,000	5,296,000	1,765,000	3,530,000	45,900,000	54 piped schemes
4	New Installed Piped Schemes using Groundwater	756,000	113,000	37,000	75,000	981,000	3 piped schemes
5	Rehabilitation and expansion plan for the existing piped schemes	107,580,000	16,137,000	5,379,000	10,758,000	139,854,000	56 piped schemes
	Total amount	179,032,000	26,854,000	8,343,000	16,386,000	230,615,000	

Source: Ministry of Water for % of "Engineering service", "Administration expeses" and "Contigency"

Note: Assuming that prioritized project is carried out by Japanese asistance, administration expenses and contingency are not included in its project.

*The rate of administration expenses of Priority Project is estimated for 1% of Construction Cost.

The planned implementation project for the water supply plan contributes to the achievement of water supply coverage in Tanzania's strategy. The priority project will be implemented by the year 2009. If the water supply plan is implemented completely, it will improve the served ratio for water supply which will contribute the target strategy of the Tanzanian side in 2025.

Financial sources for the Project will be derived from the government budget and financial assistance from foreign countries and/or international lending institutions. The annual disbursement schedule of the project costs and implementation schedule have been finalized in Table 3 in each type according to the expected funding of External Support Agencies (ESAs). The annual capital cost allocated is relevant in comparison with the expected funding of investment in the Mwanza and Mara regions.

The institutional frameworks for the water supply plan of the Study have been formulated in due consideration of the national policy and strategies. Especially, at community level, community-based water supply organizations such as VWCs, WUGs, and WUAs will be formulated for operation and maintenance of the water supply facilities.

Table 3: Annual Disbursement and Implementation Schedule (unit: USD million)

Type of Scheme	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Priority Project																				
Medium & Deep Well with HP																				
Newly Installed Piped Scheme from Lake																				
Newly Installed Piped Scheme from BH																				
Expanded & Rehabilitated Piped Scheme																				
Type of Scheme	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total
Priority Project		17.6																		17.6
Medium & Deep Well with HP		2.7	1.85	1.85	2.4	2.8	2.1	2.1	1.85	1.73	1.73	1.73	1.73	1.73						26.3
Newly Installed Piped Scheme from Lake			2.59	7.27	7.27	4.3	1.93	1.93	1.93	3.73	3.73	3.73	3.73	3.73						45.9
Newly Installed Piped Scheme from BH			0.98																	0.98
Expanded & Rehabilitated Piped Scheme		5.28	2.42			2.72	5.96	5.96	6.51	9.01	9.01	9.01	9.01	9.01	13.2	13.2	13.2	13.2	13.2	139.90
Total (Excluding Priority Project)		7.98	7.84	9.12	9.67	9.82	9.99	9.99	10.3	14.5	14.5	14.5	14.5	14.5	13.2	13.2	13.2	13.2	13.2	230.7
Expected Financing of External Support Agencies & NGO **(USD million)** by NRWSSP	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Assumed to be implemented as JGA		17.6																		
WB & IDA	20	20	20																	
AfDB	20	20	20																	
AFD, EU, UNICEF, GEF, SIDA, IFAD & Others	18	19	20	73	78	78	78	78	78	121	121	121	121	121	110	110	110	110	110	
Plan International & Others	3	3	3																	
GOT	6.2	6.7	7																	
Total	67	69	70																	
Expected Financing of External Support Agencies & NGO in Mwanza and Mara Regions **(USD million)**	7	8	8	9	10	10	10	10	10	14.5	14.5	14.5	14.5	14.5	13.2	13.2	13.2	13.2	13.2	

As the results of evaluation, the water supply plan in Mwanza and Mara regions is economically feasible.

4 Priority Project

45 villages were selected by the selection criteria based on the O&M conditions and justification to receive the Grant Aid as priority project of which include 43 villages and 1 existing piped scheme containing 2 villages.

The lists of the selected priority projects are shown in Table 4 and Table 5.

The preliminary design for the priority project was carried out based on the Design Manual, 1997 in Tanzania. The general concept of the priority project is that the lake water is utilized by using simple purification facilities, such as slow sand filtration are proposed, and in the case of groundwater, only disinfection using chlorine is proposed. The water to be stored in service reservoirs using rising pumps will be supplied to dwellers by gravity.

The total project cost including the engineering expenses of the priority project is estimated at approximately USD17.6 million. The implementation of the water supply plan for this priority project is assumed to be implemented by the Japanese Grant Aid Project.

Table 4: List of Piped Schemes for Priority Project

REGION	DISTRICT	Scheme Name	No. by District	Village	Population in 2015 =Served population	Type of piped scheme (MP=Motor pump)	Number of MP	Water Sources
MWANZA	MISUNGWI	Busongo	25	Busongo	5,590	Newly Piped Scheme MP	2	Deep BH
	MISUNGWI	Ngaya	28	Ngaya	4,371	Newly Piped Scheme		Lake V.
	SENGEREMA	Buswelu	75	Buswelu	3,780	Newly Piped Scheme MP	2	Deep BH
	SENGEREMA	Nyamiswi	99	Nyamiswi	3,264	Newly Piped Scheme		Lake V.
	SENGEREMA		100	Nyakasasa	5,709	Newly Piped Scheme		Lake V.
	SENGEREMA	Nyakahako	44	Nyakahako	7,384	Newly Piped Scheme		Lake V.
	KWIMBA	Hungumalwa	22	Hungumalwa	7,113	Newly Piped Scheme MP	3	Deep BH
	Ukerewe	Bukonyo	45	Bukonyo	2,290	Existing Piped Scheme		Lake V.
	Ukerewe		-	Namilembe	3,793	Existing Piped Scheme		Lake V.
MARA	MUSOMA	Saragana	35	Saragana	4,641	Newly Piped Scheme MP	2	Deep BH

Table 5: List of Wells with Hand Pump for Priority Project

REGION	DISTRICT	No. by District	Village	Population in 2015	Type of well (HP=Hand pump)	No of Deep BH	No of Additional Medium BH	Total BH No	Total Covered Population Rate(%)	Served Population in 2015
MWANZA	SENGEREMA	13	Sogoso	5,739	Deep & Medium HP	6	3	9	39	2,250
	SENGEREMA	67	Sotta	4,403	Deep & Medium HP	5	2	7	40	1,750
	SENGEREMA	69	Isole	5,021	Deep & Medium HP	5	2	7	53	2,644
	SENGEREMA	83	Busekeseke	3,420	Deep & Medium HP	4	3	7	51	1,750
	SENGEREMA	84	Katoma	4,046	Deep & Medium HP	5	3	8	49	2,000
	SENGEREMA	86	Magulukenda	5,092	Deep & Medium HP	6	2	8	39	2,000
	SENGEREMA	96	Nyancheche	7,677	Deep & Medium HP	5	4	9	29	2,250
	KWIMBA	71	Mhulya	3,067	Deep & Medium HP	4	4	8	65	2,000
	MAGU	75	Kijereshi	7,401	Deep & Medium HP	8	2	10	42	3,122
	GEITA	17	Bugulala	9,030	Deep & Medium HP	5	6	11	30	2,750
	GEITA	18	Kasota	10,216	Deep & Medium HP,Spring	5	4	9	39	3,984
	GEITA	22	Kamena	8,655	Deep & Medium HP	5	3	8	23	2,000
	GEITA	24	Ndelema	4,371	Deep & Medium HP	3	7	10	57	2,500
	GEITA	25	Nyashishima	2,065	Deep & Medium HP	2	3	5	61	1,250
	GEITA	26	Bogogo	10,380	Deep & Medium HP	6	2	8	32	3,349
	GEITA	27	Ikina	2,494	Deep & Medium HP	2	5	7	70	1,750
	GEITA	42	Ibondo	7,667	Deep & Medium HP	7	6	13	42	3,250
MARA	BUNDA	33	Mcharo	1,295	Deep & Medium HP	4	1	5	100	1,295
	MUSOMA	6	Sirorisimba	3,997	Deep & Medium HP	4	4	8	50	2,000
	MUSOMA	8	Ryamisanga	4,769	Deep & Medium HP	6	2	8	60	2,858
	MUSOMA	21	Kisamwene	4,427	Deep & Medium HP	6	5	11	62	2,750
	MUSOMA	33	Bugoji	5,450	Deep & Medium HP	7	3	10	68	3,699
	MUSOMA	55	Isaba	4,145	Deep & Medium HP	3	7	10	80	3,329
	TARIME	24	Nyankunguru	5,772	Deep & Medium HP	5	4	9	39	2,250
	TARIME	44	Kiwanja	5,177	Deep & Medium HP	4	1	5	48	2,492
	TARIME	71	Bisarwi	3,684	Deep & Medium HP	3	5	8	71	2,612
	TARIME	94	Kisumwa	2,690	Deep & Medium HP	2	3	5	62	1,656
	TARIME	112	Nyankonge	2,071	Deep & Medium HP	2	3	5	60	1,250
	TARIME	129	Masike	3,319	Deep & Medium HP	5	6	11	83	2,750
	TARIME	131	Bukama	5,225	Deep & Medium HP	4	7	11	53	2,750
	TARIME	144	Oliyo	4,543	Deep & Medium HP	5	4	9	50	2,250
	TARIME	157	Tatwe	5,315	Deep & Medium HP	5	6	11	52	2,750
	SERENGETI	37	Busawe	1,663	Deep HP,Spring	3		3	100	1,663
	SERENGETI	66	Nyansurura	4,124	Deep & Medium HP	3	6	9	59	2,445
	SERENGETI	67	Kebancha	6,899	Deep & Medium HP	4	3	7	32	2,178

Assuming that the prioritized project is carried out for three years, the following time schedule shown in Table 6 is proposed.

Table 6: Implementation Schedule of Priority Project

Facility	Region	District	Name of Scheme	2007	2008	2009
Borehole with hand pumps	Mwanza	Sengerema	-			
		Kwimba	-			
		Magu	-			
		Geita	-			
	Mara	Bunda	-			
		Musoma (R)	-			
		Tarime	-			
		Serengeti	-			
Piped schemes	Mwanza	Misungwi	Ngaya			
		Misungwi	Busongo			
		Sengerema	Nyamiswi			
		Sengerema	Nyakahako			
		Sengerema	Buswelu			
		Kwimba	Hungumalwa			
		Ukerewe	Bukonyo			
	Mara	Musoma (R)	Saragana			

5 Evaluation of Priority Project

Three economic indicators have been calculated as a result of the benefit cost analysis for economic evaluation, i.e. Economic Internal Rate of Return (EIRR) - 10.5 %; Net Present Value (NPV) - USD 467,416 and Benefit Cost Ratio (B/C) - 1.03. These results indicate that the proposed Project is economically feasible as the EIRR exceeds the opportunity of capital, the NPV is positive and the B/C is more than 1.0.

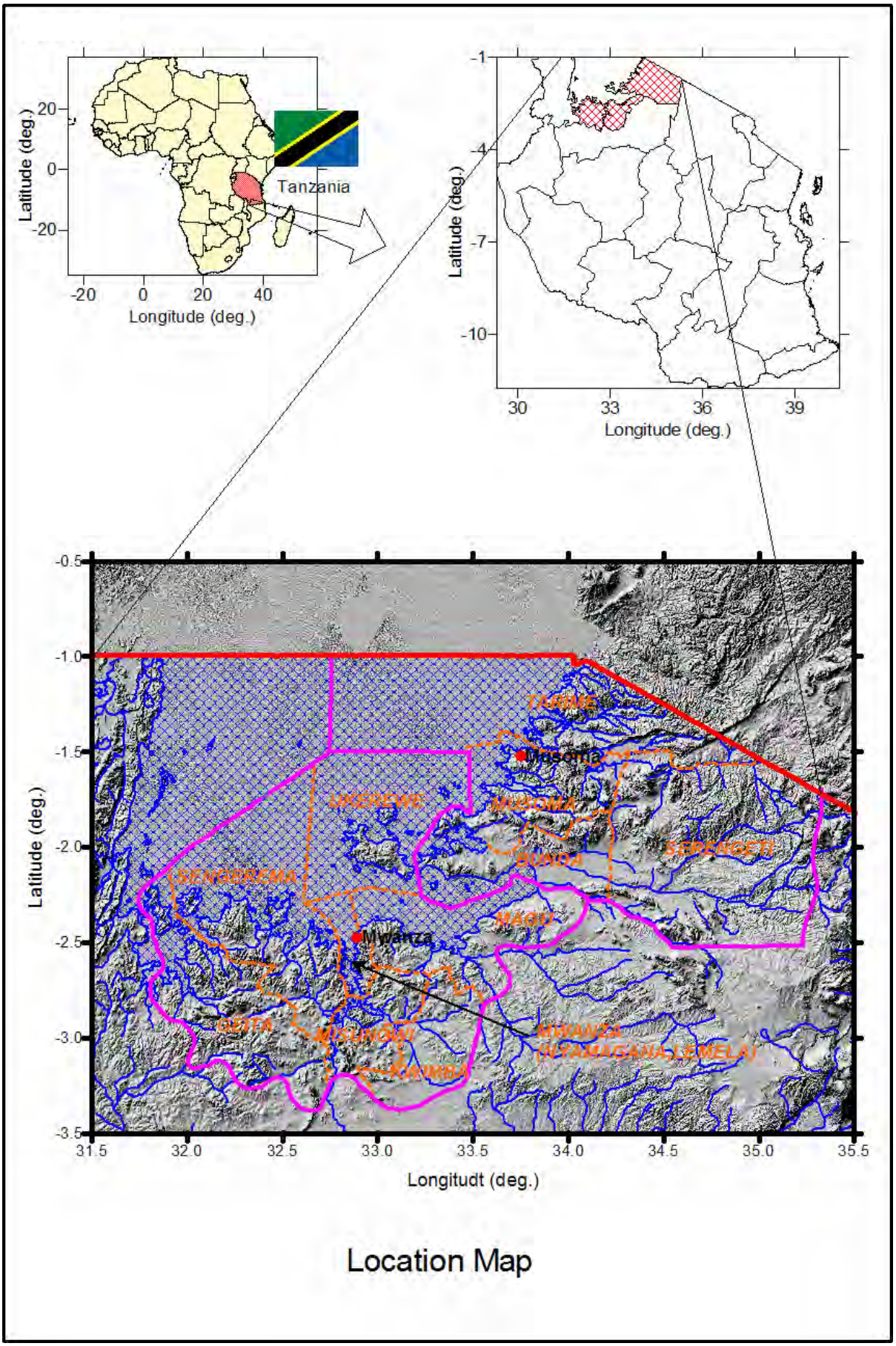
In regard to the financial evaluation, the computation also indicates that even if water fee collection rate is 50 %, the collected water fee will be sufficient to cover the annual OMR costs. It is concluded that the proposed Project is financially feasible in terms of the recovery of OMR costs.

For conducting the priority projects effectively and sustaining the facilities, the organizational and institutional plan has been proposed. By proceeding this plan, it is expected that the roles and responsibilities of the stakeholders at regional, district and communal levels will be clarified, leading to a well established organizational network for effective and sustainable management of the improved water supply systems in the target communities. The proposed plan is therefore adequate in terms of attainment of the national water policy objectives.

In regard to both boreholes with hand pumps and piped schemes, there are no special issues such as construction, because such systems, with the exception of filtration facilities, have already been used in the target area. Therefore, the project works could be conducted without any difficulty in construction stage. However it is necessary to conduct the technical support for the operation and maintenance of facility.

Based on the application submitted to NEMC, it was concluded that the applied project would not have any major adverse impact on targeted areas and the study team was not required to conduct any further EIA study. Hereafter, the water supply plan for the priority project will contribute, in all aspects, to the improvement of the water situation by implementation of the proposed activities by the close monitoring of ambient environmental conditions in the project area.

.



Location Map

Dried Traditional Water Source (Dry Season)

Dried Traditional Water Source (Dry Season)

Traditional Water Source Along River

Improved Traditional Water Source

Hand Pump Facility with Platform

Traditional Water Source
(Spring Water from Basement Rock)

Plate1: Current Conditions of Water Supply (Springs, Hand Pump)

Fluctuation

Breakdown of Pumping Machine

Abandoned Water Pipe

Leakage in Pumping Machine

Deterioration of Pipes

Corrosion of Water Tank

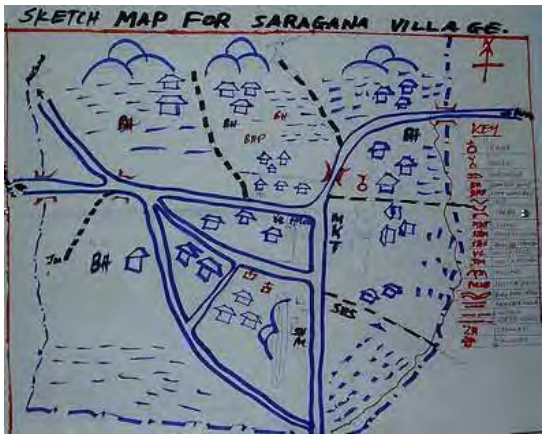
Plate2: Current Conditions of Water Supply (Piped Scheme)

Measurement of River Discharge

Water Quality Laboratory

Survey Work

Measurement of Groundwater Level



RRA Exercise (Sketch Map)

RRA Exercise (Water Source Mapping)

Plate 3: Field Survey 1

Transportation to Island

Focus Group Discussion

O&M/ Socio-economic Survey

Interview to Women

Water Fetching in the Evening

Fetching Spring Water

Plate 4: Field Survey 2

Bathing and Fetching Water in Lake Victoria

Water Quality Control (Pouring Chlorine)

Communal Tap with Meter

Water Storage

Recording Data

Village Volunteers Assisting Geophysical Survey

Plate 5: Field Survey 3

Setting of Drilling Rig

Compressor

Drilling Rod

Groundwater from Test Well

Sample Case

Water Quality Test

Plate 6: Test Well Drilling

Technology Transfer (Test Well Drilling)

Technology Transfer (Geophysical Survey: Data Input Exercise)

Onsite Technology Transfer (Geophysical Survey)

Onsite Technology Transfer (Geophysical Survey: Weinner Method)

Analysis of Groundwater Data

Analysis of Socio-economic Data

Plate 7: Technology Transfer 1

Preparation of Presentation Materials

Proofreading of Draft Final Report

Presentation by C/P in Mwanza

Preparation of Presentation Materials

Presentation by C/P in Mara

Presentation by C/P in Mara

Plate 8: Technology Transfer 2

Meeting on Inception Report

Workshop on Progress Report

Steering Committee Meeting on Interim Repor

Seminar on Draft Final Report in Mwanza

Seminar on Draft Final Report in Mara

Participants to the Seminar in Mara

Plate 9: Discussions and Meetings

CONTENTS

List of Tables

Page:

List of Figures

Page:

Abbreviations

ATP:	Affordability To Pay
AfDB:	African Development Bank
AFD:	Agence Française de Développement
BWO:	Basin Water Office
CBOs:	Community Based Organization
CIDA:	Canadian International Development Organization
COWSOs:	Community Owned Water Supply Organizations
CDO:	Community Development Officer
DC:	District Commissioner
DC:	District Council
DED:	District Executive Director
DDCA:	Drilling & Dam Construction Agency
DRWS:	Department of Rural Water Supply
DPO:	District Planning Officer
DWD:	District Water Department
DWE:	District Water Engineer
DWP:	Domestic Water Points
DWST:	District Water and Sanitation Team
DWT:	District Water Technician
EC:	Electric Conductivity
EIA:	Environmental Impact Assessment
ESAs:	External Support Agencies
EU:	European Union
FGD:	Focus Groups Discussion
FSPs:	Facilitation Service Providers
TSPs:	Technical Service Providers
GDP:	Gross Domestic Product
GEF:	Global Environmental Facility
GIS:	Geographic Information System
GNP:	Gross National Product
GOT:	Government of Tanzania
GTZ:	Deutsche Gesellschaft fur Technische Zusammenarbeit
HESAWA:	Health through Sanitation and Water
IEE:	Initial Environmental Examination
IFAD:	International Fund for Agricultural Development
IDA:	International Development Association
IWSs:	Improved Water Sources
JICA:	Japan International Cooperation Agency
LGRP:	Local Government Reform Policy
LVBWO:	Lake Victoria Basin Water Office
LVEMP:	Lake Victoria Environmental Management Project
MDGs:	Millennium Development Goals
M/M:	Minutes of Meeting
MOF:	Ministry of Finance
MOL:	Ministry of Land
MoW:	Ministry of Water
NEMC:	National Environmental Management Council
NGO:	Non-Governmental Organization

NAWAPO:	National Water Policy
NWSDP:	National Water Sector Development Policy
O&M:	Operation and Maintenance
PRA:	Participatory Rural Appraisal
PRSP:	Poverty Reduction Strategy Paper
RF:	Registration Form
PHAST:	Participatory Health and Sanitation Transformation
PMO-RALG:	Prime Minister's Office, Regional Administration and Local Government
RAS:	Regional Administrative Secretariat
RRA:	Rapid Rural Appraisal
RWSD:	Rural Water Supply Division
RWSSP:	Rural Water Supply and Sanitation Program
SIDA:	Swedish International Development Cooperation Agency
SC:	Specific Capacity
SR:	Scoping Report
SWAP:	Sector Wide Approach to Planning
SWL:	Static Water Level
TBA:	Traditional Birth Attendant
TOR:	Terms of Reference
Tsh/TSH:	Tanzanian Shillings
TWSs:	Traditional Water Sources
UFW:	Unaccounted for Water
UNICEF:	United Nations International Children's Fund
VES:	Vertical Electric Sounding
VEO:	Village Executive Officer
VF:	Village Fundis (Artisans)
VHC:	Village Hesawa Committee
VHV:	Village Health Volunteer
VWC:	Village Water Committee
WB:	World Bank
WEO:	Ward Executive Officer
WRI:	Water Resources Institutes
WSS:	Water Supply System
WSSAs:	Water Supply and Sanitation Authorities
WSSMC:	Water Supply System Management Centre
WTP:	Willingness To Pay
WUA:	Water User Association
WUG:	Water User Group

Chapter 1

Introduction

1 Introduction

1.1 Background of the Study

The United Republic of Tanzania occupies a total land area of 945 thousand sq. km and has a total estimated population of 34.4 million as of 2002. The nation's annual GDP per capita has remained at US$ 270 (2001).

According to the 2001 statistics, access to safe water per total population of the country is 88% for the urban area, and 46% for the rural area. The Government of Tanzania commenced the Rural Water Supply Plan (RWSP) in 1971 to secure safe and hygienic water within 400m for all Tanzanians by 1991, but the achievement was limited. In 2002, the government of Tanzania announced the "National Water Policy" to further increase national water supply coverage.

The project regions, both Mwanza and Mara, are on the coast of Lake Victoria. The regions have a good economic environment due to the well facilitated fishery base and suitable agricultural land with favorable rainfall. Mwanza ranks in the top five out of 21 regions in terms of contribution to the national GDP (Mara ranks 12th). However, most of the water supply facilities in the two regions are aged, having been constructed in the 1960s and 1970s. High population growth has caused an increase in the demand for water, and the current water supply rate for the two regions is 49% in Mwanza and 45% in Mara (Source of 2004 by NRWSSP, Jan. 2006).

Taking the unfavorable access to safe water into consideration and in order to achieve the national target set forth by the "National Water Policy", the Government of Tanzania requested technical assistance from the Government of Japan in August 2004 for the review of the Master Plan and the implementation of a Feasibility Study for a future water supply project.

1.2 Objectives of the Study

The objectives of the study are:

1) To formulate a water supply plan for selected villages in the Mwanza and Mara regions.
2) To conduct a preliminary design on the priority projects for the target year of 2015.
3) To develop the capability of counterpart personnel from the Ministry of Water and Livestock Development and other authorities concerned in the course of the Study.

1.3 Study Area and Selected Villages and Existing Piped Schemes

1.3.1 Study Area

The study covers requested villages in eight districts in the Mwanza region and four districts in the Mara region, as shown in Figure 1.3-1.

- ✓ Districts in the Mwanza region: Misungwi; Sengerema; Kwimba; Magu; Geita; Ukerewe; and Nyamagana + Ilemela

  Total Land Area: about 19,590Km^2

- ✓ Districts in the Mara region: Bunda; Musoma(R); Tarime; and Serengeti

  Total Land Area: about 19,560km^2

1.3.2 Selected Villages and Existing Piped Schemes for Water Supply Plan

The MoW requested a total of 929 villages in the Mwanza and Mara regions to the Government of Japan.. A total of 428 villages (205 in the Mwanza and 223 in the Mara region) were selected as the target villages for the formulation of the water supply plan.

The MoW submitted a total of 110 piped schemes to the Government of Japan, and of which, 57 piped schemes (37 in the Mwanza and 20 in the Mara region) were selected as the target piped schemes for the Water Supply Plan.

The number of target villages and existing piped schemes for the water supply plan in each district is shown in following table:

Table 1.3-1: Number of Villages and Existing Piped Schemes for Water Supply Plan

District		No. of Target Villages	No. of Target piped schemes
Mwanza Region	Missungwi	16	5
	Sengerema	74	7
	Kwimba	23	6
	Magu	23	7
	Geita	43	4
	Ukerewe	25	8
	Nyamagana+Ilemela	1	0
Sub Total		205	37
Mara Region	Bunda	25	4
	Musoma(Rural)	60	5
	Tarime	114	9
	Serengeti	24	2
Sub Total		223	20
Total		428	57

1.4 The Study Implementation

The Study was implemented by the Japanese study team which is composed of the thirteen (13) expert consultants from Kokusai Kogyo Co., Ltd. and counterpart staff nominated by the Ministry of Water (MoW).

The first stage of the project was conducted from April 2005 to December 2005 to formulate the Water Supply Plan, and the second stage of the project is being conducted from February 2006 to August 2006 to conduct the Preliminary Design on Priority Projects.

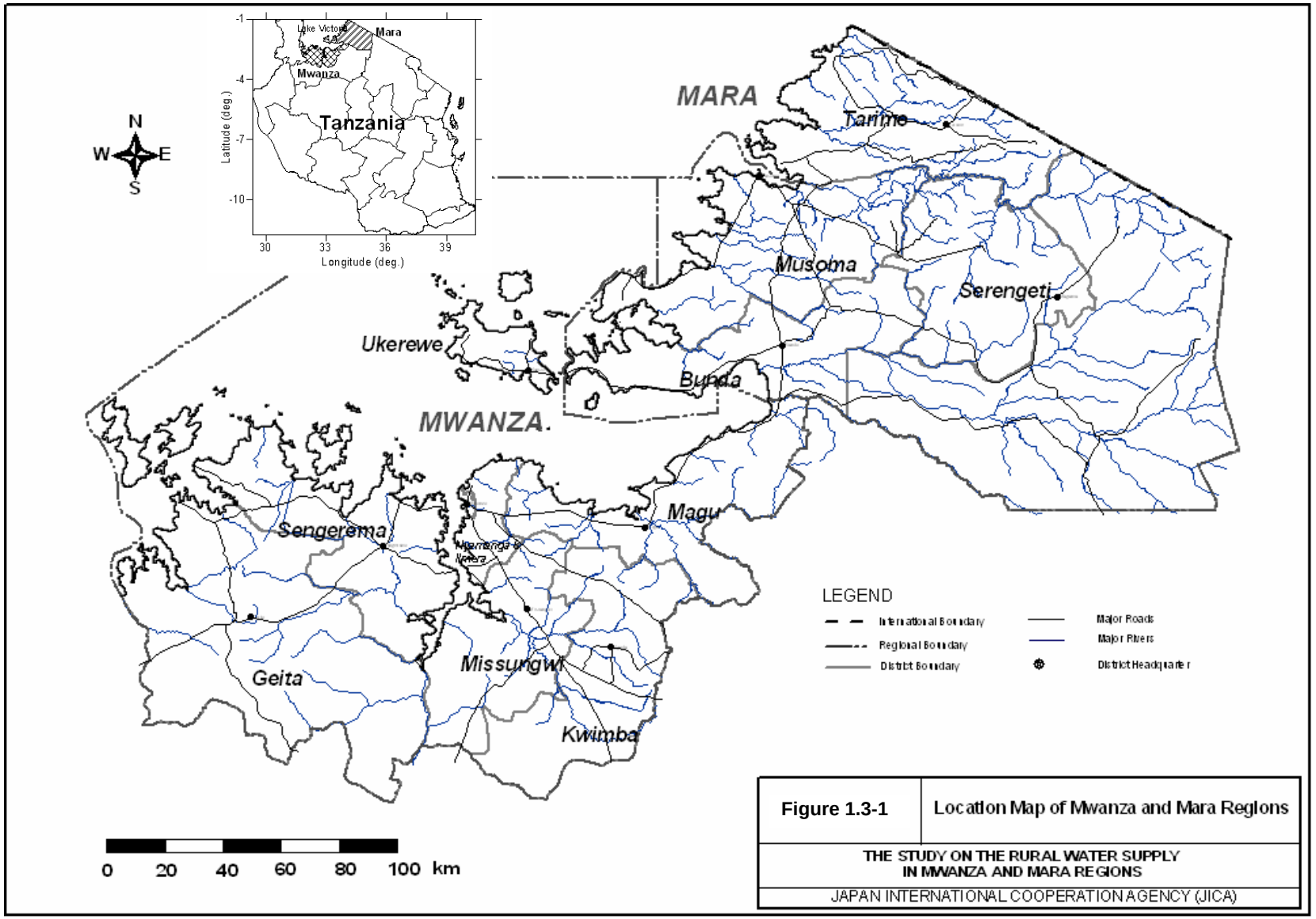


Figure 1.3-1	Location Map of Mwanza and Mara Regions
THE STUDY ON THE RURAL WATER SUPPLY IN MWANZA AND MARA REGIONS	
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	

Chapter 2

General Condition of Study Area

2 General Condition of Study Area

2.1 General

The study area of the Mwanza and Mara Regions is located at the southern shore of Lake Victoria. The climate is semi temperate compared to the coastal regions as the area consists of highland above 1134 m (swl) (water level of Lake Victoria). The land is occupied mainly by low lying hills of Cambrian Basement rocks, and hilly terrain is distributing in the northern area.

2.2 Meteorology and Hydrology

2.2.1 Meteorology

The annual average rainfall in the Mwanza and Mara Regions is 946 mm, average evaporation is about 1,800mm and average temperature is about 24.5 degree Celsius.

a. Rainfall

A distribution map (isohyte) with meteorological stations is presented in Figure 2.2-1. The average annual rainfall ranges from 356 mm to 2,080 mm. The maximum average monthly rainfall ranges from 1.7 mm to 234.35 mm. The duration of the dry season is from June to September, and the rainy season is November to April, which is the same for each station.

b. Evaporation

The maximum average monthly evaporation is 173.4 mm in Musoma in September and 177.0 mm in Mwanza in September. The minimum average monthly evaporation is 132.6 mm in Musoma in April and 113.7 mm in Mwanza in January. There are two high period of evaporation in a year, which are in April and during July to October, for both Regions. The value is measured by pan which is not representing the area and surface structure. Thornthwaite method was applied to the possible evapotranspiration for the hydrogeological calculation.

c. Temperature

The maximum monthly temperature is 31.1℃ in Musoma and 32.1℃ in Mwanza recorded both in September 1997. The minimum monthly temperature is 14.6℃ in Musoma and 11.6℃ in Mwanza in July 1998.

d. Humidity

The maximum average monthly humidity is recorded to be 84 % in Musoma in January, February and April and 91% in Mwanza in February. The minimum average monthly humidity is 46% in Musoma in June and August and 37% in Mwanza in July.

2.2.2 River System

The main rivers in the study area are Mori, Mara, Suguti, Grumeti, Mbalageti, Duma, Simiyu, Magogo, Moame and Isanga. All of these rivers flow into Lake Victoria.

The river system is divided into 14 river basins as shown in the following table.

Table 2.2-1: River Basins and Major Rivers

River Basin	Districts in Drainage	Major River	Area (km2)
Mori	Tarime	Mori	2,555
Mara	Tarime, Serengeti, Musoma	Mara	13,158
Suguti	Musoma, Bunda	Suguti	3,947
Ukerewe	Ukerewe	Consist of small tributaries	500
Grumeti	Serengeti, Bunda	Grumeti	12,797
Ramadi	Magu	Ramadi	1,010
Mbalageti	Serengeti, Bunda, Magu	Mbalageti	2,873
Simiyu	Magu, Kwimba	Simiyu	10,910
Mogogo-Moame	Misungwi, Kwimba	Mogogo, Moame	3,520
Isanga	Kwimba, Misungwi, Geita	Isanga	7,956
Nyaruhwa	Geita, Sengerema	Nyasuhwa	2,406
South 1	Ilemera, Nyamagana, Magu, Misungwi, Kwimba	Consist of small tributaries	1,798
South 2	Misungwi	Consist of small tributaries	284
South 3	Sengerema, Geita	Consist of small tributaries	4,165

Of these major rivers, Mara River is confirmed as a perennial river. Simiyu and Mori rivers are also recorded as perennial rivers, but discharge was very marginal from the data obtained from the river discharge measurement in 2005.

2.2.3 Lake Vitoria

Lake Victoria is located toward the northern part of the study area and has an area of 69,490 km^2, maximum water depth of 82m and average water depth of 40m.

The present water level of Lake Victoria is about 1,134m above sea level, and the fluctuation of water level from 1965 to 2004 is shown in Figure 2.2-2.

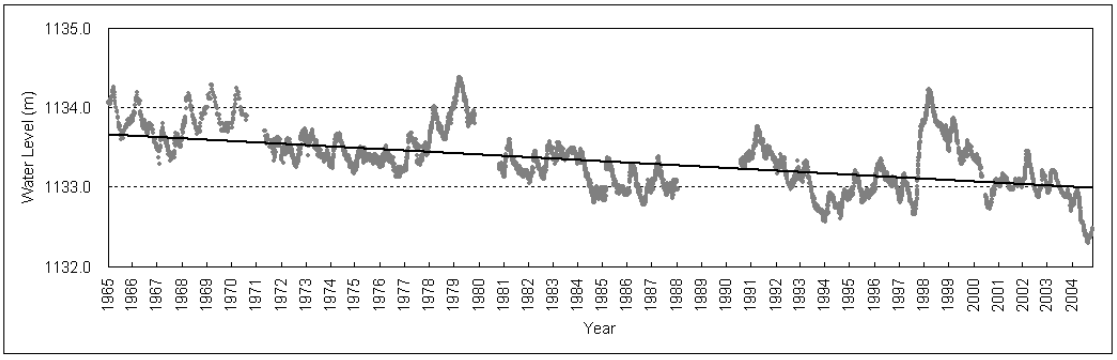


Figure 2.2-2: Water Level of Lake Victoria

According to the LVEMP data, potential sum of $33m^3/s$ annual inflow is calculated to the water balance of the Lake in the short-term. This inflow will raise the water level of 0.015m of the Lake which the value is considerably low compare to the short-term annual fluctuation, comparing with the above table of the long-term data. Presumably, the water level of the Lake Victoria is strongly controlled by evaporation, rainfall and inflow from the tributary from the surrounding catchment.

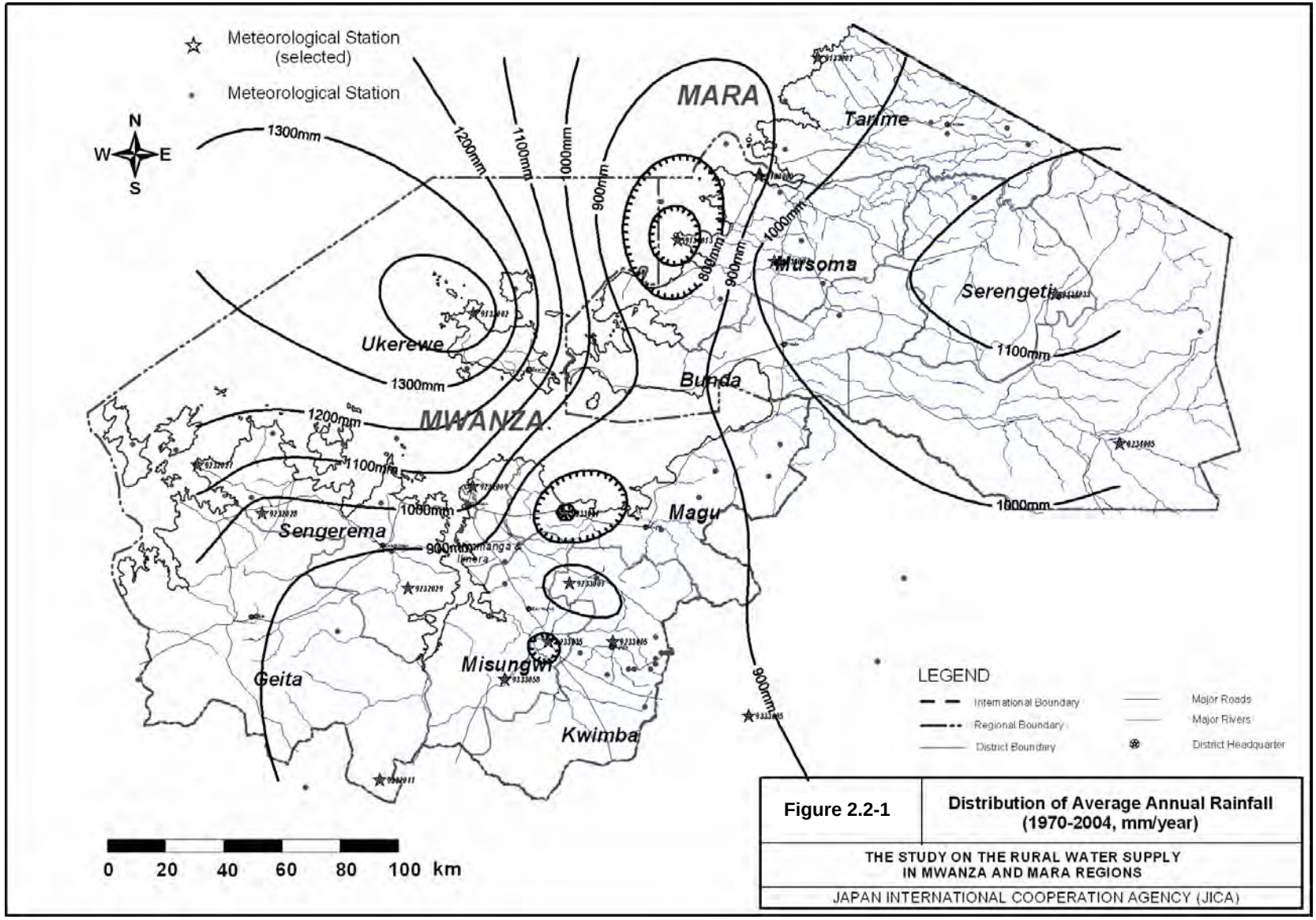


Figure 2.2-1 **Distribution of Average Annual Rainfall (1970-2004, mm/year)**

THE STUDY ON THE RURAL WATER SUPPLY IN MWANZA AND MARA REGIONS

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

2.3 Topography and Geology

2.3.1 Topography of the Study Area

The geomorphology of the study area features flatland with some hills and terrain which projects the geologic character of the area. The land is bordered on the north (Mwanza region) and west (Mara region) by Lake Victoria, which is one of the largest freshwater lakes in the world.

The Mwanza region is mostly occupied by low-lying land and rolling hills at the north to east end and particularly in the south-western area, it is composed of comparatively higher ridges and deep, wide valleys. The typical topographical feature in the flatland in the area is the so called “monadnock” or “inselberg”, which is characteristic of an arid to semiarid landscape in the latest stage of the erosion circle.

The lake shore is composed of relatively undulating ridges and hills, and the region is divided into west and east portions by the Mwanza Gulf – Smith Sound which cuts deeply into the mainland.

The Mara region is characterized by sharp valleys and rolling hills with some terraces bounded by structural lineaments. Wide valleys are developed along the major rivers of Mara, Grumeti and Mori. Cliffs can be found along the large fault structure.

The altitude is lowest at Lake Victoria (1,134m) and the highest portion is some 1400m above sea level.

2.3.2 Geology of the Study Area

a. Geological Structure and Geological Units

In general, geological formations observed in the area can be divided into the following three units by age: 1) Precambrian plutonic, volcanic and metamorphosed rocks, 2) Paleozoic sedimentary rocks and 3) Neocene deposits. Geological map is shown in Figure 2.3-1.

The geologic time table in comparison with the geological unit in the study area is shown in Table 2.3-1.

Precambrian rocks occupy about 80% of the total land area of the Mwanza and Mara regions. Neocene deposits are common in the surface geological observations and the sediments are chiefly distributed at the lake and riverside.

b. Lineament and Structure

Clear lineaments are observed in the mountainous areas in Geita, Sengerema, Misungwi, Mwanza, the north western area of Magu and northern Kwimba in the Mwanza region. In the Mara region, lineaments are widely observed, except for the flat terrace formed in the surroundings of major rivers.

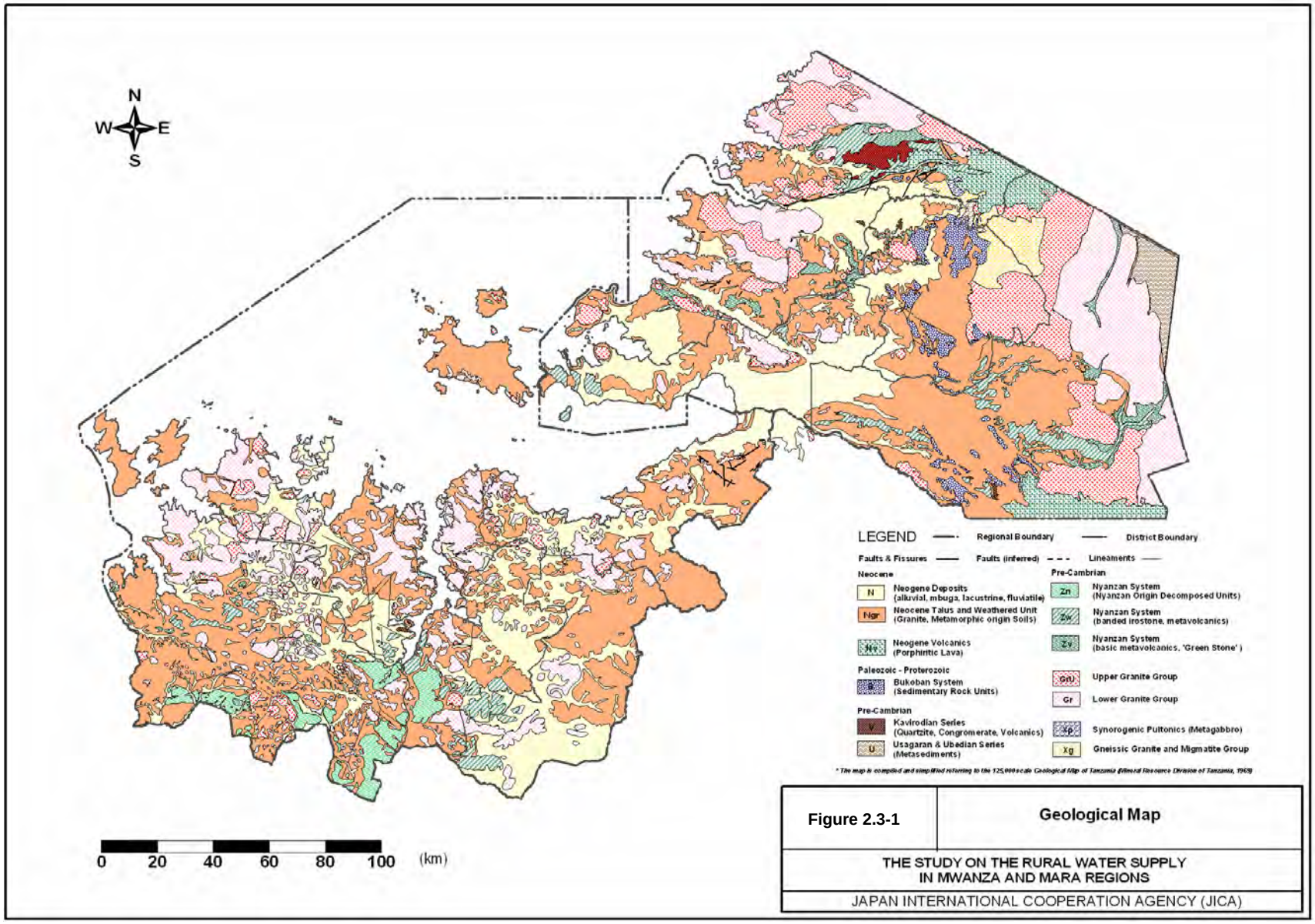
Table 2.3-1: Geologic Time Table of the Study Area

EONS	ERAS	PERIODS	EPOCHS	EPOCKS AND ROCK FORMATION AT MWANZA AND MARA REGIONS			
				EPOCHS		Abbriviation: Formation and Rocks	
						Sediment and Metamorphosed	Volcanic and Plutonic
Phanerozoic	Cenozoic	Quaternary	Holocene	Kainozoic	Neogene	**N**: alluvial, lacustrine, terrestrial, fluviatile, marine deposits	**Nv**: alkaline volcanics; basalt; pyroclastics
			Pleistocene				
		Tertiary	Pliocene				
			Miocene				
			Oligocene		Paleogene	P: marine deposits	
			Eocene				
			Paleocene				
	Mesozoic	Cretaceous		Mesozoic	Cretacious	C: continental and marine sediments	
		Jurassic			Jurassic	J: estauarine and marine deposits	
		Triassic			Karroo	K: continental sediments	
	Paleozoic	Permian		Paleozoic	Bukoban	**B**: mudstone; shale and phyllite; sandstone; arkose; quartzite; congromerate; limestone	Bv: basalt and andesite
		Carboniferous					
		Devonian					
		Silurian					
		Ordovician					
		Cambrian					Gp: granite and granodiorite
Pre-cambrian	Proterozoic	Ediacara or Vendian		Proterozoic	Karagwe - Ankolean and Ukingan	A: phyllite; schist; quartzite; sandstone G: augen gneiss; migmatite; porphyry	**Gl**: granite and granodiorite
		Neoproterozoic					
		Mesoproterozoic					
		Paleoproterozoic					
	Archean			Archean	Usagaran and Ubedian	X: marble; quartzite; schist and gneiss	**Gl**: granite and granodiorite
					Kavirondian	**V**: quartzite; phyllite	
					Nyanzian	**Z**: banded ironstone; meta-volcanics; schist and porphily	**Gs**: granite and granodiorite (foliated, gneissose or migmatitic
					Dodoman	**D**: schist; gneiss; quartite	
	Hadean						

* Geologic time reflects the Geological Society of America (GSA) 1999 Geologic Timescale, compiled by A.R. Palmer and J. Geissman -- S. Rieboldt, Nov. 2002

** Epochs and Rock Formation in the Mwanza and Mara regions are compiled, referring to the Summary of the Geology of Tanganika (A.M. Quennel, A.C.M. Mckinlay, W.G. Aitken, 1956)

*** Bold abbreviation indicates the rocks observed in the study area.


N
W
E
S
LEGEND
Regional Boundary
District Boundary
Faults & Fissures
Faults (inferred)
Lineaments
Neocene
N Neogene Deposits (alluvial, mbuga, lacustrine, fluviatile)
Ngr Neocene Talus and Weathered Unit (Granite, Metamorphic origin Soils)
Nv Neogene Volcanics (Porphiritic Lava)
Paleozoic - Proterozoic
Bukoban System (Sedimentary Rock Units)
Pre-Cambrian
Kavirodian Series (Quartzite, Congromerate, Volcanics)
Usagaran & Ubedian Series (Metasediments)
Pre-Cambrian
Zn Nyanzan System (Nyanzan Origin Decomposed Units)
Zw Nyanzan System (banded irostone, metavolcanics)
Zv Nyanzan System (basic metavolcanics, 'Green Stone')
GrU Upper Granite Group
Gr Lower Granite Group
Xp Synorogenic Pultonics (Metagabbro)
Xg Gneissic Granite and Migmatite Group
0 20 40 60 80 100 (km)
Figure 2.3-1
Geological Map
THE STUDY ON THE RURAL WATER SUPPLY
IN MWANZA AND MARA REGIONS
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

2.4 Socio-economic Conditions in the Study Area

2.4.1 Population and Demographic Characteristics

The latest population of Tanzania from national censuses is 34.4 million. The census also indicated that the population size of Mwanza is of 2,929,644 (8.8 % of the total population) and of Mara is 1,363,397 (4.1 % of the total population). The average annual population growth rate in Tanzania was 2.9 % between 1988 and 2002 censuses. The average annual population growth rate is 3.3% in Mwanza and 2.5% in Mara.

2.4.2 Local Administrative Divisions

a. Administrative Divisions

Each region is divided into districts which are further sub-divided into wards (there is a division between district and ward, but the divisions are not described in the 2002 census). Communities can be classified into those in urban and rural areas. In rural areas, most communities are called villages. In urban area, the classification of “mtaa” (street) is used to indicate a quarter or division of an urban area.

A village sometimes consists of several sub-villages (kitongoji). The lowest level of community structure is called ten-cell which actually contains ten to fourteen households. The leader of this structure is called a ten-cell leader or “mjumbe”. The “mtaa” is an urban neighborhood, the smallest unit of urban administration

Table 2.4-1: Distribution of Administrative Units in Mwanza and Mara Regions

Region	District	Division	Ward	Village	Mtaa
Mwanza	8	33	174	712	379
Mara	4	20	79	414	138
Total	12	53	253	1126	517

Source: (1) National Bureau of Statistics; (2) Socio-economic Profile Mara Region, 2003

2.4.3 Regional Economy

The agricultural sector including crop farming, livestock, forestry and fishery provides employment for most of the local population, over 85 % of the labor force in both regions.

a. Mwanza Region

The most important food crops are maize, paddy, sorghum/millet, cassava, beans and cowpeas. The major cash crops are cotton and groundnuts. Fisheries activities in Lake Victoria contribute significantly to the regional economy in terms of foreign exchange earning. Per capita GDP in the Mwanza region increased from US$102 in 1995 to US$231 in 2000.

b. Mara Region

Maize and cassava are the main food crops, paddy is considered as the cash crop when farm households have a surplus. The main cash crops are cotton, coffee and groundnuts. Cotton is the predominant cash crop in the region. Fishing provides employment for people along the lakeshore generating good income. Fishing contributes little to the regional economy

compared to crop production and livestock keeping. Per capita GDP in Mara region increased from US$142 in 1995 to US$226 in 2000.

Chapter 3

Existing Water Supply System

3 Existing Water Supply System

3.1 General

The Ministry of Water recommends 1) piped schemes, 2) protected wells, 3) wells with hand pumps, and 4) protected springs as safe water supply systems. Those functioning safe water supply systems are rarely found in the study area.

3.2 Condition of Water Supply

NRWSSP statistics (Draft -published in 2004, which data includes the figures compiled in 2003) describes that the nationwide water supply rate for rural areas is 53.5%.

The water supply coverage in the Mwanza and Mara regions is less than the national average, the coverage rate for these regions is 49% and 45%, respectively (figure data of 2004 from NRWSSP, Jan. 2006). Highest water coverage rate is 62% in Magu District in Mwanza region and lowest is 24% Musoma District (Rural) in Mara region (clarified through the data from NRWSSP, Jan. 2006).

A well inventory survey revealed that more than 70% of all water sources in the two regions are traditional dug wells and shallow wells (among 515 surveyed village). The proportion of deep wells is 14% in Mwanza, and 7% in Mara. Lake water accounts for a proportion in Mara of 9%, and that in Mwanza of 3%.

A survey of the piped water schemes revealed 63% of the water supply facilities utilizing lake water are not functional (among 57 piped water schemes).

Table 3.2-1: Condition of the Piped Scheme

	Functioning	Partially Functioning	Not Functioning	Total
Number	9	12	36	57
Percentage	15.8	21.0	63.2	100

3.3 Piped Scheme for Water Supply

A field survey was carried out on the selected 57 existing piped schemes (screened out from the 110 existing piped schemes list submitted by MoW)..

3.3.1 Current Condition of Existing Piped Scheme

As a result of the field survey on the 57 existing piped schemes, the current condition is summarized in Table 3.3-1.

Out of the 57 existing piped schemes, 59.6% schemes use lake water, 29.8% schemes use boreholes, and the rest rely on other sources, such as dams and springs.

The construction of 68.4% of the existing piped schemes was completed in the 1970s, and 22.8% were built in the 1960s or before. Therefore, most of the surveyed schemes were completed before the 1970s.

Table 3.3-1: Summary of the Existing Piped Schemes

District	Target schemes	Types of sources					Status of function			Year of completion			
		Lake	Wells	Springs	Dams	Others	Function	Partially function	Not function	Before 1969	1970s	1980s	Since 1990
Nyamagana & Ilemela	-	-	-	-	-	-	-	-	-	-	-	-	-
Missungi	5	3	2	0	0	0	2	0	3	3	2	0	0
Kwimba	6	0	6	0	0	0	0	1	5	3	3	0	0
Sengerema	7	6	0	0	1	0	3	0	4	3	4	0	0
Magu	7	5	0	0	0	2	1	2	4	1	5	1	0
Geita	4	3	1	0	0	0	0	0	4	0	3	1	0
Ukerewe	8	7	0	1	0	0	0	2	6	1	7	0	0
Sub total	**37**	**24**	**9**	**1**	**1**	**2**	**6**	**5**	**26**	**11**	**24**	**2**	**0**
		64.9 %	**24.3 %**	**2.7 %**	**2.7 %**	**5.4 %**	**16.2 %**	**13.5 %**	**70.3 %**	**29.7 %**	**64.9 %**	**5.4 %**	**0.0 %**
Bunda	4	4	0	0	0	0	2	1	1	0	4	0	0
Musoma (R)	5	3	2	0	0	0	0	2	3	1	2	2	0
Tarime	9	3	5	1	0	0	1	2	6	1	8	0	0
Serengeti	2	0	1	1	0	0	0	2	0	0	1	0	1
Sub total	**20**	**10**	**8**	**2**	**0**	**0**	**3**	**7**	**10**	**2**	**15**	**2**	**1**
		50.0 %	**40.0 %**	**10.0 %**	**0.0 %**	**0.0 %**	**15.0 %**	**35.0 %**	**50.0 %**	**10.0 %**	**75.0 %**	**10.0 %**	**5.0 %**
Total	**57**	**34**	**17**	**3**	**1**	**2**	**9**	**12**	**36**	**13**	**39**	**4**	**1**
		59.6 %	**29.8 %**	**5.3 %**	**1.8 %**	**3.5 %**	**15.8 %**	**21.1 %**	**63.2 %**	**22.8 %**	**68.4 %**	**7.0 %**	**1.8 %**

3.3.2 Types of Existing Piped Schemes

The typical facilities of the existing piped schemes consist of intake facilities, pump facilities, transmission pipes, service reservoirs and distribution pipes. The facilities of existing piped schemes are roughly classified into about seven types based on the form of intake and transmission as shown in Figure 3.3-1. Type C, which is shown in Figure 3.3-1 in the most abundant type and accounts for about 57% of the 57 piped schemes.

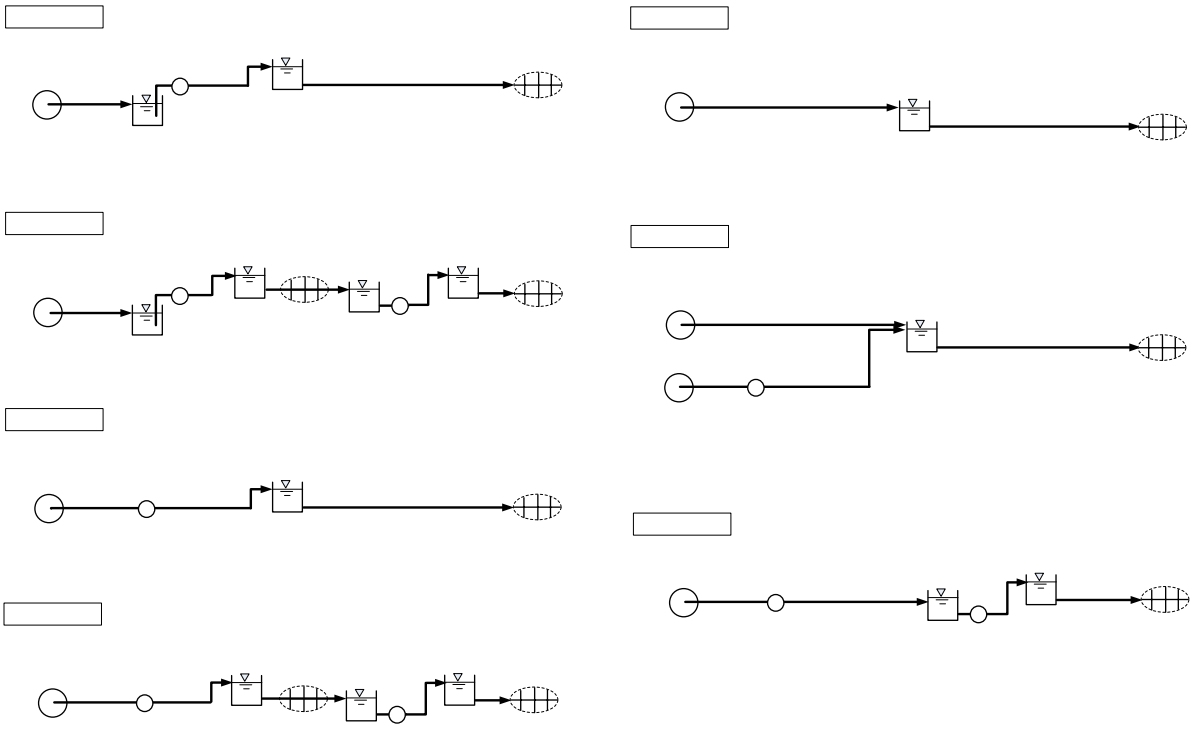


Figure 3.3-1: Facility Types of the Existing Piped Scheme

3.3.3 Problems of Existing Piped Scheme

The piped schemes have not been repaired for 30-40 years and most operations have been suspended. The conditions of various facilities and main problems are as follows;

Table 3.3-2: Current Facility Problems

Function of Facilities		Main Problems
Water Sources		• Decrease of Water Level • Lack of Capacity for the Water Source
Intake Facilities	Pipes	• Disconnection • Damage or Deterioration of Pipes
	Pump Units	• Damage, Breaking, Wearing out of Pump Units • Theft of Pump Units
Rising & Booster Pump Facilities	Pipes	• Disconnection • Damage or Deterioration of Pipes
	Booster Pump Units	• Damage, Breaking, Wearing out of Pump Units
Distribution Facilities	Service Reservoir	• Deterioration such as Cracks on Tank Structure • Leakage
	Pipes	• Disconnection Damage or Deterioration of Pipes

About 90% of the suspended piped schemes are facilities which were completed in the 1970s, the 1960s or before. Also the main causes for the suspension of the facilities are pump units which account for 78%, and especially for suspended pump facilities, which are concentrated in piped schemes completed in the 1970s. The main causes for the suspension of the facilities by the year of completion are shown in Table 3.3-3.

Table 3.3-3: Number of Suspended Facilities

The facilities which caused suspension	Water sources	Pipes	Pump Units	Others※	Total
1960s or before	0	0	9	0	**9**
1970s	5	1	17	1	**24**
1980s	0	1	2	0	**3**
1990s	0	0	0	0	**0**
2000s	0	0	0	0	**0**
Total	**5**	**2**	**28**	**1**	**36**
%	**13.9**	**5.6**	**77.8**	**2.7**	**100.0**

※Financial problem with fuel or power supply

3.4 Current Institutional Situation of Operation and Maintenance for Water Supply System

3.4.1 The Current Institutional Framework for Rural Water Supply

The present institutional arrangement for rural water supply consists of two major lines to facilitate the rural water supply activities.

1) Technical line from the MoW

2) Institutional and budgetary arrangement along with the decentralization policy following the Local Government Reform Programme (LGRP).

As for the technical matters, it is supposed that command comes down from the MoW, through the regional water advisor to the District Water Engineer Office.

The concepts of the institutional reforms for rural water supply along with the 2002 NAWAPO and the RWSSP are acknowledged by the relevant authorities such as the RAS (Regional Administrative Secretariat) and District Councils, the institutional reforms are still on the way and in transitional periods, and thus there are wide gaps between what the policies intended and the actual practices in the Study area.

Although the concepts are aware of the government offices, in general the institutional reorganization has been on the progress and not been completed in the Study area.

Identified current organizational problems are summarized below

(1) Inadequate coordination and undefined demarcation between government offices led to weak planning and performance in such areas as budget based planning and activities.
(2) Lack of coordination roles to standardize the water supply activities and human resource deployment among districts deteriorated to keep balanced development of water supply status in the region.
(3) Low priority for monitoring and supervision of community based facility management led to deterioration of water facility
(4) Shortage of skilled technicians in DWE offices led to ineffective and untimely management of water supply.
(5) Lack or deterioration of VWCs and user groups for facility management led to poor maintenance of water facility.
(6) Poor knowledge of technical maintenance and financial management led to weak sustainability of water facility.

3.4.2 Current Activities for Water Supply at Community

a. Current Activities at Community Level

The current organization arrangement for water supply at communities by types of technologies and water sources is summarized in Table 3.4-1.

Mainly there are 4 types of water supply sources or facilities:1) unprotected traditional water sources, 2) protected traditional water sources, 3) hand pumps and 4) piped schemes

The above are further divided by varieties of different water sources such as shallow wells, boreholes and lake water.

Types of community based management organizations for water facilities include:1) water board for piped scheme, 2) water user association (WUA) for piped scheme, 3)VWC for piped scheme, hand pump operation, and other type of operation; and 4) water user group (WUG) mainly for hand pump operation.

Table 3.4-1: Current Activities of Water Supply Organizations at Community

	Type of technology	Water source	Type of organization	Activities
1	Unprotected traditional water sources	Spring, pond, lake, river, etc.	VWC	✧ Cleaning (spring and pond)
2	Protected traditional water sources	Spring, ring well, etc.	VWC or WUG	✧ Protection ✧ Cleaning ✧ Security
3	Hand pump	Shallow well	VWC or WUG	✧ Cleaning ✧ Security ✧ Collection of water fee ✧ Minor repair works
4	Hand pump	Borehole	VWC or WUG	
5	Piped scheme	Borehole	Water Board, WUA or VWC	✧ Security ✧ Collection of water fee ✧ Minor repair works
6	Piped scheme	Lake Victoria	Water Board, WUA or VWC	

b. Water Board

The Water Board is a management body under authority for urban and town water supply through piped schemes. All members of the Board are appointed by the Ministry of Water. In the Study area, water fee collection for urban water supplies is done by the District Water Office, and in general the collection is still very low to cover the running costs. For instance, in the case of the Bunda Water Supply Scheme, it is estimated that 76 % of the estimated running costs are covered by national subsidy allocated every quarter.

c. Water Users Association (WUA)

The Water Users Association (WUA) is officially defined as the lowest appropriate level of water resources management entity at local level (NAWAPO 2002). A WUA is a legal entity registered under the Water Rights Act Amendments (No. 8 of 1997).

In terms of rural water supply in the Study area, the WUAs are considered to be a kind of water users group responsible for management of point source facilities (hand pump) or piped water systems.

There are three types of WUAs in the Study area: 1) a group of water users in hand pump operation; 2) a group of water users groups at water points in piped schemes; and 3) .associations for the management of piped schemes.

Formation of WUAs is not actively promoted in the Study area due to the following reasons: 1) a majority of the piped schemes are not functioning, 2) insufficient and irregular O&M support from the DWE to the communities, and 3) insufficient cost recovery from water users due to low willingness to pay

d. Village Water Committee

The village water committee (VWC) falls under the social services committee of a village government. It is elected by the community, has 6 to 12 members, and all represent their sub-villages. The roles and duties of VWCs are to:1) submit monthly and quarterly reports to the village government; 2) audit income and expenditures; 3) assist in security at domestic points; 4) enforce by-laws on the use and protection of the water system; and 5) advise on issues relating to the operation of the water system.

In terms of water fee collection, activities of the VWCs are not found active due to lack of necessary guidance from the DWE office at present. It was often found that the VWCs were

intervened by the village government on the use of the collected water fees. In some active villages, the VWCs are trying to maintain their traditional water sources even though there is no improved water supply facility.

e. Water User Group

A WUG is usually formed by voluntary membership in order to share a single water point.

Conventional organization for water supply system management was to establish water sources committees or tap committees under each VWC. However, several problems were identified in the traditional structure. For instance, the roles of the VWC were not clearly defined, and the village government leadership was often preoccupied with many local issues other than the management of water supply systems. In order to overcome these problems, the concept of the WUG has emerged. The WUGs have been established as “independent” water users` organizations in some projects such as the SIDA funded HESAWA project and Dutch funded Shinyanga project. The establishment of WUGs intended to avoid any intervention by the village government.