DEPARTMENT OF WATER AFFAIRS
MINISTRY OF ENERGY AND WATER DEVELOPMENT
THE REPUBLIC OF ZAMBIA

BASIC DESIGN STUDY REPORT
ON
THE GROUNDWATER DEVELOPMENT AND SANITATION PROJECT
IN DROUGHT PRONE RURAL AREAS
IN
THE REPUBLIC OF ZAMBIA

JANUARY 2001

JAPAN INTERNATIONAL COOPERATION AGENCY
JAPAN TECHNO CO., LTD.
MITSUI MINERAL DEVELOPMENT ENGINEERING CO., LTD.

PREFACE

In response to a request from the Government of the Republic of Zambia, the Government of Japan decided to conduct a basic design study on the Groundwater Development and Sanitation Project in Drought Prone Rural Areas in the Republic of Zambia and entrusted the study to the Japan International Cooperation Agency (JICA).

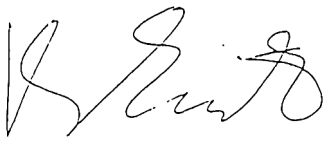
JICA sent to Zambia a study team from 13th June to 31st August, 2000.

The team held discussions with the officials concerned of the Government of Zambia, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Zambia in order to discuss a draft basic design, from 23rd October to 4th November, 2000, and as this result, the present report was finalised.

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

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Zambia for their close cooperation extended to the teams.

January, 2001



Kunihiko Saito
President
Japan International Cooperation Agency

January, 2001

LETTER OF TRANSMITTAL

We are pleased to submit to you the basic design study report on the Groundwater Development and Sanitation Project in Drought Prone Rural Areas in the Republic of Zambia.

This study was conducted by Japan Techno Co., Ltd. and Mitsui Mineral Development Engineering Co., Ltd., under a contract to JICA, during the period from 8th June, 2000 to 19th January, 2001. In conducting the study, we have examined the feasibility and rationale of the Project with due consideration to the present situation of Zambia and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

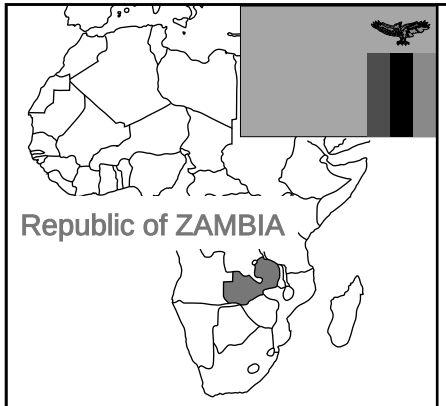
Finally, we hope that this report will contribute to further promotion of the project.

Very truly yours,

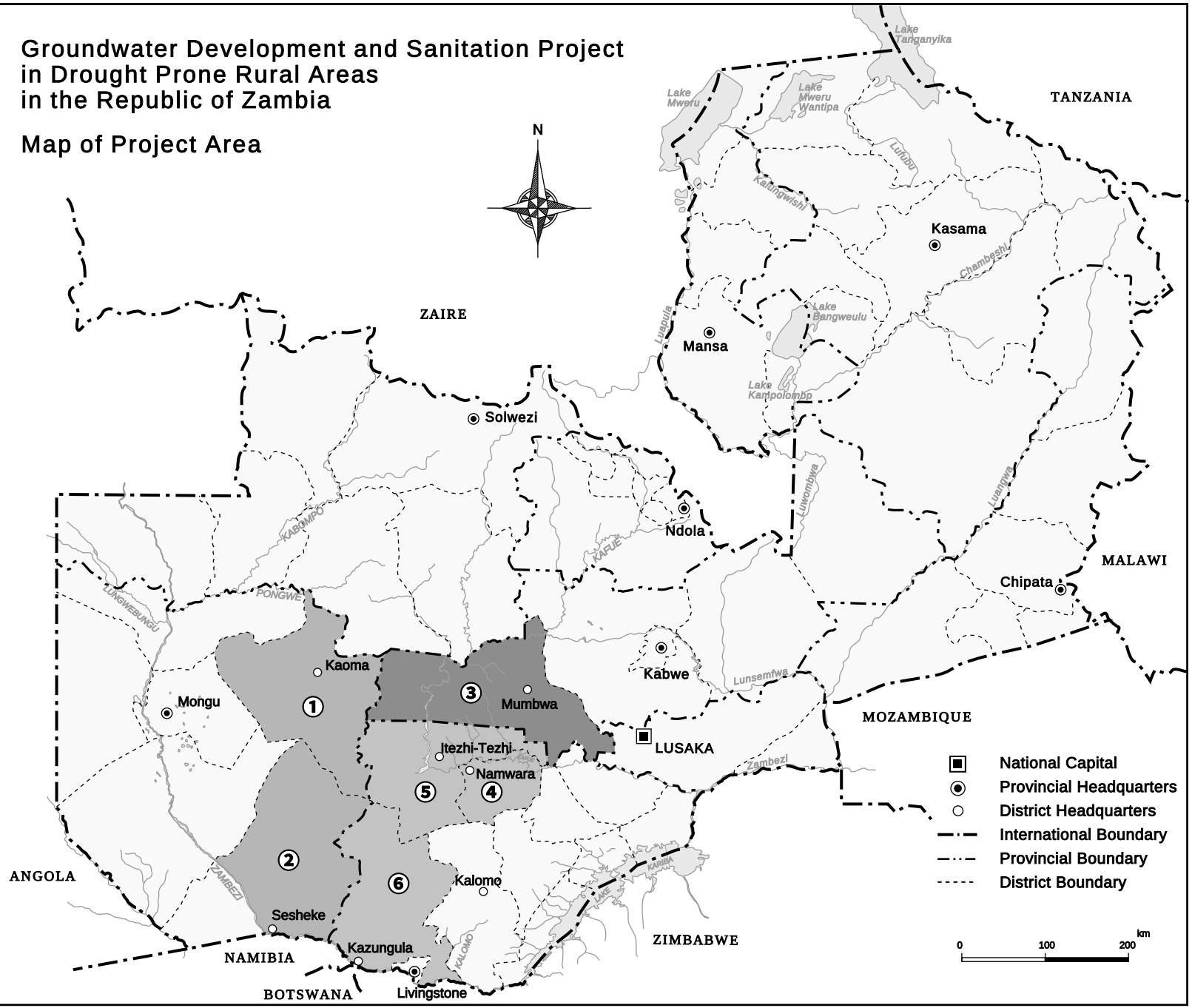
Shinichi Moromachi
Project Manager
Basic Design Study Team on the Groundwater Development and Sanitation Project in Drought Prone Rural Areas in the Republic of Zambia
Japan Techno Co., Ltd.

Groundwater Development and Sanitation Project in Drought Prone Rural Areas in the Republic of Zambia

Map of Project Area



Project Area	
① Kaoma District	Western Province
② Sesheke District	Western Province
③ Mumbwa District	Central Province
④ Namwala District	Southern Province
⑤ Itezhi-Tezhi District	Southern Province
⑥ Kazungula District	Southern Province



BASIC DESIGN STUDY
ON THE GROUNDWATER DEVELOPMENT AND SANITATION PROJECT
IN DROUGHT PRONE RURAL AREAS IN THE REPUBLIC OF ZAMBIA

CONTENTS

ABBREVIATION

BHN	Basic Human Needs
CCF	Christian Children Fund
CHW	Community Health Worker
CMMU	Community Management and Monitoring Unit
CSO	Central Statistics Office
CUs	Commercial Utilities
DDCC	District Development Co-ordinating Committee
DfID	Department for International Development
DISS	Department of Infrastructure and Support Services
D-WASHE	District WASHE Committee
DWA	Department of Water Affairs
E／N	Exchange of Notes
EHT	Environmental Health Technician
HIPCs	Heavily Indebted Poor Countries
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
MAFF	Ministry of Agriculture, Food and Fishery
MCDSS	Ministry of Community Development and Social Welfare
MEWD	Ministry of Energy and Water Development

MLGH	Ministry of Local Government and Housing
MMD	Movement for Multi-Party Democracy
MOFED	Ministry of Finance and Economic Development
MOH	Ministry of Health
NHC	Neighboring Health Committee
NGO	Non-Governmental Organization
NORAD	Norwegian Agency for Development Planning
NWASCO	National Water Supply and Sanitation Council
N-WASHE	National WASHE Co-ordinating and Training Team
PCU	Programme Co-ordinating Unit
PVC	Polyvinyl Chloride
P-WASHE	Provincial WASHE Committee
RSU	Water Sector Reform Support Unit
UNICEF	United Nations Children's Fund
VLOM	Village Level Operation and Maintenance
V-WASHE	Village WASHE Committee
WASHE	Water, Sanitation, and Health Education
WHO	World Health Organisation
ZCCM	Zambia Consolidated Copper Mines Limited

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1 BACKGROUND OF THE PROJECT

Chapter 1 Background of the Project

1-1 Background of the Request

The Republic of Zambia (hereinafter referred to as "Zambia") is located in the southern part of the African Continent. It is a landlocked country bordered by eight countries, namely, the People's Republic of Congo (former Zaire), Tanzania, Malawi, Mozambique, Zimbabwe, Botswana, Namibia, and Angola. The area of the country is 752,612 km^2 and the population is approximately 9.9 million (estimated by the World Bank, 1999), among which about 40% live in the urban areas including the capital city of Lusaka. Zambia is one of the most urbanised countries in the sub-Saharan Africa. Most of the people from the rural part who are looking for employment in the urban area flow into the peripheral of cities where it is densely populated and they derive their income from informal trading. On the other hand, approximately 90% of the population in rural areas live on agriculture, forestry and fishery, especially on small-scale agriculture.

With the global decline of the price of mineral resources such as copper and cobalt, which have been the dominant industry of Zambia for a long time, the population is trying to get out of the mono-cultural economy dependent on only the mineral industry. Thus Zambia has been seeking diversification of industries and macroeconomic liberalisation through removal of price control of commodities, liberalisation of the interest and exchange rate, deregulation of trade, and lowering of custom duties. Serious economic stagnation since the middle of 1980's occurred due to deficit of foreign currency and decline of competitiveness of export goods. In addition, the drought hit Zambia repeatedly and reduction of copper production damaged restoration of the economy in early 1990's. From 1996 to 1999, supported by the growth of agricultural production and non-traditional export goods, real GDP resumed to 2.6%, which is the same level as the population growth rate of Zambia. The GNP per capita is US$330 (World Bank, 1999). It is, however, required to expand agricultural production and export goods with competitiveness for improvement of terms of trade as well as to stabilise macroeconomic management so that the growth rate increases on the average by 5% per annum during 1999-2001 as her medium macroeconomic goal.

In this context, the Government of Zambia gives the first priority to economic development through structural adjustment policy. At the same time, the government adopts the Social Dimension of Adjustment, especially poverty reduction, in its economic and social policies and is attacking direct and indirect root causes of poverty. In Zambia, one of the Heavily Indebted Poor Countries (HIPCs), 58% of the entire population are

considered extremely poor (CSO, 1998). While the urban poor is increasing due to unstable labour market, small farmers who make up the majority of the rural population have difficulties in access to input and assets to increase crop for their income generation as well as access to social services. Consequently, approximate 83% of rural population lives below poverty line and the extremely poor is counted as 71%.

Providing small farmers with technical advice and inputs for reduction of susceptibility to drought and expansion of crops in an efficient way, the government has been making efforts to improve services of the health and education sector, rehabilitate and newly construct social infrastructures for the purpose of satisfying the Basic Human Needs.

To ensure access by the rural population to safe and stable water supply services is closely related to the health and education sectors on which Zambia gives high priority in her social policies. The coverage rate of water supply in the entire country of Zambia is 40%. In the rural areas, the same rate stays low at 30%. Especially, the coverage rate in the southern and western parts of Zambia, having low annual precipitation and suffering from drought in the past, is 22%, which is far below the average of the entire country. Residents in these areas rely on hand-dug wells and streams for their water sources. Since these water sources are dried up during the dry season or at the time of drought, the residents are forced to rely on inconveniences of fetching water from remote water sources which are not satisfactory in terms of quality and quantity.

Considering the above mentioned circumstances, the Government of Zambia requested the grant aid co-operation to Japan in 1998 in order to construct borehole water supply facilities with handpumps in the villages of 6 districts in Western, Central, and Southern provinces for realising a stable water supply not affected by drought as well as to improve water supply and sanitation facilities of public institutions located in “Sub-Centres” where public utilities such as clinics, schools, agricultural camps, and local courts provide services for residents in the Catchment areas.

1-2 Outline of the Request

The outline of the request by the Government of Zambia to the Government of Japan is as follows:

1-2-1 Construction of Water Supply Facilities

(1) Component A: Construction of 300 borehole water supply facilities with handpumps

1) Target Districts

Kaoma and Sesheke districts in Western Province, Mumbwa district in Central Province, Namwala, Itezhi-tezhi, and Kazungula districts in Southern Province

2) Contents of the Request

Construction of 300 borehole water supply facilities with handpumps in villages located in the 6 districts mentioned above in (1) 1)

(2) Component B: Construction of water supply facilities at the Sub-Centres

1) Target Districts

Sesheke district in Western Province, Namwala, Itezhi-tezhi, and Kazungula districts in Southern Province

2) Contents of the Request

- Construction of small-scale piped water schemes with solar power generating pumps for the existing water sources in order to improve the water supply at public institutions such as clinics, schools, agriculture camps, and local courts in 20 Sub-Centres located in the 4 districts mentioned above in (2) 1)
- Construction of sanitation facilities such as improved latrines

1-2-2 Procurement of Equipment and Materials for Construction Works and for Support to Operation and Maintenance System

The request was made for procurement of equipment and materials required for construction works of water supply facilities mentioned in 1-2-1 and activities for promotion of operation and maintenance of facilities as well as establishment of community based organisation and capacity building. The requested items are as listed in Table 1-1.

Table 1-1 List of Requested Equipment to be Procured

	Item	Q'ty
1.	Cargo truck with crane for transport of construction materials (4 x 4)	6 units
2.	Light vehicles for survey, project management and supervision (4 x 4)	8 units
3.	Motor-bikes for WASHE activities	18 units
4.	Personal computers for survey and project management (including software and printers)	7 units
5.	Materials for education meetings, materials for training, etc. under WASHE activities	1 lot
6.	Standby equipment and materials for piped water supply at Sub Centres	1 lot

1-2-3 Establishment of Community Based Organisation and Capacity Building for Improvement of Operation and Maintenance System (WASHE activities)

The request was made to cover capacity building of communities through sensitisation and formation of community based organisations for realising sustainable community management of water supply facilities to be constructed under the component mentioned in 1-2-1 (1) (2) with support from local authorities. In addition to this, the request was also made to include hygiene education programme provided to the communities aiming to lead to change of their behaviour in water use and sanitation.

1-3 Confirmation of the Contents Requested by the Zambian Side

In response to the request from the Government of Zambia, the Government of Japan entrusted the study of the Groundwater Development and Sanitation Project in Drought Prone Rural Areas in the Republic of Zambia (hereinafter referred to as "the Project") to the Japan International Cooperation Agency (JICA). JICA dispatched a basic design study team (hereinafter referred to as "the Study Team") to Zambia from 13th June to 31st August, 2000. As a result of a series of discussions held between the Department of Water Affairs, the Ministry of Energy and Water Development (DWA/ MEWD), which is the executing agency of the Project, and the Study Team, the following points were confirmed on the contents of the requests from Zambian side.

1-3-1 Confirmation of the Number of Borehole Water Supply Facilities to be Constructed

The requested number of the borehole water supply facilities for the Project was 300 in

total, but the list attached to the application form of the Project submitted by the Zambian government showed the total number of water supply facilities to be newly constructed under the Project as 302. As a result of confirmation of details regarding allocation of water facilities to each district, the DWA and the Study Team agreed to maintain the requested number of water facilities as 300 by adjusting the number of facilities in Kaoma district in Western province. The details of the number of facilities to be constructed in 6 districts in 3 provinces are described in Table 1-2.

Table 1-2 Details of the Requested Water Supply Facilities with Handpumps in the Target Districts

Province	District	Details of the facilities in the original request	Details of facilities after adjustment of requested numbers
Western province	Kaoma	69	67
	Sesheke	28	28
Central province	Mumbwa	69	69
Southern province	Namwala	35	15
	Itezhi-tezhi		20
	Kazungula	101	101
Total		302	300

1-3-2 Confirmation of the Study Sites

(1) Candidate Villages for Construction of Borehole Water Supply Facilities with Handpumps

As the candidate villages where 300 borehole water supply facilities are to be constructed under the Project were not indicated in the original request from the Zambian side, the Study Team requested the DWA to submit the list of candidate villages prior to commencement of the field survey and received a list including a total of 590 villages. The Study Team further requested the DWA to give priority of construction to the candidate villages in the list based on a decision made by both sides that the number of the study sites was to be the same as the number of facilities allocated to each district mentioned in 1-3-1 above. However for some districts, the DWA could not finish prioritising the candidate villages by the start of the field study. Thus, the Study Team selected 300 villages as the study sites among the 590 candidates in accordance with the consensus made during discussions among District WASHE Committee (D-WASHE), DWA and the Study Team in each district.

(2) Handling of the West Bank of Zambezi River

The west bank of the Zambezi River in Sesheke district, where a part of the study area is included, borders Angola. In this area, uncertain security conditions caused by the unstable situation within Angola were confirmed. For this reason, the Study Team proposed to exclude the villages located on the west bank of the Zambezi River in Sesheke district from the study sites in consideration of the state of peace and order.

While the executing agency agreed to this proposal from the Study Team, the Zambian side requested the Team to include provision of construction materials for water supply facilities in the Project component so that they would be able to construct facilities in the said area where the residents had suffered from severe damages by droughts.

(3) Candidate Villages for Component of Sub-Centre

The original request asked for construction of small-scale piped water schemes in 20 villages in terms of improvement of water supply in sub-centres. The candidate villages were, however, not indicated by the Zambian side for the field study. As a result of confirmation of the list of the candidates, the Zambian side made a request to the Study Team to examine 23 villages in total, as shown in Table 1-3, as the candidates for the component of sub-centres. The Study Team agreed with the executing agency to handle 22 villages as the study sites for the component of the sub-centres after exclusion of Katima Village which is located in the west bank of the Zambezi River in Sesheke.

Table 1-3 List of the Study Sites for the Component of the Sub-Centre

Province	District	Name of Sub-Centre	
Southern Province	Namwala	1	Moobola
		2	Muchila
		3	Kantengwa
		4	Banbwe
	Itezhi-tezhi	5	Nansenga
		6	Banamwaze
		7	Shimbizi
		8	Kanzwa
	Kazungula	9	Nyawa
		10	Sinde
		11	Momba
		12	Ngwezi
		13	Maknka
		14	Sekute
		15	Mambova
Western Province	Sesheke	16	Machile
		17	Mulobezi
		18	Bwina
		19	Mulauli
		20	Lipumpu
		21	Masese
		22	Katima*
		23	Sichili

*Excluded from the study sites due to its location in the west bank of the Zambezi River

1-3-3 Confirmation of Request for the Equipment and Materials

(1) Additional Request for New Drilling Machine and Others

Through the discussions with the executing agency for confirmation of requested items of equipment and the purpose of their usage, an additional request was made for procurement of new drilling machines, compressors, and spare parts for existing drilling machines. Items including these additional request are listed in Table 1-4.

The Study Team recorded this additional request in the minutes of discussions and determined the necessity of these equipment for appropriate project implementation based on the results of the survey in consideration of the existing drilling and related machines owned by the executing agency.

Table 1-4 List of the Equipment including the Additional Request

	Item	Q'ty	Remarks
1.	Cargo truck with crane for transport of construction materials (4 x 4) (6 x 6)	6 units	
2.	Light vehicles for survey, project management and supervision (4 x 4)	8 units	
3.	Motor-bikes for WASHE activities	18 units	
4.	Personal computers for survey and project management (including software and printers)	7 units	
5.	Materials for education meetings, materials for training, etc. under WASHE activities	1 lot	
6.	Standby equipment and materials for piped water supply at Sub Centres	1 lot	
7.	Drilling machines, tools and accessories	2 units	additional request
8.	Spare parts for existing drilling machines	1 lot	additional request
9.	Compressor	4 units	additional request

CHAPTER 2 CONTENTS OF THE PROJECT

Chapter 2 Contents of the Project

2-1 Objectives of the Project

The coverage rate of water supply in rural areas of Zambia remains at a level as low as about 30%. In consideration of this situation in rural water supply and sanitation, the Government of Zambia aims at raising the coverage in rural areas to 75% by 2015 based on the master plan formulated by "the Study of the National Water Resources Master Plan in the Republic of Zambia (1993-1995)" conducted by JICA.

The southern and western parts of Zambia including the target areas of this Project are prone to be affected by droughts. Therefore, residents have desired improvement and development of water supply facilities of which water sources will not dry up even at the time of droughts. However, the number of water supply facilities working in the Project areas is still 688 as of 1998, and the coverage rate remains at 22%. The Zambian government has set up quantitative indicators in the request of the Project that the coverage rate in the Project area will be increased to 40% at the completion of the Project and to 50%, which is equivalent to 1,598 water points in total, by 2005.

This Project is implemented based on "the National Water Policy" providing the basic principles on development of rural water supply and sanitation sector together with the development strategies for realisation of these principles. The Project aims at achievement of the project purpose mentioned below;

① Coverage rate of water supply in the Project area is improved from 22% as the status quo to 40%.
② Sustainable use of safe and stable water is enabled by the communities at the Project sites.
③ Capacity of the communities at the Project sites in operation and maintenance of water supply facilities constructed under the Project is developed in collaboration with district administrations.

2-2 Basic Concept of the Project

2-2-1 Examination of the Requested Contents

(1) Examination of Construction of Borehole Water Supply Facilities with Handpumps

The field survey was conducted at 300 villages in 6 districts of 3 provinces, which were selected among the candidates presented by the Zambian side, and besides, discussions and interviews were held with each district administration related to the Project in order to grasp the actual conditions of water supply in the study areas and examine the appropriateness of the Project. As a result, the actual situation in the study areas was confirmed where safe and stable water supply facilities were insufficient proportionately to inferior water supply conditions. It was also confirmed that the study sites were not overlapped by other donors' assistance programmes.

Regarding the requested contents of facilities, the adoption of borehole water supply facilities fitted with handpumps in the Project is considered to be appropriate from the situation of the spread, maintenance and management of handpump facilities and from hydrogeological conditions in the study areas.

As the list of candidate sites for assistance and amount of the materials required were not submitted by the executing agency at the time of the basic design study, the study team has decided not to accept the request for procurement of construction materials for borehole water supply facilities for West bank of the Zambezi River.

(2) Examination of Construction of Water Supply Facilities in Sub-Centres

In response to the request for introduction of a small-scale pipe water scheme with solar generating pump at the Sub-Centres, its appropriateness was examined as follows:

The field investigation was carried out at 22 villages fixed through the deliberation with the executing agency. Based on the results of the surveys, several villages were selected among the study sites for Sub-Centres from the aspects of size and formation of villages. In these villages, a detailed household survey was conducted by the local consultant under a subcontract and the final candidate sites for the component of Sub-Centres were narrowed down in the light of social conditions. The results of field

surveys on existing water supply at the 22 villages are summarised in Table 2-1.

Meanwhile, it was found in the technical meetings with the executing agency that the Zambian side targeted on improvement of water supply and sanitation at the public institutions only not mentioning improvement of the entire water supply situation in the said villages.

Advantages of introduction of the solar generating pump in water supply systems are that maintenance costs are cheaper than those of using a diesel engine in remote areas, and that it is possible to cope with areas behind in electrification. The initial cost, however, is still high as that of facilities, and it is indispensable that local agents are fully prepared for maintenance of systems. Therefore, introduction of this system requires careful examinations. In case of Zambia, it has a small number of experiences in adoption of the solar generating pump for water supply. As interviews with local agents showed their actual sales performance was low, a maintenance system including stock of spare parts is not established under an undeniable limited experience in popularity of solar systems.

On the other hand, in terms of formation of the Sub-Centres, the Study Team found that it was not cost effective to construct piped water schemes in the study sites where the households were scattered though these villages had some public utilities such as schools, clinics (or rural health centres), and markets.

The study sites for Sub-Centres are characterised by the fact that the number of water supply facilities with handpumps in operation is not enough for including domestic water for residents. Nevertheless, it is hard to say its consistence with the basic concept that the construction of water supply facilities in Sub-Centres primarily aims at improvement of water supply at public institutions if water facilities are installed in these villages under the Project only for satisfying the needs of domestic water for residents. In this context, the project sites for component of Sub-Centres were selected in consideration of necessity to improve the environment of water supply at public institutions like schools and clinics.

Water supply facilities to be constructed in these Sub-Centres are handpump water supply facilities with new developments of boreholes. Present conditions of water supply in the project sites for Sub-Centres are described below. Other villages surveyed as candidates are excluded from the project sites in this Project since the existing water supply facilities with handpumps are working mainly for use by schools and clinics.

Table2-1 Findings from the Site Investigation at the Candidate Sub-Centres

	Name of Village	Number of Existing Water Supply Facility with Handpump					Number of Water Facility in Use/ Total	Situation of Villages	Water Supply Condition	Appropriateness of Installation of New Water Facility with Handpump
		for Shoal		for Health Utilities		for Residents in the Community				
DISTRICT : NAMWALA										
1	Moobola	Primary	0	RHC	1	1 (broken down)	1/2	The village has a depot for maize and market as a centre of the areas.	A working water facility is common to school and RHC. Inconvenient because of the location of facility located far from these school and RHC. Confirmed lack of water facility for residents and the community requested for construction of additional number of facilities.	×
2	Muchila	Primary	0	RHC	0	1 (broken down)	0/1	Houses in the village are scattered and only school and RHC are located in the centre of the village. A water facility with handpump is installed within a cotton field.	Borehole is to be drilled for RHC in Aug. 2000 by DWA in a component of the Micro Project.	×
3	Katengwa	Secondary	1	PHC	1	1	3/3	The village is dotted with houses around a school. A PHC is located on the outskirts of the village.	Water facility with handpump is in use by Secondary school and PHC. Those of which are located 300m away from each other.	×
4	Baambwe	Basic	1	RHC	1	1	3/3	Houses are clustered close together and the residential area is large. RHC in the village receives patients from neighboring villages as well.	Piped water scheme used in the past is equipped handpump at the borehole. The facility has enough capacity to serve for the village.	×
DISTRICT : ITEZHI-TEZHI										
5	Nansengwa	Primary	1	PHC	1 (broken down)	0	1/2	RHC has the solar power generation system for room light and refrigerator. Houses are scattered in the village.	Each of school and RHC has borehole with handpump.	×
6	Banamwaze	Secondary	1 (broken down)	RHC	0	1 (broken down)	0/2	Houses are scattered around school and size of the village is small.	It is possible to repair handpump not working at present.	×
7	Shimbizi	Primary	1 (broken down)	PHC	0	0	0/1	Houses are scattered and the village itself is small.	School and RHC are common to water facility. Foundation of handpump has sunk.	○
8	Kaanzwa	Primary	1 (broken down)	RHC	1 (broken down)	0	0/2	The RHC has patients from surrounding villages as well.	It is possible to repair handpump not working at present. Problem of water quality was not found as a result of water quality test.	×
DISTRICT : KAZUNGULA										
9	Nyawa	Primary	1	PHC	0	0	1/1	The village has market and small groceries at the centre and the school receives many students from neighboring villages as well.	Water facility is common to PHC and school.	×
10	Sinde	Primary, Basic	0	RHC	0	1	1/1	Houses are scattered in the village.	Water facility is used properly and can serve enough for community.	×
11	Momba	Primary	0	RHC	0	1	1/1	Houses are scattered around school and RHC. The size of village is small.	Existing water facility can serve for residents because of the small area of village.	×
12	Ngwezi			RHC	1	1	2/2	A station is located within the village. The RHC receives patients from surrounding areas.	One borehole is in use with equipping handpump. Previously, the said borehole was used for water source of flush toilet which is not in use at present.	×

Table2-1 Findings from the Site Investigation at the Candidate Sub-Centres

	Name of Village	Number of Existing Water Supply Facility with Handpump					Number of Water Facility in Use/ Total	Situation of Villages	Water Supply Condition	Appropriateness of Installation of New Water Facility with Handpump
		for Shoal		for Health Utilities		for Residents in the Community				
DISTRICT : KAZUNGULA										
13	Makunka	Primary	0	PHC	3 in use/ 1 (brokendown)	1	3/4	A Catholic Mission is operating PHC. The community is well organised.	PHC is partially using diesel engine for water supply and room light. Due to old specification of the engine, spare parts are not available and they are considering to purchase new one. Community requested for water supply system with solar power generating system.	×
14	Sekute					1	1/1	All of the residents are using a borehole located in the centre of the village. It is slightly contaminated with sand. Windmill was previously equipped at the borehole.	Though windmill was used for pumping device previously, it has been replaced to handpump. Water facility can serve the community because of the small size of the village.	×
15	Mambova			PHC	0	2	2/2	Since a borehole located at the centre of the village is salinised, residents are fetching water from the Zambezi River. The other one is seemed to has fresh water though it is required to check the structure of well.	Residents fetch water from Zambezi River due to salinisation of groundwater. It is not suitable to construct new borehole due to problem of salinisation.	×
DISTRICT : SESHEKE										
16	Machile	Basic	1	RHC	0	0	1/1	Borehole with handpump is located at the centre of the village.	Existing water facility can serve for school and residents because of the small area of village.	×
17	Mulobezi	Basic	1	PHC	1	1	3/3	The village has large area with a sizable population since there was a sawmill. Though the number of boreholes are not enough for the amount of population, each borehole is distributed appropriately so as to serve these residents.	A part of the village has been turned into a slum after declining of forestry. It is difficult to ensure appropriate operation and maintenance in the present situation of the village.	×
18	Bwina	Basic	1	PHC	1 (broken down)	1	2/3	Most of residents are using water from stream without utilising boreholes. It is teachers and some members in the community that uses the borehole.	Residents do not know the means of maintenance and repair of handpump because of absence of capacity building of community in O & M. It is required to be settled antagonistic situation among groups in the community at first.	×
19	Mulauli							-	The village is served by piped water scheme.	×
20	Lipumpu	Basic	0	RHC	0	1	1/1	School is located next door of RHC. Houses spread over around these public facilities.	Salinisation was confirmed at the water source. Potential to develop new water source was analysed based on results of hydrogeological survey.	×
21	Masese	-	-	RHC	0	0	0/0	Most of the residents used to engaged in forestry which was promoted as a project previously.	The village has no handpump water facility but facility for rainwater harvesting. A new borehole with handpump is to be considered for improvement of present constraint in terms of water supply.	○
22	Katima	-	-	-	-	-	-	-	Excluded from the candidates because of the location of village at the West bank of the Zambezi River.	-
23	Sichili	-	-	-	-	-	-	-	The village has piped water scheme utilising surface water, which was constructed under the NORAD's support.	×

1) Shimbizi in Itezhi-tezhi district

Households are scattered in the village and the size of the village itself is small. An existing borehole water supply facility with handpump constructed in 1994 by Africare is located on the premises of a primary school in the village and shared with a PHC. The foundation of the handpump has sunk due to inappropriate construction, and is now not in use. As it is observed that there is a problem with the structure of the borehole, a borehole water supply facility with handpump is to be newly constructed under the Project to improve water supply at the primary school and the PHC.

2) Masese in Sesheke district

They have no borehole water supply facilities with handpump within the village. Though borehole developed for the forestry workers had been used with installation of a motor pump, it is left without any maintenance since its breakdown along with the transfer of the forestry sites. Residents in the villages pump water from this facility by operating the piston of the broken engine with manpower. A rural health centre located in the village uses shallow well and rainwater. The village does not have any school facilities. The Project constructs a borehole water supply facility with handpump at the rural health centre for the purpose of improvement of water supply.

(3) Examination of Procurement of Equipment and Materials

In the case where the period of project implementation is 2 to 3 years, it is required to have a formation of at least 4 teams for construction, estimating from experiences in past similar projects. The DWA owns 4 units of drilling machines at present and is available to dispatch a drilling team for operation of each drilling machine. Therefore, if there are drilling machines available to be allocated for the Project, it is possible to execute the construction works with the 4 teams. 3 of the 4 drilling machines were allocated in Central province under the “Rural Water Supply Development Project (Phase-III)” in 1992 and 1993, while the remaining one was procured under the “Non-Project Grant Aid” in 1989 and allocated in Southern province.

In the previous project named “the Southern Province Water Supply Project”, the construction works commenced after these machines had been repaired using spare parts procured under the said project. Survey in the present conditions of these

existing drilling machines resulted in a conclusion that all of them had received damages by continuous operation since their procurement. Nevertheless, 2 of the 3 machines procured in the Rural Water Supply Development (Phase III) are considered to be usable for the Project by repairing them with spare parts to be procured prior to the commencement of the construction works. Therefore, it is necessary for the Project to procure 2 units of new drilling machines as inputs for construction works in addition to the existing 2 drilling machines. For the existing drilling machines, procurement of spare parts and service at the earliest stage of the Project are included.

Contents of accessories to be attached to the drilling machines are limited to tools and parts necessary for the construction works under the Project since the objective of procurement of the equipment and materials is improvement of the water supply in the target sites of the Project.

(4) Examination of Establishment of Community Based Organisation and Capacity Building for Improvement of Operation and Maintenance System

The Government of Zambia has a policy on rural water supply and sanitation projects that the operation and maintenance system is to be established under community management and cost recovery by the communities based on the principles of the National Water Policy. In accordance with the same policy, the executing agency of the Project requires the Project to support facilitation of the operation and maintenance at the village level with the Village WASHE Committee (V-WASHE) which are to be established and capacities built through the WASHE activities. Existing interventions in water supply and sanitation by other donors and the Southern Province Water Supply Project under the Japan's grant aid have also adopted the approaches of the WASHE activities in the target areas of this Project. Consequently, it is possible to consider utilisation of the human resources such as the members of the District WASHE Committees (D-WASHE) for support activities to improve the operation and maintenance system in the Project. It is notable that each district also adopts the WASHE concept as the basic policy for water supply and sanitation projects.

Meanwhile, the D-WASHEs in the target districts vary in allocation of the trained human resources as well as capacity and system for implementation of the planned activities. It is considered to be appropriate that the Project supports to improve operation and maintenance system with enhancing community participation from the

stage of pre-construction so that the Project achieves its project purpose smoothly.

2-2-2 Examination of the Contents of the Project

The project sites for component of the Sub-Centres are to be dealt with as part of the project sites for construction of borehole water supply facilities with handpumps since means of water supply in these Sub-Centres have been concluded to use borehole with handpumps. The numbers of the water supply facilities to be constructed under the Project is compared with the original request in Table 2-2.

Table 2-2 Comparison of numbers of water supply facilities between the request and the basic design

Name of Facilities	Quantity	
	Request	Basic Design
1. Borehole water supply facilities with handpumps	300 water points	302 water points
2. Small-scale piped water scheme	20 systems	-

According to the contents examined above, the numbers of water points to be constructed in each district are summarised in Table 2-3.

Table 2-3 Breakdown of the Numbers of Water Points to be Constructed in each District

Province	District	Number of Water Points
Western Province	Kaoma	67
	Sesheke	29
Central Province	Mumbwa	69
Southern Province	Namwala	15
	Itezhi-tezhi	21
	Kazungula	101
Total		302

2-3 Basic Design

2-3-1 Design Concept

Contents of the Project are construction of 302 borehole water supply facilities with handpumps at the project sites located in 6 districts in 3 provinces and procurement of equipment and materials necessary for construction works and maintenance promotion

activities. The design concept of the Project is as follows:

(1) Water Supply Rate

The Project applies the Zambian standard for rural water supply projects as its water supply rate, i.e. 30 litres per capita per day. Since the project areas are prone to droughts in Zambia, improvement of water supply for domestic usage is expected by ensuring stable water supply with 30 litres per capita per day in the Project.

(2) Design Served Population

The DWA has a policy for rural water supply as sharing one borehole water facility with handpump by a population of 250. This is led by the planned pumping rate as 750 litres per hour and duration of water supply as 10 hours. In this context, the design served population of the Project is estimated as approximately 75,500 in total as calculated below.

750 litres/hour x 10 hours / 30 litres/capita/day = 250

250 users/ borehole x 302 boreholes = 75,500

(3) Design Water Supply Rate

According to the water supply rate per capita per day as 30 litres and the planned demand of population per borehole as 250, the design water supply rate per day is calculated as follows:

30 litres/capita/day x 250 users/borehole = 7,500 litres/day/borehole

The pumping capacity of handpumps to be introduced in the Project, which is mentioned in "2-3-3 (2) Planning of Water Supply Facility", is estimated at approximately 12.5 litres/minute (maximum 23 litres/minute) though it varies due to times of stroke and water level. On the condition that the running hours of the handpump per day is 10 hours, the water supply rate per day is:

12.5 litres/minute x 60 minutes/hour x 10 hours =7,500 litres/day

As the result, the pumping capacity of the handpump to be applied in the Project

satisfies the design water supply rate per day.

(4) Policy on Natural Conditions

Landforms of the Central, Southern and Western provinces covered by the Project are plateau rising 900m to 1,200m above sea level which have generally small relief. Main rivers in the Project areas are Kafue River rising from Busanga Marshland located in eastern part of the area and running southward as well as Zambezi River running southward in the western province. The direction of these rivers changes to the east around Itezhi-tezhi and Sesheke, respectively. As the geology of the Project area, strata from the Pre-Cambrian period to the Cenozoic are distributed. What will be dealt with is mainly alluvium, sandstone, basalt, limestone, shale, quartzite and granite. In the zone of base rock with low water permeability, cracks form an aquifer. While the average depth of boreholes that have been developed in past in the Project areas is approximately 70m, the results of geophysical prospecting carried out in the basic design study show that there are also villages where the expected depth of borehole is to be 100m to 130m (about 10% of all boreholes in the Project).

In Kaoma, Namwala and Sesheke, stratum water (sand/gravel) of the Kalahari group is the main aquifer. These aquifers are thin, and in some areas the collection of a large amount of water is difficult. In the western part of Sesheke and the eastern part of Kazungula, there are some areas with high concentration of salt where the water is not suitable to drink. Based on the analysis of materials collected in the study and the results of the geophysical prospecting, appropriate method for drilling and development of groundwater for each project sites are to be applied together with determination of the specification of the equipment necessary for these construction works.

(5) Policy on Social Conditions

The location of water supply facilities is to be selected after having close discussions among the communities in the project sites, DWA staff and related parties. Careful attention is to be paid in selection of location of water points in order to avoid concentration of the benefit of the Project for a certain group or households in the project sites without consensus in the community.

Majority of residents in the Project areas earns their living by small farming. It was confirmed through socio-economic and household survey in the Project sites that the

income generation and working at household level are generally patterned after seasonality of farming. Therefore, the WASHE activities to be conducted in the Project considers such calendar of communities for farming at each stage to gain community participation in the Project as well as the timing available for communities to raise maintenance fund for water facilities. Affordable ways of community contributions are also decided and managed by the communities themselves with advice from the external agencies related to the Project.

The roles of women as water resource users are required to be encouraged, as it is instrumental in the success and in the sustainability of the Project. It is the women who spend a substantial portions of time carrying water and is affected by the availability or lack of appropriate water facilities. Capacity building at the village and catchment area levels needs to contain enhancement of participation and leadership of women. Nonetheless, the results of some exercises with participatory manner conducted in the household survey show quite heavy workload of women and their involvement need to be sensitive to their own willingness and availability.

On the occasion of community dialogues to be held in a series of activities for community sensitisation, health education, formation of V-WASHEs and their capacity building, understanding of the Project by the traditional leaders in the project areas are also to be enhanced in consideration of their spiritual influences on the communities.

(6) Policy on Water Quality

The Project applies for the Zambian standard on water quality formulated based on the WHO's standard. However, due to the policy of the DWA to improve coverage of water supply, the standard has not been strictly applied in their own programmes. In the Project, appropriate water analysis is to be conducted at the drilling of boreholes. In case that the water quality at a certain project site does not satisfy the standard of Zambia, borehole is to be constructed only if mutual agreement is obtained from deliberation with the DWA. The upper 20m of the borehole is covered with cement to seal off water completely in order to prevent contamination of sewage and others from the surface.

(7) Policy on Success Ratio

The project areas have much experiences in development of boreholes in the projects of the DWA and the ones supported by the donor countries including Japan. The entire success ratio in the Project is examined based on those of every geological formation with referring to the data collected in terms of the existing boreholes developed by projects under the Japan's grant aid and from interviews with water engineers of the DWA. It is required for the success boreholes to meet conditions mentioned below:

1) Discharge: more than 0.75 m^3/hour
2) Dynamic water level: maximum 40m
3) Water quality: to satisfy Zambian Standard

The success ratio for each geological formation is described in Table 2-4.

Table 2-4 Success Ratio for Each Geological Formation

Formation	Success Ratio
Alluvium, laterite (sand, gravel, clay)	85%
Kalahari Group (sand, sandstone, gravel)	95%*
Karroo Group (basalt) (limestone, shale, sandstone)	78%
Katanga Group (limestone, marl, dolomite) (shale, sandstone, quartzite, schist)	53%
Basement (granite, quartzite, gneiss, schist)	62%
Average	75%

* actual results of Kaoma and Sesheke only

As a result of the geophysical prospecting consisting of the vertical electrical prospecting and horizontal electrical prospecting in the study, crack zones were confirmed even in the bedrock where the success ratio was generally low. Therefore, the success ratio of the Project is set as 80% which is higher than the results in the past.

(8) Policy on Unsuccessful Boreholes

If the conditions mentioned in above (7) are not met, the well will be judged unsuccessful. However, in case discharge is insufficient (dry well), the drilling will proceed up to 25% more of the originally estimated depth. If the unsuccessful possibility still remain, the drilling work will stop and proceed to start drilling in the optional second well point. At the same condition the second well was also unsuccessful, the village will be canceled and mobilized to another village. The reason for this is because the well siting is done based on detailed survey to choose the best place within the limited area of the village and the subsequent optional point will have a successful rate lower than the first point. Considering the limited execution period and cost benefit of the Project, it is reasonable to have two as maximum number of dry wells for each facility. Also, the DWA and Japanese side will explain in detail this drilling work policy for the villagers to have a comprehension by them.

(9) Policy on Water Supply Facility

The Project adopts a policy to construct borehole water supply facilities fitted with handpumps in consideration of formation of villages as the project sites and maintenance of facilities based on the community management.

The INDIA MARK II is the most popular handpump type in Zambia at present, and is considered to be a "de facto" standard. In this context, the Zambian government is promoting standardisation of handpump type to INDIA MARK II which has already been spread and used nation-wide. Paying attention to inadequate distribution system of spare parts in the country, however, standardisation of the handpump has not been completed yet. The Project applies for the optimum type of handpump in terms of costs, durability, ease of operation and maintenance at village level, and other factors without sticking to the INDIA MARK II only. Table 2-5 shows the results of comparison between the INDIA MARK II and handpump with riser pipe made of PVC.

Table 2-5 Comparison of Advantages/ Disadvantages between Two Types of Handpump

Compared Factors	Handpump with riser pipe made of PVC	INDIA MARK II
Riser Pipe	PVC	Galvanised steel
Characteristic of the material	a. superior to durability and electrical corrosion b. light weight and easy to install c. low cost d. inferior to strength and shocks e. inferior to resistance to organic solvent, heat and ultraviolet rays	a. superior to strength against shocks b. light weigh and easy to process c. requires consideration of electrical corrosion d. requires consideration of water quality
Price of the body	approx. US$750.-	Approx. US$ 800.-
Maintenance	a. easy to repair plunger and replace spare parts without pulling up riser pipe b. available to pull up riser pipe with simple maintenance tools c. available to get PVC pipes in Zambia d. available for village level operation and maintenance e. required to train the APMs f. required to pay attention at pulling up riser pipe because of weakness of material	a. required to pull up riser pipe to repair plunger b. requires a set of special maintenance tools kept by the APMs for pulling up riser pipe due to its weight c. difficult to maintain only at the village level d. has established training manuals for the APMs
Spare parts	a. requires establishment of distribution network for spare parts to introduce into the country b. required to establish distribution system of spare parts to realise village level maintenance	a. has not established distribution network for spare parts in spite of promotion of standardisation b. required to establish distribution system of spare parts to facilitate village level maintenance
Pumping rate per stroke	0.44 litres	0.32 litres
Weight of riser pipe	73kg/ 50m	171kg/ 50m

The appurtenant facilities such as apron, drainage and fence for water supply facilities allocated in the Project are to be constructed by the residents of the project sites, in order to enhance their sense of ownership and facilitate smooth launch of the operation and maintenance activities at the village level after completion of the Project. The Area Pump Menders (APMs) have responsibilities to involve in mobilisation of and instruction to communities and V-WASHEs on construction of these facilities under the technical advice by the Japanese Contractor.

Majority of the residents in the project sites are small farmers heavily relying their cash income on crops and they do not necessarily have particular income sources through the year. Therefore, the Project sets the demarcation of scope of works between the Zambian side and Japanese side that the installation of handpump and procurement of construction materials for apron and drainage are under the responsibilities of Japanese side while the construction of these appurtenant facilities is to be conducted by the communities. The appurtenant facilities are designed as simple as possible so that communities can easily construct and maintain them, in accordance with the standard design in Zambia.

(10) Policy on the Construction Works by the Executing Agency

Three types of implementation system of the construction works were compared to plan the formation of construction teams in the Project, i.e. appoint of local private companies, utilisation of drilling teams of the DWA, and use of both local private companies and the DWA.

The study found around ten private drilling companies existing in Zambia. Some of these companies have experiences in construction of boreholes under the programme funded by UNICEF. Since many projects for borehole construction including those of UNICEF in Zambia adopt the piecework system to these contractors, they generally move to other water points with good conditions in case of facing difficulty in hydrogeological conditions. This has been one of the factors to prevent the private sector from improving their capacity in terms of development of groundwater and drilling works.

Meanwhile, water engineers and geophysicist of the DWA have experiences in involving in similar rural water supply project and training courses with co-operation by the donor countries including Japan. Similarly, their technology on drilling of boreholes has improved with support of technical transfer received from the Japanese

Contractor during the Southern Province Water Supply Project. After completion of the Project, the experience has been utilised in other programme.

Compared with the experiences of groundwater development in the remote areas with hard hydrogeological condition and technical skills of personnel between the DWA and the local private companies, it is judged that the DWA has human resources with basic knowledge and skills required for execution of construction works in the Project.

Sections and personnel of the DWA to engage in the Project implementation are the Groundwater Resources Section, especially Groundwater Development Unit, Drilling Section and Water Resource Management Section at the headquarter, water engineers in the Provincial Water Engineer Offices and officers in charge of the DWA district offices.

(11) Policy on Operation and Maintenance of the Constructed Water Supply Facilities

Based on the National Water Policy adopted and realised through WASHE concept in rural water supply and sanitation sector in Zambia, the V-WASHEs formed by the communities where the water points are located are primarily responsible for operation and maintenance of water supply facilities. Further, the V-WASHEs are required to make consensus on rules on use and maintenance of facilities in user community as well as to manage the action plans for improvement of water supply and sanitation through the process of planning, implementation, monitoring and evaluation.

(12) Policy on the Construction Schedule

1) Working Days necessary for Construction of a Borehole

Table 2-6 shows working days necessary for construction of a borehole in consideration of natural conditions and accessibility to the project sites.

Table 2-6 Working Days necessary for each Construction Process of Borehole

Construction Process	Working Days per Borehole
Mobilisation and temporary works	1.0
Drilling of borehole	2.0
Well logging	0.5
Installation of casing	0.5
Well development	1.0
Demobilisation and move to the next site	0.5
Total	5.5/ borehole

In consideration of experiences in the previous project and hard conditions of accessibility to the project sites, the number of necessary days for drilling in the rainy season is determined to be 11 days/borehole on the assumption that work efficiency reduces to half.

2) Duration of the Construction Works

On the assumption that the number of drilling machines to be used is 4 and the actual working days for drilling per month is 26 for construction of 302 boreholes in total under the Project, the duration of the construction works in consideration of work efficiency in rainy season is as follows;

[Dry season]

(26 days / 5.5 days/borehole) = 4.7 boreholes/month x 9 months = 42.3 boreholes/year

[Rainy season]

(26 days / 11 days/borehole) = 2.4 boreholes/month x 3 months = 7.2 boreholes/year

Average number of boreholes to be drilled per month = 4.1 boreholes/month

The period of construction works is calculated as follows by using the rate of 4.1 boreholes/month mentioned above and the success rate as 80%;

302 boreholes / 0.8 / (4.1 boreholes/month x 4 drilling machines) = 23.0 months

3) Procurement of the Equipment and Materials

It takes 8 months in total from order to delivery of drilling machines and spare parts of the existing ones to the designated sites. The period includes 6 months for delivery and 2 months for transport and customs clearance. The schedule for service of the existing drilling machines is planned with reference to this condition.

The Project is to be implemented divided into 3 phases as a result of examinations of working schedule as mentioned above. Therefore, the first phase is spent for procurement of the planned equipment and service of existing drilling machines and the related equipment while actual execution of drilling works is under the component of the second and the third phases. The contents of the Project in each phase are as follows;

Phase-1: procurement of the equipment and materials, service of the existing drilling machines and the related equipment
Phase-2: procurement of the equipment and materials, construction of borehole water supply facilities with handpump
Phase-3: construction of borehole water supply facilities with handpump

(13) Policy on Procurement of the Equipment and Materials

Among the equipment and materials to be covered by the Project, those which are not hindered by anything in quality and procurement of a sizable quantity will be considered procurement in Zambia or surrounding countries. Equipment which are in common use locally has advantage in terms of accessibility to the spares for maintenance and to service. On the other hand, spare parts and other consumables for equipment which were procured in the past project under the Japan's grant aid will be procured from Japan.

2-3-2 Condition of Design

(1) Criteria for Selection of the Project Sites

The Project aims at realising provision of water supply to as many villages as possible in the target areas in order to take a preventive measure against affect by drought. The field study was conducted at 302 villages in total as the candidate sites for construction of 302 borehole water supply facilities with handpumps based on the principle that one water supply facility would be constructed per Project site. The Project sites were selected with the criteria described below, compared to the results of hydrogeological survey, geophysical prospecting, socio-economic conditions survey, and investigation on water supply conditions at each study site. A total number of 285 villages were selected as the Project sites among the surveyed 302. (For the Project sites, see "2-3-3 (1) The Project Sites and Number of Water Supply Facilities")

[Criteria for Selection of the Project Sites]

- Population is 100 or more.
- There are no water supply facilities to provide safe and stable water.
- There is a willingness to establish V-WASHE.
- There is a willingness to pay a maintenance cost.
- It is possible to carry equipment in.
- There is groundwater potential.

(2) Selection of Water Sources

It is important to select water sources that will be able to supply the necessary volume of water hygienically, continuously and at a stable rate in the areas covered by the Project. It is also required to select places which are most convenient for residents to access for use and maintenance. As water sources in the target areas of the Project, stream, spring, shallow well and boreholes can be mentioned. Among these water sources, water from river or stream requires running cost for purification. Spring and hand-dug well are to be excluded from the water source in the Project since both have possibility of contamination of water from the ground surface artificially or naturally; rather, clean and stable water from the confined aquifer shall be used as water sources. It was confirmed that the target areas of the Project had confined groundwater that met the conditions mentioned above and that it was technically possible to develop this water.

(3) Conditions of Design of Water Supply Facilities

The design conditions in the Project are as established below.

① Project sites: 285 villages
② Design served population: 250 users/ borehole
250 users x 302 boreholes = 75,500
③ Water supply rate: 30 litres/capita/day
④ Number of water supply facilities to be constructed: 302
⑤ Success rate for drilling work: 80%
⑥ In case of unsuccessful borehole at the first point, the second point is to be drilled within the same village. If unsuccessful at the second point as well, the said village is excluded from the project site.
⑦ Discharge rate: more than 0.7 m^3/hour
⑧ Pumping devise: to be used with riser pipe made of PVC
⑨ Diameter of casing: 100mm
⑩ Average drilling depth: 70 m
⑪ Water quality: Zambian standard is to be applied.
⑫ Design of appurtenant facilities: based upon the standard design of WASHE

2-3-3 Basic Design

(1) Project Sites and Number of Water Supply Facilities

In consequence of selection of the Project sites from the 302 candidates based on the criteria mentioned in 2-3-2 (1), 285 villages have satisfied the criteria while the remaining 17 were not included in the target since these did not meet the conditions. As a policy of the Project, adjustment of the number of water supply facilities requested by the Zambian side is not considered in the process of project implementation, in order to ensure improvement of water coverage rate in the target areas.

Table 2-7 shows the numbers of the Project sites and the requested water supply facilities in each district.

Table 2-7 Details of Water Supply Facilities to be Constructed and the Project Sites in the Target District

Target Areas		Number of the Project Sites	Number of Facilities
Western province	Kaoma district	63	67
	Sesheke district	27	29
Southern province	Namwala district	15	15
	Itezhi-tezhi district	20	21
	Kazungula district	93	101
Central province	Mumbwa district	67	69
Total		285 villages	302 boreholes

1) Number of Water Supply Facilities in Each Project Site

The Project aims at providing water supply to as many villages in the target areas as possible. For villages that have been determined to be covered by the Project, one water facility will be constructed per village, in principle. It was, however, confirmed during the field survey that there were villages requiring 2 or more wells due to density of population and shape of villages. A second well shall be constructed at these villages with higher priority.

2) Handling of Cases Impossible to Construct Borehole

Some villages might be excluded from the Project sites at the time of drilling

borehole due to hydrogeological conditions or problems accompanying establishment of V-WASHE. In this case, without reducing the number of borehole water supply facility as an output of the Project, the said construction of borehole is to be allocated to other sites. The priority order in this case was made according to the following criteria. Table 2-8 is the list of the Project sites, and Fig. 2-1 shows a location map of these Project sites.

[Criteria for Scoring the Order of Priority]

① The village has any experiences in establishment of community-based organisation (such as village development committee, Women's Group, Agriculture Committee and others) to cope with common issues within the community (2 points)

② The village has a school. (2 points)

③ The village has a health utility (such as clinic, Rural Health Centres, Health Post, and others). (1 point)

* In case that more than one village has same points in total as a result of prioritisation among the Project sites, the village which has the largest amount of population among them is to be given the first priority.

(2) Planning of Water Supply Facilities

1) Structure of Boreholes

Specifications of the borehole as water source are described below. Also, Fig. 2-2 shows the standard borehole structure.

① Diameter of borehole

The drilling diameter shall be 162 to 215 mm, and casing diameter shall be 100 mm.

② Drilling depth

Drilling depth will differ according to hydrogeological conditions in the target areas. The average drilling depth is calculated as 70m by analysing well depth, depth of aquifers, lithology, static water levels, and location of fracture zones and weathered zones referring to the existing borehole data, in addition to the results of hydrogeological survey and geophysical prospecting in the target areas. Refer to the Appendix-6(1) The Result of Geoelectrical Prospecting.

③ Casings and screens

As casings and screens made of PVC are light and durable for transportation

Table 2-8 List of the Project Sites

Priority	No.	Village Name	Population	No. Borehole	Groundwater Potential	Access	Existing Well	Priority				Remarks
								Existing Village Committee	School	Clinic	Total	
CENTRAL PROVINCE: MUMBWA DISTRICT												
1	MB-43	Maimweene Scheme	1,440	2	○	○	1	2	2	1	5	
2	MB-26	Nakamwenda	985	2	○	△		2	2	1	5	
3	MB-33	Shilangabwe (B)	950	1	○	○		2	2	1	5	
4	MB-56	Chamakumba	750	1	○	△		2	2	1	5	
5	MB-29	Mulonda	700	1	○	◎		2	2	1	5	
6	MB-69	Shimbwasame	680	1	△	△		2	2	1	5	
7	MB-64	Musokotwani	495	1	○	◎		2	2	1	5	
8	MB-32	Buntiti School	350	1	○	○		2	2	1	5	
9	MB-62	Maluza	250	1	○	○		2	2	1	5	
10	MB-18	Mulela School	960	1	○	○	1	2	2		4	Existing HP in the village
11	MB-30	Kalwazhi	950	1	○	◎		2	2		4	
12	MB-63	Shikacila	670	1	○	○		2	2		4	
13	MB-51	Kapotwe	652	1	○	△		2	2		4	
14	MB-16	Kachoya	650	1	○	○		2	2		4	
15	MB-15	Mweete/Mwando	157	1	○	○		2	2		4	
16	MB-11	Kapeela	1,000	1	○	◎		2		1	3	
17	MB-31	Mabeele	970	1	○	○		2		1	3	
18	MB-8	Shabasonje RHC	800	1	○	◎			2	1	3	
19	MB-7	Chikonka	700	1	○	△			2	1	3	
20	MB-17	Chimaundu	580	1	○	○			2	1	3	
21	MB-10	Chibomboma	520	1	○	◎			2	1	3	
22	MB-12	Chitanda	450	1	○	◎			2	1	3	
23	MB-25	Changwe	450	1	△	△		2		1	3	
24	MB-9	Shacileza	450	1	○	◎			2	1	3	
25	MB-27	Molomo	375	1	△	△			2	1	3	
26	MB-65	Kanuti	360	1	○	◎	1	2		1	3	Existing HP in the school
27	MB-57	Chipuluka	300	1	○	△		2		1	3	
28	MB-36	Shangabwe	280	1	○	○			2	1	3	
29	MB-52	Malembeka/Chilambe	156	1	○	○			2	1	3	
30	MB-55	Kafwabwe	950	1	○	◎			2		2	
31	MB-2	Kasumpka	850	1	○	○			2		2	
32	MB-6	Mwachulabantu	850	1	○	◎			2		2	
33	MB-49	Bulungu School	700	1	○	◎			2		2	
34	MB-3	Shichumpalubanje	672	1	○	○			2		2	
35	MB-22	Shikabila	650	1	△	○			2		2	
36	MB-34	Kang ' omba	580	1	○	○			2		2	
37	MB-28	Lumano	560	1	○	◎			2		2	
38	MB-23	Nzovu	500	1	△	○	1		2		2	Existing HP in the school
39	MB-50	Chitambala East	500	1	△	○			2		2	
40	MB-1	Mwanachindalo	496	1	○	○			2		2	
41	MB-46	Kazoka	473	1	○	◎		2			2	
42	MB-61	Chiyaba	465	1	○	○			2		2	
43	MB-68	Chilele	400	1	○	○		2			2	
44	MB-21	Muzungu	350	1	△	○		2			2	
45	MB-20	Malende School	250	1	△	○		2			2	
46	MB-5	Shamilimo	250	1	△	◎			2		2	
47	MB-44	Chipata	890	1	○	○				1	1	
48	MB-40	Mulangu	700	1	○	○				1	1	
49	MB-59	Kabolesha	280	1	○	◎				1	1	
50	MB-47	Kabesha	250	1	○	○				1	1	
51	MB-45	Shamabanse	200	1	△	○				1	1	
52	MB-14	Musutu	980	1	○	◎					0	
53	MB-58	Ndabandaba	980	1	○	○					0	
54	MB-13	Shaachele	870	1	○	◎					0	

Priority	No.	Village Name	Population	No. Borehole	Groundwater Potential	Access	Existing Well	Priority				Remarks
								Existing Village Committee	School	Clinic	Total	
55	MB-35	Nakanjoli	800	1	○	○					0	
56	MB-41	Chimbwe	800	1	△	◎					0	
57	MB-37	Kasalu	650	1	△	△					0	
58	MB-24	Nsaka	550	1	○	○					0	
59	MB-19	Mulobela	530	1	○	○					0	
60	MB-67	Mulimba	520	1	○	○					0	
61	MB-48	Kachoya	400	1	○	○					0	
62	MB-60	Mupealbantu	370	1	○	◎					0	
63	MB-39	Kaili	300	1	○	○					0	
64	MB-42	Muntanga	300	1	○	△					0	
65	MB-66	Mweega	300	1	○	◎					0	
66	MB-4	Shichongo	175	1	○	○					0	
67	MB-38	Kasumbalesa	170	1	○	△					0	
-	MB-53	Kateya		0	○	○	Excluded from the list because O&M will be difficult					
-	MB-54	Kalenda		0	○	○	Excluded from the list because O&M will be difficult					
	Total	67 villages/69 wells	38,541	69								
	SOUTHERN PROVINCE: ITEZHI-TEZHI											
1	ITZ-6	Shalooba Palace	800	2	○	○		2	2	1	5	
2	ITZ-18	Idyamaala	700	1	○	○		2	2	1	5	
3	ITZ-12	Mulimbwa/Buzhiba	600	1	○	○		2	2	1	5	
4	ITZ-16	Nanjuwa	500	1	○	○		2	2	1	5	
5	ITZ-17	Muwezwa	500	1	○	○		2	2	1	5	
6	ITZ-19	Samundengo	500	1	○	○		2	2	1	5	
7	ITZ-21	Shimbizi	500	1	○	○		2	2	1	5	
8	ITZ-15	Muunga RHC	300	1	△	○		2	2	1	5	
9	ITZ-13	Shapama/Nkobo East	250	1	△	○		2	2	1	5	
10	ITZ-11	Shamuchinda	93	1	○	○		2	2	1	5	
11	ITZ-14	Kabanga School	500	1	○	○		2	2		4	
12	ITZ-20	Itumbi Palace	598	1	○	○		2		1	3	
13	ITZ-7	Mahunga/Mooba	400	1	○	○		2		1	3	
14	ITZ-2	Nsokosho	270	1	△	○		2		1	3	
15	ITZ-1	New Ngoma	157	1	○	○		2		1	3	
16	ITZ-4	Makona	700	1	○	○		2			2	
17	ITZ-5	Kantalimwa	672	1	○	○		2			2	
18	ITZ-3	Shantebe/Selibelo	328	1	○	○		2			2	
19	ITZ-9	Shinampambe/Kangongwe	240	1	○	○		2			2	
20	ITZ-10	Iblamunzi	150	1	○	△		2			2	
-	ITZ-8	Manimbwe/Shikaba		0	×	○	Excluded because low hydrogeological potential					
	Total	20 villages/21 wells	8,758	21								
	SOUTHERN PROVINCE: NAMWALA DISTRICT											
1	NW-2	Simanje	683	1	○	○		2	2	1	5	
2	NW-9	Kasonkomwa RHC	600	1	○	○		2	2	1	5	
3	NW-12	Inongwe(B) RHC	500	1	○	○		2	2	1	5	
4	NW-11	Kawilizhi School	400	1	○	○		2	2	1	5	
5	NW-8	Munyangombe	400	1	○	○		2	2	1	5	
6	NW-15	Hamapondo	3,000	1	△	△	1		2	1	3	Existing HP in the school
7	NW-14	Shababwe/Hamapondo	2,000	1	○	△			2	1	3	
8	NW-10	Nalukwale	700	1	○	○	1		2	1	3	Existing HP in the school
9	NW-7	Chisumpule RHC	700	1	○	○			2	1	3	
10	NW-6	Munjile/Hakaloba	600	1	○	○		2		1	3	
11	NW-3	Chilumino RHC	400	1	△	△			2	1	3	
12	NW-4	Njili RHC	300	1	△	○			2	1	3	
13	NW-1	Musemu RHC	240	1	○	○			2	1	3	
14	NW-5	Makalo	200	1	○	○			2	1	3	
15	NW-13	Malembele	150	1	○	△			2		2	
	Total	15 villages/15 wells	10,873	15								

Priority	No.	Village Name	Population	No. Borehole	Groundwater Potential	Access	Existing Well	Priority				Remarks
								Existing Village Committee	School	Clinic	Total	
SOUTHERN PROVINCE: KAZUNGULA DISTRICT												
1	KZ-72	Nyawa	14,077	2	△	○	1	2	2	1	5	Existing HP in the school
2	KZ-10	Mandia RHC	1,600	2	○	○	1	2	2	1	5	
3	KZ-9	Kabuyu RHC	1,375	2	○	○		2	2	1	5	
4	KZ-89	Siamwala/Lwiindi	1,110	2	○	△		2	2	1	5	
5	KZ-83	Siampuli	1,095	2	○	◎		2	2	1	5	
6	KZ-56	Siamundele	900	2	△	△	1	2	2	1	5	Existing HP in the school
7	KZ-4	Kauwe RHC	800	2	○	○	1	2	2	1	5	
8	KZ-68	Chilangu/Mandandi	625	2	○	○		2	2	1	5	
9	KZ-12	Sekute School	600	1	○	○	1	2	2	1	5	Existing HP in the Clinic
10	KZ-58	Chilefwe	570	1	○	○		2	2	1	5	
11	KZ-88	Ndela	456	1	○	△		2	2	1	5	
12	KZ-67	Sikoobosya	450	1	○	△		2	2	1	5	
13	KZ-77	Siakasipa	450	1	○	○		2	2	1	5	
14	KZ-61	Muntanga	435	1	○	△		2	2	1	5	
15	KZ-47	Siakasipa Namwaba	375	1	○	△		2	2	1	5	
16	KZ-69	Chakuziba	375	1	○	△		2	2	1	5	
17	KZ-54	Kayingu	360	1	△	△		2	2	1	5	
18	KZ-76	Chumbumutwe	360	1	○	△		2	2	1	5	
19	KZ-93	Sianyemba	360	1	○	○		2	2	1	5	
20	KZ-15	Nachilinda School	345	1	○	◎		2	2	1	5	
21	KZ-34	Siansimbi	345	1	○	○		2	2	1	5	
22	KZ-7	Siakasipa RHC	315	1	△	○		2	2	1	5	
23	KZ-55	Wachila	300	1	○	△		2	2	1	5	
24	KZ-70	Lukuni	300	1	○	○		2	2	1	5	
25	KZ-30	Sandonji	296	1	○	○		2	2	1	5	
26	KZ-17	Kazungula Basic School	267	1	○	◎		2	2	1	5	
27	KZ-82	Mabbonga	264	1	○	△		2	2	1	5	
28	KZ-97	Sianyemba	250	1	○	○		2	2	1	5	
29	KZ-101	Chooma River School	212	1	○	○		2	2	1	5	Existing HP in the school
30	KZ-33	Siakabale	184	1	△	△		2	2	1	5	
31	KZ-44	Mungole	150	1	○	◎		2	2	1	5	
32	KZ-20	Kanyoze School	128	1	△	△		2	2	1	5	
33	KZ-27	Ngandu School	450	1	○	◎		2	2		4	
34	KZ-11	Nguba RHC	400	1	○	○	1	2	2		4	Existing HP in the school
35	KZ-28	Nampuyani School	380	1	○	○		2	2		4	
36	KZ-18	Lunungu School	300	1	○	○		2	2		4	
37	KZ-19	Saala School	280	1	△	○		2	2		4	
38	KZ-13	Simukombo School	270	1	○	◎		2	2		4	
39	KZ-22	Mankodi School	180	1	○	△		2	2		4	
40	KZ-6	Katapazi RHC	4,000	1	○	○	1	2		1	3	Existing HP in the school
41	KZ-8	Chilale/Bombwe RHC	350	1	○	△		2		1	3	
42	KZ-16	Maria Mahachi	250	1	○	◎		2		1	3	
43	KZ-1	Namukaba School	170	1	△	○			2	1	3	
44	KZ-40	Muzambwe	774	1	○	○		2			2	
45	KZ-24	Libala School	748	1	○	○		2			2	
46	KZ-87	Siamukwena	540	1	○	○		2			2	
47	KZ-49	Dwadwa	460	1	○	○		2			2	
48	KZ-43	Shindu	400	1	○	○		2			2	
49	KZ-5	Leuleu	400	1	○	○		2			2	
50	KZ-94	Simwando	400	1	○	○		2			2	
51	KZ-66	Sangu	389	1	△	○		2			2	
52	KZ-65	Makamisa	364	1	○	○		2			2	
53	KZ-59	Chileya	360	1	○	△		2			2	
54	KZ-79	Siakayuwa	360	1	○	○		2			2	
55	KZ-96	Syakalima	360	1	○	○		2			2	
56	KZ-25	Kapunda	300	1	○	○		2			2	
57	KZ-26	Mushwalumuku	300	1	○	○		2			2	

Priority	No.	Village Name	Population	No. Borehole	Groundwater Potential	Access	Existing Well	Priority				Remarks
								Existing Village Committee	School	Clinic	Total	
58	KZ-35	Siamukuta	300	1	○	△		2			2	
59	KZ-62	Likunyi	300	1	○	◎		2			2	
60	KZ-75	Malimbuluti	300	1	△	○		2			2	
61	KZ-36	Mupotola	289	1	○	◎		2			2	
62	KZ-57	Inonge	288	1	○	◎		2			2	
63	KZ-42	Siachalwa	282	1	△	◎		2			2	
64	KZ-37	Ngwezi	280	1	○	○	1	2			2	1 private HP
65	KZ-84	Machabwa/Kasumo	280	1	○	△		2			2	
66	KZ-81	Mumbwatasai	278	1	○	◎		2			2	
67	KZ-98	Sichiyasa	260	1	△	◎		2			2	
68	KZ-29	Lubango/Simulinda	250	1	○	◎		2			2	
69	KZ-85	Siatubi	250	1	○	◎		2			2	
70	KZ-92	Sianyinyiti	250	1	○	◎		2			2	
71	KZ-52	Lingamba	248	1	○	○		2			2	
72	KZ-64	Muzandu	240	1	○	○		2			2	
73	KZ-73	Mutoka	240	1	○	○		2			2	
74	KZ-63	Chikuni	225	1	○	○		2			2	
75	KZ-46	Muzumbwe	222	1	○	○		2			2	
76	KZ-78	Jama Sialwindi	218	1	○	△		2			2	
77	KZ-39	Makumba	210	1	○	◎		2			2	
78	KZ-80	Muduli	210	1	○	○		2			2	
79	KZ-91	Sibbobole	200	1	○	△		2			2	Existing HP in the school
80	KZ-41	Siachuma	190	1	○	◎		2			2	
81	KZ-45	Kapule	190	1	○	△		2			2	
82	KZ-95	Siamapa	186	1	△	◎		2			2	
83	KZ-48	Shybuyani	182	1	○	○		2			2	
84	KZ-32	Sialwiindi	180	1	○	○		2			2	
85	KZ-86	Siansundi	180	1	△	○		2			2	
86	KZ-90	Syakalundu	180	1	○	△		2			2	
87	KZ-99	Sankope	180	1	○	○		2			2	
88	KZ-50	Mungole/Siachibuye	162	1	○	△		2			2	
89	KZ-51	Libonda	154	1	△	△		2			2	
90	KZ-31	Simbeza	150	1	○	○		2			2	
91	KZ-74	Chileya	138	1	○	○		2			2	
92	KZ-2	Chitebe Settlement	200	1	○	○					0	
93	KZ-3	Chika Chipongo	180	1	○	◎					0	
-	KZ-100	Lubinda	-	0	×	○		Excluded because of low hydrogeological potential				
-	KZ-14	Kasaya School	-	0	×	○		Excluded because of low hydrogeological potential				
-	KZ-21	Sichifulo School	-	0	-	○	1	Excluded because existing HP is sufficient				
-	KZ-23	Sihumbwa School	-	0	-	○	2	Excluded because existing HP is sufficient				
-	KZ-38	Mungambwa	-	0	×	○		Excluded because of low hydrogeological potential				
-	KZ-53	Siankunku	-	0	○	○		Excluded from the list because O&M will be difficult				
-	KZ-60	Lubasi RHC	-	0	×	○		Excluded because of low hydrogeological potential				
-	KZ-71	Diabanji/Sianyumbu/Mateele	-	0	○	○		Excluded from the list because O&M will be difficult				
	Total	93 villages/101 wells	50,986	101								
WESTERN PROVINCE: KAOMA DISTRICT												
1	KA-67	Mangango Shopping Center	4,215	2	○	◎		2	2	1	5	
2	KA-7	Sipalo School	980	2	○	○		2	2	1	5	
3	KA-17	Helen Kaunda Section	665	2	○	◎		2	2	1	5	
4	KA-45	Manjolo	480	2	○	◎		2	2	1	5	
5	KA-39	Lizobo	430	1	○	○		2	2	1	5	
6	KA-10	Kankomba School	420	1	○	○		2	2	1	5	
7	KA-24	Chilombo School	350	1	△	○		2	2	1	5	
8	KA-43	Lububa	350	1	○	◎	1	2	2	1	5	Existing HP in the school
9	KA-62	Lombelombe School	350	1	○	○		2	2	1	5	
10	KA-18	Roads Camp School	257	1	○	◎		2	2	1	5	
11	KA-44	Mambumbu	254	1	○	◎		2	2	1	5	
12	KA-15	Mutondo School	180	1	○	△		2	2	1	5	
13	KA-65	Kambweize School	146	1	○	△		2	2	1	5	

Priority	No.	Village Name	Population	No. Borehole	Groundwater Potential	Access	Existing Well	Priority				Remarks
								Existing Village Committee	School	Clinic	Total	
14	KA-11	Kandoyana	130	1	○	○		2	2	1	5	
15	KA-63	Kamakokwa School	500	1	○	○		2	2		4	
16	KA-57	Winda School	496	1	△	○		2	2		4	
17	KA-30	Mutoleka School	490	1	○	△		2	2		4	
18	KA-9	Mungulungwa School	480	1	○	○		2	2		4	
19	KA-21	Kaoma Prim. School	400	1	○	◎	1	2	2		4	Existing HP in the village
20	KA-52	Sempyeka/Mutesi	220	1	○	◎		2	2		4	
21	KA-58	Mushwala School	132	1	△	○		2	2		4	
22	KA-13	Lima Section	1,120	1	○	◎			2	1	3	Same area of KA67
23	KA-31	Kanyanyu	800	1	○	△			2	1	3	
24	KA-29	Tamboka	600	1	○	○	1		2	1	3	Existing HP in the village
25	KA-35	Mbundu	480	1	△	△			2	1	3	
26	KA-46	Shimboela	400	1	○	○			2	1	3	
27	KA-66	Mangongi School	387	1	○	◎			2	1	3	
28	KA-64	Kabilulwe School	350	1	○	○			2	1	3	
29	KA-54	Kalumba	330	1	○	◎			2	1	3	
30	KA-27	Kapupa	312	1	○	◎			2	1	3	
31	KA-5	Chivuli School	286	1	○	○			2	1	3	
32	KA-41	Makeni	274	1	△	○		2		1	3	
33	KA-2	Libinga	265	1	○	○			2	1	3	
34	KA-36	Muzangabantu	250	1	○	○		2		1	3	
35	KA-40	Ngimbu	231	1	○	◎			2	1	3	
36	KA-33	Ngoma Roads Camp	210	1	○	○			2	1	3	
37	KA-60	Lyamunale School	158	1	○	○			2	1	3	
38	KA-37	Mpande	155	1	○	○			2	1	3	
39	KA-49	Malulu/Kazanzu	118	1	○	◎		2		1	3	
40	KA-53	Mukunkiki School	118	1	○	◎			2	1	3	
41	KA-51	Katunda/Chiwasha	680	1	○	◎		2			2	
42	KA-47	Mukunkiki/Mboyonga	600	1	○	◎		2			2	
43	KA-25	Kalukundwe	310	1	○	○		2			2	
44	KA-42	Litoma	300	1	○	○			2		2	
45	KA-28	Kacholola/Likomeno	250	1	○	◎		2			2	
46	KA-32	Lemvu School	144	1	○	◎			2		2	
47	KA-50	Shingangu	133	1	○	○			2		2	
48	KA-8	Kandende School	115	1	○	○			2		2	
49	KA-3	Kambanga	99	1	○	◎		2			2	
50	KA-6	Kangolongolo School	75	1	○	△			2		2	
51	KA-1	Chikondo/Kamuni West	65	1	○	○			2		2	
52	KA-26	Kalamba Turn Off	685	1	○	○				1	1	
53	KA-34	Kankulo	270	1	○	△				1	1	
54	KA-38	Kawanda PHC	176	1	△	○				1	1	
55	KA-12	Shunduma	135	1	○	○				1	1	
56	KA-4	Chizeze/Machile	612	1	○	◎					0	
57	KA-23	Mahilo West	456	1	○	◎					0	
58	KA-19	Nabowa	400	1	△	◎					0	
59	KA-55	Winda RHC	357	1	△	△					0	
60	KA-22	Samasengo	310	1	△	◎					0	
61	KA-48	Liwema/Mihozhi	240	1	○	△					0	
62	KA-16	Kashompa	225	1	○	○					0	
63	KA-20	Kafubu	135	1	△	◎					0	
-	KA-14	Kasoka	-	0	×	○		Excluded because of low hydrogeological potential				
-	KA-56	Luambua School	-	0	○	○		Excluded from the list because O&M will be difficult				
-	KA-59	Mushwala Scheme	-	0	○	○		Excluded from the list because O&M will be difficult				
-	KA-61	Namshakasha School	-	0	○	○		Excluded from the list because O&M will be difficult				
	Total	63 villages/67 wells	25,541	67								
WESTERN PROVINCE: SESHEKE DISTRICT												
1	S-6	Mangamu School	600	2	○	◎		2	2	1	5	
2	S-5	Manyekanga School	500	2	○	◎		2	2	1	5	
3	S-7	Nangombe	450	1	○	○		2	2	1	5	

Priority	No.	Village Name	Population	No. Borehole	Groundwater Potential	Access	Existing Well	Priority				Remarks
								Existing Village Committee	School	Clinic	Total	
4	S-19	Nawinda RHC	409	1	○	○		2	2	1	5	
5	S-23	Munyeula	200	1	△	△		2	2	1	5	
6	S-12	Mukenani	160	1	○	◎		2	2	1	5	
7	S-28	Lumbo	150	1	△	○		2	2	1	5	
8	S-20	Lupasa	140	1	△	◎		2	2	1	5	
9	S-16	Masamu	500	1	○	◎		2		1	3	
10	S-2	Kamenyani	450	1	○	△		2		1	3	
11	S-18	Sanponde	400	1	○	○		2		1	3	
12	S-10	Eliya	310	1	○	◎		2		1	3	
13	S-21	Mbanga	310	1	○	◎		2		1	3	
14	S-1	Chibula	300	1	○	○		2		1	3	
15	S-26	Samutuma	300	1	○	○		2		1	3	
16	S-8	Nakanzi	300	1	△	○		2		1	3	
17	S-9	Adonsi	300	1	○	○		2		1	3	
18	S-22	Kasaya	250	1	○	◎		2		1	3	
19	S-13	Kasikili	200	1	○	◎		2		1	3	
20	S-24	Tukalo	200	1	○	△		2		1	3	
21	S-14	Chimwaya	150	1	○	◎		2		1	3	
22	S-27	Namwinga	100	1	△	○		2		1	3	
23	S-29	Masese RHC	2,500	1	○	◎		2			2	
24	S-17	Lunga	300	1	△	◎		2			2	
25	S-25	Likanyisa	250	1	○	◎		2			2	
26	S-3	Twangula	135	1	○	◎		2			2	
27	S-4	Mbuyoti	130	1	○	○		2			2	
-	S-11	Sanembo School	-	0	○	○	1	Excluded because existing HP is sufficient				
-	S-15	Mukwitwa	-	0	×	○		Excluded because of low hydrogeological potential				
	Total	27 villages/29 wells	9,994	29								
TOTAL： 285 villages/302 wells			144,693	302								

HP: Borehole with hand pump
O&M: Operation and Maintenancee

Remarks： Hydrogeological Potential
○ : Have Potential
△ : Have potential at specified place
× : Low potential

Access for drilling rig
◎ : Approachable even in the rainy season
○ : Approachable only in the dry season
△ : Is necessary to clear the bush or repair the road (not approachable in the rainy season)
× : Not approachable

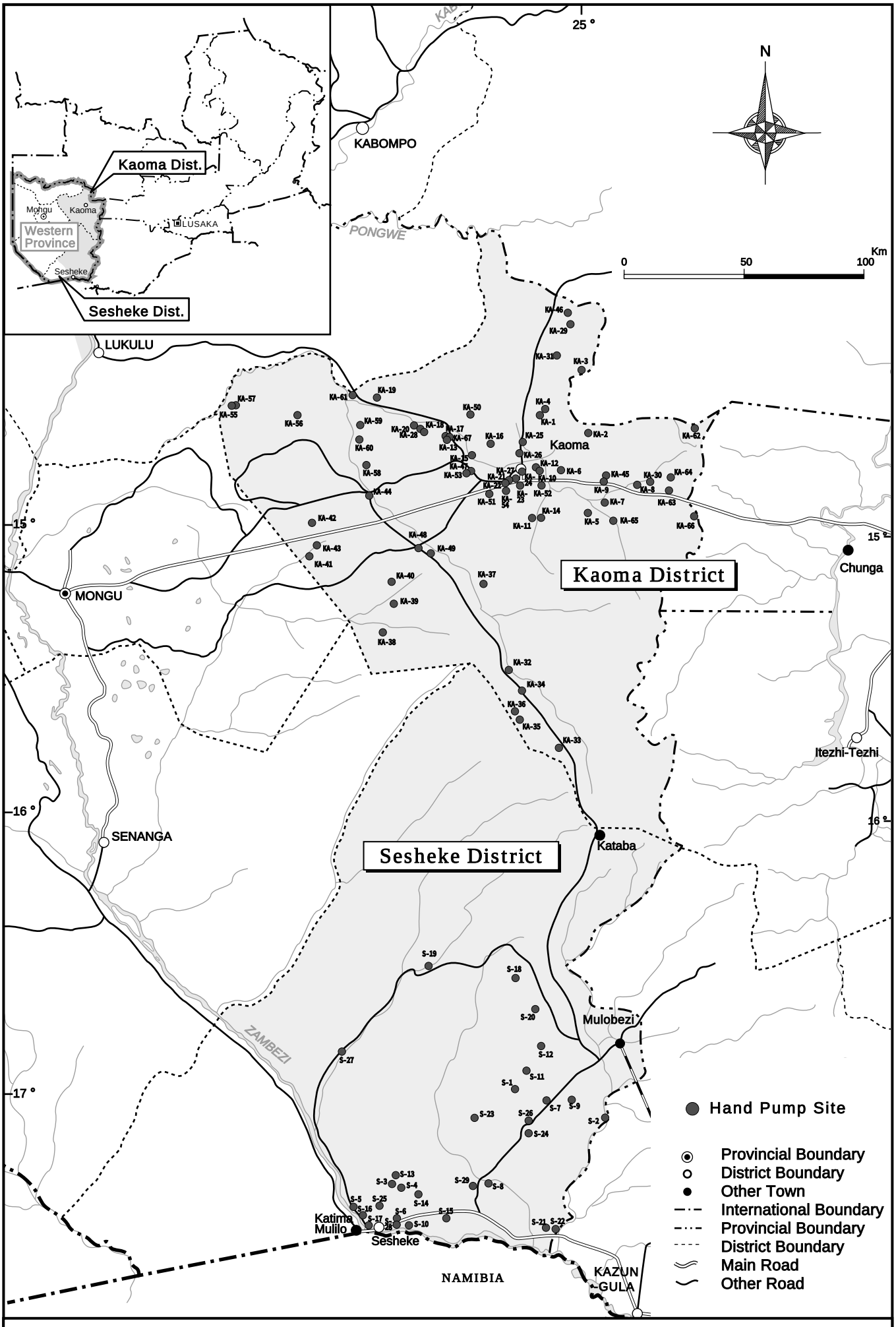


Fig.2-1(1) Location Map of the Project Sites (Kaoma and Sesheke District)

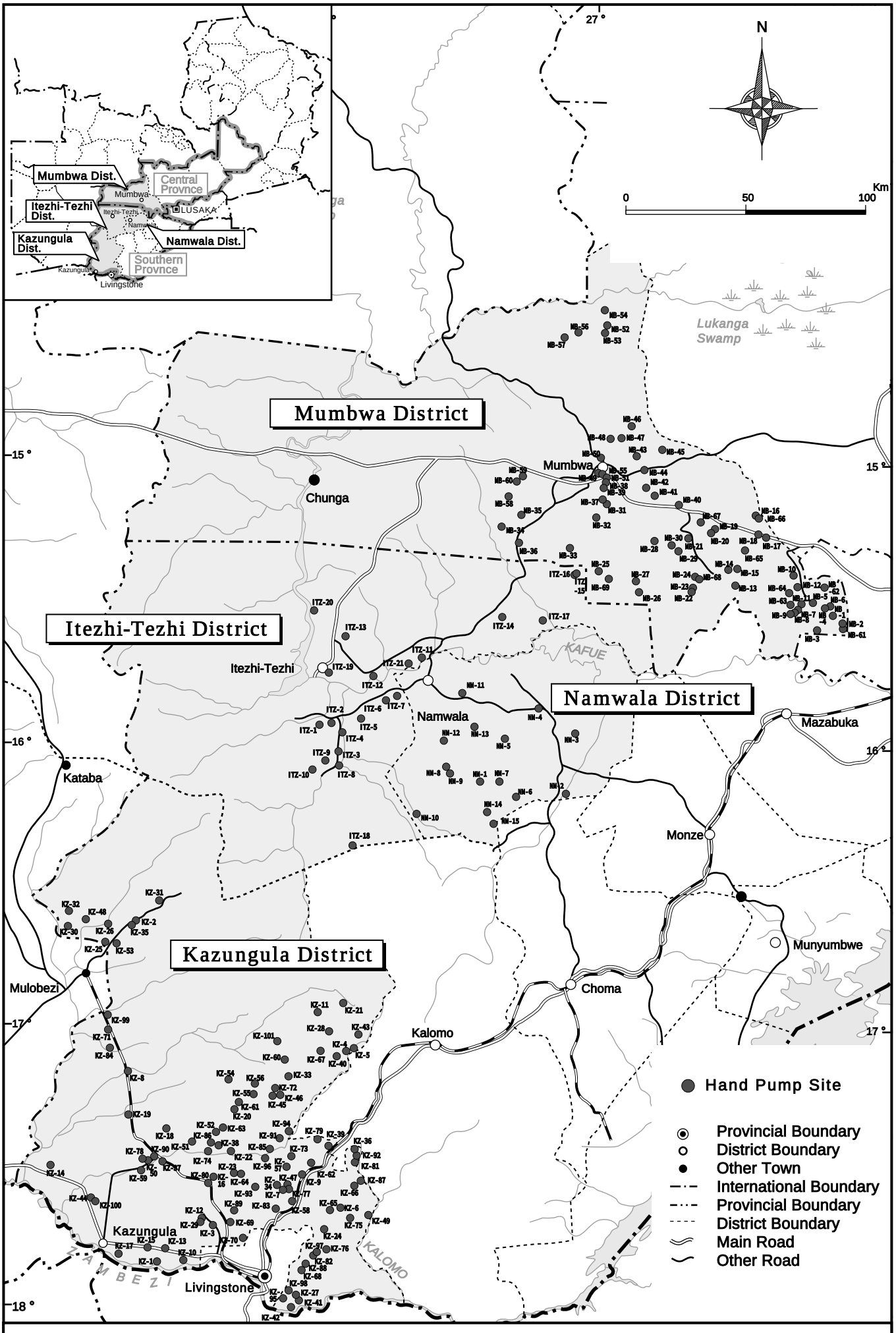


Fig.2-1(2) Location Map of the Project Sites (Mumbwa, Namwala, Itezhi-Tezhi and Kazungula District)

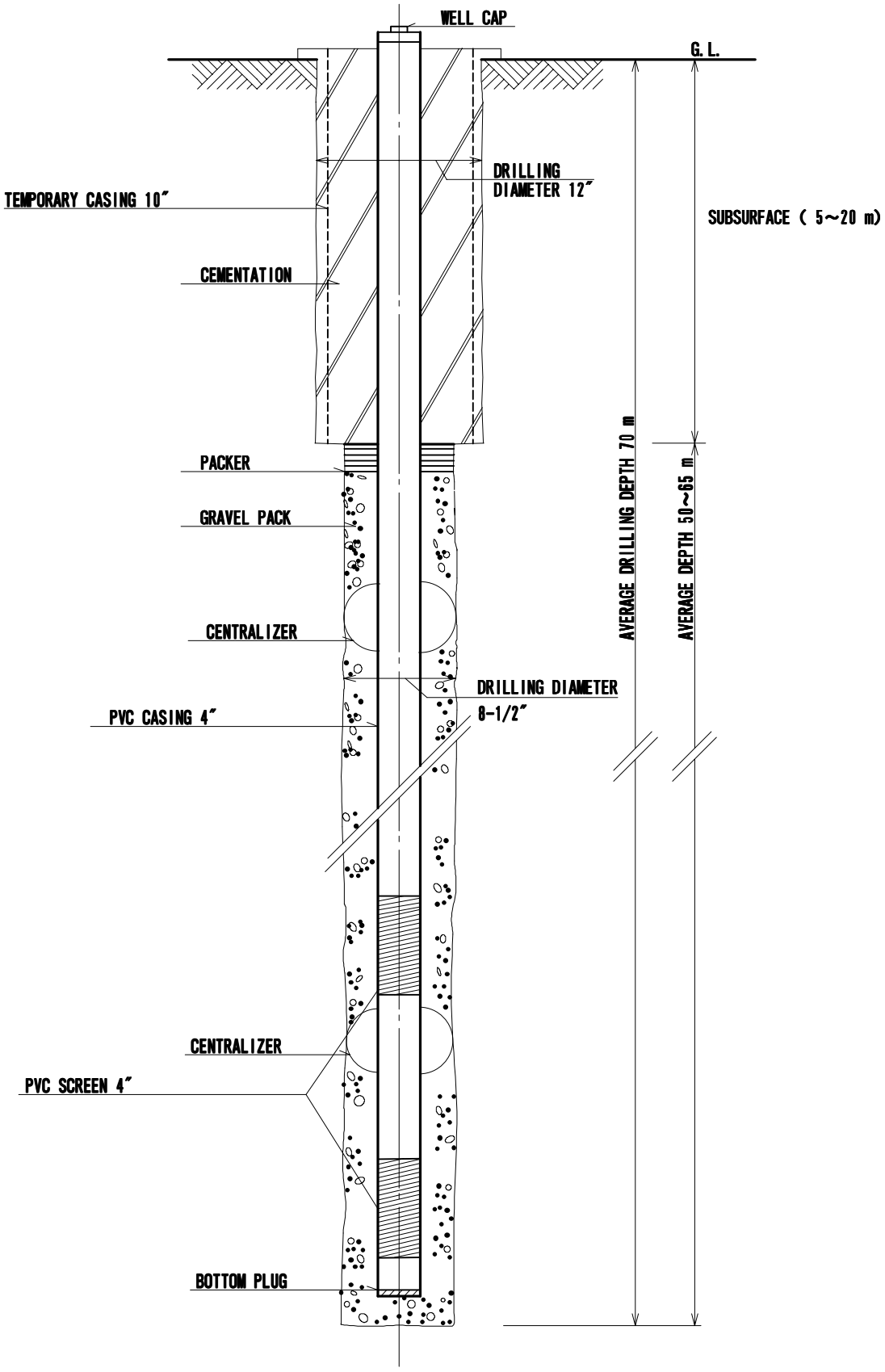


FIG.2-2(1) STANDARD BOREHOLE STRUCTURE (MUD DRILLING)

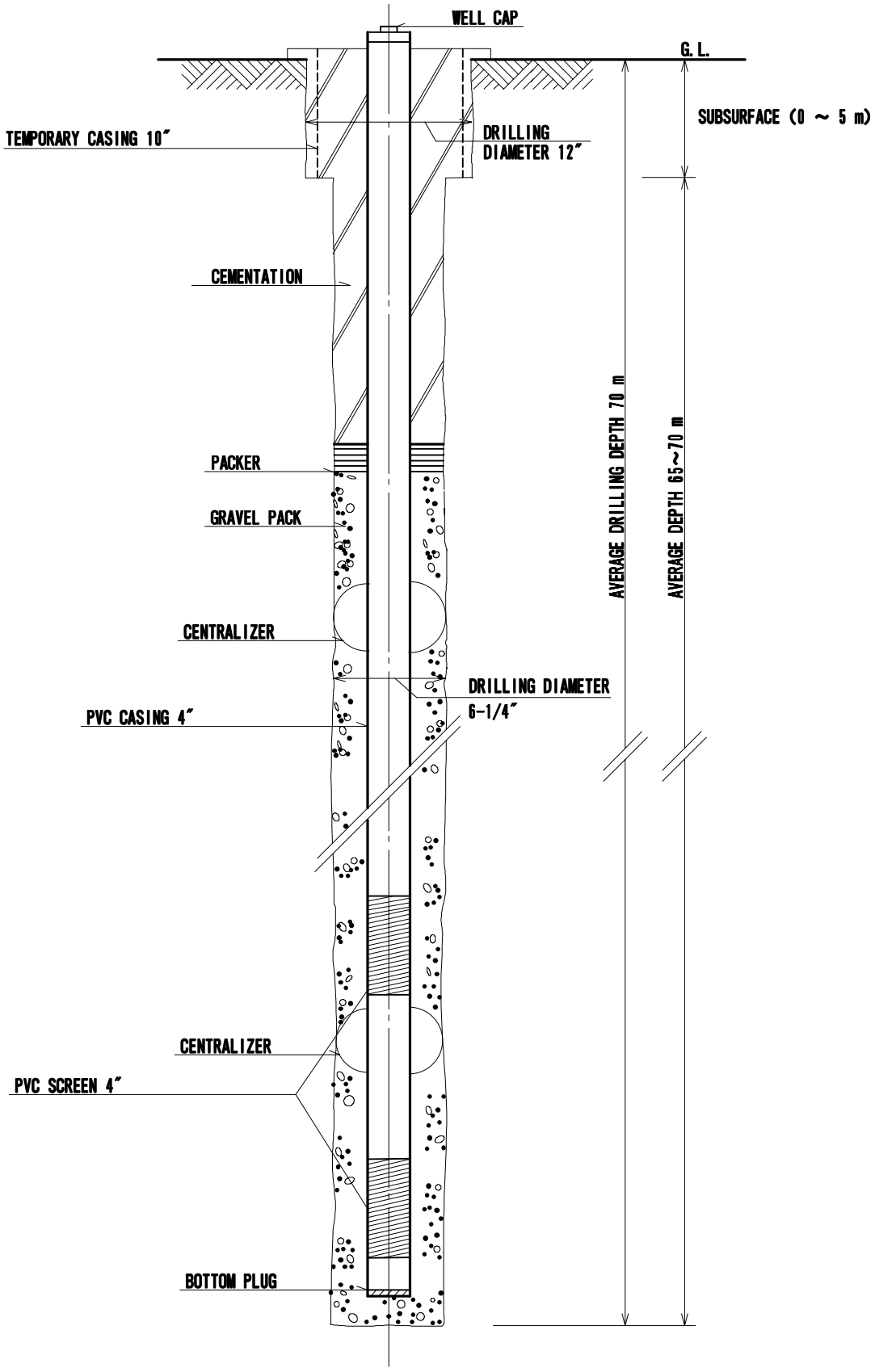


Fig.2-2(2) STANDARD BOREHOLE STRUCTURE (DTH DRILLING)

and working, and have been used by the DWA so far, these shall be used in the Project as well. Each unit length and others shall be standard ones. If the drilling depth in average is 70 m, the ratio of the total length of screen and casing per borehole will be estimated as 30% of well depth (about 21 m) and 70% (49 m), respectively, based on the hydrogeological analysis.

④ Centraliser

A centraliser shall be equipped so that screens and casings are properly installed at the centre of the drilled boreholes.

⑤ Cementing and gravel packing

The borehole shall be sealed with cement in the upper part up to 20m according to geological conditions in order to prevent an inflow of the contaminated water from the ground surface. Gravel of selected size shall be filled between aquifer and screens.

2) Pumping Devise

① Material

The government of Zambia is presently facilitating standardisation of INDIA MARK II which riser pipe is made of steel. While riser pipes made of steel have some advantages, those which used PVC, which is not affected strongly by water quality, will be introduced to the Project in consideration of influence of water quality to the steel.

② Maintenance

Because the type of handpump currently in use in Zambia has self-weight, at least 4 persons are required to pull up the riser pipe for repair. In addition, these works require special tool kits generally kept by the Area Pump Menders. After comparison of each advantages and disadvantages between the INDIA MARK II and the handpumps with PVC riser pipes as shown in Table 2-5, the type of handpump to be applied in the Project was decided as those of PVC for reason of its easiness to maintain by the community.

3) Appurtenance Facilities

Appurtenant facilities of water supply facilities include aprons, drainage, and fence. Design of these facilities varied in each project before the WASHE concept states necessity to standardise design, construction method, and means of maintenance as the communities are primarily responsible for the construction and maintenance of these appurtenance facilities. In the Project, as mentioned in

"2-3-1 (9) Policy on Water Supply Facility", materials necessary for construction of facilities will be procured under the responsibility of the Japanese side while the communities are responsible for construction under technical advise by the Japanese contractor. Fig. 2-3 shows the standard water supply facility to be constructed in the Project.

(4) Planning of the Equipment and Materials to be Procured

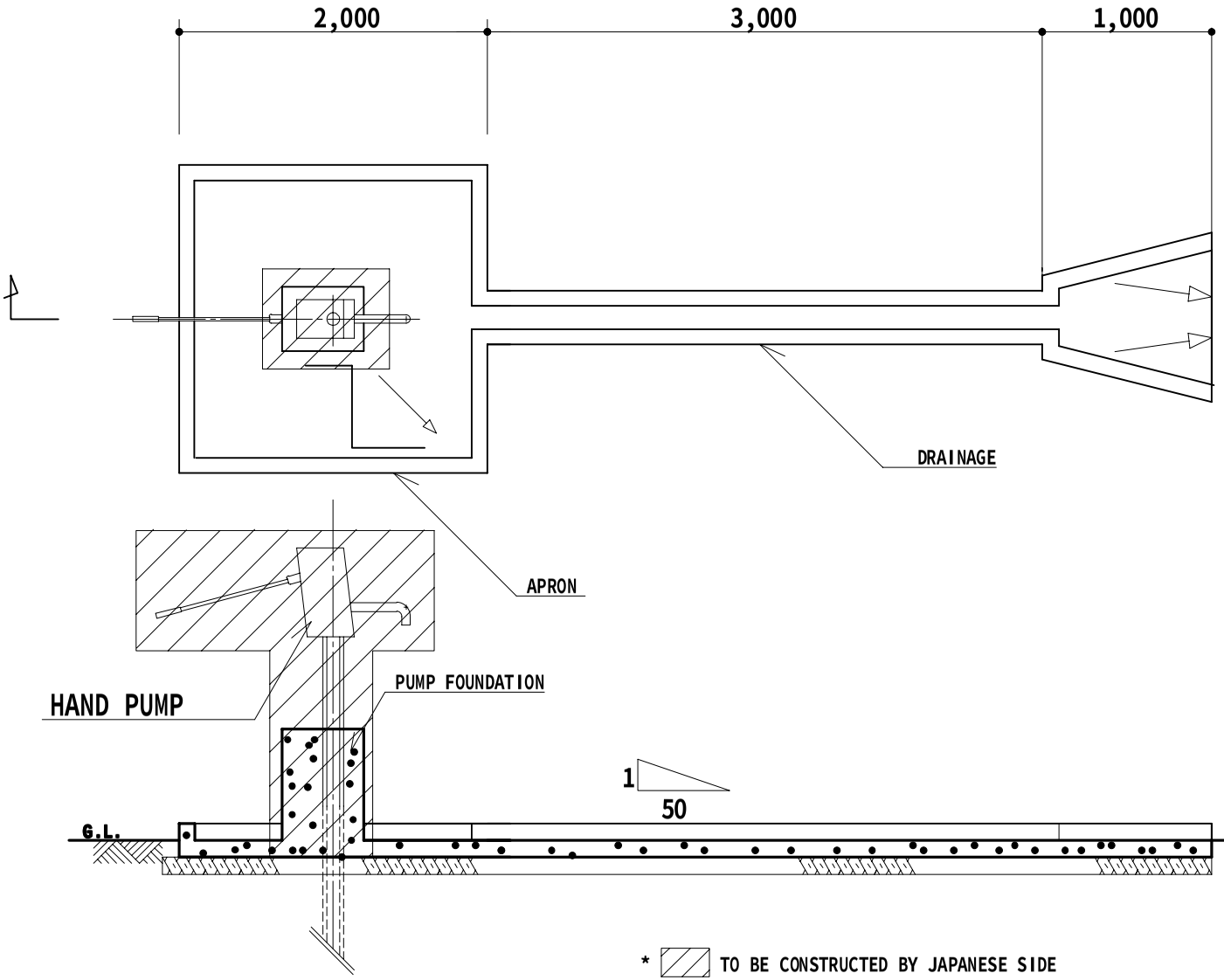
The items and their usage of equipment and materials to be procured in the Project are summarised as follows;

1) Drilling Machines

The drilling machines to be newly procured are required to have the following capacities in order to use different drilling methods and estimated drilling depth according to the geological structure of the target areas to be covered by the Project: a) to have a capacity of DTH drilling more than 130m with using 158mm hammer bit, and b) to have a capacity of direct mud circulation more than 100m with using 215mm tricorn. The DTH drilling will be used for operation in Mumbwa and Kazungula where hard rock such as hard sandstone, shale and granite distribute, while the mud circulation will be applied to drilling where alluvium and soft sandstone are confirmed in Namwala, Kaoma and Sesheke districts. In order to secure smooth operation of drilling, diameter of a drill pipe is to be 4-3/4" due to the quantities of air and mud circulation. The selected specifications are those that can cope with the maximum drilling depth of 150m (drilling diameter of 215mm) so that the drilling works in other areas in Zambia are also to be promoted by the said equipment even after the completion of the Project.

2) Standard Tools and Accessory for Drilling Machines

The tools necessary for the drilling works include those for mud circulation drilling, DTH drilling, installation of casing pipes, and fishing tools to pull up in the case of failure. Hammers for DTH drilling shall be procured after estimating the number necessary for works in the target areas and then calculating based on geological conditions.



0 0.5 1 2 3 m

* TO BE CONSTRUCTED BY JAPANESE SIDE

* APRON AND DRAINAGE : TO BE CONSTRUCTED BY THE VILLAGERS
(MATERIALS WILL BE PROCURED BY JAPANESE SIDE)

FIG.2-3
STANDARD WATER SUPPLY FACILITY

JAPAN TECHNO

3) Compressors

As DTH drilling will be indispensable for development of groundwater in the Project due to geological condition, the equipment is required to have capacity to supply quantities of air and pressure suitable for the drilling diameter. Considering mobility under the bad condition on accessibility to the Project sites, two compressors shall be those mounted on trucks. As 2 units of trucks owned by the executing agency will be also utilised for mounting compressors in the Project, 2 sets of compressors mounted on trucks are to be newly procured together with another 2 sets (only body).

4) Pumping Test Equipment

This will be used for pumping tests of new boreholes. A complete set of generator, submersible motor pump, pumping pipes, water level meter and instrument to measure the well discharge will be mounted on cargo truck. This equipment was not originally included in the request from the Zambian side, but it was judged that 1 set of the equipment was necessary for the Project as a result of confirmation of conditions of supporting vehicles owned by the executing agency.

5) Trucks for Construction Works

① Cargo truck for transportation of construction materials (6 x 6, with 4t crane)
This truck will transport materials necessary for construction of boreholes. Transporting materials and equipment necessary for one borehole requires several trips. Considering the conditions of the distance and access from the base camp, it is necessary to always run one cargo truck for transportation of materials for each drilling machine.

② Cargo truck for transportation of water and fuel for construction works (4 x 4, with 3t crane)
As places where fuel can be purchased are limited in the target areas of the Project, the purchase of fuel requires running a truck over a considerable distance, and it is impossible that one truck can cover two or more sites. This truck is used for procurement and transportation of water for construction works and for domestic use as well as these activities for fuel . The number of trucks, however, shall be reduced by using water and fuel tanks that can be unloaded.

③ Fuel and water tanks

These tanks are used for transportation of water and fuel to each site. Considering the effective use of trucks, tanks that can be loaded on cargo trucks shall be procured. Structure shall be stout because frequent loading and unloading will be repeated during construction works. Sufficient corrosion-resisting processing shall be applied to water supply tanks.

6) Equipment for Support of WASHE Activities

For the purpose of utilisation in the process of WASHE activities including community sensitisation, establishment of V-WASHE and their capacity building, the following equipment will be procured in the Project.

① Motorbike

Motorbikes will be used for means of transportation of the Extension Staff who involve in establishment of V-WASHE, training in participatory approach to the operation and maintenance of the water supply facilities as well as hygiene education during WASHE activities in the Project under supervision by NGO. Also they are expected to utilise the procured motorbikes for monitoring activities after the completion of the Project.

② Personal Computer

The equipment will be procured for the purpose of support to the management of well inventory in each target district. In case the District Council and/or the DWA office in the district have already installed the computers, these new ones are to be allocated for producing and maintaining of well inventory when necessary.

7) Spare Parts for the Existing Drilling Machines

Two of 4 drilling machines to be used under the Project, their supporting vehicles and related equipment were allocated to the Central province under the “Rural Water Supply Development Project (Phase III)” in 1992 and 1994. The present conditions of these equipment for construction of boreholes were confirmed in this study. Although all of them were damaged, it was judged that, if parts were procured and service was executed, these machines would be able to be utilised in the implementation of the Project, hence procurement of tools and accessories for service of these equipment.

Table 2-9 shows the list of equipment to be procured under the Project.

Table 2-9 List of the Equipment and Materials to be Procured in the Project

Equipment	Contents		Specifications	Q'ty
1. Truck Mounted Drilling Machine	1-1 Drilling Machine		Type: Mud circulation and DTH drilling Top head drive rotary drilling machine Basic capacity: 150 m (drilling ϕ8-1/2") (with 4-3/4"O.D. drill pipe)	2 sets
		Mount truck	4 x 4, GVW15000kg, 200PS aprox.	
		Mud pump	600lit/min x 25 kgf/cm^2 aprox.	
	1-2 Standard Accessories			2 sets
	1-3 Tools for mud drilling		Drill pipe: O.D. 4-3/4"x 6.0m, flush type 3-1/2" IF box Drill collar: 127 mm O.D. x 3 m, 3-1/2"1 IF box	2 sets 2 sets
	1-4 Tools for DTH drilling		DTH hammer: for 6" to 10"	2 sets
	1-5 Fishing tools	Fishing tap (male/ female) hydraulic jack (30t), etc.		2 sets
	1-6 Miscellaneous	Welder, tools for mud pump and equipment, water tank, mud testing kit, camping tools, etc.		2 sets
2. Compressor	2-1 Compressor (truck mounted)		21m^3/min x 20kg/cm^2 aprox. (4x4)	2 units
	2-2 Compressor (Body)		21m^3/min x 20kg/cm^2 aprox.	2 units
3. Pumping test equipment	3-1 Pumping test equipment		Submersible motor pump: 80 lit/min. x 60 mH x 1.5 kW Generator: 6.5 KVA x 230V x 50 Hz Control panel, cable, water meter, valves, water level meter, conductivity meter, pH meter, PVC pipe for water level meter, tools for assembling and disassembling	3 sets
	3-2 Truck for the equipment transportation		4 x 4, with 3t crane, 6t payload	1 unit
4. Supporting cargo truck for drilling works	4-1 Cargo truck for drilling materials		6 x 6, with 4t crane	2 units
	4-2 Cargo truck for water and fuel tank		4 x4, with 3t crane	2 units
	4-3 Water tank		2 m^3	2 units
	4-4 Water tank		4 m^3	2 units
	4-5 Fuel tank		1 m^3	2 units
5. Equipment for WASHE activities	5-1 Motor bike		For off-road use (125cc)	12 units
	5-2 Computer		Computer, display, printer	2 sets
6. Spare parts for the existing drilling equipment	6-1 Accessories 6-2 Tools for maintenance		Mud pump, hydraulic system for drilling machine and crane, tire, engine, well logging equipment	1 lot

Other than the equipment to be newly procured, which is mentioned above, the equipment owned by the executing agency will be served and used for the Project. The list of equipment owned by the executing agency is shown in Table 2-10.

Table 2-10 Equipment owned by the DWA

	Items	Quantity	Year of Procurement	Specifications
①	Drilling machines (truck mounted)	2 units	1994 1992	Type: Top-head drive type for both DTH drilling and mud circulation Mud pump: 600 lit/min. x 25 kg/cm^2 Truck: 4 x 4
②	Cargo Truck for mounting Compressor	2 units	1994 1992	4 x 4 4 x 4
③	Cargo Truck	2 units	1998 1993	6 x 6 with 5.5t crane, loading 8t 6 x 6 with 5.5t crane, loading 8t
④	Water Tank Truck	2 units	1994 1993	4 x 4 4,000 litres 4 x 4 4,000 litres
⑤	Fuel Tank Truck	2 units	1994 1993	4 x 4 4,000 litres 4 x 4 4,000 litres
⑥	Cargo Truck for mounting Pumping Test Equipment	2 units	1998 1994	4 x 4 with a 3t crane 4 x 4 with a 3t crane
⑦	Pick-up truck	3 units	1998	4 x 4

(5) Planning of Implementation of Construction Works

The execution process of work for water supply facilities in each village is shown Fig. 2-4. As mentioned below, it is necessary to get into close communication with these organs concerned in order that each will bear its share of work in each stage of execution.

① Selection of drilling point: V-WASHE Committee, consultants, DWA

② Drilling of boreholes and installation of casing pipes, screens and pumps: Japanese contracting company

③ Construction of appurtenant facilities: V-WASHE Committee

1) Implementation System of Construction of Borehole

Two drilling machines that were procured by grant aid co-operation in the past and two new ones to be procured shall be used. On Japanese contractor's responsibility and under guidance of Japanese engineers, engineers of the DWA shall execute works of construction of boreholes (covering drilling, electric logging, installation of casing pipes and screens, pumping test and execution work of the

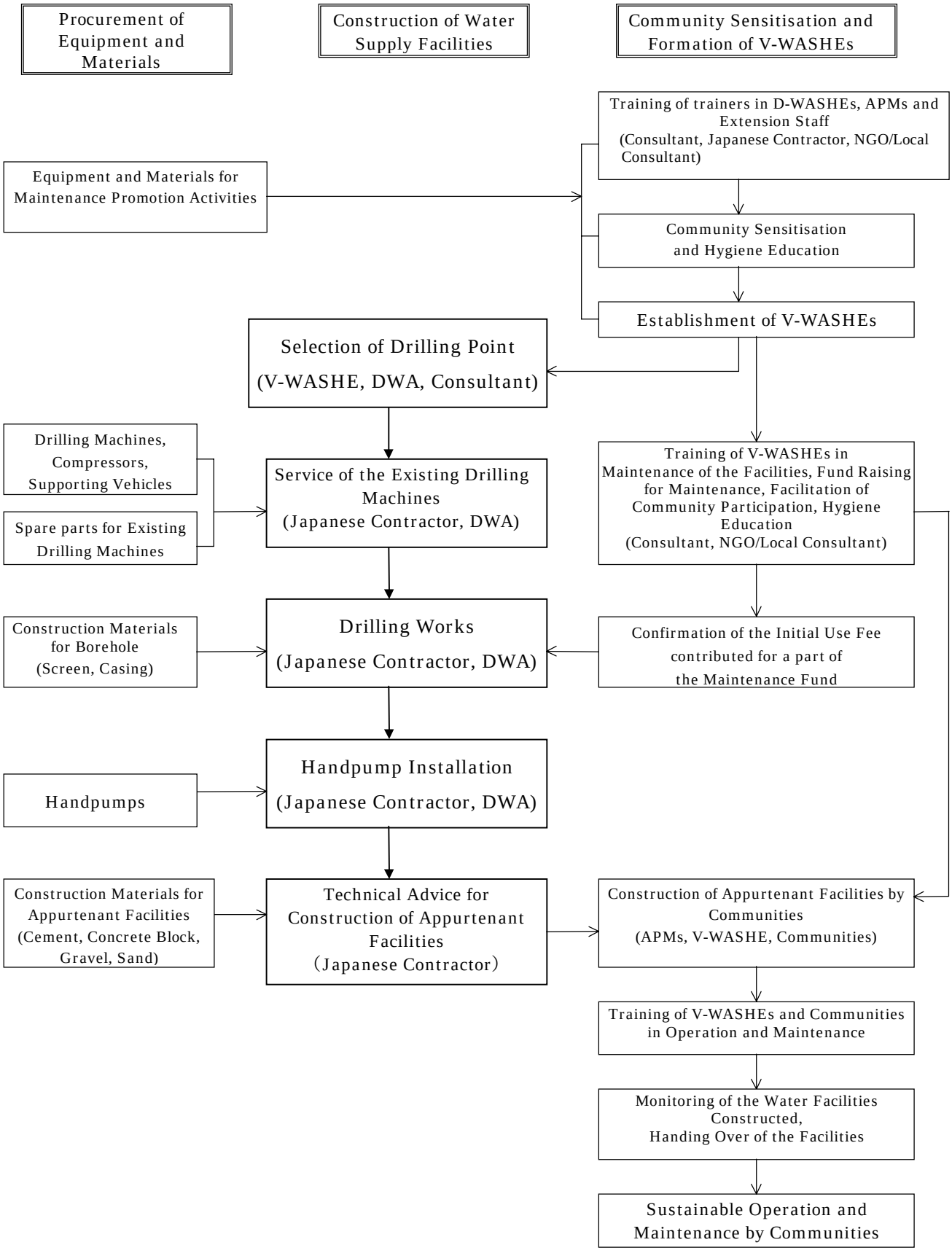


Fig. 2-4 Process of Construction of Water Supply Facilities

pump foundation). Therefore, regarding the costs of construction of boreholes, the Japanese side shall take charge of procurement of necessary materials and equipment, dispatch of Japanese engineers and the general management of construction works, while the Zambian side shall offer equipment such as the existing drilling machines and DWA engineers who will be engaged in work (wages and allowances for this staff will be borne by the DWA side.)

2) Implementation System of Construction of Appurtenant Facilities

As mentioned in 2-3-1, the Japanese side is responsible for procurement of materials necessary for construction of apron and drainage of water supply facility while the Zambian side is responsible for construction of the appurtenant facilities (apron, drainage, fence). The scope of works of the Japanese contractor are up to installation of handpumps, and they are required to provide technical advice with the Area Pump Menders to communities for construction of appurtenant facilities by V-WASHE and residents.

3) Phasing

The Project will be divided into 3 phases. The first phase will be used for procurement of the equipment while the second and the third phases will be for construction of water supply facilities.

Number of boreholes to be constructed in the second and the third phases are as follows;

2nd Phase 158 boreholes
3rd Phase 144 boreholes
Total 302 boreholes

Table 2-11 shows details of boreholes to be drilled in each district.

Table 2-11 Details of Boreholes to be Drilled in Each District

2nd Phase		3rd Phase	
District	No. of Borehole	District	No. of Borhele
Kazungula	101	Mumbwa	69
Namwala	15	Itezhi-tezhi	8
Itezhi-tezhi	13	Kaoma	67
Sesheke	29		
Total	158	Total	144

(6) Planning of Technology Transfer

As sections and people concerned with the Project, the groundwater resource section (group for groundwater development and excavation) and the water resource management section of the DWA headquarter, water utilisation engineers of each target province and members of each district branch office will be engaged in the implementation of the Project. As members attached to these sections have acquired techniques of basic drilling work and others, their technical level is reliable in the implementation of the Project. They, however, do not have enough experience regarding operation and management of drilling work and in the techniques of drilling under difficult geological conditions such as strata that collapse easily in the western province. Therefore, aiming at improvement of these techniques, technology transfer shall be given by the Japanese engineers who will be dispatched by a contracting company during the period of work to construct boreholes.

(7) Planning of Support for Improvement of Operation and Maintenance System

As an operation and maintenance system for the Project, based on the national water policies of Zambia and the WASHE concept, V-WASHE will be primarily responsible for operation and maintenance of the water supply facility to be constructed under the Project. (The operation and maintenance plan for the Project is described in detail in Chapter 4) In order to realise smooth and continuous operation, maintenance and management of facilities based on the assumed plan, it is indispensable that organisations/personnel which will be the main body in each district and village have appropriate capacity. The present levels related to execution of water supply and sanitation projects in the areas covered by the Project were investigated. As a result, it was found that districts were different in the time of establishment of the D-WASHE, its members' level of capacity and ability and the situation of posting personnel required in the catchment area.

Zambia is now promoting WASHE activities consisting of capacity building, strengthening of organisations and hygiene education as a means to develop the ideal system to execute projects at each level, i.e., national, province, districts, catchment areas and villages. A certain modelling has been done regarding plans of necessary inputs and activities, ability level to be achieved and so on. In the Project, standing on models in Zambia, actual performance of other donors and experiences of the WASHE Component Programme which was taken in the "Southern Province Water Supply Project" and based on valuations of resources usable in the districts covered by

the Project, a “Soft Component Programme” (WASHE Programme) shall be implemented aiming at support of capacity building and strengthening of organisations suitable for each district. The basic plan is shown in the proposal for the “Soft Component Programme” attached in the Appendices.

CHAPTER 3 IMPLEMENTATION PLAN

Chapter 3 Implementation Plan

3-1 Implementation Plan

The Project implementation plan under Japan's Grant Aid Scheme is as follows. The implementation system of the Project is shown in Fig. 3-1.

3-1-1 Implementation Policy

The Project is undertaken by the executing agency, the Department of Water Affairs (DWA) under the supervision of the Ministry of Energy and Water Development (MEWD).

As the Project is executed under Japan's Grant Aid Scheme, the main contractor shall be a Japanese firm that shall perform its duty to complete the Project under the supervision of Japanese consultant. This Project comprises construction of borehole water supply facilities and procurement of materials and equipment for groundwater development. Since the water supply facilities are constructed by utilising those materials and equipment procured under the Project, those two components (construction and procurement) shall be well co-ordinated. Therefore, it is considered desirable that construction and procurement in the Project shall be carried out in a unified manner by the same company or a consortium. The execution of the entire work shall be undertaken under the responsibility of a Japanese company.

In the construction of borehole, however, the arrangement is taken such that DWA as the executing agency participates in the work while receiving technology transfer from the Japanese prime contractor, considering utilisation of drilling teams and equipment of its possession. As deterioration of the existing equipment is remarkable, spare parts and repair services required are provided under the Project. Drilling machines and supporting vehicles are also procured to make up for the insufficiency for the implementation of the Project. The Japanese contractor carries out the installation of hand pumps while mobilising local labours. Appurtenant facilities of borehole water supply facility such as aprons, drainage, and fences, shall be constructed by recipient communities with provision of materials, which are procured and supplied under the Project.

3-1-2 Conditions of Implementation

Since the Project sites are located and scattered over 6 districts in 3 provinces, access to

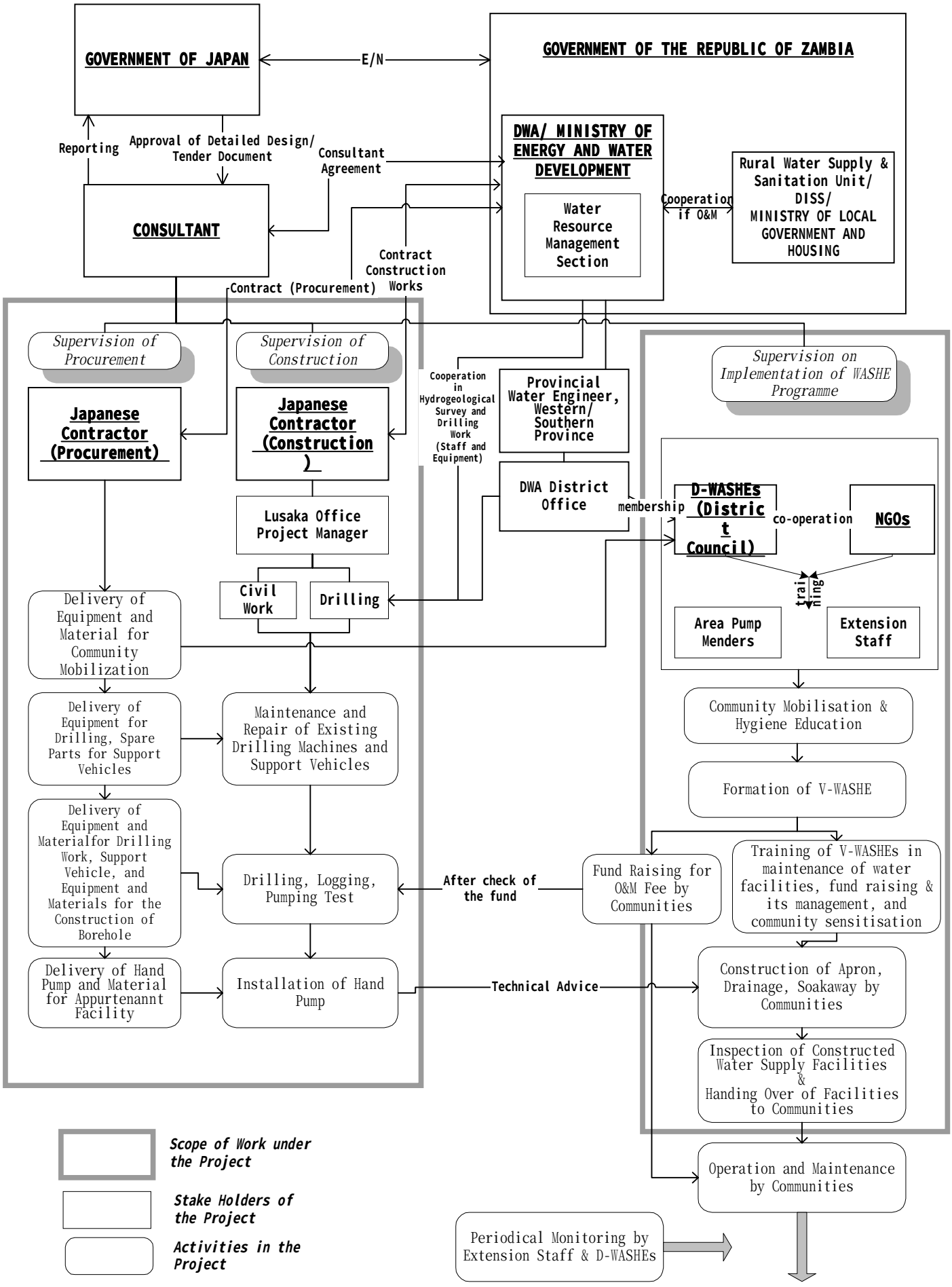


Fig.3-1 Implementation System

the sites from the main and paved road shall be made through unpaved sand or clay roads. While the Project area suffers from serious damage by droughts in the dry season, the access to each site becomes extremely difficult in the rainy season because of the submergence and worsening conditions of road due to the overflow of small and large rivers. For this reason, it is necessary to execute construction work in the period when the sites are not subject to the influence of the rainy season, except for sites of better accessibility located along a national road, in order to safely carry in equipment such as drilling machines and materials for construction.

In the aspect of risk management, it is also necessary to give considerable attention to the occurrence deteriorating peace and order in the border area with Angola in the execution of the work.

As the Project is a public enterprise based on the national development plan of Zambia, there are no legal violation regarding water rights and land acquisition that may accompany groundwater development and construction of water supply facilities.

3-1-3 Scope of Works

The scope of works to be undertaken by the Japanese side concerned with the Project is as follows:

(1) To construct 302 borehole water supply facilities fitted with handpumps.
(2) To procure the materials (i.e. cement, aggregate) necessary for construction of appurtenant facilities for the above-mentioned borehole water supply facilities fitted with hand pumps (i.e. aprons, drainage), which are constructed by the self-help effort of recipient communities.
(3) To transfer the technology related to the construction of borehole to DWA through execution of the above-mentioned construction work.
(4) To procure equipment and vehicles required for the above-mentioned construction of borehole and to repair the existing equipment and vehicles.
(5) To provide consulting service in detail design and supervision on the construction and procurement under the Project.
(6) To carry out the activities involved in WASHE component programme, such as establishment of community-based organisation, community assessment, and health education, in order to enable sustainable operation and maintenance by recipient communities.

The scope of works to be undertaken by the Zambian side is as follows:

(1) To rent free of charge drilling machines and supporting vehicles which are procured and/or repaired to the Japanese contractor in charge of work execution.
(2) To ensure DWA staff to be engaged in the drilling work to whom relevant technologies are transferred.
(3) To supplement WASHE component programme beyond the scope of work to be carried out by the Japanese side.
(4) To construct appurtenant facilities of borehole water supply facilities with hand pumps (apron, drainage, fence).
(5) To conduct monitoring and follow-up activities for facilitation of proper use of water supply facilities.

3-1-4 Consultant's Supervision

As the Project is implemented under Japan's Grant Aid Scheme, a Japanese consulting firm shall provide services for detail designing of the Project and supervision on procurement and construction work. The consultant carries out in-factory inspection, before-shipping inspection, and receiving inspection by a spot-base supervision. In the construction stage, an engineer in charge for the supervision on the work shall be stationed with a full-time position to cope with the continuity of the work, whose responsibilities are to supervise the construction work from borehole construction to the installation of hand pumps. The person in charge of the supervision of the work also supplements the work involved in the implementation of the WASHE component programme during the absence of a person in charge of social development. The scope of works undertaken by Japanese consultant is summarised in Table 3-1.

Table 3-1 Scope of Works undertaken by the Japanese Consultant

1.	In prior to the construction and procurement stage	□ Detailed Design Study □ Preparation of Tender documents □ Assistance in tendering □ Evaluation of tender □ Support and advice in the contracting
2.	In construction and procurement stage	□ Supervision on construction and procurement of equipment and materials □ Reporting

3-1-5 Procurement Plan

(1) Equipment

As the Project is carried out under Japan's Grant Aid Scheme, equipment shall be procured from Japan in principle, excluding those for which procurement from Japan has low rationality. Particularly as to drilling machines and supporting vehicles, the DWA has already had a number of procurement of Japanese products and has become skilled in and accustomed to operation and maintenance of those equipment with higher degree of their satisfaction on quality of those products. Therefore, drilling machines and supporting vehicles shall be procured from Japan. Workshop facilities of the DWA are capable of repairing, fixing and servicing those drilling machines, supporting vehicles, and compressors with an appropriate supply of spare parts. Thus, it can be said that DWA has sufficient capacity to maintain those equipment procured under the Project.

(2) Materials for Construction Works

Among construction materials, those produced in Zambia are only cement and aggregates. Although there are no domestically produced materials for borehole construction, such as casings and screens, those made in third countries such as the Republic of South Africa are imported into and widely available in the local market. However, those materials shall be procured from third countries of vicinity considering advantages in the transportation cost and so forth, since there are the possibilities that those materials may not be available in quantity required for the Project. As handpumps are not manufactured in Zambia, the products made in India, or the neighbouring countries such as the Republic of South Africa are procured.

Among the materials and equipment mentioned above, those that involve marine transportation, such as products procured from Japan, are landed in the Republic of South Africa and then transported overland to Zambian territory via Zimbabwe or another route. On the other hand, those procured from the neighbouring countries including the Republic of South Africa are transported to Zambia by truck.

The major materials and equipment procured under the Project and the countries of procurement is listed in the Table 3-2:

Table 3-2 Classification of the Procurement

Item	Classification of Procurement			Remarks
	Zambia	Japan	3rd Country	
[Construction Materials]				
Cement, aggregates, concrete blocks, etc.	○			Procurement from 3rd countries is considered depending on the availability in the local market, such as those produced in SA and India
Casing, Screen	○		○	
Reinforcing	○			
Hand pump	○		○	
[Equipment]				
Truck mounted drilling machine		○		
Tools and accessories for drilling machines		○		
Compressor (truck mounted)		○		
Compressor		○		
Pumping test equipment		○		
Truck for carry pumping test equipment		○		
Cargo truck with 4 tone crane		○		
Cargo truck with 6 tone crane		○		
Motor bike	○			Local procurement of Japanese made
Personal computer	○			
Maintenance tools		○		
Spare parts		○		

3-1-6 Implementation Schedule

The implementation schedule of the Project as Japan's Grant Aid is as follows;

(1) Exchange of Notes (E/N)
(2) Consultant agreement
(3) Detailed Design Study
(4) Preparation of tender documents
(5) Bidding, contractor contracts
(6) Procurement of materials and equipment
(7) Transportation and customs clearance of materials and equipment
(8) Construction of water supply facilities
(9) Completion and handing over

The Project is implemented dividing its schedule into 3 phases. The construction works is executed utilising both newly procured equipment and the existing ones used. It is necessary to repair the existing equipment with procurement of spare parts under the Project. Therefore, it is spent in the first phase for procurement and repair of equipment necessary for the execution of construction works. Construction work is implemented in the second and third phases. The work involved in the Project for each phase is as follows:

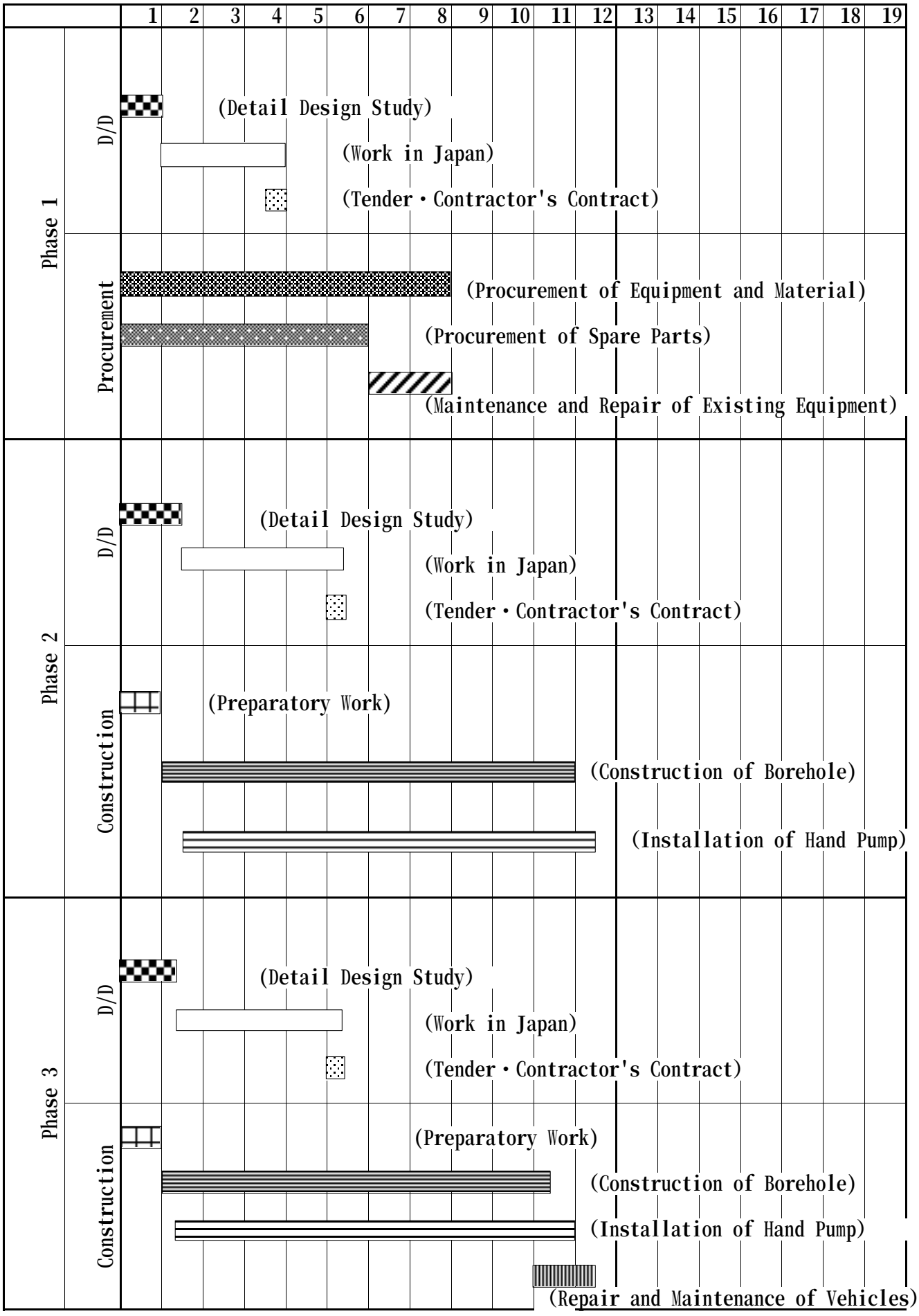
- First Phase: Procurement of equipment and repair/ fixing of existing ones
- Second Phase: Procurement of equipment and construction of borehole water supply facilities with handpumps (158 facilities)
- Third Phase: Construction of borehole water supply facilities with handpumps (144 facilities)

For the procurement of equipment, since it takes 6 months for manufacturing drilling machines, which is the longest period required for manufacturing among equipment to be procured under the Project, it takes 8 months from ordering to completion of delivery to the final destination including 2 months for inland transportation and customs clearance. As it is considered that the period required for manufacturing spare parts of existing equipment is about 4 months, those spare parts are delivered after 6 months from ordering (including 2 months for transportation and customs clearance). In addition, services of the drilling equipment with such spare parts require an additional 2 months. Therefore, 8 months are necessary for the existing equipment to become operational for the construction works.

As mentioned above, the construction of water supply facilities requires careful consideration of the influence in the rainy season. Based on meteorological data of the past 10 years, the rainy season is determined as 3 months from December to February, and the dry season is the remaining period.

The implementation schedule that was made on the basis of the above is shown in Table 3-3.

Table 3-3 Implementation Schedule



3-1-7 Obligations of the Government of Zambia

(1) Undertakings by the Zambian Side

Zambian side shall undertake necessary measures described below, in addition to the items mentioned in 3-1-3, for the smooth implementation of the Project, when the Japanese government makes decision to implement the Project under Japan's Grant Aid.

1) To secure land necessary for the sites for the construction of 302 borehole water supply facilities with handpump and to clear and reclaim the land prior to the commencement of the construction.
2) To maintain, repair and/or expand the access road to the Project sites.
3) To secure land necessary for operation base and to clear and reclaim the land prior to the commencement of the construction.
4) To provide warehouse and stock yard for the safe storage and control of equipment and material procured under the Project.
5) To arrange necessary staff and budget for operation and maintenance of the equipment and material procured under the Project.
6) To provide data and information necessary for the project.
7) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the Republic of Zambia and stay therein for the performance of their work.
8) To exempt Japanese nationals form customs duties, internal taxes and other fiscal levies which will be imposed in the Republic of Zambia with respect to the supply of the products and services under the Verified Contract.
9) To ensure all the expenses and prompt execution for unloading, customs clearance and internal transportation of the materials and equipment procured under the Project.
10) To bear the commissions to the Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.
11) To operate and maintain the equipment and material, and the facilities constructed under the Project properly and effectively.
12) To bear all expenses other than those to be borne by the Grant, necessary for the implementation of the Project.
13) To secure the necessary personnel of DWA for the drilling work under the Project.
14) To bear the cost for insurance of vehicle procured under the Project.

(2) Project Cost Estimation for Expense to be Borne by the Zambian Side

The cost to be borne by the Zambian side in the implementation of the Project is estimated at ZK 2,317,700,000. The breakdown of the cost is shown in the Table 3-4 and the detail for each phase is explained in the Appendix 5.

Table 3-4 Cost to be Borne by Zambian Side

Description	Amount (Thousand Kwacha)
Banking Commission	*1
Insurance Cost for the Procured Vehicles	*2
Allowance for DWA Drilling Team	2,272,400
Allowance for Extension Staff	45,300
Total	2,317,700

*1: to be fixed based on the Project cost
*2: to be fixed based on the price of each vehicle

3-2 Operation and Maintenance Plan

3-2-1 Operation and Maintenance Plan under the Project

Giving the respect on the policy of the Zambian government regarding operation and maintenance in the rural water and sanitation sector and WASHE concept that promotes the said policy as well as consideration on the achievement of each province and district of the Project area in the implementation of WASHE activities, the Project adopts the following basic principle for its operation and maintenance. A framework of the proposed strategy is shown in Fig. 3-2.

(1) Operation and maintenance of water supply facilities by the Village WASHE Committee (V-WASHE)

For the village level operation and maintenance of borehole water supply facilities with handpump, the Village WASHE Committee (V-WASHE) is organised for each water supply facility. The main role and responsibilities undertaken by the V-WASHE are daily operation and maintenance of facilities such as replacement of expendable parts like packing, cleaning of the sites, determination of supply hours, collection of water fees, and communication with extension staff and D-WASHE members.

Since the clinics and schools are also targeted under the Project, V-WASHE committee or the relevant organisation suitable for operation and maintenance shall be formed in

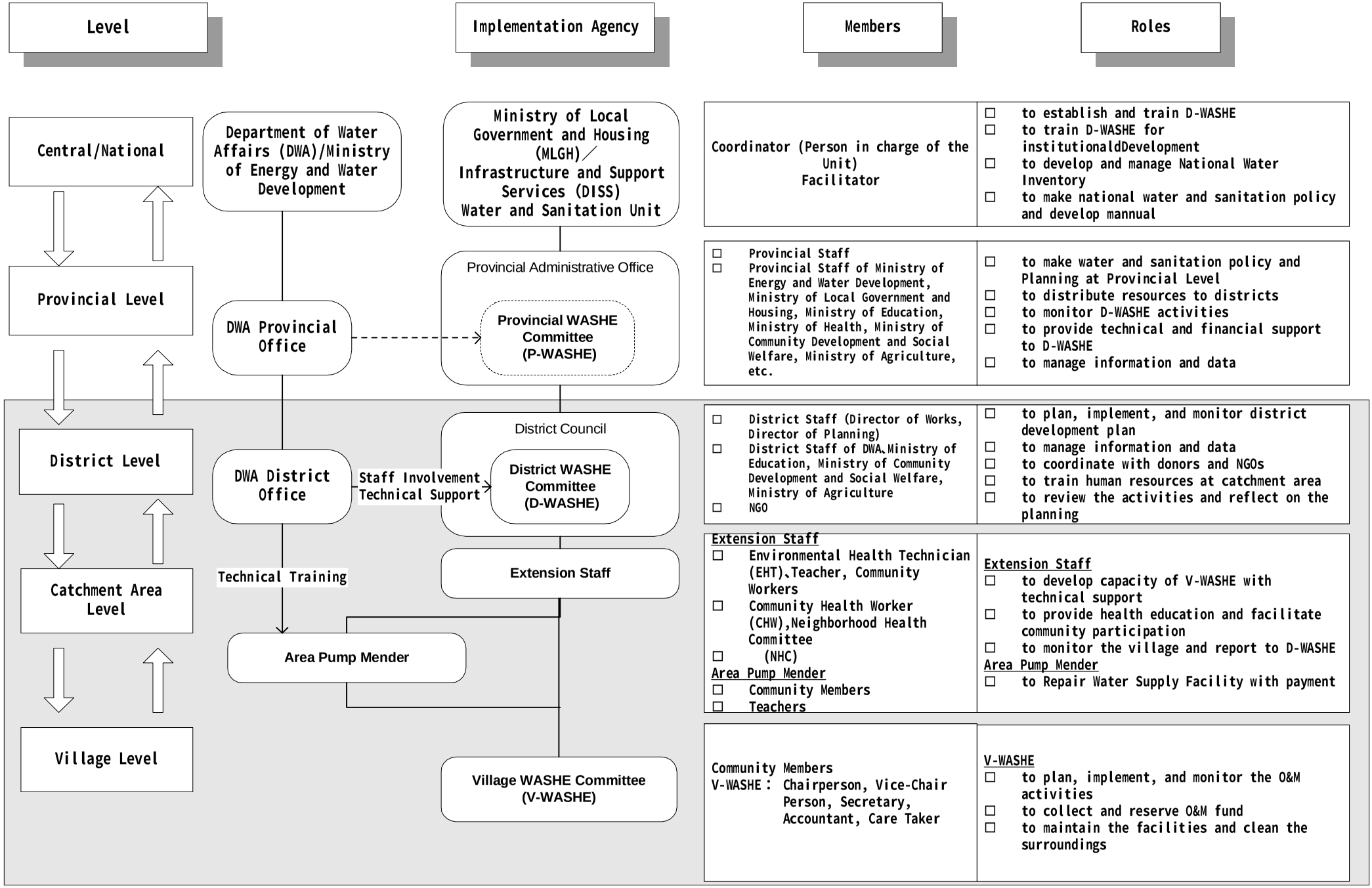


Fig. 3-2 Operation and Maintenance System of the Proejct

the situation such that the water supply facilities installed in the public entity, through discussion both with village and staff stationed in those public facilities, while implementing WASHE activities.

(2) Community Fund for Operation and Maintenance

It is principle that the operation and maintenance cost for the water supply facilities be borne by the users (community), such as the cost necessary for repair of handpump and travel allowance for Area Pump Mender (APM) and so forth. V-WASHE committee shall collect, reserve, and manage the operation and maintenance fund. V-WASHE committee is expected to take appropriate measure such that the committee purchase spare parts whenever the fund is reserved in a certain amount, in order to avoid the risks of devaluation of local currency.

To apply the flat rate and fixed collection frequency to all the villagers is not practical, since the number of households and economic situation differ among the villages. Under the Project, therefore, such elements as the water rate and collection frequency and method to reserve fund will be determined by each V-WASHE, while the Japanese side will provide essential information necessary for its decision. The cost to be borne by the Zambian side for the maintenance of the water supply facilities after completion of the Project is described in 3-3-2 maintenance cost.

(3) Repair of Water Supply Facility

It is principle that the V-WASHE copes with repair and maintenance of water supply facilities at the village level, while spreading the technique and know-how necessary to the village through implementation of WASHE component programme. Since the handpump of VLOM (Village Level Operation and Maintenance) type is introduced in the Project, V-WASHE members such caretakers are in charge for daily maintenance and repair.

In case that the repair and maintenance is difficult at village level, the community can be provided the paid services by Area Pump Menders (APM), of which roles and responsibilities are described later. On the other hand, for maintenance work requiring relatively higher technical know-how, there is an approach that the Village Level Operation and Maintenance Team (VLOM Team) is separately formulated in every one or two village(s) to undertake such works as replacement and repair of handpump.

However due to the reasons that this approach is not necessarily taken in all the districts in the Project area, responsibilities and roles between VLOM Teams and APMs are not well defined, and caretakers of V-WAHE can take the same role as VLOM team if technical training is provided, the Project adopts the approach such that the repair is coped by V-WASHE in principle or APM if it is beyond the capacity of V-WASHE.

(4) Support System at the District Level

The aforementioned village level operation and maintenance system essentially needs support at the district level to tackle various technical and administrative problems. As one of its strategies to promote decentralisation, the Zambian government has recently been encouraging the execution of rural water and sanitation projects by the local authorities, and in the project it is expected that the District Councils and the D-WASHEs takes the major role in formulating and executing plans, monitoring, and operation and maintenance of water facilities in the respective districts as well as capacity building and training of personnel engaged in operation and maintenance activities based on WASHE concept.

The D-WASHE Committee is composed of staff from district/branch offices of the local authorities and ministries related to the water and sanitation sector, i.e. officials from the planning department and the department of works of the district council, the DWA, the Ministry of Health, Ministry of Education, Ministry of Community Development and Social Welfare, and Ministry of Agriculture, Food and Fisheries. The staff from the DWA is mainly responsible for technical aspects in operation and maintenance of the water supply facility. On the other hand, one of the main aims in the formulation of the V-WASHE is to offer capacity building to the villagers in order to strengthen their capability of planning and controlling water facilities as well as to enhance their awareness in health and sanitation. From this viewpoint, participation of committee members from various ministries in the operation and maintenance scheme under this project is highly encouraged.

(5) Support System at the Catchment Area (Sub-District) Level

To supplement the aforementioned operation and maintenance system, the extension staff and Area Pump Menders (APMs) are employed as an intermediary between the communities and the district administration, who can provide direct support to the communities for the improvement of the village level water management. The D-

WASHE Committees supervise their activities. The district is divided into the so-called catchment areas, each one of which has extension staff and APMs.

Proposed human resources at the catchment area level and their roles are summarised in Table 3-5.

Table 3-5 Staff and Human Resource Composition at the Catchment Area Level

	Extension Staff	Area Pump Menders
Proposed Human Resources	□ Environmental Health Technician (EHT), Community Development Officer, Teacher, other government staff □ Community-Based Organization such as Community Health Worker (CHW), Neighbourhood Health Committee (NHC)	□ Community member □ Teacher
Roles	□ To carry out health education in awareness building to use safe water and prevent water-borne diseases □ To form V-WASHE with provision of training for the members □ To provide report to D-WASHE regarding problems and measures taken in the village level activities, and to communicate with and support the communities for the implementation of water and sanitation plan set by the D-WASHE	□ Installation of hand pump at each village and construction of appurtenant facilities with provision of training to the communities □ Repair of water supply facilities with payment by the communities □ Provision of training for V-WASHE and VLOM Team in daily maintenance and repair of the facilities

(6) Co-operation with the Line Ministries at National Level and Provincial Administrations

In the implementation stage of the Project, the Ministry of Energy and Water Development/ Department of Water Affairs (MEWD/DWA), as executing agency, co-ordinate and unify the ministries and departments concerned for the implementation of the Project.

On the other hand, after completion of the Project, the water supply facilities are handed over to the community through District administration and D-WASHE, and the community becomes responsible in a large extent for the operation and maintenance of the facilities. Because district administration becomes responsible for supervision of such community-based operation and maintenance after handing

over of the facilities, the Ministry of Local Government and Housing (MLGH) is in charge for the entire process in operation and maintenance.

The Rural Water Supply and Sanitation Unit (RWSS Unit) established under the Department of Infrastructure and Support Services in the Ministry of Local Government and Housing is planning to establish a Provincial WASHE committee (P-WASHE) and reinforcement and further capacity building of D-WASHE. Therefore, attention is to be paid to obtain the advice and co-operation from the line ministries at national and provincial levels by DWA's co-ordination for establishment of the operation and maintenance system under the Project.

3-2-2 Operation and Maintenance Cost

The estimated operation and maintenance cost, shown in Table 3-6, for the borehole water supply facilities to be constructed under the Project is to be borne by the Zambian side after the completion of the Project.

Table 3-6 Operation and Maintenance Cost to be borne by the Zambian Side

Item	Cost (Thousand Kwacha/Year)
1. Monitoring by D-WASHE	2,376,000
2. Monitoring by extension staff	9,187,200
3. Maintenance by V-WASHE	
Purchase of spare part for hand pump	2,826,720
Total	14,389,920

3-2-3 Personnel Deployment

The operation and maintenance system under the Project is established under the communities' responsibility in collaboration with the district administrations, based on the WASHE concept. Therefore, the main constituent for operation and maintenance is community and V-WASHE which is representative of the community, and extension staff and Area Pump Mender (APM) are deployed to support community-based operation and maintenance in a sustainable manner, facilitate communication between the community and district administration, and take prompt measure for the identified problems. D-WASHE is responsible for supervision of those activities and planning and implementation of new plans.

The personnel mentioned above can be deployed in the implementation stage of the

Project, along with implementation of WASHE component programme facilitating the formation and capacity building of V-WASHE and strengthening the institutional capacity of administrations.

3-2-4 Budget Arrangement

The greater part of the operation and maintenance cost to be borne at the village level is the cost for purchasing spare parts for handpumps. The average cost to be contributed per household is estimated at 780 Kwacha/month. The figure seems to be affordable for the community members with the fact that the households in the Project area spend 500 ～ 1,500 Kwacha per month for the operation and maintenance of existing water supply facilities according to the household survey conducted in the Project area.

On the other hand, the cost for monitoring conducted by D-WASHE and extension staff in a regular manner is included in the annual budget of the ministry, department, and district administration to which they belong, since those activities are part of their routine work.

CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

Chapter 4 Project Evaluation and Recommendation

4-1 Project Effects

The DWA, the executing agency of the Project, has been an organisation responsible in all the process in the implementation of the rural water supply and sanitation project such as planning, survey, construction of borehole water supply facility, and operation and maintenance. As a consequence of the water sector reorganisation, responsibility in development of rural water and sanitation sector is transferred to the Ministry of Local Government and Housing (MLGH) from the Ministry of Energy and Water Development (MEWD). Roles and responsibilities of MEWD will be concentrated and focused on the policy-making and supervision in water resource development and management. However, MEWD is expected to promote the improvement of rural water and sanitation conditions continuously for the relief of the vulnerable and underprivileged population in the least developed areas such as remote areas whereby the development of the sector by the involvement of the private sector is difficult, aiming at provision of safe, stable and reliable water even in the drought period.

Most of the residents in the Project area are making their living with small-scale farming or peasantry, as observed identically in the other rural areas in the country. Those residents have been repeatedly poverty-stricken even in a self-sufficient manner, due to natural conditions significantly affected by drought and small rain, limit in access for the necessary resources for farming, lack of labour force caused by migration of the working population to the urban areas in search for work. Moreover, as their water source, the majority of the residents depend on a source in a distance or unprotected shallow well near the house being aware of the possibility of water contamination, since there are no protected water sources in the target villages.

The Project is aiming to secure safe and sufficient water supply services as improvement of the BHN for the residents living in the conditions mentioned above, through the construction of borehole water supply facilities fitted with hand pumps. The Project is implemented with participation of the communities, improving community awareness through sensitisation and health education to facilitate proper use of water supply facilities, safe transport/storage/use of water, as well as institutional building for operation and maintenance. The plan for operation and maintenance employed in the Project is based on the WASHE concept adopted as the development strategy in the rural water and sanitation sector of Zambia, and the district administration and communities are expected to implement the continuous activities after the completion of the Project.

Moreover, the Project is coherent with the policy that put emphasis on the support for the rural poor, since the project is meant for drought preparedness.

From those viewpoints, the implementation of the Project under Japan's Grant Aid is considered as relevant. The following positive effects are expected by the implementation of the Project:

① The rural population of 75,500 in the Project area become able to use clean and stable water. The amount of water that the residents can use at present is less than 10 litres/person/day and the water quality is not safe. With the implementation of the Project, an amount of 30 litres/person/day of clean water shall be secured for their living.

② The water coverage rate in 6 districts of 3 provinces is improved by the Project from 22% to 40%.

③ With the implementation of the WASHE component programme under the Project, water supply facilities are operated and maintained in a sustainable manner, improving the capacity of the community in operation and maintenance through building a supporting system with the local authorities

④ As the stable water supply becomes available near the target villages in the Project area, the time and labour of women and children who fetch water from water sources located a long distance away are reduced. At present, women and children spend more than two hours for the round-trip to fetch the safe water on foot. The time necessary to fetch the water is reduced to less than thirty minutes with the implementation of the Project.

In addition to the above-mentioned direct effects, the following can be listed as the indirect effects:

① At present, it becomes extremely difficult to secure drinking water in the Project area whereby the existing water source is dried up in drought periods. However, the residents being able to access the water supply facilities can afford the safe drinking water even in the drought, since the water supply through the facilities constructed under the Project is reliable even in the drought and dry seasons. The number of beneficiaries that includes the indirect beneficiaries utilising the water supply facilities constructed only when the existing water source becomes dry amounts to

140,000.

② The capacity of DWA in groundwater development is improved as a result of technology transfer during the construction stage of the Project in operation and maintenance of drilling machines and related equipment.

③ The procured equipment can be effectively utilised after completion of the Project and promote the smooth implementation of projects to be conducted by the DWA in the future.

④ The safe water supply in the target villages in the Project area contributes to the prevention of water-borne diseases.

⑤ The children and women are relieved from the labour of fetching water, and more educational and/or employment opportunities can be realized.

4-2 Recommendation

For more effective and efficient implementation of the Project and the water supply projects in Zambia, the following points are recommended.

(1) Standardisation of Handpumps

In Zambia, standardised specifications of handpumps are considered at present. In the WASHE activities, the practical training on the maintenance and services of handpumps use a specific model that have been widely used in Zambia. However the system to supply spare parts are not well established. Thus, the residents in rural areas have difficulty in obtaining necessary spare parts. Though the continuing promotion for standardisation of handpumps by selecting proper models is necessary, it is more desirable to standardise the pumps by not only selecting some specific manufacturers and models, but by including every process into standardisation such as improvement of the spare parts distribution system by pump manufacturers and agents, establishment of service shops, and introduction of a technology transfer system.

(2) Promotion of the WASHE Activities

In the rural water supply and sanitation sector, various organizations such as the central government, local governments, donor agencies, NGOs, community-based organizations, and private companies have been involved for a long time without defining their roles properly. It might be one of the factors that led to a complex and inefficient development mechanism in the rural water supply and sanitation sector. Since the sector is in a transitional stage where the responsibility in supervision for development of the sector is transferred to the Ministry of Local Government and Housing (MLGH), the Ministry of Energy and Water Development/ Department of Water Affairs (MEWD/DWA) need to co-ordinate with ministries, department, and institutions concerned, for the establishment of Village WASHE Committee (V-WASHE) and implementation of activities for improving the capacity of the community in operation and maintenance. In addition, it is expected even after the completion of the Project that the personnel, who trained for operation and maintenance of the facilities, are utilised and human resource development is continued.

APPENDICES

APPENDIX-1 MEMBER LIST OF THE STUDY TEAM

(1) Basic Design Study Team

Name	Position	Affiliation
Dr. Yuji MARUO	Team Leader	Senior Advisor, JICA
Mr. Hisanao NODA	Planning Management	Management Div., Grant Aid Management Dept., JICA
Mr. Shinichi MOROMACHI	Chief Consultant	Japan Techno Co., Ltd.
Mr. Shoichi YOKOGI	Hydrogeological Survey I/ Drilling Planning	Japan Techno Co., Ltd.
Mr. Tsuyoshi YAMADA	Hydrogeological Survey II	Mitsui Mineral Development Engineering Co., Ltd.
Ms. Machi TANAKA	Socio-Economic Condition Survey	Japan Techno Co., Ltd.
Mr. Eiji TANAKA	Geophysical Survey I	Mitsui Mineral Development Engineering Co., Ltd.
Mr. Hidehiro ISHIKAWA	Geophysical Survey II	Mitsui Mineral Development Engineering Co., Ltd.
Mr. Shoji TAKAMATSU	Procurement/ Cost Estimation	Japan Techno Co., Ltd.

(2) Draft Report Explanation Team

Name	Position	Affiliation
Dr. Yuji MARUO	Team Leader	Senior Advisor, JICA
Mr. Etsuji YOSHIMURA	Planning Management	JICA, Zambia Office
Mr. Shinichi MOROMACHI	Chief Consultant	Japan Techno Co., Ltd.
Mr. Shoichi YOKOGI	Hydrogeological Survey I/ Drilling Planning	Japan Techno Co., Ltd.

JICA: Japan International Cooperation Agency

APPENDIX-2 STUDY SCHEDULE

(1) Basic Design Study

No.	Date	Itinerary		
1	6/13(tue)	Departure: Tokyo		
2	6/14(wed)	Arrival: Lusaka, Zambia Courtesy call and Meeting: JICA		
3	6/15(thu)	Courtesy call: Embassy of Japan; Courtesy call and meetings: with parties concerned at Zambian side		
4	6/16(fri)	Meetings		
5	6/17(sat)	Internal Meeting		
		Team (A) **(JICA &Consultant)**	**Team (B)**	**Team (C)**
6	6/18(sun)	Move Lusaka → Livingstone	Site survey: Mumbwa	Site survey: Mumbwa
7	6/19(mon)	Meeting at Kazungula Site visit at Kazungula	Site survey: Mumbwa	Site survey: Mumbwa
8	6/20(tue)	Meeting at Sesheke Site visit at Sesheke	Site survey: Mumbwa	Site survey: Mumbwa
9	6/21(wed)	Move: Livingstone to Lusaka	Site survey: Mumbwa	Site survey: Mumbwa
10	6/22(thu)	Minute of Discussion	Site survey: Mumbwa	Site survey: Mumbwa
11	6/23(fri)	Signing of Minutes Report to EOJ, JICA	Site survey: Mumbwa	Site survey: Mumbwa
12	6/24(sat)	Site visit	Site survey: Mumbwa	Site survey: Mumbwa
13	6/25(sun)	JICA: Depart. Lusaka	Site survey: Mumbwa	Site survey: Mumbwa
14	6/26(mon)	JICA: flight Consultant: Move to Livingstone/Sesheke	Move to Livingstone / Sesheke	Move to Livingstone / Sesheke
15	6/27(tue)	JICA: flight Consultant: Sub-Centre (SC) survey	Site survey: Sesheke	Site survey: Sesheke
16	6/28(wed)	JICA: Arrival at Tokyo Consultant: SC survey	Site survey: Sesheke	Site survey: Sesheke
17	6/29(thu)	SC survey: Sesheke	Site survey: Sesheke	Site survey: Sesheke
18	6/30(fri)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
19	7/1(sat)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
20	7/2(sun)	Data Analysis	Data Analysis	Data Analysis
21	7/3(mon)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
22	7/4(tue)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
23	7/5(wed)	SC survey: Sesheke	Move to Livingstone	Move to Livingstone
24	7/6(thu)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
25	7/7(fri)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
26	7/8(sat)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula

No.	Date	Itinerary		
27	7/9(sun)	Data Analysis	Data Analysis	Data Analysis
28	7/10(mon)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
29	7/11(tue)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
30	7/12(wed)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
31	7/13(thu)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
32	7/14(fri)	SC survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
33	7/15(sat)	Site survey: Sesheke	Site survey: Kazungula	Site survey: Kazungula
34	7/16(sun)	Move to Livingstone	Data Analysis	Data Analysis
35	7/17(mon)	SC Survey: Kazungula	Site survey: Kazungula	Site survey: Kazungula
36	7/18(tue)	SC Survey: Kazungula	Site survey: Kazungula	Site survey: Kazungula
37	7/19(wed)	SC Survey: Kazungula	Site survey: Kazungula	Site survey: Kazungula
38	7/20(thu)	SC Survey: Kazungula	Site survey: Kazungula	Site survey: Kazungula
39	7/21(fri)	SC Survey: Kazungula	Site survey: Kazungula	Site survey: Kazungula
40	7/22(sat)	SC Survey: Kazungula	Site survey: Kazungula	Site survey: Kazungula
41	7/23(sun)	SC Survey: Kazungula	Move to Lusaka	Move to Lusaka
42	7/24(mon)	SC Survey: Kazungula	Move to Kaoma	Move to Kaoma
43	7/25(tue)	SC Survey: Kazungula	Site survey: Kaoma	Site survey: Kaoma
44	7/26(wed)	SC Survey: Kazungula	Site survey: Kaoma	Site survey: Kaoma
45	7/27(thu)	SC Survey: Kazungula	Site survey: Kaoma	Site survey: Kaoma
46	7/28(fri)	SC Survey: Kazungula	Site survey: Kaoma	Site survey: Kaoma
47	7/29(sat)	HP site: Kazungula	Site survey: Kaoma	Site survey: Kaoma
48	7/30(sun)	Data Analysis	Data Analysis	Data Analysis
49	7/31(mon)	HP site: Kazungula	Site survey: Kaoma	Site survey: Kaoma
50	8/1(tue)	Move to Lusaka	Site survey: Kaoma	Site survey: Kaoma
51	8/2(wed)	Report to JICA, DWA	Site survey: Kaoma	Site survey: Kaoma
52	8/3(thu)	Move to Itezhi-tezhi	Site survey: Kaoma	Site survey: Kaoma
53	8/4(fri)	SC Survey: Namwala/ Itezhi-tezhi	Site survey: Kaoma	Site survey: Kaoma
54	8/5(sat)	SC Survey: Namwala/ Itezhi-tezhi	Site survey: Kaoma	Site survey: Kaoma
55	8/6(sun)	Data Analysis	Data Analysis	Data Analysis
56	8/7(mon)	SC Survey: Namwala/ Itezhi-tezhi	Site survey: Kaoma	Site survey: Kaoma
57	8/8(tue)	SC Survey: Namwala/ Itezhi-tezhi	Site survey: Kaoma	Site survey: Kaoma
58	8/9(wed)	SC Survey: Namwala/ Itezhi-tezhi	Site survey: Kaoma	Site survey: Kaoma
59	8/10(thu)	SC Survey: Namwala/ Itezhi-tezhi	Move to Itezhi-tezhi	Move to Itezhi-tezhi
60	8/11(fri)	SC Survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi
61	8/12(sat)	SC Survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi
62	8/13(sun)	Data Analysis	Data Analysis	Data Analysis
63	8/14(mon)	SC Survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi

No.	Date	Itinerary		
64	8/15(tue)	SC Survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi
65	8/16(wed)	SC Survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi
66	8/17(thu)	SC Survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi
67	8/18(fri)	HP site: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi
68	8/19(sat)	HP site: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi	Site survey: Namwala/ Itezhi-tezhi
69	8/20(sun)	Move to Lusaka	Move to Mumbwa	Move to Mumbwa
70	8/21(mon)	Meeting with DWA	Site survey: Mumbwa	Site survey: Mumbwa
71	8/22(tue)	Meeting with DWA	Site survey: Mumbwa	Site survey: Mumbwa
72	8/23(wed)	Survey of existing Rig	Site survey: Mumbwa	Site survey: Mumbwa
73	8/24(thu)	Survey of existing Rig	Move to Lusaka	Move to Lusaka
74	8/25(fri)	Meeting with DWA		
75	8/26(sat)	Data Analysis		
76	8/27(sun)	Internal Meeting		
77	8/28(mon)	Signing of Technical Note, Report to EOJ and JICA		
78	8/29(tue)	Departure Lusaka		
79	8/30(wed)	Transit		
80	8/31(thu)	Arrival at Tokyo		

Note： DWA: Department of Water Affaires; HP: Hand Pump; SC: Sub-Centre

(2) Draft Basic Design Explanation

No.	Date	Itinerary	
		JICA	Consultant
1	10/23(mon)	Departure from Tokyo	
2	10/24(tue)	Arrival: Lusaka, Zambia	
3	10/25(wed)	Courtesy call: Embassy of Japan, JICA, MOFED, MEWD, DWA	
4	10/26(thu)	Explanation of the Draft Basic Design at DWA	
5	10/27(fri)	Explanation of the Draft Basic Design at DWA, Courtesy call to Minister of MEWD, Minutes of Discussion with DWA	
6	10/28(sat)	Internal meeting	
7	10/29(sun)	Internal meeting	
8	10/30(mon)	Minutes of Discussion	
9	10/31(tue)	Minutes of Discussion Report to Embassy of Japan and JICA	
10	11/1(wed)	Signing of Minutes of Discussion	
		Officials departure from Lusaka	Data arrangement
11	11/2(thu)	Meeting at JICA South Africa Office	Departure from Lusaka
12	11/3(fri)	Departure from South Africa	Transit
13	11/4(sat)	Arrival at Tokyo	Arrival at Tokyo

MOFED: Ministry of Finance and Economic Development;

MEWD: Ministry of Energy and Water Development

APPENDIX-3 LIST OF PARTIES CONCERNED IN THE RECIPIENT COUNTRY

1. Embassy of Japan in Zambia

Mr. Mitsuhiro Saotome	Ambassador
Mr. Kenji Endo	First Secretary
Mr. Takashi Kimura	Second Secretary

2. JICA Zambia Office

Mr. Mitsuo Ishikawa	Resident Representative
Mr. Koji Ohta	Deputy Resident Representative
Mr. Etsuji Yoshimura	Assistant Resident Representative

3. Ministry of Finance and Economic Development-MOFED

Ms. Agnes M. Musunga	Principal Economist
Mr. W.S. Akapelwa	Economist
Mr. Tetsuro Hamada	JICA Expert

4. Ministry of Energy and Water Development-MEWD

Mr. Eusebius Chola Katai	Deputy Permanent Secretary

5. Department of Water Affairs-DWA

Mr. Adam Hussen	Acting Director
Mr. Peter Chola	Deputy Director
Mr. O. L. Sangulube	Senior Hydrogeologist
Mr. S. Banda	Chief of Drilling Section
Mr. M.S. Muyendekwa	Western Provincial Engineer
Mr. Alex Lusaka	Water Engineer (Lusaka Province)
Mr. Fred Mulenga	Water Engineer (Southern Province)
Mr. Andrew Mtonga	Water Engineer (Lusaka Province)
Mr. Jack Nkhoma	Water Engineer (Lusaka Province)
Mr. Kabombo Felix	Water Engineer (Mumbwa Province)
Mr. Emelda Mataa	Community Education and Participation

6. Ministry of Local Government and Housing-MLGH

Mr. O.M. Banda	Permanent Secretary

7. Department of Infrastructure and Support Services-DISS

Mr. Peter Lubambo	Director

Mr. Pola P.L.M. Kimena	Assistant Director
Mr. M. D. Patel	Chief Engineer
Mr. Mbaala Matengu	Principal Economist

8. Department of Human Resources and Administration

Ms. Elizabeth Pezo Kanoka	Director

9. National Water Supply and Sanitation Council-NWASCO

Mr. Oswald M. Chanda	Director
Mr. Paul M. Banda	Chief Inspector

10. National Water Sanitation and Hygiene Education - N-WASHE

Mr. Isaac Mbewe	Co-ordinator
Mr. Sam Ngoma	Public Relation and Legal Assessor
Mr. K. Nyundu	Water Engineer
Mr. Davy Nglowa	Data Management & Graphics
Mr. Mboshya Paul	Sanitation（N-WASHE/ UNICEF）

11. Water Sector Reform Support Unit - RSU

Mr. P. Mwasanbili	Team Leader

12. Mumbwa District

Mr. Alex B. Meema	District Administrator
Mr. Victor Mwelba	Chairperson of D-WASHE
Ms. Ester Katenda	Central and Northern Health Department

13. Itezhi-tezhi District

Mr. V. Hamayuwa	Director of Works/ Chairperson of D-WASHE
Mr. Samuel Nabuzoha	Co-ordinator

14. Namwala District

Mr. David Lamanyexido	District Administrator
Mr. Phillymon Michelo	District Council
Mrs. I.Z. Haambozi	Director of Health
Mr. Brown Ngenda	D-WASHE
Mr. Justine Malupande	WASHE Programme Advisor

15. Kazungula District

Mr. M.M. Mainza	Council Secretary
Mrs. N. Kalufyanya	Deputy Council Secretary
Mr. F. Ngelezi	Director of Works
Mr. Cruesher Muleya	Community Development Officer

16. Kaoma District

Mr. S. Kambenja	Director of Works
Mr. M. Mkozomba	District Planning Officer
Mr. R. N. Mwanamambo	Director of Health
Mr. S. Mkhata	Environmental Health Technician

17. Sesheke District

Mr. M. Mutale	Council Secretary
Mr. Patrick Mutaneko	Director of Works
Mr. Kawana Wamuwi	Assistant Community Development Officer (D-WASHE)

18. UNICEF

Dr. S. P. Mathur	Project Manager

19. World Vision Zambia

Mr. Martin Silutongwe	Director of Field Programme
Mr. Chikondi Phiri	Programme Manager
Mr. Rev. Sam Simon Sakala	Strategy Officer

20. Water Aid

Mr. John Kelleher	Country Director

21. Christian Children's Fund

Dr. Joseph S. Conteh	Representative to Zambia
Mr. Victor Koyi	Planning Manager

22. Care International

Mr. Felix Lombe	Livingstone Food Security Programme
Ms. Jasper Hatwiinda	Livingstone Food Security Programme

APPENDIX - 4 (1) MINUTES OF DISCUSSION ON BASIC DESIGN STUDY

MINUTES OF DISCUSSIONS
ON BASIC DESIGN STUDY
ON THE GROUNDWATER DEVELOPMENT AND SANITATION PROJECT
IN DROUGHT PRONE RURAL AREAS
IN THE REPUBLIC OF ZAMBIA

In response to a request from the Government of the Republic of Zambia (hereinafter referred to as "Zambia"), the Government of Japan decided to conduct a Basic Design Study on the Groundwater Development and Sanitation Project in Drought Prone Rural Areas (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Zambia the Basic Design Study Team (hereinafter referred to as "the Team"), which is headed by Dr. Yuji Maruo, Senior Advisor, JICA, and is scheduled to stay in the country from June 14 to August 29, 2000.

The Team held discussions with the officials concerned of the Government of Zambia (hereinafter referred to as "Zambian side") and conducted field survey in the study area.

In the course of the discussions and field survey, both sides have confirmed the main items described on the attached sheets. The Team will proceed with further works and the Basic Design Study report.

Lusaka, June 23, 2000

丸尾祐治

Yuji Maruo
Leader
Basic Design Study Team
JICA

Adam Hussen
Acting Director
Department of Water Affairs
Ministry of Energy and Water Development

(Witness)

pp

A.M.Musunga
Acting Chief Economist
Bilateral Cooperation
Ministry of Finance and Economic
Development

ATTACHMENT

1. Objective

The Objective of the Project is to improve the living standard of rural population by means of development of groundwater supply and sanitation facilities.

2. Study Area

The Zambian side and the Team agreed that the following six districts would be the study area for the Project.

(1) Central Province:	Mumbwa District
(2) Western Province:	Kaoma District
	Sesheke District (East Bank of Zambezi River)
(3) Southern Province:	Namwala District
	Itezhi-Tezhi District
	Kazungula District

3. Responsible and Executing Organization

(1) Responsible organization of the Project is the Ministry of Energy and Water Development

(2) Executing organization of the Project is the Department of Water Affairs (DWA).

Organization chart of the above organizations is described in Annex-I.

4. Items requested by the Zambian side

After discussions with the Team, the following items were finally requested by the Zambian side. However, the project sites and final components of the Project will be decided by the Government of Japan after further studies.

(1) Construction of boreholes fitted with hand pump

The Zambian side requested the construction of total number of three hundred (300) boreholes fitted with hand pump. The number of boreholes requested in each district is described in Annex-II.

The Team will select 300 sites for study from a list of candidate sites prepared by the Zambian side through discussion with officials in each district, clarification of priority, analysis of geophysical condition, and other relevant information in accordance with Water, Sanitation and Health Education (WASHE) selection criteria.

The actual sites for borehole construction will finally be decided according to the study.

(2) Construction of water supply and public sanitation facilities at the sub-centres

The Zambian side requested construction of water supply and public sanitation facilities at twenty (20) sub-centres. The locations of sub-centres are selected from the list of candidate sub-centres in Annex-III for further discussion.

The Team will consider the most appropriate system in each sub-centre.

(3) Procurement of equipment

Requested items are listed in Annex-IV

5. Japan's Grant Aid System

(1) The Zambian side has understood the system of Japan's Grant Aid on Annex-V as explained by the Team.

(2) The Zambian side will take the necessary measures described in Annex-VI for the smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

6. Schedule of the Study

(1) The consultant members of the Team will proceed with further studies in Zambia until August 29, 2000.

(2) Based on the Minutes of Discussions and technical examination of the study results, JICA will prepare the draft report and dispatch a mission in order to explain its contents in October, 2000.

(3) In case the contents of the draft report are acceptable in principle by the Zambian side, JICA will complete the final report and send it to the Zambian side around January, 2001.

7. Other relevant issues

(1) Both sides confirmed that the Zambian side would be responsible for operation and maintenance of facilities constructed under the Project. For the proper operation and maintenance of the facility, the Team explained each community at the Project site should raise enough funds so that it could fully cover procurement costs of expendables and replacement costs of facility in future.

The Zambian side understood this explanation by the Team, and in response they said that they would take measures to encourage the activity of community-based operation and

maintenance body, such as the village water, sanitation and health education committee (V-WASHE), for proper management of facilities.

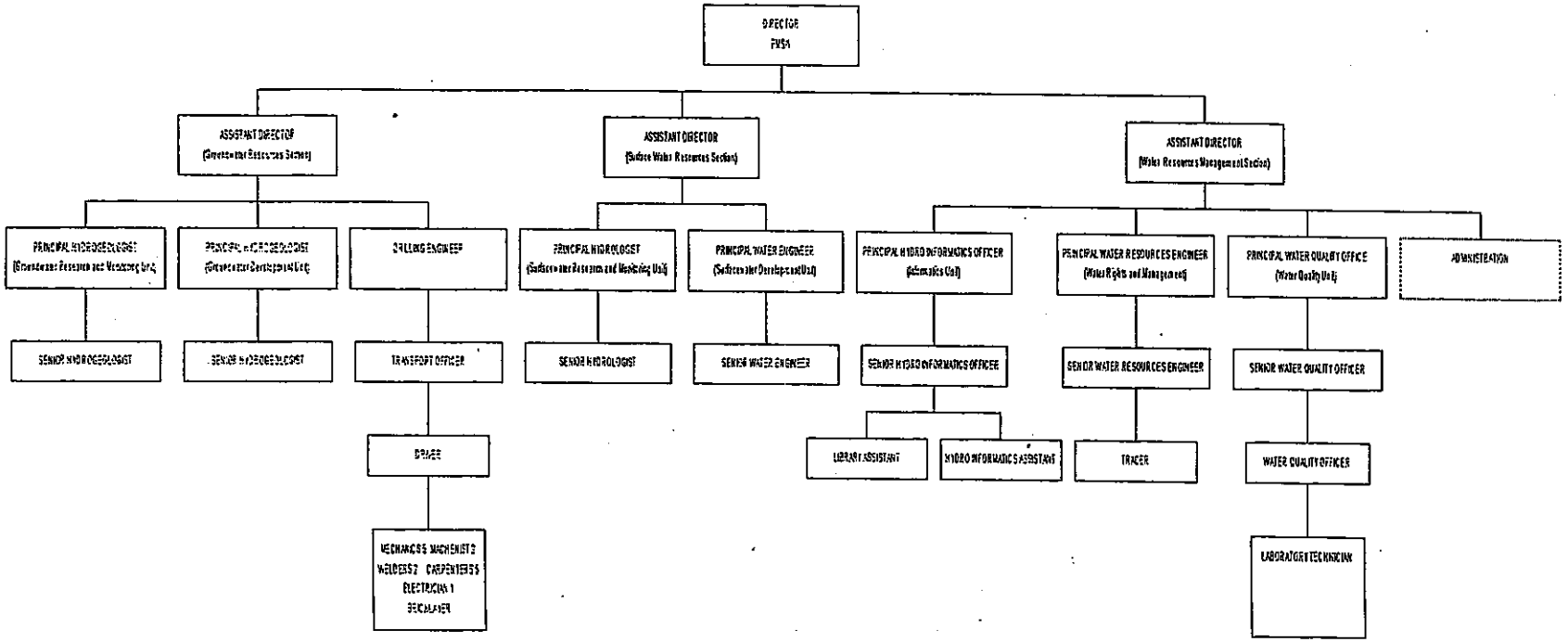
(2) The Team proposed that it would exclude the West Bank of Zambezi River in Sesheke District from the Study Area due to the uncertain security conditions in the border area.

The Zambian side agreed to this proposal in principle. However, the Zambian side explained that there are villages in the West Bank which are severely affected by drought, and therefore requested the Team to include provision of materials for construction of water supply facilities which would be implemented by the Government of Zambia.

In response the Team said it would consider any possible measures in the course of study.

(3) The Zambian side requested the Team to include counterpart training in Japan for DWA staff in order to enhance their capacity in project management.

MINISTRY OF ENERGY AND WATER DEVELOPMENT
DEPARTMENT OF WATER AFFAIRS
HEADQUARTERS ORGANISATION CHART



Annex-II

NUMBER OF REQUESTED BOREHOLES WITH HANDPUMP IN EACH DISTRICT

1. Central Province		
	Mumbwa District	69 boreholes
2. Western Provice		
	Kaoma District	67 boreholes
	Sesheke District	28 boreholes
3. Southern Province		
	Namwala/ Itezhi-Tezhi District	35 boreholes
	Kazungula District	101 boreholes
Total		300 boreholes

Annex-III

LIST OF CANDIDATE SUB-CENTRES IN EACH DISTRICT

1. Namwala District	Moobola, Muchila, Kantengwa and Banbwe
2. Itezhi-tezhi District	Nansenga, Banamwaze, Shimbizi and Kanzwa
3. Kazungula District	Nyawa, Sinde, Momba, Ngwezi, Makunka, Sekute and Mambova
4. Sesheke District	Machile, Mulobezi, Bwina, Mulauli, Lipumpu, Masese, Katima and Sichili

Annex-IV

LIST OF REQUESTED EQUIPMENT

1 Cargo Truck 4x4 (6x6) with crane for transport of construction materials	6 units
2 Light vehicles 4x4 for community mobilization, pre- and post-construction activities with the communities	8 units
3 Motor-bikes for WASHE activities	18 units
4 Personal computer for survey and project management	7 units
5 Materials for education meetings, materials for training	1 lot
6 Tools and equipment for maintenance of water supply facilities at sub-centres	1 lot
7 Drilling rigs, tools and accessories	2 units
8 Spare parts for existing drilling rigs	1 lot
9 Truck mounted compressor	4 units

JAPAN'S GRANT AID SCHEME

1. Grant Aid Procedures

1) Japan's Grant Aid Program is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the Project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the Project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Japanese Government. The contents of the Study are as follows:

a) Confirmation of the background, objectives, and benefits of the requested Project and also institutional capacity of agencies concerned of the recipient country necessary for Project's implementation.

b) Evaluation of the appropriateness of the Project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.

c) Confirmation of items agreed on by both parties concerning the basic concept of the Project.

d) Preparation of a basic design of the Project.

e) Estimation of costs of the Project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s)

selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consultant firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchanges of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

1) Grant Aid

The Grant Aid Program provides a recipient country with non-reimbursable funds to procure facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is not supplied through the donation of materials as such.

2) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc. are confirmed.

3) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consultant firm(s) and (a) contractor(s) and a final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year by mutual agreement between the two Governments.

4) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.
When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

5) Necessity of the "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

6) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

(1) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.

(2) To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.

(3) To secure buildings prior to the procurement in case the installation of the equipment.

(4) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.

(5) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.

(6) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as

may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(7) Proper Use

The recipient country is required to maintain and use facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

(8) Re-export

The products purchased under the Grand Aid should not be re-exported from the recipient country.

(9) Banking Arrangement (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the verified contracts.

b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

Annex-VI

Necessary measures to be taken by the Government of Zambia

1 To secure the sites for the Project

2 To clear, level and reclaim the sites prior to commencement of the Project

3 To provide the land for access road, a temporary site office, warehouse and stockyard during implementation of the Project

4 To provide data and information for the Project

5 To provide necessary facilities for the Project such as warehouse for spare parts, drilling accessories and other incidental facilities

6 To undertake incidental outdoor works such as gardening, fencing, gates and exterior lighting in and around the site

7 To construct the access road to the site prior to commencement of the construction

8 To bear commissions to a Bank of Japan for the banking services based upon the banking arrangement

9 To exempt taxes and levies and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation

10 To ensure prompt unloading and customs clearance at a port of disembarkation in Zambia and facilitate internal transportation therein of the products purchased under the Project

11 To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Zambia with respect to the supply of the products and services under the contracts verified by the Government of Japan

12 To accord Japanese nationals whose services may be required in connection with supply of the products and services under the contract verified by the Government of Japan, such facilities as may be necessary for their entry into Zambia and stay therein for the performance of their work

13 To assign the necessary staff and secure the necessary budget for operation and maintenance of the equipment purchased under the Grant Aid

14 To maintain and use properly and effectively the equipment procured under the Grant Aid

15 To bear the expenses other than those to be borne by the Grant Aid necessary for construction of the facilities as well as for the transportation and installation of the equipment

16 To maintain the control of tools and spare parts purchased under the Grant Aid

APPENDIX - 4 (2) MINUTES OF DISCUSSIONS ON THE EXPLANATION OF DRAFT BASIC DESIGN STUDY

MINUTES OF DISCUSSIONS
ON BASIC DESIGN STUDY ON THE GROUNDWATER
DEVELOPMENT AND
SANITATION PROJECT IN DROUGHT PRONE RURAL AREAS
IN THE REPUBLIC OF ZAMBIA
(EXPLANATION ON DRAFT REPORT)

In June 2000, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Groundwater Development and Sanitation Project in Drought Prone Rural Areas (hereinafter referred to as "the Project") in the Republic of Zambia (hereinafter referred to as "Zambia"), and through a series of discussions, field surveys, and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult the Department of Water Affairs on the component of the draft report, JICA sent to Zambia the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Dr. Yuji MARUO, Senior Advisor, JICA from 24 October to 1 November 2000.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Lusaka, November 1, 2000.

丸尾祐治

Dr. Yuji Maruo
Leader
Draft Report Explanation Team
Japan International Cooperation Agency
Japan

pp Mr. Joseph C. Kasongo
Permanent Secretary
Ministry of Energy and
Water Development
Republic of Zambia

(Witnesses)

A. Musunga.

Ms. A.M. Musunga
Acting Chief Economist
Bilateral Cooperation
Ministry of Finance and
Economic Development
Republic of Zambia

Mr. Adam Hussen
Acting Director
Department of Water Affairs
Ministry of Energy and
Water Development
Republic of Zambia

ATTACHMENT

1. Components of the Draft Report

The Government of Zambia agreed and accepted in principle the components of the draft report explained by the Team.

2. Japan's Grant Aid scheme

The Zambian side understands the Japan's Grant Aid scheme and the necessary measures to be taken by the Government of Zambia as explained by the Team and described in Annex-V and Annex-VI of the Minutes of Discussions signed by both parties on 23 June 2000.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed items and send it to the Government of Zambia by January 2001.

4. Other relevant issues

1) Responsible and Executing Organization

i. Responsible organization of the Project is the Ministry of Energy and Water Development.

ii. Executing organization of the Project is the Department of Water Affairs(DWA).

2) Budgetary Arrangement

The Ministry of Finance and Economic Development has allocated a budget of Kwacha 450 million for DWA to execute the Project during the fiscal year 2001.

The Zambian side confirmed to take necessary measures for acquiring necessary amount of budget to execute the Project in the following fiscal years as well.

3) Contents of the Items of the Project

Both sides have basically confirmed the number of boreholes at the site listed in Annex-I and items which would be procured under the Japanese Grant Aid listed in Annex-II.

4) Vehicles for Construction Team

The Zambian side requested three (3) pick-up trucks for following use:

i. One (1) pick-up for overall management and inspection of the construction

ii. Two (2) pick-up for liaison and transportation of four(4) drilling crews

5) Suitable Type of Handpump

Due to corrosive nature of groundwater quality in the Project area, the Japanese side proposed a type of handpump in which riser pipe is made of PVC. On the other hand, the Zambian side requested that steel riser pipe of the present standard handpump would be replaced with stainless steel riser pipe. Both sides came to a conclusion that the final decision would be made after the detailed analysis and evaluation of advantage and disadvantage of two types of the handpump which will be described in the final Report.

6) Implementation Schedule

Regarding the implementation schedule, the Zambian side requested to start the drilling work during the phase-1. The Japanese side responded that, in order to implement this Project efficiently, the existing drilling rigs and supporting vehicles must be properly rehabilitated with newly procured spare parts and accessories before they are deployed to the actual drilling works. At least eight (8) months would be required for the procurement and rehabilitation of the above mentioned existing drilling rigs and supporting vehicles. Therefore, it is not possible to start the drilling works before beginning of the rainy season during the phase-1.

While the Zambian side understood the above mentioned explanation, they strongly requested again to find a way to start the drilling works in phase-1 in order to maintain the community confidence. The Japanese side responded that this request would be conveyed to JICA headquarter for further consideration.

7) Operation and Maintenance

The Zambian side is responsible for operation and maintenance of facilities constructed under the Project. D-WASHE members will play major role in the community mobilization activities after receiving the training. However, the Zambian side requested that some activities of the community mobilization during the Project be conducted by the Japanese side.

8) Specifications of the Equipment

The Zambian side basically agreed with the specification of the equipment to be procured under the Project.

9) Supervision of Community Mobilization Activities

The Zambian side requested to assign a member of consultant on the supervision of the community mobilization activities, particularly in the area where NGOs are taking part in the community mobilization activities.

10) Provision of Land for Base Camp and Stockyard

The Zambian side confirmed that necessary land for the base camp and stockyard would be provided as follow:

i. Main stockyard and base camp in Livingstone and Mumbwa
ii. Branch stockyard in Kaoma, Itezhi-tezhi, Namwala and Sesheke

ANNEX-1

NUMBER OF BOREHOLES IN EACH DISTRICT TO BE CONSTRUCTED UNDER THE PROJECT

(1) Central Province		
Mumbwa District		69 boreholes
(2) Western Province		
Kaoma District		67 boreholes
Sesheke District (East Bank of Zambezi River)		29 boreholes
(3) Southern Province		
Namwala District		15 boreholes
Itezhi-tezhi District		21 boreholes
Kazungula District		101 boreholes
	Total	302 boreholes

A-M.

ANNEX-2

LIST OF EQUIPMENT AND MATERIALS TO BE PROCURED UNDER THE PROJECT

Item.	Q'ty.
1. Equipment for drilling works	
a. Truck mounted drilling rigs	2 units
b. Tools for mud drilling	2 sets
c. Tools for DTH drilling	2 sets
d. Compressor for DTH drilling	
i. Truck mounted	2 units
ii. Skid mounted	2 units
e. Fishing tools	2 sets
f. Miscellaneous	2 sets
2. Equipment for pumping test	3 sets
3. Cargo truck with crane for pumping test equipment(4x4)	1 unit
4. Cargo truck for drilling works	
a. For tools and construction material transportation (6x6, with 4 tone crane)	2 units
b. For water and fuel tank transportation (4x4, with 3 tone crane)	2 units
5. Materials and equipment for community education and mobilization	
a. Motor-bikes	12 units
b. Computer (for Sesheke and Itezhi-tezhi)	2 sets
6. Spare parts and accessories for the existing drilling rigs and cargo truck	1 set

APPENDIX - 5 COST TO BE BORN BY THE RECIPIENT COUNTRY/ OPERATION AND MAINTENANCE COST

(1) Cost to be Born by the Recipient Country

Description	Amount (Kwacha)			
	Phase 1	Phase 2	Phase 3	Total
1. Allowance for the Construction Team	—	790,140	728,780	1,518,920
2. Allowance for the Pumping Test Team	—	390,780	362,700	753,480
3. Allowance for the Extension Staff	15,100	15,100	15,100	45,300
Total	15,100	1,196,020	1,106,580	2,317,700

* 4 Construction Teams are to be formed with eight crews each.
* 3 Pumping Test Team are ato be frormed with five crews each.
* Period of the second phase is set as 12 months and the thrid phase as 11 months.

(2) Operation and Maintenance Cost for Handpump

Items of Spare Parts	Period of Durability	Q'ty	Unit Cost	Amount	Cost/ annum
Rod centralizers	5	10	1.23	12.30	2.46
Bearings(inner & outer)	1	1	3.15	3.15	3.15
Plunger seal	1	1	0.88	0.88	0.88
plunger with pump rod fitting bottom	5	1	18.13	18.13	3.63
Nylon rope	5	1	3.00	3.00	0.60
Foot valve with fitting	5	1	8.41	8.41	1.68
Pipe centralizers	5	1	1.23	1.23	0.25
Pump rod -Mild Steel	5	1	150.00	150.00	30.00
Riser Main	5	1	108.64	108.64	21.73
Cylinders without plunger/foot valve	5	1	44.74	44.74	8.95
Pump head	10	1	84.30	84.30	8.43
Handle	10	1	49.01	49.01	4.90
Fulcrum Pin	5	1	0.25	0.25	0.05
Rod hanger Pin	5	1	0.25	0.25	0.05
uPVC riser pipe (530mm long)with bell ends on both sides	5	1	9.98	9.98	0.05
M16*30 Hex Screw	5	1	3.61	3.61	0.72
M12*35 Hex Bolt	5	1	1.53	1.53	0.31
M12 Hex Nuts	5	1	3.00	3.00	0.60
M16*30 Hex Bolt	5	1	3.61	3.61	0.72
'O' ring	5	1	0.74	0.74	0.15
Amount of Maintenance Cost/ Annum					89.30
Maintenance Cost/ Household	The results of the socio-economic surveys in the project sites shows the affordable amount for communities as K500-K1,000 in average. Amount of K500-K1,000/ household are collected in the communities where the residents has already had a certain experience in fund raising for the maintenance cost of existing boreholes.				
US$89.30/12 months = US$7.44/month					
US$7.44/250 capita= US$0.029					
US$0.029 x 8 persons/ HH= US$0.229					
US$0.229 x K3400/ US$ = K780/ HH					

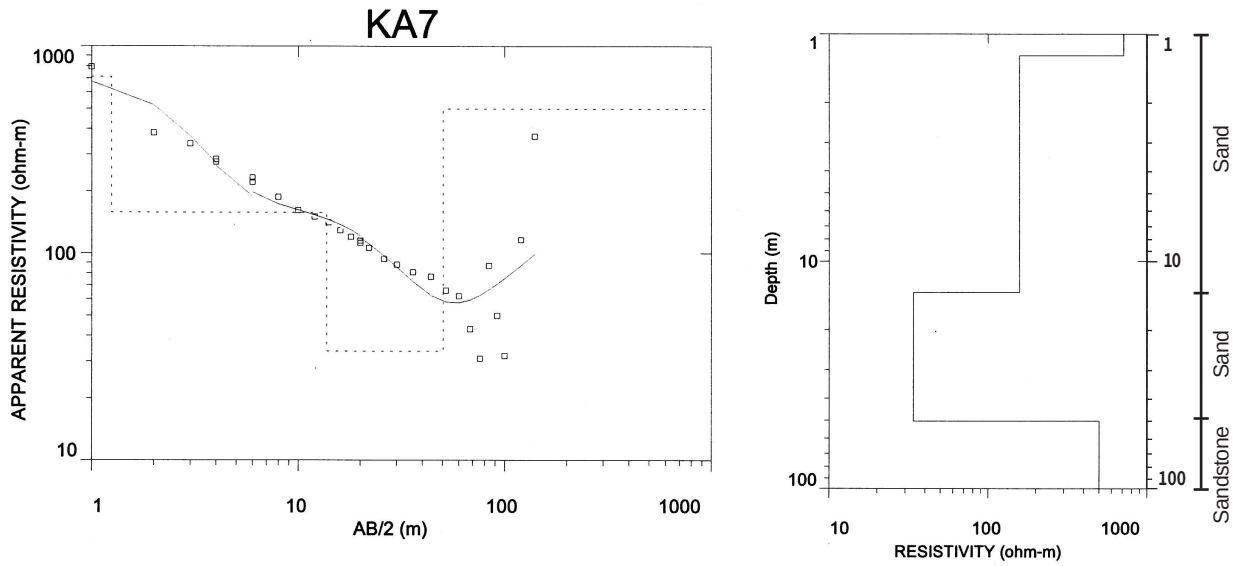
APPENDIX- 6 TECHNICAL DATA

(1) The Results of Geoelectrical Prospecting

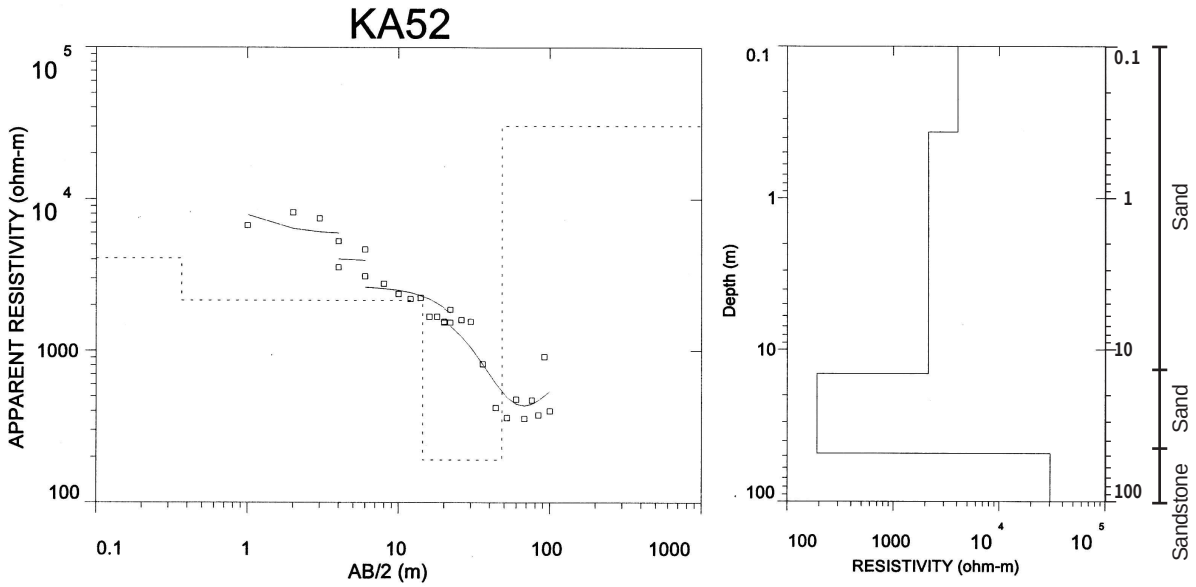
(2) Proposal on the Soft Component Programme

(3) Village Inventory Data

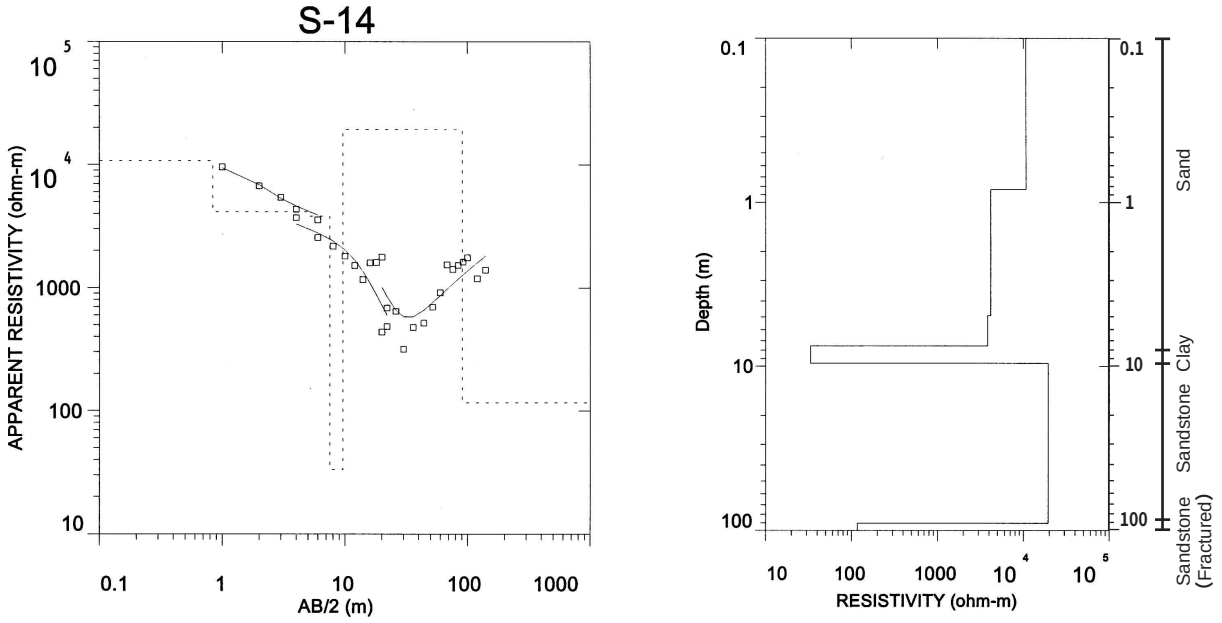
(4) Overview of the Results of the Household Survey



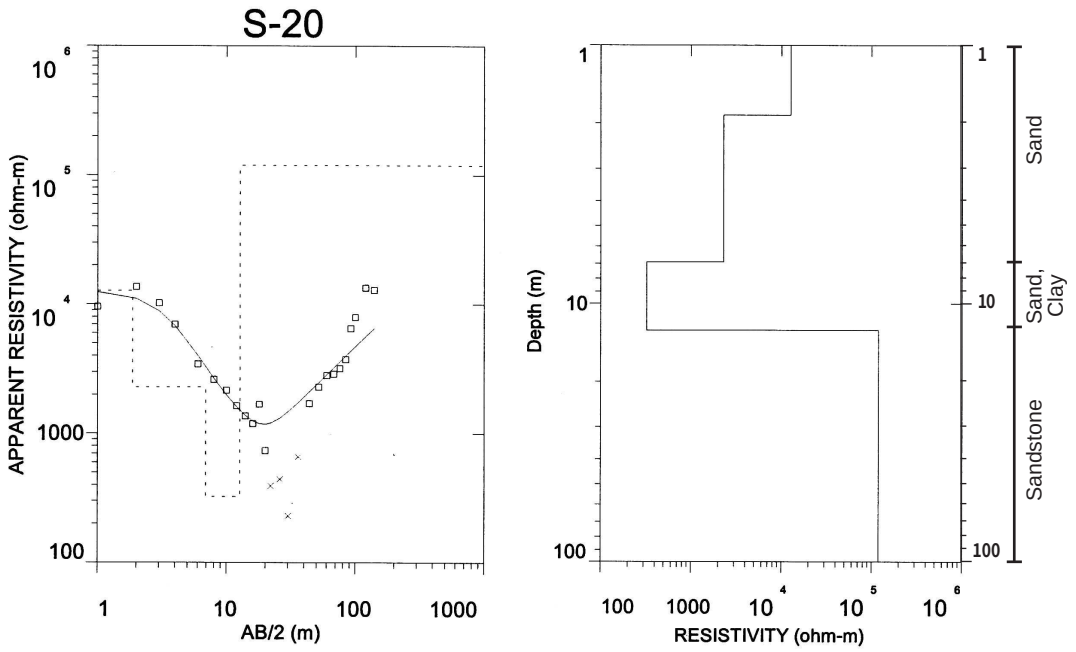
Vertical Geoelectrical Prospecting	KA-7：Sipalo School (Western Province, Kaoma District)



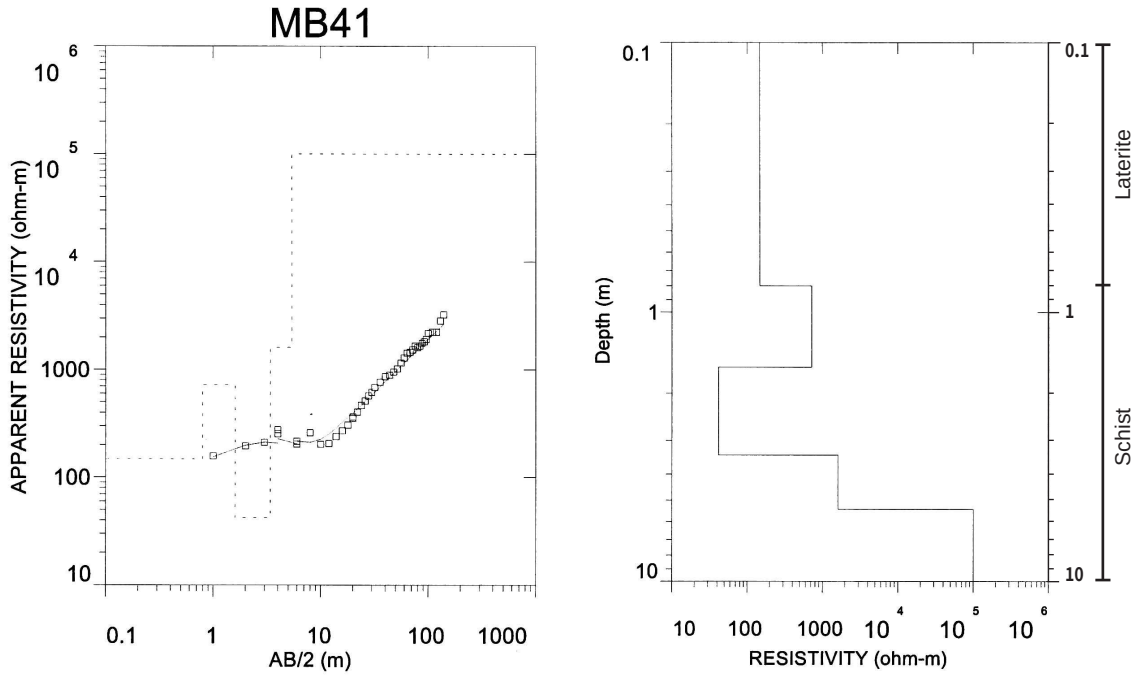
Vertical Geoelectrical Prospecting	KA-52：Sempyeka/Mutesi (Western Province, Kaoma District)



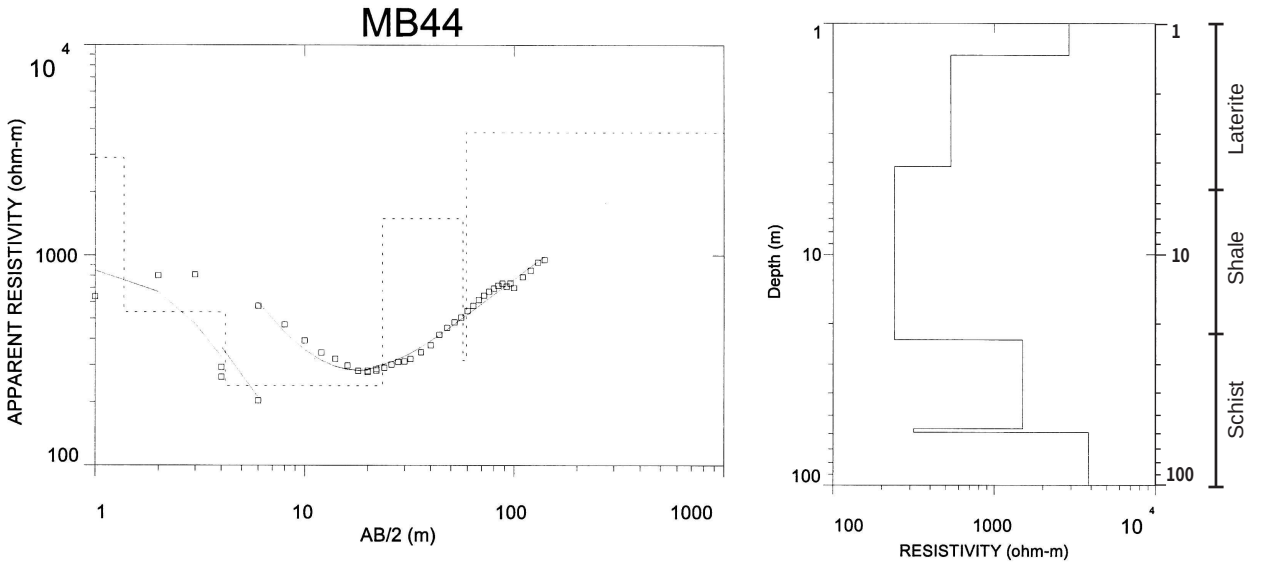
Vertical Geoelectrical Prospecting	S-14 : Chimwaya (Western Province, Sesheke District)



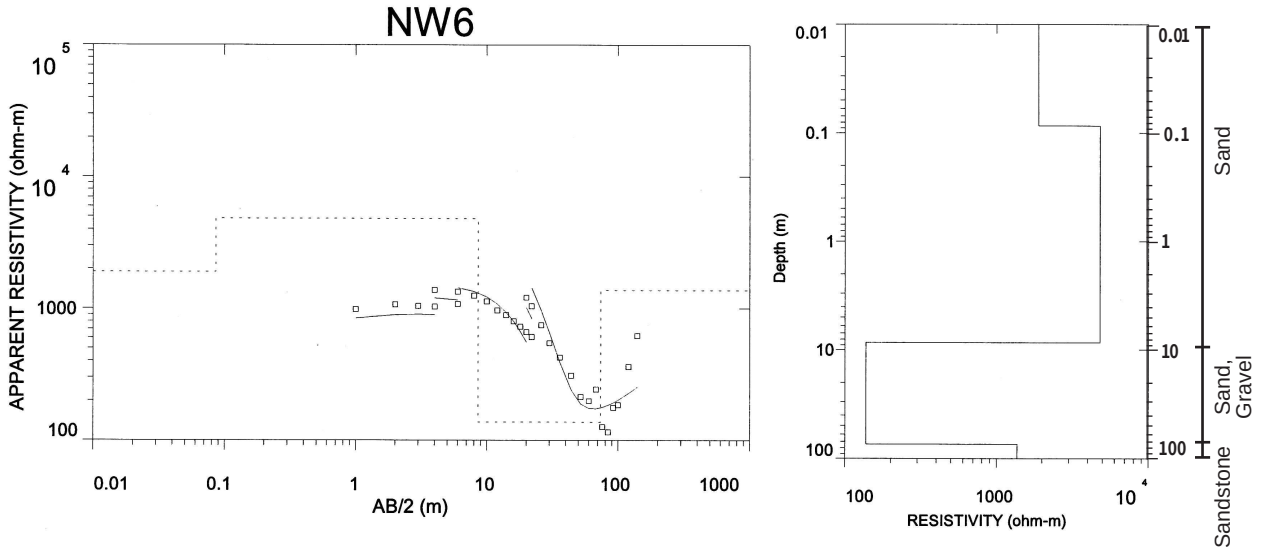
Vertical Geoelectrical Prospecting	S-20 : Lupasa (Western Province, Sesheke District)



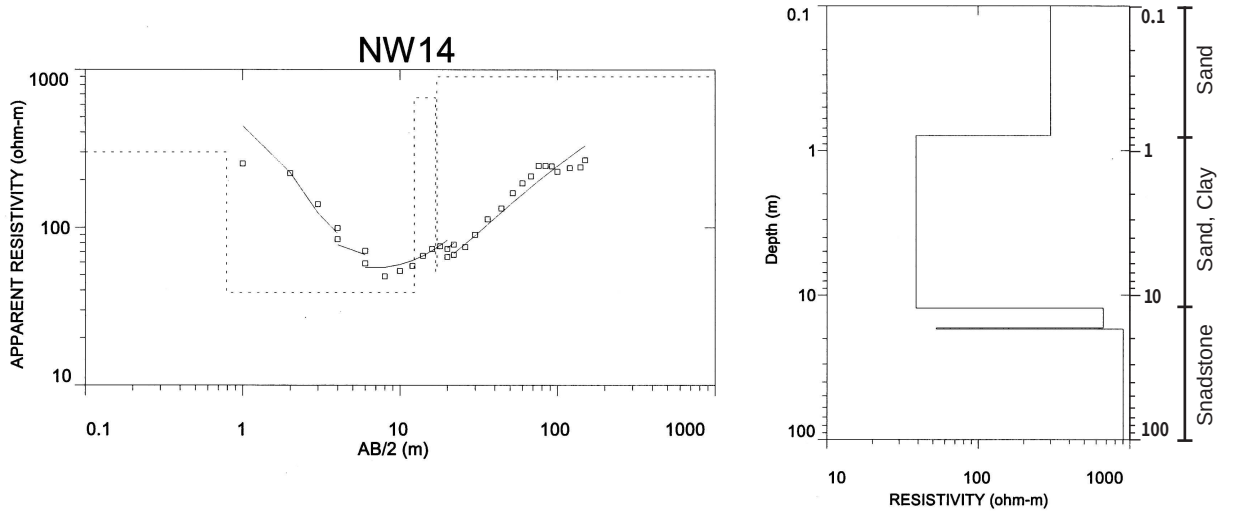
Vertical Geoelectrical Prospecting	MB-41：Chimbwe (Central Province, Mumbwa District)



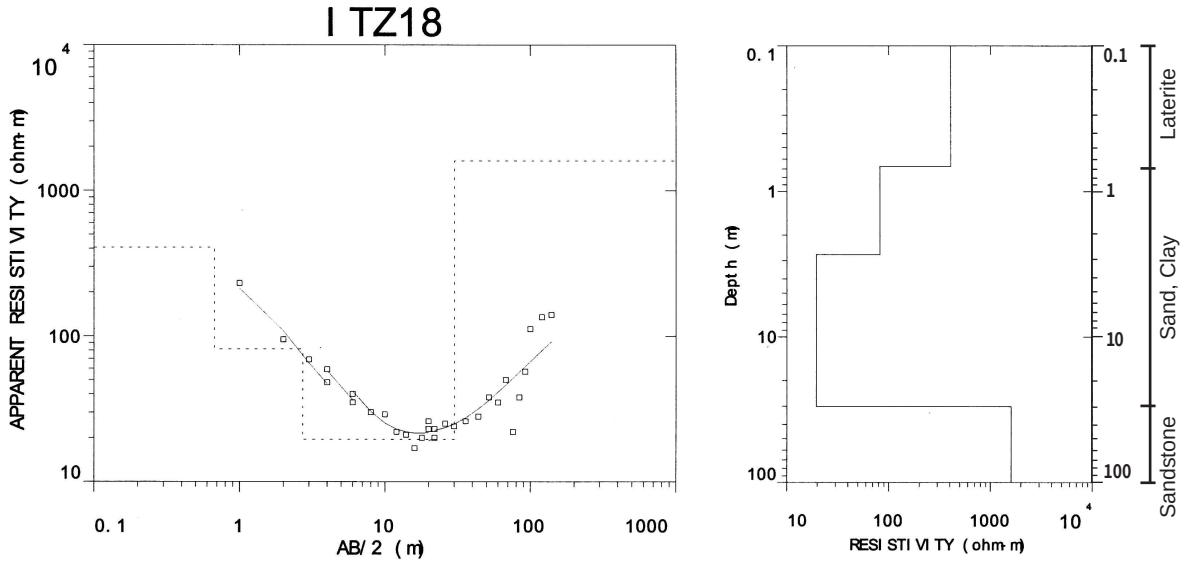
Vertical Geoelectrical Prospecting	MB-44：Chipata (Central Province, Mumbwa District)



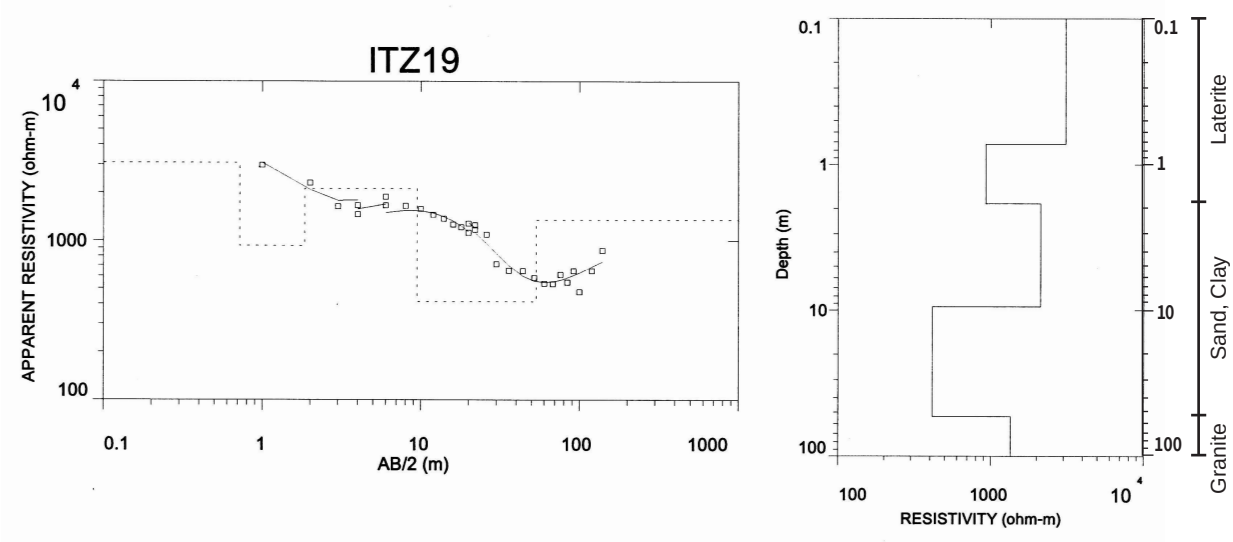
Vertical Geoelectrical Prospecting	NW-6：Munjile/Hakaloba (Southern Province, Namwala District)



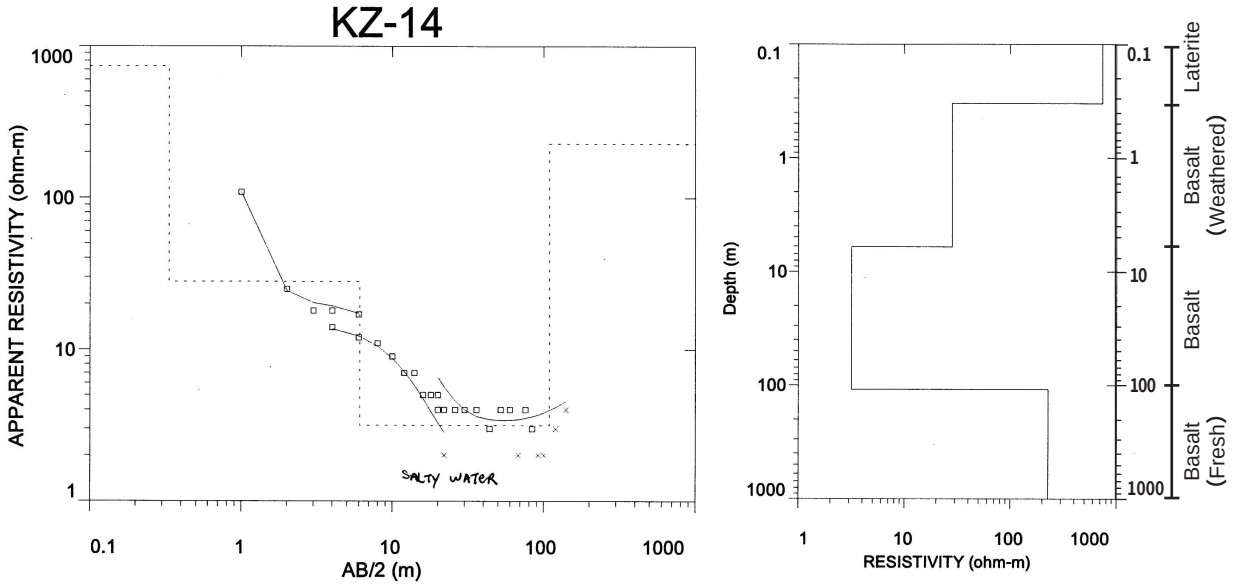
Vertical Geoelectrical Prospecting	NW - 14：Shababwe/Hamapondo (Southern Province, Namwala District)



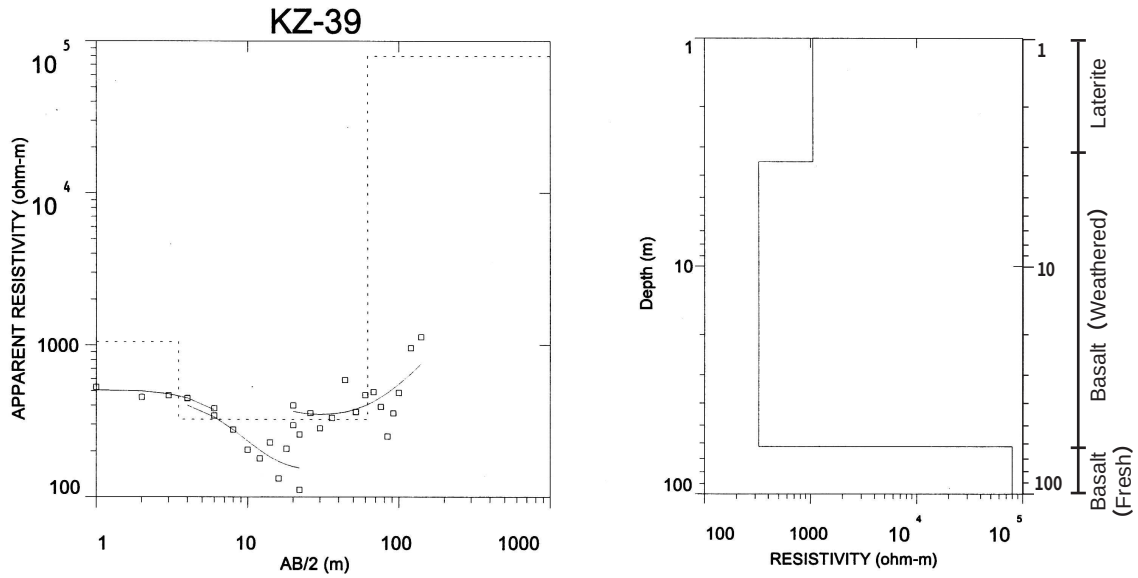
Vertical Geoelectrical Prospecting	ITZ-18：Idyamaala (Southern Province, Itezhi-Tezhi District)



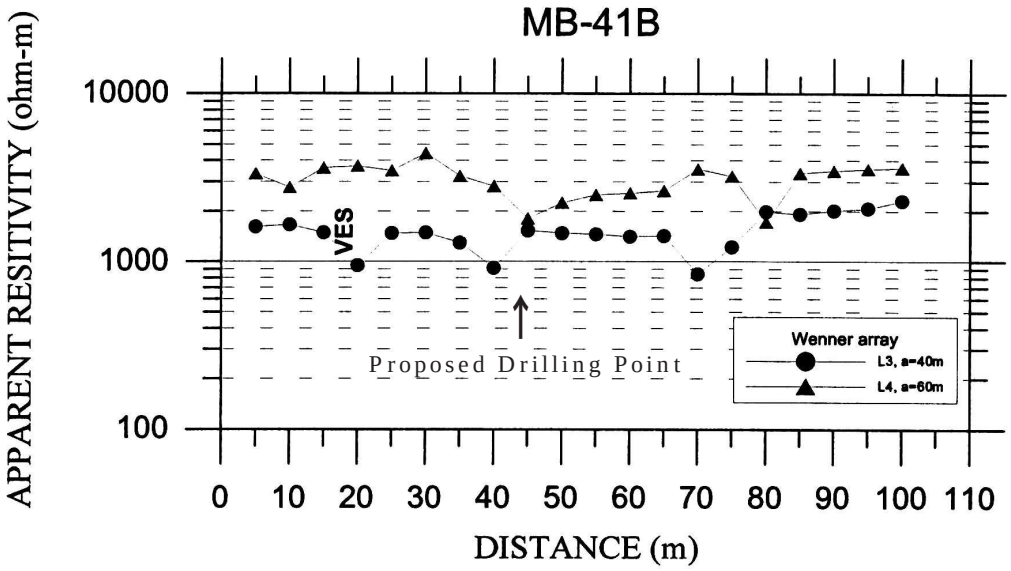
Vertical Geoelectrical Prospecting	ITZ-19：Samundengo (Southern Province, Itezhi-Tezhi District)

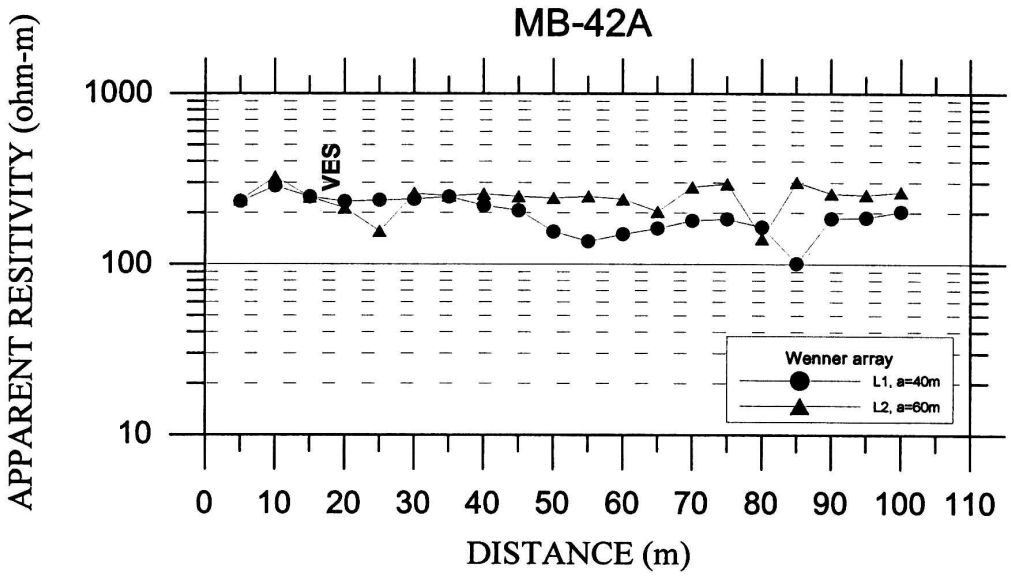


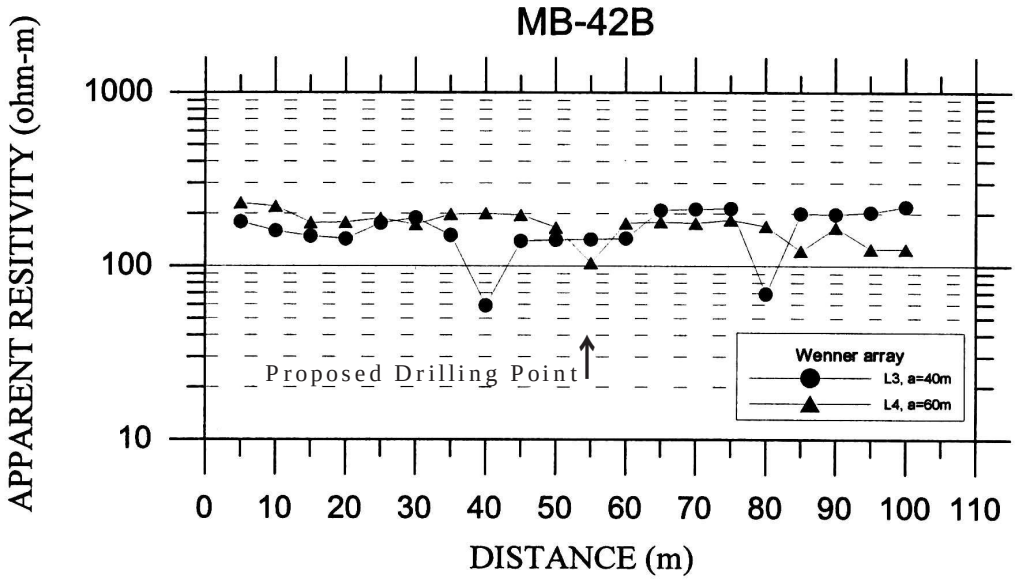
Vertical Geoelectrical Prospecting	KZ - 14 ：Kasaya School (Southern Province, Kazungula District)



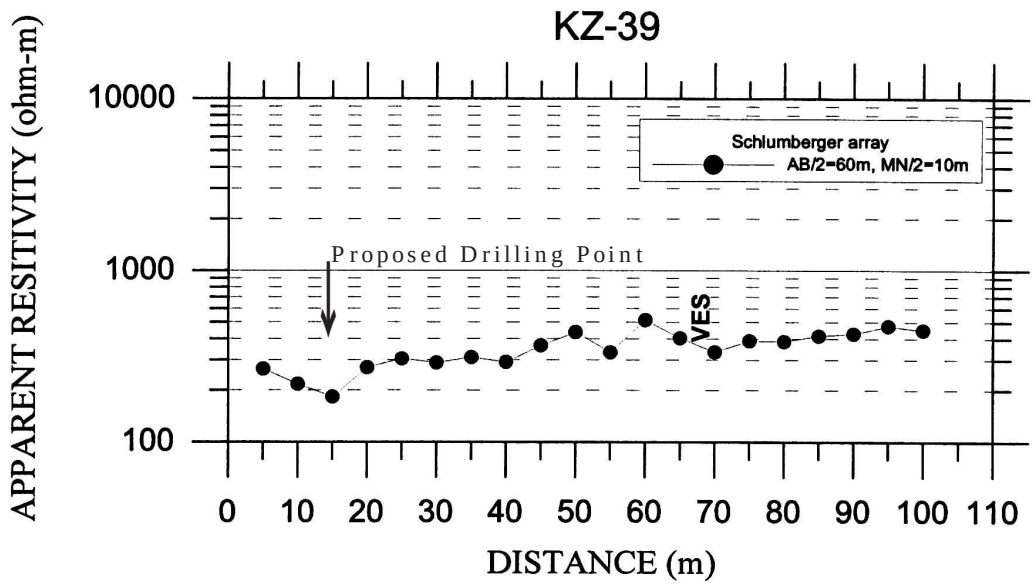
Vertical Geoelectrical Prospecting	KZ - 39 ：Makumba (Southern Province, Kazungula District)

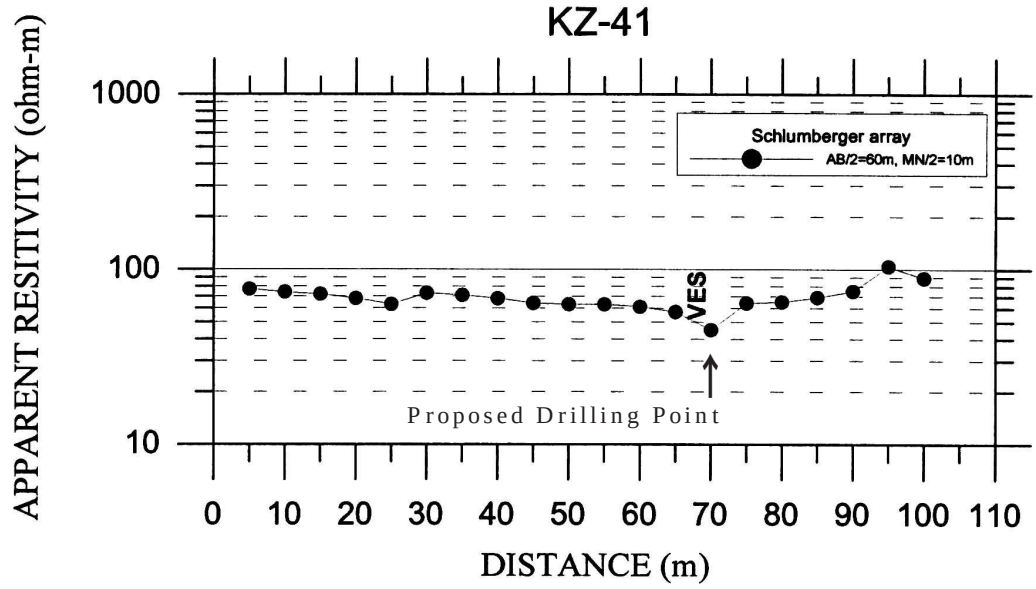


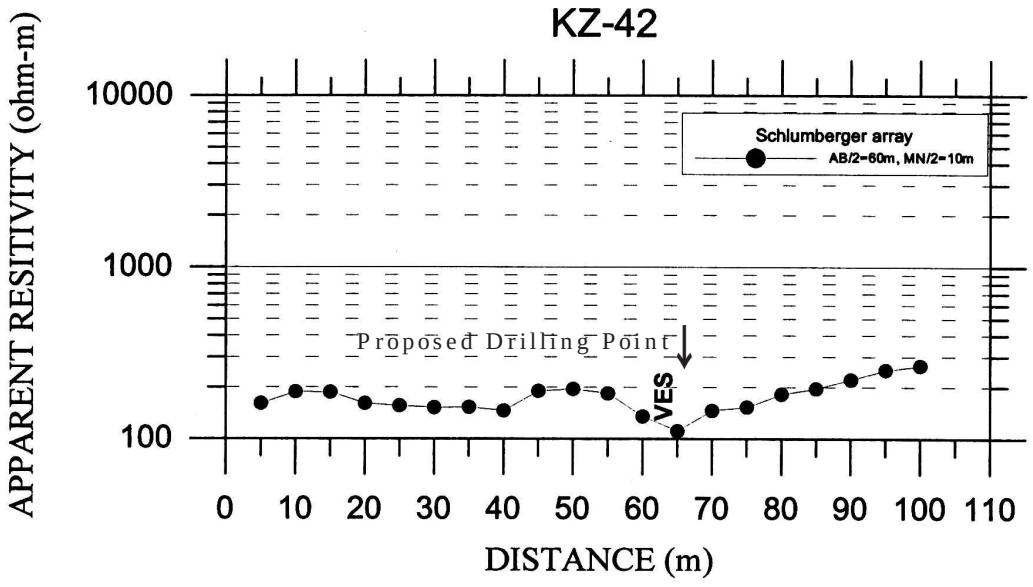




Horizontal Geoelectrical Prospecting	MB-41B, MB-42A, MB-42B


KZ-39
APPARENT RESITIVITY (ohm-m)
10000
1000
100
Schlumberger array
AB/2=60m, MN/2=10m
Proposed Drilling Point
VES
0 10 20 30 40 50 60 70 80 90 100 110
DISTANCE (m)


KZ-41
APPARENT RESITIVITY (ohm-m)
1000
100
10
Schlumberger array
AB/2=60m, MN/2=10m
VES
Proposed Drilling Point
0 10 20 30 40 50 60 70 80 90 100 110
DISTANCE (m)


KZ-42
APPARENT RESITIVITY (ohm-m)
10000
1000
100
Schlumberger array
AB/2=60m, MN/2=10m
Proposed Drilling Point
VES
0 10 20 30 40 50 60 70 80 90 100 110
DISTANCE (m)

APPENDIX-6 (2)

PROPOSAL ON THE SOFT COMPONENT PROGRAMME FOR THE GROUNDWATER DEVELOPMENT AND SANITATION PROJECT IN DROUGHT PRONE RURAL AREAS IN THE REPUBLIC OF ZAMBIA

1. BACKGROUND

1-1. Operation and Maintenance Plan for This Project

In order to sustain the water supply facilities constructed in the Project, it is required that the beneficiaries, i.e. the villagers, fully understand the importance of safe water, utilise the facilities in proper manners, and participate actively in the operation and maintenance (O&M).

The Water, Sanitation and Health Education (WASHE) is the development strategy of the rural water supply and sanitation sectors in Zambia. According to the WASHE concept, the communities are supposed to participate in the whole project cycle from the planning stage to the evaluation stage through the Village WASHE Committee (V-WASHE). Communities have the ownerships of constructed facilities, and the villagers are responsible for the maintenance and the costs for that.

The objectives of this Soft Component programme are to maximise the impact and benefit of the Project to the target areas and to support the systems with which the communities can operate, manage and maintain the facilities by themselves. Since the activities of education and organisation of the communities will start prior to the commencement of the construction works in this Project, it is expected that the education programme and the construction works proceed smoothly at the same time.

1-2. Current situations of the Operation and Maintenance of Water Facilities in the Target Areas

Concerning the current situations of operation and maintenance of water supply facilities in the target areas, the followings were revealed through the field surveys.

1) Many of the communities in the target villages recognise the safety of water from boreholes even in the case that they are presently dependant on unprotected water sources. They showed their willingness to pay for the water fee and the costs for operation and maintenance when boreholes are constructed.
2) Each target district has a D-WASHE composed of about 15 members of staff from the governmental institutions such as the Department of Water Affairs, the Ministry of Health, the Ministry of Education, the Ministry of Agriculture, Food and Fishery, the Ministry of

Community Development and Social Welfare, the Central Statistic Office, and NGOs as well as officials of the District Council. The level of activities of D-WASHEs are different upon the time from their establishment, number of the core members, and support from NGOs. Regarding the target districts of this Project, Itezhi-tezhi district and Sesheke district need the reinforcement of the staff since these districts do not have personnel from the DWA, who is in charge of technical support for operation and maintenance of the water supply facilities. In addition, for Mumbwa district where D-WASHE was established just in 1999, institutional strengthening of the committee is required.

3) The Environmental Health Technicians of rural health centres have roles and responsibilities on hygiene education and organisation of communities as the Extension Staff, being intermediate between the personnel of D-WASHEs and Communities. However since there are some areas where the number of Environmental Health Technicians is not enough to cover WASHE activities in the catchemnt area, Community Health Workers and Traditional Birth Attendants working as volunteers with the government officials as well as civil servant like Community Development Officer and schoolteachers are to be allocated instead of the EHTs in order to conduct activities of community mobilisation and hygiene education.

In the light of these present situations, the following points are to be paid attention in the Project in order to carry out the smooth operation and maintenance in the target villages.

- ✓ Reorganisation of the O&M systems through V-WASHEs
- ✓ Fund raising for the O&M by the villagers: It is necessary that V-WASHEs collect water tariffs from the users and spend them on spare parts and payment for repairs by Area Pump Menders, etc.
- ✓ Strengthening of supporting systems at district levels: Systems, which support the O&M from the aspects of techniques and policies, are essential at district levels to facilitate the community based O&M activities.
- ✓ Strengthening of education and training systems composed of the personnel of Catchment Areas

2. OBJECTIVES

The objectives of this Soft Component programme are to improve the capacity of the communities in operation and maintenance of constructed water supply facilities with the supports from the district administrations, and to establish the systems for the sustainable community based management of the facilities. The framework of the basic concept of the Programme is described in the Project Design Matrix attached as the annexe.

3. ACTIVITIES AND OUTPUT

3-1. Contents of the Activities

The following shows the contents of the activities and their output within the framework of the Soft Component Programme. The details of each activity are described in Annex 2) hereafter.

APPENDIX-6 (2)

Activities of Soft Component Programme

(1) Activities to Strengthen the Capacity in Community Mobilisation at District Level

① Orientation of the overview of the project and the soft component programme
② Training of the trainers for the construction and repair of water supply facilities with handpumps

<Output>
Capacity of D-WASHE Committee for training of trainers involved in the construction and maintenance of water supply facilities is enhanced.

(2) Activities to Strengthen the Capacity in Community Mobilisation at Catchment Area Level

① Workshop training for the Extension Staff to improve skills used for establishment of V-WASHE and health/hygiene education.
② Workshop training for Area Pump Mender to improve technique for construction and maintenance of the handpump water supply facilities.

<Output>
Extension staff and Area Pump Menders involved in community mobilisation, construction and maintenance of the water supply facilities , and implementation of health education are trained.

(3) Community Mobilisation/ Health Education, and Formation and Capacity Building of V-WASHE

① Making appointment (Village visits)
② Community mobilisation and hygiene education
③ Establishment of V-WASHEs
④ Training to develop awareness on responsibilities and roles of V-WASHE
⑤ Training for accountants in fee collection and management
⑥ Training for the Care Takers
⑦ Monitoring before the handing over the facilities

＜Output>
☐ Boreholes fitted with hand pumps are constructed in the target communities
☐ Appurtenant facilities are constructed on the borehole
☐ V-WASHE is established and trained.
☐ Behaviour of the community in use of safe water is improved.

(4) Regular Monitoring of the Activities

①Review workshops for the Extension Staff and the Area Pump Menders
②Review workshops of D-WASHEs

＜Output＞
☐ The activities are regularly reviewed and checked. If there were some problems, it would be improved.
☐ Comprehensive monitoring of the activities at village, district and catchment levels are conducted, and these activities could be modified to make them better.

3-2. Activities to be Funded by the Government of Zambia

Whereas the activities mentioned above will be implemented as the obligation of the Japanese side, the monitoring activities after the completion of Soft Component Programme should be funded by the Zambian side. Monitoring activities consist of two portions as follows.

① Monthly monitoring of the villages done by Extension Staff

＜Objective＞

The objectives are to check the usage of the facilities, the quality and quantity of water, the conditions of handpumps and the improvement of the users' behaviours for the sanitation; to promote D-WASHE's policies for water supplies and hygiene; and to report the results of the monitoring to D-WASHEs

② Quarterly monitoring of the villages done by the technical staff of D-WASHEs

＜Objectives＞

The technical staff of D-WASHEs such as the Water Engineers of the DWA, the Director of Works, the Director of Planning and District Health Inspectors have inspection visits to the villages to check the conditions of the facilities and identify the problems of the communities. They also monitor the activities of personnel at Catchment Areas. The results of the monitoring would be reflected to the Development Plans of D-WASHEs.

3-3. Roles of the Actors in the Soft Component Programme

For the implementation of this soft component programme, the roles of each actor involved are as follows.

APPENDIX-6 (2)

Actors	Roles
1) Japanese consultants	☐ To implement and supervise the Programme and to report to the Owner and JICA ☐ To hold orientation workshops for introduction of the Project and the Soft Component Programme to the D-WASHE, staff of district council and the Member of Parliament ☐ To provide technical advice to D-WASHEs' trainers in terms of construction and maintenance of water facilities with hand pumps to be introduce by the Project ☐ To monitor and check the appurtenant facilities after the construction, and give technical advice
2) DWA counterparts	☐ To supervise the programme in co-operation with the Japanese consultants ☐ To request their co-operations to other Ministries and the Departments ☐ To coordinate the implementation schedule between the Programme and the construction works ☐ To hold orientation workshops for introduction of the Project and the Soft Component Programme to the D-WASHE, staff of district council and the Member of Parliament ☐ To train the D-WASHEs' trainers in terms of construction and maintenance of water facilities with hand pumps to be introduced under the Project ☐ To monitor and check the appurtenant facilities after the construction, and give technical advices
3) NGOs	☐ To implement the programme in each district based on the sub-contract with Japanese Consultant ☐ To train the trainers of D-WASHEs regarding the construction and the maintenance of hand pumps ☐ To train the Extension Staff and the Area Pump Menders ☐ To plan and implement community mobilisation and hygiene education with the Extension Staff and the Area Pump Menders ☐ To report the activities to the D-WASHEs, the consultants and the DWA counterparts ☐ To provide technical advice and transportation to extension staff and APM
4) D-WASHEs	☐ To manage and allocate the equipment and the materials for the O&M to be delivered by the Project ☐ To train the Extension Staff and the Area Pump Menders ☐ To monitor the programme in the districts and advise them ☐ To allocate necessary human resources for the Programme implementation
5) Extension Staff	☐ To implement community mobilisation and hygiene education and establish and train V-WASHEs with the supervision of NGOs/D-WASHEs. ☐ To check the funding for the O&M in the villages, and instruct how to use the facilities with hygienic manners ☐ To report the progress of the activities to the NGOs
6) Area Pump Menders	☐ To Care Takers of boreholes with the supervision of NGOs/D-WASHEs ☐ To report the progress of the activities to the NGOs
7) V-WASHEs	☐ To coordinate the O&M within the villages ☐ To collect the costs for the O&M of water facilities, and store spare parts ☐ To sensitise the community for the proper usage of the facilities, the prevention of breakdowns, and the improvement of the hygienic environment

APPENDIX-6 (2)

ANNEXE

1) Project Design Matrix of the Project including the Soft Component Programme

2) Detail Plan of Activity

3) Overview of the Activities and their Targets by District and Implementation Phase

ANNEX 1)

Project Design Matrix (PDM) of the Project including the Soft Component Programme

Project Title: Groundwater Development and Sanitation Project in Drought Prone Rural Area
Project Area: Kaoma District, Sesheke District, Mumbwa District, Namuwala District, Itezhi-Tezhi District, Kazungula District Project Term: January 2001 – March 2004 Target Group: 302 Communities in the Project Area

Version: October. 2000

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumption
Overall Goal			
1. Water supply facilities constructed under the Project are operated and maintained in a sustainable manner. 2. Knowledge in selection of appropriate types of hand pump and capacity in operation and maintenance of hand pump is enhanced at District Level	1. Function rate of water supply facilities 2. Amount reserved by the communities for community fund 3. Number of APM trained	Record of monitoring by extension staff and District staff Account book for community fund D-WASHE Action Plan	
Project Purpose			
1. Water coverage rate in the Project area is improved. 2. Sustainable use of safe and stable water is enabled by the target communities 3. Capacity of the target community in operation and maintenance of water supply facilities is developed in collaboration with District Administrations	1 Water coverage rate in the Project area improved from 22% to 40% 2-1 Water supply facilities constructed are used throughout years 2-2 Water quality of the facilities constructed satisfies WHO standards 3-1 Amount reserved by the communities for community fund 3-2 Number of monitoring by the District Council Staff	Final inspection report of the Project Final inspection report, record of monitoring by district staff Record of drilling Record of monitoring by extension staff and district staff	Total population in target communities is not decreased significantly Income of the community is not decreased significantly due to natural disaster Policy on the rural water and sanitation sector remains unchanged
Output			
1-1 Boreholes facilities fitted with hand pumps are constructed in the target communities 1-2 Appurtenant facilities are constructed on the water supply facilities 2 Capacity of D-WASHE Committee for training of trainers involved in the construction and maintenance of water supply facilities is enhanced 3-1 Extension staff and Area Pump Menders involved in community mobilisation, construction and maintenance of the water supply facilities, and implementation of health education are trained 3-2 V-WASHE is established and trained 3-3 Behaviour of the community in use of safe water is improved	1-1 302 borehole facilities fitted with hand pump is constructed 1-2 Appurtenant facilities are constructed at 302 borehole facilities 2 Control and management plan for the equipment for operation and maintenance is prepared by each W-WASHE 3-1 Number of APM trained 3-2 Deployed number of APM and extension staff in the Project area 3-3 V-WASHE is established at 302 sites 3-4 Safe transport and storage, and cleaning for surrounding are carried out	Final report of the project Final report of the project, record of monitoring by extension staff and district staff Control and management plan of equipment Report of training Implementation plan of APM, report of NGO Report of NGO Record of monitoring by extension staff	Amount of ground water remains unchanged Ground water will not contain salt Trained D-WASHE staff, extension workers, and APM continue working

Activities	Input	
1. Construction of Facilities 1-1 Construct 302 boreholes water supply facilities fitted with hand pump 1-2 Support communities to construct appurtenant facilities of 302 boreholes (including supply of construction materials) 2. Procurement of Equipment and Materials Procure equipment and materials for drilling work and community mobilisation 3. Support for Capacity Building in Operation and Maintenance 3-1 Provide D-WASHE members with training of trainers to train extension staff involved in construction and maintenance of water supply facilities 3-2 Carry out workshop training to train extension staff and Area Pump Menders 3-3 To provide workshop training for establishment and capacity building of V-WASHE 3-4 To implement community mobilisation and health education 3-5 Reserve community fund for operation and maintenance of water supply facilities 3-6 To conduct regular monitoring on the target communities	Japanese Side Equipment and Materials 1) For drilling machines and works 2) For community mobilisation and operation and maintenance Human Resources: Consultant, Contractors Implementation Cost Zambian Side: Equipment and Materials Existing drilling machines and related equipment Human Resources: Counterpart, Labour, D-WASHE members, extension staff Local Cost: Personnel expense for counter part and labour	Transport and custom clearance carried out on schedule Water supply facilities constructed is not destroyed **Preconditions** The communities and district of target does not oppose the project Target communities are not overlapped with other donors Development of groundwater is successful

Annex 2) Detail Plan of Activity

Basic plan of activities in accordance with implementation schedule of the Programme is shown as follows:

Stages		Activities	Target Group (Target population)	Place	Duration	Facilitator (Number)	Necessary Equipment
	Ⅰ. Activities to Strengthen the Capacity in Community Mobilization at District Level						
Before Construction	1.	**Orientation Workshop to introduce the Overview of the Project and Soft Component Programme** Objectives: □ To enhance deeper understanding of staff of District Council, Member of Parliament, and D-WASHE Committee on the Project and Soft Component Programme, and develop commitment and forge partnership □ To discuss and develop consensus on the roles and responsibilities of each actors and implementation schedule. □ To determine monitoring system during the implementation of the Programme □ To forge consensus on the management and control system for the equipment procured under the Project	District Council Staff Member of Parliament D-WASHE members (25 persons)	District	2 days× 1 workshop	DWA Counterpart (1) Consultant (1)	DWA owned vehicles Consultant owned Vehicles
	2.	**Training of Trainers for the Construction and Repair of Water Supply Facilities fitted with Hand Pump** Objectives: □ To foster the deeper understandings on the WASHE concept of community-based operation and maintenance of water supply facilities □ To improve technical know-how in installation and maintenance of hand pump and construction and repair of appurtenant facilities □ To improve capacity of trainers to train Area Pump Menders and plan, implement and manage workshop trainings, obtaining participatory methods	D-WASHE Member (3 persons including DWA staff)	District	5 days× 1 workshop	NGO Staff (1)	NGO owned vehicles Text Book
	(As a part of component of water facility construction, prior to the commencement of construction works, technical training in installation and maintenance of handpump to be introduced in the Project is to be conducted by the Japanese Contractor for trainers of D-WASHEs trained in the activity 2. mentioned above)						

*1: Tools Kit for operation and maintenance procured under the Project is utilised for the training of D-WASHE staff and Area Pump Mender

*2: Existing text book is utilised for the activities of 2(1), 3, and 4, and 4 of Module 5, 5 of Module 5, and 8 of Module 5, the numbers of text book are printed and distributed according to the number of participants.

Stages	Activities		Target Group (Target population)	Place	Duration	Facilitator (Number)	Necessary Equipment
Before Construction	**Ⅱ. Activities to Strengthen the Capacity in Community Mobilization at Catchment Area Level**						
	3.	**Workshop Training for the Extension Staff to Improve Skills used for Establishment of Village-WASHE and Health/Hygiene Education** Objectives: □ To improve communication skills using participatory methods for community mobilization and health/hygiene education □ To develop deeper understandings on the concept, skills of participatory planning/implementation/monitoring for the activities to improve water and sanitation conditions □ To determine the implementation schedule of village-level activities and system of reporting and monitoring	Environmental Health Technician (EHT) Community Development Officer and other government officials Community Health Worker and other volunteers (1person/Catchment Area)	Di（strict	5 days× 1 workshop	NGO (1) D-WASHE (1)	NGO owned vehicles Text Book
	4.	**Workshop Training for Area Pump Mender to Improve Technique for Construction, and Operation and Maintenance of the Hand Pump Water Supply Facilities** Objectives: □ To develop deeper understandings on the concept of community-based management, and operation and maintenance of water supply facilities □ To elaborate technique for installation, operation and maintenance of the hand pump □ To develop skills to construct appurtenant facilities □ To develop capacity to plan and implement the workshop for the communities and V-WASHE □ To prepare the implementation schedule for installation of pump, monitoring and construction of appurtenant facilities	Area Pump Mender (1 person/Catchment Area)	District	5 days× 1 workshop	NGO staff (1) trained in 2. (2) D-WASHE member (1) trained in 2.	NGO owned vehicles Tools kit for hand pump Text book

Stages	Activities		Target Group (Target population)	Place	Duration	Facilitator (Number)	Necessary Equipment
	Ⅲ. Community Mobilization / Health Education, and Formation and Capacity Building of V-WASHE						
Before Construction	Module 1 (1 visit)	**Making Appointment (Visiting Village)** Objectives: □ To enhance the understanding of the village leaders on the overview of the Programme and Project and facilitate commitment of the communities □ To determine the date of next meetings with the community □ To facilitate the participation of women in the next meeting	Village Leaders (Village head man, MP, community leaders) (2-3 persons)	Village	0.5day/site	Extension Staff (1) NGO staff (1)	NGO owned vehicles Motor bike for extension staff
	Module 2 (2 visits)	**Community Mobilisation / Health Education** 1st Workshop Objectives: □ To maximize the understanding on the objective and overview of the Programme □ To identify the problems perceived by the community regarding water and sanitation, and introduce the improved hygiene behavior and practices □ To make consensus on the roles and responsibility of actors involved (communities, D-WASHE, NGO, Extension Staff, Area Pump Mender, Consultant, and Contractor)	Target Community	Village	1day/site	Extension worker (1) NGO (1)	NGO owned vehicles Motor bike for extension staff VIPP materials
		2nd Workshop Objectives: □ To assess the actual situation and problems regarding water and sanitation such as the water use, availability and accessibility to water source, method for transport and storage of water □ To promote behavior changes for improvement of sanitation and prevention of water borne diseases	Target Community	Village	1day/site	Extension Staff (1) NGO (1)	NGO owned vehicles Motor bike for extension staff VIPP materials

Stages	Activities		Target Group (Target population)	Place	Duration	Facilitator (Number)	Necessary Equipment
Before Construction	Module 3 (1 visit)	**Establishment of Village WASHE** Objectives: □ To make consensus on the community-based operation and maintenance system □ To make consensus on the roles and responsibilities of V-WASHE □ To develop understandings on the importance to reserve community fund for operation and maintenance of the facilities and purchase of spare parts for the hand pump □ To make consensus with villagers on the condition of the project as the necessity of fund raising for the O&M prior to the construction of borehole and provision of labour force for construction of appurtenant facilities □ To determine the level of contribution provided by the community such as the amount to be reserved as community fund, provision of labour force for the construction of appurtenant facilities, and its time frame □ To elect members of V-WASHE	Target Community	Village	1day/site	Extension Staff (1) NGO (1)	NGO owned vehicles Motor bike for extension staff VIPP materials
	Module 4 (1 visit)	**Training to Develop Awareness on Responsibilities and Roles of V-WASHE** Objectives: □ To assess the factors which foster and/or obstruct the activities of V-WASHE □ To make action plan of V-WASHE □ To determine the control system to manage water supply facilities and storage of spare parts □ To develop skills to mobilize the community	V-WASHE	Village	2days/site	Extension Staff (1) NGO (1)	NGO owned vehicles Motor bike for extension staff Text Book
	Module 5 (1 visit)	**Training for Accountants in Fee Collection and Management** Objectives: □ To develop the capacity in collection and management of operation and maintenance fund □ To determine the system of fund reservation and reporting	V-WASHE Community members	Village	1days/site	Extension Staff (1) NGO (1)	NGO owned vehicles Motor bike for extension staff Text Book

Stages		Activities	Target Group (Target population)	Place	Duration	Facilitator (Number)	Necessary Equipment
After Construction	*(Utilising materials procured by the Project, communities construct appurtenance facilities (apron, drainage, fence) under the technical advice from the Japanese Contractor as a part of component of the water supply construction after completion of installation of handpump by the Japanese Contractor.)*						
	Module 6 (1 visit)	**Training for the Care-Takers** Objectives: □ To develop the skills in daily control and communication with the community to facilitate proper use of facilities □ To prepare the daily monitoring plan for the facilities	V-WASHE Community members	Village	1day/site	NGO (1) APM (1)	NGO owned vehicles Text book
	Module 7 (1 visit)	**Monitoring before the Handing over of the Facilities** Objectives: □ To inspect the appurtenant facilities and provide technical advice if required □ To inspect the use of water supply facilities	Community members	Village	0.5day/site	Consultant (1) DWA counter part (1) NGO (1) D-WASHE (1)	Consultant owned vehicles NGO owned vehicles
	Ⅳ. Regular Monitoring						
All the Stage	6.	**Review Workshop for the Extension Staff and Area Pump Menders** Objectives: □ To assess and review the activities under the Programme and take proper measures on the problems in community mobilization 1st workshop shall be held after Module 1 at the village level	Extension staff APM (1 each/catchment area)	District	2day× 4 times	NGO (1) D-WASHE (5)	NGO owned vehicles

The Groundwater Development and Sanitation Project in Drought Prone Rural Areas in the Republic of Zambia

Implementation Period: Phase 1, Phase 2, Phase 3

Numbers of Activities: Target

Annex 3) Overview of the Activities and their Targets by District and Implemetation Phase in the Soft Component Programme

	Activities	Number of Activities: Total	P-1	P-2	P-3	Total	Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi*		Kazungula
Number of Water Points to be Constructed under the Project		302	–	158	144		67	29	69	15	13	8	101
Number of Catchment Area		58	–	–	–		17	6	12	5	7	21	11
1	Orientation Workshop to Introduce the Overview of the Project and Soft Component Programme	6	4	2	0	Member of D-WASHEs, District Council 25	1 Member of D-WASHEs, District Council 25	1 Member of D-WASHE, District Coucil 25	1 Member of D-WASHE, District Council 25	1 Member of D-WASHE, District Council 25	1 Member of D-WASHE, District Council 25		1 Member of D-WASHE, District Council 25
2	Training of Trainers for the Construction and Repair of Water Supply Facilities fitted with Handpump	5	3	2	0	15 members of D-WASHEs	1 3 D-WASHE Members	1 3 D-WASHE Members	1 3 D-WASHE Members	0 –	1 3 D-WASHE Memebers		1 3 D-WASHE Members
3	Workshop Training for the Extension Staff to Improve Skills used for Establishment of V-WASHE and Health/ Hygiene Education	6	4	2	0	58 Extension Staff	1 **17 Extension Staff**	1 **6 Extension Staff**	1 **12 Extension Staff**	1 **5 Extension Staff**	1 **4 Extension Staff**	 **3 Extension Staff**	1 **11 Extension Staff**
4	Workshop Training for Area Pump Mender to Improve Technique for Construction, and Operation and Maintenance of the Handpump Water Supply Facilities	7	0	6	0	58 APMs	1 **17 APMs**	1 **6 APMs**	1 **12 APMs**	1 **5 APMs**	1 **4 APMs**	1 **3 APMs**	1 **11 APMs**
5 M1	Making Appointment (Visiting Village)	302	158	144	0	302 communities	67 67 communities	29 29 communities	69 69 communities	15 15 communities	13 13 communities	8 **8 communities**	101 101 communities
M2-1)	Community Mobilisation/ Health Education (1st Workshop)	302	158	144	0	302 communities	67 67 communities	29 29 communities	69 69 communities	15 15 communities	13 13 communities	8 **8 communities**	101 101 communities
M2-2)	Community Mobilisation/ Health Education (2nd Workshop)	302	158	144	0	302 communities	67 67 communities	29 29 communities	69 69 communities	15 15 communities	13 13 communities	8 8 communities	101 101 communities
M3	Establishment of Village WASHE	302	158	144	0	302 V-WASHEs	67 67 V-WASHEs	29 29 V-WASHEs	69 69 V-WASHEs	15 15 V-WASHEs	13 13 V-WASHEs	8 **8** V-WASHEs	101 101V−WASHE**s**
M4	Training to Develop Awareness on Responsibilities and Roles of V-WASHE	302	158	144	0	302 V-WASHEs	67 67 V-WASHEs	29 29 V-WASHEs	69 69 V-WASHEs	15 15 V-WASHEs	13 13 V-WASHEs	8 **8** V-WASHEs	101 101V-WASHEs
M5	Training of Treasurers in Fund Raising and Management	302	158	144	0	302 V-WASHEs	67 67 V-WASHEs	29 29 V-WASHEs	69 69 V-WASHEs	15 15 V-WASHEs	13 13 V-WASHEs	8 8 V-WASHEs	101 101V-WASHE**s**
M6	Training of Care Takers	302	158	158	144	302 V-WASHEs	67 67 V-WASHEs	29 29 V-WASHEs	69 69 V-WASHEs	15 15 V-WASHEs	13 13 V-WASHEs	8 8 V-WASHEs	101 101 V-WASHEs
M7	Monitoring before Handing Over of the Facilities	302	158	158	144	302 communities	67 67 communities	29 29 communities	69 69 communities	15 15 communities	13 13 communities	8 8 communities	101 101 communities
6	Review Workshop for Extension Staff and Area Pump Mender	24	8	12	6	58 Extension Staff & 58 APMs	4 **17 Extension Staff & 17 APMs**	4 **6 Extension Staff & 6 APMs**	4 **12 Extension Staff & 12 APMs**	4 **5 Extension Staff & 5 APMs**	4 **4 Extension Staff & 4 APMs**	**3 Extension Staff & 3 APMs**	4 **11 Extension Staff & 11 APMs**

APPENDIX-6 (3)

VILLAGE INVENTORY DATA : ① KAOMA DISTRICT

Location of Villages							New Drilling	Population Details		Cattle	Economy		Community Based Organisation	Health Facilities	School		Main Diseases					NGO	Existing Water Source			Existing Borehole	Distance	V-WASHE Committee		Accessibility		
No.	Name of Village	Area Name	Ward	Chief	Latitude S	LongitudeE	Estimated Depth (m)	Population	No.of household	Heads of cattle	Income source	Coperative	Community Based Organisation	Health Facilities	School	No.puplies	Malaria	Dysentery	Diarrhoea	Sore eyes	Water born diseases prevalent	NGO activity	Existing Water Source	Depth of Hand Dug Well	S.W.L. (m)	Yes / No	Between Source and the Village (m)	Possibility to Organise V-WASHE	Affordable price	Approch road	Motorable	Bush clearing requirement
KA-1	CHIKONDO/ KAMUNI WEST	KAMUNI	CITWA	LIBINGA	14° 34' 58.8"	24° 51' 19.2"	60	65	25	-	Agriculture	No	No	Clinic	Primary	-	Yes	No	Yes	No	-	No	Open pit	-	1.0	-	0.1	Yes	K1,000	Moderate	All seasons	Yes
KA-2	LIBINGA	KATOYA	CITWA	LIBINGA	14° 38' 38.5"	25° 1' 51.0"	60	265	70	Yes	Agriculture	No	No	No	Basic	-	Yes	No	Yes	No	Schistosomiasis	No	Open pit	-	-	-	-	Yes	K500	Bad	Dry season	Yes
KA-3	KAMBANGA	KAMBANGA	CITWA	HUTONDO	14° 27' 28.6"	25° 0' 16.0"	55	99	56	Yes	Agriculture	No	Health committee	No	No	-	Yes	No	Yes	Yes	Schistosomiasis	No	Open pit	-	2.5	-	0.86	Yes	K5,000	Moderate	All seasons	Yes
KA-4	CHIZEZE/MACHILE	KAMUNI	CITWA	LIBINGA	14° 33' 41.6"	24° 52' 30.3"	50	80	51	Yes	Agriculture	No	No	No	No	-	Yes	No	Yes	No	-	No	Dug well	-	2.5	-	-	Yes	K1,000	Moderate	All seasons	Yes
KA-5	CHIVULI SCHOOL	CHIVULI	NAMILANGI	KAHARE	14° 55' 33.9"	25° 1' 59.3"	60	30	6	Yes	Agriculture, Teaching	No	No	PHC	Primary	286	Yes	No	Yes	Yes	-	-	Dug well	-	1.8	-	-	Yes	K1,000	Moderate	Dry season	Yes
KA-6	KANGOLONGOLO SCHOOL	KANGOLONGOLO	NAMILANGI	KUKUMBA	14° 46' 37.2"	24° 56' 7.7"	50	75	9	Yes	Agriculture, Teaching	No	No	No	Primary	189	Yes	No	No	Yes	Schistosomiasis	No	Open pit	-	-	-	0.2	Yes	K1,000	Moderate	Dry season	Yes
KA-7	SIPALO SCHOOL	SIPALO	NAMILANGI	KAHARE	14° 53' 24.0"	25° 5' 47.0"	65	980	196	Yes	Agriculture	Yes	P.T.A., Woman committee	PHC	Primary	153	Yes	Yes	Yes	No	-	Women's club	Dug well	9.0	7.7	-	0.2	Yes	K500	Moderate	All seasons	No
KA-8	KANDENDE SCHOOL	KANDENDE	NAMILANGI	KUKUMBA	14° 49' 22.9"	25° 12' 45.9"	50	104	8	Yes	Agriculture, Teaching	No	No	No	Primary	249	Yes	No	Yes	No	Schistosomiasis	No	Dug well	-	3.7	-	-	Yes	K1,000	Moderate	Dry season	No
KA-9	MUNGULUNGWA SCHOOL	NAMLANG	NAMILANGI	KUKUMBA	14° 48' 46.6"	25° 5' 45.4"	80	69	48	Yes	Agriculture	No	Works committee	No	Primary	112	Yes	No	Yes	Yes	Schistosomiasis, Scabies	-	Stream	-	-	-	1	Yes	K500	Good	All seasons	No
KA-10	KANKOMBA SCHOOL	KANKOMBA	MILANAFILA	LIBINGA	14° 46' 46.0"	24° 51' 26.0"	55	4,200	60	Yes	Agriculture	No	-	-	Secondary	200	Yes	No	Yes	No	-	No	Open pit	-	-	-	1	Yes	K2,000	Moderate	Dry season	-
KA-11	KANDOYANA	KANDOYANS	MILANAFILA	KAHARE	14° 56' 43.0"	24° 50' 5.0"	45	130	10	Yes	Agriculture	No	Community health worker committee	PHC	Primary(3km)	225	Yes	No	Yes	No	Schistosomiasis	No	Open pit	-	-	-	0.1	Yes	K1,000	Moderate	Dry season	No
KA-12	SHUNDUMA	SHUNDUMA	MILANAFILA	LIBINGA	14° 46' 6.6"	24° 50' 44.0"	60	135	15	-	Agriculture	No	No	PHC	No	-	Yes	No	No	No	-	No	Open pit	-	-	-	0.5	Yes	K5,000	Bad	All seasons	-
KA-13	LIMA SECTION	MANGANGO	MANGANGO	MUTONDO	14° 40' 3.0"	24° 31' 7.0"	90	1,120	160	10	Agriculture, Timber cutting	Yes	No	Hospital	Primary, Secondary	-	Yes	Yes	No	Yes	Schistosomiasis	Women for change	Spring	-	-	-	-	Yes	K500	Good	All seasons	No
KA-14	KASOKA	KASHAMU	MILANAFILA	SHAKUMBILA	14° 56' 38.0"	24° 51' 55.0"	-	180	15	Yes	Agriculture, Timber cutting	No	No	PHC	Primary	225	Yes	Yes	Yes	No	Schistosomiasis	No	Open pit	-	-	-	0.2	Yes	K1,000	Good	All seasons	No
KA-15	MUTONDO SCHOOL	MUTONDO	KANABILUMBU	MUTONDO	14° 43' 44.9"	24° 36' 39.3"	50	19	30	-	Agriculture, Cattle rearing	No	Micro project committee	PHC	Primary	200	Yes	No	Yes	No	-	No	River	-	-	-	0.4	Yes	K500	Moderate	All seasons	No
KA-16	KASHOMPA	KASHOMPA	KANABILUMBU	MUTONDO	14° 41' 14.3"	24° 40' 37.7"	60	84	25	-	Agriculture	No	No	No	No	-	Yes	No	Yes	No	-	No	Open pit	-	-	-	0.11	Yes	K1,000	Bad	All seasons	-
KA-17	HELEN KAUNDA SECTION	MANGANGO	MANGANGO	MUTONDO	14° 39' 57.0"	24° 30' 55.0"	70	665	95	3	Agriculture	No	Community health worker committee	Hospital	Primary, Secondary	-	Yes	No	No	No	Schistosomiasis	No	Spring	-	-	-	-	Yes	K500	Good	All seasons	No
KA-18	ROADS CAMP SCHOOL	MANGANGO (KACHOLOLA)	MANGANGO	MUTONDO	14° 38' 30.0"	24° 25' 31.0"	80	257	25	5	Agriculture,Teaching	No	P.T.A.	PHC	Primary	257	Yes	No	Yes	No	Schistosomiasis	Women for change	Spring	-	-	-	-	Yes	K415	Good	All seasons	No
KA-19	NABOWA	NABOWA	MANGANGO	MUFATA	14° 31' 40.7"	24° 15' 33.0"	70	400	44	Yes	Agriculture	No	No	No	No	-	Yes	No	Yes	Yes	Schistosomiasis	No	Dug well	-	-	-	0.55	Yes	K500	Good	All seasons	No
KA-20	KAFUBU	KAFUBU	MANGANGO	MUFATA	14° 37' 33.6"	24° 23' 52.3"	60	135	9	Yes	-	No	No	No	No	-	No	No	Yes	No	Schistosomiasis	No	Open pit	-	-	-	0.55	Yes	K500	Good	All seasons	No
KA-21	KAOMA PRIMARY SCHOOL	NALIELE	NALIELE	ISITEKETO	14° 48' 51.0"	24° 44' 51.0"	-	2,500	500	Yes	Agriculture	No	No	No	Primary	400	Yes	No	Yes	No	Schistosomiasis	-	Open pit	-	-	Yes	0.4	Yes	K1,000	Good	All seasons	-
KA-22	SAMASENGO	NALIELE	NALIELE	LIBINGA	14° 49' 22.3"	24° 44' 2.1"	75	310	34	Yes	Agriculture, Cattle rearing	No	No	No	No	-	Yes	No	No	Yes	Schistosomiasis	No	Spring	-	-	-	0.37	Yes	K500	Good	All seasons	No
KA-23	MAHILO WEST	MAHILO	NALIELE	LIBINGA	14° 49' 56.3"	24° 47' 11.4"	80	122	76	Yes	Agriculture, Cattle rearing	No	No	No	No	-	Yes	No	No	Yes	-	No	Dug well	2.0	1.5	-	-	Yes	K500	Good	All seasons	No
KA-24	CHILOMBO SCHOOL	CHILOMBO	SHIKOMBWE	MUTONDO	14° 46' 41.0"	24° 47' 21.0"	50	350	70	-	Agriculture, Cattle rearing	No	-	Hospital	Primary	475	Yes	No	No	No	Schistosomiasis	No	Dug well	2.0	1.5	-	0.2	Yes	K500	Good	All seasons	No
KA-25	KALUKUNDWE		SHIKOMBWE	MUTONDO	14° 40' 42.3"	24° 47' 37.9"	70	310	26	Yes	Agriculture	No	Women's Club, P.T.A.	No	No	-	Yes	No	Yes	Yes	-	No	Spring	-	-	-	0.1	Yes	K1,000	Moderate	All seasons	Yes
KA-26	KALAMBA TURN OFF	KALAMBA	SHIKOMBWE	MUTONDO	14° 43' 10.3"	24° 46' 54.8"	45	685	-	Yes	Agriculture, Cattle rearing	No	No	PHC	No	-	Yes	No	Yes	No	Schistosomiasis	No	Open pit	-	-	-	0.37	Yes	K1,000	Moderate	All seasons	Yes
KA-27	KAPUPA	KAPUPA	NALIELE	LIBINGA	14° 48' 25.0"	24° 46' 14.0"	70	312	26?	Yes	Agriculture	No	No	Hopital	Primary	350	Yes	Yes	Yes	Yes	-	No	Open pit	-	-	-	1	-	-	-	-	-
KA-28	KACHOLOLA/ LIKOMENO	KACHOLOLA	MANGANGO	MUTONDO	14° 38' 10.7"	24° 25' 18.4"	60	250	16	Yes	Agriculture	No	Women's Club	No	No	-	Yes	No	No	No	Schistosomiasis	P.A.M.	Open pit	-	-	-	0.1	Yes	K500	Moderate	All seasons	No
KA-29	TAMBOKA	KALUMWANGE	LALAFUTA	KASIMBA	14° 15' 25.6"	24° 57' 45.0"	70	600	120	6	Agriculture	No	No	Clinic	Primary	500	Yes	No	Yes	No	Hookworms	No	Borehole	-	-	Yes	3	Yes	K500	Gravel	Dry season	No
KA-30	MUTOLEKA SCHOOL	MUTOLEKA	NAMILANGI	KUKUMBA	14° 48' 32.9"	25° 15' 31.3"	50	87	35	Yes	Agriculture, Teaching	No	Fisheries Club, Productivity committees	No	Primary	196	Yes	No	No	Yes	Schistosomiasis	Micro project unit	Dug well	-	3.5	-	-	Yes	K500	Bad	Dry season	Yes
KA-31	KANYANYU	KANABILUMBU	LALAFUTA	KASIMBA	14° 22' 18.0"	24° 54' 55.0"	80	800	-	250	Agriculture	No	No	Clinic	Primary	300	Yes	No	Yes	No	-	No	Open pit	-	-	-	6	Yes	K500	Moderate	Dry season	No
KA-32	LEMVU SCHOOL	KINGAMA	NYAMBI	ILUYA	15° 28' 35.9"	24° 45' 16.3"	65	45	13	Yes	Agriculture, Teaching	No	No	No	Primary	115	No	No	Yes	No	Schistosomiasis	No	Open pit	-	-	-	0.1	Yes	K1,500	Moderate	All seasons	Yes
KA-33	NGOMA ROADS CAMP	NYAMBI	NYAMBI	KAHARE	15° 44' 55.0"	24° 56' 19.0"	60	210	35	5	Agriculture, Cattle rearing	No	No	PHC	Primary	20	Yes	Yes	No	Yes	Schistosomiasis	No	Dug well	-	-	-	-	Yes	-	Moderate	All seasons	No
KA-34	KANKULO	KANKULU	NYAMBI	KAHARE	15° 33' 6.0"	24° 48' 23.0"	110	270	45	6	Agriculture,Cattle rearing, Timber	No	No	PHC	No	-	No	No	Yes	Yes	Schistosomiasis	No	Open pit	-	-	-	-	Yes	-	Bad	Dry season	Yes
KA-35	MBUNDU	NYAMBI	NYAMBI	KAHARE	15° 39' 2.0"	24° 47' 51.0"	90	480	40	4	Agriculture,Cattle rearing	Yes	No	PHC	Primary	-	Yes	No	Yes	Yes	Schistosomiasis	No	Open pit	-	-	-	1	Yes	K500	Bad	All seasons	Yes

VILLAGE INVENTORY DATA : ① KAOMA DISTRICT

Location of Villages							New Drilling	Population Details		Cattle	Economy		Community Based Organisation	Health Facilities	School		Main Diseases					NGO	Existing Water Source			Existing Borehole	Distance	V-WASHE Committee		Accessibility		
No.	Name of Village	Area Name	Ward	Chief	Latitude S	LongitudeE	Estimated Depth (m)	Population	No.of household	Heads of cattle	Income source	Coperative	Community Based Organisation	Health Facilities	School	No.puplies	Malaria	Dysentery	Diarrhoea	Sore eyes	Water born diseases prevalent	NGO activity	Existing Water Source	Depth of Hand Dug Well	S.W.L. (m)	Yes / No	Between Source and the Village (m)	Possibility to Organise V-WASHE	Affordable price	Approch road	Motorable	Bush clearing requirement
KA-36	MUZANGABANTU	MBUNDU	NYAMBI	ILUYA	15° 37' 33.4"	24° 46' 44.9"	80	250	25	Yes	Agriculture	No	committee for blanks	PHC	No	-	Yes	No	Yes	Yes	-	No	Open pit	-	-	-	-	Yes	K1,000	Moderate	All seasons	Yes
KA-37	MPANDE	MPANDE	NANANDO	CHILARDA	15° 10' 38.2"	24° 39' 29.0"	45	155	31	Yes	Agriculture	No	No	PHC	Primary	280	Yes	Yes	Yes	No	-	No	Open pit	-	-	-	0.2	Yes	K1,000	-	Dry season	No
KA-38	KAWANDA P.H.C.	SIFULU	MNLWS	KARGUYA	15° 21' 11.4"	24° 17' 35.0"	60	176	22	Yes	Agriculture	No	No	PHC	No	-	Yes	No	Yes	No	-	No	Open pit	-	-	-	0.2	Yes	K2,000	Moderate	Dry season	-
KA-39	LIZOBO	NAKAYPMBA	MNLWS	KARGUYA	15° 15' 9.6"	24° 19' 49.4"	60	430	33	Yes	Agriculture	No	Health committee	PHC	Primary	41	Yes	Yes	Yes	No	-	No	Dug well	-	2.0	-	2	Yes	K1,500	Moderate	Dry season	-
KA-40	NGIMBU	NGIUBN	MNLWS	KARGUYA	15° 10' 25.9"	24° 19' 18.4"	100	231	33	Yes	Agriculture	No	No	PHC	Primary	40	Yes	Yes	Yes	No	Schistosomiasis	No	Open pit	-	-	-	0.1	No	K1,000	Moderate	Dry season	-
KA-41	MAKENI	MAKENI SUNJINGA	LUI	MWANANBOYU	15° 5' 21.0"	24° 1' 24.0"	70	274	34	7	Agriculture	No	Health community	PHC	No	-	Yes	No	Yes	No	-	No	Open pit	-	-	-	0.2	Yes	K1,000	Bad	Dry season	-
KA-42	LITOMA	LITOMA	LUI	MWANANBOYU	14° 58' 18.0"	24° 1' 43.0"	100	300	43	45	Agriculture	No	No	No	Primary	-	Yes	No	Yes	No	-	No	Open pit	-	-	-	0.8	Yes	K500	Bad	Dry season	No
KA-43	LUBUBA	LUBUBD	LUI	MWANANBOYU	15° 2' 58.0"	24° 2' 46.0"	50	350	35	-	Agriculture	Yes	P.T.A.	PHC	Primary	500	Yes	No	Yes	No	-	No	Open pit	-	-	Yes	0.2 ～ 0.5	Yes	K500	Good?	All seasons	No
KA-44	MABUMBU	MABUMBU	NKENGA	MUFAYA	14° 52' 28.4"	24° 14' 11.7"	55	254	51	Yes	Agriculture	No	-	PHC	Primary	-	Yes	No	Yes	Yes	Schistosomiasis	No	Open pit	-	1.0	-	-	Yes	K1,000	Moderate	All seasons	Yes
KA-45	MANJOLO	NAMLANG	NAMILANGI	MUMBA	14° 47' 54.8"	25° 5' 54.9"	50	480	53	-	Agriculture	No	Kwatoku farming club(women's club)	PHC	Primary	-	Yes	No	Yes	Yes	-	No	Open pit	-	2.0	-	0.2	Yes	K500	Good	All seasons	-
KA-46	SHIMBOELA	SHIMBOELA	LALAFUTA	RAHUMBA	14° 13' 26.0"	24° 57' 10.0"	70	400	80	30	Agriculture	No	No	Clinic	Primary	-	Yes	No	Yes	No	-	No	Open pit	-	3.0	Yes	1	Yes	K1,000	Moderate	Dry season	No
KA-47	MUKUNKIKI/ MBOYONGA	MBOTONGA	MBANYUTU	KASIMBA	14° 47' 18.0"	24° 36' 12.5"	60	600	42	Yes	Agriculture	No	Mukunkiki society for farmers	No	No	-	Yes	No	Yes	No	Schistosomiasis	No	Open pit	-	-	-	0.42	-	K200	Moderate	All seasons	No
KA-48	LIWEMA/ MIHOZHI	LUAMPA	LUAMPA	MWANATETE	15° 3' 20.3"	24° 25' 9.0"	90	240	18	Yes	Agriculture	No	No	No	No	-	Yes	No	Yes	Yes	Schistosomiasis	No	Open pit	-	-	-	-	Yes	K500	Bad	-	Yes
KA-49	MALULU/KAZANZU	LUAMPA	LUAMPA	MWANATETE	15° 4' 18.5"	24° 27' 36.9"	60	118	76	Yes	Agriculture	No	Liyoyelo farmer's group	Hopital	No	-	Yes	Yes	Yes	No	Schistosomiasis	No	Open pit	-	-	-	-	Yes	K1,000	Moderate	All seasons	No
KA-50	SHINGANGU	NYANGO	KANABILUMBU	MUTONDO	14° 35' 4.4"	24° 36' 7.5"	60	133	86	Yes	Agriculture,Cattle rearing	No	No	No	Primary	-	No	No	Yes	Yes	-	No	Open pit	-	-	-	0.32	Yes	K1,000	Moderate	All seasons	Yes
KA-51	KATUNDA/ CHIWASHA	CHIWASHA	MBANYUTU	MUTONDO	14° 51' 43.0"	24° 40' 26.4"	90	680	32	Yes	Agriculture	No	Timber association	No	No	-	Yes	No	Yes	Yes	Schistosomiasis	No	Dug well	2.5	2.0	-	-	Yes	K500	Good	All seasons	No
KA-52	SEMPYEKA/ MUTESI	LONGE	MULAMATILA	LIBINGA	14° 49' 53.4"	24° 51' 56.1"	70	220	132	Yes	Agriculture	No	Longe youth cooperative society	No	Primary	-	No	No	Yes	Yes	-	No	Dug well	2.0	1.5	-	0.1	Yes	K500	Good	All seasons	No
KA-53	MUKUNKIKI SCHOOL	MUKUNKIKI	MBANYUTU	MUTONDO	14° 47' 27.0"	24° 35' 54.7"	50	118	4	Yes	Agriculture	No	No	PHC	Middle basic	118	Yes	No	Yes	Yes	Schistosomiasis	No	Dug well	5.0	3.5	-	-	-	-	Good	All seasons	No
KA-54	KALUMBA	KAOMA NDONGA	MBANYUTU	MUTONDO	14° 51' 4.4"	24° 44' 15.0"	90	330	22	3	Agriculture,Cattle rearing	No	No	PHC	Primary	-	Yes	Yes	No	No	Schistosomiasis	P.A.M., Red cross	Dug well	5.0	dry	-	-	-	-	Good	All seasons	No
KA-55	WINDA R.H.C.	WINDA	LUAMBUA	KABILAMWANDI	14° 33' 51.0"	23° 44' 33.0"	50	84	51	Yes	Agriculture, Fishing, Cattle rearing	No	No	No	No	-	Yes	No	Yes	Yes	-	No	Open pit	-	-	-	-	Yes	-	Bad	Dry season	Yes
KA-56	LUAMBUA SCHOOL		LUAMBUA	KABILAMWANDI	14° 35' 32.0"	23° 58' 22.0"	0	30	5	-	Agriculture,Cattle rearing,Teaching	No	No	No	Primary	94	Yes	No	Yes	No	-	No	Open pit	-	-	-	-	Yes	K1,000	Bad	All seasons	Yes
KA-57	WINDA SCHOOL	WINDA	LUAMBUA	KABILAMWANDI	14° 33' 44.0"	23° 44' 47.0"	50	85	62	-	Agriculture, Fishing, Cattle rearing	No	Social welfare committee	PHC (under construction)	Middle basic	183	Yes	No	Yes	Yes	-	No	Open pit	-	-	-	-	Yes	K1,000	Bad	Dry season	Yes
KA-58	MUSHWALA SCHOOL	MUSHWALA	MUSHWALA	MUFUYA	14° 45' 56.5"	24° 13' 32.4"	40	5	11	-	Agriculture, Teaching	No	Health committee	No	Primary	170	Yes	No	No	No	Schistosomiasis	No	Open pit	-	-	-	0.1	Yes	K500	Moderate	All seasons	No
KA-59	MUSHWALA SCHEME	MUSHWALA	MUSHWALA	MUFAYA	14° 37' 37.5"	24° 12' 0.3"	-	14	2	Yes	Agriculture	No	Health committee, Farmer's committee	PHC	No	-	No	No	Yes	Yes	-	No	Open pit	-	-	-	-	Yes	K10,000	Moderate	Dry season	Yes
KA-60	LYAMUNALE SCHOOL	MUSHWALA	MUSHWALA	MUFAYA	14° 40' 40.9"	24° 11' 51.1"	100	158	86	-	Agriculture	No	No	PHC	Primary	125	No	No	Yes	Yes	-	No	Open pit	-	-	-	-	Yes	K500	Moderate	All seasons	No
KA-61	NAMSHAKASHA SCHOOL	NAMSHAKASHA	MUSHWALA	MWANANVTE	14° 29' 37.4"	24° 10' 17.6"	-	88	54	-	Agriculture,Teaching	No	No	PHC	Primary	76	Yes	No	Yes	Yes	Schistosomiasis	No	Open pit	-	-	-	-	Yes	K1,000	Moderate	-	No
KA-62	LOMBELOMBE SCHOOL	LONBELOMBE	NKEYEMA	TAPULA	14° 36' 7.0"	25° 24' 58.0"	100	380		Yes	Agriculture	No	P.T.A.	PHC	Primary	102	Yes	No	Yes	No	-	No	Dug well	11.5	10.7	-	0.3	Yes	K200	Bad	Dry season	No
KA-63	KAMAKOKWA SCHOOL	KANAKOKWA	NKEYEMA	KAHARE	14° 50' 34.0"	25° 19' 45.0"	60	500	100	Yes	Agriculture	Yes	Cooperative society, P.T.A.	At Nkeyena (8km)	Primary	200	Yes	No	Yes	No	Schistosomiasis	No	Dug well	8.2	5.1	-	0.05	Yes	K1,000	Moderate	All seasons	No
KA-64	KABILULWE SCHOOL	WNNKUYE	NKEYEMA	TAPULA	14° 47' 46.0"	25° 19' 58.0"	50	350	50	Yes	Agriculture	No	No	PHC	Primary	200	Yes	No	Yes	No	Schistosomiasis	No	Open pit	-	-	-	0.3 ～ 1	Yes	K1,000	Moderate	Dry season	No
KA-65	KAMBWEIZE SCHOOL	KAMBWIZE	LITOYA	KAHARE	14° 57' 4.0"	25° 7' 38.0"	60	320	40	350	Agriculture	No	P.T.A.	Clinic	Primary	146	Yes	No	Yes	No	-	No	Dug well	6.2	3.2	-	0.5	Yes	K2,000	Moderate	All seasons	Yes
KA-66	MANGONGI SCHOOL	TBIZSCIIEME	LITOYA	KAHARE	14° 55' 50.0"	25° 25' 12.0"	110	495	33	-	Agriculture	No	No	PHC	Primary	387	Yes	Yes	Yes	No	-	No	Dug well	22.0	20.4	-	0.3	Yes	K1,000	Good	All seasons	No
KA-67	MANGANGO SHOPPING CENTER	MANGAMGO	MANGANGO	MTONPO	14° 40' 8.0"	24° 31' 1.0"	70	6,000	600	12	Agriculture, Fishing, Cattle rearing	Yes	Market committee	Hopital	Primary, Secondary	-	Yes	No	Yes	No	Schistosomiasis	Women for change	Spring	-	-	-	0.5	-	-	Good	All seasons	No

PHC: Primary Health Care

VILLAGE INVENTORY DATA: ② SESHEKE DISTRICT

Location of Villages							New Drilling	Population Details		Cattle	Economy		Community Based Organisation	Health Facilities	School		Main Diseases					NGO	Existing Water Source			Existing Borehole	Distance	V-WASHE Committee		Accessibility		
No.	Name of Village	Area Name	Ward	Chief	Latitude S	LongitudeE	Estimated Depth (m)	Population	No.of household	Heads of cattle	Income source	Coperative	Community Based Organisation	Health Facilities	School	No.pupiles	Malaria	Dysentery	Diarrhoea	Sore eyes	Water born diseases prevalent	NGO activity	Existing Water Source	Depth of Hand Dug Well	S.W.L. (m)	Yes / No	Between Source and the Village (m)	Possibility to Organise V-WASHE	Affordable price	Approch road	Motorable	Bush clearing requirement
S-1	CHIBULA	CHIPUPA	LUAZAMBA	SABUKUBE	16° 57' 46.0"	24° 48' 21.1"	55	300	100	-	-	-	-	Clinic	-	-	Yes	-	-	-	-	No	Dug well	4.0	3.0	-	-	Yes	K1,080	very bad	all seasons	Yes
S-2	KAMENYANI	KAMENYANI	MAGUMWI	MATAPE	17° 4' 22.0"	25° 9' 32.0"	50	450	45	-	Agriculture/ Cattle rearing	Yes	Yes	PHC	-	-	Yes	-	Yes	-	-	No	Open pit	3.0	2.0	-	1.5	Yes	K2,500	very bad	dry season	No
S-3	TWANGULA		MULIMAMBANGO	NALISA	17° 15' 26.4"	24° 21' 5.0"	50	135	70	-	Agriculture	-	-	-	-	-	Yes	-	-	-	-	No	Pond	-	-	-	-	Yes	K245	very bad	all seasons	Yes
S-4	MBUYOTI		MULIMAMBANGO	KATUNDU	17° 19' 8.1"	24° 23' 10.0"	80	130	65	-	Agriculture	-	-	-	-	-	Yes	-	Yes	-	-	No	Pond	-	-	-	-	Yes	-	very bad	all seasons	Yes
S-5	MANYEKANGA PRIM. SCHOOL	MANYEKANGA	MULIMAMBANGO	NALISA	17° 24' 2.0"	24° 11' 20.0"	40	500	64	150	Fishing/ Agriculture	No	PTA	PHC	Primary	198	Yes	Yes	Yes	-	-	No	River	-	-	-	1	Yes	K1,000	good	all seasons	No
S-6	MANGAMU PRIM. SCHOOL	MANGAMU	MULIMAMBANGO	KATUNDU	17° 26' 38.6"	24° 22' 17.6"	60	600	60	-	Agriculture/ Fishing	No	No	PHC	Primary	230	Yes	-	Yes	-	-	No	River	-	-	-	6	N	K1,000	very bad	all seasons	Yes
S-7	NANGOMBE	NANGOMBE	MACHILE	MULAULI	17° 0' 2.0"	24° 55' 31.0"	65	450	45	300	Agriculture /cattle rearing	No	Yes	Salumbwe RHC	Primary	200	Yes	-	Yes	-	-	No	Dug well/ Open pit	30.0	29.0	-	10	Yes	K5,000	Bad	dry season	No
S-8	NAKANZI	SILANGU	LUANJA	NASANDO	17° 17' 59.0"	24° 42' 34.0"	60	300	30	150	Agriculture/ Cattle rearing	No	No	Clinic	No	-	Yes	-	Yes	-	-	No	Open pit	-	-	-	3	Yes	K5,000	Bad	dry season	No
S-9	ADONSI	MUSEMO	MACHILE	MULAULI	16° 59' 56.0"	25° 0' 59.0"	50	300	30	360	Agriculture/ Cattle rearing	No	No	Sichili Hospital	Primary	200	Yes	-	Yes	-	-	No	Open pit	-	-	-	16	Yes	K2,500	Bad	dry season	No
S-10	ELIYA	KATONGO	MAONDO	MUSHIMBO	17° 27' 4.0"	24° 24' 49.0"	50	310	31	150	Agriculture/ Cattle rearing	-	No	PHC	-	-	Yes	-	Yes	-	-	No	Borehole (8km)	-	-	-	10	Yes	K5,000	moderate	dry season	No
S-11	SANEMBO PRIM. SCHOOL		SICHILI		They have a borehole with hand pump						-	-	-	-	-	-	-	-	-	-	-	No	Existing hand pump	-	-	-	-	-	-	Bad	dry season	No
S-12	MUKENANI	KASINSI	SICHILI	MULAULI	16° 48' 34.7"	24° 54' 3.8"	50	160	50	-	Agriculture	-	-	Hospital	Primary	-	Yes	-	-	-	-	No	Borehole (3km)	-	-	-	-	Yes	K3,300	bad	all seasons	Yes
S-13	KASIKILI		MUSHUKULA	SAMPUO	17° 16' 21.8"	24° 21' 56.3"	70	200	120	-	Agriculture	-	-	Clinic	-	-	Yes	-	-	-	No	No	Dambo	-	-	-	-	Yes	K830	very bad	all seasons	Yes
S-14	CHIMWAYA		MUSHUKULA	SAMPUO	17° 20' 6.3"	24° 27' 4.6"	45	150	60	-	Agriculture	No	No	Clinic	-	-	Yes	-	-	-	-	No	Dambo	-	-	-	-	Yes	K5,000	very bad	all seasons	Yes
S-15	MUKWITWA	MAONDO	MAONDO	MUSHIMBO	17° 25' 17.0"	24° 33' 18.0"	-	310	31	200	Agriculture/ Cattle rearing	-	No	PHC	-	-	Yes	-	Yes	-	-	No	Open pit	-	-	-	-	Yes	K5,000	moderate	all seasons	No
S-16	MASAMU	MNGUNDU	MULIMAMBANGO	NALISA	17° 25' 41.0"	24° 13' 30.0"	40	500	50	200	Agriculture/ Fishing/ Cattle rearing	-	Yes (Village Health Committee)	PHC	Primary (Manyekanga)	198	Yes	Yes	Yes	Yes	-	No	River	-	-	-	1	Yes	K100	good	all seasons	Yes
S-17	LUNGA	SESHEKE	MULIMAMBANGO	NALISA	17° 28' 30.4"	24° 15' 45.1"	45	300	100	-	Agriculture	-	-	-	-	-	Yes	-	-	-	Cholera	No	River	-	-	-	4	Yes	K1,650	bad	all seasons	Yes
S-18	SANPONDE	SANPONDE	NAWINDA	SIFUWE	16° 34' 1.1"	24° 48' 19.6"	50	400	-	-	Agriculture	-	-	Clinic	-	-	-	-	-	-	-	No	Dambo	-	-	-	-	Yes	-	very bad	all seasons	Yes
S-19	NAWINDA RHC		NAWINDA	SIFUWE	16° 31' 48.9"	24° 28' 50.2"	100	409	-	-	-	-	Yes	Clinic	School	-	Yes	-	-	-	-	No	Dambo	-	-	-	-	Yes	K100	very bad	all seasons	Yes
S-20	LUPASA	SIMULYA	SICHILI	MUKWE	16° 40' 37.9"	24° 52' 40.4"	70	140	10	-	Agriculture	-	-	Hospital	Primary	-	Yes	-	-	-	-	No	Dug well	8.0	6.0	-	-	Yes	K1,650	very bad	dry season	Yes
S-21	MBANGA	KASAYA	MABUMBU	AIBELWE	17° 27' 27.0"	24° 57' 54.0"	80	310	31	300	Agriculture/ Fishing/ Cattle raring	No	No	PHC	-	-	Yes	-	Yes	-	-	No	River	-	-	-	3	Yes	K2,000	moderate	all seasons	No
S-22	KASAYA	KASAYA	MABUMBU	AIBELWE	17° 27' 40.0"	24° 59' 57.0"	60	250	25	-	Fishing	Yes	No	PHC	-	-	Yes	-	Yes	-	-	No	River	-	-	-	0.4	Yes	K2,000	moderate	all seasons	No
S-23	MUNYEULA	LUAZAMBA	LUAZAMBA	SABUKUBE	17° 3' 57.0"	24° 39' 20.0"	45	200	20	100	Agriculture/ Cattle rearing/ Hand Craft	Yes	Yes	PHC	School	265	Yes	-	Yes	-	-	No	Open pit	6.0	4.0	-	0.3	Yes	K1,500	moderate	dry season	No
S-24	TUKALO	LUMINO	SANKOLONGA	NASIMONA	17° 7' 1.0"	24° 51' 29.0"	55	200	40	100	Agriculture/ Cattle rearing	Yes	Yes	PHC	-	-	Yes	-	Yes	-	-	No	Open pit	1.0	1.0	-	0.6	Yes	K4,200/ village	bad	dry season	Yes
S-25	LIKANYISA		MULIMAMBANGO	NALISA	17° 22' 49.5"	24° 18' 16.7"	60	250	100	-	Agriculture	-	-	-	-	-	Yes	-	-	-	-	No	Open pit	-	-	-	-	Yes	K3,300	very bad	all seasons	Yes
S-26	SAMUTUMA	LUMINO	SANKOLONGA	NASIMONA	17° 4' 41.0"	24° 51' 24.0"	60	300	30	250	Agriculture	No	Yes	PHC	No	-	Yes	-	Yes	-	-	No	Open pit	-	-	-	-	Yes	Bucket of maize	moderate	dry season	No
S-27	NAMWINGA	KACHOLA	LUAMPUNGU	IMALENDA	16° 50' 20.6"	24° 9' 35.4"	40	100	-	-	Agriculture	-	-	Clinic	-	-	Yes	-	-	-	-	No	Spring	-	-	-	-	Yes	K3,000	bad	all seasons	Yes
S-28	LUMBO	KATONGO	MULIMAMBANGO	KATUNDU	17° 27' 38.9"	24° 22' 20.3"	40	150	-	-	Agriculture	-	-	Clinic	Primary	-	Yes	-	-	-	-	No	River	-	-	-	-	Yes	K1,650	good	all seasons	No
S-29	MASESE		LUWANJYA		17° 17' 28.0"	24° 38' 23.0"	60	2,500	250	NA	Agriculture	Yes	Yes	RHC	-	-	Yes	-	Yes	-	-	No	-	-	-	Yes	0.3	Yes	-	bad	dry season	No

PHC: Primary Health Care
RHC: Rural Health Care

VILLAGE INVENTORY DATA: ③ MUMBWA DISTRICT

Location of Villages							New Drilling	Population Details		Cattle	Economy		Community Based Organisation	ealth Facilitie	School		Main Diseases					NGO	Existing Water Source			Existing Borehole	Distance	V-WASHE Committee		Accessibility		
No.	Name of Village	Area Name	Ward	Chief	Latitude S	LongitudeE	Estimated Depth (m)	Population	No.of household	Heads of cattle	Income source	Coperative	Community Based Organisation	Health Facilities	School	No,pupiles	Malaria	Dysentery	Diarrhoea	Sore eyes	Water born diseases prevalent	NGO activity	Existing Water Source	Depth of Hand Dug Well	S.W.L. (m)	Yes / No	Between Source and the Village (m)	Possibility to Organise V-WASHE	Affordable price	Approch road	Motorable	Bush clearing requirement
MB-1	MWANACHINDALO	MWANACHINDALO	NAMPUNDWE	SHAKUMBILA	15° 29' 17.3"	27° 54' 54.9"	80	496	62	1,200	Agriculture, Cattle rearing	Yes	No	No	Primary, Secondary	-	Yes	Yes	Yes	No	-	No	Private well	-	-	Yes	2	Yes	K1,000	Very bad	Only during dry season	Yes
MB-2	KASUMPULA	KASUMPULA	NAMPUNDWE	SHAKUMBILA	15° 30' 6.2"	27° 56' 58.6"	90	850	60	125	Agriculture, Cattle rearing	No	No	No	Secondary	-	Yes	Yes	Yes	No	Schistosomiasis	No	Borehole (1.6km)	-	-	Yes	2.5	Yes	K3,000	Good	All seasons	Yes
MB-3	SHICHUMPALUBANJE	SHICHUMPALUBANJE	NAMPUNDWE	SHAKUMBILA	15° 32' 30.0"	27° 51' 31.3"	90	672	65	500	Agriculture, Cattle rearing	No	No	No	Primary	-	Yes	Yes	Yes	No	Schistosomiasis	No	Dug well	3	2	-	2	Yes	K2,000	Very bad	Only during dry season	Yes
MB-4	SHICHONGO	SHICHONGO	MAKOMBWE	SHAKUMBILA	15° 27' 46.0"	27° 53' 6.5"	70	175	21	350	Agriculture	No	No	No	-	40	Yes	Yes	Yes	No	-	No	Hand dug well	10	8.4	Yes	0.5	Yes	K1,000	Moderate	Only during dry season	No
MB-5	SHAMILIMO	SHAMILIMO	MAKOMBWE	SHAKUMBILA	15° 26' 41.1"	27° 50' 26.0"	80	250	25	1,000	Agriculture	No	No	No	Primary	360	Yes	Yes	Yes	No	-	No	Borehole (2km)	-	-	Yes	2	Yes	K500	Good	-	Yes
MB-6	MWACHULABANTU	MWACHULABANTU	MAKOMBWE	SHAKUMBILA	15° 27' 26.9"	27° 54' 18.3"	75	850	85	160	Agriculture, Cattle rearing	-	No	No	Primary	350	Yes	Yes	Yes	No	-	No	Dug well	-	-	-	-	Yes	K1,000	Bad	Only during dry season	Yes
MB-7	CHIKONKA	CHIKONKA	MILANDU	SHAKUMBILA	15° 28' 12.8"	27° 47' 15.4"	80	700	69	2,000	Agriculture, Fishing, Cattle rearing	No	No	Yes	Primary	-	Yes	Yes	Yes	No	Schistosomiasis	No	Dug well	10	7.6	-	-	Yes	-	Good	All seasons	Yes
MB-8	SHABASONJE RHC	SHABASONJE RHC	MILANDU	SHAKUMBILA	15° 28' 50.0"	27° 46' 30.9"	75	800	100	800	Agriculture, Fishing, Cattle rearing	No	No	Yes	Primary	-	Yes	Yes	Yes	Yes	Schistosomiasis	No	Borehole	-	-	-	-	Yes	-	Good	All seasons	No
MB-9	SHACILENZA	SHACILENZA	MILANDU	SHAKUMBILA	15° 29' 9.7"	27° 45' 35.6"	60	450	37	200	Agriculture, Fishing, Cattle rearing	No	No	Yes	Primary	-	Yes	Yes	Yes	No	Schistosomiasis	No	Dug well	15	12	-	0.5	Yes	-	Good	All seasons	Yes
MB-10	CHIBOMBOMA	CHIBOMBOMA	KALUNDU	SHAKUMBILA	15° 20' 54.0"	27° 46' 4.0"	70	520	52	4	Agriculture, Cattle rearing	Yes	No	Yes	Primary	-	Yes	No	Yes	No	Schistosomiasis	No	Dug well	15.45	5.15	-	-	-	-	Bad	Only during dry season	Yes
MB-11	KAPEELA	KAPEELA	KALUNDU	SHAKUMBILA	15° 27' 0.0"	27° 47' 58.0"	110	1,000	100	6	Agriculture	Yes	Yes	Yes	-	-	Yes	No	Yes	No	-	No	Dug well	8.7	7.1	-	-	Yes	-	Moderate	All seasons	Yes
MB-12	CHITANDA	CHITANDA	KALUNDU	SHAKUMBILA	15° 23' 20.0"	27° 47' 7.0"	80	450	30	7	Agriculture, Cattle rearing	No	No	Yes	Basic	-	Yes	No	Yes	No	-	No	Dug well	8	-	-	0.4	Yes	K833	Moderate	All seasons	Yes
MB-13	SHACHELE	SHACHELE	CHABOTA	SHAKUMBILA	15° 23' 21.6"	27° 33' 23.9"	60	870	96	100	Agriculture, Cattle rearing	No	No	No	-	-	Yes	No	Yes	No	-	No	Open pit	-	-	-	1	Yes	K300	Moderate	Only during dry season	-
MB-14	MUSUTU	MUSUTU	CHABOTA	SHAKUMBILA	15° 20' 2.8"	27° 31' 54.2"	55	980	65	50	Agriculture, Cattle rearing	No	No	No	-	-	Yes	No	Yes	Yes	-	No	Dug well	33.2	21.5	-	0.6	Yes	K1,000	Bad	Only during dry season	Yes
MB-15	MWEETE-MWANDO	MWEETE-MWANDO	CHABOTA	SHAKUMBILA	15° 19' 45.3"	27° 33' 45.7"	60	157	25	100	Agriculture	Yes	village development committee	No	-	490	Yes	No	Yes	No	-	No	Dug well	20	15.6	-	0.3	Yes	K2,000	Moderate	Only during dry season	Yes
MB-16	KACHOYA	KACHOYA	KAPYANGA	SHAKUMBILA	15° 8' 33.7"	27° 37' 37.7"	110	650	40	60	Agriculture, Cattle rearing	No	V-WASHE	No	Primary	-	Yes	Yes	Yes	No	-	No	Dug well	18	15.4	-	-	Yes	K4,150	Moderate	All seasons	Yes
MB-17	SHIMAUNDU	SHIMAUNDU	KAPYANGA	SHAKUMBILA	15° 12' 58.5"	27° 39' 51.0"	55	580	48	450	Agriculture, Cattle rearing	No	No	Yes	Primary	-	Yes	Yes	Yes	No	-	No	Dug well	8	5.4	-	-	Yes	K2,000	Moderate	All seasons	Yes
MB-18	MULELA PRIMARY SCHOOL	MULELA PRIMARY SCHOOL	KAPYANGA	SHAKUMBILA	15° 12' 21.5"	27° 38' 11.9"	45	960	87	1,000	Agriculture, Cattle rearing	No	Water point committee	No	Primary	580	Yes	Yes	Yes	No	-	No	Dug well	16	6.2	-	-	Yes	K1,650	Moderate	All seasons	Yes
MB-19	MULOBELA	MULOBELA	CHISALU	SHAKUMBILA	15° 11' 33.1"	27° 28' 36.7"	100	530	35	20	Agriculture, Cattle rearing	No	No	No	-	-	Yes	No	No	Yes	-	No	Dug well	22	16.2	-	0.5	Yes	K1,000	Moderate	Only during dry season	Yes
MB-20	MALENDE PRIMARY SCHOOL	MALENDE PRIMARY SCHOOL	CHISALU	SHAKUMBILA	15° 12' 12.2"	27° 27' 54.7"	45	250	25	-	-	No	PTA	No	-	-	No	No	No	Yes	-	No	Dug well	23	16.4	-	-	-	-	Bad	Only during dry season	No
MB-21	MUZUNGU	MUZUNGU	CHISALU	SHAKUMBILA	15° 13' 33.6"	27° 22' 38.7"	45	350	30	80	Agriculture, Cattle rearing	No	V-WASHE	No	-	-	Yes	Yes	Yes	No	Schistosomiasis	No	Dug well	22	15	-	-	Yes	-	Moderate	Only during dry season	Yes
MB-22	SHIKABILA	SHIKABILA	CHOMA	SHAKUMBILA	15° 24' 42.6"	27° 23' 50.5"	60	650	58	200	Agriculture, Cattle rearing	No	No	No	Primary	-	Yes	Yes	Yes	No	Schistosomiasis	No	Borehole (1.6km)	-	-	Yes	-	Yes	-	Good	All seasons	Yes
MB-23	NZOVU	NZOVU	CHOMA	SHAKUMBILA	15° 24' 4.2"	27° 24' 0.3"	60	500	45	200	Agriculture, Cattle rearing	No	No	No	Primary	-	Yes	Yes	Yes	No	-	No	Borehole	-	-	Yes	1	Yes	-	Good	All seasons	Yes
MB-24	NSAKA	NSAKA	CHOMA	SHAKUMBILA	15° 21' 43.6"	27° 24' 33.8"	100	550	53	100	Agriculture,Cattle rearing	No	No	No	-	-	Yes	Yes	Yes	No	-	No	Dug well	25	19.8	-	1.5	Yes	-	Moderate	All seasons	Yes
MB-25	CHANGWE	CHANGWE	NALUBANDA	SHAKUMBILA	15° 21' 5.0"	27° 3' 6.0"	70	450	30	14	Agriculture	No	Yes	Yes	-	-	Yes	No	Yes	No	-	No	Dug well	25	dry	Yes	6	Yes	K1,000	Moderate	Only during dry season	Yes
MB-26	NAKAMWENDA	NAKAMWENDA	NALUBANDA	SHAKUMBILA	15° 25' 14.0"	27° 12' 6.0"	60	985	98	-	Agriculture,Cattle rearing	Yes	V-WASHE	Yes	Primary	-	Yes	No	Yes	No	-	No	Borehole (1.6km)	-	-	Yes	-	Yes	K1,000	Good	All seasons	Yes
MB-27	MULOMO	MULOMO	NALUBANDA	SHAKUMBILA	15° 22' 57.0"	27° 11' 25.0"	80	375	25	15	Agriculture,Cattle rearing	No	No	Yes	Primary	350	Yes	No	Yes	No	-	No	Dug well	-	-	-	0.02	Yes	-	Moderate	Only during dry season	Yes
MB-28	LUMANO	LUMANO	MYOOYE	SHAKUMBILA	15° 14' 22.0"	27° 15' 12.6"	40	560	54	120	Agriculture, Cattle rearing	No	No	No	Primary	-	Yes	Yes	Yes	No	Schistosomiasis	No	Dug well	27.9	27.4	-	1	Yes	-	Good	All seasons	Yes
MB-29	MULONDA	MULONDA	MYOOYE	SHAKUMBILA	15° 16' 18.2"	27° 20' 37.9"	95	700	100	200	Agriculture, Cattle rearing	No	NA	Yes	Primary	-	Yes	Yes	Yes	No	Schistosomiasis	No	Dug well	19	14.8	-	-	Yes	-	Moderate	All seasons	Yes
MB-30	KALWAZHI	KALWAZHI	MYOOYE	SHAKUMBILA	15° 15' 9.6"	27° 19' 7.6"	40	950	94	100	Agriculture, Cattle rearing	No	Village committee	No	Primary	-	Yes	Yes	Yes	No	Schistosomiasis	No	Dug well	10	6	-	-	Yes	-	Moderate	All seasons	Yes
MB-31	MABEELE	MABEELE	NAMBALA	MOONO	15° 6' 35.0"	27° 4' 32.0"	70	970	74	20	Agriculture	Yes	Yes	Yes	-	-	Yes	No	Yes	No	-	Women for change	Dug well	7	5	-	0.2	Yes	K415	-	-	-
MB-32	BUTINTI PRIM. SCHOOL	BUTINTI PRIM. SCHOOL	NAMBALA	MOONO	15° 9' 35.3"	27° 2' 23.6"	65	350	40	3	Agriculture	Yes	PTA	Yes	Primary	350	Yes	No	Yes	No	-	No	Dug well	18	10	-	0.2	Yes	K1,000	Moderate	Only during dry season	Yes
MB-33	SHILANGABWE (B)	SHILANGABWE (B)	NAMBALA	MOONO	15° 16' 9.6"	26° 56' 44.0"	70	950	63	12	Agriculture,Cattle rearing	Yes	NA	Yes	Primary	-	Yes	No	No	No	-	No	Dug well	9	7.5	-	-	Yes	-	-	-	-
MB-34	KANG'OMBA	KANG'OMBA	CHIBOLYO	CHIBULUMA	15° 11' 55.0"	26° 41' 47.0"	95	580	53	300	Agriculture, Cattle rearing	No	No	No	Primary	-	Yes	Yes	Yes	No	-	No	Borehole (School)	-	-	Yes	-	Yes	K1,000	Very bad	Only during dry season	Yes
MB-35	NAKANJOLI	NAKANJOLI	CHIBOLYO	CHIBULUMA	15° 9' 23.0"	26° 45' 53.0"	95	800	66	1,600	Agriculture, Cattle rearing	-	No	No	-	-	Yes	Yes	Yes	No	-	No	Open pit	-	-	Yes	-	Yes	K2,000	Very bad	Only during dry season	Yes

VILLAGE INVENTORY DATA: ③ MUMBWA DISTRICT

Location of Villages							New Drilling	Population Details		Cattle	Economy		Community Based Organisation	ealth Facilitie	School		Main Diseases					NGO	Existing Water Source			Existing Borehole	Distance	V-WASHE Committee		Accessibility		
No.	Name of Village	Area Name	Ward	Chief	Latitude S	LongitudeE	Estimated Depth (m)	Population	No.of household	Heads of cattle	Income source	Coperative	Community Based Organisation	Health Facilities	School	No,pupiles	Malaria	Dysentery	Diarrhoea	Sore eyes	Water born diseases prevalent	NGO activity	Existing Water Source	Depth of Hand Dug Well	S.W.L. (m)	Yes / No	Between Source and the Village (m)	Possibility to Organise V-WASHE	Affordable price	Approch road	Motorable	Bush clearing requirement
MB-36	SHANGABWE	SHANGABWE	CHIBOLYO	CHIBULUMA	15° 15' 23.0"	26° 45' 30.0"	85	280	35	30	Agriculture, Cattle rearing	Yes	No	Yes	Primary	-	No	No	No	No	-	No	Stream	-	-	Yes	-	No	K5,000	Moderate	Only during dry season	Yes
MB-37	KASALU	KASALU	SHIMBIZHI	MUMBA	15° 5' 48.0"	27° 3' 41.0"	85	650	60	100	Agriculture, Cattle rearing	No	No	No	-	-	Yes	Yes	Yes	No	Schistosomiasis	No	Borehole (3.7km)	-	-	Yes	0.8	Yes	-	Bad	All seasons	Yes
MB-38	KASUMBALESA	KASUMBALESA	SHIMBIZHI	MUMBA	15° 2' 5.2"	27° 4' 22.1"	90	170	17	6	Agriculture, Cattle rearing	-	No	No	-	-	Yes	No	No	No	-	No	Dug well	15	2	-	1	Yes	K200	Moderate	Only during dry season	Yes
MB-39	KAILI	KAILI	SHIMBIZHI	MUMBA	15° 3' 13.5"	27° 3' 52.4"	80	300	30	-	Agriculture, Cattle rearing	No	No	No	-	-	Yes	Yes	Yes	No	-	No	Open pit	36	-	-	0.5	Yes	K500	-	Only during dry season	Yes
MB-40	MULANGU	MULANGU	NANGOMA	SHAKUMBILA	15° 6' 32.0"	27° 20' 32.0"	90	700	87	90	Agriculture	No	No	Yes	-	-	No	No	No	No	-	No	Stream	-	-	-	0.7	Yes	K1,000	Moderate	Only during dry season	Yes
MB-41	CHIMBWE	CHIMBWE	NANGOMA	SHAKUMBILA	15° 4' 39.0"	27° 15' 7.5"	80	800	65	500	Agriculture	No	No	-	-	-	Yes	No	Yes	No	-	Catholic Mission	Dug well	5	3	-	0.3	Yes	K1,000	Moderate	All seasons	Yes
MB-42	MUNTANGA	MUNTANGA	NANGOMA	SHAKUMBILA	15° 3' 3.1"	27° 13' 17.0"	80	300	20	160	Agriculture	No	No	No	-	-	Yes	No	No	No	-	No	Borehole	-	-	Yes	-	Yes	K1,000	Moderate	All seasons	Yes
MB-43	MAIMWEENE SCHEME	MAIMWEENE SCHEME	NAKASAKA	MUMBA	14° 56' 22.0"	27° 10' 56.0"	80	1,440	160	8	Agriculture,Cattle rearing	Yes	Yes	Yes	Middle basic	-	Yes	No	No	No	-	No	Borehole	-	-	Yes	2.5	Yes	K5,000	Bad	Only during dry season	Yes
MB-44	CHIPATA	CHIPATA	NAKASAKA	MUMBA	14° 59' 23.0"	27° 12' 43.0"	80	890	59	4	Agriculture	Yes	No	Yes	-	-	Yes	No	No	No	-	No	Dug well	3	1	-	1	-	-	-	Only during dry season	Yes
MB-45	SHAMABANSE	SHAMABANSE	NAKASAKA	MUMBA	14° 54' 50.0"	27° 16' 34.0"	80	200	20	10	Agriculture,Cattle rearing	-	No	Yes	-	-	Yes	No	Yes	Yes	-	No	Stream	-	-	-	2	Yes	K415	Moderate	Only during dry season	Yes
MB-46	KAZOKA	KAZOKA	MUMBA	MUMBA	14° 50' 3.1"	27° 9' 41.5"	70	473	78	300	Agriculture	-	Viillage productivity committee	No	-	-	Yes	No	No	No	-	No	Hand dug well with hand pump	10	2.5	-	3.2	Yes	K1,000	Good	All seasons	Yes
MB-47	KABESHA	KABESHA	MUMBA	MUMBA	14° 52' 31.9"	27° 7' 27.6"	65	250	40	200	Agriculture	No	No	Yes	Primary	50	Yes	No	Yes	No	-	No	Dambo	-	1.4	-	2.5	Yes	K2,000	Good	Only during dry season	Yes
MB-48	KACHOYA	KACHOYA	MUMBA	MUMBA	14° 52' 48.2"	27° 5' 2.8"	50	400	63	100	Agriculture	Yes	No	No	-	-	Yes	No	Yes	No	-	No	Hand dug well with hand pump	-	-	Yes	3	Yes	K500	Good	All seasons	No
MB-49	BULUNGU PRIMARY SCHOOL	BULUNGU PRIMARY SCHOOL	MUPONA	MUMBA	15° 0' 3.0"	27° 2' 48.0"	70	700	100	8	Agriculture, Cattle rearing	Yes	No	No	Primary	1200	Yes	No	No	No	-	No	Seasonal river(2.5km)	-	-	-	-	-	-	Good	All seasons	No
MB-50	CHITAMBALA EAST	CHITAMBALA EAST	MUPONA	MUMBA	14° 56' 59.0"	27° 3' 7.0"	45	500	50	6	Agriculture	Yes	No	No	Primary	-	Yes	No	Yes	No	-	World Vision	Dug well	-	-	-	-	Yes	K500	Moderate	All seasons	Yes
MB-51	KAPOTWE	KAPOTWE	MUPONA	MUMBA	15° 1' 1.0"	27° 4' 18.0"	90	652	64	1,000	Agriculture, Cattle rearing	Yes	NA	No	Pre-school	25	Yes	Yes	Yes	No	Typhus	No	Borehole	-	-	Yes	-	Yes	K200	Bad	All seasons	Yes
MB-52	MALEMBEKA/CHILANBE	MALEMBEKA/CHILANBE	MPUSU	KAINDU	14° 28' 40.6"	27° 3' 54.8"	75	156	12	100	Agriculture	No	No	Yes	Primary	-	Yes	Yes	Yes	No	Schistosomiasis	No	Dug well	-	1.5	-	0.5	Yes	-	Very bad	Only during dry season	Yes
MB-53	KATEYA	KATEYA	MPUSU	KAINDU	14° 30' 17.0"	27° 3' 27.6"	-	96	8	150	Agriculture, Cattle rearing	No	No	Yes	-	-	Yes	Yes	Yes	No	Schistosomiasis	No	Dambo	-	-	-	1.5	Yes	-	Bad	Only during dry season	Yes
MB-54	KALENDA	KALENDA	MPUSU	KAINDU	- - -	- - -	-	12	1	-	Agriculture	No	No	No	-	-	Yes	Yes	Yes	No	-	No	-	-	-	Yes	0.3	Yes	-	Very bad	Only during dry season	Yes
MB-55	KAFWABWE	KAFWABWE	MUPONA	MUMBA	15° 0' 23.0"	27° 3' 23.0"	50	950	95	-	Agriculture	No	No	-	Basic	-	Yes	Yes	Yes	No	Schistosomiasis	No	Open pit	-	-	-	-	Yes	-	Good	All seasons	Yes
MB-56	CHAMAKUMBA	CHAMAKUMBA	KALWANYEMBE	KAINDU	14° 30' 18.0"	26° 57' 40.0"	60	750	150	1	Agriculture	Yes	Yes	Yes	Basic	-	Yes	No	No	No	-	No	Borehole (2.5km)	-	-	Yes	2	Yes	K1,650	Moderate	Only during dry season	Yes
MB-57	CHIPULUKA	CHIPULUKA	KALWANYEMBE	KAINDU	14° 31' 25.0"	26° 54' 32.0"	60	300	30	7	Agriculture,Fishing,Cattle rearing	Yes	Yes	Yes	-	-	Yes	No	Yes	No	-	No	Dug well	-	-	-	0.2	Yes	K1,000	Moderate	Only during dry season	Yes
MB-58	NDABANDABA	NDABANDABA	NALUSANGA	KABULWEBULWE	15° 5' 36.0"	26° 43' 2.4"	80	980	70	20	Agriculture	No	No	No	-	-	Yes	No	Yes	No	-	Women for Change	Open pit	-	-	-	-	Yes	K830	Bad	Only during dry season	Yes
MB-59	KABOLESHA	KABOLESHA	NALUSANGA	KABULWEBULWE	15° 1' 12.1"	26° 46' 4.7"	80	280	35	40	Agriculture, Cattle rearing	No	No	Yes	-	-	Yes	No	Yes	No	-	No	Dug well	1	0.5	-	-	Yes	K300	Bad	Only during dry season	No
MB-60	MUPEALBANTU	MUPEALBANTU	NALUSANGA	KABULWEBULWE	15° 2' 19.1"	26° 44' 42.8"	60	370	46	40	Agriculture	No	No	No	-	-	No	No	Yes	No	Schistosomiasis	No	Open pit	-	-	-	-	Yes	-	Bad	Only during dry season	No
MB-61	CHIYABA	CHIYABA	NAMPUNDWE	SHAKUMBILA	15° 32' 1.5"	27° 57' 11.4"	60	465	42	450	Agriculture, Cattle rearing	No	No	No	Primary	-	Yes	Yes	Yes	No	Cholera	No	Dug well	-	4.3	-	0.1	Yes	K2,000	Bad	Only during dry season	Yes
MB-62	MALUZA	MALUZA	MAKOMBWE	SHAKUMBILA	15° 23' 20.0"	27° 52' 54.0"	100	250	30	600	Agriculture	No	Health committee	Yes	-	210	Yes	No	Yes	No	-	No	Borehole	-	-	Yes	3	Yes	K3,000	Good	Only during dry season	No
MB-63	SHIKACILA	SHIKACILA	MILANDU	SHAKUMBILA	15° 27' 14.7"	27° 45' 34.1"	80	670	60	200	Agriculture, Fishing, Cattle rearing	No	No	No	Primary	-	Yes	Yes	Yes	No	Schistosomiasis	No	Dug well	-	24	-	-	Yes	-	Good	All seasons	Yes
MB-64	MUSOKOTWANI	MUSOKOTWANI	KALUNDU	SHAKUMBILA	15° 24' 39.0"	27° 45' 19.0"	80	495	33	200	Agriculture, Cattle rearing	Yes	Yes	Yes	Basic	-	Yes	No	Yes	No	Schistosomiasis	C.C.F.	Dug well	20.4	20	-	-	Yes	-	Moderate	All seasons	No
MB-65	KANUTI	KANUTI	CHABOTA	SHAKUMBILA	15° 15' 49.4"	27° 35' 17.0"	60	360	30	20	Agriculture, Cattle rearing	No	Farming club	Yes	-	-	Yes	No	Yes	No	-	No	Borehole (School)	-	-	-	-	Yes	K500	-	Only during dry season	No
MB-66	MWEEGA	MWEEGA	KAPYANGA	SHAKUMBILA	15° 8' 58.3"	27° 38' 6.3"	65	300	25	200	Agriculture, Cattle rearing	No	No	No	-	-	Yes	Yes	Yes	No	-	No	Dug well	-	9.5	-	-	Yes	K2,000	Moderate	All seasons	Yes
MB-67	MULIMBA	MULIMBA	CHISALU	SHAKUMBILA	15° 10' 10.0"	27° 25' 31.0"	90	520	40	-	Agriculture, Cattle rearing	Yes	No	No	-	-	Yes	No	No	No	-	No	Dug well	-	3.4	-	-	Yes	K500	Moderate	All seasons,Only during dry season	No
MB-68	CHILELE	CHILELE	CHOMA	SHAKUMBILA	15° 22' 16.2"	27° 25' 22.9"	50	400	32	80	Agriculture, Cattle rearing	No	No	No	-	-	Yes	Yes	Yes	No	Schistosomiasis	No	From Simpuwe Village	-	-	Yes	-	Yes	-	Bad	All seasons	Yes
MB-69	SHIMBWASAME	SHIMBWASAME	NALUBANDA	SHAKUMBILA	15° 22' 36.0"	27° 5' 19.0"	70	680	56	30	Agriculture	No	Yes	Yes	Basic	-	Yes	No	Yes	No	-	No	Borehole (5km)	-	-	Yes	5	Yes	K6,650	Moderate	Only during dry season	Yes

VILLAGE INVENTORY DATA: ④ NAMWALA

Location of Villages							New Drilling	Population Details		Cattle	Economy		Community Based Organisation	Health Facilities	School		Main Diseases					NGO	Existing Water Source			Existing Borehole	Distance	V-WASHE Committee		Accessibility		
No.	Name of Village	Area Name	Ward	Chief	Latitude S	LongitudeE	Estimated Depth (m)	Population	No.of household	Heads of cattle	Income source	Coperative	Community Based Organisation	Health Facilities	School	No.pupiles	Malaria	Dysentery	Diarrhoea	Sore eyes	Water born diseases prevalent	NGO activity	Existing Water Source	Depth of Hand Dug Well	S.W.L. (m)	Yes / No	Between Source and the Village (m)	Possibility to Organise V-WASHE	Affordable price	Approch road	Motorable	Bush clearing requirement
NW-1	MUSEMU RHC	MUSEMU	NDEMA	MUCHILA	16° 5' 51.3"	26° 37' 39.1"	80	240	72	-	Agriculture /cattle rearing	-	No	PHC	Primary	400	Yes	-	Yes	Yes	-	No	Dug Well	30	11.5	-	-	Yes	K6,000	good	all seasons	Yes
NW-2	SIMANJE	SIMANJE	NAKAMBOMA	NALUBAMBA	16° 8' 13.1"	26° 57' 9.5"	80	683	85	-	Agriculture /cattle rearing	-	Yes	PHC	Primary/ Secondary	-	Yes	-	Yes	-	-	No	Dug Well	3	2.3	-	-	Yes	K4,150	moderate	all seasons	Yes
NW-3	CHILUMINO RHC		KABULAMWANDA	MUNGAILA	15° 55' 21.2"	26° 58' 49.7"	50	400	50	-	Agriculture /cattle rearing	-	No	PHC	Primary	600	Yes	-	Yes	-	-	No	Dug Well	25	23.5	-	-	Yes	K3,000	bad	dry season	Yes
NW-4	NJILI RHC		KABULAMWANDA	MUNGALA	15° 50' 1.2"	26° 50' 39.9"	80	300	30	-	Agriculture /cattle rearing	-	No	PHC	Primary Secondary	800	Yes	-	Yes	Yes	-	No	Dug Well	50	20.0	-	-	Yes	K5,000	good	all seasons	Yes
NW-5	MAKALO		KABULAMWANDA	MUCHILA	15° 56' 31.8"	26° 43' 12.3"	60	200	20	-	Agriculture	-	No	PHC	Primary	500	Yes	-	Yes	-	-	No	Dug well	4	3.0	-	2	Yes	K2,500	bad	all seasons	Yes
NW-6	MUNJILE	HAKALOBA	NDEMA	MUJIRA	16° 8' 51.0"	26° 45' 53.0"	90	600	40	120	Agriculture /cattle rearing	-	Health Centre Committee	PHC	No	-	Yes	-	Yes	-	-	No	Dug well	14	13.5	-	0.3	Yes	K1,000	very bad	dry season	Yes
NW-7	MANINA	CHISUMPULE HP	NDEMA	MUCHILA	16° 5' 44.0"	26° 41' 59.0"	85	700	5	200	Agriculture	-	No	PHC	Community School	60	Yes	-	Yes	Yes	-	No	-	-	-	Yes	-	Yes	K500	moderate	dry season	Yes
NW-8	MUNYANGOMBE	KASONKOMWA	NAMAKUBE	MUCHILA	16° 2' 59.0"	26° 30' 16.0"	70	400	16	500	Agriculture /cattle rearing	-	Health commiittee, PTA, Women's Club	PHC	Community School	204	Yes	Yes	Yes	-	-	No	Open pit	-	-	-	0.3	Yes	K800	very bad	dry season	Yes
NW-9	KASONKOMWA RHC	KASONKOMWA	NAMAKUBE	MUCHILA	16° 3' 41.0"	26° 32' 36.0"	55	600	24	400	Agriculture /cattle rearing	-	Health commiittee, PTA, Women's Club	PHC	Community School	204	Yes	Yes	Yes	-	-	No	Open pit	-	-	-	0.3	Yes	K800	very bad	dry season	Yes
NW-10	NALUKWALE	NALUKWALE	NAMAKUBE	MUCHILA	- - -	- - -	60	700	28	200	Agriculture	-	No	PHC	Community School	86	Yes	-	Yes	-	-	No	-	-	-	-	1.5	Yes	K500	moderate	dry season	Yes
NW-11	KAWILIZHI SCHOOL	KAWILIZHI	BAAMBWE	MUKOBELA	15° 46' 59.3"	26° 33' 32.8"	70	400	40	100	Agriculture /cattle rearing	-	Yes	PHC	Primary	240	Yes	-	Yes	-	-	No	Dug Well	15	13.5	-	1	Yes	K3,300	moderate	all seasons	Yes
NW-12	INONGWE(B) RHC	NAMANKHUBAULE	KALUEZA/NGABO	MUKOBELA	15° 57' 15.9"	26° 29' 37.4"	60	500	50	60	Agriculture /cattle rearing	-	Yes	PHC	Primary	300	Yes	-	-	Yes	-	No	Dug Well	12	11.0	-	3	Yes	K3,300	good	all seasons	Yes
NW-13	MALEMBELE	MALEMBELE	NGABO	MUKOBELA	15° 54' 11.0"	26° 36' 22.0"	70	150	20	1400	Cattle rearing	No	No	No	No	-	-	Yes	Yes	-	-	No	Dug well	13.7	12.9	-	-	Yes	K1,000	moderate	dry season	No
NW-14	SHABABWE	SHABABWE	MOOBOLA	MUCHILA	- - -	- - -	100	5000	200	2000	Agriculture	No	No	Clinic	Primary	240	Yes	-	Yes	Yes	-	No	-	-	-	-	3	Yes	K250	bad	dry season	Yes
NW-15	HAMAPONDO	SHABABWE	MOOBOLA	MUCHILA	- - -	- - -	65	5000	200	2000	Agriculture	No	No	Clinic	Primary	240	Yes	-	Yes	Yes	-	No	-	-	-	-	3	Yes	K250	bad	dry season	Yes

PHC: Primary Health Care

VILLAGE INVENTORY DATA: ⑤ ITEZHI-TEZHI DISTRICT

Location of Villages							New Drilling	Population Details		Cattle	Economy		Community Based Organisation	Health Facilities	School		Main Diseases					NGO	Existing Water Source			Existing Borehole	Distance	V-WASHE Committee		Accessibility		
No.	Name of Village	Area Name	Ward	Chief	Latitude S	LongitudeE	Estimated Depth (m)	Population	No.of household	Heads of cattle	Income source	Coperative	Community Based Organisation	Health Facilities	School	No.pupiles	Malaria	Dysentery	Diarrhoea	Sore eyes	Water born diseases prevalent	NGO activity	Existing Water Source	Depth of Hand Dug Well	S.W.L. (m)	Yes / No	Between Source and the Village (m)	Possibility to Organise V-WASHE	Affordable price	Approch road	Motorable	Bush clearing requirement
ITZ-1	NEW NGOMA	NEW NGOMA	BASANGA	MUSUNGWA	15° 54' 59.0"	26° 2' 12.0"	80	157	20	350	Agriculture	No	V-WASHE	Primary Health Care	No	-	Yes	-	Yes	Yes	-	No	Open pit	-	-	-	0.2	Yes	K1,000	bad	dry season	No
ITZ-2	NSOKOSHO	NSOKOSHO	BASANGA	MUSUNGWA	15° 54' 32.0"	26° 4' 49.0"	55	270	9	400	Agriculture	No	Basanga Development Committee	Primary Health Care	No	-	Yes	-	-	-	-	No	Dug well	-	-	-	0.1	Yes	K1,000	bad/ sandy	dry season	No
ITZ-3	SHANTEBE/ SELIBELO	NAMWAMBA	BASANGA	MUSUNGWA	16° 0' 33.0"	26° 3' 31.0"	80	328	82	70	Agriculture	Yes	No	No	No	-	Yes	-	Yes	-	-	No	Shallow Well	25m	-	-	0.5	Yes	K1,000	very bad	dry season	No
ITZ-4	MAKONA	MAKONA	BASANGA	MUSUNGWA	15° 56' 33.0"	26° 7' 11.0"	70	700	44	600	Agriculture /cattle rearing	No	No	No	No	-	Yes	-	Yes	-	-	No	Pond	9m	-	-	0.3	Yes	K5,000	very bad	dry season	Yes
ITZ-5	KANTALIMWA	KANTALIMWA	LUUBWE	MUSUNGWA	15° 53' 32.0"	26° 11' 19.0"	90	672	96	4800	Agriculture /cattle rearing	No	No	No	No	-	Yes	-	Yes	-	-	No	Pond	-	-	-	1	Yes	K325	very bad	dry season	Yes
ITZ-6	SHALOOBA PALACE	LUUBWE	LUUBWE	MUSUNGWA	15° 46' 37.0"	26° 16' 40.0"	80	800	50	600	Agriculture	No	V-WASHE	Clinic	Primary	382	Yes	Yes	Yes	-	-	No	Shallo Well	20m	15m	-	0.2	Yes	K5,000	very bad	dry season	No
ITZ-7	MAHUNGU/ MOOBA	MAHUNGU	LUUBWE	MUSUNGWA	15° 48' 38.0"	26° 19' 17.0"	100	400	40	500	Agriculture /cattle rearing	No	Health Committee	Primary Health Care	No	-	Yes	-	Yes	-	-	No	Shallow Well	-	-	-	0.2	Yes	K250	very bad	dry season	No
ITZ-8	MANIMBWE/ SHIKABA	MNIMBWE	LUCHENA	SHEZONGO	16° 3' 25.0"	26° 6' 20.0"	-	400	40	600	Agriculture	Yes	V-WASHE	-	Primary	280	Yes	-	Yes	-	-	No	Pond	-	-	-	0.5	Yes	K2,000	very bad	dry season	No
ITZ-9	SHINAMPAMBA/ KANGONGWE	SHINAMPAMBA	LUCHENA	SHEZONGO	16° 2' 35.0"	26° 3' 38.0"	80	240	30	370	Agriculture	Yes	V-WASHE	No	No	-	Yes	-	Yes	-	Trypanosomiasis	No	Stream	-	-	-	2	Yes	K6,250	very bad	dry season	Yes
ITZ-10	IBULAMUZI	IBULAMUZI	LUCHENA	SHEZONGO	16° 4' 41.0"	26° 0' 52.0"	60	150	25	70	Agriculture	No	Committee for Agriculture	No	No	-	Yes	-	Yes	-	-	No	Pond	-	-	-	5	Yes	K3,000	very bad	dry season	Yes
ITZ-11	SHAMUCHINDA	BAANGA	LUBANDA	SHIMBIZHI	- - -	- - -	55	93	50	600	Agriculture/ Fishing / Cattle rearing	No	V-WASHE	Clinic	Primary	400	Yes	Yes	Yes	-	-	-	River	-	-	-	1	Yes	K500	moderate	dry season	No
ITZ-12	MULIMBWA/ BUZHIBA	BUZHIBA	LUBANDA	SHIMBIZHI	15° 44' 21.6"	26° 14' 1.7"	70	600	200	700	Agriculture / Cattle rearing	No	V-WASHE	Primary Health Care	Primary	50	Yes	Yes	Yes	-	-	-	River	-	-	-	3	Yes	K1,000	bad	dry season	No
ITZ-13	SHAPAMA/ NKOBO EAST	NKOBO EAST	ITUMBI	KAINGU	15° 36' 0.1"	26° 7' 41.2"	80	250	70	300	Agriculture/ Cattle rearing	No	No	Clinic	Primary	126	Yes	-	-	-	-	-	Pond	-	-	-	2	Yes	K500	good	all seasons	Yes
ITZ-14	KABANGA SCHOOL	KABANGA	BANAMWAZE	CHILYABUFU	15° 31' 22.2"	26° 42' 6.7"	80	500	200	800	Agriculture/ Cattle rearing	No	No	-	Primary	74	Yes	Yes	Yes	-	-	No	Shallow Well	40m	21.6m	-	0.1	Yes	K500	very bad	dry season	Yes
ITZ-15	MUUNGA RHC	MUUNGA	NYAMBO	MUWEZWA	15° 22' 9.9"	26° 58' 28.3"	90	300	16	2000	Agriculture	Yes	No	Clinic	Primary	400	Yes	Yes	Yes	-	-	No	-	-	-	-	-	Yes	K1,000	bad	dry season	Yes
ITZ-16	NANJUWA	NANJUWA	NYAMBO	MUWEZWA	15° 22' 13.2"	26° 58' 13.6"	70	500	300	3000	Agriculture/ Cattle rearing	No	No	Clinic	Primary	400	Yes	Yes	Yes	-	-	No	Shallow Well	-	-	-	-	Yes	K1,000	bad	dry season	Yes
ITZ-17	CHIEF MUWEZWA	MUWEZWA	NYAMBO	MUWEZWA	15° 31' 56.9"	26° 51' 24.6"	70	500	300	1000	Agriculture/ Fishing / Cattle rearing	No	V-WASHE	Primary Health Care	Primary	120	Yes	-	-	-	-	No	Shallow Well	-	-	-	-	Yes	K500	very bad	dry season	Yes
ITZ-18	IDYAMAALA	IDYAMAALA	MBILA	SHEZONGO	16° 20' 44.0"	26° 9' 56.0"	70	700	100	600	Agriculture	-	V-WASHE	Primary Health Care/ TBA	Community School	180	Yes	-	Yes	-	-	No	Pond	-	-	-	4	Yes	K325	very bad	dry season	Yes
ITZ-19	SAMUNDENGO	SAMUDENGO	MASEMU	SHIMBIZHI	15° 43' 42.0"	26° 3' 57.9"	70	500	200	-	Agriculture	No	No	Clinic	Primary	40	Yes	-	-	-	-	-	Pond	-	-	-	0.5	Yes	K500	good	all seasons	No
ITZ-20	ITUMBI PALACE	MALINGA	ITUMBI	KAINGU	15° 30' 36.9"	26° ' 29.6"	75	598	95	3	Agriculture/ Fishing / Cattle rearing	No	No	Clinic	No	-	Yes	Yes	Yes	-	-	No	River	-	-	-	0.5	Yes	K500	very bad	dry season	Yes
ITZ-21	SHIMBIZI	LUBANDA	LUBANDA		15° 36' 30.0"	26° 15' 30.0"	70	500	62	-	Agriculture	Yes	V-WASHE	Clinic	Primary	-	Yes	Yes	Yes	-	-	No	Dug well	-	-	Yes	-	Yes	NA	Bad	dry season	No

VILLAGE INVENTORY DATA: ⑥ KAZUNGULA DISTRICT

Location of Villages							New Drilling	Population Details		Cattle	Economy		Community Based Organisation	Health Facilities	School		Main Diseases					NGO	Existing Water Source			Existing Borehole	Distance	V-WASHE Committee		Accessibility		
No.	Name of Village	Area Name	Ward	Chief	Latitude S	LongitudeE	Estimated Depth (m)	Population	No.of household	Heads of cattle	Income source	Coperative	Community Based Organisation	Health Facilities	School	No.pupiles	Malaria	Dysentery	Diarrhoea	Sore eyes	Water born diseases prevelent	NGO activity	Existing Water Source	Depth of Hand Dug Well	S.W.L. (m)	Yes / No	Between Source and the Village (m)	Possibility to Organise V-WASHE	Affordable price	Approch road	Motorable	Bush clearing requirement
KZ-1	NAMUKABA PRIMARY SCHOOL	KASOMBORA	SEKUTE	SEKUTE	17° 50' 36.0"	25° 27' 11.0"	130	170	4	5000	Agriculture/ Fishing/ Cattle rearing	No	No	Clinic	Primary	170	Yes	Yes	Yes	-	-	Yes	River	-	-	-	1	Yes	K1,000	bad	dry season	Yes
KZ-2	CHITEBE SETTLEMENT	MOOMBA	MOOMBA	MOOMBA	16° 36' 6.0"	25° 21' 23.0"	45	200	15	-	Agriculture/ Fishing	No	No	-	-	-	Yes	Yes	Yes	-	-	No	Borehole (2km)	-	-	-	2	Yes	K500	moderate	all seasons	Yes
KZ-3	CHIKA CHIPONGO	SEKUTE	SEKUTE	SEKUTE	17° 41' 3.8"	25° 39' 41.7"	50	180	16	280	Agriculture	No	No	-	-	-	Yes	-	-	-	-	-	Borehole (7km)	-	-	-	10	Yes	K600	moderate	all seasons	No
KZ-4	KAUWE RHC	MUZABWE	KAUWE	NYAWA	17° 3' 28.8"	26° 9' 0.0"	80	800	92	12	Agriculture	-	V-WASHE for borehole at school	Clinic	Primary	550	Yes	-	-	-	-	CARE/ seed multiplication	Borehole (1km)	-	-	Yes	0.2	Yes	K1,000	moderate	all seasons	No
KZ-5	LEULEU	KAUWE	KAUWE	NYAWA	17° 3' 0.2"	26° 10' 40.6"	100	400	56	-	Agriculture	No	Area Development Committee	-	-	-	Yes	Yes	Yes	-	-	CARE/ seed multiplication	Dambo	-	-	-	7	Yes	K1,000	moderate	all seasons	No
KZ-6	KATAPAZI RHC	KATAPAZI	KATAPAZI	MUKUNI	17° 36' 56.0"	26° 8' 20.5"	90	4000	390	3000	Agriculture	No	Village Development Committee	Clinic	-	-	Yes	-	-	-	Bilhalzia	CARE/ seed multiplication	Borehole (School)	-	-	Yes	1	Yes	K1,000	moderate	all seasons	No
KZ-7	SIAKASIPA RHC	SIAKASIPA	MUSOKOTWANE	MUSOKOTWANE	17° 33' 15.0"	25° 55' 46.0"	70	315	21	-	Agricutlure	No	No	Clinic	Primary	315	Yes	-	Yes	-	Bilhalzia	CARE/ agric. inputs	Dam	-	-	-	0.3	Yes	K1,000	bad	all seasons	Yes
KZ-8	CHILALE/BOMBWE RHC	BOMBWE	NGWEZI	MUSOKOTWANE	17° 8' 33.0"	25° 19' 55.0"	50	350	39	60	-	No	Village Committee	Clinic	-	-	Yes	Yes	Yes	-	-	-	River	-	-	-	0.6	Yes	K500	moderate	dry season	No
KZ-9	KABUYU RHC	KABUYU	SIMANGO	MUSOKOTWANE	17° 29' 52.2"	25° 59' 40.6"	85	1375	125	11	Agricultrue	No	Health Committee/ V-WASHE	Clinic	Primary	560	Yes	-	Yes	-	-	-	Dug well	10.0	8.0	-	3	Yes	K500	moderate	all seasons	No
KZ-10	MANDIA RHC	MANDIA	SEKUTE	SEKUTE	17° 49' 56.6"	25° 33' 12.8"	60	1600	200	2000	Agriculture/ Fishing/ Cattle rearing	-	Diptank Committee/ PTA/ AMC	Clinic	Primary	204	Yes	-	-	-	-	CARE/ seed multiplication	Borehole	-	-	Yes	0.1	Yes	K500	moderate	dry season	No
KZ-11	NGUBA CLINIC	NGUBA	CHOOMA	NYAWA	16° 55' 12.0"	26° 2' 39.0"	90	400	38	2000	Agriculture/ Cattle rearing	Yes	No	No	Primary	410	Yes	-	Yes	-	-	-	Borehole (School)	-	-	Yes	1	Yes	K1,000	very bad	dry season	Yes
KZ-12	SEKUTE PRIMARY SCHOOL	SEKUTE	SEKUTE	SEKUTE	17° 39' 35.2"	25° 37' 14.0"	55	600	68	7000	Agriculture	No	PTA	Clinic	Primary	600	Yes	-	-	-	-	-	Borehole (RHC)	-	-	Yes	1.1	Yes	K500	good	all seasons	No
KZ-13	SIMUKOMBO PRIMARY SCHOOL	SIMUKOMBO	SEKUTE	SEKUTE	17° 46' 12.6"	25° 29' 5.1"	55	270	150	300	Agriculture	No	PTA	-	Primary	210	Yes	Yes	Yes	-	-	CARE/ seed multiplication	Dambo	1.0	0.5	-	3	Yes	K500	moderate	all seasons	No
KZ-14	KASAYA PRIMARY SCHOOL	KASAYA	SIKAUNZWE	SEKUTE	17° 28' 47.0"	25° 3' 9.4"	0	420	84	2130	Agriculture/ Fishing/ Cattle rearing	No	PTA/ PAM	PHC	Primary	290	Yes	-	-	-	-		Dam	-	-	-	1	Yes	K2,000	moderate	all seasons	No
KZ-15	NACHILINDA PRIMARY SCHOOL	MAPANDA	SEKUTE	SEKUTE	17° 46' 4.0"	25° 25' 8.0"	70	345	23	700	Agriculture/ Cattle rearing	-	Area Management Committee	PHC	Primary	117	Yes	Yes	Yes	-	Schistosomiasis	CARE/ seed multiplication	Dug well	8.8	8.1	-	0.5	Yes	K1,000	moderate	all seasons	No
KZ-16	MARIA MAHACHI	MAKUNKA	SEKUTE	SEKUTE	17° 32' 41.2"	25° 38' 29.7"	60	250	22	N	Agriculture/ Cattle rearing	-	No	Clinic	-	-	Yes	-	-	-	-	CARE	Borehole (1km)	-	-	Yes	2	-	-	good	all seasons	No
KZ-17	KAZUNGULA MID. BASIC SCHOOL	KAZUNGULA	SEKUTE	SEKUTE	17° 47' 30.0"	25° 18' 42.0"	70	267	-	2000	Agriculture/ Fishing	No	No	Clinic	Primary	267	Yes	-	Yes	-	Schistosomiasis	-	Dug well	1.0	0.5	-	0.5	Yes	K1,000	moderate	all seasons	No
KZ-18	LUNUNGU SCHOOL	LUNUNGU	NGWEZI	MUSOKOTWANE	17° 20' 28.0"	25° 28' 46.0"	70	300	39	1200	Agriculture	-	School Committee	-	Primary	80	Yes	-	-	-	Schistosomiasis	-	Open pit	0.5	0.3	-	0.1	Yes	K5,000	bad	dry season	Yes
KZ-19	SAALA SCHOOL	SAALA	NGWEZI	MUSOKOTWANE	17° 17' 36.0"	25° 20' 42.0"	70	280	30	162	Agriculture	-	Village Development	-	Primary	-	Yes	Yes	Yes	-	-	-	From Livingstone by train	-	-	-	1	Yes	K10,000	bad	dry season	Yes
KZ-20	KANYOZE SCHOOL	SIAMUDELE	NYAWA	NYAWA	17° 16' 8.0"	25° 44' 9.0"	85	128	16	3000	Agriculture/ Cattle rearing	No	No	PHC	Primary	40	Yes	-	-	-	Schistosomiasis	-	Open pit	-	-	-	0.1	Yes	K1,000	very bad	dry season	Yes
KZ-21	SICHIFULO PRIMARY SCHOOL	SICHIFULO	CHOOMA	NYAWA	16° 53' 11.0"	26° 8' 8.0"	0	300	19	110	Agriculture/ Cattle rearing	No	V-WASHE	PHC	Primary	300	Yes	-	-	-	-	-	Borehole	-	-	Yes	0.3	Yes	K1,000	very bad	dry season	Yes
KZ-22	MANKODI PRIM. SCHOOL	MANKODI	KANCHELE	MUSOKOTWANE	17° 25' 8.0"	25° 43' 24.0"	100	180	30	72	Agriculture	-	PTA	-	Primary	120	Yes	-	Yes	-	-	-	Open pit	16.0	10.0	-	5	Yes	K1,000	moderate	dry season	No
KZ-23	SIHUMBWA PRIM. SCHOOL	SIHUMBWA	KANCHELE	MUSOKOTWANE	17° 29' 43.0"	25° 44' 16.0"	-	230	23	100	Agriculture/ Cattle rearing	-	V-WASHE/ PTA	-	Primary	325	Yes	-	Yes	-	-	CARE/ food security	Dug well /Lined	-	-	-	0.1	Yes	K1,000	moderate	all seasons	No
KZ-24	LIBALA SCHOOL	KATAPAZI	KATAPAZI	MUKUNI	17° 41' 33.4"	26° 4' 42.8"	90	748	68	1200	Agriculture	-	PTA	-	Primary	200	Yes	-	Yes	-	-	CARE/ seed multiplication	Stream	-	-	-	0.24	Yes	K10,000	moderate	all seasons	No
KZ-25	KAPUNDA	MALUMANE	MOOMBA	MOOMBA	16° 42' 16.0"	25° 13' 1.0"	45	300	60	400	Agriculture	No	No	No	-	-	Yes	-	Yes	-	-	-	Stream	-	-	-	0.3	Yes	K500	moderate	all seasons	No
KZ-26	MUSHWALUMUKE	BUNSANA	MOOMBA	MOONBA	16° 36' 58.0"	25° 15' 6.0"	60	300	30	250	Agriculture	No	No	No	No	-	Yes	Yes	Yes	-	-	-	Open pit	-	-	-	-	-	-	-	-	-
KZ-27	NGANDU PRIM. SCHOOL	NGANDU	MUKUNI	MUKUNI	17° 55' 39.7"	25° 58' 24.5"	60	450	52	-	Agriculture	-	V-WASHE	-	Primary	380	Yes	Yes	Yes	-	-	-	Borehole (0.55km)	-	-	-	1.6	Yes	-	good	all seasons	No
KZ-28	NAMPUYANI SCHOOL	KAUWE	KAUWE	NYAWA	16° 59' 18.4"	26° 5' 8.2"	50	380	42	1800	Agriculture	No	Village Development Committee	-	Primary	150	Yes	Yes	Yes	-	-	No	Open pit	-	-	-	1	Yes	K700	bad	dry season	No
KZ-29	LUBANGO/ SIMULINDA	SEKUTE	SEKUTE	SEKUTE	17° 40' 9.3"	25° 37' 3.7"	60	250	29	340	Agriculture/ Cattle rearing	-	PTA	-	-	-	Yes	-	-	-	-	-	Borehole (1.5km)	-	-	-	2	Yes	K1,000	moderate	all seasons	No
KZ-30	SANDONJI	SITONDO	MOOMBA	MOOMBA	16° 37' 29.0"	25° 6' 18.8"	60	296	36	600	Agriculture/ Cattle rearing	-	PTA	Clinic (proposed)	Primary	46	Yes	Yes	Yes	-	-	-	River	-	-	-	1.6	Yes	K126	moderate	all seasons	Yes
KZ-31	SIMBEZA	MABWE	MOOMBA	MOOMBA	16° 31' 46.0"	25° 26' 30.0"	45	150	15	N	-	-	-	No	No	-	Yes	Yes	Yes	-	-	No	Open pit	-	-	-	2	Yes	K500	moderate	all seasons	Yes
KZ-32	SIALWIINDI	SITONDO	MOOMBA	MOOMBA	16° 34' 10.9"	25° 6' 28.8"	70	180	23	45	Agriculture	No	Agriculture Development	-	-	-	Yes	Yes	Yes	-	-	-	Dambo	-	-	-	0.5	Yes	K5,000	moderate	all seasons	No

VILLAGE INVENTORY DATA: ⑥ KAZUNGULA DISTRICT

Location of Villages							New Drilling	Population Details		Cattle	Economy		Community Based Organisation	Health Facilities	School		Main Diseases					NGO	Existing Water Source			Existing Borehole	Distance	V-WASHE Committee		Accessibility		
No.	Name of Village	Area Name	Ward	Chief	Latitude S	LongitudeE	Estimated Depth (m)	Population	No.of household	Heads of cattle	Income source	Coperative	Community Based Organisation	Health Facilities	School	No.pupiles	Malaria	Dysentery	Diarrhoea	Sore eyes	Water born diseases prevelent	NGO activity	Existing Water Source	Depth of Hand Dug Well	S.W.L. (m)	Yes / No	Between Source and the Village (m)	Possibility to Organise V-WASHE	Affordable price	Approch road	Motorable	Bush clearing requirement
KZ-33	SIAKABALE	NYAWA	NYAWA	NYAWA	17° 9' 1.0"	25° 56' 8.0"	70	184	46	50	Agriculture/ Cattle rearing	Yes	committee for borehole nearby	Clinic	Primary	-	Yes	Yes	Yes	-	-	CARE/ constructed a dam	Borehole (2km)	-	-	-	3	Yes	K1,000	very bad	dry season	Yes
KZ-34	SIANSIMBI		MUSOKOTWANE	MUSOKOTWANE	17° 32' 16.0"	25° 53' 55.0"	75	345	23	300	Agriculture	Yes	V-WASHE	PHC	Primary	-	Yes	Yes	Yes	-	-	CARE/ provides seeds	Dug well (6km)	-	-	-	7	Yes	K2,000	bad	all seasons	Yes
KZ-35	SIAMUKUTA	MOOMBA	MOOMBA	MOOMBA	16° 36' 55.0"	25° 20' 46.0"	60	300	7	300	Agriculture/ Cattle rearing	No	No	No	-	-	Yes	Yes	Yes	-	-	No	Borehole (1.6km)	-	-	-	3	Yes	K1,000	moderate	all seasons	Yes
KZ-36	MUPOTOLA	MANYEMUNYEMU	KATAPAZI	MUKUNI	17° 24' 29.2"	26° 11' 58.8"	80	289	52	180	Agriculture	-	Sewing Club	-	-	-	Yes	-	Yes	-	-	CARE/ seed multiplication	Pond	-	-	-	1.8	Yes	K1,500	moderate	all seasons	No
KZ-37	NGWEZI	NGWEZI TANK	NGWEZI	MUSOKOTWANE	17° 27' 37.0"	25° 28' 8.0"	50	280	54	200	Agriculture	-	Farming Association/ Market Committee	-	-	-	Yes	-	Yes	-	-	-	Borehole/Pit	-	-	Yes	0.2	Yes	K1,000	moderate	dry season	No
KZ-38	MUNGAMBWA	KANCHELE	KANCHELE	MUSOKOTWANE	17° 23' 59.0"	25° 40' 37.0"	-	134	20	83	Agriculture	No	-	-	-	-	-	Yes	Yes	-	-	CARE/ seed multiplication	River	-	-	-	2	Yes	K1,000	bad	dry season	No
KZ-39	MAKUMBA	SIAMULUNGA	SIMANGO	MUSOKOTWANE	17° 23' 41.6"	26° 5' 20.6"	80	210	49	16	Agriculture	-	Villaged Development Committee	-	-	-	Yes	Yes	Yes	-	-	-	Open pit	-	-	-	0.25	Yes	K1,500	good	all seasons	No
KZ-40	MUZAMBWE	KAUWE	KAUWE	NYAWA	17° 4' 44.3"	26° 6' 59.5"	45	774	97	-	Agriculture	-	Village committee	-	-	-	-	Yes	Yes	-	-	CARE/ seed multiplication	Dambo	-	-	-	3	Yes	K600	good	all seasons	No
KZ-41	SIACHUMA	MACHENJE	MUKUNI	MUKUNI	17° 56' 44.2"	25° 59' 5.1"	55	190	35	400	Agriculture / cattle rearing	-	Village Productive Committee	-	-	-	Yes	Yes	Yes	Yes	-	-	Stream	-	-	-	2.5	Yes	K500	moderate	all seasons	No
KZ-42	SIACHALWA	MACHENJE	MUKUNI	MUKUNI	17° 58' 16.5"	25° 57' 36.4"	85	282	42	50	Agriculture	-	V-Washe	-	-	-	Yes	Yes	Yes	-	-	CARE	Stream	-	-	-	2	Yes	K500	moderate	all seasons	No
KZ-43	SHINDU	SHINDU	KAUWE	NYAWA	16° 59' 47.3"	26° 11' 38.7"	60	400	50	30	Agriculture	No	Village Committee	-	-	-	Yes	Yes	Yes	-	-	CARE/ seed multiplication	Dambo	-	-	-	17	Yes	K2,500	bad	dry season	No
KZ-44	MUNGOLE	SIKAUNZWE	SIKAUNZWE	SEKUTE	17° 35' 38.0"	25° 12' 18.0"	50	150	15	250	Agriculture / cattle rearing	No	No	PHC	Primary	-	Yes	-	Yes	-	-	No	Open pit	2.0	0.1	-	1	Yes	K1,000	moderate	all seasons	Yes
KZ-45	KAPULE	KAPULE	NYAWA	NYAWA	17° 13' 7.0"	25° 52' 47.0"	100	190	27	50	Agriculture	No	Village committee	No	No	-	Yes	-	Yes	-	-	CARE/ dam construction	Open pit	-	-	-	0.3	Yes	K1,000	very bad	dry season	Yes
KZ-46	MUZUMBWE	MUZUMBWE	NYAWA	NYAWA	17° 12' 56.0"	25° 54' 18.0"	70	222	44	200	Agriculture	No	Village/Area Management Committee	No	No	-	Yes	-	Yes	-	-	CARE/ construction of dam	Dam	-	-	-	1.5	Yes	K700	moderate	dry season	Yes
KZ-47	SIAKASIPA NAMWABA	SIAKASIPA	MUSOKOTWANE	MUSOKOTWANE	17° 32' 8.0"	25° 56' 19.0"	70	375	25	90	Agriculture	No	No	Clinic	Primary	-	Yes	-	Yes	-	-	-	Dam	-	-	-	4	Yes	K2,000	moderate	all seasons	Yes
KZ-48	SHABUYANI	SITONDO	MOOMBA	MOOMBA	16° 36' 1.4"	25° 10' 7.7"	90	182	13	13	Agriculture	-	Village Productive Committee	-	-	-	-	Yes	Yes	-	-	-	Stream	-	-	-	0.3	Yes	K5,000	moderate	all seasons	No
KZ-49	DWADWA	KATAPAZI	KATAPAZI	MUKUNI	17° 38' 48.2"	26° 15' 15.5"	90	460	46	300	Agriculture	-	Village Development	-	-	-	-	Yes	Yes	-	-	CARE/ seed multiplication	River	-	-	-	0.5	Yes	K3,000	bad	dry season	No
KZ-50	MUNGOLE/ SIACHIBUYE	NAMASUTE	NGWEZI	MUSOKOTWANE	17° 27' 20.0"	25° 24' 47.0"	55	162	18	28	Agriculture	No	No	-	-	-	Yes	-	Yes	-	-	CARE/ seed loan	Open pit	-	-	-	2	Yes	K1,000	moderate	dry season	No
KZ-51	LIBONDA	KANTUMBI	KANCHELE	MUSOKOTWANE	17° 23' 17.0"	25° 34' 41.0"	70	154	22	75	Agriculture	No	Village Committee	-	-	-	Yes	Yes	-	-	Schistosomiasis	-	Dug well	3.0	2.5	-	3	Yes	K1,000	bad	dry season	No
KZ-52	LINGAMBA	KANTUMBI	KANCHELE	MUSOKOTWANE	17° 21' 9.5"	25° 40' 3.6"	60	248	31	155	Agriculture	No	V-WASHE	-	-	-	Yes	-	Yes	-	Schistosomiasis	-	Open pit	1.5	1.0	-	0.5	Yes	K5,000	moderate	-	No
KZ-53	SIANKUNKU	SIANKUKU	MOOMBA	MOOMBA	16° 41' 7.0"	25° 17' 6.0"	-	75	15	200	Agriculture	No	No	No	-	-	Yes	Yes	Yes	-	-	-	Open pit	-	-	-	2	Yes	K1,000	moderate	all seasons	No
KZ-54	KAYINGU	SIAMUNDELE	NYAWA	NYAWA	17° 9' 47.0"	25° 42' 39.0"	70	360	30	1000	Agriculture / cattle rearing	No	No	PHC	Primary	60	Yes	Yes	Yes	-	-	-	Open pit	-	-	-	30	Yes	K1,000	very bad	dry season	Yes
KZ-55	WACHILA	SIAMUNDELE	NYAWA	NYAWA	17° 12' 47.0"	25° 48' 23.0"	75	300	20	600	Agriculture / cattle rearing	No	Area Development Committee by CARE	PHC	Primary	-	Yes	Yes	Yes	-	-	-	Borehole (4km)	-	-	Yes	3	Yes	K500	inaccessible	all seasons	Yes
KZ-56	SIAMUNDELE	SIAMUNDELE	NYAWA	NYAWA	17° 10' 37.0"	25° 48' 39.0"	80	900	60	2000	Agriculture/ Cattele rearing	Yes	No	PHC	Primary	-	Yes	Yes	Yes	-	-	CARE/ seeds multiplication	Borehole (school)	-	-	-	2	Yes	K1,000	bad	all seasons	Yes
KZ-57	INONGE	SIMANGo	SIMANGO	MUSOKOTWANE	17° 28' 17.5"	25° 56' 2.5"	85	288	32	4	Agriculture	No	V-WASHE	-	-	-	Yes	Yes	Yes	Yes	-	-	River	-	-	-	7	Yes	K200	good	all seasons	No
KZ-58	CHILEFWE	MLANGU	MUSOKOTWANE	MUSOKOTWANE	17° 35' 40.0"	25° 57' 31.0"	70	570	38	7	Agriculture	No	No	PHC	Primary	-	Yes	-	-	-	Schistosomiasis	CARE/ seed multiplication	Dug well(lined)	7.3	3.0	-	2	-	-	moderate	all seasons	Yes
KZ-59	CHILEYA	KASENSA	NGWEZI	MUSOKOTWANE	17° 29' 37.0"	25° 23' 23.0"	110	360	40	100	Agriculture	-	Area Management Committee	-	-	-	-	Yes	-	-	Schistosomiasis	CARE/ seed loan	Open pit	-	-	-	2	Yes	K500	moderate	dry season	No
KZ-60	LUBASI RHC	MABWA	NYAWA	NYAWA	17° 5' 21.0"	25° 55' 20.0"	-	280	44	200	Agriculture/ Cattle rearing	No	PTA/ Village Committee	No	Primary	400	Yes	-	Yes	-	-	CARE/dam construction	Stream	-	-	-	0.3	Yes	K1,000	very bad	dry season	Yes
KZ-61	MUNTANGA	SIAMUNDELE	NYAWA	NYAWA	17° 14' 40.0"	25° 45' 10.7"	100	435	29	2000	Agriculture/ Cattle rearing	No	No	PHC	Primary	40	Yes	Yes	Yes	-	Schistosomiasis	-	Open pit	-	-	-	5	Yes	K1,000	inaccessible	dry season	Yes
KZ-62	LIKUNYI	KABUYU	SIMANGO	MUSOKOTWANE	17° 27' 22.3"	26° 1' 31.4"	110	300	50	14	Agriculture	No	V-WASHE	-	-	-	Yes	Yes	Yes	-	-	-	Pond	-	-	-	2	Yes	K500	moderate	all seasons	No
KZ-63	CHIKUNI	NZWIDA	KANCHELE	MUSOKOTWANE	17° 20' 10.9"	25° 41' 35.0"	90	225	25	135	Agriculture	No	Village Development Committee	-	-	-	Yes	Yes	Yes	-	-	-	Pond	-	-	-	2.5	Yes	K2,500	bad	dry season	No
KZ-64	MUZANDU	ACHUMBWA	KANCHELE	MUSOKOTWANE	17° 30' 4.0"	25° 45' 47.0"	45	240	60	25	Agriculture	-	Yes	-	-	-	Yes	Yes	Yes	-	-	CARE/ food security	Borehole (1km)	-	-	Yes	2	Yes	K1,000	good	dry season	No
KZ-65	MAKAMISA	KATAPAZI	KATAPAZI	MUKUNI	17° 37' 18.3"	26° 6' 2.3"	90	364	52	20	Agriculture	-	No	-	-	-	-	Yes	Yes	-	-	CARE/ seed multiplication	Open pit	-	-	-	2.5	Yes	K10,000	very bad	-	Yes
KZ-66	SANGU	MANYEMUNYEMU	KATAPAZI	MUKUNI	17° 32' 9.7"	16° 11' 7.0"	70	389	43	80	Agriculture	No	Village Productive Committee	-	-	-	Yes	Yes	Yes	-	-	CARE/ seed multiplication	Pond	-	-	-	0.1	Yes	K750	very bad	dry season	Yes
KZ-67	SIKOOBOSYA	SIKOOBOSYA	KAUWE	NYAWA	17° 3' 25.0"	26° 3' 14.0"	130	450	30	3000	Agriculture/ Cattle rearing	Yes	No	PHC	Primary	-	Yes	Yes	Yes	-	-	-	Open pit	-	-	-	9	Yes	K1,000	inaccessible	-	Yes
KZ-68	CHILANGU /MANDANDI	KAMWI	MUKUNI	MUKUNI	17° 50' 23.0"	25° 59' 45.0"	90	220/ 405	27/ 22	50 (C)/ 28 (M)	Agriculture/ Cattle rearing	No	No	PHC	Primary	-	Yes	-	-	-	Schistosomiasis	CARE/ seed multiplication	River	-	-	-	1	Yes	K1,000	bad	dry season	Yes

VILLAGE INVENTORY DATA: ⑥ KAZUNGULA DISTRICT

Location of Villages							New Drilling	Population Details		Cattle	Economy		Community Based Organisation	Health Facilities	School		Main Diseases					NGO	Existing Water Source			Existing Borehole	Distance	V-WASHE Committee		Accessibility		
No.	Name of Village	Area Name	Ward	Chief	Latitude S	LongitudeE	Estimated Depth (m)	Population	No.of household	Heads of cattle	Income source	Coperative	Community Based Organisation	Health Facilities	School	No.pupiles	Malaria	Dysentery	Diarrhoea	Sore eyes	Water born diseases prevalent	NGO activity	Existing Water Source	Depth of Hand Dug Well	S.W.L. (m)	Yes / No	Between Source and the Village (m)	Possibility to Organise V-WASHE	Affordable price	Approch road	Motorable	Bush clearing requirement
KZ-69	CHAKUZIBA	SINDE	MUSOKOTWANE	MUSOKOTWANE	17° 40' 20.0"	25° 43' 43.0"	80	375	25	-	Agriculture	No	No	PHC	Primary	-	Yes	-	Yes	-	-	CARE/ seed multiplication	Stream	-	-	-	0.3	Yes	K1,000	very bad	dry season	Yes
KZ-70	LUKUNI	MAUNGA	MUSOKOTWANE	MUSOKOTWANE	17° 43' 39.0"	25° 46' 27.0"	85	300	25	500	Agriculture/ Cattle rearing	No	No	PHC	Primary	-	Yes	-	Yes	-	Schistosomiasis	-	Stream	-	-	-	0.5	Yes	K1,000	bad	all seasons	Yes
KZ-71	DIABANJI/ SIANYUMBU/ MATEELE	KATEMWA	NGWEZI	MUSOKOTWANE	16° 59' 30.0"	25° 15' 45.0"	-	56	12	10	Agriculture	-	(Agriculture	-	-	-	-	Yes	Yes	-	-	-	Dambo	-	-	-	0.5	Yes	K5,000	very bad	dry season	Yes
KZ-72	NYAWA	NYAWA	NYAWA	NYAWA	17° 10' 30.0"	25° 50' 30.0"	100	14077	935	1200	Agriculture	No	Yes	RHC	Primary	380	Yes	-	Yes	Yes	-	Rotary Club	Borehole (School)	-	-	Yes	-	Yes	K1,000	moderate	all seasons	No
KZ-73	MUTOKA	SIMANGo	SIMANGO	MUSOKOTWANE	17° 26' 1.0"	25° 57' 4.5"	100	240	40	-	Agriculture	-	Village Development Committee	-	-	-	Yes	Yes	Yes	-	-	CARE/ seed loan	River	-	-	-	5	Yes	K1,000	bad	all seasons	No
KZ-74	CHILEYA	KANCHELE	KANCHELE	MUSOKOTWANE	17° 25' 11.0"	25° 38' 21.0"	90	138	13	70	Agriculture	-	Village Committee	-	-	-	-	-	Yes	-	-	-	Open pit	-	-	-	2	Yes	K1,000	bad	dry season	No
KZ-75	MALIMBULUTI	KATAPAZI	KATAPAZI	MUKUNI	17° 39' 6.3"	26° 10' 30.2"	120	300	48	5	Agriculture	-	Agriculture Committee	-	-	-	-	-	Yes	-	-	CARE/ seed multiplication	Stream	-	-	-	0.1	Yes	K1,650	moderate	dry season	No
KZ-76	CHUMBUMUTWE	SIAMASIMBI	MUKUNI	MUKUNI	17° 45' 51.0"	26° 5' 21.0"	110	360	30	200	Agriculture/ Cattle rearing	No	No	PHC	Primary	-	Yes	-	Yes	-	Bilhalzia	-	Stream	-	-	-	0.4	-	-	very bad	all seasons	Yes
KZ-77	SIAKASIPA	SIAKASIPA	MUSOKOTWANE	MUSOKOTWANE	17° 33' 2.0"	25° 56' 27.0"	45	450	30	50	Agriculture	No	No	Clinic	Primary	-	Yes	-	Yes	-	-	CARE/seeds multiplication	Dug well	1.0	0.5	-	0.1	Yes	K2,000	moderate	all seasons	Yes
KZ-78	JAMA SIALWINDI	NAMASUTE	NGWEZI	MUSOKOTWANE	17° 27' 3.0"	25° 23' 43.0"	70	218	30	90	Agriculture	-	Village Management Committee	-	-	-	Yes	-	Yes	-	Schistosomiasis	CARE/ seed loan	Dam	-	-	-	0.8	Yes	K5,000	moderate	dry season	No
KZ-79	SIAKAYUWA	SIAMULUNGA	SIMANGO	MUSOKOTWANE	17° 22' 18.9"	26° 2' 50.0"	80	360	30	60	Agriculture	No	Village Productive Committee	-	-	-	-	Yes	Yes	-	-	-	River	-	-	-	5	Yes	K1,500	moderate	all seasons	No
KZ-80	MUDULI	MAKUNKA	KANCHELE	MUSOKOTWANE	17° 30' 41.0"	25° 39' 40.0"	70	210	24	200	Agriculture	-	V-WASHE	-	-	-	Yes	-	Yes	-	-	-	Borehole (3km)	-	-	Yes	3	Yes	K5,000	moderate	all seasons	No
KZ-81	MUMBWATASAI	MANYEMUNYEMU	KATAPAZI	MUKUNI	17° 27' 8.8"	26° 12' 25.9"	80	278	70	30	Agriculture	No	Village Development Committee	-	-	-	Yes	-	-	-	-	CARE/ seed multiplication	Stream	-	-	-	3	Yes	K500	moderate	all seasons	No
KZ-82	MABBONGA	SIAMASIMBI	MUKUNI	MUKUNI	17° 47' 6.0"	26° 2' 36.0"	70	264	22	80	Agriculture	-	Village Manag. Committee by CARE	PHC	Primary	-	Yes	-	Yes	-	Schistosomiasis	CARE/ seed multiplication	Stream	-	-	-	1	-	-	very bad	dry season	Yes
KZ-83	SIAMPULI	MUSOKOTWANE B.	MUSOKOTWANE	MUSOKOTWANE	17° 37' 19.0"	25° 53' 44.0"	65	1095	73	20	Agriculture	Yes	No	Clinic	Primary	-	Yes	-	Yes	-	Bilhalzia	-	Open pit	-	-	-	0.5	Yes	K1,000	moderate	all seasons	Yes
KZ-84	MACHABWA/ KASUMO	KATEMWA	NGWEZI	MUSOKOTWANE	17° 3' 27.0"	25° 16' 3.0"	40	280	30	12	Agriculture	-	Dam Committee	-	-	-	-	Yes	Yes	-	-	-	Open pit	-	-	-	0.4	Yes	K1,000	moderate	dry season	No
KZ-85	SIATUBI	SIMANGo	SIMANGO	MUSOKOTWANE	17° 24' 35.2"	25° 52' 12.2"	70	250	70	N	Agriculture	-	V-WASHE	-	-	-	Yes	Yes	Yes	-	-	-	Stream	-	-	-	2	Yes	K500	good	all seasons	No
KZ-86	SIANSUNDI	KANTUMBI	KANCHELE	MUSOKOTWANE	17° 23' 18.1"	25° 38' 57.7"	80	180	26	300	Agriculture	-	Village Development Committee	-	-	-	Yes	Yes	Yes	-	-	CARE/ seed multiplication	River	-	-	-	6	Yes	K2,000	moderate	dry season	No
KZ-87	SIAMUKWENA	MANYEMUNYEMU	KATAPAZI	MUKUNI	17° 30' 53.5"	26° 13' 18.0"	70	540	77	830	Agriculture/ Cattle rearing	No	Village Development Committee	-	-	-	Yes	Yes	Yes	-	-	CARE/ seed multiplication	Spring	-	-	-	0.1	Yes	K500	bad	dry season	Yes
KZ-88	NDELE	KAMWI	MUKUNI	MUKUNI	17° 49' 10.0"	26° 0' 39.0"	100	456	38	300	Agriculture/ Cattle rearing	No	No	Clinic	Primary	-	Yes	-	-	-	Schistosomiasis	-	River	-	-	-	1	Yes	K1,000	moderate	dry season	Yes
KZ-89	SIAMWALA/ LWIINDI	SINDE	MUSOKOTWANE	MUSOKOTWANE	17° 37' 53.0"	25° 44' 28.0"	50	540/ 570	36 (L)/ 38(S)	15	Agriculture	Yes	Village Management Committee under CARE	PHC	Primary	-	Yes	-	Yes	-	-	CARE/ seed multiplication	Dug well	1.5	1.0	-	2	Yes	K1,000	very bad	all seasons	Yes
KZ-90	SYAKALUNDU	NAMASUTWE	NGWEZI	MUSOKOTWANE	17° 26' 31.0"	25° 26' 15.0"	60	180	24	400	Agriculture	-	Village Development Committee	-	-	-	Yes	Yes	-	-	Schistosomiasis	CARE/ seed loan	Borehole (1km)	-	-	Yes	1	Yes	K2,000	moderate	all seasons	No
KZ-91	SIBBOBOLE	MALIMBA	SIMANGO	MUSOKOTWANE	17° 22' 14.9"	25° 54' 25.0"	80	200	38	8	Agriculture	No	V-WASHE	-	-	-	-	-	Yes	-	-	-	Stream	-	-	-	4	Yes	K5,000	bad	dry season	No
KZ-92	SIANYINYITI	MANYEMUNYEMU	KATAPAZI	MUKUNI	17° 25' 32.3"	26° 12' 25.0"	80	250	54	23	Agriculture	No	V-WASHE	-	-	-	Yes	-	Yes	-	-	CARE/ seed production	Pond	-	-	-	1	Yes	K1,000	moderate	all seasons	No
KZ-93	SIANYEMBA	SINDE	MUSOKOTWANE	MUSOKOTWANE	17° 32' 47.0"	25° 49' 6.0"	80	360	24	110	Agriculture	No	No	PHC	Primary	-	Yes	-	Yes	-	-	CARE/ seed multiplication	Borehole (0.5km)	-	-	Yes	3	Yes	K1,000	bad	all seasons	Yes
KZ-94	SIMWANDO	MALIMBA	SIMANGO	MUSOKOTWANE	17° 20' 33.7"	25° 56' 28.6"	70	400	40	160	Agriculture	-	Village Development Committee	-	-	-	Yes	Yes	Yes	-	-	CARE/ agriculture	Borehole (2km)	-	-	Yes	2	Yes	K500	bad	dry season	No
KZ-95	SIAMAPA	MUKUNI	MUKUNI	MUKUNI	17° 55' 7.6"	25° 54' 9.5"	40	186	20	70	Agriculture	-	-	-	-	-	Yes	Yes	Yes	-	-	-	Borehole (2km)	-	-	Yes	4 ～ 5	Yes	K5,000	good	all seasons	No
KZ-96	SYAKALIMA	SIMANGo	SIMANGO	MUSOKOTWANE	17° 26' 23.5"	25° 51' 16.3"	60	360	40	40	Agriculture	No	V-WASHE	-	-	-	Yes	Yes	Yes	-	-	-	River	-	-	-	1	Yes	K5,000	moderate	all seasons	No
KZ-97	SIANYEMBA	SIAMASIMBI	MUKUNI	MUKUNI	17° 46' 25.0"	26° 2' 57.0"	90	250	25	25	Agriculture/ Cattele rearing	Yes	Area Manag. Committee by CARE	PHC	Primary	-	Yes	Yes	Yes	-	Schistosomiasis	CARE/ seed multiplication	Stream	-	-	-	0.5	Yes	K1,000	very bad	-	Yes
KZ-98	SICHIYASA	MUKUNI	MUKUNI	MUKUNI	17° 53' 53.5"	25° 55' 27.1"	130	260	28	500	Agriculture	No	-	-	-	-	Yes	Yes	Yes	-	-	-	Borehole (1.5km)	-	-	Yes	1.8	Yes	K500	good	all seasons	No
KZ-99	SANKOPE	MULANGA	MOOMBA	MOOMBA	16° 56' 23.2"	25° 15' 19.1"	70	180	24	N	Agriculture	-	No	-	-	-	Yes	Yes	Yes	-	-	-	Borehole (School)	-	-	Yes	1.8	Yes	K1,000	moderate	all seasons	No
KZ-100	LUBINGA	SIKAUNZWE	SIKAUNZWE	SEKUTE	17° 36' 18.0"	25° 13' 26.0"	-	160	20	114	Agriculture/ Cattle rearing	No	No	PHC	Primary	-	Yes	Yes	Yes	-	-	No	Dam	-	-	-	0.3	Yes	K2,000	moderate	all seasons	No
KZ-101	CHOOMA RIVER SCHOOL	CHOOMA	CHOOMA	NYAWA	17° 1' 34.0"	25° 53' 37.0"	90	212	15	3000	Agriculture/ Cattele rearing	-	PTA/ AMC/ Women's Club	PHC	Primary	212	Yes	-	-	-	Schistosomiasis	CARE/Dam construction	Open pit	-	-	-	1	Yes	K1,000	very bad	all seasons	Yes

PHC: Primary Health Care

APPENDIX- 6(4) OVERVIEW OF THE RESULTS OF THE HOUSEHOLD SURVEY

I. Questionnaire Survey at the All Study Villages

The household survey was conducted at the all Study Villages both for construction of handpump water supply facilities and for the Sub-Centres as a course of the Socio-Economic Condition Survey in the Basic Design Study. The main objectives of this household survey were; a) to explore the willingness of the communities to participate in the operation and maintenance activities of water facilities and b) to assess the socio-economic conditions, especially economic factors of livelihood of household, which will support the level and type of contribution by the communities towards the project-related O&M activities.

Methodologies employed in the survey is the structured interview with using a questionnaire in order to concentrate collection of information indispensable to examine the said two major factors at all Study Villages within the limited period. Tables below show results of the household survey conducted at the Study Villages for construction of borehole water facilities with handpumps. 1)

1. Distribution of the Surveyed Household

			Province	Western		Central	Southern			Total
			District	Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi	Kazungula	
(1)	Number of Surveyed Household			57	73	119	40	59	290	638
(2)	Respondent by Sex	Male		70%	19%	61%	58%	58%	39%	51%
		Female		26%	25%	24%	23%	27%	61%	31%

2. Household Size and Economic Activities

			Province	Western		Central	Southern			Total
			District	Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi	Kazungula	
(1)	Household Headship	Male-Headed		70%	70%	65%	88%	78%	79%	75%
		Female-Headed		9%	7%	4%	8%	2%	13%	7%
(2)	Average Size of Household (person)			7	7	12	16	8	7	9
(3)	Main Income Sources (multiple answer)	Farming		86%	19%	52%	35%	97%	75%	61%
		Handcraft		2%	0%	4%	15%	0%	2%	4%
		Animal Production		5%	0%	5%	0%	14%	0%	4%
		Fishing		2%	1%	3%	3%	5%	0%	2%
		Trading		0%	0%	3%	0%	0%	0%	0%
		Day Labour		28%	1%	0%	0%	0%	1%	5%
		Others		9%	10%	5%	0%	2%	4%	5%
(4)	Ownership of Farming Land	Yes		79%	92%	75%	98%	98%	92%	89%
		No		14%	0%	2%	0%	0%	4%	3%
(5)	Livestock Ownership (multiple answer)	Cattle		46%	79%	50%	83%	75%	51%	64%
		Goats		18%	67%	45%	63%	25%	24%	40%
		Cocks		82%	85%	85%	95%	93%	82%	87%
		Duck		9%	15%	10%	28%	36%	6%	17%
		Others		14%	18%	16%	20%	25%	24%	20%
(6)	Monthly Medical Expenses	less than K500		0%	15%	12%	3%	5%	0.3%	6%
		K500 - K2000		74%	60%	16%	23%	51%	29%	42%
		K2000 - 4000		4%	10%	0%	10%	25%	9%	10%
		K4000 - K6000		4%	3%	5%	10%	7%	12%	7%
		K6000 - K8000		4%	0%	1%	5%	7%	3%	3%
		K8000 or above		7%	4%	51%	48%	3%	15%	21%
(7)	Monthly Educational Expenses	less than K500		0%	1%	0%	0%	7%	1%	1%
		K500 - K2000		11%	53%	2%	18%	15%	18%	19%
		K2000 - 4000		37%	10%	5%	8%	17%	14%	15%
		K4000 - K6000		11%	3%	9%	23%	27%	11%	14%
		K6000 - K8000		11%	1%	1%	8%	8%	5%	6%
		K8000 or above		18%	8%	61%	35%	17%	19%	26%
(8)	Need to Buy Mealie-Meal	Yes		37%	73%	19%	5%	51%	18%	34%
		No		58%	7%	18%	93%	31%	69%	46%

3. Present Situation of Access to Water

		Province	Western		Central	Southern			Total
		District	Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi	Kazungula	
(1)	Time spent to Water Source	less than 15 minutes	49%	15%	8%	15%	54%	9%	25%
		15 min. - 30 min.	7%	8%	17%	13%	14%	16%	12%
		30 min. - 60 min.	12%	29%	31%	25%	0%	43%	23%
		60 min. - 120 min.	2%	10%	15%	25%	20%	19%	15%
		120 minutes or above	0%	22%	13%	15%	8%	11%	12%
(2)	Water Fetching Frequency (average time)		4	4	3	4	4	3	4
(3)	Person in Charge of Water Collection (multiple	Adult Men	5%	21%	24%	53%	19%	23%	24%
		Adult Women	58%	30%	76%	48%	86%	86%	64%
		Children	39%	18%	58%	25%	12%	37%	31%
		Water Vendor	0%	1%	5%	0%	0%	0%	1%
		Others	0%	0%	0%	0%	0%	0%	0%

4. Willingness to Participate in the Operation and Maintenance Activities

		Province	Western		Central	Southern			Total
		District	Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi	Kazungula	
(1)	Willingness to Organise V-WASHE	Yes	96%	97%	83%	98%	97%	89%	93%
		No	0%	0%	0%	0%	0%	0%	0%
(2)	Willingness to Pay for Water Costs	Yes	95%	97%	82%	98%	95%	89%	93%
		No	2%	0%	0%	0%	0%	1%	0%
(3)	Affordable Price in Monthly Basis	less than K500	0%	1%	2%	8%	0%	6%	3%
		K500 －K1500	61%	11%	46%	28%	51%	54%	42%
		K1500 －K2500	14%	8%	17%	3%	8%	14%	11%
		K2500 －K3500	2%	3%	3%	5%	3%	2%	3%
		K3500 －K4500	2%	1%	2%	3%	3%	0%	2%
		K4500 or above	9%	51%	25%	30%	10%	10%	23%
(4)	Annual Payment Desired		0%	1%	0%	5%	19%	1%	4%
(5)	Purpose of Time Use to be Gained from Alleviation of Water Fetching Time (multiple answer)	Farming	72%	77%	66%	68%	58%	81%	70%
		Handcraft	0%	47%	18%	0%	2%	1%	11%
		Animal Production	23%	49%	43%	38%	14%	3%	28%
		Housework	40%	53%	71%	30%	47%	59%	50%
		Trading	0%	5%	13%	20%	0%	1%	7%
		Others	30%	16%	3%	8%	0%	1%	9%

Notes

1）Since the data collected from the survey includes invalid answer, the items summarised in the tables shows the proportion of respondents in the total household (respondents) surveyed. This means that the total figure of answers described for each question is not necessarily 100%.

II. Sample Household Survey

Aiming to collect more detailed information to support and supplement the data gained from the household survey at the all Study Villages, the sample household survey was conducted by the subcontractor at villages sampled from the all targets for the Study for construction of handpump water facilities and for Sub-Centres. The survey consist of the sub-structured interview to the key-informant of the sample villages on community profile, the structured interview with questionnaire to household, and the Focused Group Discussion interwoven with the PRA exercises.

Comparing with the survey results in Section I, the tables below shows some main output from the questionnaire survey conducted at the sample villages for construction of handpump water facilities and for Sub-Centres. **1)** In addition to these data, some results of the PRA exercises which were participated by the communities are attached.

A. Questionnaire Survey

1. Distribution of the Surveyed Household

	Province		Western		Central	Southern			Total
	District		Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi	Kazungula	
(1)	Number of Surveyed Household		61	20	74	10	15	75	255
(2)	Respondent by Sex	Male	62%	40%	73%	50%	33%	37%	49%
		Female	38%	60%	27%	50%	67%	63%	51%

2. Household Size and Economic Activities

	Province		Western		Central	Southern			Total
	District		Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi	Kazungula	
(1)	Household Headship	Male-Headed	77%	65%	86%	70%	73%	64%	73%
		Female-Headed	23%	35%	14%	30%	27%	36%	27%
(2)	Average Size of Household (person)		6	5	9	9	9	7	8
(3)	Main Income Sources (multiple answer) **2)**	Farming	75%	95%	74%	80%	27%	80%	72%
		Handcraft	5%	0%	22%	0%	13%	0%	7%
		Animal Production	3%	0%	1%	0%	0%	0%	1%
		Fishing	2%	0%	3%	10%	13%	0%	5%
		Trading	2%	15%	14%	0%	0%	0%	5%
		Day Labour	10%	0%	0%	0%	0%	0%	2%
		Others	36%	50%	30%	20%	60%	71%	44%
(4)	Ownership of Farming Land	Yes	92%	75%	97%	90%	93%	89%	89%
		No	7%	25%	3%	10%	7%	11%	10%
(5)	Livestock Ownership (multiple answer)	Cattle	36%	35%	57%	70%	47%	24%	45%
		Goats	11%	25%	49%	40%	13%	27%	28%
		Cocks	84%	50%	84%	90%	73%	63%	74%
		Duck	8%	95%	3%	20%	13%	5%	24%
		Others	11%	55%	5%	20%	27%	55%	29%
(6)	Monthly Medical Expenses	less than K500	2%	0%	4%	0%	20%	0%	4%
		K500 - K2000	11%	25%	28%	80%	60%	24%	38%
		K2000 - 4000	18%	20%	19%	10%	13%	29%	18%
		K4000 - K6000	21%	20%	28%	0%	0%	5%	13%
		K 6 000 - K8000	10%	0%	1%	0%	7%	7%	4%
		K8000 or above	25%	35%	14%	0%	0%	21%	16%
(7)	Monthly Educational Expenses	less than K500	0%	0%	0%	0%	13%	0%	2%
		K500 - K2000	3%	60%	9%	60%	53%	11%	33%
		K2000 - 4000	26%	15%	23%	20%	7%	12%	17%
		K4000 - K6000	13%	0%	27%	10%	20%	12%	14%
		K 6 000 - K8000	3%	10%	1%	0%	0%	8%	4%
		K8000 or above	31%	5%	11%	0%	0%	25%	12%
(8)	Need to Buy Mealie-Meal	Yes	20%	75%	9%	0%	13%	45%	27%
		No	52%	25%	85%	100%	87%	55%	67%

3. Present Situation of Access to Water

		Province	Western		Central	Southern			Total
		District	Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi	Kazungula	
(1)	Time spent to Water Source **3)**	less than 15 minutes	74%	40%	34%	70%	53%	20%	48%
		15 min. - 30 min.	5%	20%	26%	10%	13%	31%	17%
		30 min. - 60 min.	11%	20%	30%	20%	27%	24%	22%
		60 min. or above	7%	20%	7%	0%	13%	25%	12%
(2)	Water Fetching Frequency (average time)		3	4	3	3	2	2	3
(3)	Person in Charge of Water Collection (multiple	Adult Men	16%	5%	20%	0%	0%	21%	10%
		Adult Women	95%	100%	89%	100%	93%	97%	96%
		Children	67%	40%	50%	20%	8%	68%	42%
		Water Vendor	0%	0%	0%	0%	0%	0%	0%
		Others	5%	0%	7%	0%	0%	0%	2%

4. Willingness to Participate in the Operation and Maintenance Activities **4)**

		Province	Western		Central	Southern			Total
		District	Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi	Kazungula	
(1)	Willingness to Organise V-WASHE	Yes	98%	100%	99%	90%	100%	100%	98%
		No	0%	0%	0%	10%	0%	0%	2%
(2)	Willingness to Pay for Water Costs	Yes	100%	100%	99%	80%	100%	97%	96%
		No	0%	0%	1%	20%	0%	3%	4%
(3)	Affordable Price in Monthly Basis	less than K500	0%	5%	23%	60%	53%	33%	29%
		K500 －K1500	80%	90%	31%	20%	20%	63%	51%
		K1500 －K2500	13%	5%	18%	10%	7%	1%	9%
		K2500 －K3500	2%	0%	9%	0%	0%	0%	2%
		K3500 －K4500	0%	0%	3%	0%	0%	0%	0%
		K4500 or above	2%	0%	12%	0%	7%	0%	3%
(4)	Annual Payment Desired		0%	0%	53%	80%	73%	0%	34%
(5)	Purpose of Time Use to be Gained from Alleviation of Water Fetching Time (multiple answer) **5)**	Farming	84%	100%	32%	20%	20%	92%	58%
		Handcraft	20%	5%	5%	0%	0%	9%	7%
		Animal Production	38%	15%	1%	0%	0%	7%	10%
		Housework	95%	90%	26%	30%	53%	84%	63%
		Trading	10%	15%	0%	0%	0%	3%	5%
		Others	8%	100%	51%	0%	13%	83%	43%

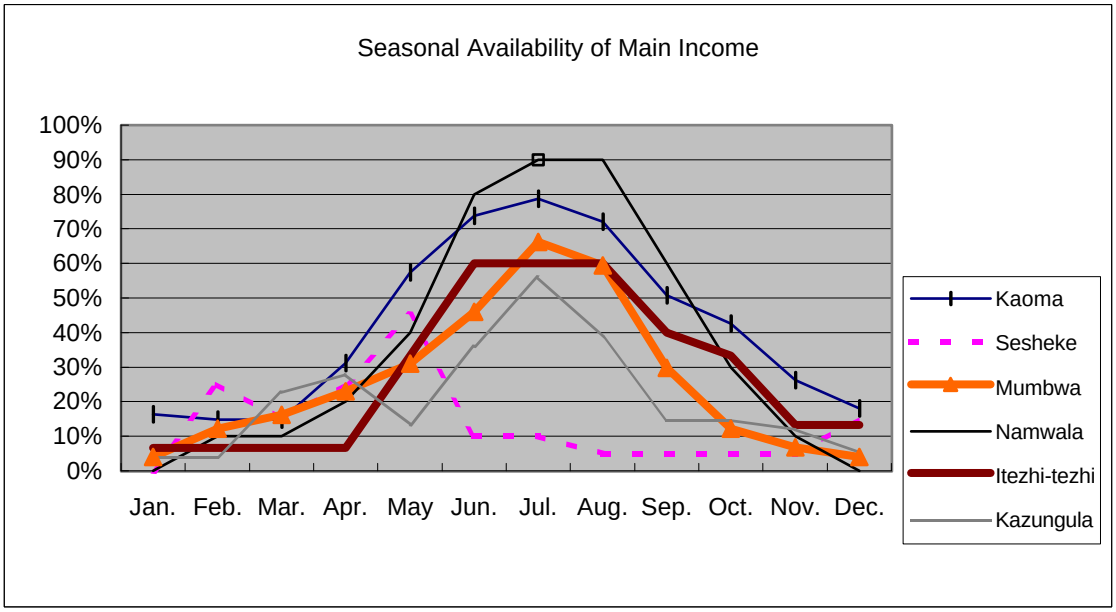
Notes:

1) Since the data collected from the survey includes invalid answer, the items summarised in the tables shows the proportion of respondents in the total household (respondents) surveyed. This means that the total figure of answers described for each question is not necessarily 100%.

2) Answers of "others" in the main income source include items listed below. Also, distribution of subsidiary income source and seasonal availability of the main income are shown in the table and graph, respectively.
a) Cutting/selling timber, b) Beer brewing, c) Gardening, e) Charcoal burning

Distribution of Subsidiary Income Source

	Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi	Kazungula	Total
Farming	26%	5%	14%	10%	40%	20%	19%
Handcraft	26%	30%	4%	0%	0%	15%	12%
Animal Production	51%	80%	12%	10%	7%	63%	37%
Fishing	7%	25%	4%	10%	0%	3%	8%
Trading	18%	65%	11%	10%	20%	28%	25%
Day Labour	39%	20%	3%	0%	0%	7%	11%



3) While average time spent to water sources takes less than 15 minutes equivalent to 48% in total, more than 60% of household uses unprotected water source such as hand-dug well, river, stream, and so forth. It is perceived from the table below that the communities do not necessarily recognise the safety of such water sources even located near the houses.

		Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi	Kazungula	Total
Access to Safe Drinking Water	Yes	13%	25%	31%	50%	53%	32%	34%
	No	87%	75%	64%	50%	40%	68%	64%
Source of Existing Water Supply (multiple answer)	River	8%	75%	0%	0%	7%	7%	16%
	Pond	0%	0%	4%	0%	0%	0%	1%
	Spring	5%	0%	0%	0%	0%	0%	1%
	Stream	0%	0%	7%	0%	0%	40%	8%
	Dambo	7%	0%	4%	0%	0%	20%	5%
	Unprotected Shallow Well	69%	0%	65%	30%	33%	20%	36%
	Protected Shallow Well	26%	0%	4%	50%	33%	7%	20%
	Borehole	5%	25%	16%	50%	33%	33%	27%
	Others	2%	0%	16%	0%	7%	1%	4%

4) Table below shows experiences of involvement in the community projects and present situation of contribution in cash for operation and maintenance of existing water facilities, which were collected as the supplemental data for assessment of willingness and capacities of the communities for participation in the project-related O&M activities.

		Kaoma	Sesheke	Mumbwa	Namwala	Itezhi-tezhi	Kazungula	Total
Experiences to Involve in Community	Yes	95%	100%	53%	80%	47%	96%	78%
	No	5%	0%	46%	20%	53%	4%	21%
Activities Undertaken (multiple answer)	Agricultural Work	8%	60%	1%	0%	0%	61%	22%
	Church Construction	48%	65%	0%	20%	0%	33%	28%
	School Construction	82%	85%	27%	0%	20%	67%	47%
	Road Rehabilitation	28%	15%	5%	0%	7%	25%	13%
	Water Point Rehabilitation	15%	0%	0%	0%	0%	27%	7%
	Others	51%	65%	32%	80%	47%	40%	52%
Payment of Water Cost for Existing Water	Yes	7%	25%	16%	50%	0%	37%	23%
	No	90%	75%	85%	50%	100%	63%	77%

5) Answers of "Others" in purpose of time use to be gained from alleviation of water fetching time include items listed below.

a) Gardening, b) Cutting/selling timber/logs, c) Beer brewing, e) Going to school, f) Joining Women's Club, g) Trading/business, h) Recreation

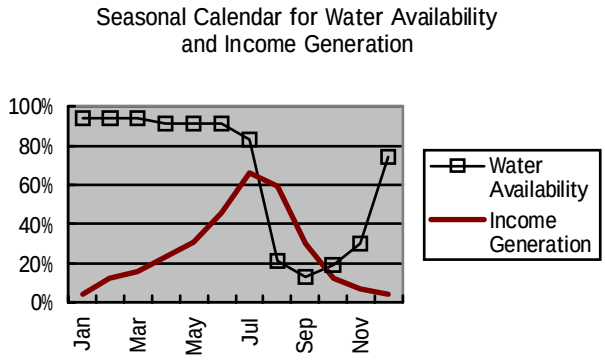
B. Results of the PRA Exercises at the Sample Villages (The Source: PMTC Report, 2000)

Some output from the PRA exercises conducted at the sample villages are attached hereunder. Attached diagrams consist of the followings;

① **Seasonal Calendar for Disease Prevalence, Water Availability, Food Security and Income Generation**

Sample Village: Kasuumbalesa Village, Mumbwa District

Participants: 4 men and 3 women



The graph shown above summarises results of the questionnaire survey at sample villages in Mumbwa regarding seasonality of water availability and income generation. Annual change of the both factors can be grasped from this figure. Meanwhile, in addition to describe such seasonality of factors, the seasonal calendar attached shows correlation among factors of disease prevalence, water and food availability, and income generation, which the community is aware.

② **Casual-Flow Diagram for Inadequate Water**

Sample Village: Mweenge Village, Mumbwa District

Participants: 6 men and 4 women

The participants for this exercise defined “inadequate water” as the case that the water source dried up at some stages in the year. The diagram shows a cause-effect relationship lead by “inadequate water”.

③ **Water Factor Related Matrix**

Sample Village: Malulu/ Kazanzu, Kaoma District

The matrix shows frequency of use, available duration, time and distance to the water source, user fee, and usages of existing water sources. Though this village has a borehole water facility which provides water through the year, priority to use the facility has been given to its owner. Therefore participants for this exercise ranked high score on shallow wells, which are frequently used by the villagers. The water drawn from the borehole is strictly for drinking and cooking purpose.

④ **Scoring to the Income Source**

Sample Village: Kabweze Primary School, Kaoma District

Participants: Residents living around the school

The table shows the differences in the income activities, which male and female participate in, and profitability.

⑤ **Seasonal Diagram of Gender Role**

Sample Village: Kachoya Village, Mumbwa District

Participants: Drawn by separate groups of men and women

⑥ **Gender Role in Daily Activities**

Sample Village: Kachoya Village, Mumbwa District

Participants: Drawn by separate groups of 7 men and 5 women

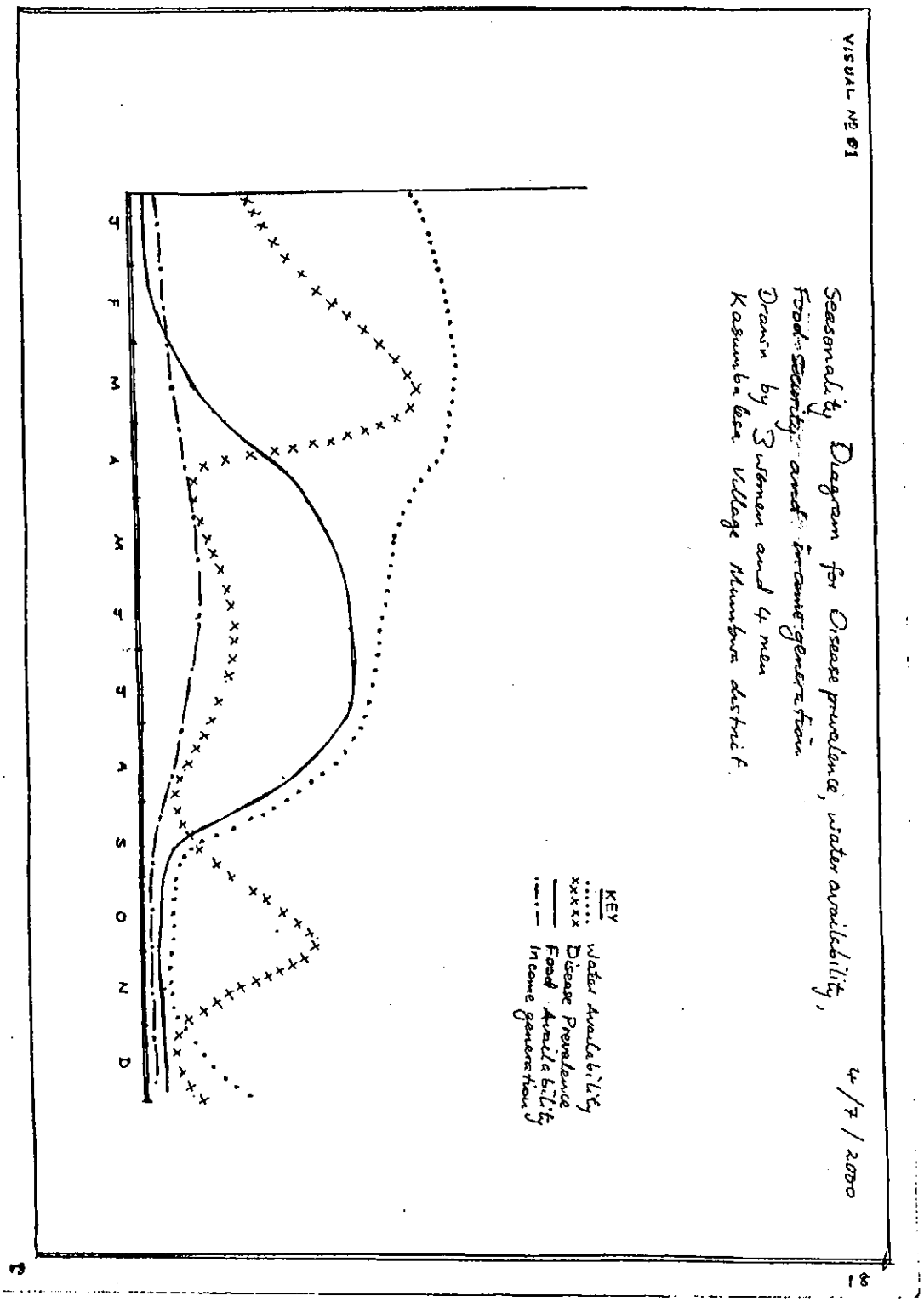
The diagrams of ⑤ and ⑥ describe gender role in activities and magnitude of each activity.

⑦ **Venn Diagram on Organisation Servicing the Community**

Sample Village: Nyawa, Kazungula District

This diagram shows view of the participants for this exercise on significance and networking among organisations servicing this sample village. Size of circle describes significance and recognition of the organisation while the relationship among these organisations is indicated as overlap of circles.

① **Seasonal Calendar for Disease Prevalence, Water Availability, Food Security and Income Generation**



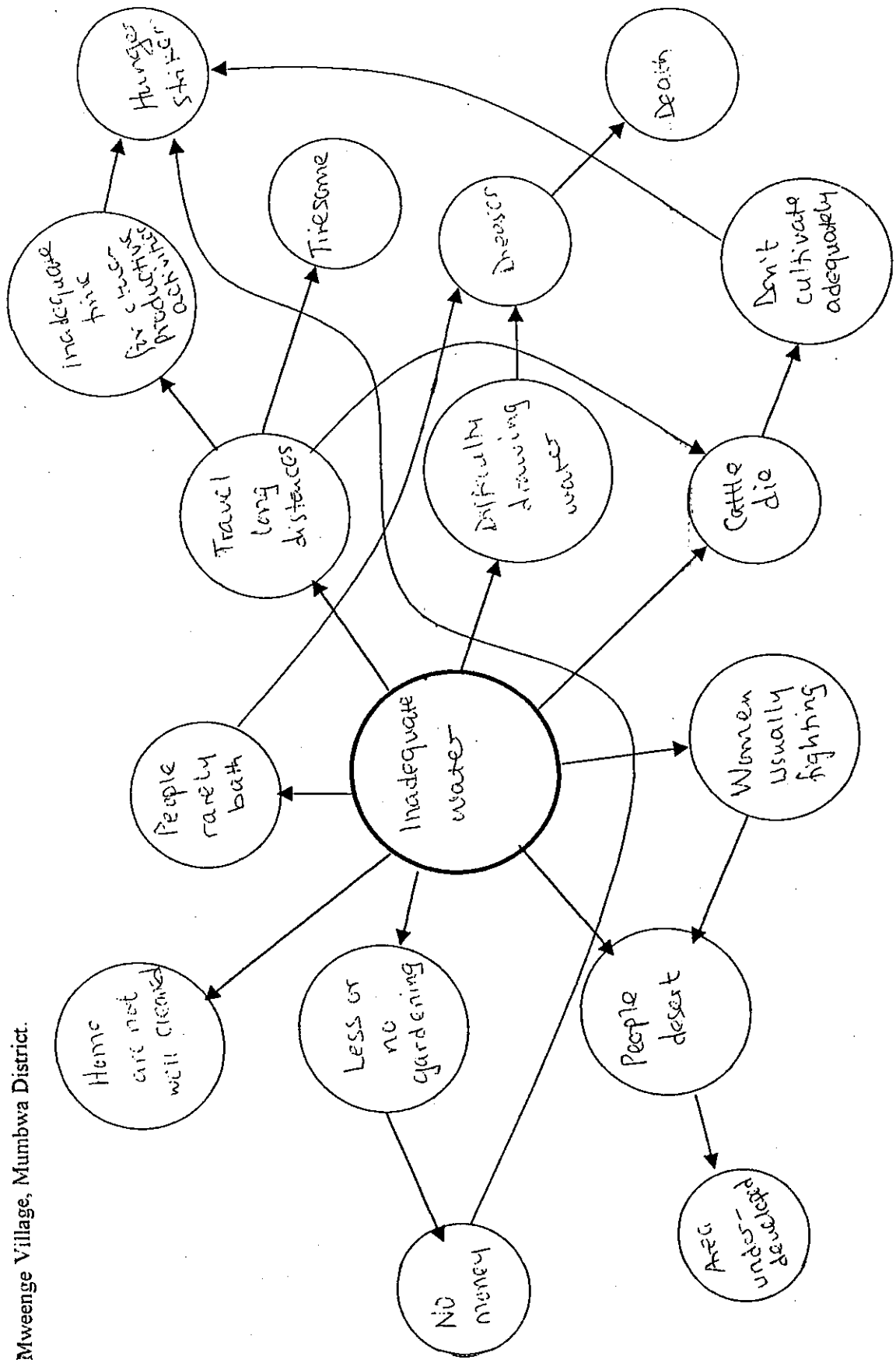
Visual No. 1

② Casual-Flow Diagram for Inadequate Water

VISUAL NO. 3

CASUAL-FLOW DIAGRAM FOR INADEQUATE WATER. Drawn by 4 women and 6 men.

Mweenge Village, Mumbwa District.



③ **Water Factor Related Matrix**

Malulu/kazanzu Village Water Related Factors Matrix

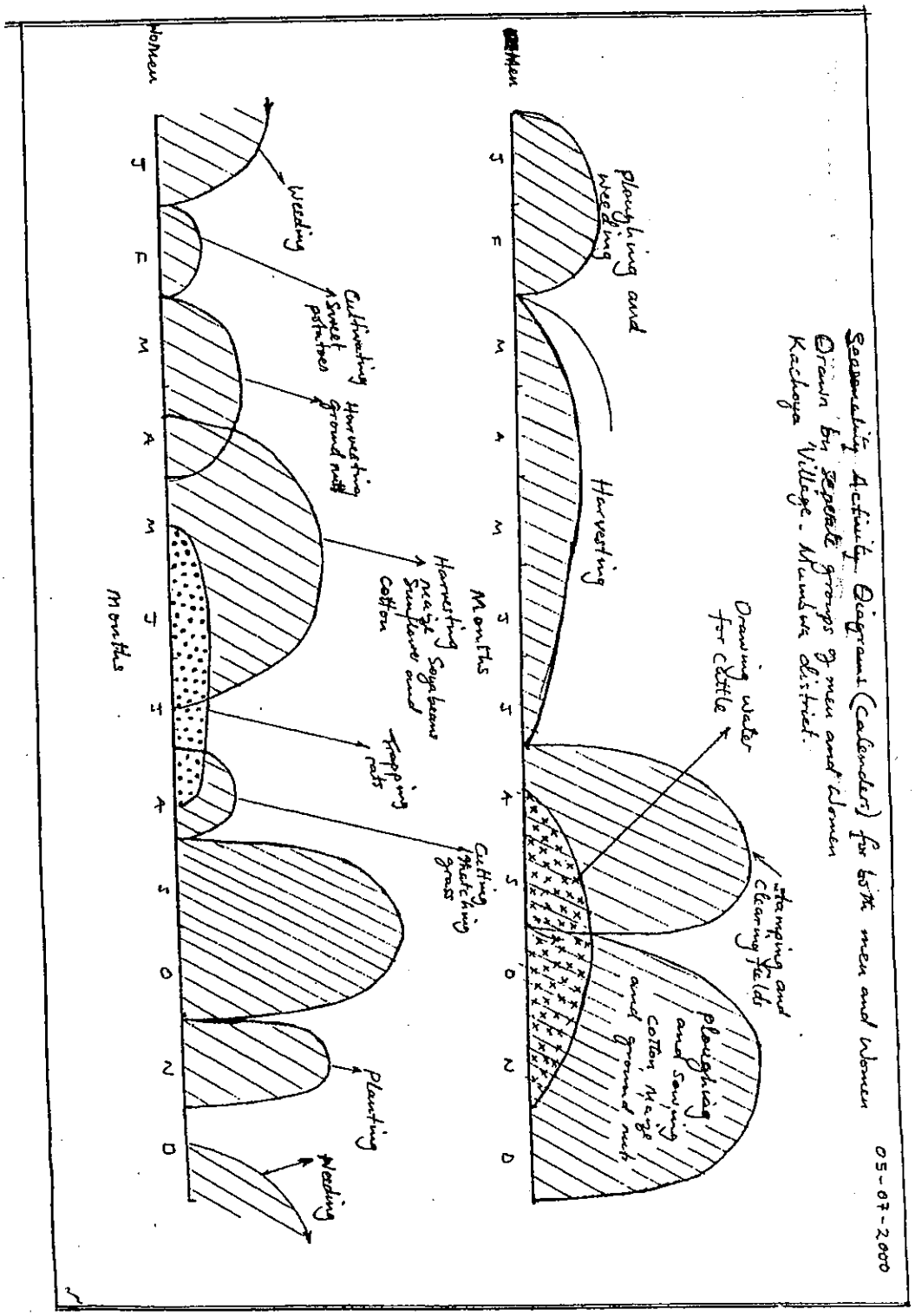
Water source	Rank (used most	Quality	Quantity	Distance	Time spent	Cost	Uses	Collectors
Shallow wells	1	Bad and dirty	Reduces in dry season	400m	30 min	Free	Domestic	Women and children
Hand pump	3	Good and clean	Throughout the year	500m	30 min	K1000 per/ HH /month	Drinking & cooking	Adult women & children
River	2	Very bad and dirty	Throughout the year	1km	1hour	Free	Washing clothes & gardening	Adult women & children

④ **Scoring to the Income Source**

Kambweze Primary School Sources of Income

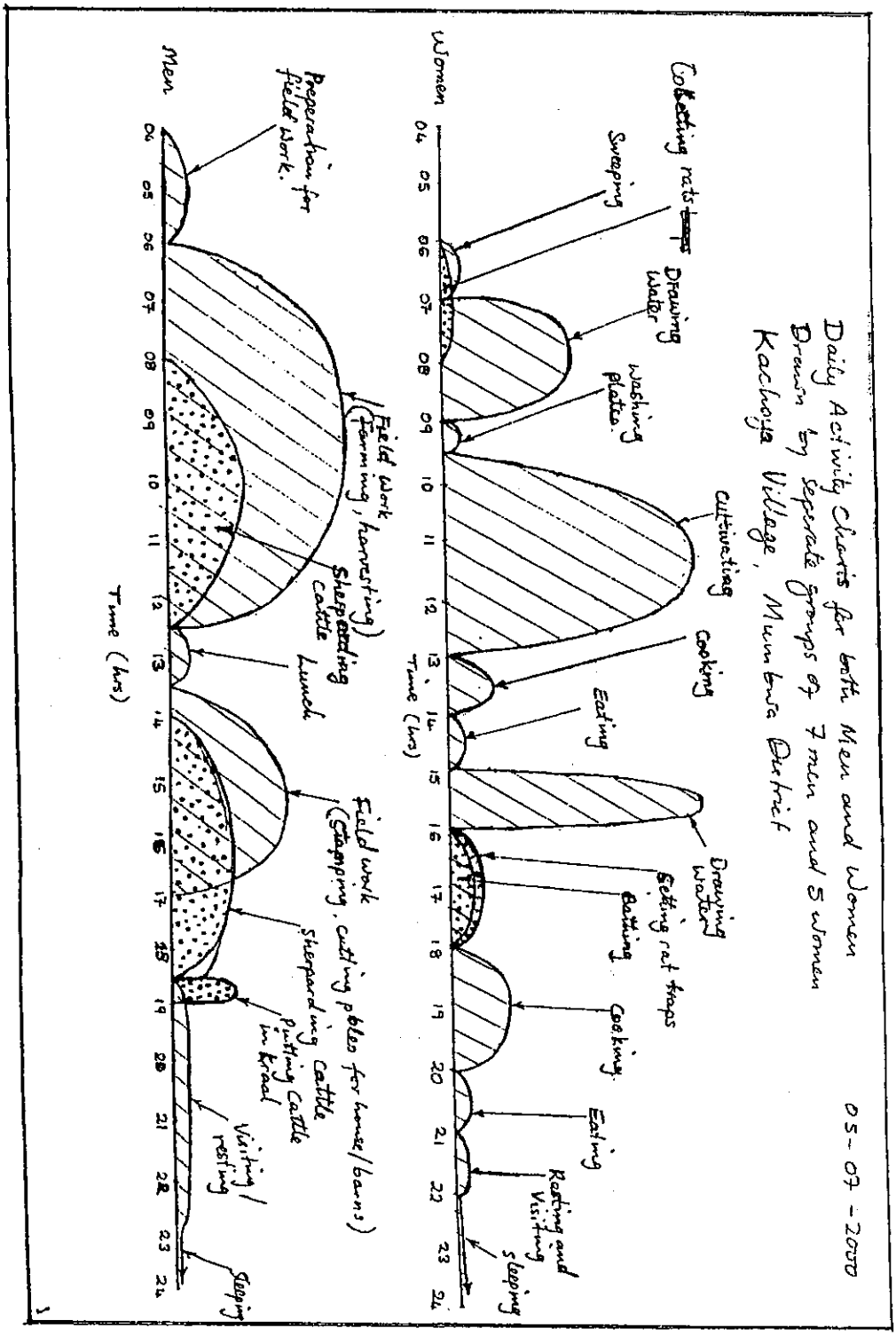
Source	Male		Female	
	Participation (fixed score : 10)	Profitability	Participation (fixed score:10)	Profitability
Selling farm produce	000000000	1	0000000000	1
Selling grass	00000000	5	00000000	7
Hiring 0xen for ploughing	000	6		
Piecework	000	11	000000	6
Selling fish	00000	2	00000	2
Beer brewing			000000	3
Blacksmith	000	7		
Handcraft	00000	8	0000	5
Selling milk	000	4	0000000	8
Selling domestic animals	00	3	0000	4
Brick making	000	10		
Brick laying	00	9		

⑤ **Seasonal Diagram of Gender Role**



Annex IIB:

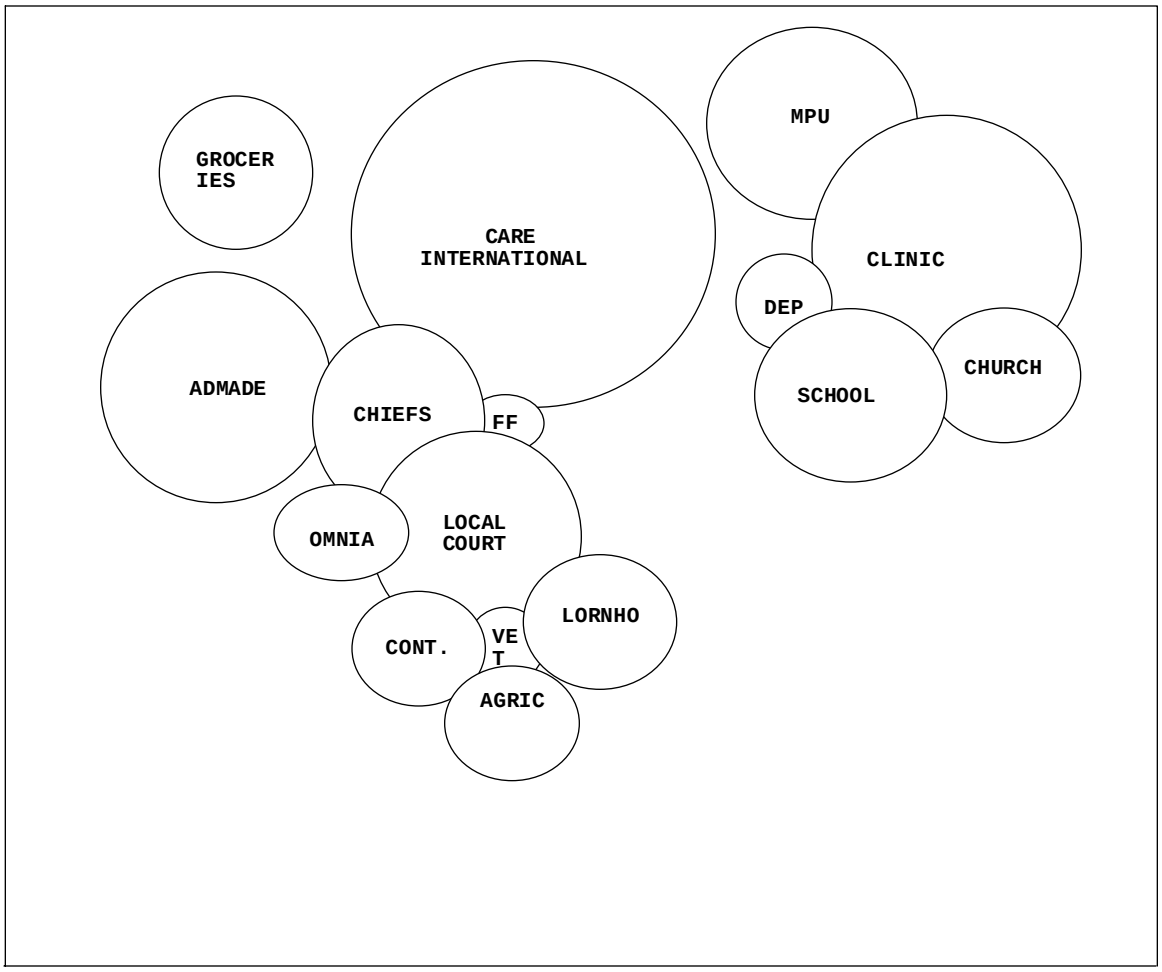
⑥ **Gender Role in Daily Activities**



Annex IIC:

⑦ **Venn Diagram on Organisation Servicing the Community**

Significance and networking between organisations servicing Nyawa.



The family forms the nucleus of the network

MPU: Micro-Project Unit
DEP: Development Education Programme
FF: Farmer's Friend
VET: Veterinary Department
Agric: Agriculture Department

APPENDIX-7 REFERENCES

Title	Issued	Publisher
The Integration of Water, Sanitation and Hygiene Education (WASHE) in the Teaching of English, Social Studies, Environmental Science and Mathematics : Information and Suggested Activities : Grade 1-7	1997	Ministry of Education
Community Water Supply and Sanitation Draft Strategy Summary Report		Water Sector Reform Support Unit
Water Point Inventory : Mumbwa District 1st Edition	1995	CMMU
School Health and Nutrition and School Sanitation and Hygiene Education Workshop : Workshop Report for the Southern Province	2000	Unicef
Human Resource Management and Development : Policy and Strategy for the Water and Sanitation Sector (Final Draft)	2000	Water Sector Reform Support Unit
Quarterly Digest of Statistics, First and Second Quarterly 1999	2000	Central Statistics Office
Quarterly Employment & Earnings Survey Report	2000	Central Statistics Office
Selected Socio-Economic Indicators 1999	2000	Central Statistics Office
Selected Socio-Economic Indicators 1998	1999	Central Statistics Office
Selected Socio-Economic Indicators 1997	1998	Central Statistics Office
Selected Socio-Economic Indicators 1996	1997	Central Statistics Office
Map of District Administrations 1:250,000	1970	Government of Zambia
Geological Map 1:1,000,000	1981	Government of Zambia