No.

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR WATER SUPPLY IN SOUTHERN NATIONS, NATIONALITIES AND PEOPLE'S REGIONAL STATE
IN
THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

MARCH 2005

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
GRANT AID MANAGEMENT DEPARTMENT

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PREFACE

In response to a request from the Government of the Federal Democratic Republic of Ethiopia, the Government of Japan decided to conduct a basic design study on the Project for Water Supply in Southern Nations, Nationalities and Peoples' Regional State in the Federal Domestic of Ethiopia and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Ethiopia a study team from October 6 to December 15, 2004.

The team held discussions with the officials concerned of the Government of Ethiopia, 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 Ethiopia in order to discuss a draft basic design, and as this result, the present report was finalized.

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 Federal Democratic Republic of Ethiopia for their close cooperation extended to the teams.

March, 2005

Seiji Kojima

Vice-President
Japan International Cooperation Agency

March, 2005

Letter of Transmittal

We are pleased to submit to you the basic design study report on the project for Water Supply in Southern Nations, Nationalities and People's Regional State in the Federal Democratic Republic of Ethiopia.

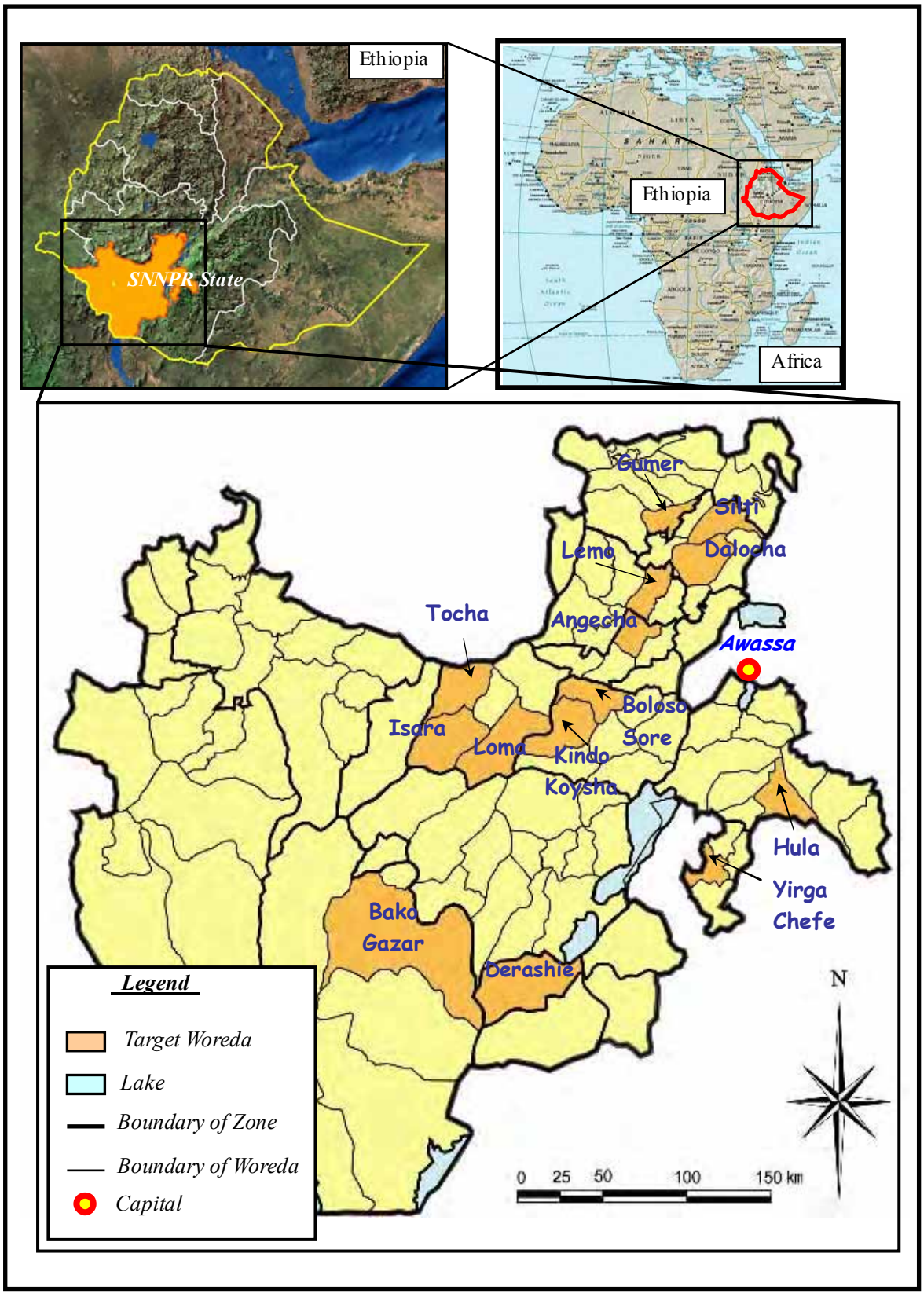
This study was conducted by Nippon Koei Co., Ltd., under a contract to JICA, during the period from October, 2004 to March, 2005. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Ethiopia and formulated the most 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.

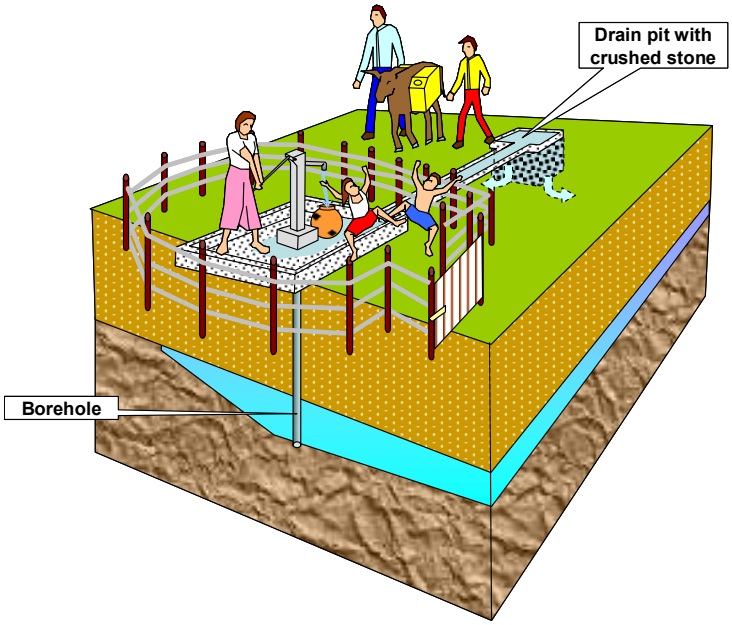
Very truly yours,

Masato Fujinami

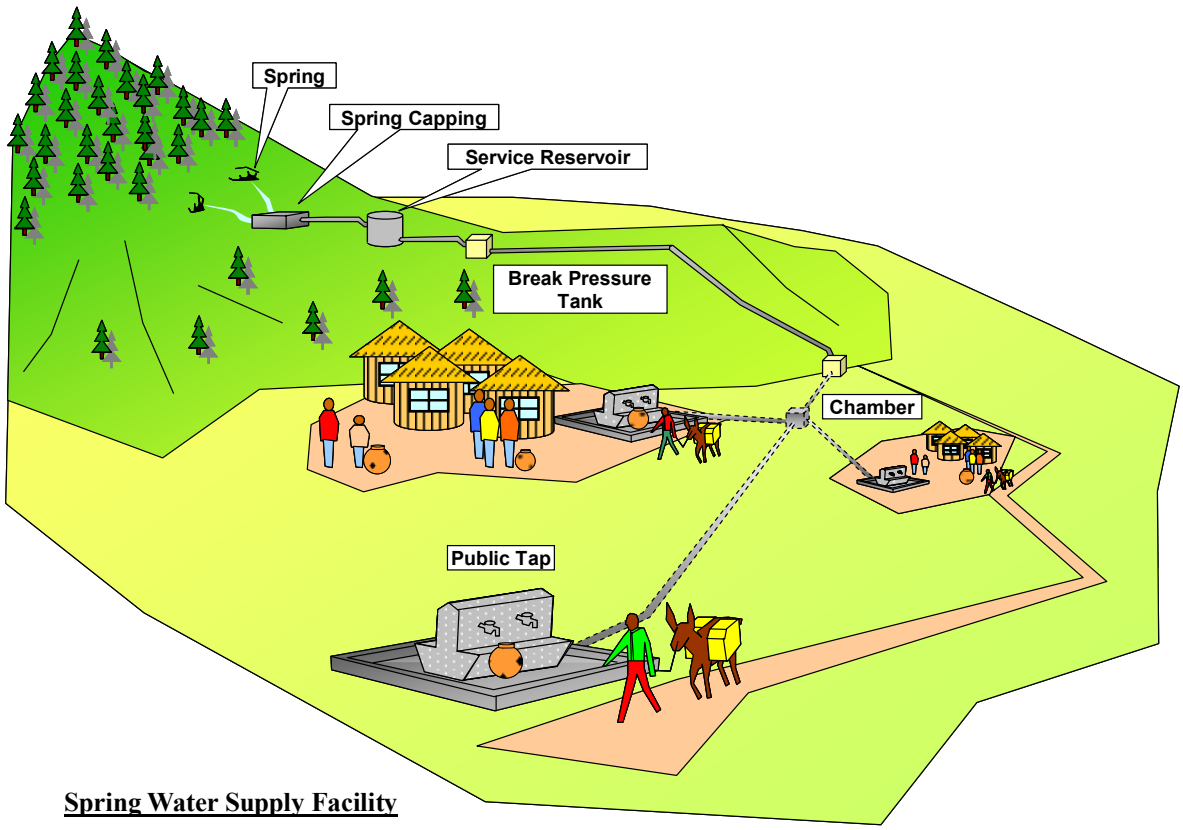
Chief Consultant
Basic design study team on the project
for Water Supply in SNNPR State
Nippon Koei Co., Ltd.



Location Map



Water Supply Facility with Hand Pump



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ABBREVIATIONS

AfDB	Africa Development Bank
BD	Basic Design
BPT	Break Pressure Tank
CORPs	Community Resource Persons
CPP	Community Participation Promoters
DTH	Down the Hole
EC	Electric Conductivity
ESRDF	Ethiopia Social Rehabilitation & Development Fund
E/N	Exchange of Note
EU	European Union
FAO	Food and Agricultural Organization
FINNIDA	Finland International Development Agency
GDP	Gross Domestic Product
GI	Galvanized Iron
GNI	Gross National Income
GRDP	Gross Regional Domestic Product
IBRD	International Bank for Reconstruction and Development
IMF	International Monetary Fund
JICA	Japan International Cooperation Agency
MDGs	Millennium Development Goals
MoFED	Ministry of Finance and Economic Development
MOU	Memorandum of Understanding
MoWR	Ministry of Water Resources
NGO	Non Governmental Organization
O&M	Operation and Maintenance
ODA	Official Development Assistance
OJT	On the Job Training
PDM	Project Design Matrix
PHAST	Participatory-Health and Sanitation Transformation
PRSP	Poverty Reduction Strategy Paper
RWSS	Rural Water Supply and Sanitation
SDPRP	Sustainable Development and Poverty Reduction Program
SNNPRS	Southern Nations, Nationalities and People's Regional State
SWL	Static Water Level
SWRDB	Southern Water Resource Development Bureau
SWWCE	Southern Water Works Construction Enterprise
ToT	Training of Trainers

UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
uPVC	Unplasticised Polyvinyl Chloride
VES	Vertical Electrical Sounding
VLOM	Village Level Operation and Maintenance
WATSAN	Water Works Drilling Enterprise
WB	World Bank
WHO	World Health Organization
WRDB	Water Resource Development Bureau
WSDP	Water Sector Development Program
WSSDP	Water Supply and Sanitation Development Program
WUA	Water User Assosiation
WWCE	Water Works Construction Enterprise
WWD	Woreda Water Desk
WWDE	Water Works Drilling Enterprise

Units

Length

mm	=	millimeter
cm	=	centimeter
m	=	meter
km	=	kilometer
ft	=	feet

Area

cm^2	=	square centimeter
m^2	=	square meter
km^2	=	square kilometer

Volume

cm^3	=	cubic centimeter
m^3	=	cubic meter
l or lit	=	liter

Weight

mg	=	milligram
g	=	gram
kg	=	kilogram

Time as denominator

/s or /sec	=	per second
/min	=	per minute
/hr.	=	per hour

Derived measures

mg/l	=	milligram per liter

Pressure

Kgf/cm^2	=	kilogram-force per squarer centimeter

Others

%	=	percent
Ph	=	potential of hydrogen
°C	=	degrees Celsius
ppm	=	parts per million
micro S/cm	=	micro siemens per centimeter

Currency

JPY	Japanese Yen
US$	US Dollar
Birr	Ethiopian Birr

Exchange Rate as of the end of November 2004

1 US$ = Birr 8.64 = JPY 109.92

Summary

SUMMARY

【Background of the Request】

The Federal Democratic Republic of Ethiopia is an inland country situated in the center of 'the Horn of Africa' in Eastern Africa. The total area of the country is 1,097,000 km^2; population: 64.30 million; GNI: US$ 6,700 million for the country and US$ 100 per capita. The economy of the country had been impoverished through the recent civil war and droughts prevailing for 17 years. After the recovery of the economy since 1995, the economy was again adversely affected by refugees from drought-affected areas and the areas of border conflict with neighboring Eritrea. To tackle such a severe economic downturn, the Government of Ethiopia formulated 'The Second - Five Year National Development Program (2000-2005)' in the year of 2000 and a 'Poverty Reduction Strategy Paper (PRSP)' in 2002.

The accessibility to safe water in Ethiopia is about 23 %. That is a very low level when compared with the 54 % average for the Sub-Sahara area (UNDP). The poor accessibility to safe water forces about 85% of the Ethiopian inhabitants in rural areas to spend long hours or laborious works to fetch water; which is one of the causes of poverty in the areas. Therefore, supplying safe water is a multi-sectional issue impacting such sectors as fundamental education, health and medical improvement and agricultural development.

Since 1994, the Government of Ethiopia has had a policy of decentralization, through which, policy responsibility for rural water supply and sanitation (RWSS) has been handed over to the regional level. Recently, the policy has further been expanded so that the responsibility for RWSS is transferred down to a *woreda* level, though arrangements of sufficient budget and capable staff have yet to be realized. It is therefore urgent that relevant staff be empowered, water supply facilities have to be constructed and proper O&M techniques have to be introduced. The National Development Program stated that the water sector is one of the essential issues, and the Water Sector Development Program (2001-2005) pointed out that water resource development is crucial for poverty reduction and sustainable development. The National Water Master Plan (2003) has set a target water coverage rate of 68% for the year of 2016 which is further endorsed by the Millennium Development Goals.

【Dispatching of Basic Design Study Team】

Under such circumstances, the government of Japan has supported the Government of Ethiopia in the water sector. For example, a technical assistance 'Groundwater development and Water Supply Training Project' has contributed to the country in empowering human resources for the water sector development.

In responding to the requests, the Japan International Cooperation Agency (JICA) dispatched a preliminary study mission in November 2002 to examine the necessity, validity and urgency of this work. As a result; (a) the two requested projects; 'Groundwater Development in Dowero District' and 'Water Supply Project' (procurement of equipment for groundwater development and construction of deep well water supply facilities) were to be combined into one project, (b) Urgency of construction of the facilities was confirmed due to the prolonged adverse influence of the drought (c) Validity of procurement of equipment was confirmed to improve the water coverage due to an insufficient amount of equipment presently available to SNNPRS, (d) Favorable impacts and improvements were

expected through the grant aid assistance due to the necessity of improvement of implementation capability. Furthermore, synergy effects were expected with the technical assistance of the 'Groundwater development and Water Supply Training Project' because the project selected SNNPRS as an important training field.

Based on the Preliminary Study, JICA dispatched the Basic Design Study Team to Ethiopia on October 5, 2004 to conduct a field survey through to December 8, 2005. After the study in Japan, the Team visited Ethiopia from March 6, 2005 to March 20, 2005 for the explanation of the outline of the Study. Through the discussions made with relevant officers of SNNPRS, the two parties reached an agreement on the basic design.

【Confirmation of Requested Contents and Subjects for the Basic Design Study】

[Requested Facility Construction] Construction of 247 water supply facilities comprised of three hand-dug wells, 214 shallow wells with hand pumps and 30 spring fed water supply facilities were originally requested. These requested sites were field surveyed from the viewpoints of: 1) duplication with other donors, 2) groundwater development potential, 3) accessibilities to the sites and 4) willingness to accept and pay. As a result, there were sites that were not suitable for this project mainly due to the reasons of 1), 2) and 3) above. However, as many sites as possible were kept for the basic design due to a strong request of SNNPRS because the present water coverage of the target area is very low. Also, the sites where groundwater development potential was judged low after the field investigation were taken up for the basic design study on the condition that alternative sites should be proposed by SNNPRS by the end of detailed study of this project. As a result, it was agreed that a total of 240 facilities comprising 214 shallow wells with hand pumps and 26 spring water fed facilities should be the subject for the Basic Design Study.

[Justification of Procurement of Equipment] The National Water Master Plan (2003) set up the target of water coverage as 68% at the year of 2016, and the MDGs indicates a similar target. In order to attain the target, SNNPRS will have to construct some 300 wells per year. UNICEF started its project in 2002 to construct water wells by providing two drilling rigs and materials as well as funds for operation. In 2004 the World Bank also started assistance for the water sector in providing water supply facilities. The assistance from UNICEF and WB, however, is not sufficient to attain the target. Equipment owned by SNNPRS is extremely out-of-date and the number of drilling machines in Ethiopia is limited for pursuit necessary drilling works, even if the expected funds, including WB, AfDB, EU and others are made available. On the other hand, there are 23 drilling experts who have been trained at the 'Kaliti Training Center' supported by Japanese Technical Assistance, but have not had adequate opportunity to practice their capacity due to lack of equipment. From the circumstance where funds from donors are expected and man-powers are available, procurement of drilling equipment is judged justifiable to support SNNPRS's efforts to attain the target.

【Basic Design Policy】

[Selection of Facility Types]

With consideration of easy operation and maintenance, gravity delivery systems for springwater fed facilities and shallow wells with hand pumps were selected. The maximum depth of shallow pumps was set at 80 m.

[Unit Water Supply Volume, Population to be served]

A volume of 15 L/day/capita was adopted for the unit water supply volume as it is commonly accepted in Ethiopia and the design year was set at the year of 2014 for determination of size of spring water fed facilities. As for shallow wells with hand pumps, the minimum yield was set 0.2 L/sec and the population to be served from a well is 350 people taking consideration of Ethiopian practices and instances of the World Bank.

[Design Standards/criteria]

As no design manual is available in Ethiopia, the existing facilities shall be referred to. Usability is also considered for the design.

[Policy for Water Quality]

Water quality for the project shall basically meet the requirement of 'The Ethiopian Standard for Water Quality for Drinking water (2002)'. 1) Water with chemicals of health significance in excess of the standards shall not be used, 2) water with substances and parameters that may give rise to complaints from consumers in excess of the standards can be used only if the users accept the water, 3) as for bacteriological quality for spring water, the water sources shall be covered properly and the periodical monitoring shall be conducted as stated in the standards, together with periodical disinfection proposed by the Study.

[Criteria for successful wells]

A successful well shall have a minimum yield of 0.2 L/sec in accordance to the common practice of Ethiopia and shall have the water quality mentioned above. A well that does not meet the criteria shall be regarded as an unsuccessful well.

[Facility Construction]

Based on the results of the field survey and the design policies mentioned above, it is agreed that the following facilities shall be constructed.

Facility Construction

Zone		Woreda		Shallow wells with Hand Pumps	Spring Utilization	
					Spring-On-Spot	GPS
1	Dawero	1	Tocha	20	5	3
		2	Loma	26	1	
		3	Esara	20	4	6
2	Sidama	4	Hula	13		
3	Gedeo	5	Yerega Chaffe	19		
4	Hadia	6	Lemo	14		
5	Wolaita	7	Boloso Sore	31		
		8	Kindo Koysha	3		
6	K Tembara	9	Anegacha	5		
7	Dereshe	10	Special Woreda		1	6
8	Silti	11	Silti	20		
		12	Dalocha	20		
9	Gurage	13	Gumar	15		
10	South Omo	14	Baco Gazer	8		
Sub total					11	15
Total 10 Zones, 14Woredas, 103Kebels				214	26	

[Policy for Selection of Equipment]

Justification for procurement of equipment was examined based on necessity and urgency. It was agreed that the following equipment shall be procured under the Project.

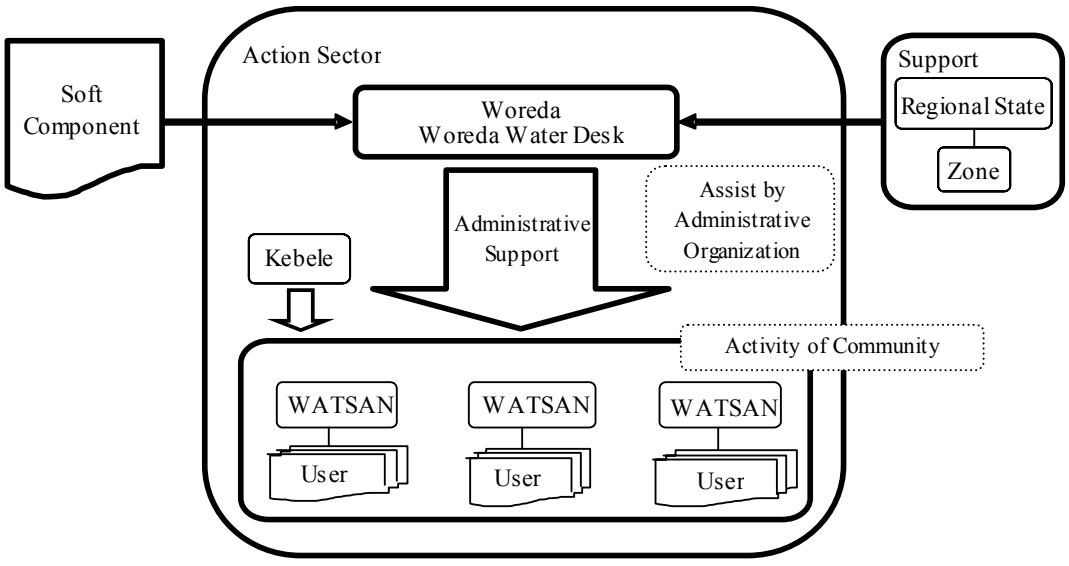
Procurement of Equipment

Items		Nos.	To be procured from	
			A third Country	Japan
Truck-mounted Rotary drilling Rigs		2	o	○
Air rift equipment for development		2	○	○
Supporting heavy Vehicles for construction	10 ton trucks	2	○	○
	5 ton Crane Trucks	2	○	○
	12 ton Dump Trucks	2	○	○
Electric logging	Electric Logging Equipment	1	○	○
Water Quality	Handy incubators	2	○	○
	Agent for analysis	1set	○	○
Motor bike		28	-	○

【Soft-Component】

The Ethiopian Government urges decentralization by transferring authority from Regional and Zonal levels to *Woreda* level. Also, in the water-related sector *woreda* water desks are being strengthened. However, the *woreda* water desks lack sufficient capacity. The plan for operation and maintenance and the soft-component program in the Project aims at strengthening community-based operation and maintenance through building the capacity of the local administration in supporting target communities.

Relevant issues and expected outputs of the soft component are shown below.



WATSAN : Water and Sanitation Committees

Conceptual Frame Work for O&M

Relevant Issues and Expected Output of the Soft Component

Current Issues	Expected Outputs
1. No sense of ownership and unwillingness to participate in operation and maintenance based on the user-pay-principles	Refined sense of ownership and willingness to participate
2. Lack of knowledge and skills for community-based operation and maintenance	Enhanced capacity of the target communities in operation and maintenance of the improved water supply facilities
3. Inadequate support to the communities by local administrations for establishment of community-based operation and maintenance	Enhanced capacity and skills of local administrations to support communities for establishment of community-based operation and maintenance
4. Lack of awareness of health and sanitation, and poor understanding of the correlation between human health and water use	Increased awareness of personal health and sanitation, and understanding of the correlation between personal health and the use of safe water

The soft component plan aims at strengthening community-based operation and maintenance, and the capacity building of local administrations in supporting target communities.

【Spare Parts Distribution for hand pumps】

In the project funded by the World Bank, the Bank intends to foster local providers or local tradesmen who undertake simple construction works, repairing works together with spare parts procurement. It will however, take some time for the system to be established in rural villages. On the other hand, WRDB undertakes procurement and distribution of spare parts for the facilities to be constructed by the project.

For this project, it is proposed that a system similar to the UNICEF project shall be adopted where WRDB shall be responsible for procurement and distribution of spare parts for the facilities to be constructed by the Project, provided that users shall incur the cost for spare parts. This was agreed to by both parties.

【Project Cost and Time Schedule】

The project will be implemented in two (2) phases where each phase will need 18 months for the detail design works, tendering and contractual procedures and the construction works, after an exchange of note (E/N) is formalized. As the detail design works, the tendering and contractual procedures for the second phase may proceed during the construction works of the first phase, the total time required may be shorter than twice the time required for one phase. It is estimated that approximately JY 1,064 million may be required. Of that, JY 1,061 million will be provided by the Government of Japan and JY 2.5 million by SNNPRS, Ethiopia. The costs to be incurred by SNNPRS shall include costs for land acquisition, bush clearing and land preparation, preparing and maintaining access roads and construction of fences around the facilities.

【Project Effects and Justifications】

Implementation of the project will have favorable effects on the present water supply conditions as shown in the table below. Upon completion of the facility construction at the end of 2007, the total population served will be increased by 94,000. The coverage rates to be increased by the project will be 3.3 points at the end of 2007.

Water Supply Conditions before and after the project (for the 14 *woredas*)

	Present (2000)	Completion of Construction (2007)		
		W/O - P	W - P	increment
Population (x 1,000)	2,327	2,780		
Population served (x 1,000)	569	569	661	92
Coverage (%)	24.5%	20.5%	23.8%	3.3%
W/O-P: Without Project、W-P: With Project				

【Recommendations】

1) Replenishment of personnel to the *woreda* water desks

A sufficient number of personnel to act in important roles for rural water supply is urgently required for the *woreda* water desks to support the trend toward decentralization. The head of a *woreda* water desk, community participatory promoters and mechanical experts shall be assigned to each *woreda* water desk before the planned soft-component program starts.

2) Preparations and maintenance of access roads to the sites

Many of the sites do not have satisfactory access. In particular, the final accesses from village roads to construction sites have sometimes yet to be prepared. Village roads are also to be maintained properly for construction equipment to access the construction points. Such preparations and maintenance of access roads shall be assured before the construction starts for smooth implementation of the field works.

3) Participatory construction works for fences around the facilities

Together with formulation of WATSAN committees for water use, it is necessary for WRDB to obtain agreement for the participatory fence construction works from targeted communities by the end of the detail design to be carried out.

4) Securing of Counter Funds

It is necessary for WRDB to make proper arrangement for securing the required counter funds to carry out the works to be undertaken by the Ethiopian party.

【Conclusions】

The Project will construct 240 water supply facilities in a period of two years to urgently relieve the drought-affected areas and procure two drilling rigs and relevant equipment to support the country's self-efforts to attain the target set by National Water Master Plan and MDGs.

For the Project to be implemented, it is necessary to not only practice adequate time-schedule control and quality control for completion on time and with the required quality, but also to undertake proper procurement control for timely procurement of materials for construction; together with a sizable sum of capital funds. It is therefore significantly meaningful to input Japan's highly developed techniques for time and quality control of urgent and bulky construction work. It is also in accordance with the basic concept that Japan's Grant Aid Scheme shall support self-help efforts of a recipient country; that is, the project will procure drilling rigs to support SNNPRS to continue to construct water wells through self effort. Moreover, as a Japan's Grant Aid Scheme project, the Project will harmonize with a world movement to attain the MDGs to rescue the poor countries in need.

Basic Design Study Report
on
The Project for Water Supply in Southern Nations, Nationalities and People's Regional State
in
The Federal Democratic Republic of Ethiopia

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Background of the Project

CHAPTER 1
BACKGROUND OF THE PROJECT

1.1 Background of the Request

The Federal Democratic Republic of Ethiopia is an inland country situated in the center of 'the Horn of Africa' in Eastern Africa, the total area of the country: 1,097,000 km2, population: 64.30 million and GNI: US$6,700 million for the country and US$ 100 per capita. The economy of the country had been impoverished through the recent civil war and prevailing droughts for 17. After the recovery of the economy since 1995, the economy was again adversely affected by refugees from drought-affected areas and the areas of border conflict with neighboring Eritrea. To tackle such a severe economic downturn, the Government of Ethiopia formulated 'The Second - Five Year National Development Program (2000-2005)' in the year of 2000 and a 'Poverty Reduction Strategy Paper (PRSP)' in 2002.

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Since 1994, the Government of Ethiopia has had a policy of decentralization, through which, policy responsibility for rural water supply and sanitation (RWSS) has been handed over to a regional level. Recently, the policy has further been expanded so that the responsibility for RWSS is transferred down to a *woreda* level, though arrangements of sufficient budget and capable staff have yet to be realized. It is therefore urgent that relevant staff be empowered, water supply facilities have to be constructed and proper O&M techniques have to be introduced. The National Development Program stated that the water sector is one of the essential issues, and the Water Sector Development Program (2001-2005) pointed out that water resource development is crucial for poverty reduction and sustainable development. The National Water Master Plan (2003) has set up a target water coverage rate of 68% for the year of 2016 which is further endorsed by the Millennium Development Goals.

Under such circumstances, the government of Japan has supported the Government of Ethiopia in the water sector. For example, a technical assistance 'Groundwater development and Water Supply Training Project' has contributed to the country in empowering human resources for the water sector development.

The Government of Southern Nations, Nationalities and Peoples Region State (SNNPRS) of Ethiopia requested grant aid from the Government of Japan though the Ministry of Finance and Economy Development, Ethiopia in the years of 2000 and 2001.

In responding to the requests, the Japan International Cooperation Agency (JICA) dispatched a preliminary study mission in November 2002 to examine the necessity, validity and urgency. As a result; (a) the requested two projects; 'Groundwater

Development in Dowero District' and 'Water Supply Project' (procurement of equipment for groundwater development and construction of deep well water supply facilities) were to be unified into one project, (b) Urgency of construction of the facilities was confirmed due to the prolonged adverse influence of the drought (c) Validity of procurement of equipment was confirmed to improve the water coverage due to an insufficient amount of equipment presently available to SNNPRS, (d) Favorable impacts and improvements were expected through the grant aid assistance due to the necessity of improvement of implementation capability. Furthermore, synergy effects were expected with the technical assistance of the 'Groundwater development and Water Supply Training Project' because the project selected SNNPS as an important training field.

1.2 Outline of the Request

Accordoing to the results of the Preliminary Study, the request is outlined as follows:

Table-1.1 Requested Facilities for Construction

Zone		Woreda		Shallow wells with Hand Pumps	Hand dug wells	Spring Utilzation		
						Spring On Spot	GPS**	Type unspecified
1	Dawero	1	Tocha	17	3	5	3	0
		2	Loma	26	-	1	-	-
		3	Esara	20	-	6	4	-
2	Sidama	4	Hula	13	-	-	-	-
3	Gedeo	5	Yerega Chaffe	19	-	-	-	-
4	Hadia	6	Lemo	14*	-	-	-	-
5	Wolaita	7	Boloso Sore	31	-	-	-	-
		8	Kindo Koysha	3	-	-	-	-
6	K Tembara	9	Anegacha	5	-	-	-	-
7	Dereshe	10	Special Woreda	-	-	-	-	11
8	Silti	11	Silti	20	-	-	-	-
		12	Dalocha	20	-	-	-	-
9	Gurage	13	Gumar	15	-	-	-	-
10	South Omo	14	Baco Gazer	8	-	-	-	-
Sub total				211	3	12	7	11
Total 10 Zones, 14 Woredas,				214		30		

* Three (3) shallow well sites from the original requested 17 sites were canceled by SNNPRS at the Inception Meeting.
**GPS: Gravity Piped System

Table-1.2 Requested Equipment for Procurement

Item	Requested Quantity
1) Truck mounted rotary drilling rig	2
2) Air lift equipment for shallow well development	2
3) Support truck	
Cargo truck	3
Cargo truck with crane	6
Dump truck	2
4) Groundwater survey equipment	
Borehole logging equipment	3
Geophysical prospecting equipment	7
VLF survey equipment	1
GPS equipment	14
Water level measure	6
5) Water quality test kit	
Mobile laboratory	1
Portable incubator	4
Test reagent	1 set
6) Computer	
Desk top computer	4
Lap top computer	3
Plotter	1
Digitizer	2
7) Radio communication equipment	1 set
8) Motor bike	40
9) Training equipment for Awassa Training center	1 set
10) Support vehicle	11

Based on the results of the preliminary study, the Basic Design Study, conducted since October 2004, confirmed that (a) construction of the requested water supply facilities are urgently required due to insufficient safe water in the requested communities, and that (b) procurement of drilling equipment is also justifiable due to insufficient availability of drilling equipment in Ethiopia to attain the target that the country has set up in the National Water Master Plan (2003).

From the above, construction of the facilities for the urgent assistance to the drought areas and procurement of equipment for the improvement of water coverage are considered justifiable as a Japan's Gant Aid.

Under the project, the following facilities will be constructed and the equipment will be procured together with the soft component assistance to *woreda* personnel as a form of TOT (Training of Trainers) to realize sustainable project implementation.

Table-1.3 Facility Construction

Zone		Woreda		Shallow wells with Hand Pumps	Spring Utilzation	
					Spring-On-Spot	GPS
1	Dawero	1	Tocha	20	5	3
		2	Loma	26	1	
		3	Esara	20	4	6
2	Sidama	4	Hula	13		
3	Gedeo	5	Yerega Chaffe	19		
4	Hadia	6	Lemo	14		
5	Wolaita	7	Boloso Sore	31		
		8	Kindo Koysha	3		
6	K Tembara	9	Anegacha	5		
7	Dereshe	10	Special Woreda		1	6
8	Silti	11	Silti	20		
		12	Dalocha	20		
9	Gurage	13	Gumar	15		
10	South Omo	14	Baco Gazer	8		
Sub total					11	15
Total 10 Zones, 14Woredas, 103Kebels				214	26	

Table-1.4 Procurement of Equipment

Items		Nos.	To be procured from	
			The third Country	Japan
Truck-mounted Rotary drilling Rigs		2	○	○
Air rift equipment for development		2	○	○
Supporting heavy Vehicles for construction	15 ton trucks	2	○	○
	Trucks with 3 ton crane	2	○	○
	14 ton Dump Trucks	2	○	○
Electric logging	Electric Logging Equipment	1	○	○
Water Quality	Handy incubators	2	○	○
	Agent for analysis	1set	○	○
Motor bike		28	-	○

Chapter 2
Contents of the Project

CHAPTER 2
CONTENTS OF THE PROJECT

2.1 Basic Concept of the Project

Based on the results of the preliminary study conducted in November 2002, the Basic Design Study, conducted from October 2004 to March 2005, confirmed that (a) construction of the requested water supply facilities are urgently required due to insufficient safe water in the requested communities in drought affected areas, and that (b) procurement of drilling equipment is also justifiable due to insufficient availability of drilling equipment in Ethiopia to attain the target that the country has set up in the National Water Master Plan (2003).

Under the project, the following facilities will be constructed and the equipment will be procured together with the soft component assistance to *woreda* personnel as a form of TOT (Training of Trainers) to realize sustainable project implementation.

Table-2.1 Facility Construction

Zone		Woreda		Shallow wells with Hand Pumps	Spring Utilization	
					Spring-On-Spot	GPS
1	Dawero	1	Tocha	20	5	3
		2	Loma	26	1	
		3	Esara	20	4	6
2	Sidama	4	Hula	13		
3	Gedeo	5	Yerega Chaffe	19		
4	Hadia	6	Lemo	14		
5	Wolaita	7	Boloso Sore	31		
		8	Kindo Koysha	3		
6	K Tembara	9	Anegacha	5		
7	Dereshe	10	Special Woreda		1	6
8	Silti	11	Silti	20		
		12	Dalocha	20		
9	Gurage	13	Gumar	15		
10	South Omo	14	Baco Gazer	8		
Sub total					11	15
Total 10 Zones, 14Woredas, 103Kebels				214	26	

Table-2.2 Procurement of Equipment

Items		Nos.	To be procured from	
			The third Country	Japan
Truck-mounted Rotary drilling Rigs		2	○	○
Air rift equipment for development		2	○	○
Supporting heavy Vehicles for construction	10 ton trucks	2	○	○
	5 ton Crane Trucks	2	○	○
	12 ton Dump Trucks	2	○	○
Electric logging	Electric Logging Equipment	1	○	○
Water Quality	Handy incubators	2	○	○
	Agent for analysis	1set	○	○
Motor bike		28	-	○

The Project Design Matrix is shown in Table-2.3.

Table-2.3 Project Design Matrix (PDM)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal Improve sanitation conditions inSNNPR State	a) Decrease water-bone disease in the target communities b) Provide water supply facilities to be used throughout the year	a) Results of monitoring survey b) Data of Ministry of Health c) Statistical Data	Basic policy and organization framework will not be changed
Project Purpose Increase served population with safe and stable drinking water supply	a) Served population increase of about 94,000 b) Collection of water tariff and O&M cost will be commenced	a) Monitoring on O&M after implementation of the project b) Data of Woreda Water Desk c) Operation records of WUA d) Financial records of WUA	a) O&M system is developed in WUA b) Sensitization is continued by WRDB
Outputs a) Provide water supply facilities b) Organize Water Users Associations for sustainable water supply	a) New water supply facilities are provided b) Member of WUA has learnt before commencement of operation of the facilities	a) As-built Drawings b) Basic data about Wells c) Report on monitoring of O&M	a) Supporting system for communities in O&M is secured b) WUA is functioning
Activities Japanese Side Construction of Facilities Shallow Wells with Hand Pumps, Spring Water Supply Facilities Procurement of Equipment Rotary Rigs, Support Vehicles, Electric Sounding Survey Equipment, Water Quality Test Kit, Motor Bikes Soft Component Soft Component for Water Sector Staff of SNNPRS Ethiopia Side Construction of Facilities Site Leveling and Fence Making by Users Supporting for Communities in O & M 1. Explanation of the Project and Sensitization for Communities 2. Organization of Water Users Associations (WUA) 3. Training for WUA 4. Monitoring of the Project	Input Japanese Side Staff Japanese: a) Construction Supervisors b) Soft Components Facilities Shallow Wells with Hand Pumps (214 sites), Spring Water Supply Facilities (26 sites) Equipment a) Rotary Rigs (2 nos.) b) Well Perfection Machinery (2 nos.) c) Support Vehicles (6 nos.) d) Pumping Test Machinery (1 nos.) e) Electric Logging Equipment (1 nos.) f) Incubator (1 nos.) g) Test Chemical (1 set) h) Motor Bikes (28 set) Project Cost	Ethiopian Side Staff of WWCE, WRDB, WWD a) Support Drilling Wells b) Support O & M c) Support Procurement of Spare Parts Construction of Facilities and Sensitization a) Set up Fence by WUA b) Support O & M by WRDB and WWD Project Cost	Trained staff of WRDB is not shifted to other organizations within a short time Pre-condition a) Willingness of communities for participation to the Project is not changed b) Safe and stable water source is secured

2.2 Basic Design of the Requested Japanese Assistance

2.2.1 Design Policy

(1) General Policy

1) Design Policy for VLOM and Cost Effectiveness

【Facility Construction】

Proper facility types for safe water supplies shall be selected from the view points of VLOM (Village-Level-Operation and Maintenance). Gravity distribution systems for spring water utilization and shallow wells with hand pumps will be constructed. Facilities with motorized equipment shall not be adopted.

【Procurement of Equipment】

Such equipment shall be procured that suits the purposes of construction of water supply facilities being conducted by the WRDB and is consistent with the existing equipment owned by the WRDB. Procurement from third countries shall be considered from both points of cost effectiveness and easy availability of necessary spare parts.

2) Selection of Villages for Facility Construction

The SNNPRS requested 250 facilities (3 hand-dug wells, 217 shallow wells with hand pumps and 30 spring-fed facilities) at 121 *kebeles* in 16 *woredas* of 10 zones. At the inception meeting held in October 2004 the SNNPRS proposed a cancellation of 3 shallow well constructions in 3 *kebeles* of 2 *woredas*. The field survey therefore was conducted for 247 facilities at 119 *kebeles* in 14 *woredas* of 10 zones.

The principles for site selection were as follows:

- Materials and equipment shall be accessible to the site
- Communities are in need of safe and stable water and willing to accept facilities
- Schemes are not duplicated by other aiding agencies

【Confirmation of accessibility】

The site survey conducted has identified requested sites that are not accessible by construction materials and equipment. The SNNPRS strongly wishes, in such case, to maintain the number of requested project sites and proposed alternative sites for such inaccessible sites. Alternative sites were proposed by the *woreda* water desk supported by zonal office followed by the final approval of WRDB. The field surveys were conducted by the Team for alternative sites too.

【Willing to accept facilities】

The socio-economic survey conducted under the Study confirmed that the all target communities are (1) seriously in need of safe and stable water, (2) willing to form an organization for water use, and (3) willing to pay for water, although knowledge and experience on O&M are not sufficient. Soft components will be conducted to strengthen

the capability of O&M if facilities.

【Duplication with other aid agencies】

Although they were selected for the request to Japan on the condition that they were not to be duplicated with other assistances, there were found several communities where other aid agencies had installed water supply facilities. For such cases, alternative sites were proposed by the Ethiopian side and surveyed by the Team as is the case of accessibility.

(2) Design Policy for Water Quality

Ethiopian Guidelines – Specifications for Drinking Water Quality is, in principle applied for the Basic Design, as follows:

- The guideline values for 'Chemicals of Health Significance' shall strictly be applied. Water with exceedingly high Fluoride for an example, shall not be utilized. De-fluoridation facilities will not be incorporated into the design because such a facility is still used only on a trial basis in Ethiopia.
- The guideline values for 'Substance and Parameters that may Give Rise to Complaints from Consumers' shall be flexibly applied based on the willingness of the users to accept.
- Bacteriological tests shall be conducted as the guideline demands and chlorination is to be conducted before capping the water source. In addition, periodical chlorination, twice a year before and after a rainy season, shall be conducted. Facilities for only chlorination shall not be built taking into consideration easy O&M.

(3) Design Policy for Water Supply Facilities Using Spring Water

1) Selection of Sites for the Facilities

- From the requested 30 project sites for spring water utilization, 26 sites were selected based on the following criteria. The other 4 sites were canceled due to no other alternative sites in the corresponding Kebeles for spring water utilization.
- Target regions must have a stable water source that can supply safe drinking water throughout the year.
- At least 10 households should benefit in one facility.
- The topography of target areas should be suitable for construction (there will be no large-scale earth-works required)

2) Water Supply System to be adopted

With consideration of cost effectiveness and minimum O&M, a gravity delivery system has been adopted; i.e. Gravity-Piped-System (GPS) and Spring-On-Spot. Design criteria for the facilities are based, in principle, on the past examples/instances prevailing in SNNPRS and Ethiopia. Materials and structures are selected so that those will not cause

any troubles on O&M such as water quality contamination, vandalism or improper usage of water.

(4) Design Policy for Shallow wells with Hand pumps

1) Alternative Sites based on the results of the BD Study

Groundwater development potential was judged very poor in 13 sites based on the conducted field hydro-geological surveys. However reduction of site numbers is not considered by this basic design study provided that alternative sites are to be proposed before the Detail Design for the project.

2) Criteria for Successful Well for Implementation

Definitions of successful wells are as follows:

- Pumping water Volume shall not be less than 0.2 L/sec
- Dynamic water level at a pumping rate of 0.2 L/sec shall not be deeper than 60 m.
- Water quality value of 'Chemicals of Health Significance' shall be within the Ethiopian Guideline Values; and water quality values of 'Substance and Parameters that may Give Rise to Complaints from Consumers' shall be at a range acceptable to the local users.

3) Handling principles of unsuccessful wells

Handling principles of unsuccessful wells are as follows:

- In principle, re-filling wells that produce water at not more than 0.2 L/sec.
- Handing over such wells providing caps/lids on them; the wells that produce water not more than 0.2 L/sec at a dynamic water level deeper than 60m so that the SNNPRS may install capable pumps by themselves in the future.
- Handing over such wells providing caps/lids on them; the wells that produce water, quality that does not meet the principle set up by the study. If water pollutants exceed guideline values of 'health significant', a notice of such shall clearly be marked on the caps/lids.

4) Alternative sites for unsuccessful wells

As the contract will be on a lamp-sum basis, the full number of success wells agreed with the SNNPRS will be constructed. Therefore, it is necessary to drill an alternative well when a well does not fulfill the requirement as a successful well. The selection of the alternative well point shall follow the following procedure.

- The village residents conferring with the *woreda* water desk shall select an alternative point in the same village. Up to two wells including the first unsuccessful well will be drilled in a community.
- The SNNPRS shall prepare an alternative site in the area that meets the following requirements if the above-mentioned 2 wells are not productive.

- Area where groundwater development potential is considered high.
- Area that is not far from the point selected by the B/D study.
- Area where a truck mounted drilling rig is accessible.
- Area where no other donors or NGOs have input their assistance

(5) Design Policy for Socio-Economic Conditions

A water supply facility, after completion, shall be operated and maintained by a water and sanitation committee (WATSAN) to be composed of users. However, the users there have insufficient experience in such management because the water supply rate is very low in the target areas. Therefore, technical assistance for appropriate maintenance and improvement of willingness to participate are important for the sustainable operation and maintenance of the facilities.

In this project, the communities shall be responsible for construction of fences around the facilities and preparation and maintenance of access roads from village roads to well points for the purposes of arousing a sense of participation among the communities.

(6) Design Policy for the Construction Period and Utilization of Equipment to be Procured for the Construction

Taking into consideration the scale of the project, the construction shall be conducted over 2 Japanese fiscal years.

(7) Design Policy for Procurement Conditions

The design shall be such that operation and maintenance should be easy and inexpensive. As much material and equipment shall be procured in Ethiopia as possible so that spare parts for them are made available in the country. To reduce such construction risks as damage or loss of materials, pipe-material convenient for construction and a minimum number of joint types shall be selected.

As for hand-pumps to be procured, Afri-dev type shall be selected for wells with a static water level not deeper than 40 m and Afri-deep type for wells with a static water level deeper than 40m.

(8) Design Policy for Improvement of Operation and Maintenance

With the progress of the decentralization of Ethiopia, personnel of the Regional and zonal government are being shifted to *woredas* administrative level. *Woredas* will be the main responsible administrative organizations for rural water supply. However, there are many issues to be tackled such as: (1) the number of personnel of *woredas* have not been strengthened yet (the numbers of *woreda* personnel are not large enough), (2) experience

of *woreda* personnel are not adequate as there are few water supply facilities in villages, (3) sense of facility ownership and O&M based on a beneficiary-payment principle has not sufficiently been developed. (4) Communities do not have sufficient knowledge or experience in organizing O&M, and necessary techniques for participatory O&M, (5) inadequate knowledge on the relationship between health and water.

Training of personnel of *woreda* water desks will be conducted by the soft-component assistance under the project for the human resources development as the foundation for establishing participatory O&M.

(9) Design Policy for Spare Parts Supply

Spare parts supply is a crucial matter for a rural water supply project.

At present, the Regional administration of SNNPRS collectively administers spare parts and delivers them to *woredas* if required under the Unicef Project. On the other hand, WB intends to foster independent/private local providers or local artisans who handle spare parts and/or repairing at village levels. However, such local providers or local artisans can be active only if there should be sufficient demand (i.e. many hand pumps distribution in village levels). The project shall adopt the UNICEF method, though it shall be shifted in the future to the WB system. The spare parts to be procured by the project will be handed over to the Regional office in Awasa and they will be delivered to *woreda* level on request.

When the spare parts procured by the project run out in future, the Regional administration shall procure such spare parts from private sectors and store them at the Regional office. The spare parts will be delivered to communities through *woreda* offices, fees for such spare parts shall be collected from the end users (villagers). The fees collected will be saved at the *woreda* level and regional level as revolving funds for future procurement of spare parts when such procurement becomes necessary.

2.2.2 Basic Plan (Construction Plan / Equipment Plan)

2.2.2.1 Basic Plan (Construction Plan)

(1) Water supply facilities which utilize springs as a water source

1) Target areas

Based on the results of the field survey conducted for 30 projects at 16 Kebeles (villages) in the target area, the facility types outlined in Table-2.4 were selected for the basic plan according to the criteria stated in a previous section of this report:

Table-2.4 Target Communities for Water Supply Facilities with Spring Sources

Zone	Woreda	Kebele	District	Facility type		Reason(s) for change or non applicability
				Requested	Recommende	
Dawero	Tocha	Kechi	Upsream	GPS	GPS	
			Downstream	GPS	GPS	
		Shushuri	Nala	On-Spot	On-Spot	
			Beleki	On-Spot	On-Spot	
		Medihanalem	Sitota-Tebenja Yaje	On-Spot	On-Spot	
			Leffe-Korente	On-Spot	On-Spot	
			Woyshikare-Ginjani	On-Spot	On-Spot	
		Waruma Kessa	Waruma Kessa	GPS	GPS	
	Loma	Aruga Bacho	Zigni	On-Spot	On-Spot	
	Esera	Arusi Bale	Escaro	On-Spot	On-Spot	
			Arusi Bale	GPS	GPS	
			Billille	On-Spot	GPS	People are living downstream from the spring source, and the spring water supply is adequate, so it was changed to GPS.
		Gudumu	Soso	GPS	GPS	
			Urgmo	GPS	GPS	
		Duzi	Mada	On-Spot	On-Spot	
			Elementary School	On-Spot	On-Spot	
		Ofa	Yoge	On-Spot	GPS	People are living downstream from the spring source, and the spring water supply is adequate, so it was changed to GPS.
			Gasyo	On-Spot	On-Spot	
		Sengeti	Sengeti	GPS	GPS	
Derashe	Special Woreda	Ades Altema	Mendeaero	Spring	GPS	Difficult to access during and up to 2-3 days after a rain. Although bad weather precluded survey working, it is still included in the basic design.
			Ketico	Spring	On-Spot	
		Walessa	Dawura	Spring	Not applicable	A dug well already exists. Also, topographical and structural impediments make it difficult to change to GPS or On-spot.
		L/Holte	Eledate	Spring	Not applicable	A dug well already exists. Also, topographical and structural impediments make it difficult to change to GPS or On-spot.
		L/Arguba	Kora	Spring	GPS	
			Hamro	Spring	GPS	
			Abello	Spring	GPS	
		Walayte	Elcola	Spring	GPS	
			Calchakaba	Spring	Not applicable	Topographic impediments to GPS construction, and few beneficiaries (about 50 people). There are also few people near the spring source, so On-spot is not necessary.
		Busabaso	Kogdeya	Spring	GPS	
			Kullo	Spring	Not applicable	There is already an On-spot facility thanks to NGO efforts.
合計			GPS	7	15	
			On-Spot	12	11	
			Spring	11	0	
			Not applicable to design	0	4	

2) Population to be served and water volume to be supplied

The target year for the plan is 2014 because Japan's grant aid projects usually have a short- to medium-term target period. The present population to be served in a Kebele was reported by the Kebele chairmen. The annual growth of 2.57% in rural population was applied to calculate the population to be served, and the amount of water to be supplied for the target year. If spring water does not meet the water demand in 2014, the planned population to be served will be determined by the maximum amount of spring water available. Tables 2.5 and 2.6 show the expected population receiving water and expected amount of water supply in FY 2014 for GPS and On-Spot facilities, respectively.

Table-2.5 Expected Serviced Population and Expected Amount of Water Supply (GPS)

Service area				Present population	Serviced population (2014)	Number of students	Number of patients	Average daily water supply (ℓ/s)	Spring water yield (ℓ/s)
Zone	Woreda	Kebele	District						
Dawero	Tocha	Kechi	Kechi	2,575	3,319	660	20	0.682	1.000
		Waruma Kessa	Waruma Kessa	875	1,128 (847)		20	0.222	0.167
	Esera	Arusi Bale	Arusi Bale	350	451 (259)			0.086	0.050
		Arusi Bale	Billille	675	870			0.166	0.200
		Gudumu	Soso	875	1,128 (835)			0.216	0.160
		Gudumu	Urgmo	475	612			0.117	0.120
		Ofa	Yoge	850	1,096			0.209	0.320
		Sengeti	Sengeti	875	1,128 (938)	600		0.254	0.217
Derashe	Special Woreda	Ades Altema	Mendeaero	600	773	500		0.179	0.487
		L/Arguba	Kora	350	451			0.086	0.143
		L/Arguba	Hamro	375	483			0.092	0.108
		L/Arguba	Abello	425	548			0.105	0.667
		Walayte	Elcola	150	193 (138)			0.037	0.028
		Busabaso	Kogdeya	575	741 (645)			0.142	0.122
Total				10,025	11,814	1,760	40		

Note: The numbers in parentheses in the “Serviced population” column contain numbers that were revised because the spring water volume could not support the original number of people. The total for “Serviced population” was calculated based on these revis

: Amount of water based on recommended size of facility.

Comdition:Annual growth rate : 2.57%

Table-2.6 Expected Serviced Population Water and Expected Amount of Water Supply (On-Spot)

Service area				Present population	Serviced population (2014)	Number of students	Average daily water supply (ℓ/s)	Spring water yield (ℓ/s)
Zone	Woreda	Kebele	District					
Dawero	Tocha	Shushuri	Nala※	125	161		0.028	0.040
			Beleki※	125	161		0.028	0.050
		Medihanalem	Sitota-Tebenja Yaje	150	193		0.034	0.058
			Leffe-Korente	300	387 (346)		0.067	0.060
			Woyshikare-Ginjani※	600	773		0.134	0.167
	Loma	Aruga Bacho	Zigni	650	838		0.145	0.600
	Esera	Arusi Bale	Escaro	75	97		0.017	0.210
		Duzi	Mada	1,000	1,289 (864)		0.224	0.150
		Duzi	Elementary School	75	97	1,000	0.075	0.077
		Ofa	Gasyo	200	258		0.045	0.100
Derashe	Special Woreda	Ades Altema	Ketico	125	161		0.028	0.050
Total				3,425	3,949	1,000		

Note: The numbers in parentheses in the “Serviced population” column contain numbers that were revised because the spring water volume could not support the original number of people. The total for “Serviced population” was calculated based on these revis

: Amount of water based on recommended size of facility.

※Facilities come with at least 10m of piping

Comdition:Annual growth rate： 2.57%

3) Design Criteria / Standard

Presently, SNNPRS does not have design standards for water supply facilities. The design standards to be applied for this project were therefore decided through discussion with the persons in charge with reference to the designs of the existing and prevailing facilities in SNNPRS.

Table-2.7 Design Conditions

Item		Planning and design conditions
Effective water	Household water	Water demand per capita per day 15 ℓ／c／d
	School water	Water demand per capita per day 5 ℓ／c／d
	Medical facility water	Water demand per capita per day 25 ℓ／c／d
Ineffective water		15% of above figures
Maximum daily supply		1.2 times average daily supply
Peak hourly supply		2.0 times average daily supply
Effective head at main distribution pipes		Plans call for effective water head of 5m at points where water pipes diverge
Capacity of service reservoir		15 hours worth of average daily supply
Times that public taps are open		3 hours each during morning, afternoon and night
Formula for hydraulic calculations		Hazen-Williams formula
Flow velocity coefficient used in hydraulic calculations		C value = 110

4) Plan for the Water Supply System

Three types of water supply facilities are proposed with consideration of demands, sources, and usage of water, the topographic conditions, and local lifestyles. To reduce O&M costs, the gravity flow method is proposed to distribute the water.

Facility 1: Gravity Piped System (GPS), in which water is delivered from the source spring through a service reservoir to several locations using gravity flow (See Figure-2.1).

Target districts: Shown in Table-2.5.

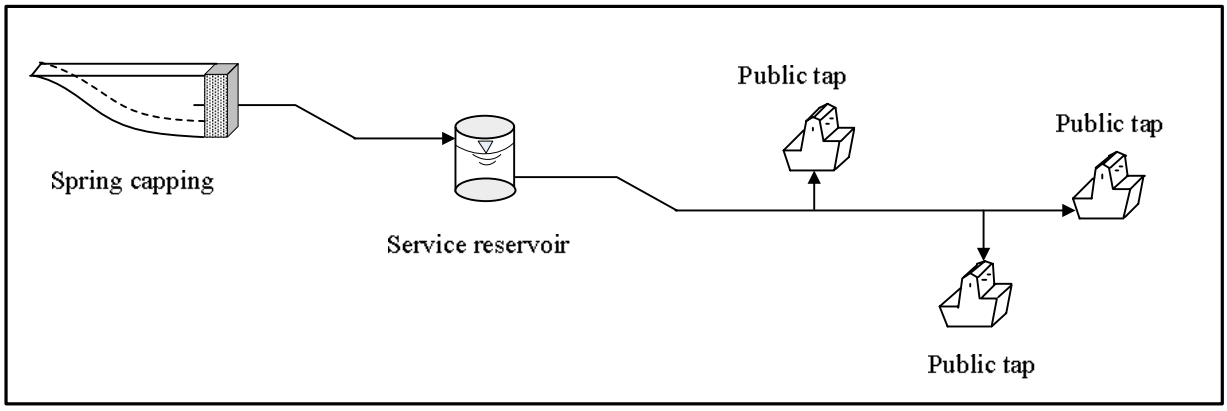


Figure-2.1 Diagram of a Water Supply Facility (Facility 1)

Facility 2: Proposed Spring On-Spot system which supplies water through the service reservoir to one point near the spring source (See Figure-2.2). Total length of the pipes does not exceed 10 meters.

Target districts: All districts, except for Nala and Beleki in Shushuri *Kebele* and Woyshikare-Ginjani in Medihanalem *Kebele* in Tocha *Woreda*, Dawero Zone as shown in Table (See Table-2.6).

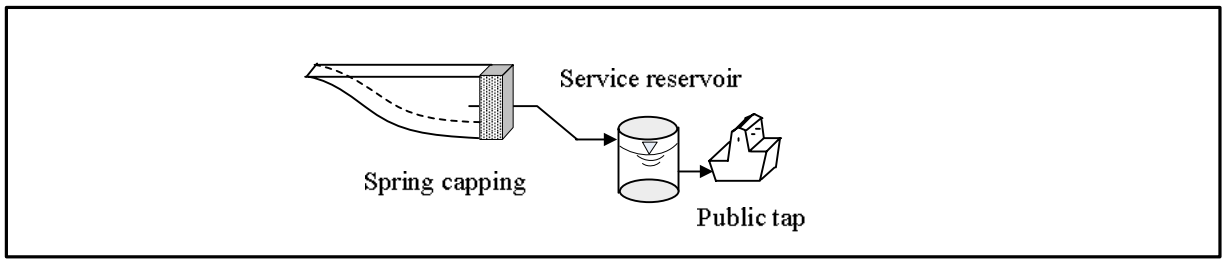


Figure-2.2 Diagram of a Water Supply Facility (Facility 2)

Facility 3: Proposed Spring On-Spot system which supplies water from the spring through the service reservoir to one point downstream (See Figure-2.3). Total length of the pipes is about 65-80 meters.

Target districts: Nala and Beleki in Shushuri *Kebele* and Woyshikare-Ginjani in Medihanalem *Kebele* in Tocha *Woreda*, Dawero Zone as shown in Table-2.6

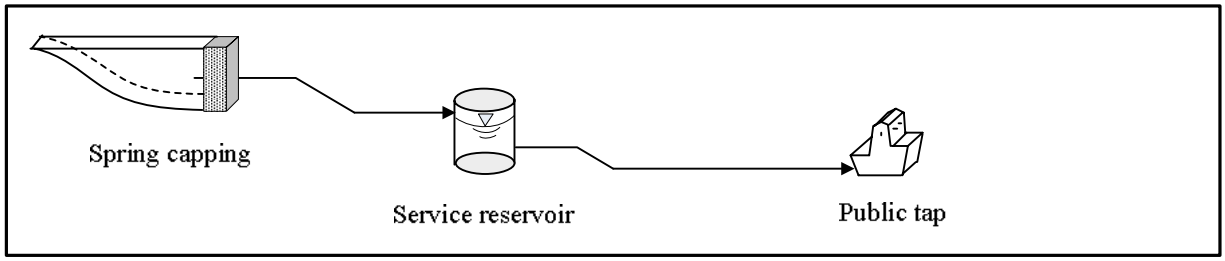


Figure-2.3 Diagram of a Water Supply Facility (Facility 3)

5) Overview of water supply facilities

a. Spring water protection

A spring water source shall be completely protected from external contaminants by stone masonry. The inside of the protective facility (Capping structure) is filled with small gravel and pebbles. An opening (manhole for inspection) should be made so that when these fill materials are clogged, they can be replaced or cleaned. In addition, an overflow pipe should be installed to accommodate increased water during the rainy season, and a wash-out pipe installed to remove sediments.

b. Service reservoirs

Service reservoirs that are most commonly used in Ethiopia are the following four structural types.

- 100 m^3, 200 m^3 □300 m^3 : Reinforced concrete structure
- 25 m^3, 50 m^3, 100 m^3 : Stone masonry and concrete structure (sandwich-type structure)

- Less than 25 m^3 : Stone masonry structure
- 1 m^3, 2 m^3, 4 m^3, 5 m^3, 10 m^3 : Roto tank

The ease of installation and durability of the facilities are considered based on the condition of the access roads to the target areas, and other factors.

The structure of the 25m3 service reservoirs is a sandwich type consisting of stone masonry and concrete; for lesser storage capacities, stone masonry alone would be adequate. The outlet pipes of the service reservoirs will be fitted with water flow gauges.

c. Break pressure tank (BPT)

If the static water pressure is over 0.5Mpa in water distribution and service pipes, it could damage pipe materials such as water taps which in turn would cause leakage. To prevent this from happening, water pressure is controlled using break pressure tanks. As with the smaller service reservoirs, these tanks would be made of stone masonry.

d. Public taps

Public taps are the 6 tap types from which water is to be filled into containers of different sizes and types (such as poly-tanks, water drums, etc.). Public taps are to be built on a concrete and with small drainage ditch around the slab. The inlet pipes of the public taps are equipped with a water meter.

e. Distribution and service pipes

The distribution and services pipes used in Ethiopia usually are u-PVC or GI pipes. The pipes proposed in the plan shall be GI pipes to prevent water from being diverted to irrigation or other purposes. The minimum excavation depth of the water pipes is 80cm.

f. Valves

For most small-scale water supply facilities, it is possible to remove the air from the water taps at public taps. There are often no air release valves. Although this is also generally the case in the present plan, air release valves are to be installed on the top places in steep topographies. Gate valves are installed in places downstream of junction points and at necessary points to separate service areas.

g. Wash-out pipes

Wash-out pipes are laid in areas that droop downward to facilitate the removal of solid matter and particles.

An overview of the main facilities for each type of project scenario is shown in Table-2.8 and Table-2.9.

Table-2.8 Overview of GPS Facilities

Service area				Design amount of water (ℓ/s)	Spring capping (set)	Pipe diameter (inches)	Pipe length (m)	Capacity of service reservoirs (m3)	Break pressure tanks (set)	Public taps (set)
Zone	Woreda	Kebele	District							
Dawero	Tocha	Kechi	Kechi	0.682	2	2"1/2-1"	4,975.77	15, 25	3	8
		Waruma Kessa	Waruma Kessa	0.167	1	1"1/2-1"	1,031.78	10	0	4
	Esera	Arusi Bale	Arusi Bale	0.050	1	3/4"-1/2"	595.42	5	1	3
		Arusi Bale	Billille	0.166	1	1"1/2-3/4"	974.65	10	0	4
		Gudumu	Soso	0.160	1	1"-3/4"	2,414.52	10	2	6
		Gudumu	Urgmo	0.117	1	1"-3/4"	1,494.20	10	1	4
		Ofa	Yoge	0.209	1	2"-3/4"	3,128.67	15	3	8
		Sengeti	Sengeti	0.217	1	1"1/2-3/4"	2,430.27	15	0	6
Derashe	Special Woreda	Ades Altema	Mendeaero	0.179	1	1"-3/4"	1,500.00	10	3	6
		L/Arguba	Kora	0.086	1	1"	909.73	5	0	3
		L/Arguba	Hamro	0.092	1	1"-3/4"	470.88	5	0	3
		L/Arguba	Abello	0.105	1	1"-3/4"	922.87	5	0	4
		Walayte	Elcola	0.028	1	3/4"-1/2"	917.73	5	1	2
		Busabaso	Kogdeya	0.122	1	1"-3/4"	1,324.11	10	1	4
Total				2.380	15		23,090.60		15	65

Table-2.9 Overview of On-Spot Facilities

Service area				Design amount of water (ℓ/s)	Spring capping (set)	Pipe diameter (inches)	Pipe length (m)	Capacity of service reservoirs (m3)	Public taps (set)
Zone	Woreda	Kebele	District						
Dawero	Tocha	Shushuri	Nala※	0.028	1	3/4"	65	5	1
			Beleki※	0.028	1	3/4"	80	5	1
		Medihanalem	Sitota-Tebenja Yaje	0.034	1	3/4"	10	5	1
			Leffe-Korente	0.060	1	1"	10	5	1
			Woyshikare-Ginjani※	0.134	1	1"	50	10	1
	Loma	Aruga Bacho	Zigni	0.145	1	1"1/2	10	10	1
	Esera	Arusi Bale	Escaro	0.017	1	3/4"	10	5	1
		Duzi	Mada	0.150	1	1"1/2	10	10	1
		Duzi	Elementary School	0.075	1	1"	10	5	1
		Ofa	Gasyo	0.045	1	1"	10	5	1
Derashe	Special	Ades Altema	Ketico	0.028	1	3/4"	10	5	1
Total				0.744	11		275		11

※Facilities come with at least 10m of piping

(2) Shallow Wells with Hand pumps

1) Evaluation of Groundwater Potential

Based on the results of the hydro geological surveys and two dimensional electrical resistively survey, groundwater development potential was classified as follows:

Table-2.10 Groundwater Development Potential

Potential	Description	To be drilled
Good	Clear Aquifers identified	Yes
Fair	Aquifers identified	Yes
Poor	Aquifers identified though unclear	Yes
Very Poor	No Aquifers identified	No

The evaluation results are as follows.

Table-2.11 Evaluation of Groundwater Potential

Woreda	Good, Fair, Poor	Very Poor	Woreda	Good, Fair, Poor	Very Poor
Tocha	20	0	Kindo Koysha	3	0
Esara	20	0	Aneacha	4	1
Loma	26	0	Dereshe	-	-
Hula	13	0	Silty	19	1
Yerega Chaffe	19	0	Dalocha	13	7
Lemo	11	3	Gumar	15	0
Boloso Sore	30	1	Baco Gazer	8	0
合計	139	4		62	9
Total				201	13

The sited where groundwater potential was judged very poor are as follows.

Table-2.12 Sites with Very Poor Groundwater Potential

#	Scheme #	Zone	Woreda	Kebele	Community
1	060-1	Hadiya	Lemo	Bkuna Chachey	Galora
2	061-1	Hadiya	Lemo	Hayse	Bandama
3	064-1	Hadiya	Lemo	Achamo	Danfa
4	070-3	Wolaia	Boloso Sore	Anchurcho Dege	Koisha Weybe
5	089	K. Tembaro	Anegacha	Uetuge	Uetuge
6	108-1	Silti	Silti	Koto Baloso	Baja
7	114-2	Silti	Dalocha	Bureka	Yiseche Angelu
8	115-2	Silti	Dalocha	Germama	Site 1
9	116-1	Silti	Dalocha	Koro	Chimt
10	119-1	Silti	Dalocha	Golana Shemeto	Golakure
11	120-2	Silti	Dalocha	Husend Shola	Site 2
12	121-2	Silti	Dalocha	Waneja Golachiba	Site 1
13	121-2	Silti	Dalocha	Waneja Golachiba	Site 2

2) Well Success Rate

Well success rates were set up by analyzing drilling records of the UNICEF project that drilled 142 wells in SNNPRS. The analysis was made on the following conditions.

1. Unicef constructed wells that are regarded as 'unsuccessful wells' for this Basic Design Study are as follows.
   - Dry wells or abandoned wells
   - Drilling depth deeper than 80 m
   - Wells with SWL deeper than 55 m. Dynamic water level will be deeper than 60 m which may exceed the capacity of Afri-deep type pump.
   - Wells with SWL shallower than 20 m. Such wells may well be dry in dry seasons.

2. No Unicef data available for *Woreda* Dalocha where massive ignimbrite develops, the hydro-geological aspects of which might resemble Bac Gazer, South Omo. The success rate of South Omo is applied to Dalocha.
3. No Unicef data available for Wolaita or Dowuro Zone. Success rate of Gedeo and Sidama zone are referred to as the topographical and geological conditions resemble each other.

The decided success rates for each *woreda* are as follows.

Table-2.13 Well Success Rate

Zone	Woreda	Successful Rate (%)	Wells to be handed over (nos.)	Wells needed to be drilled (nos.)	Overall success Rate
Dowuro	Tocha	90.0	20	23	
	Esara	90.0	20	23	
	Loma	90.0	26	29	
Sidama	Hula	75.9	19	21	
Gedeo	Yerega Chaffe	93.3	13	18	
Hadiya	Lemo	70.0	14	20	
Walaita	Boloso Sore	90.0	31	35	
	Kindo Koysha	90.0	3	4	
K. Tenbaro	Anegacha	91.7	5	6	
Dereche	Special Woreda	-	-	-	
Silti	Silty	90.0	20	23	
	Dalocha	56.5	20	36	
Gurage	Gumar	91.3	15	17	
South Omo	Baco Gazer	56.5	8	15	
Total			214	270	79.3(%)

For the success rate analysis, water quality factors are not considered because no 'Health Significant' items exceed the Ethiopian guideline values according to the water quality tests conducted under the Study.

3) Shallow Well Facilities

(a) Standard Well Structures

All the sites, except South Omo, are underlain by volcanic and pyroclastic rocks/sediments. Although South Omo is underlain by gneiss, weathering patterns will be similar to some of the volcanic rocks. From this consideration above, one typical well structure is proposed assuming typical geological conditions.

(b) Well Depth

Under the Japan's Grant Aid Scheme, hand pumps of VLOM (Village level Operation and

Maintenance) will be equipped to shallow wells to be drilled. The maximum pumping head is regarded as 60 m, the pump cylinder is installed at 65 m below the ground level. When the aquifer is expected to be below the cylinder level (65m), the well will be deepened down to 80 m for longer penetration of the well in the aquifer for better well performance. The maximum depth of a well shall be 80 m.

(c) Diameter, Material for Casing and Screen Pipe

Material for casing and screen shall be of uPVC that is commonly and widely used in Ethiopia. The diameter of the pipe shall be nominal 4 inch, which is sufficient for wells with hand pumps. Casings and screen pipes will be installed down to the bottom of the well. For screen pipes, slots shall be made in the blank uPVC pipe so that draw-down should be minimized.

(d) Drilling Diameter

Because the diameter of casing pipe to be installed in the wells is nominal 4 inch, drilling diameter shall be 8-1/2. Between the 4 inch uPVC casing and the drilled hole there is sufficient space for gravel packing.

(e) Electrical Logging

Wells are drilled either with DTH method or with rotary method. When rotary method should be used, drilling mud is necessary for drilling which hinders identification of the depth at which water is struck during drilling. Electrical logging shall be conducted in wells drilled with rotary method with drilling mud; to locate the water baring formation. The electrical logging shall be conducted before installation of the casing pipe.

(f) Gravel packing and re-filling with soil produced by drilling, cementing

The space between the well hole and the casing pipe shall be re-filled with material. Gravel shall be re-filled up to a level 10 m above the SWL. Above the gravel filling, in-situ soil produced by the drilling shall be re-filled to the space up to a level 0.5 below the ground surface. On top of the soil produced in-situ, cement-grouting shall be injected to seal the surrounding of the uPVC pipe so that contaminated surface water does not enter into the well. On the other hand, a bottom plug shall be fitted to the bottom of the casing before installation.

(g) Pumping Test

A pumping test shall be conducted after completion of drilling. Because the minimum yield is as small as 0.2 L/sec, a simplified pumping test is considered reasonable from a cost effective point of view.

Method	: Air lifting
Preliminary	: Maximum 6 hours, until clear water emerges
Drawdown test	: Maximum 8 hours
Recovery test	: Maximum 4 hours

(h) Water Quality Testing

Water from a well shall be sampled when the pumping test is conducted. The water sample shall be sent to an authorized laboratory for water quality testing. The testing items are as follows: 1) pH, 2) TDS, 3) Turbidity, 4) color, 5) Total Hardness, 6) Chloride, 7) Copper, 8) Iron, 9) Manganese, 10) Sodium, 11) Sulfate, 12) Zink, 13) lead. 14) Fluoride, 15) Nitrate, 16) Nitrite

4) Shallow Wells with Hand Pumps

(a) Unit Water Consumption Rate

Unit water consumption rate shall be the same as facilities using springs: 15L/capita/day.

(b) Operation time, Population to be served, Design Water Demand

Operation time shall be 8 hours per day taking into consideration O&M. With reference to the unit water consumption rate and the World Bank proposed population to be served by a well with a hand pump, population to be served by a well is regarded as 350 capita/day.

(c) Hand pump to be adopted

Under this Japan's Grant Aid Scheme, only VLOM shallow wells with hand pumps will be constructed. From this point, Afri-dev type (for a maximum pumping head of 40m), and Afri-deep type (for a maximum pumping head of 60m) will be adopted. Afri-dev type pumps shall be installed in wells where dynamic water level in dry seasons is shallower than 35 m and Afri-deep type pump to wells where dynamic water level in dry seasons is deeper than 35 m. Rate of adoption of either pump was proposed by analyzing UNICEF drilling records.

Conditions for analyzing adoption rate of pump type (Unicef data)

1. Data excluded from consideration

   - dry or abandoned wells
   - Drilling depth: shallower than 20m
   - Drilling depth: deeper that 80 m

2. Draw Down for consideration

   - Natural Draw Down in dry season: 10m
   - Draw Down by pumping: 5 m

As a result, for 60 % of wells to be drilled, Afri-dev type pumps shall be equipped and for the rest 50% Afri-deep type pump.

(d) Water supply facility on the ground

The water supply facility on the ground consists of a pump stage, apron, drainage trough and percolation pit. Such facility, which is widely constructed and accepted in Ethiopia, shall be designed. In addition to the arrangement above, a 60 x 60 cm stand will be equipped next to the pump stand for a container to be temporarily placed for easy loading onto a person's back. Troughs for livestock will not be designed.

Fencing facility around the pump shall be constructed by the users.

2.2.2.2 Basic Plan (Equipment Procurement Plan)

Equipment to be procured is tabulated below:

Table-2.14 Equipment Procurement Plan

Item	Requested Quantity	First phase procurement	Second phase procurement
1) Truck mounted rotary drilling rig	2	1	1
2) Air lift equipment for shallow well development	2	1	1
3) Support truck			
Cargo truck	3	1	1
Cargo truck with crane	6	1	1
Dump truck	2	1	1
4) Groundwater survey equipment			
Borehole logging equipment	3	1	0
Geophysical prospecting equipment	7	0	0
VLF survey equipment	1	0	0
GPS equipment	14	0	0
Water level measure	6	0	0
5) Water quality test kit			
Mobile laboratory	1	0	0
Portable incubator	4	2	0
Test reagent	1 set	1 set	0
6) Computer			
Desk top computer	4	0	0
Lap top computer	3	0	0
Plotter	1	0	0
Digitizer	2	0	0
7) Radio communication equipment	1 set	0	0
8) Motor bike	40	28	0
9) Training equipment for Awassa training center	1 set	0	0
10) Support vehicle	11	0	0

(1) Truck mounted drilling rig

The drilling rigs that are presently owned by SWWCE are as follows:

- Drilling capacity 300 m depth : 2 nos. (8-9 years since procurement□
- Drilling capacity 150 m depth : 1 nos. (more than 25years since procurement)
- Drilling capacity 80 m depth : 1 nos. (more than 30years since procurement□

Except the two rigs with the 300m depth capacity, all the above drilling rigs which hinders have become too old. Too much time is required for maintenance and repairing of the equipment implementation of the well construction projects. Moreover, the 300 m capacity rigs also have a problem on maintenance since the after-sales service of the rigs is poor. (The manufacturer of the rig had bankrupted.)

According to National Water Supply and Sanitation Master Plan Framework (The Master Plan) that is based on WSDP, the well development plan (target) in SNNPRS is as follows:

Table-2.15 Well Drilling Plan (Target)

Year	2006-2011	2011-2015	2006-2015
Well depth : less than 100m	924	1,003	1,927
Well depth : 100m – 300m	539	569	1,108
Total	1,463	1,572	3,035

In order for SWWCE to contribute to the above development plan, the number of drilling rigs shall be increased as tabulated below. That is, the drilling capacity shall be reinforced from 40 wells/year to 110 wells/year, contributing to the above development plan (300 wells/year).

Table-2.16 Present Capacity and Planned Capacity of Drilling Rig

	Present capacity		Planned capacity	
	nos.	Drilling capacity	nos.	Drilling capacity
Capacity : Depth 300m (existing)	2	10 wells /year/rig = 20 wells /year	2	10 wells /year/rig = 20 wells/year
Capacity : Depth 200m (planned procurement)			2	30 wells /year/rig = 60 wells/year
Capacity : Depth 150m (existing)	1	6 wells/year	0	(superannuated)
Capacity : Depth 100m (existing: UNICEF fund)			1	30 wells/year
Capacity : Depth 100m (existing)	2	7 wells /year/rig = 14 wells/year	0	(superannuated)

Requirement for rigs to be procured shall be as follows, considering the well designs, site conditions, and similarity with the existing rigs.

Type	:	Top head drive type
Drilling method	:	Both DTH & Mud rotary
Drilling capacity	:	Depth 200m
		Hole diameter 12-1/4"(mud rotary), 9-5/8"(DTH)
Mounting truck	:	Drive type shall be 6 x 4 to meet the road conditions of the sites

(2) Air lift equipment for shallow well development

SWWCE can use drill pipes and a high pressure air compressor used for DTH for development of deep wells with 6" diameter. However, for shallow wells with 4" diameter, the drill pipes can not be used and proper well development can not be executed with the high pressure air compressor used for DTH.

Therefore, two sets of the following equipment shall be procured. The specification is based on the past instances.

- Portable air compressor
  Free air delivery : approx. 8.5 m^3/min
  Max. Pressure : 10.5 kgf/cm^2
- Air pipe 1-1/2" one set
- Water pipe 3" etc. one set

(3) Support trucks

(3)-1 Support trucks for well construction

Two support trucks are required for each drilling rig, as shown below:

- Truck No.1 (fixed at site□:
  for loading of generator/welder and drill pipes, etc.
- Truck No.2 (working between the site and stock yard) :
  for transport of casing pipes, screens, gravel, water tanks, etc.

Therefore, one each of the two above trucks shall be procured for each drilling rig to be procured. Considering the road conditions, the trucks shall be of 6 x 4 drive and shall meet the following requirements.

a) Truck No.1 (fixed at site)

Loading capacity shall be 15 ton:

- Generator/Welder : approx. 2.5 ton
- Compressor for well development, etc. : approx. 2.5 ton
- Drill pipe, Tools, etc. : approx. 8 - 9 ton

  Total 13 - 14 ton

Length of the bed shall be more than 7 m（Length of drill pipes is more than 6 m）

b) Truck No.2 (working between the site and stock yard)

Loading capacity shall be 13 ton:

- Casing pipe : approx. 5.5 ton (for 200 m depth)
- Gravel : approx. 12 ton (for 200 m depth)
- Water tank : approx. 2 ton
- Bentonite : approx 2.5 ton (for 50 bags)

Length of the bed shall be more than 7 m（Length of casing pipes is more than 6 m）

Truck mounted crane with loading capacity of 3 ton for lifting casing pipes, water tanks (weight: approx. 1 ton), etc. shall be equipped.

(3)-2 Support Dump trucks for well construction

The SWWCE development plan includes construction of a water supply system utilizing spring water. Therefore, two dump trucks for transportation of construction materials such as concrete aggregate shall be procured.

Support trucks are required for each drilling rig, as shown below:

Drive type : 6 x 4 (Road conditions at site is taken into consideration)

Loading capacity : 14 ton

(The distance between the material procurement place and the construction site is long. Therefore, it is economical to transport the required quantity of material (about 10 m3) in one trip.)

(4) Groundwater survey equipment

The water resource development bureau and SWWCE have the following equipment:

Table-2.17 Present Equipment

Equipment	WRDB	Woreda office	SWWCE	Total
Borehole logging equipment	2	0	0	2
Geophysical prospecting equipment	4	2	0	6
VLF equipment	2	0	0	2
GPS	10	30	3	43
Water level measure	3	10	2	15

As shown in the above table, there is sufficient equipment. Therefore, it is judged to be appropriate that only one set of borehole logging equipment shall be procured. The length of the electrode cable shall be 300 m.

(5) Water quality test kit

The existing portable incubator for water quality tests in WRDB has become superannuated. It is necessary to procure new ones. The number of the incubators shall be two, considering the number of the staff in WRDB. Moreover, test reagents for water quality analysis shall be procured, since they are in shortage.

A mobile laboratory was requested, but this shall not be procured, since the function of the mobile laboratory could be taken over by the portable incubators.

(6) Computers

There are sufficient computers in WRDB and SWWCE. Therefore, procurement of computers shall not be included.

(7) Radio communication equipment

Radio communication equipment for communication between the head office and the site was requested. However, according to SWWCE, it is difficult to get permission for this from the Government of Ethiopia for security reasons. Therefore, it shall not be procured.

(8) Motor bikes

The staffs of 14 *Woredas* where construction works will be executed have no transportation equipment. Therefore, off-road type motor bikes of 110 cc or more displacement shall be procured. Although the requested number is 40, the present staff of *Woreda* office is limited in number and the future increase is not determined. Nevertheless, at least two staffs for each *Woreda*, a community participation promoter and a mechanic, have to go to the site frequently. Therefore, the procurement number shall be two for each *Woreda*, totaling 28.

(9) Equipment for the training center in Awassa (submersible pump, tools, etc.)

Equipment for the training center in Awassa was requested. However, the present activity in this center is mainly lecture and no buildings or facilities for practice are provided yet. Therefore, procurement of the equipment is judged to be too early.

(10) Support vehicle for well construction (Pick-up)

SWWCE owns 15 working and 9 broke down/out of use pick-ups. Considering the number of staffs to be employed for construction works (approx. 70 staffs), necessity for procurement of new pick-ups is low. The need for additional pick-ups could be met by the repairing the broken ones.

(11) Procurement of spare parts and consumables

Procurement of spare parts should be considered for the following equipment:

- Truck mounted rotary drilling rigs
- High pressure air compressor for DTH
- Truck for mounting of the above compressor
- Generator
- Air compressor for well development
- Supporting trucks (Cargo trucks, Cargo trucks with cranes, Dump trucks)

For appropriate operation and maintenance of the above equipment, spare parts for two years of operation shall be procured. However, spare parts for the supporting truck are available at the agent in Addis Ababa and shall be excluded from the procurement.

2.2.3 Basic Design Drawings

Overviews of the proposed water supply system (Gravity Piped System with spring) are shown in the following pages (Appendix 5.6).

In addition, the basic design drawings of the present plan are shown in the "Basic design drawing collection".

Basic drawings for the following equipment are attached.

- Truck mounted rotary drilling rig
- Air lift equipment for well development
- Cargo truck
- Cargo truck with crane
- Dump truck

2.2.4 Implementation Plan (Facility Construction)

2.2.4.1 Implementation Policy

Assuming that the Project is implemented under the Japanese Grant Aid Scheme, the following principles should be applied for implementation:

1) The executing agency of the Government of Ethiopia (herein after called GOE) is the Water Resource Development Bureau (WRDB) of Southern nations, nationalities and people's regional State (SNNPRS).

2) At the stage of signing the Exchange of Notes between the Government of Japan (herein after called GOJ) and GOE, WRDB should commence the preparation works and proceed with necessary actions for implementation of the Project.

3) After the Exchange of Notes for the implementation of the Project is signed between GOJ and GOE, a Japanese consulting firm will sign a contract with WRDB, and the consultant will prepare detailed design and tender documents, and then commence the tendering procedure.

4) The Japanese contractor will sign a contract with WRDB and execute construction works under supervision of the consultant.

5) The Japanese contractor will establish a site management office for construction works.

6) The Project should be implemented for 103 communities, comprising construction of 214 shallow well and water supply facilities (11 intakes at springs and 15 water transmission pipe lines).

7) After the construction works are completed, the responsibility for the constructed facilities shall be handed over to WRDB.

8) The construction material for the Project should be procured in Ethiopia. This includes hand pumps, galvanized steel pipes, uPVC pipes, steel plates, structural steel, reinforcement, cement, timber, fuel, oils, painting materials, and so on.

9) The contract for construction and procurement is a lump sum contract.

10) Considering the size of the project for 103 communities, the Project is divided in two phases.

2.2.4.2 Implementation Conditions

The contractor shall utilize a local contractor as a subcontractor at the implementation of the Project. The local contractors are registered at the national and state level. Therefore a subcontractor could be selected from the registered contractors based on the nature and size of the work.

Necessary procedures for tax exemptions are concerned with many organizations

including WRDB. Therefore, it is assumed that it takes time for the above procedures because of the complication of an application and approval system. The responsibility for the tax exemption procedure is taken by WRDB, although the consultant and contractor should understand the laws and regulations, prepare the required documents, and apply/proceed them.

The environmental impacts due to construction works are related to: 1) noise, 2), dust, 3) vibration from heavy construction equipment, and 4) traffic accidents in general. Special attention to the environmental impacts due to noise and vibration should be taken, especially for the habitants near the construction site. Mud water is used for the drilling of wells. Therefore, special attention shall be taken to the treatment of mud water after the drilling of wells.

There are many traffic accidents in Ethiopia. To avoid these traffic accidents, a strict management of traffic rules and driving speed, an application of a registration system of drivers, a restriction of private vehicle use, education of drivers, a creation of awareness by periodic meetings, and control of traffic should be applied.

2.2.4.3 Implementation Planning

(1) Construction material and local contractor/ construction equipment

1) Construction material

a) General

Most of the major construction material, such as galvanized pipe, uPVC pipe, steel plate, steel beams, reinforcement bar, cement, wood, fuel, oil and paint could be available in Ethiopia and it is assumed that the required volume for this project is not too large compared to the supply of the local market. Therefore bentonite will be procured in Ethiopia.

b) Hand-pumps

Afri-dev type and Afri-deep type hand-pumps are commonly used, not only in Ethiopia, but also in other African countries. All the material for the hand-pumps is imported from other countries but many marketing agencies are available in Ethiopia. Therefore Hand-pumps could be procured in Ethiopia through a marketing agency.

c) Reservoir tanks

Tanks are made of polyethylene, brick, and concrete in Ethiopia. The polyethylene-tank is fabricated in Ethiopia.

d) Galvanized pipe and uPVC pipe

Galvanized pipe, uPVC pipe and valves are available in Ethiopia through a marketing agency. Steel pipe and uPVC pipe are produced in Ethiopia but imported material also is to be used.

e) Steel plate, steel beams

GSP (Galvanized steel plate) and steel material are not only produced in Ethiopia but also imported from other countries. The imported material is available from a marketing agency.

f) Valves

Valves are imported from other countries. The imported material is available from a marketing agency.

g) Reinforcement bar/ Formwork

Reinforcement bar is produced in Ethiopia and can be procured easily in Ethiopia. Formwork also can be procured easily in Ethiopia.

h) Concrete blocks

The quality of manufacture of concrete blocks to be used for buildings and walls varies from a very small class to middle class. The contractor should pay attention to the quality of concrete block.

i) Sand and Gravel

Sand to be used for the bedding for pipes could be procured from a quarry in the southern states. Also good-quality sand to be used for mortar mixing is available. Most of the sand and gravel to be used for concrete and crashed stones could be obtained from a quarry in the southern states also.

j) Cement

Cement is available in Ethiopia.

k) Diesel oil

Major international oil companies such as Shell, Mobile and Total have advanced into the southern states. Therefore, diesel oil is available in Ethiopia.

Table-2.18 Availability of Main Construction Material

Item	Ethiopia	Japan	Third Country	Reason
Hand Pumps	○			Available from imported products
Casing, screens	○			Available from imported products
Tanks	○			Available from domestic products
Galvanized pipe	○			Available from domestic and imported products
uPVC pipe	○			Available from domestic products
Steel (plates, beams, angles etc)	○			Available from imported products
Reinforcement	○			Available from domestic products
Gravel, sand	○			Available from domestic products
Cement	○			Available from domestic products
Bentonite			○	Reliability of quality and supply
Concrete admixture material	○			Available from imported products
Formwork	○			Available from domestic products
Wood	○			Available from domestic products
Fuel	○			Available from imported products
Oil	○			Available from imported products
Paint	○			Available from imported products

2) Local contractors, construction equipment

a) Local contractors

The contractors are registered at grade 1 to 9, based on the amount of contracts at a federal level. 30 companies are registered at grade 1. It is assumed that the capacity and quality of these companies is very high for the companies registered as grade 1. And also the contractors are registered at a regional level.

The ministry of water resources is implementing the registration and classification of contractors. The results of registration and classification are not yet published. Even though it is assumed that about 10 contractors are capable for drilling of wells. The sub-contractor for construction of wells will be selected from the above registered companies or equivalent companies.

b) Construction Equipment

In general, major local well contractors possess the equipment for the construction of wells. And also, general construction equipment could be leased in Ethiopia.

(2) The drilling work for wells

The schedule for the drilling of wells is planned, considering the percentage of success for drilling of wells. 5 teams will be planned for the drilling of wells.

The required construction period for the successful wells by DTH, the un-successful wells by DTH, the successful wells by the mud water method, the un-successful wells by the mud water method is planned as 7 days, 4 days, 9 days, and 6 days respectively.

(3) Installation work for hand pumps

After the completion of drilling of the wells, the civil work (aprons and ditches) for the installation of hand-pumps will be commenced at the successful wells. 6 teams will be planned for both phase 1 and phase 2. The hand-pumps will be installed by man power at the wells at which the civil work is completed. The spare parts will be handed over to WRDB at the same time as the arrival of the hand pumps.

(4) Construction of the facilities at spring sources

The water supply facilities at the springs are comprised of the water transmission pipe lines and intakes. The construction of spring water supply facilities will be carried out in Dawuro zone and Derashie zone only.

The protection of the springs, pipe lines, reservoirs, Break Pressure Tanks (BPT), valve pits and public taps is included in the construction of the spring water supply system facilities.

The majority of the construction work will be carried out by man-power. The construction schedule will be determined from the construction of piping works (excavation, pipe installation, backfilling) and the construction of water supply facilities.

In phase 1, four teams are prepared for the piping work, six teams are prepared for the protection of the springs, reservoirs and public taps. In phase 2, four teams are prepared for the piping works and seven teams are prepared for the protection of the springs, reservoirs and public taps.

2.2.4.4 Scope of Works

(1) Scope of Works to be executed by the Japanese Side

1) Execution of detailed design
2) Preparation and evaluation of tender documents, and support for the contracting process on behalf of WRDB
3) Undertaking construction of shallow wells and water supply facilities based on the terms of reference stipulated in the Basic Design Study Report

(2) Scope of Works to be undertaken by the Ethiopian side

1) Provision of and arrangements for the land necessary for implementation of the Project (Shallow wells, protection of springs, pipe lines and etc.)
2) Cutting of bushes along the pipe lines and compensation for the cut bushes
3) Provision of and arrangement for the land necessary for access roads, temporary site management offices and store and storage yards
4) Budget arrangements and payment of import taxes, internal taxes, and other levies
5) Application for approval of commencement of the construction and its payment
6) Arrangement of necessary counterpart personnel
7) Arrangement of necessary operators for the equipment procured for the Project

2.2.4.5 Construction Supervision

(1) Detailed Design and Tendering

1) Detailed Design

Based on the results of the basic design study, detailed design and tender documents will be prepared:

- Detailed design for water supply facilities
- Preparation of design reports and drawings
- Calculation of work quantities and cost estimates
- Preparation of construction plans and tender documents

2) Tender assistance

Prior to the tender, a pre-qualification of applicants will be carried out. This announcement will appear in the name of WRDB in major Japanese construction-related newspapers. The pre-qualification documents will be prepared and distributed by the consultant. Tender documents will then be distributed to the qualified contractors. The proposals of the tenderers will be received by the consultant and opened by the consultant in the presence of the staff of WRDB. The proposals will be evaluated by the consultant and the staff of WRDB immediately after opening of the proposals. The contract documents will be drafted and finalized by negotiation with the selected tenderer. The consultant will assist WRDB in the following works:

- Tender announcement
- Preparation, distribution, and evaluation of pre-qualification documents
- Distribution and evaluation of tender documents and contract negotiation

(2) Construction Supervision

After the verification of the contract by GOJ, the consultant will publish notification of the commencement of the works. After this commencement, a resident engineer will reside at the site. The resident engineer will supervise construction works and report work progress to the Embassy of Japan, JICA Ethiopia office, and WRDB. The resident engineer will take a role in facilitating communication among the concerned agencies including the contractor.

The main consultant office will be located at Awasa city, which is the capital of SNNPRS. The construction supervision will be carried out based on the consultant's supervision plan prepared by the consultant at the assignment of the resident engineer. The resident engineer will prepare a manual for the construction supervision and give necessary instructions to the contractor.

The following are the major items of the supervision works:

1)	Approval of construction drawings	: Evaluation and approval of construction and shop drawings, permission for construction works, material, specification of equipment and machinery, and so on
2)	Supervision of construction works	: Instruction for the construction schedule, overseeing progress of works, shop inspection for materials, and other required works
3)	Approval for payment	: Issuance of certificate for payment and completion of works
4)	Inspection at the end of defect liability period	: Inspection of constructed facilities
5)	Submission of report	: Submission of monthly progress reports

2.2.4.6 Quality Control Plan

The quality control plan for the Project applies to the concrete work, piping work and manufacturing of equipment such as pipes, hand pumps, and so on. The quality control items are given as follows:

1) Concrete work: Slump tests, Compression tests
2) Piping work: Hydraulic pressure tests
3) Hand pump equipment: Shop inspection
4) Well, springs: Water quality inspection

2.2.4.7 Basic Plans for the Soft Component Scheme

The Ethiopian Government urges decentralization by transferring authority from Regional and Zonal levels to *Woreda* level. Also, in the water-related sector *woreda* water desks are

being strengthened. However, the capacity of *woreda* water desks is yet to be made sufficient. The plan for operation and maintenance and the soft-component program in the Project aims at strengthening community-based operation and maintenance through building the capacity of the local administration in supporting target communities.

(1) Issues Relevant to Planning the Soft Component Program

1) Local Administrations

A training package is provided, mainly for the personnel of *Woreda* Water Desk, to advance their capacity and skills in administrative support for the communities to establish community-based operation and maintenance. In this regard, if capacities of *woredas* are not yet sufficient to conduct administrative support to communities, Zonal offices shall participate in the capacity building activities.

2) Target Communities

Although the willingness of target communities for participation in operation and maintenance was confirmed by the socio-economic survey, it was observed that some communities lack the willingness to pay for water, the understanding of user-pay-principles or the willingness to participate in operation and maintenance. In addition, the majority of target communities has no water supply facilities, and therefore has little experience in operating and maintaining facilities in a systematic and organized manner. It is indispensable for the sustainability of the Project that administrative offices should support communities to nurse a sense of participation and to urge capacity building for operation and maintenance through implementation of a soft component program.

According to the survey, many community members responded that they would use existing water sources in rainy seasons due to lack of understanding of the relationship between sanitation and water quality, even if new water supply facilities would be constructed. It is necessary to increase their awareness of human health and sanitation, and their understanding of the correlation between human health and the use of safe water. Use of newly constructed facilities may decrease during rainy seasons, which may lead to income reduction of WATSAN for operation and maintenance of facilities. The soft component program will be needed to improve community awareness in health and sanitation based on use of safe water, through which activities the target communities are expected to change their attitude towards hygiene practices.

(2) Relevant Issues and Expected Output of the Soft Component

Relevant issues and expected output of the soft component are shown in Table-2.19.

Table-2.19 Relevant Issues and Expected Output of the Soft Component

Current Issues	Expected Outputs
1. Uncultivated sense of ownership and willingness to participate in operation and maintenance based on the user-pay-principles	Refined sense of ownership and willingness to participate
2. Lack of knowledge and skills for community-based operation and maintenance	Enhanced capacity of the target communities in operation and maintenance of the improved water supply facilities
3. Inadequate support to the communities by local administrations for establishment of community-based operation and maintenance	Enhanced capacity and skills of local administrations to support communities for establishment of community-based operation and maintenance
4. Lack of awareness of health and sanitation, and poor understanding of the correlation between human health and water use	Increased awareness of personal health and sanitation, and understanding of the correlation between personal health and the use of safe water

The soft component plan aims at strengthening community-based operation and maintenance, and the capacity building of local administrations in supporting target communities.

(3) Means of Verification to Assess the Achievement

The means of verification to assess the achievement as expected outputs are outlined below:

Output 1) Sense of ownership and participation is improved.

Participatory community assessment is undertaken in each target community prior to the construction of facilities under the Project by organizing beneficiary meetings (work shops). This will employ participatory planning methods such as PRA (Participatory Rapid Appraisal) to identify and analyze the problems of communities in future operation and maintenance. In addition, it is planned in the Project that the construction of fences surrounded water supply facilities shall be done by the locals. Attention shall also be drawn to the progress and achievement of construction by user communities to assess the issue.

Output 2) Capacity and skills of local administrations to support communities are enhanced and retained at the concerned organizations

In the initial stage of the soft component program, a field implementation manual for the *Woreda* Water Desk will be prepared. Training of Trainers (TOT) is provided, especially to Community Participatory Promoters (CPP) of the *Woreda* Water Desk. Personnel of the *Woreda* Water Desk, who are to be trained as trainers, will undertake activities to support community-based operation and maintenance systems at the field level under a Japanese consultant. On-the Job-Training (OJT) is also provided to the personnel of the *Woreda* Water Desk during the field activities. Acquired skills can be evaluated through both TOT and OJT. The capacity of the staffs will be built through the soft component.

Output 3) Capacity of the target communities is enhanced.

The *woreda* water desks shall, with the assistance of the consultant to be employed under the project, support communities to organize WATer and SANitation committees (WATSAN) these are community-based organizations taking the leading role and responsibility in operation and maintenance. The *woreda* water desk shall also support WATSAN to establish a written agreement for WATSAN. In the formation of WATSANs and provision of training to WATSANs, participation of women in numbers and the decision-making process shall be realized.

Capacity and skills that WATSANs shall acquire are categorized into: 1) leadership skills, 2) organization management skills, 3) financial management skills including tariff setting, collection, budgeting, accounting, 4) technical skills such as operation, maintenance, and trouble shooting of supply facilities, and 5) monitoring and evaluation skills. Those fields are monitored by the *Woreda* Water Desk by applying uniform monitoring sheets, though which the achievements can be assessed. In addition, checks of the accounts and operation records by WATSANs are indispensable for assessment.

Output 4) Awareness in human health and sanitation through safe water is increased.

The soft component program includes activities to improve community awareness in health and sanitation based on use of safe water, through which communities are expected to change their attitude towards improved hygiene practices. In the implementation of health and sanitation education, participatory health education methods and PHAST (Participatory Health and Sanitation Transformation) is introduced.

Community Resource Persons (CORPs) shall be trained under the program through training with PHAST concepts and skills. These CORPs are expected to provide health and sanitation education to their communities. Frequency and contents of the health and sanitation education programs to be provided by CORPs shall be confirmed for assessment purposes. Women are expected to be included in the selection of CORPs.

The achievement of the issues shall be evaluated through a post-baseline survey at completion of the Project. The evaluation will be made by comparing the results of before-after the project from the view points of 1) understanding the causes of water-borne diseased or water-related diseases, 2) improvement in personal hygiene practices such as hand-washing, 3) change in behavior in carrying and storing water, and 4) dis/satisfaction with the quality and quantity of water.

(4) Activities of the Soft Component Program

Activities for the soft component program are planed as below.

1) Activities to improve community ownership and participation:

Community beneficiary meetings

Community consultation (participatory community assessment), and consensus building on the community action plan

Activities to facilitate community participation

Supervision of community construction of fences surrounding water supply facilities

2) Activities to enhance capacity and skills of local administrations to support communities:

- Development of field implementation manual
- Conducting of TOT (Training of Trainers) for the *Woreda* Water Desk and Provision of action plans for the *Woreda* Water Desks
- Conducting OJT (On-the-Job-Training) through the implementation of field-level activities
- Preparation of maintaining/follow-up check list

3) Activities for capacity building of target communities:

- Review and revision of WATSAN agreement, regarding participatory operation and maintenance activities
- Implementation of activities to develop the capability of communities in operation and maintenance, and health and sanitation education.
- Conducting of follow-up training for WATSANs to strengthen their capacity in operation and maintenance
- Monitoring and follow-up

4) Activities to increase community awareness in health and sanitation through safe water usage:

- Fostering a person as the community human resource (CORP) for health and sanitation education. A woman is expected to be selected as the CORP.
- Conducting of training to CORP in PHAST (Participatory Health and Sanitation Transportation) methods
- Implementation of health and sanitation education by CORP.

5) Activities to measure the impact of the Project

- Monitoring and follow up by the *Woreda* Water Desk
- Post-baseline survey

Details of activities are described in the following tables, indicating the contents of activities and their output, target of activities, means and period of implementation, human resources for implementation, and output of submission.

Responsibilities and duties to undertake each activity either by the Japanese or Ethiopia authorities are determined and indicated in the tables, which means the realization of the output set in the program depends on the efforts undertaken by both parties.

Table-2.20 Contents of Soft Component Activities (1/3)

Activity	Output	Target	Means of Implementation	Period	Implementation【Responsibility】	Output of Submission
1. Pre-Planning Stage						
1.1 To hold an orientation for WRDB (WRDB: Water Resources Development Bureau)	Developing a common sense of purposes of this Project among personnel of WRDB	WRDB-SNNPRS	Orientation	1 week	Japanese Consultant Local Consultant (Organization) 【at Japanese expense】	
1.2 To Prepare Field Implementation Manual ・Organization Management Skill ・Financial Management ・Technical O&M ・Replenishing spare parts ・PHAST (Participatory Health and Sanitation Transformation) ・Participatory Monitoring and Evaluation	Field implementation manuals for Woredas' CPPs to use for their field activities (CPP: Community Participatory Promoter)	14 Woredas	Consultation and needs assessment with the implementing agency and Woredas. Submission to WRDB and Woredas	35 days	Japanese Consultant Local Consultant (Organization), Local Consultant (Financial expert) Local Consultant (Technical), Co-operated by: 'Kaliti Center' and MoWR (MoWR:Ministry of Water Resources) 【At Japanese expense】	Field implementation manual (English version)
1.3 To prepare field implementation manual (Amharic version)	The field implementation manual for Woredas CPPs to use for the field activities to support communities to organize WATSANs or operate and maintain facilities	14 Woredas	Translation	35 days	Japanese Consultant Local Consultant (Organization), Local Consultant (Financial expert) Local Consultant (Technical), Co-operated by: WRDB - SNNPRS 【At Japanese expense】	Field implementation manual (Amharic version)
1.4 To prepare materials for education and TOT (TOT: Training of Trainers)	Materials for TOT	Participants in TOT	Provision of visual training materials for TOT	1week	Japanese Consultant Local Consultant (Organization), Local Consultant (Financial expert) Local Consultant (Technical), Co-operated by: WRDB - SNNPRS 【At Japanese expense】	Material for Training
1.5 To formulate community facilitators (CPPs) in Woredas Water Desks	Confirmation of staffing of CPPs at woreda water desks. The CPPs shall support communities to formulate WATSANs and to O&M of facilities	14 Woredas	Requests for staffing of CPPs to words and following -up to confirm	0.5 months	WRDB SNNPRS 【At Ethiopian expense】	Staffing lists of woreda water desks
1.6 To Conduct TOT to CPPs of woreda water desks and to support CPPs to formulate action plans to be followed by CPPs	Capacity building of CPPs as facilitators or trainers to communities and preparation of action plans for CPPs	14 Woredas	Training workshop	0.5 months	Japanese Consultant Local Consultant (Organization) Co-operated by WRDB - SNNPRS 【At Japanese expenses】	Workshop report Woredas Water Desk action plan

Table-2.20 Contents of Soft Component Activities (2/3)

Activity	Output	Target	Means of Implementation	Period	Implementation【Responsibility】	Output of Submission
1.7 To monitor, evaluate and follow-up the activities during the 1st period of the implementation	Monitoring and evaluation of the soft component program at pre-planning stage	8 Woredas	Interview/hearing	3 days per woreda	Japanese Consultant Local Consultant (Organization), Local Consultant (Financial expert) Local Consultant (Technical), Cooperated by: WRDB - SNNPRS 【At Japanese expense】	Hearing and Monitoring report
1.8 To revise the field implementation manual	The field implementation manual is revised based on the results of the baseline survey shown in clause 1.7.	14 Woredas	Review	5 days	Japanese Consultant Local Consultant (Organization), Local Consultant (Financial expert) Local Consultant (Technical), Cooperated by: WRDB - SNNPRS 【At Japanese expense】	Revised field implementation report
2. Participatory Planning						
2.1 To conduct consultations with beneficiaries for promotion of beneficiary meetings	Community-based needs and problems are identified and analyzed in order to develop the participatory community action plan in a participatory manner.	2 villages × 4 Woredas	Consultation	3 days per facility	Local Consultant (Organization) 【At Japanese expense】	Consultation report
2.2 To hold community consultation meetings organized by CPPs	The community facilitators trained in the TOT organize a community consultation meeting to confirm the understanding of communities on the project purpose.	All target communities	Community Meetings	3 days per facility	WRDB, SNNPRS 【At Ethiopian expense】	
2.3 To Monitor and follow-up the communities' activities by the Community Facilitator (CPPs).	The CPPs support communities to organize communities' meetings.	All target communities	Support on Site	4 days per woreda	Local Consultant (Organization) 【At Japanese expense】	Monitoring report
3. Construction/Implementation						
3.1 To conduct consultations with communities on principles to be agreed and methods to be followed for formulating WATSANs (WATSAN: Water and Sanitation Committee)	Community-based needs and relevant issues are clarified to maximize the benefits from WATSANs.	2 villages × 4 Woredas	Consultation	3 days per facility	Local Consultant (Organization) 【At Japanese expense】	Consultation report

Table-2.20 Contents of Soft Component Activities (3/3)

Activity	Output	Target	Means of Implementation	Period	Implementation【Responsibility】	Output of Submission
3.2 To formulate WATSANs supported by CPPs	To confirm that CPPs organize communities' meetings and formulate WATSANs for O&M of facilities	All of target communities	Community Meetings	3 days per village	WRDB SNNPRS 【At Ethiopian expense】	Formulation of WATSANs, Agreement of WATSANS
3.3 To Monitor WATSANs by CPPS	CCPs support communities to formulate WATSANs smoothly	All of target communities	Site guidance	3 days per facility	Local Consultant (Organization) 【At Japanese expense】	Monitoring Report
4. Operation and Maintenance						
4.1 To Follow-up CPPs' activities	Woredas Water Desk activities are monitored and evaluated based on the field implementation manual.	14 Woredas	Review Meetings	3 days per facility	Local Consultant (Organization) 【At Japanese expense】	Minutes of review meetings
4.2 To Follow-up WATSANs' activities for O&M	Following –up as to weather WATSANs are properly operated in accordance with the agreements	2 villages/Woredas	Review Meetings	3 days per facility	Local Consultant (Organization) 【At Japanese expense】	Minutes of meetings
5. Monitoring and Follow-up						
5.1 To prepare check-lists of monitoring and following-up	A monitoring and follow-up check list is prepared and periodic monitoring system is promoted.	14 Woredas	Workshops	5 days	Japanese Consultant Local Consultant (Organization) 【At Japanese expense】	Check lists of Maintaining/following-up
5.2 To check the CPPs' activities for monitoring and following-up of community activities	CPPs' activities on monitoring and following-up of communities' activities will be followed up by the consultant.	14 Woredas	Site guidance	4 days per Woreda	Local Consultant (Organization) 【At Japanese expense】	Monitoring report

(5) Assignment of Personnel

Personnel to be assigned to implement the soft component program are the following:

1) Japanese consultant (Operation and Maintenance/Health and Sanitation Education)

One Japanese consultant is responsible for formulating and supervising of the soft component program, reporting to the implementing agency and relevant Japanese organizations, and coordinating parties concerned in the program, and coordinating the implementation program with the construction schedule. Also, technical advice and capacity building will be given to local staff from the implementing agency and local consultants.

2) Counterpart from the implementing agency

One staff from WRDB will participate as a counterpart to the Japanese consultant to cooperate in supervisory activities. In the case of program implementation, the counterpart will also coordinate administrative matters with the Ethiopia authorities when necessary.

3) Local consultants

Involvement of local consultants is essential for establishment of community-based operation and maintenance. It is also indispensable to utilize accumulated knowledge and experience acquired by the Japanese Technical Assistant Program, 'Groundwater Development and Water Supply Training Project' since 1998. Thus, in the implementation of the soft component program, local consultants are employed with sufficient knowledge and experience in capacity building of communities in similar programs.

The local consultants will implement activities allocated as Japanese undertakings described above, under the supervision of the Japanese consultant. Also, local consultants will collaborate with the Japanese consultant in preparation of a field implementation manual, conducting of TOT and OJT to the *Woreda* Water Desk and implementation of field level activities.

Local consultant staff shall be deployed as follows, considering the scale and schedule of activities involved in the program. Each staff member shall be experienced in a similar program and be fluent in the local language.

4) Local Consultant (Program Coordinator)

Under the supervision of the Japanese consultant, one program coordinator will take the leading role in implementation of field-level activities and manage the schedule, methodology and output in the implementation of the program, as well as reporting to the Japanese consultant. The program coordinator shall have experience as a team leader in similar programs.

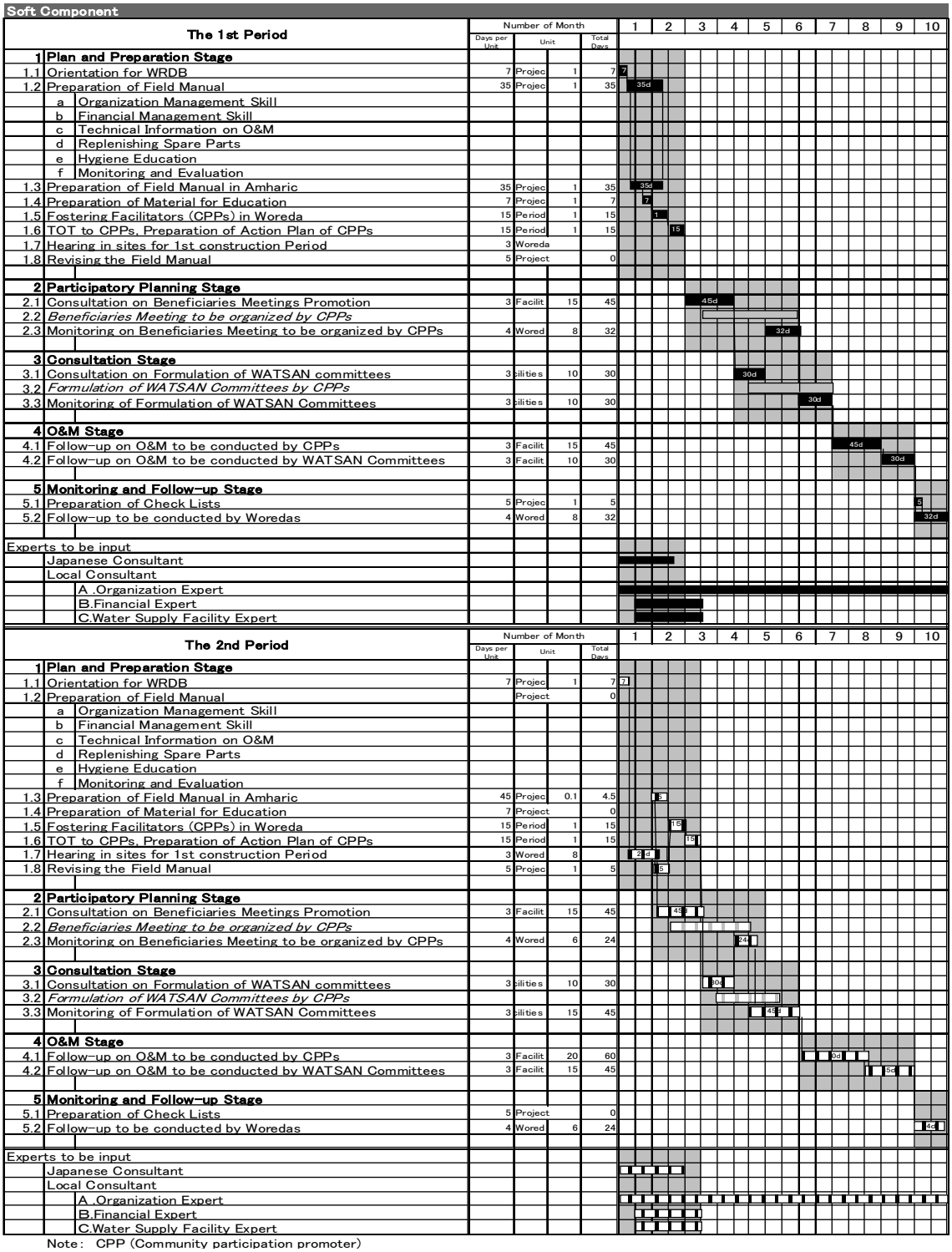
5) Local Consultant (Financial Expert and Water Supply Expert)

Under the supervision of the program coordinator, one financial expert and one water supply expert will conduct field-level activities to support the program coordinator. One shall have experience in financial operations and the other in rural water supply facilities

for community-based operation and maintenance of water supply facilities.

(6) Implementation Schedule

The implementation schedule is given in Figure-2.4.



Note: CPP (Community participation promoter)
TOT(Training of the trainer)

Figure-2.4 Implementation Schedule for Soft Component Program

(7) Output from Soft-Component Activities

Outputs from soft component are listed in Table-2.20.

Output will be a field implementation manual for the *Woreda* Water Desk, *Wareda* action plan, training/work shop reports, minutes, fences constructed by WATSANs, monitoring checklists, post-baseline report etc. In addition, the Japanese consultant will prepare a completion report and submit it to the Ethiopia and Japanese authorities concerned.

(8) Undertakings by Ethiopia Authorities

In the implementation of the soft component program, the following activities shall be undertaken by the Ethiopia side:

- Formation of *Woreda* Water Desk Staff
- Field-level follow-up activities (capacity building of the community in operation and maintenance, improvement of health and sanitation awareness and practice) {During construction stage}
- Supervision of community construction of fences
- Provision of follow-up training for WATSANs {During operation and maintenance stage}
- Monitoring activities {After completion of construction}

2.2.4.8 Implementation Schedule

The Project shall be divided into two phases in order to adjust the types of water supply facilities based on the actual borehole capacity. Assuming that the Exchange of Notes is agreed on in July of 2005, it is judged that the project schedule will be divided into two phases. The implementation schedule is shown in Figure-2.5.

（Unit：months）

	The first phase	The second phase
Detail Design, Tender Procedure	7.0	7.0
Construction of Facility, Inspection for handing over	10.0	10.0
Procurement of equipment	10.5	10.5
Soft-component	10.0	10.0

The two phase implementation schedule is summarized below:

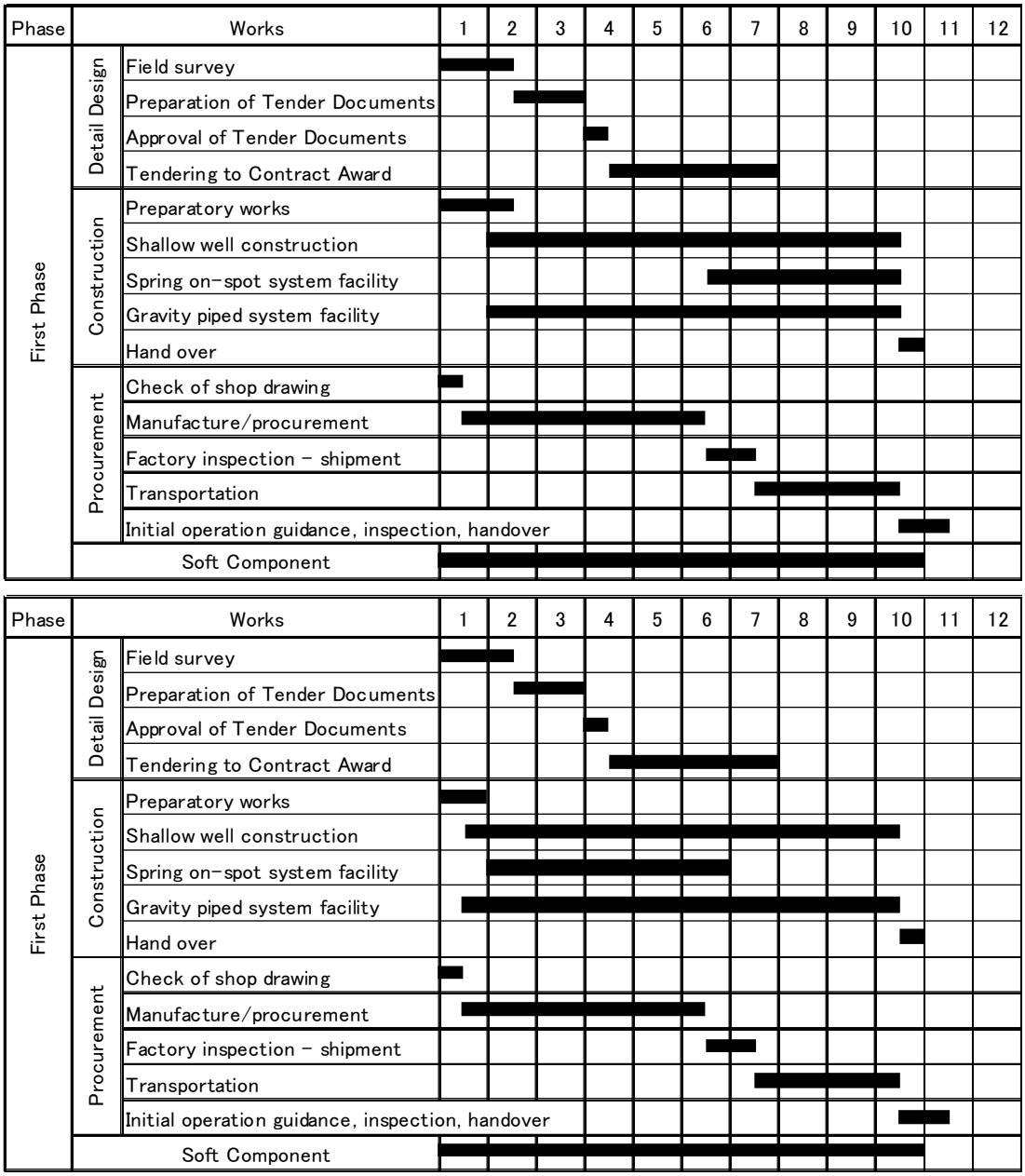


Figure-2.5 Implementation Schedule

2.2.5 Implementation Plan (Procurement Equipment)

2.2.5.1 Procurement Policy

Assuming that the Project is implemented under the Japanese Grant Aid Scheme, the following principles should be applied for implementation:

(1) The executing agency of the Ethiopian side is Southern Nations, Nationalities and peoples' Regional State Government Water Resource Development Bureau (WRDB).

(2) At the signing of Exchange of Notes between the Japanese and Ethiopian Governments, WRDB should proceed with necessary actions for implementation of the Project.

(3) After signing of Exchange of Notes between the Japanese and Ethiopian Governments, a Japanese consulting firm will sign a contract with WRDB, and the consultant will prepare detailed design and tender documents, and then commence the tendering procedure.

(4) A Japanese contractor will sign a contract with WRDB and execute procurement under supervision of the consultant.

(5) The Japanese consulting firm will be provided a room in the Water Works Construction Enterprise free of charge.

(6) The equipment to be procured are:

- Truck mounted top drive rotary drilling rigs
- Air lift equipment for shallow well development
- Support trucks
- Groundwater survey equipment
- Motor bikes

This equipment is not manufactured in Ethiopia and is to be procured from Japan or a third country. The procurement should be done by one contractor.

(7) At the completion of the procurement, responsibility for the procured equipment is handed over to WRDB.

2.2.5.2 Procurement Conditions

Procured equipment shall be transported to Djibouti port by sea and transported inland to Ethiopia. Customs clearance is not necessary at Djibouti and will be done in Ethiopia. Formalities for the customs clearance shall be undertaken by WRDB.

To secure proper operation of the drilling rigs, initial operation guidance to the staff of SWWCE for O&M of the procured drilling rigs will be provided. The guidance will be executed by a pair of technicians, a mechanic and a driller. The guidance period will be one month. In addition, spare parts for two years operation of the drilling rigs will be procured.

2.2.5.3 Scope of Works

Japanese Side:

1) Detailed design (Specification)
2) Preparation of tender documents, tender evaluation, assistance for contract awards
3) Procurement of the planned equipment
4) Performance tests at the factory and packing inspection
5) Pre-shipment inspection by a third party

6) Inspection, acceptance and handing-over of equipment to the Government of Ethiopia
7) Preparation of the procurement documents
8) Transportation of the procured equipment to the final destination
9) Tuning up, trial operation, and initial operation guidance

Ethiopian Side:

1) Provision of stock yard and storage house for the procured equipment, spare parts, materials etc.
2) Provision of an office for the procurement contractor and the consultant
3) Customs clearance of the equipment
4) Tax exemption for the procured equipment
5) Maintenance of the procured equipment
6) Budgeting for the well construction using the procured material
7) Assignment of the counterpart personnel

2.2.5.4 Procurement Supervision

The consultant will conclude a consulting service contract with the Ethiopian executing agency within a framework of the E/N and provide the following services.

1) Confirmation of the procurement items

The consultant will confirm the procurement items, procurement schedule and obligations of the Ethiopian government based on the basic design and results of consultation with the Ethiopian side.

2) Preparation of Tender documents

The consultant will prepare the tender documents based on the above confirmed procurement plan. The tender documents will be submitted to the executing agency for approval. The approved tender documents will be submitted to JICA.

3) Tender call, Tender opening, Tender evaluation, Conclusion of contract

The consultant will conduct the tender call, prepare answers to queries by the tenderers, attend the tender opening, and prepare the tender evaluation report. The consultant will assist the executing agency in contract negotiation and contract conclusion.

4) Check of the shop drawings

Following the contract conclusion, the consultant will verify the shop drawings submitted by the contractor to check whether those are in accordance with the specifications.

5) Factory inspection, Pre-shipment inspection, Pre-loading inspection by the third party

a) Factory inspection

The consultant will attend the factory inspection and confirm the performance of the equipment and verify the inspection report prepared by the manufacturer.

b) Pre-shipment inspection

The consultant will confirm the items and quantity of the equipment before those are packed for shipment.

c) Pre-loading inspection by a third party

The consultant will entrust the pre-loading inspection to a third party. The consultant will liaise between the contractor and the third party.

6) Acceptance and hand over

The resident engineer of the consultant will stay in Ethiopia from the arrival of the equipment to completion of hand-over in order to supervise the opening of the packing, initial operation guidance, acceptance, and handover.

2.2.5.5 Quality Control Plan

The consultant will confirm, in each procurement step, that the procurement is conducted in accordance with the contract. The inspection for each step is as follows.

Check of the shop drawings	: confirmation of specifications and quantity
Factory inspection	: confirmation of performance, verification of the test reports
Pre-shipment inspection	: confirmation of shipment items, specification, and quantity
Pre-loading inspection	: confirmation of loading items, specification, and quantity
Acceptance and hand over	: confirmation of procured items, specification, and quantity checking if any damages occur confirmation of proper execution of the initial operation guidance

2.2.5.6 Procurement Plan

(1) Procurement Plan

All the equipment to be procured is manufactured outside of Ethiopia. The procurement source countries are determined considering the following:

- Quality, performance, price, and delivery period

- Advantages in maintenance (availability of the spare parts, etc.)

The procurement source countries for respective equipment are as follows:

1) Well drilling rig

The source countries of the drilling rigs used in Ethiopia are Japan, UK, USA, Italy Sweden, and South Africa. Other than Japan, Sweden is judged to be a proper source country in terms of quality of the equipment and after-sales service. Therefore, the equipment to be procured will be made in Japan or in Sweden.

2) Air compressor and generator

The source countries of these items of equipment are Japan, Sweden (air compressor), Denmark (submersible pump). These items of equipment are appropriate in terms of quality and convenience in maintenance. Therefore, the equipment to be procured will be made in Japan or these third countries.

3) Support trucks

The Japanese and Italian manufactures have agents with workshops in Addis Ababa and are well organized for the after-sales service. Therefore, the equipment to be procured will be made in Japan or in Italy.

4) Ground water survey equipment

The source countries of this equipment are Japan, Sweden, USA, Germany, and UK. This equipment is appropriate in terms of quality and convenience in maintenance. Therefore, the equipment to be procured will be made in Japan or these third countries.

5) Motor bikes

The one made in Japan is the most popular. These are several agents of Japanese manufacturers and the after-sales service system is well organized. Therefore, the equipment to be procured will be made in Japan.

(2) Transportation plan

The equipment will be unloaded at Djibouti port and will be transported by land to the delivery place, Awassa. Customs formalities are not necessary at Djibouti port and are executed in Ethiopia. The transportation distance is about 1,200 km via Addis Ababa and 1,000 km directly.

2.2.5.7 Implementation Schedule

Implementation is composed of detailed design stage and procurement stage.

The implementation schedule is dominated by the procurement schedule of the drilling rig and the expected periods are as follows:

Check of the shop drawings/specification	: 0.5 months
Manufacture/procurement	: 6 months
Transportation	: 3 months
Initial operation guidance - hand over	: 1 month
Total	: 10.5 months

The implementation schedule is shown in Figure-2.5. Regarding the equipment procurement, the schedule is as follows:

(Unit : months)

	The first phase	The second phase
Detail Design, Tender Procedure	7.0	7.0
Procurement of Equipment,	10.5	10.5

2.3 Obligations of Recipient Country

Undertakings of the Government of Ethiopia are drafted as follows:

(1) To secure the sites for proposed water supply facilities.

(2) To clear, level and reclaim the sites prior to commencement of construction.

(3) To provide data and information necessary for the Project.

(4) To provide the land for access roads, a temporary site office, warehouse and stock yard during implementation of the Project.

(5) To provide warehouses for storing of spare parts and other equipment procured by the Project, at *Woreda* offices as well as at WDRB in Awasa.

(6) To undertake associated outdoor works such as security of the sites, fencing, gates, and exterior lighting in and surrounding the borehole sites if necessary.

(7) To construct access roads to the sites prior to commencement of construction if necessary.

(8) To bear the commissions of the Japan bank for banking services based upon the Banking Arrangements.

(9) To exempt taxes and to take necessary measures for customs clearance of materials and equipment procured by the Project at the port of disembarkation. If tax exemption is not applicable, such expense shall be borne by the relevant organizations of Ethiopia.

(10) To ensure the prompt unloading and customs clearance at a port of disembarkation in Ethiopia and facilitate internal transportation therein of the products purchased under the Grant.

(11) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies that may be imposed in Ethiopia with respect to the supply of the products and services under the Verified Contracts.

(12) To accord Japanese nationals, whose services may be required in connection with

supply of the products and services under the verified contracts, such facilities as may be necessary for their entry into Ethiopia 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 all 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.

(17) To support the establishment of Water and Sanitation Committees for the target communities.

(18) To bear all the expenses and staff for establishment of the trainer's team.

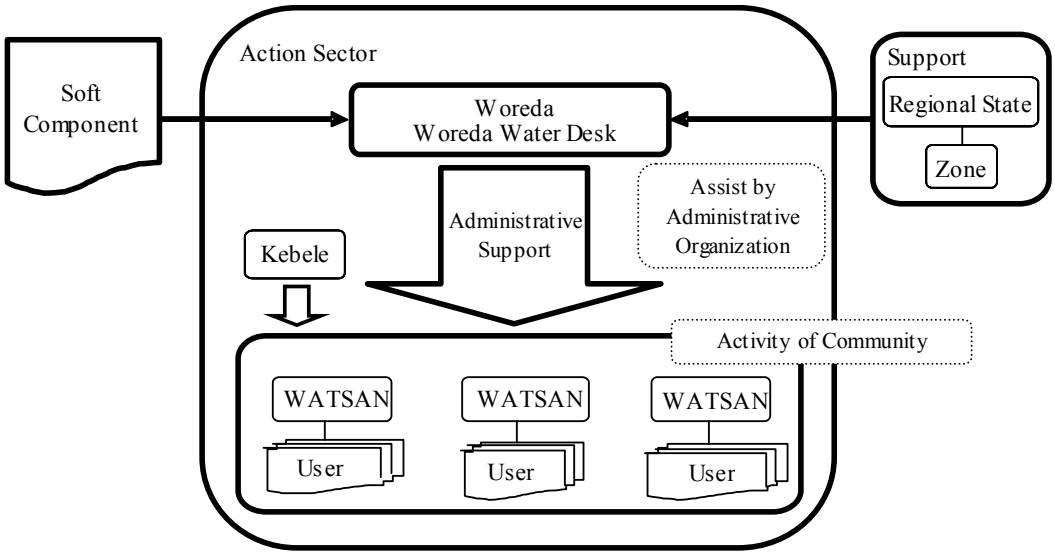
2.4 Project Operation and Maintenace Plan

2.4.1 Project Operation and Maintenance Plan

2.4.1.1 Organization of Operation and Maintenance

The plan for Operation and Maintenance for this project shall principally consist of: 1) promotion of participatory O&M by a community organization, 2) providing support for administrative organizations. De-centralization shall be considered when support from administrative organizations is to be planed, namely *woredas* are the main actors for the administrative levels.

A conceptual set-up for O&M for this project is shown below.



WATSAN : Water and Sanitation Committees

Figure-2.6 Conceptual Frame Work for O&M

2.4.1.2 O&M Principles for Administrative Organization Level

Woredas shall be the main responsible administrative organization for operation and maintenance of the rural water supply facilities. Although role of Zones, positioned between the Regional level and *Woreda* level are being reduced, the *woredas* capabilities, including physical number of personnel, shall be supported by the respective zones.

Woredas shall conduct training and monitoring activities for improvement of participatory operation and maintenance of the communities. *Woredas* shall also support communities for what is beyond the ability of communities. Under the soft-component activities to be conducted by the Project, *woreda* personnel will be trained through TOT (Training of Trainers) to improve participatory facilitation skill for enhancing the ability of operation and maintenance by communities.

2.4.1.3 O&M Principles for Community Level

At present, communities organize community level groups, in principle, before implementation of water supply projects with support from the Regional level and Zonal level. The community level organizations undertake daily O&M activities such as daily operation, water tariff collection and its handling, and small-scale repair works. Although a similar system will be adopted by the Project, it is *Woreda* personnel that play the main role at the administrative level to support the communities.

Communities shall, based on the beneficiary-payment-principle, organize Water and Sanitation Committees (or Water Users Associations) for sustainable O&M by themselves.

2.4.2 Plan for Operation and Maintenance

2.4.2.1 Role at Each Level

Expected roles and personnel/organizations in charge are as shown in Table-2.21.

(1) Role of the WRDB

In the course of decentralization, the role of WRDB and the Regional office will be minimized for the facilities after handing them over to the village level. At present, the regional office shall urgently fill up vacancies of *woreda* water desks and monitor the activities to be conducted by *woreda* water desks.

In addition, because the supply-chain of spare parts for hand pumps has not been well developed in SNNPRS, the WRDB shall assist in procuring spare parts from suppliers and distribute them to the communities through the *woreda* level, until the third sector or private sector will have undertaken such spare parts supply chain.

(2) Role of Zonal Offices

Similar to the role of WRDB, the role of Zonal Offices are being minimized for facilities

after construction and handing over. In some Zones where capacity of *woredas* has not developed enough, Zonal offices shall undertake the roles to be conducted by the *Woreda* office.

Table-2.21 Role and Responsible Body for O&M after Implementation

Body	Organization/personnel	Responsible Roles	Notes
Region	WRDB	・ Overall Coordination ・ Bulk purchasing of spare parts (S/P) for hand pumps ・ Temporary storage of S/P ・ Support for delivering S/P ・ Handling of Revolving-fund for S/P ・ Supporting and monitoring activities of Woreda offices	Bulk purchasing S/P will be done until local providers will have been activated.
Zone	Operation & Maintenance	・ Coordination between Regional and woreda offices ・ Procurement S/P from WRDB on request from woredas ・ Assisting in delivering S/P to woreda	Zonal water desk has to inspect facilities. Personnel are being reduced for decentralization
Woreda	**Soft-Component assistant is given to Woreda**		
	WWD/ Water resource development monitoring team	・ Trainers to Water and sanitation committees for sustainable O&M ・ Water quality、sanitation promotion	Training of villagers and monitoring of communities activities
	WWD /maintenance team	・ Repair of facility and guidance to communities	
	Rural development coordination office	・ Request for S/P to Zone or Regional office ・ Storing S/P ・ Providing S/P to communities at fair prices ・ Collecting payment for S/P, handling the collected money and remit it to WRDB	
Kebele	Chairman	・ Coordination between WATSAN and Woreda Office ・ Supporting WATSAN in opening Bank account ・ Co-maker for S/P request	
WATSAN	Chairman	・ Representative,	
	Vice Chairman	・ Supporting or Acting Chairman	
	Secretary	・ General Affairs	
	Accountant	・ Accounting	
	Water Tariff Collector	・ Tariff Collector	Pump attendant
	Store Keeper	・ Storing and maintaining S/P, tools and stationary	
	Audit	・ Auditing	
Users	Users	・ Paying tariff, clearing pump facilities	
	Pump attendant	・ Time keeping, fence locking	Allowance To be paid
	Artisan	・ Small scale repairing	Pump attendant
WWD: Woreda Water Desk, CPP: Community Participation Promoter			

(3) Role of Woreda

Woreda shall undertake significantly important roles under the tidal stream of decentralization.

A *woreda* water desk shall be responsible for supporting communities in: 1) formulating water sanitation committees (WATSAN) through reconciliation of various interests maintaining fairness, transparency and gender fairness, 2) formulating WATSAN action plans and agreements ; and in registering the agreement, 3) technical guidance for

operation and daily maintenance of facilities, 4) advising on decisions of water tariff and collecting method, 5) guidance of accounting, handling and administering funds, 6) following up and monitoring.

(4) Role of WATSAN

Water and sanitation committees (WATSAN) shall be formed as the consensus of all users, with support of the *woreda* water desks A WATSAN consists of seven (7) persons as shown in the Figure below and the role of each person will be as listed in Table-2.21. In particular, WATSAN shall elect, with an agreement from users, a pump attendant who will be employed as a paid worker who shall conduct daily maintenance of the water facility. He may better double as the pump attendant and artisan if possible.

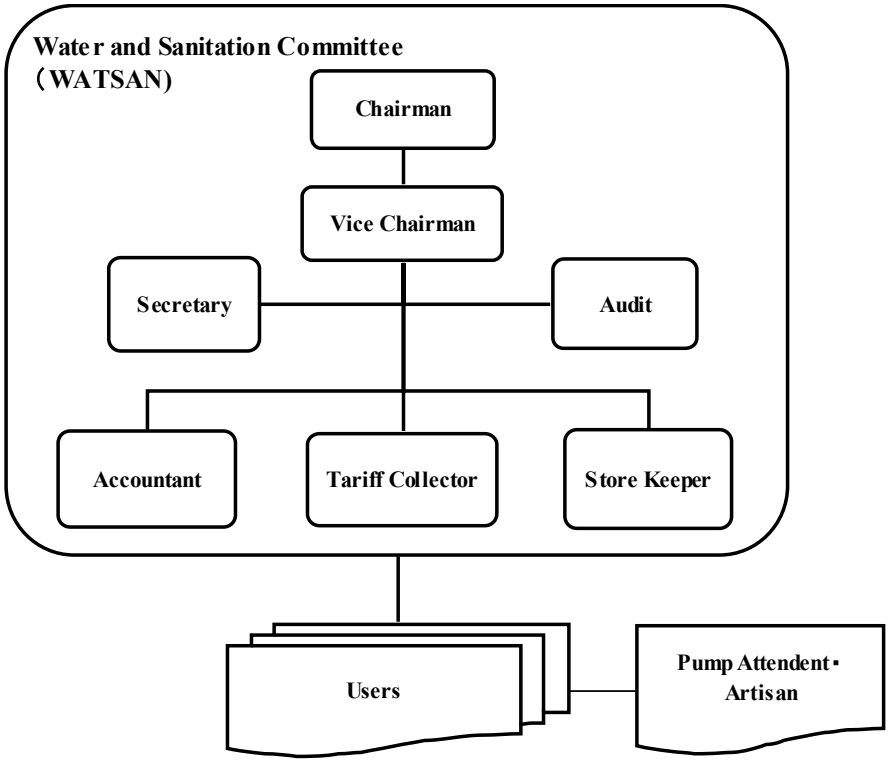


Figure-2.7 Working Part of Community and WATSAN

The targets of the soft-comportment to be conducted under the Project shall be as follows through *woreda* water desks

- Leadership skill
- Skill for management of local community organization
- Skill for deciding water tariff and for money collection
- Skill for budget-planning, accounting and operating funds
- Skill for facility operation, maintenance and repairing, and trouble shooting,
- Skill for holding meetings

Kebele Chairman shall undertake such roles as:

- He shall support a WATSAN in opening a bank account if a bank account is necessary, because a bank usually requests WATSANs to bring an authorization letter from an administrative office when an unauthorized organization opens an account.
- He shall be a 'warrantor' for a WATSAN when the WATSAN requests spare parts to the *woreda* office, if required.
- He shall be the representative of all the WATSANs in his village (*Kebele*).

(5) Education for Sanitation Through Water Usage

Improvement of the living environment by continuous use of a water supply facility can be realized through understanding and practice of proper usage and maintenance activities of safe water together with a sense of ownership. It is thus necessary for communities to enhance the sense of ownership and change the mode of behavior with assistance from the *woreda* water desk, taking into consideration their present sense of hygiene and their living habits as far as O & M is concerned.

Women who are elected as a member of the WATSAN committee shall be in charge of improving the sense of hygiene and behavior of villagers. If a health committee is available in a village, a member of the health committee will be in charge of this activity provided that an agreement is reached with the Ministry of Health. Materials to be used for the hygiene education will be handed over to the village school so that the school can use them in daily classes.

2.4.2.2 Spare Parts Distribution for Hand Pumps

There will be two theoretical supporting systems where spare parts for hand pumps can be procured and distributed to WATSAN formed by users. One method is that they shall obtain spare parts in the market system and the other method is that the governmental administrations shall support procurement and distribution (supply chain) until such supply chain will have been developed.

The World Bank intends to foster local providers or local tradesmen who undertake simple construction works such as hand-dug well constructions, masonry works or concreting works. The bank also assigns such local sectors as spare parts suppliers at the local level. However, suppliers of hand pump spare parts that are imported from abroad are only available in Addis Ababa. Under such conditions it will be realistic as a step-wise approach and transitional measure that the governmental administration shall undertake such procurement and distribution of spare parts for hand pumps or any other rural water supply facilities.

In this case, WRDB shall maintain lists of specifications of hand pumps prevailing in SNNPRS, spare parts, suppliers, and so on; bulk purchase of necessary spare parts; and store and maintain them in the warehouse of WRDB. Based on request forms, *woredas*,

WRDB shall make arrangements to deliver requested spare parts to *woredas*. Fees for spare parts will be collected from the users through the *woreda*, but delivery services shall be made available at a cost to WRDB. UNICEF adopts this method for the project being conducted in SNNPRS.

As water supply facilities will be constructed on the basis of the beneficiary-payment principle, the *woreda* who receives the requested spare parts shall notify the WATSAN of the costs of the spare parts as well as the arrival of the spare parts. On the notice from the *woreda*, the WATSAN shall pay the invoiced costs to the *woreda* water desk from the savings deposited by water users as water tariff. The costs paid from WATSANs to a *woreda* shall be operated as revolving funds and be revolved/restored to WRDB. WRDB, in fact, intends to adopt this system for the UNICEF project once the spare parts supplied by UNICEF have run short in the future.

This system involving governmental administrations will be a temporary arrangement until private sectors will have been fostered for the procurement and distribution of spare parts for water supply facilities.

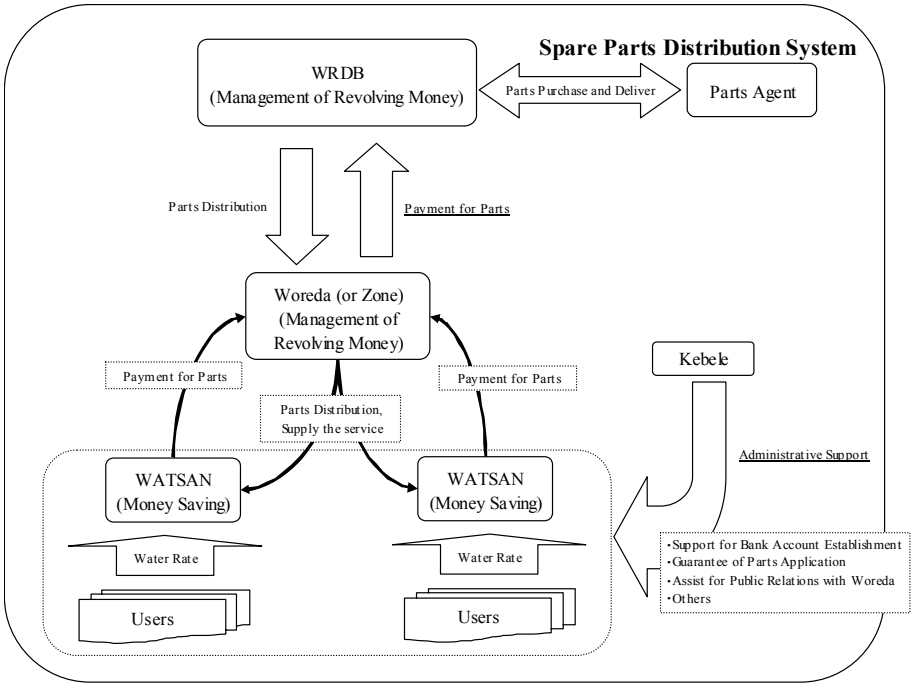


Figure-2.8 Procurement System for Spare Parts

2.4.2.3 Capacity Building and Organizational Enforcement of Relevant Organizations in the Field of Operation and Maintenance

Support for preparation and enhancement of the structure for operation and maintenance will be made on the basis of one of the principles of Japan's Grant Aid Scheme that the recipient shall have the principle responsibility for O &M of facilities to be constructed or to be procured under Japan's Grant Aid. Based on the principle above, the Project will input 'soft Component' support to the relevant governmental organizations for capacity building and organizational enforcement in the field of Operation and Maintenance for an early realization of the expected effect through sustainable water supply facilities.

2.5 Cost Estimates

2.5.1 Project Cost

Under Japan's Grant Aid Scheme, the Project cost is estimated at JPY 1,063.5 million, composed of JPY 1,061 million from the Japanese Government and JPY 2.5 million from the Ethiopia Government in accordance with the work demarcation between the Japanese and Ethiopia sides and based on the conditions outlined below. This cost estimate is provisional and will be further examined by the Government of Japan for the approval of the Grant.

(1) Cost to be incurred by Japan

Estimated Project Cost: 1,061 million JPY

Item		Project Cost (Million JPY)
Facilities	Water supply facilities equipped with hand pumps (Construction of boreholes, installation of hand pumps and construction of aprons) Water supply facilities using spring water sources (Construction of water source protection facilities and distribution reservoirs, laying of distribution pipes and public taps)	456
Procurement of Equipment	Well drilling rigs, support vehicles, air lift equipment, electrical sounding equipment, portable incubators, reagent sets for spectrophotometer and motor bikes	457
Detailed Design, Construction Supervision and Capacity Building ('Soft Component')		148

(2) Cost to be Covered by Ethiopia

The following are the proposed undertakings of the Government of Ethiopia.

1) Undertakings of Community

Item	Description	Project Cost	
		Thousand Birr	Million JPY
1. Land Acquisition	Land acquisition/compensation for private land (Drilling sites, water intake structure sites, pipe installation areas, storage tanks and public taps etc.)	-	-
2. Trees	Cutting/compensation	-	-
3.Community Participation	Construction of fences (240 locations)	-	-
4. Organization of WATSAN	Organization of 240 WATSAN	-	-
Total Cost for Community Side		-	-

2) Undertakings of WRDB

Item	Description	Project Cost	
		Thousand Birr.	Million JPY
1. Site	Land acquisition/compensation for public land (Drilling sites, water intake structure sites, pipe installation areas, storage tanks and public taps etc.)	-	-
	Holding Temporary yard, storehouse office	-	-
	Acquiring permission for road use and drilling from local police/Government	-	-
2. Trees	Cutting permission, supporting for communities	-	-
3. Storage house/Place	Storage place for O&M materials	-	-
4. Project Manager /Coordinator	Project Management and coordination for the construction of water supply facilities, water intake structures from springs, gravity-piped systems and fences at 240 locations by Counterpart or Coordinator （WRDB、Woreda Water Desk）	79	1.0
6. Establishment of WUA	Training for Woreda/CPP and Participation in workshop WATSAN organization for 240 schemes Staff regarding training for O&M methods and sanitary education	114	1.5
Total Cost for 240 Sites		193	2.5

(3) Condition of Cost Estimate

1) Time of Cost Estimate	End of November, 2004
2) Exchange of Rate	1 US$ = ¥109.92 1 Birr = ¥12.72
3) Schedule	Two phases
4) Others	The project shall be implemented in accordance with the regulations and system of Japan's Grant Aid Scheme.

2.5.2 Operation and Maintenance Cost

The Water Sanitation Committees (WATSAN) shall carry out operation and maintenance for the facilities. WATSAN shall collect the water fee from users to cover all necessary costs for operation, maintenance and replacement of water supply facilities. As a result of the social-economic survey, the beneficiaries of all *Woredas* are, in principal, willing to pay for water and more than 90% of them understand the user-pays principle and might participate in operation and maintenance activities.

Furthermore, the survey indicates that most of the users of the existing wells pay one Birr/month/household; or 10 cents per 20 L for the water under a fixed fee system, whereas expected users' willingness to pay was five cents per 20 L for the water fee. In view of affordability to pay, the well users will be able to pay 1-3 Birrs/month/household for each facility-type.

(1) Water Supply Facility Equipment with Hand Pumps

Operation and maintenance costs for hand pumps are composed of 1) Expenses of the pump operators for the routine maintenance of the well facilities, 2) O&M by WATSAN (spare parts cost) and 3) Depreciation cost of the hand pump including resetting cost.

Expenses of a pump operator are estimated at 100 Birrs/month. If enough funds should not be available in a WATSAN, such expenses are sometimes paid in the form of material compensation or crop land sharing. Each WATSAN shall decide the proper amount of payment to a pump attendant. It is reported that the spare parts cost for a pump is approximately 3% of the pump price. Cost for pump renewal including re-installation cost shall be estimated in view of the user-pays principle. In addition, funds to cover miscellaneous costs such as cost for stationery will be necessary.

It is usually accepted that the life time of a hand pump is 10 years if proper maintenance is conducted. After 3 years, for which period spare parts will be supplied under the Project, users shall bear the costs for spare parts. As a result, the operation and maintenance costs per year including replacement cost are estimated as follows:

Table-2.22 Operation and Maintenance Cost for Hand Pump

Item	Contents	O&M Cost (Birr/Year)	
Pump Type	Hand Pump	Afridev	Afrideep
Pump Operator (WATSAN)	Birr 100/year x 12	1,200	1,200
O&M by WATSAN (Spare Parts)	Birr 7,000x 3%/year	210	—
	Birr 8,000x 3%/year	—	240
Depreciation Cost of the Hand Pump, including resetting cost	Birr 9,000 x 10%/year	900	—
	Birr 10,000 x 10%/year	—	1,000
Incidentals (Stationery etc.)	Birr 20 /month x 12	—	240
Total		2,550	2,680

Annual O&M cost for the Afridev type and the Afrideep type are estimated at approximately 2,550 Birrs and 2,680 Birrs respectively. The amount of revenue is expected to be 2520 Birrs/year for one well, since the water fee is estimated at three Birrs according to the upper limit of actual payment in SNNPRS and more than 70 households will use one well. It might be noted that the expenses for a pump operator account for almost half of the amount of the O&M cost. It is therefore necessary that a WATSAN shall offer a reasonable payment for a pump operator and decide acceptable water rates based on the water user's ability to pay.

(2) Spring Water Supply Facility

The O&M for spring water supply facilities will be executed by WATSANs and O&M cost will be financed from water fees to be collected. The O&M cost is composed of 1) Public tap operator costs, 2) O&M cost (spare parts cost) and 3) Purchasing cost of chlorine for disinfection.

Public tap operation costs consist of expenses for tap attendants (operators). Although

Costs for an operator are estimated at 100 Birrs/month, payment may be made in the form of material compensations or crop land sharing or their combination if funds of a WATSAN may sometimes not enough. The spare parts cost is estimated as shown in Table 5-2-2, on the basis of a life time of 10 years for a hand pump and 3 years for water taps. In addition, funds to cover miscellaneous costs such as for stationary will be necessary.

The spring water supply facilities consist of the GPS type and the On-Spot type. Total length of pipe line and numbers of public taps are decided in proportion to the population to be served and configurations of villages and scale of water sources. The O&M costs of the GPS type are therefore estimated based on the scale of the facilities (total length of pipes, population to be served and number of public taps) as in Table 5-2-2.

Table-2.23 Annual Operation and Maintenance Cost for GPS Facilities

(Birr/year)

Item		Case1	Case2	Case3
		TPL of less than 1km, 40-110 HH, One operator	TPL of 1 to 2 km, 150-200 HH, Two operators	TPL of 2-5 km, 220-660 HH, Three operators
Public Tap Operator (WATSAN)		1,200	2,400	3,600
O&M Cost	Water meter (10 year L/T)	12-60	17-45	18-80
	Gate valves (10 year L/T)	22-140	60-84	84-206
	Water taps (3 year L/T)	40-80	80-120	120-160
Chlorine for disinfection		60	60	60
Miscellaneous		240	240	240
Total		1,574-1,780	2,857-2,949	4,122-4,346
TPL:Total pipe length, HH: House hold, L/T: Life Time				

The amount of estimated annual O&M cost ranges from approximately 1600 Birrs to 4400 Birrs according to the size of facilities and WATSA. The expenses for the operator exceed 70% of the amount of the O&M cost. On the other hand, the amount of revenue for the O&M based on the water user's ability to pay is estimated as in Table 5-2-3.

Table-2.24 Revenue for the O&M of GPS Type Water Supply Facility

(Birr/year)

Monthly Charge for Water Use per Household	Size of Communities		
	Approx.100 households	Approx. 200 households	Approx. 600 households
1 Birr	1,200	2,400	6,000
1.5 Birr	1,800	3,600	9,000
2 Birrs	2,400	4,800	12,000

As shown in the above table; 1.5 birr/month/HH is needed for a community of 100 HH and for a community of 200 HH with two operators; 2.0 birr/month/HH is needed for a community of 200 HH with three operators; and 1 birr for a community of 600 HH with 3 operators. Note HH denotes 'House Hold'. In view of affordability to pay, the well users will be able to pay for the O&M cost, since the expected O&M cost per one handhold is

within three Birrs. The WATSAN shall decide a reasonable level of payment for public tap operators and the acceptable water rate based on the water user's ability to pay through village meetings.

Facilities for spring on-spot systems are small scale facilities that are constructed near the water sources with one public tap. The O&M cost of the On-Spot type water supply facility is not subject to the size of the community to be served. The O&M cost for on-spot type water supply facilities is estimated as Table 5-2-4.

Table-2.25 Annual O&M Cost for On-Spot Water Supply Facilities

(Birr/year)

Item		One Public Tap and One Operator
Public Tap Operator		1,200
O&M Cost	Water meter (10 year LT)	17-45
	Gate valve (10 year LT)	18-50
	Water tap (3 year LT)	20
Chlorine for disinfection		60
Miscellaneous	Birr 20 /month x 12	240
Total		1,555-1,615
LT: Life time		

The O&M cost for the On-Spot type water supply facility is estimated at approximately 1600 Birr/year/spot. The expenses for an operator exceed 70% of the O&M cost. The expected amount of revenue for the facility is shown in Table 5-2-5.

Table-2.26 Revenue for the O&M of On-Spot Type Water Supply Facility

(Birr/year)

Monthly Charge for Water Use per One Household	30 HH	50 HH	100 HH	150 HH
1 Birr	360	600	1,200	1,800
2 Birrs	720	1,200	2,400	3,600
3 Birrs	1,080	1,800	3,600	5,400
HH: House Hold				

When O&M costs are compared with affordability to pay; 1 birr/month/HH will be enough for a community of 150 HH; 2 birr/month/HH will be enough for a community of 100 HH, 3 birr/month/HH will be enough for a community of 50 HH. On the other hand 3 birr/month/HH will not be sufficient for a community with 30 HH (note HH denotes 'House hold'). Therefore, a small sized community shall offer a reasonable level of payment for a public tap operator and an acceptable range of water rate based on the water user's ability to pay shall be decided through village meetings.

Chapter 3
Project Evaluation and Recommendation

CHAPTER 3
PROJECT EVALUATION AND RECOMMENDATIONS

3.1 Project Effects

3.1.1 Effects on Improvement of the Present Conditions

The expected effects from this Project are as follows:

Table-3.1 Effects and Improvement by the Implementation of the Project

Present Status and Issues	Countermeasures taken by the Project (Project to be implemented)	Effects and Improvements
Villagers use water of seasonal streams for drinking in the targeted 103 villages where the recent drought has had serious effects. People can hardly obtain safe water and women and children who are responsible for bringing water have to walk great distances, particularly in dry seasons when the seasonal stream/river dries up. Obtaining safe and stable water is urgently required in the villages.	Construction of 214 shallow wells with hand pumps and 26 water supply facilities using spring water.	When the 240 facilities are completed in 2007, about 92,000 villagers will have safe and stable water, which will mitigate adverse impacts of the previous drought.
Villagers in the target villages do not have enough experience in O&M of water supply facilities. Obtaining such techniques for O&M will be most important.	Training on techniques for O&M by soft-component assistance.	
The national target aims at 68% water supply coverage by the year of 2016, which is also the target in MDGs. Some 4,300 wells have to be drilled by 2016 for the achievement of the targets.	Procurement of 2 units of drilling rigs and the other equipment.	Together with the above mentioned urgent assistance, population to be serviced will be further increased by the drilling equipment to be procured.

3.1.2 Improvement of Water Supply Coverage

Implementation of the project will have favorable effects on the present water supply conditions as shown in the table below (The assessment was made with a consideration of natural population growth). On the completion of the facility construction at the end of 2006, population served will be increased by 94,000. The coverage rate is to be increased 3.3 percentage points by the project at the end of 2007.

Table-3.2 Water Supply Conditions before and after the Project (for the 14 Woredas)

	Present (2000)	Completion of Construction (2007)		
		W/O - P	W - P	increment
Population (x 1,000)	2,327	2,780		
Population served (x 1,000)	569	569	661	92
Coverage (%)	24.5%	20.5%	23.8%	3.3%

3.1.3 Indirect Effects

Indirect Effects of the Project will be as follows.

The Project will:

1) foster a sense of ownership of the facilities and participation in O&M among users,
2) improve users' capabilities for participatory O&M,
3) create in *woreda* water desk personnel the capability for forming organizations for participatory O&M, and
4) enhance well construction capability of SNNPRS.

3.2 Recommendations

It is recommended that sufficient attention and consideration have to be given to the following points for smooth and effective implementation of the Project.

1) Replenishment of personnel for the *woreda* water desks

A sufficient number of personnel who shall act in important roles for rural water supply in the trend toward decentralization is urgently required for the *woreda* water desks. The head of a *woreda* water desk, community participatory promoters and mechanical experts shall be assigned to each *woreda* water desk before the planed soft-component program starts.

2) Preparation and maintenance of access roads to the sites

Many of the sites do not have satisfactory access. In particular, the final access from village roads to construction sites have sometimes yet to be prepared. Village roads are also to be maintained properly for construction equipment to access the construction points. Such preparations and maintenance of access roads shall be assured before the construction starts for smooth implementation of the field works.

3) Participatory construction works for fences around the facilities

Together with formulation of WATSAN committees for water use, it is necessary for WRDB to obtain agreement for the participatory fence construction works from targeted communities by the end of the detail design to be carried out.

4) Securing of Counter Funds

It is necessary for WRDB to make proper arrangement for securing of the required counter funds to carry out the works to be undertaken by the Ethiopian party.

3.3 Project Justification

Based on the results of the Basic Design Study, it is judged to be justifiable that the Project should be implemented as a Japan's Grand Aid Scheme.

1) Safe and stable water will be made available to villagers in 103 *kebeles* (villages) because of the 240 facilities to be constructed in the period of 2 years under the Project.
2) Together with the 240 water supply facilities to be constructed as mentioned above, population to be benefited by the Project will further be increased by the drilling equipment to be procured.
3) Operation and maintenance to be introduced for the facilities to be constructed under the project can be handled and managed by the personnel and budget to be prepared by the relevant Ethiopian parties.
4) The project will significantly contribute to the county's effort to attain the target set by the National Water Development Plan (2003). The Project will also contribute to the national effort to attain the target set for water coverage proposed by MDGs.
5) The project will hardly have any adverse impacts on the environment.
6) The project can be implemented without serious difficulties under the Japan's Grant Aid Scheme.

3.4 Conclusions

The Project will construct 240 water supply facilities in a period of two years to urgently relieve the drought-affected areas and procure two drilling rigs and relevant equipment to support the country's self-efforts to attain the target set by National Water Master Plan and MDGs.

For the Project to be implemented, it is necessary, not only to practice adequate time-schedule control and quality control for the completion within the time-schedule and with the required quality; but also proper procurement control for timely procurement of materials or construction; together with a sizable sum of capital funds. It is therefore significantly meaningful to input Japan's highly developed technique on time and quality control in an urgent and bulky construction work. It is also in accordance with a basic concept that the Japan's Grant Aid Scheme shall support self-help efforts of a recipient country, that the project will procure the drilling rigs to support SNNPRS to continue to construct water wells with his self efforts. Moreover the Project as a Japan's Grant Aid Scheme, will harmonize with a world movement to attain the MDGs to rescue the poor countries in need.

Appendixes

1. Member List of Study Team
2. Survey Itinerary
3. List of Parties Concerned in the Recipient Country
4. Minutes of Discussions
5. Other Relevant Data

Appendix-1
Member List of Study Team

Appendix-1 : Member List of the Study Team

1. Explanation of Inception Report and Field Survey (October 6 to December 15, 2004)

Position in Charge	Name	Affiliation
Team Leader	JIN, Kimiaki	Deputy Resident Representative, JICA Ethiopia Office
Chief Consultants / Rural Water Supply	FUJINAMI, Masato	Nippon Koei Co., Ltd.
Vice Chief Consultants / Groundwater Development	TAKAHASHI, Shinya	Nippon Koei Co., Ltd.
Hydrogeology / Geophysical Survey	KIKAWADA, Atsusa	Nippon Koei Co., Ltd.
Water Supply Facility Planning	FUJIYAMA, Taketoshi	Nippon Koei Co., Ltd.
Donor Coordinatoin	NINOMIYA, Masanobu	Nippon Koei Co., Ltd.
Sustainable O&M Planning with Beneficiary's Participation	NISHI, Makoto	Nippon Koei Co., Ltd.
Procurement Planning / Procurement Management	TAMURA, Hidehisa	Nippon Koei Co., Ltd.
Construction & Procurement Planning / Cost Estimation	KOZAWA, Takuo	Nippon Koei Co., Ltd.
Coordinator	TAKAHASHI, Masayuki	Nippon Koei Co., Ltd.

2. Explanation of Draft Final Report (March 7 to 18, 2005)

Position in Charge	Name	Affiliation
Team Leader	JIN, Kimiaki	Deputy Resident Representative, JICA Ethiopia Office
Chief Consultants / Rural Water Supply	FUJINAMI, Masato	Nippon Koei Co., Ltd.
Vice Chief Consultants / Groundwater Development	TAKAHASHI, Shinya	Nippon Koei Co., Ltd.
Donor Coordinatoin	NINOMIYA, Masanobu	Nippon Koei Co., Ltd.

Appendix-2
Survey Itinerary

Appendix-2 : Survey Itinerary

1. Explanation of Inception Report and Field Survey (October 5 to December 17, 2004)

No	Date		Member	Station	Activities
1	Oct.5	Tue	Ninomiya	On Board	
2	6	Wed	Ninomiya	Addis Ababa	
3	7	Thu	Ninomiya	Addis Ababa	Data Collection
4 ・ 5	8 ・ 9	Fri ・ Sat	Ninomiya	Addis Ababa	Data Collection
6	10	Sun	Ninomiya	Addis Ababa	Data Collection
			Fujinami, M.Takahashi	On board	
7	11	Mon	Ninomiya	Addis Ababa	Data Collection
			Fujinami, M.Takahashi	Addis Ababa	
8	12	Tue	Jin, Fujinami, Ninomiya, M.Takahashi	Addis Ababa	Courtesy Call to JICA and Discussion with JICA Courtesy Call to MoFED and MoWR
9	13	Wed	Jin, Fujinami, Ninomiya, M.Takahashi	Bahir Dar	Courtesy Call to SWRDB, Discussion on Contents of Minutes
10	14	Thu	Jin, Fujinami, Ninomiya, M.Takahashi	Bahir Dar	Discussion on Contents of Minutes
11	15	Fri	Jin, Fujinami, Ninomiya, M.Takahashi	Bahir Dar	Discussion on Contents of Minutes
			S.Takahashi, Kikawada	On board	
12	16	Sat	Jin, Fujinami, Ninomiya, M.Takahashi	Addis Ababa	Study Team Meeting
			S.Takahashi, Kikawada	Addis Ababa	
13	17	Sun	Jin, Fujinami, S.Takahashi, Kikawada,Ninomiya, Nishi, M.Takahashi	Awasa	
14	18	Mon	Jin, Fujinami, S.Takahashi, Kikawada,Ninomiya, Nishi, M.Takahashi	Awasa	Courtesy Call to SNNPR WRDB, Discussion on Contents of Minutes
			Fujiyama	On board	
15	19	Tue	Jin, Fujinami, S.Takahashi, Kikawada,Ninomiya, Nishi, M.Takahashi	Awasa	Discussion on Contents of Minutes
			Fujiyama	Addis Ababa	
16	20	Wed	S.Takahashi, Kikawada, Ninomiya, Nishi, M.Takahashi	Awasa	Discussion on Contents of Minutes, Data Collection
			Jin, Fujinami, Fujiyama	Addis Ababa	Courtesy Call to Japan Embassy Data Collection
17 ・ 18	21 ・ 22	Thu ・ Fri	Jin, Fujinami, S.Takahashi, Kikawada, Fujiyama, Ninomiya, Nishi, M.Takahashi	Addis Ababa	Study Team Meeting Data Collection
19	23	Sat	Fujinami, S.Takahashi, Kikawada, Fujiyama, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			Nishi	Awasa	
			Ninomiya	On board	
20	24	Sun	Fujinami, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi, Kikawada, Fujiyama, Nishi	Awasa	
			Ninomiya	On board	
21	25	Mon	Fujinami, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi, Kikawada, Nishi	Awasa	
			Fujiyama	Sodo	
			Ninomiya		
22	26	Tue	Fujinami, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi, Kikawada, Nishi	Awasa	
			Fujiyama	Waka	

No	Date		Member	Station	Activities
23	Oct. 27	Wed	Fujinami, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi, Kikawada	Awasa	
			Fujiyama	Waka	
			Nishi	Hosaina	
24	28	Thu	Fujinami, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi, Kikawada	Awasa	
			Fujiyama	Waka	
			Nishi	Hosaina	
25	29	Fri	Fujinami, M.Takahashi	Addis Ababa	Data Collection, Field Survey
・	・	・	S.Takahashi	Dhila	
・	・	・	Kikawada	Hagore Salem	
・	・	・	Fujiyama		
・	・	・	Nishi	Sodo	
26	30	Sat	Kozawa	On board	
27	31	Sun	Fujinami, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi, Kikawada	Awasa	
			Fujiyama	Kechi	
			Nishi	Sodo	
			Kozawa	Addis Ababa	
28	Nov. 1	Mon	Fujinami, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi	Hosaina	
			Kikawada	Durame	
			Fujiyama	Kechi	
			Nishi	Tercha	
29	2	Tue	Fujinami, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi	Hosaina	
			Kikawada	Hosaina	
			Fujiyama	Kechi	
			Nishi	Sodo	
30	3	Wed	Fujinami, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi	Butajira	
			Kikawada	Butajira	
			Fujiyama	Kechi	
			Nishi	Sodo	
31	4	Thu	Fujinami, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			Tamura	On board	
			S.Takahashi	Butajira	
			Kikawada	Butajira	
			Fujiyama	Kechi	
			Nishi	Sodo	
32	5	Fri	Fujinami, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			Tamura	Addis Ababa	
			S.Takahashi	Butajira	
			Kikawada	Butajira	
			Fujiyama	Kechi	
			Nishi	Sodo	
33	6	Sat	Fujinami, Kikawada, Nishi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi	Hosaina	
			Fujiyama	Kechi	
34	Nov. 7	Sun	Fujinami, Tamura, Kozawa, M.Takahashi	Bahir Dar	Data Collection, Field Survey
			S.Takahashi	Sodo	
			Kikawasa	Wolayta	
			Fujiyama	Kechi	
			Nishi	Addis Ababa	

No	Date		Member	Station	Activities
35	Nov. 8	Mon	Fujinami, Tamura, Kozawa, M.Takahashi	Bahir Dar	Data Collection, Field Survey
			S.Takahashi	Sodo	
			Kikawasa	Wolayta	
			Fujiyama	Kechi	
			Nishi	Awasa	
36	9	Tue	Fujinami, Tamura, Kozawa, M.Takahashi	Bahir Dar	Data Collection, Field Survey
			S.Takahashi	Sodo	
			Kikawasa	Hosaina	
			Fujiyama	Kechi	
			Nishi	Awasa	
37	10	Wed	Fujinami, Tamura, Kozawa, M.Takahashi	Bahir Dar	Meeting on Technical Notes with AWRDB, Data Collection, Field Survey
			S.Takahashi	Sodo	Data Collection, Field Survey
			Kikawasa	Tercha	
			Fujiyama	Kechi	
			Nishi	Awasa	
38	11	Thu	Fujinami, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi	Sodo	
			Kikawasa	Kechi	
			Fujiyama	Tercha	
			Nishi	Yerega Chaffe	
39	12	Fri	Fujinami, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi	Tercha	
			Kikawasa	Kechi	
			Fujiyama	Loma	
			Nishi	Awasa	
40	13	Sat	Fujinami, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi	Tercha	
			Kikawasa	Kechi	
			Fujiyama	Awasa	
			Nishi	Awasa	
41	14	Sun	Fujinami, Nishi, Tamura, Kozawa, M.Takahashi	Awasa	Data Collection, Field Survey
			S.Takahashi	Sodo	
			Kikawasa	Tercha	
			Fujiyama	Arbaminch	
42	15	Mon	Fujinami, Nishi, Tamura, Kozawa, M.Takahashi	Awasa	Data Collection, Field Survey
			S.Takahashi	Arbaminch	
			Kikawasa	Tercha	
			Fujiyama	Arbaminch	
43	16	Tue	Fujinami, Tamura, Kozawa, M.Takahashi	Awasa	Data Collection, Field Survey
			S.Takahashi	Arbaminch	
			Kikawada	Waka	
			Fujiyama	Arbaminch	
			Nishi	Butajira	

No	Date		Member	Station	Activities
44	Nov. 17	Wed	Fujinami, Tamura, Kozawa, M.Takahashi	Awasa	Data Collection, Field Survey
			S.Takahashi	Jinka	
			Kikawada	Arbaminch	
			Fujiyama	Arbaminch	
			Nishi	Butajira	
45	18	Thu	Fujinami, Tamura, Kozawa, M.Takahashi	Awasa	Data Collection, Field Survey
			S.Takahashi	Jinka	
			Kikawada	Jinka	
			Fujiyama	Arbaminch	
			Nishi	Butajira	
46	19	Fri	Fujinami, Tamura, Kozawa, M.Takahashi	Awasa	Meeting on Technical Notes with SWRDB
			S.Takahashi	Jinka	Data Collection, Field Survey
			Kikawada	Jinka	
			Fujiyama	Arbaminch	
			Nishi	Addis Ababa	
47	20	Sat	Fujinami, Nishi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi, Kikawada, Fujiyama	Arbaminch	
48	21	Sun	Fujinami, Nishi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi	Tercha	
			Kikawada	Arbaminch	
			Fujiyama	Arbaminch	
49	22	Mon	Fujinami, Nishi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi	Sodo	
			Kikawada	Arbaminch	
			Fujiyama	Arbaminch	
50 ・ 51	23 ・ 24	Tue ・ Wed	Fujinami, Nishi, Tamura, Kozawa M.Takahashi	Addis Ababa	Data Collection, Field Survey
			S.Takahashi, Kikawada, Fujiyama	Awasa	
52	25	Thu	Fujinami, S.Takahashi, Kikawada, Fujiyama, Nishi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection
53	26	Fri	Fujinami, S.Takahashi, Fujiyama, Nishi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Study Team Meeting Data Collection
			Kikawada	On board	
54	27	Sat	Fujinami, S.Takahashi, Fujiyama, Nishi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection
			Kikawada	On board	
55	28	Sun	Fujinami, S.Takahashi, Fujiyama, Nishi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection
			Kikawada		
56	29	Mon	Fujinami, S.Takahashi, Nishi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection
			Fujiyama	On board	
57	30	Tue	Fujinami, S.Takahashi, Nishi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection
			Fujiyama	On board	
58	Dec. 1	Wed	Fujinami, S.Takahashi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection
			Fujiyama		

No	Date		Member	Station	Activities
59 ・ 62	Dec. 2 ・ 5	Thu ・ Sun	Fujinami, S.Takahashi, Tamura, Kozawa, M.Takahashi	Addis Ababa	Data Collection
63	6	Mon	S.Takahashi, M.Takahashi	Addis Ababa	Report to Japan Embassy / JICA Ethiopia Office
			Fujinami, Tamura, Kozawa	On board	
64	7	Tue	S.Takahashi, M.Takahashi	Addis Ababa	Data Collection
			Fujinami, Tamura, Kozawa	On board	
65	8	Wed	S.Takahashi, M.Takahashi	Addis Ababa	Data Collection
			Fujinami, Tamura, Kozawa		
66 ・ 71	9 ・ 14	Thu ・ Tue	S.Takahashi, M.Takahashi	Addis Ababa	Data Collection
72	15	Wed		Addis Ababa	Report to JICA Ethiopia Office
			S.Takahashi	On board	
			M.Takahashi	On board	
73	16	Thu	S.Takahashi	On board	
			M.Takahashi	On board	
74	17	Fri	S.Takahashi		
			M.Takahashi		

Note MoFED : Ministry of Finance and Economic Development
MoWR : Ministry of Water Resource
SWRDB : Southern Water Resource Development Bureau
AWRDB : Amhara Water Resource Development Bureau

2. Explanation of Inception Report and Field Survey (October 5 to December 17, 2004)

No	Date		Member	Station	Activities
1	Mar. 6	Sun	Fujinami, S.Takahashi	On Board	
			Ninomiya	On Board	
2	7	Mon	Fuhinami, S.Takahashi, Ninomiya	Addis Ababa	
3	8	Tue	Jin, Fujinami, S.Takahashi, Ninomiya	Addis Ababa	Courtesy Call to JICA Courtesy Call to MoFED
4	9	Wed	Jin, Fujinami, S.Takahashi, Ninomiya	Addis Ababa	Courtesy Call to MoWR
5	10	Thu	Jin, Fujinami, S.Takahashi, Ninomiya	Addis Ababa	Discussion with SNNPR WRDB
6	11	Fri	Jin, Fujinami, S.Takahashi, Ninomiya	Addis Ababa	Discussion with SNNPR WRDB
7	12	Sat	Jin, Fujinami, S.Takahashi, Ninomiya	Addis Ababa	Study Team Meeting
8	13	Sun	Jin, Fujinami, S.Takahashi, Ninomiya	Addis Ababa	-
9	14	Mon	Jin, Fujinami, S.Takahashi, Ninomiya	Addis Ababa	Discussion with Amhara WRDB
10	15	Tue	Ninomiya	On Board	
			Jin, Fujinami, S.Takahashi	Addis Ababa	Discussion with Amhara WRDB
11	16	Wed	Ninomiya	Dubai	
			Jin, Fujinami, S.Takahashi	Addis Ababa	Report to Japan Embassy / JICA Ethiopia Office
12	17	Thu	Ninomiya		
			Jin, Fujinami, S.Takahashi	Addis Ababa	Courtesy Call to Japan Embassy
13	18	Fri	Fujinami, S.Takahashi	On Board	
14	19	Sat	Fujinami, S.Takahashi	Dubai	
15	20	Sun	Fujinami, S.Takahashi	-	

Appendix-3
List of Parties Concerned in the Recipient Country

Appendix-3 : List of Parties Concerned in the Recipient Country

Ministry of Finance and Economic Development
<Department of Bilateral Cooperation>

Mr. Tilahum Tadesse	Team Leader
Mr. Gebremedhine Birega	Desk Officer for Japan
Ms. Asnakech Teferra	Team Leader, Asia Australia & Middle East Countries

Ministry of Water Resources
<Planning & Project Department>

Mr. Gulilat Birhane	Department Head

<Urban Water Supply and Sanitation Department>

Mr. Yohannes G/Medhin	Department Head

Addis Ababa Water and Sewerage Authority
<Engineering Department>

Ms. Azeb Asneka	Department Head

Southern Nations, Nationalities and People's Regional State
<Water Resources Development Bureau>

Mr. Asfaw Dingamo	Bureau Head
Mr. Jemal Reshid	Vice Bureau Head
Mr. Getachew Geletu	Water Supply & Sanitation Department Head
Mr. Adane Temesgen	Equipment Vehicle Maintenance Head

<Water Works Construction Enterprise>

Mr. Tilahun Sarka	General Manager
Mr. Geremew Gamie	Water Well Drilling Department Head
Mr. Wudneh Ayele	Construction Department Head
Mr. Berhanu Alemseged	Office Engineering Head
Mr. Teffese Gedaoo	Action Head, Policy Study and Analysis Department

Japanese Embassy

Izumi, Kenjiro	Ambassador
Mihogi, Yoshiyuki	Second Secretary

JICA Ethiopia Office

Saito, Naoki	Resident Representative
Jin, Kimiaki	Deputy Resident Representative
Inoue, Hiromu	Assistant Resident Representative

JICA Groundwater Development & Water Supply Training Project

Dr. Maruo, Yuji	Chief Advisor
Ishigaki, Shigeki	Coordinator
Sagawa, Mitsuyoshi	Mechanical Engineer
Suzuki, Takashi	Drilling Engineer

FINNIDA/RESEP Amhara Region

Mr. Arto Suominen	Programme Coordinator

UNICEF

Mr. Tekka	Representative

ESRDF Amhara Region

Zenebe Worku	Rural Water Supply Team Leader

Appendix-4
Minutes of Discussion

Minutes of Discussions
The Basic Design Study on
The Project for Water Supply in Southern Nations, Nationalities and People's Regional State
in the Federal Democratic Republic of Ethiopia

In response to the request from the Government of the Federal Democratic Republic of Ethiopia (hereinafter referred to as 'Ethiopia'), the Government of Japan decided to conduct a Basic Design Study on the Project for Water Supply in Southern Nations, Nationalities and People's Regional State (hereinafter referred to as "the Project"), and entrusted the study to Japan International Cooperation Agency (hereinafter referred to as 'JICA').

JICA sent to Ethiopia the Basic Design Study Team (hereinafter referred to as 'the Team'), which was headed by Mr. Kimiaki Jin, Deputy Resident Representative, JIC A Ethiopia Office, JICA, and was scheduled to stay in the country from October 11th to December 7th, 2004.

The Team held a series of discussions with the officials concerned of the Government of Ethiopia and conducted a field survey in the study area.

In the course of discussions and field survey, both parties confirmed the main items described on the attached sheets. The Team will proceed to further work and prepare the Basic Design Study Report.

Addis Ababa, November 22nd, 2004

Mr. Kimiaki Jin
Leader,
Basic Design Study Team,
Japan International Cooperation Agency

Mr. Asfaw Dingamo
Head,
Water Resources Development Bureau,
Council of Southern Nations, Nationalities and People's Regional State,
Federal Democratic Republic of Ethiopia

Witness

Mr. Hailemichael Kinfe
Head,
Bilateral Cooperation Department,
Ministry of Finance and Economic Development,
Federal Democratic Republic of Ethiopia

ATTACHMENT

1. Objective of the Project

The objective of the Project is to improve the water supply services in Southern Nations, Nationalities and People's Regional State through providing drilling equipment and constructing water schemes in the selected sites in order to meet regional requirement to supply safe and adequate drinking water for the residents.

2. Responsible and Implementing Organization

Water Resources Development Bureau (WRDB), Council of Southern Nations, Nationalities and People's Regional State and Water Works Construction Enterprise (WWCE), the implementation entity of WRDB.

3. Sites of the Project

The Project sites requested by the Ethiopian side are as shown in Annex-1 (page 6). Ethiopian side clarified the selection criteria and promised to avoid duplication of sites with other donor's activities. Both sides confirmed that the number of selected villages (kebeles) shall be 129 kebeles, instead of 131 kebeles that had been proposed at the initial stage. Acco rdingly, it is also confirmed that total of 244 candidate sites are identified in the 129 kebeles as per the list attached in Annex-1. As a result of the social, geo-physical and hydro-geological survey, the sites will be finalized at the time when the draft final report is scheduled to be presented in February 2005.

4. Items requested by the Government of Ethiopia

After discussions with the Team on the points described as below, Ethiopian side finalized the items of the request described in Annex-2 (Page 7). JICA will assess the appropriateness of the request in engineering, social and financial terms and will report the findings to the Government of Japan.

(1) Exclusion of Cable Tool Percussion Rig

The Ethiopian side initially requested a cable tool percussion rig in order to drill borehole in sites with alluvial deposit. In response to this request, the Team articulated that the cable percussion rig is inefficient in its performance to be resulted in inappropriateness for the attainment of the purpose of the proposed Project. Cognizant of a fact that WWCE has one unit of cable tool percussion rig, though the rig is old, cost effectiveness of procurement of additional rig was discussed taking into account prioritization in terms of type of rigs, i.e., rotary rig

and cable percussion rig. Finally, both parties agreed that a cable tool percussion rig was excluded from the request taking the priority of the items into account.

(2) Specification of Success Wells

The specification of success well drilled in the Project was discussed and agreed as below,

- Discharge rate of well; more than 0.2 liter per second. The well shall be abandoned if discharge rate is found to be less than 0.2 liter per second.
- Pumping water level is not exceeding more than 60 m of depth.
- Most suitable type of hand pumps, i.e. village level operation and maintenance type (VLOM); Afridev for pumping water level with less than 40 m, while improved type of hand pump, e.g., Afrideep, for a range of 40 to 60 m of pumping water level.

(3) Utilization of Existing Boreholes

Ethiopian side pointed out that, in the Project sites, there might be several boreholes drilled by other donors and sealed without installation of pumps due to the lack of financial resource. Both sides discussed the possibility to install pumps in such boreholes and concluded the result that a) geo-physical survey to be curried in the Basic Design Study would not cover such sites, b) social survey shall included the inquiry of such existing water scheme both operational and not operational so that demand of communities would be clarified, c) WRDB shall provide the list of boreholes which includes well structure, geological log, result of pumping test and data of water quality, d) the issue would be brought back to Japan and discussed appropriateness of including in the Project.

(4) Capacity Building of Ethiopian side

Ethiopian side emphasized that capacity building of Woreda Water Desks is important for proper operation and maintenance of the schemes. Motorbikes, tools and spare parts for the pumps were requested to be provided by the Project.

WRDB is a regulatory body in charge of planning and designing, maintenance and rehabilitation of the water supply scheme so that water quality test kits and mobile workshop were requested in order to develop capacity of the bureau. The team will access the necessity to provide these equipment and report to the Government of Japan.

(5) Submersible Pump

Both sides agreed that the submersible pumps shall not be included in the Project activities.

ASFAW DEGAMO

(6) Cost Reduction in the Construction

Reduction of average unit cost for well construction is a prime concern for Japanese Grant Aid program in order to improve cost effectiveness. Application of shallow borehole with hand pump is recognized as one of the key approaches to cost reduction. Another approach shall be considered in a way that construction work shall be contracted out to local companies. The team will also examine the possible relation how to collaborate WWCE and Japanese contractor in the construction stage of water scheme in the Project.

5. Japan's Grant Aid Programme

Ethiopian side has understood the system and characteristics of Japan's Grant Aid Programme as described by the Team shown in Annex-3 (Page 8).

6. Necessary measures to be taken by the Ethiopia side

Ethiopian side will take the necessary measures, as described in Annex-4 (Page 12), for smooth implementation of the Project on condition that the Japanese Grant Aid is extended.

In the discussion on Annex-4, Ethiopian side pointed out that internal transportation cost should be covered by Grant Aid scheme while Ethiopian side would make necessary procedures and cover cost for custom and duties in these procedures.

Ethiopian side also expressed that the matching fund for the construction of water supply scheme would be properly allocated by Ethiopian side in accordance with the result of the Basic Design Study.

7. Further Schedule of the Study

a. The consultant members of the Team will proceed with further studies in Ethiopia until December 7th, 2004.

b. JICA will prepare the Draft Basic Design Study Report in English and dispatch a mission in order to explain and discuss its contents around February 2005.

8. Other relevant issues

(1) Baseline Survey

The social survey and geo-physical survey in the Basic Design Study will be conducted in 129 villages listed in Annex-1 as the baseline survey.

(2) Questionnaires

The Team submitted questionnaires on the responsible and implementing organization as well as design, construction and cost estimation to Ethiopian side.

Ethiopian side will fulfill the questionnaires by the end of October.

(3) Success Rate of Drilling

In response to the request by the team, Ethiopian side promised to provide relevant data indicating success rate of drilling by WWCE and WRDB.

(4) Ownership

Both sides confirmed that all the machineries, equipment and materials to be provided by the Project shall be owned by relevant government organizations to be specified by items respectively, including Water Resource Development Bureau, WWCE, Woreda Water Desk and related institutions. Both sides also confirmed that these provided items shall be used for the intended Project activities only during Project implementation.

(5) Maintenance of the Machineries, Equipment and Water Supply Facilities

The Ethiopian side has agreed to secure and allocate the necessary budget to operate and maintain the water well drilling machineries and equipment, and water supply facilities to be constructed by Project.

(6) Tax Payment

Value Added Tax (VAT), custom duties and any other taxes and fiscal levies in Ethiopia arisen from the Project activities will be born by beneficiary institution.

(7) Safety and security

The Ethiopian side agreed to take any necessary measures deemed necessary to secure the safety of the member of the Team.

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Annex-1 List of Requested Villages in Southern Nations, Nationalities and People's Region

No	Zone	Woreda	Kebele	Population	Type of Scheme	Qty
1	Dawero	Tocha	Kechi Idigit	1,600	HDW	3
2			Goradoba	1,746	SW-HP	2
3			Shechikale	2,681	SW-HP	2
4			Aba Dahi	1,848	SW-HP	2
5			Kechi	2,575	GPS	2
6			Shushuri	350	SP-onspot	2
7			Medihanalem	785	SP-onspot	3
8			Wara Gessa	1,512	SW-HP	3
9			Waruma Kessa	375	GPS	1
10			Waruma Kessa	225	SW-HP	2
11			Gorika	1,500	SW-HP	3
12			Aba	1,800	SW-HP	3
13		Loma	Loma Bata	2,488	SW-HP	3
14			Kawcha	1,912	SW-HP	4
15			Gufo Gato	1,710	SW-HP	3
16			Yeli Chawla	1,821	SW-HP	3
17			Lala Ambe	1,725	SW-HP	3
18			Dissa	2,694	SW-HP	5
19			Lomma Bale	2,488	SW-HP	5
20			Arga Bacho	1,500	SP-onspot	1
21		Esara	Duzi	920	SW-HP	1
22			Gego	1,570	SW-HP	1
23			Arusi Bale	325	GPS	1
24			Arusi Bale	402	SP-onspot	2
25			Gudumu	1,041	GPS	2
26			Guzi	1,250	SP-onspot	2
27			Hagali 02	1,535	SW-HP	2
28			Ofa	450	SP-onspot	2
29			Sengeti	1,250	GPS	1
30			Dalba 3/Dali/	2,225	SW-HP	4
31			Bale	5,250	SW-HP	10
32			Aruse Bale	1,228	SW-HP	2
33	Sidama	Hula	Chiro Ne	No Data	SW-HP	1
34			Worema	No Data	SW-HP	1
35			Gansa	No Data	SW-HP	1
36			Sukie Bonbie	No Data	SW-HP	1
37			Sede	No Data	SW-HP	1
38			Bedesa Chechu	No Data	SW-HP	1
39			Damlo Chercha	No Data	SW-HP	1
40			Abayie Qeraro	No Data	SW-HP	1
41			Menisa Wacho	No Data	SW-HP	1
42			Abayie Adola	No Data	SW-HP	1
43			Hobena Ganegawa	No Data	SW-HP	1
44			Deleya	No Data	SW-HP	1
45			Adahie	No Data	SW-HP	1
46	Gedeo	Yirga Chaffe	Hafursa worabi	1,000	SW-HP	2
47			Konga	1,100	SW-HP	2
48			Wote	1,050	SW-HP	2
49			Chelba	900	SW-HP	2
50			Chito	1,100	SW-HP	2
51			Oru Batala	No Data	SW-HP	1
52			Resity	No Data	SW-HP	1
53			Tutuity	No Data	SW-HP	1
54			Adame	No Data	SW-HP	1
55			Birbisa Kala	No Data	SW-HP	1
56			Chirku	No Data	SW-HP	1
57			Dako	No Data	SW-HP	1
58			Udessa	No Data	SW-HP	1
59			Kedida	No Data	SW-HP	1
60	Hadiya	Lemo	Bukuna chachey	5,413	SW-HP	2
61			Hayse	2,646	SW-HP	2
62			Lereba	3,000	SW-HP	2
63			Ana	4,511	SW-HP	1
64			Achamo	4,532	SW-HP	2
65			Doisha Hule	5,229	SW-HP	2
66			Lafto Lenka	3,716	SW-HP	1
67			Homa Gare	4,357	SW-HP	2
~~68~~		~~Shashogo~~	~~Doisha Kenemo~~	~~1,250~~	~~SW-HP~~	~~1~~
~~69~~		[illegible]	[illegible]	[illegible]	~~SW-HP~~	[illegible]
70	Wolaita	Boloso sore	Anchurcho Dege	8,013	SW-HP	3
71			Dmaba Zamina	11,597	SW-HP	4
72			Dubo	5,900	SW-HP	3
73			Ademancho	7,988	SW-HP	4
74			Gara Gubo	9,862	SW-HP	4
75			Wermuma	6,521	SW-HP	4
76			Gununo	5,969	SW-HP	3
77			Bomebea	No Data	SW-HP	1
78			Adila	No Data	SW-HP	1
79			Farawocha	No Data	SW-HP	1
80			Chama henbeacho	No Data	SW-HP	1
81			Matila Hibeche	No Data	SW-HP	1
82			Achura	No Data	SW-HP	1
83		Kindo Koyesha	Doge Mashedo	No Data	SW-HP	1
84			Doge Shakisho	No Data	SW-HP	1
85			Doge Sarosa	No Data	SW-HP	1
86	K.tembaro	Anegacha	WenejlaAmcho wato	No Data	SW-HP	1
87			Bonga	No Data	SW-HP	1
88			Lume suticho	No Data	SW-HP	1
89			Uetuge	No Data	SW-HP	1
90			Jeba Dodoba	No Data	SW-HP	1
91	Derashe	Special woreda	Ades Altema	No Data	Spring	1
92			Ades Altema	No Data	Spring	1
93			Walessa	No Data	Spring	1
94			L/Holte	No Data	Spring	1
95			L/Arguba	No Data	Spring	1
96			L/Arguba	No Data	Spring	1
97			L/Arguba	No Data	Spring	1
98			Walayte	No Data	Spring	1
99			Walayte	No Data	Spring	1
100			Busabaso	No Data	Spring	1
101			Busabaso	No Data	Spring	1
102	Silti	Silty	Aedebrwelwya Ageta	4,257	SW-HP	2
103			Bozie Sabola	2,633	SW-HP	2
104			Aegodie Lobriera	2,886	SW-HP	2
105			Dobo Bedeno	2,868	SW-HP	2
106			Senene Gerierar	3,806	SW-HP	2
107			Weliya Sidest	3,203	SW-HP	2
108			Koto Balosd	2,636	SW-HP	2
109			Asano Degderiea	3,808	SW-HP	2
110			Abezana	3,151	SW-HP	2
111			Daniecho Mukerie	7,558	SW-HP	2
112		Dalocha	Laygnaw Yedi	2,039	SW-HP	2
113			Acherayi Konecho	2,925	SW-HP	2
114			Bureka	1,799	SW-HP	2
115			Germama	1,257	SW-HP	2
116			Koro	1,572	SW-HP	2
117			Korogalay	2,279	SW-HP	2
118			Kura Kolisa	3,074	SW-HP	2
119			Golana Shemeto	1,933	SW-HP	2
120			Husend Shola	2,329	SW-HP	2
121			Waneja Golachiba	1,963	SW-HP	2
122	Gurage	Gumer	Hamebeyata	2,880	SW-HP	3
123			Wenwzerana Gorate	2,275	SW-HP	3
124			Zara	4,094	SW-HP	3
125			Fegnekir	4,735	SW-HP	3
126			Aremua	4,611	SW-HP	3
127	South Omo	Backo Gazer	Aynalem	3,158	SW-HP	2
128			Tanbale	2,857	SW-HP	2
129			Aydamr	3,198	SW-HP	2
130			Aldemer	2,144	SW-HP	1
131			Lofit	1,402	SW-HP	1
					Total	247

SW-HP : Shallow Borehole with Hand Pump
HDW: Hand Dug Well
GPS: Gravity Pipe System
SP: Spring

Annex-2 List of Requested Items

(1) Construction of water supply facilities including hand pump borehole, dug well, spring water supply system and rainwater tank for 129 Kebeles

(2) Procurement of following equipments

- Two units of rotary drilling rig
- 11 units of trucks for well drilling support
- 11 units of 4WD pick-up trucks
- Electric sounding equipment
- Computer
- Communication equipment
- Portable water quality test kit
- Motorbike

(3) Technical support in capacity building for Worada Water Officers and communities in order to enable the users to operate and manage the water supply facilities properly

However, necessity for procuring 4WD pick-up trucks is a subject for further discussion between Water Resources Development Bureau of Southern Nations, Nationalities and People's Regional State and Federal Ministry of Finance and Economic Development.

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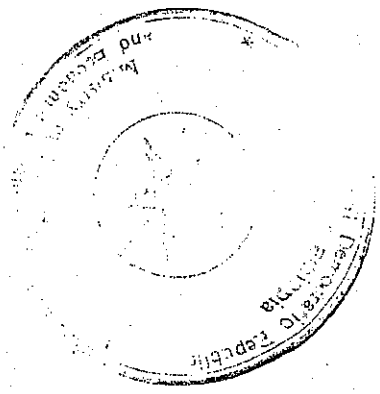

Annex-3

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 (hereinafter 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:

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

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

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ASFAW DINGAMO

Federal Democratic Republic of Ethiopia
Ministry of Finance and Economic Development

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

4) Preparation of a basic design of the Project.

5) 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 consulting firm(s) used for the Study is (are) recommended by JICA to the recipient country to also work in the Project's implementation after the Exchange 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 "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 the 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 the 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 Grant Aid should not be re-exported from the recipient country.

ASFAW DARGAMO

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.

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Annex-4

MAJOR UNDERTAKING TO BE TAKEN BY EACH GOVERNMENT

No.	Items	To be covered by Grant Aid	To be covered by Recipient Side
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site		●
4	To construct the parking lot		●
5	To construct roads		
	1) Within the site		●
	2) Outside the site		●
6	To procure equipment and materials for the project	●	
7	To construct water well, water intake, transmission/ distribution pipes, storage tank and public taps	●	
8	To bear the following commissions to the Japanese foreign exchange bank for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
9	To ensure unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
10	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contact such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.		●
11	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contracts.		●
12	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant.		●
13	To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment.		●

Note
B/A: Bank Arrangement
A/P : Authorization to Pay

ASFAW DENGAMO

MINUTES OF DISCUSSIONS
ON BASIC DESIGN STUDY
ON THE PROJECT FOR WATER SUPPLY IN SOUTHERN NATIONS, NATIONALITIES AND PEAPLES' REGIONAL STATE
IN THE FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
(EXPLANATION ON DRAFT REPORT)

In October 2004, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for water supply in southern nations, nationalities and peoples' regional state (hereinafter referred to as "the Project") to the Federal Democratic Republic of Ethiopia (hereinafter referred to as Ethiopia), and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

In order to explain and to consult the Ethiopia on the components of the draft report, JICA sent to Ethiopia the Draft Report Explanation Team (hereinafter referred to as " the Team "), which is headed by Mr. Kimiaki JIN, Deputy Resident Representative, JICA Ethiopia Office, from March 7th to March 18th 2005.

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

Addis Ababa, March 15th, 2005

Mr. Kimiaki JIN
Leader,
Draft Report Explanation Team,
Japan International Cooperation Agency,
Japan

Mr. Asfaw Dingamo
Head,
Water Resource Development Bureau,
Southern Nations, Nationalities and Peoples' Regional State,
Federal Democratic Republic of Ethiopia

Witnesses

Mr. Hailemichael Kinfu
Head,
Bilateral Cooperation Department,
Ministry of Finance and Economic Development,
Federal Democratic Republic of Ethiopia

Mr. Getachew Hamussa
Head,
Finance and Economy Development Coordination Bureau
Southern Nations, Nationalities and Peoples' Regional State,
Federal Democratic Republic of Ethiopia

ATTACHMENT

1. Components of the Draft Report

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

2. Japan's Grant Aid scheme

Ethiopian side understands the Japan's Grant Aid Scheme and the necessary measures to be taken by the Government of Ethiopia as explained by the Team and described in Annex-3 and Annex-4 of the Minutes of Discussions signed by both parties on November 22nd 2004.

3. Schedule of the Study

JICA will complete the final report in accordance with the confirmed item and send it to the Government of Ethiopia by May 2005.

4. Other relevant issues

The following issues were discussed and confirmed by both sides.

(1) Application of Offsetting under on-budget arrangement

It is well understood among authorities concerned that the intended project as Japan's Grant Aid Scheme shall be implemented in an ordinary and regulatory framework prevailing in the country that a project cost to be incurred by Japan shall be registered on the budget of the country. It is also understood that on-budgeted cost shall be treated under offsetting arrangement.

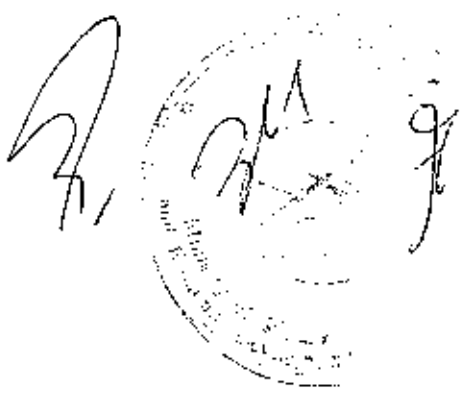
In accordance with this, it is confirmed that the Finance and Economic Development Coordination Bureau of the Southern Nations, Nationalities and Peoples' Regional State in close collaboration with the Water Resource Development Bureau of the SNNPRS shall make necessary arrangements as regional mandate for ensuring the smooth implementation of Japan's Grant Aid Scheme.

(2) Tax Payment

Value Added Tax (VAT), custom duties and any other taxes and fiscal levies in Ethiopia arisen from the Project activities will be born by the Ethiopian beneficiary institutions (SNNPRS).

(3) Components and Implementation of the Project

Both parties agreed that the Project would consist of the following components, provided that the Government of Japan finally decides the implementation of the Project.



a) Construction of 214 water supply facilities of shallow wells fitted with hand pumps.

b) Construction of 26 water supply facilities using existing springs.

c) Procurement of equipment consisting of:

- Two (2) sets of truck mounted rotary drilling rigs capable to drill down to 200m
- Two (2) sets of assembled air-lifting equipment for well development
- Two (2) sets of 10-ton cargo trucks
- Two (2) sets of 5-ton crane trucks
- Two (2) sets 12-ton of dump trucks
- One (1) set of geo-electric logging equipment capable to log down to 300m
- Two (2) sets of portable incubator for bacterial testing
- One (1) unit of chemical agent for water quality analysis
- Twenty-eight (28) sets of motor cycles with a capacity of 115 cc or more.

d) Support to capacity building of *woreda* personnel who support the communities for establishment of sustainable O&M of water supply facilities ("Soft Component")

It was also agreed by both parties that the Project would be implemented in two phases for Japanese two fiscal years, taking into account of the scale of the Project.

(4) Communities selected for construction of water supply facilities

Both parties agreed in principle that the target communities for construction of facilities under the Project would be two hundred forty (240) as listed in the attached. However, as a result of the hydro-geological investigation carried out under the basic study, thirteen (13) sites are found to have insufficient groundwater development potential. The Ethiopian party shall nominate alternative sites for those 13 sites before the Detail Design Study should start.

(5) Criteria for successful wells

Criteria for successful wells in implementation stage are as follows.

a) Well shall be not deeper than 80 m.

b) Yield shall be not less than 0.2 L/sec with a dynamic water level not deeper than 60 m.

c) Water quality for 'health significant' shall be within the Ethiopian standards for drinking water quality.

d) Water quality for taste-parameters shall be within acceptable levels to users.

(6) Countermeasures for unsuccessful wells

a) If a well should be dry, such well shall be backfilled.

b) If a well should yield water less than 0.2 L/sec with a dynamic water level not deeper than 60 m, such well shall in principle be backfilled with agreement of Ethiopian party.

c) If water quality dissatisfy the criteria above, a rid or cover shall be placed on such well which may in future be used for miscellaneous purposes except drinking purposes. All responsibility for using such

wells shall be borne by Ethiopian party once it is handed over.

(7) Alternative drilling sites

a) If a well first drilled in a community should not be successful, an alternative well can be drilled in the same community. Two wells including the first one shall be drilled in one community if the first well is unsuccessful.

b) If two wells should be unsuccessful in a community, an alternative site shall be selected in other community in the same *Kebele*. Such procedure shall be followed till a successful well is made for the originally planed well.

(8) Communities' undertaking

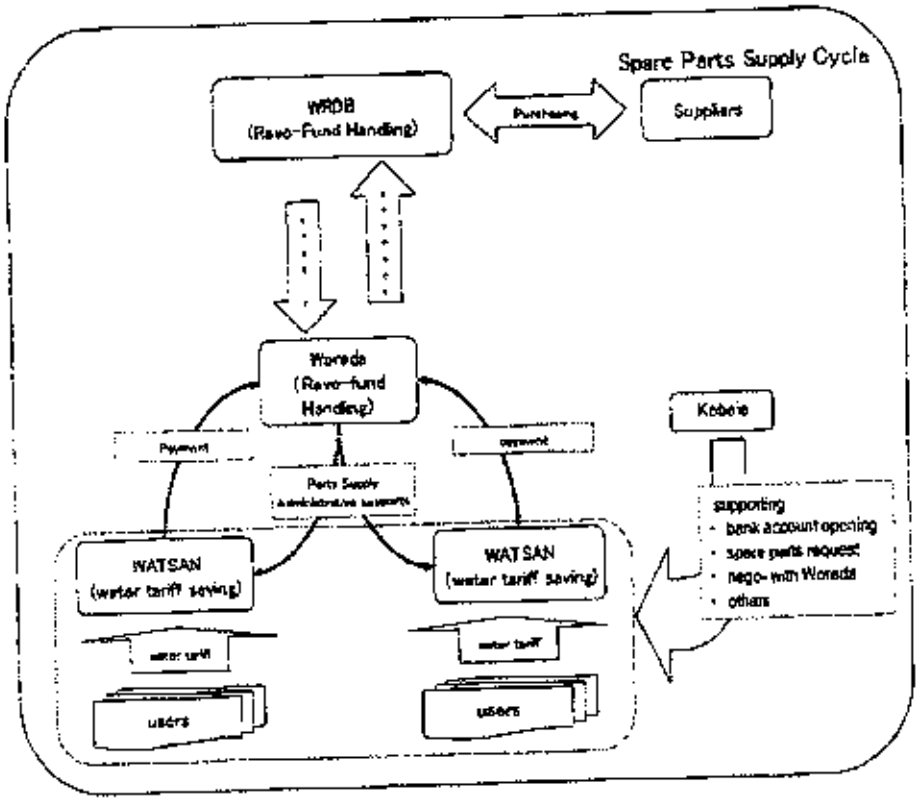
Communities shall construct a fencing arrangement around facilities to be constructed by the Project. Such fencing construction shall be conducted at the expense of the communities.

(9) Operation and maintenance of facilities

Under the Project, technical support ('soft component support') will be provided to personnel mainly of *woreda* offices so that they shall continue to support communities for sustainable operation and maintenance of facilities.

(10) Procurement of Hand Pump Spare Parts after the Project

Ethiopian party agreed that spare parts should be procured and supplied as shown in the following figure. The WRDB shall be the responsible body for this arrangement. This proposed procurement cycle can be replaced with another spare parts procurement cycle as the World Bank is presently trying to establish if it is in place in future.



(11)Budget allocation

The Ethiopian party agreed to allocate necessary counterpart funds for implementation of the Project. The funds to be allocated shall be for:

a) daily allowance and transportation costs for personnel of *woredas* who shall participate soft-component training to be conducted by the consultant.

b) the works proposed in the report to be carried out by the implementing agency WRDB.

(12) Other Undertakings of the Counterpart Agency

a) WRDB shall allocate sufficient personnel to relevant *woredas* so that soft-component training should be conducted smoothly and effectively.

b) The Ethiopian party shall maintain proper access to drilling sites so that drilling rigs can reach the site without difficulties.

c) The Ethiopian party shall be responsible for organizing Water and Sanitation Committee (WATSAN) with the soft-component support from this Project.

d) Ethiopian party agreed to secure land and warehouses to properly store equipment, spare parts and accessories to be procured.

e) Ethiopian party agreed to provide land for temporary site management offices for the Contractor and Consultant at Awasa, Arba Minch, Hossaina, and Tercha.

(13)Project Title

Both parties agreed that the Project title shall be: 'The Project for Water Supply in Southern Nations, Nationalities and Peoples' Regional State, Federal Democratic Republic of Ethiopia.

End of the document

Table-1 Selection of Target Communities(1/3)

No. in the original list	K-No.	Zone	Woreda	Kebele	Type of Schem & Q'ty (Recommended for B/D)					Notes
					Q'ty	HDW	SW-HP	SP-onspot	GPS	
1	SK-1	Dawero	Tocha	**Kechi Idigit -> Kechi**	3		3			"Kechi Idigit" is the same as "Kechi Kebele". "Kechi Idigit" shall read as "Kechi". See (SK-17)
2	SK-2	Dawero	Tocha	Goradoba	2		2			
3	-	Dawero	Tocha	Shechikale	0		0			Canceled due to inaccessibility (2 hrs walk to reach)
4	SK-3	Dawero	Tocha	**Aba Dahi -> Aba**	3		3			"Aba Dahi" was merged with "Aba Kebele". See (SK-3)
5	(SK-1)	Dawero	Tocha	Kechi	2				2	same village as SK-17
6	SK-4	Dawero	Tocha	Shushuri	2			2		
7	SK-5	Dawero	Tocha	Medihanalem	3			3		
8	SK-6	Dawero	Tocha	Wara Gessa	3		3			
9	SK-7	Dawero	Tocha	Waruma Kessa	1				1	
10	SK-7	Dawero	Tocha	Waruma Kessa	3		3			
11	SK-8	Dawero	Tocha	Gorika	3		3			
12	(SK-3)	Dawero	Tocha	Aba	3		3			same village as SK-3
13	SK-9	Dawero	Loma	**Loma Bota -> Loma Borge**	2		2			"Loma Bata" shall read as "Loma Borze"
14	-	Dawero	Loma	Kawcha	0		0			Canceled due to inaccessibility (2.5 hrs walk to reach)
15	SK-10	Dawero	Loma	Gufo Gato	6		6			
16	-	Dawero	Loma	Yeli Chawla	0		0			Canceled due to inaccessibility (3 hrs walk to reach)
17	SK-11	Dawero	Loma	Lala Ambe	5		5			
18	SK-12	Dawero	Loma	Dissa	7		7			
19	SK-13	Dawero	Loma	Lomma Bale	6		6			
20	SK-14	Dawero	Loma	Arga Bacho	1			1		
21	SK-15	Dawero	Esara	**Duzi**	1		1			
22	SK-16	Dawero	Esara	Gego	1		1			
23	SK-17	Dawero	Esara	Arusi Bale	2				2	One spring in re-(SK-17) is developed as GPS.
24	(SK-17)	Dawero	Esara	Arusi Bale	1			1		- do -
25	SK-18	Dawero	Esara	Gudumu	2				2	
26	(SK-15)	Dawero	Esara	**Guzi -> Duzi**	2			2		"Guzi" shall read as "Duzi"
27	SK-19	Dawero	Esara	Hagali 02	2		2			
28	SK-20	Dawero	Esara	Ofa	2			1	1	One spring for SP-on-spot, the other for GPS
29	SK-21	Dawero	Esara	Sengeti	1				1	
30	SK-22	Dawero	Esara	Dalba 3/Dali/	4		4			
31	SK-23	Dawero	Esara	Bale	10		10			
32	(SK-17)	Dawero	Esara	Aruse Bale	2		2			same village as SK-17
33	SK-24	Sidama	Hula	Chiro Ne	2		2			
34	SK-25	Sidama	Hula	Woreina	2		2			
35	SK-26	Sidama	Hula	**Gansa -> Gasse**	2		2			"Gansa" shall read as "Gasse".
36	-	Sidama	Hula	Sukie Bonbie	0		0			Canceled due to inaccessibility (el. 500 m down a valley)
37	SK-27	Sidama	Hula	Sede	1		1			
38	-	Sidama	Hula	Bedesa Chechu	0		0			Canceled due to inaccessibility (opposite side over a valley)
39	SK-28	Sidama	Hula	Damlo Chercha	1		1			
40	SK-29	Sidama	Hula	Abayie Qeraro	1		1			
41	SK-30	Sidama	Hula	Menisa Wacho	1		1			
42	-	Sidama	Hula	Abayie Adola	0		0			Cancelled due to in accessibility (6 km on foot path)
43	SK-31	Sidama	Hula	Hobena Ganegawa	1		1			
44	SK-32	Sidama	Hula	Deleya	1		1			
45	SK-33	Sidama	Hula	Adahie	1		1			

Table-1 Selection of Target Communities(2/3)

No. in the original list	K-No.	Zone	Woreda	Kebele	Type of Schem & Q'ty (Recommended for B/D)					Notes
					Q'ty	HDW	SW-HP	SP-onspot	GPS	
46	SK-34	Gedeo	Yirga Chaffe	Hafursa worabi	2		2			
47	SK-35	Gedeo	Yirga Chaffe	Konga	2		2			
48	SK-36	Gedeo	Yirga Chaffe	Wote	2		2			
49	SK-37	Gedeo	Yirga Chaffe	Chelba	2		2			
50	SK-38	Gedeo	Yirga Chaffe	Chito	2		2			
51	SK-39	Gedeo	Yirga Chaffe	Oru Batala	1		1			
52	SK-40	Gedeo	Yirga Chaffe	Resity	1		1			
53	SK-41	Gedeo	Yirga Chaffe	Tutuity	1		1			
54	SK-42	Gedeo	Yirga Chaffe	Adame	1		1			
55	SK-43	Gedeo	Yirga Chaffe	Birbisa Kala	1		1			
56	SK-44	Gedeo	Yirga Chaffe	Chirku	1		1			
57	SK-45	Gedeo	Yirga Chaffe	Dako	1		1			
58	SK-46	Gedeo	Yirga Chaffe	Udessa	1		1			
59	SK-47	Gedeo	Yirga Chaffe	Kedida	1		1			
60	SK-48	Hadiya	Lemo	Bukuna chachey	2		2			
61	SK-49	Hadiya	Lemo	Hayse	2		2			
62	SK-50	Hadiya	Lemo	Lereba	2		2			
63	SK-51	Hadiya	Lemo	Ana	2		2			
64	SK-52	Hadiya	Lemo	Achamo	2		2			
65	-	Hadiya	Lemo	Doisha Hule	0		0			Canceled due to the kebele in Shashogo wareda
66	SK-53	Hadiya	Lemo	Lafto Lenka	2		2			
67	SK-54	Hadiya	Lemo	Homa Gare	2		2			
68	-	Hadiya	Shashogo	Doisha Kenema	0		0			Canceled by the Ethiopia. No alternative sites are proposed.
69	-	Hadiya	Misha	Wesgehta 1&2	0		0			Canceled by the Ethiopia. No alternative sites are proposed.
70	SK-55	Wolaita	Boloso sore	Anchurcho Dege	3		3			
71	SK-56	Wolaita	Boloso sore	Dmaba Zamina	4		4			
72	SK-57	Wolaita	Boloso sore	Dubo	3		3			
73	SK-58	Wolaita	Boloso sore	Ademancho	2		2			
74	SK-59	Wolaita	Boloso sore	**Gara Gubo -> Gara Godo**	4		4			"Gara Gubo" shall read as "Gara Godo"
75	SK-60	Wolaita	Boloso sore	Wermuma	4		4			
76	SK-61	Wolaita	Boloso sore	Gununo	3		3			
77	SK-62	Wolaita	Boloso sore	Bomebea	3		3			
78	SK-63	Wolaita	Boloso sore	Adila	1		1			
79	SK-64	Wolaita	Boloso sore	Farawocha	1		1			
80	SK-65	Wolaita	Boloso sore	Chama henbeacho	1		1			
81	SK-66	Wolaita	Boloso sore	Matila Hibeche	1		1			
82	SK-67	Wolaita	Boloso sore	Achura	1		1			
83	SK-68	Wolaita	Kindo Koyesha	Doge Mashedo	1		1			
84	SK-69	Wolaita	Kindo Koyesha	Doge Shakisho	1		1			
85	SK-70	Wolaita	Kindo Koyesha	**Doge Sarosa -> Doge Larosa**	1		1			"Goge Sarosa" shall read as "Doge Larosa"
86	SK-71	K.tembaro	Anegacha	WenejlaAmcho wato	1		1			
87	SK-72	K.tembaro	Anegacha	Bonga	1		1			
88	SK-73	K.tembaro	Anegacha	Lume suticho	1		1			
89	SK-74	K.tembaro	Anegacha	Uetuge	1		1			
90	SK-75	K.tembaro	Anegacha	Jeba Dodoba	1		1			
91	SK-76	Derashe	Special Woreda	Ades Altema	1				1	
92	SK-76	Derashe	Special Woreda	Ades Altema	1			-	1	32 km away from the wareda office
93	-	Derashe	Special Woreda	Walessa	0			-	-	"The spring" is a dug well. Not possible to develop for GPS or SP-on-Spot
94	-	Derashe	Special Woreda	L/Holte	0			-	-	- do -

Table-1 Selection of Target Communities(3/3)

No. in the original list	K-No.	Zone	Woreda	Kebele	Type of Schem & Q'ty (Recommended for B/D)					Notes
					Q'ty	HDW	SW-HP	SP-onspot	GPS	
95	SK-77	Derashe	Special Woreda	L/Arguba	1				1	
96	(SK-77)	Derashe	Special Woreda	L/Arguba	1				1	same village as SK-77
97	(SK-77)	Derashe	Special Woreda	L/Arguba	1				1	same village as SK-77
98	SK-78	Derashe	Special Woreda	Walayte	1				1	
99	-	Derashe	Special Woreda	Walayte	0			-	-	Yield is too small to develop
100	SK-79	Derashe	Special Woreda	Busabaso	1				1	
101	-	Derashe	Special Woreda	Busabaso	0			-	-	Facility for a spring-on-spot exists.
102	-	Silti	Silty	Aedebrwelwya Ageta	0		0			Canceled due to inaccessibility (3 hrs walk)
103	SK-80	Silti	Silty	Bozie Sabola	2		2			
104	SK-81	Silti	Silty	Aegodie Lobriera	3		3			
105		Silti	Silty	Dobo Bedeno	0		0			Canceled due to inaccessibility (3 hrs walk)
106	SK-82	Silti	Silty	Senene Gerierar	2		2			
107	SK-83	Silti	Silty	Weliya Sidest	2		2			
108	SK-84	Silti	Silty	Koto Balosd	3		3			
109	SK-85	Silti	Silty	Asano Degderiea	4		4			
110		Silti	Silty	Abezana	0		0			Canceled due to inaccessibility (3 hrs walk)
111	SK-86	Silti	Silty	Daniecho Mukerie	4		4			
112	SK-87	Silti	Dalocha	Laygnaw Yedi	2		2			
113	SK-88	Silti	Dalocha	Acherayi Konecho	2		2			
114	SK-89	Silti	Dalocha	Bureka	2		2			
115	SK-90	Silti	Dalocha	Germama	2		2			Merged with 117 Korogalay, renamed as Germama Gala
116	SK-91	Silti	Dalocha	Koro	2		2			
117	(SK-92)	Silti	Dalocha	Korogalay	2		2			Merged with 115 Germama, renamed as Germama Gala
118	SK-92	Silti	Dalocha	Kura Kolisa	2		2			Merged with 119 Golana Shemeto, renamed as Gola Kure
119	SK-94	Silti	Dalocha	Golana Shemeto	2		2			Merged with 118 Kura Kolisa, renamed as Gola Kure
120	SK-93	Silti	Dalocha	Husend Shola	2		2			Merged with 121 Waneja Golachiba, renamed as Wanja Shaola
121	SK-96	Silti	Dalocha	Waneja Golachiba	2		2			Merged with 120 Husend Shola, renamed as Wanja Shaola
122	(SK-94)	Gurage	Gumer	Hamebeyata	3		3			
123	SK-95	Gurage	Gumer	Wenwzerana Gorate	3		3			
124	(SK-96)	Gurage	Gumer	Zara	3		3			
125	SK-97	Gurage	Gumer	Fegnekir	3		3			
126	SK-98	Gurage	Gumer	Aremua	3		3			
127	SK-99	South Omo	Backo Gazer	**Aynalem -> Alga**	1		1			All kebeles nominated in South Omo are inaccessible
128	SK-100	South Omo	Backo Gazer	**Tanbale -> Kaysa**	2		2			Alternative kebeles were proposed by the Zone/Wareda
129	SK-101	South Omo	Backo Gazer	**Aydamr -> Muti**	2		2			
130	SK-102	South Omo	Backo Gazer	**Aldemer -> Ayda**	2		2			
131	SK-103	South Omo	Backo Gazer	**Lofit -> Gazer**	1		1			
					240		214	11	15	