

No.

**BASIC DESIGN STUDY REPORT
ON
INTEGRATED WATER USE PROJECT (PHASE 2)
IN
THE REPUBLIC OF THE GAMBIA**

FEBRUARY 2004

**JAPAN INTERNATIONAL COOPERATION AGENCY
JAPAN TECHNO CO., LTD.**

GR 1

JR

04-021

PREFACE

In response to a request from the Government of the Republic of the Gambia, the Government of Japan decided to conduct a basic design study on the Integrated Water Use Project (Phase 2) and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to the Gambia a study team from 20th August 2003 to 14th September 2003.

The team held discussions with the officials concerned of the Government of the Republic of the Gambia, 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 the Gambia in order to discuss a draft basic design, from 14th to 20th January 2004, 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 Republic of the Gambia for their close cooperation extended to the teams.

February 2004

Kunimitsu Yoshinaga

Vice-President

Japan International Cooperation Agency

February 2004

LETTER OF TRANSMITTAL

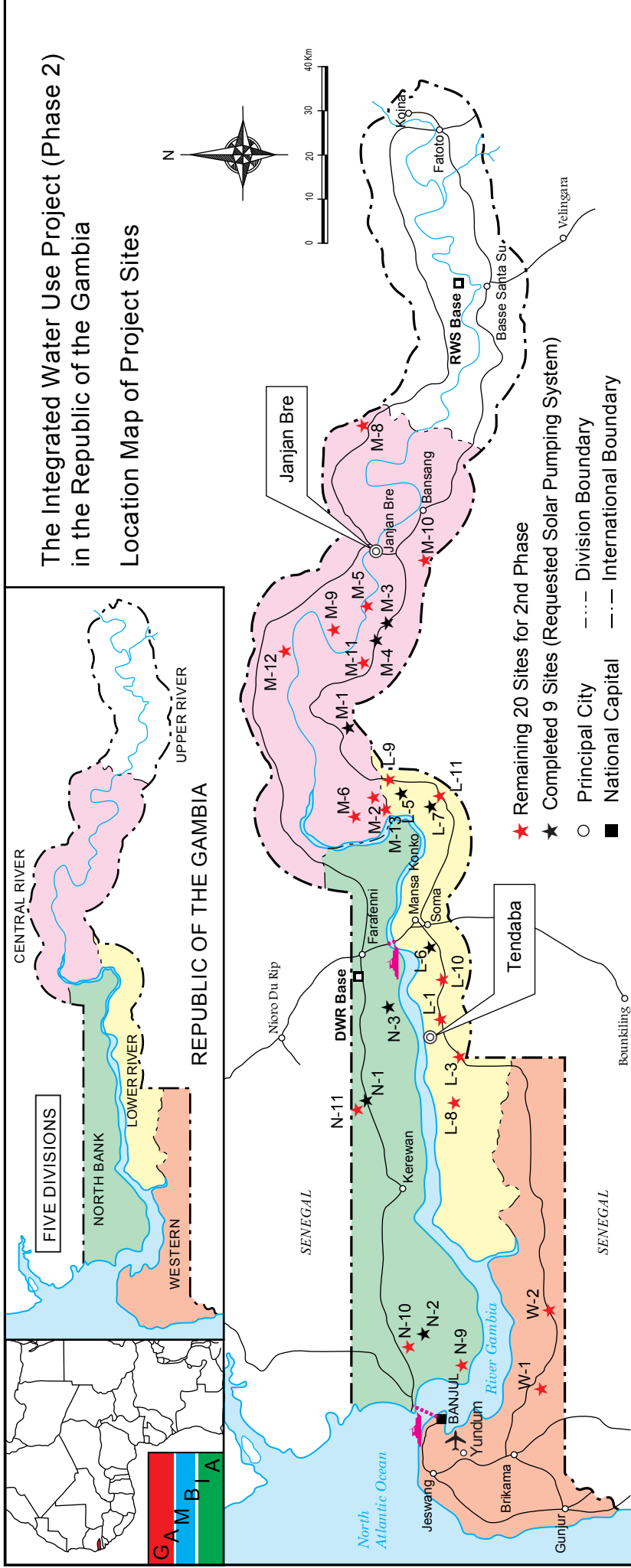
We are pleased to submit to you the basic design study report on the Integrated Water Use Project (Phase 2) in the Republic of the Gambia.

This study was conducted by Japan Techno Co., Ltd, under a contract to JICA, during the period from August 2003 to February 2004. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of the Gambia 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,

Shigeyoshi Kagawa
Project Manager
Basic Design Study Team
The Integrated Water Use Project
(Phase 2)
The Republic of the Gambia
Japan Techno Co., Ltd.



NORTH BANK			LOWER RIVER			CENTRAL RIVER		
No.	Site Name	District	No.	Site Name	District	No.	Site Name	District
N-1	Njaba Kunda	Central Baddibu	L-1	Nema	Kiang Central	M-1	Mamut Fana	Niamina East
N-2	Fass Omar Sahor	Upper Niiumi	L-3	Dumbutu	Kiang West	M-2	Piniai	Niamina West
N-3	Katchang	Upper Baddibu	L-5	Baro Kunda	Jarra East	M-3	Brikama Ba	Fuladu West
N-9	Tuba Kolong	Upper Niiumi	L-6	Toniataba	Jarra West	M-4	Madina Umfally	Fuladu West
N-10	Madina Sering Mass	Lower Niiumi	L-7	Bureng	Jarra East	M-5	Saruja	Fuladu West
N-11	Nawleru	*1 Central Baddibu	L-8	Jali	Kiang West	M-6	Dankunku	Niamina Dankunku
WESTERN			L-9	Pakali Ba	Jarra East	M-8	Sami Pachonki	Sami
W-1	Sohm	*2 Kombo East	L-10	Masseme	Kiang East	M-9	Sukuta	Niani
W-2	Sutusinjang	*3 Foni Brefet	L-11	Wellingara	*4 Jarra East	M-10	Galleh Manda	Fuladu West
						M-11	Jakhally	*5 Fuladu West
						M-12	Bakadagy	*6 Nianija
						M-13	Sambang Complex	*7 Niamina West

* Replaced Sites



INTEGRATED WATER USE PROJECT (PHASE 2) IN THE REPUBLIC OF THE GAMBIA

LIST OF FIGURES AND TABLES

Figures

	Page
Figure 2-1	2-22
Figure 2-2	2-30
Figure 2-3	2-31
Figure 2-4	2-41
Figure 2-5	2-47
Figure 2-6	2-48
Figure 2-7	2-49
Figure 2-8	2-50
Figure 2-9	2-51
Figure 2-10	2-52
Figure 2-11	2-53
Figure 2-12	2-54
Figure 2-13	2-55
Figure 2-14	2-56
Figure 2-15	2-57
Figure 2-16	2-58
Figure 2-17	2-59
Figure 2-18	2-60
Figure 2-19	2-61
Figure 2-20	2-62
Figure 2-21	2-63
Figure 2-22	2-64
Figure 2-23	2-65
Figure 2-24	2-66
Figure 2-25	2-67
Figure 2-26	2-68
Figure 2-27	2-69
Figure 2-28	2-70
Figure 2-29	2-71
Figure 2-30	2-73
Figure 2-31	2-83

Tables

Table 1-1	1-2
Table 1-2	1-3
Table 1-3	1-4
Table 1-4	1-6

Table 2-1	Logical Framework of the Project (Project Design Matrix: PDM)	2-3
Table 2-2	Outline of the Project	2-4
Table 2-3	List of the Project Sites	2-4
Table 2-4	Evaluation Table for Construction of New Water Supply Facilities in accordance with Site Selection Criteria	2-7
Table 2-5	Number of Existing Piped Water Supply Facilities in the Gambia	2-9
Table 2-6	Comparison between Solar and Diesel Engine-Powered Pumping System	2-10
Table 2-7	Requirements for Application of Solar Pumping System	2-12
Table 2-8	Water Quality Analyses of Existing Water Sources at Project Sites	2-15
Table 2-9	Budget of DWR in Past Three Years (2001-2003)	2-21
Table 2-10	Borehole Drilling Performance by DWR (1996-2001)	2-22
Table 2-11	Present Construction Methods in the Gambia and Methods Adopted in the Project	2-23
Table 2-12	Design Borehole Drilling Depths	2-29
Table 2-13	Condition of Existing Equipment	2-35
Table 2-14	Specifications of Supporting Vehicles to be Procured	2-37
Table 2-15	Specifications of Supporting Equipment to be Procured for Operation and Maintenance	2-38
Table 2-16	Quantity of Spare Parts Procured for 10 Sites in a Project funded by UNDP/UNCDF	2-38
Table 2-17	Procurement Schedule of Spare Parts for Solar Pumping System	2-42
Table 2-18 (A)	Quantity of Spare Solar Panels (Phase 1)	2-43
Table 2-18 (B)	Quantity of Spare Solar Panels (Phase 2)	2-43
Table 2-18 (C)	Quantity of Spare Solar Panels (Phase 3)	2-43
Table 2-19	Specifications of Solar Pumping System to be Installed	2-44
Table 2-20	Water Supply Facilities Plan	2-46
Table 2-21	Scope of Works of the Japanese Consultant	2-75
Table 2-22	Assignment of the Consultant for Supervision of the Project	2-75
Table 2-23	Number of Times for Compressive Strength Test for Concrete	2-76
Table 2-24	Classification of Origin of Equipment and Materials to be Procured	2-78
Table 2-25	Description of Phase-Wise Implementation	2-79
Table 2-26	Project Implementation Schedule	2-80
Table 2-27	Demarcation of Responsibilities in Operation and Maintenance of Solar-Powered Water Supply Facilities	2-86
Table 2-28	Summary of the Planned Activities in the Software-Component Programme	2-101
Table 2-29	Operation and Maintenance Cost for Solar Pumping System	2-131
Table 3-1	Effects and Improvements due to Project Implementation	3-1

LIST OF ABBREVIATIONS

AfDB	African Development Bank
A/P	Authorization to Pay
B/A	Banking Arrangement
BHN	Basic Human Needs
CRD	Central River Division
CILSS	Comité Permanent Inter Etats de Lutte contre la Sécheresse au Sahel (Permanent Interstate Committee for Drought Control in the Sahel)
DWR	Department of Water Resources
EDF	European Development Fund
E/N	Exchange of Notes
GMD	Gambian Dalasi
GNI	Gross National Income
HDI	Human Development Index
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immuno-Deficiency Syndrome
JICA	Japan International Cooperation Agency
LRD	Lower River Division
JPY	Japanese Yen
NAWEC	National Water and Electricity Company
NBD	North Bank Division
NGO	Non-Governmental Organization
OJT	On-the-Job Training
PRA	Participatory Rural Appraisal
PDM	Project Design Matrix
PRSP	Poverty Reduction Strategy Papers
SDRD	Support to Decentralised Rural Development
UPVC	Unplasticized Polyvinyl Chloride Pipes
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
VDC	Village Development Committee
VIP	Ventilated Improved Pit (Latrine)
VWC	Village Water Committee
WD	Western Division
WHO	World Health Organization

Summary

The Republic of The Gambia (hereafter referred to as the Gambia) is situated at the western end of Sub-Sahara of African continent, lat. 13 ° 28" N and long. 16 ° 34" W, fronting onto the Atlantic Ocean. The population is approximately 1.35 million (estimated in 2002) with GNI 320US\$ (World Bank, 2001). The area of the country is 11,295km² (about 3.1% of that of Japan). The Gambia has drawn a long term development plan 'Vision2020' as well as Poverty Reduction Strategy Paper (PRSP, 2002) to improve living standards of the population and sanitation, hygiene and primary health care sectors wherein supply of the good quality potable water in rural areas is the highest development priority. The Human Development Index (UNDP, Human Development Report, 2003) is ranked at 151 out of 175 countries with a gravely low development level of health and hygiene sectors among West African countries. Therefore, provision of social infrastructure services in the rural areas is a significant development issue of the Gambia. With these the Government of the Gambia has constructed water supply facilities with boreholes and provided the population with technical support for operation and maintenance. However, the nationwide water supply coverage rate is as low as 62% and 53% for rural areas, which means that one third of the national population is forced to drink unhygienic water.

Upon receiving a request from the Gambian government, the Japanese government started the Integrated Water Use Project in 1992 composed of procurement of drilling equipment and construction of water supply facilities with boreholes. This project was however, suspended at the 3rd stage of Phase I, divided into 4 stages in total, due to a political disorder, leaving 20 sites of 30 planned sites untouched. Thereafter, since 1996 Japan had observed the progress of democratisation until March 1997 to decide resuming the assistance. In 1998 policy discussions were held as to the grant aid and technical cooperation schemes. To benefit a large extent of general public, Phase II of the Integrated Water Use Project being suspended since 1994 was brought to a discussion for re-implementation to intensively support Basic Human Needs (BHN).

Having these as a background, the Government of the Gambia drew 'the Integrated Water Use Project (Phase 2)' for construction of water supply facilities with solar pumping systems and procurement of equipment for the remaining 20 sites as well as conversion of the diesel generators to solar pumping systems for the 10 completed sites in the previous project and requested a grant aid assistance to the Government of Japan in 2001. Japan International Cooperation Agency (JICA) dispatched a study team in

January 2002 to check conditions of the equipment procured in 1992 in the previous grant aid project and to make necessary follow-up. The procured drilling machine is still made full use after 10 years of its procurement, yet some equipment needed spare parts and repairs. The support for these was rendered as a scope of the follow-up study.

Further, in order to formulate basic design of the project consistent with conditions of the Japan's grant aid assistance, JICA concluded to conduct a basic design study. A basic design study team was dispatched between 20th August to 14th September 2003 to discuss with the Government of the Gambia and conduct a basic design study entailing natural and social conditions surveys of the target areas. Having returned, the team analysed the contents of the discussions and field survey results to complete this report with explanations of the draft basic design to the Gambian government between 14th January and 20th January 2004.

From the results of the basic design study, one (1) site with the existing piped water scheme constructed in the previous project was deleted from the requested 30 sites since the pumping system had already been rehabilitated to solar pumping system by another donor. The remaining 29 sites in 4 Divisions are targeted to construction of water supply facilities with a borehole fitted with solar pumping system and conversion of the existing water supply facilities with diesel generator to solar pumping system. This project leads to improvement of living and sanitary environment and securing potable water for approximately 80,000 populations¹ in rural poor villages.

The executing agency of this project is the Department of Water Resources (DWR) whose headquarters is located in the capital, Banjul and the 239 staff is working. It is organized as a water resources development and supply entity as part of the Department of State for Fisheries, Natural Resources and the Environment based on the National Water Resources Act, 1978. The main tasks are development and conservation of groundwater for potable and livestock raising purposes. Concerning operation and maintenance of water supply facilities, DWR is supporting the beneficial communities through its staff at Divisional level to establish participatory operation and maintenance system. Water usage by residents in the target areas at present is 15-20 l/person/day fetched with a bucket from traditional shallow wells and wells with handpumps which is contaminated with coliform. According to the socio-economic survey, the willingness to pay at the targeted 29 villages is approximately 30-40 GMD

¹ Estimated population at the target year of 2015

(Japanese Yen 138-184)/person/year. Operation and maintenance of solar pumping system constructed in this project will be executed based on a contract between villages and local maintenance companies. The result of simulation forecasted that 20 years operation is possible with 40 GMD (JPY 184)/person/year at target villages with about 2,000 inhabitants.

For construction of boreholes as water source of the facilities in this project, existing drilling equipment owned by DWR will be utilised as the department is a sole entity specialised in groundwater development in the Gambia. The drilling equipment possessed by DWR was procured by the grant aid assistance by Japan in 1992. The equipment is still at work after 10 years, thus operation and maintenance capacity of DWR can be well rated. A follow-up study was conducted in January 2002 to procure spare parts of the equipment. In October 2003, a Japanese expert was dispatched for repair works of the equipment with utilising the procured spare parts. Therefore, no spare parts of the drilling equipment will be purchased in this project. Exception is made for supporting vehicles to be procured at the minimum requirements for project operation, as these have been used more than 10 years. Motorbikes and a computer set will also be procured to support operation and maintenance activities to be facilitated by DWR.

The agreed components of the project are outlined below. If the project is approved for implementation under Japan's grant aid assistance, the provisional cost estimate is 901 million Japanese Yen (JPY) (about 196 million Dalasi) in total, JPY 868 million (189 million Dalasi) as Japan's assistance and JPY 33 million (7 million Dalasi) as responsibility of the Gambian side.

1. Construction of Water Supply Facilities

The project adopts piped water supply schemes sourced by boreholes. In other words, facilities such as borehole, pump pit, solar pumping system, elevated water tank, and public faucets will be connected with each other by transmission and distribution pipes. Construction of 20 piped water supply schemes for 29 villages and conversion of existing 9 schemes with diesel generators to solar-powered ones are to be implemented.

Facility	Contents
Intake Facility	1) Boreholes as water sources (1) Newly constructed boreholes (Depth 70m ~ 100m): 20 boreholes (2) Existing boreholes: 9 boreholes 2) Pumping devise: Submersible motor pump: 29 units 3) Power Source: Solar pumping system: 29 units
Operation System	1) Inverter: 29 units Installation of control panel and valves (partly attached to existing water tanks)
Pipeline	1) Total extension length: 51.6km Transmission pipes(50 ~ 75mm), Distribution pipes(25 ~ 140mm) 2) Depending on geographical conditions, for transmission, stainless steel pipes and UPVC, and for distribution, UPVC and HDPE are to be used.
Water Storage Facility	1) Elevated tank made of reinforced concrete (height 5m) 30m ³ : New installation 7 units 50m ³ : New installation 11 units 70m ³ : New installation 2 units
Public Faucet	1) New installation: total 319 units (1 tap per unit)

2. Procurement of Equipment and Materials

Supporting vehicles for construction works and equipment for operation and maintenance activities will be procured.

No.	Items	Purpose	Q'ty
1	Double cabin pick-up truck	Support for construction works	2 units
2	4WD station wagon	Support for construction works	1 unit
3	Motorbike (Off-road type)	Operation and maintenance	8 units
4	Computer	Operation and maintenance	1 set

3. Software Component

Beneficial communities of the project will primarily be responsible for operation and maintenance of the constructed water supply facilities while the maintenance and repair works of the solar pumping system will be contracted out to local service providers by the communities. A system of support services provision by the government and private sector is in place in the Gambia for operation and maintenance of solar pumping system as a benefit of continuous efforts by the government to promote participation of the private sector in operation and maintenance activities in rural water supply as a national strategy. For this existing system to function effectively, user communities of the water supply facilities require to understand scope and

appropriate use of such support services as well as to have capacities and system to execute operation and maintenance activities. For this purpose, a software-component programme will be implemented to support the following.

- Formation and capacity building of Village Water Committees (VWCs) and facilitation of conclusion of maintenance contract between the target communities and local private company
- Health and hygiene education to the community members

Further, for implementation of the project, items to be borne by the Gambian side are the following with budgetary measures.

Cost Item	Cost		Remarks
	GMD (million)	JPY(¥) Equivalent (million)	
1. Land Acquisition & Clearance	6.26	Approx. 28.73	Under the supervision of DWR, VWC will materialise at each target village.
2. Counterpart Personnel Cost	0.48	Approx. 2.20	For counterpart personnel from DWR
3. Costs borne by Residents	0.40	Approx. 1.84	VWCs in the target villages will materialise collection of upfront contribution for operation and maintenance fund prior to commencement of the construction works under the supervision of DWR and local authorities.
Total	7.14	Approx. 32.77	-

Conditions for Estimation

- a. Estimation Base August 2003
- b. Exchange Rate 1 US\$ = 119.63 JPY
1 GMD = 4.59 JPY

The project is implemented during 45 months upon conclusion of the Exchange of Notes (E/N). Using an existing drilling rig owned by DWR, a Japanese firm will implement construction works of the water supply facilities. Local sub-contractors will also be utilised in a part of the construction works. Implementation of the project is divided into three phases due to a long construction period so that the scope of works for each phase is self-conclusive. Activities per phase are summarised as follows.

Phase	Construction Works and Procurement	Software Component
-------	------------------------------------	--------------------

Phase I	<ul style="list-style-type: none"> • Procurement of materials and equipment • Borehole drilling (7 wells) • Construction of piped water supply facilities (7 sites) • Conversion to solar pumping system (3 sites) 	<ul style="list-style-type: none"> • Support for community mobilisation/ sensitisation and establishment of operation and maintenance system
Phase II	<ul style="list-style-type: none"> • Borehole drilling (6 wells) • Construction of piped water supply facilities (6 sites) • Conversion to solar pumping system (3 sites) 	<ul style="list-style-type: none"> • Support for community mobilisation/ sensitisation and establishment of operation and maintenance system
Phase III	<ul style="list-style-type: none"> • Borehole drilling (7 wells) • Construction of piped water supply facilities (7 sites) • Conversion to solar pumping system (3 sites) 	<ul style="list-style-type: none"> • Support for community mobilisation/ sensitisation and establishment of operation and maintenance system

Implementation of the project will produce the following direct and indirect impacts.

(1) Direct Impact

- Safe water will be stably supplied to approximately 80,000 residents in the 29 target communities in 4 Divisions with underprivileged living conditions. It will result in increase of coverage of a rural population of 700,000 with safe and stable water supply by 11%, from 53% to 64%.
- Quantity of available water for domestic use at the target area will increase from the current 15-20lit/person/day to 35lit/person/day.
- The software-component programme facilitates hygiene education, which will improve health and hygiene behaviour of the community members as well as environmental sanitation of the target villages.
- Through the software-component programme, capacity of community members for operation and maintenance of water supply facilities will be improved. In collaboration with the local maintenance service providers, the water supply facilities with solar pumping system will be stably operated.

(2) Indirect Impact

- At the target area, safe water in compliance with the Gambian and WHO standards is supplied and cases of water borne/ related diseases such as diarrhoea will decrease.
- Time for water fetching will be shortened and heavy burden especially for women and children will be reduced.

Multi-faceted impacts are expected from the project as described above. In addition, the project will positively contribute to improvement of the Basic Human Needs (BHN), thus it is fully justifiable for implementation with the grant aid from Japan.

CONTENTS

PREFACE		
LETTER OF TRANSMITTAL		
LOCATION MAP		
PERSPECTIVE DRAWING		
LIST OF FIGURES AND TABLES		
LIST OF ABBREVIATIONS		
SUMMARY		Page i
CHAPTER 1	BACKGROUND OF THE PROJECT	1-1
 CHAPTER 2 CONTENTS OF THE PROJECT		
2-1	Basic Concept of the Project	
2-1-1	Overall Goal and Project Objective	2-1
2-1-2	Outline of the Project	2-4
2-2	Basic Design of the Requested Japanese Assistance	
2-2-1	Design Policy	
2-2-1-1	Basic Policy	2-5
2-2-1-2	Policy towards Natural Conditions	2-13
2-2-1-3	Policy towards Socio-Economic Conditions	2-17
2-2-1-4	Policy towards Construction and Procurement	2-19
2-2-1-5	Policy on Use of Local Contractors	2-20
2-2-1-6	Policy towards Capacity of Executing Agency	2-20
	on Operation and Maintenance	
2-2-1-7	Policy on Grade of Facilities	2-23
2-2-1-8	Policy on Construction/Procurement	2-24
	Methods and Implementation Schedule	
2-2-2	Basic Plan	
2-2-2-1	Water Supply Facilities Plan	2-26
2-2-2-2	Facilities Design	2-32
2-2-2-3	Plan for Equipment and Materials	2-34
2-2-3	Basic Design Drawing	2-45
2-2-4	Implementation Plan	
2-2-4-1	Implementation Policy	2-72
2-2-4-2	Implementation Conditions	2-72
2-2-4-3	Scope of Works	2-74
2-2-4-4	Consultant Supervision	2-74
2-2-4-5	Quality Control Plan	2-75
2-2-4-6	Procurement Plan	2-77
2-2-4-7	Implementation Schedule	2-78

2-3	Obligations of Recipient Country	2-81
2-4	Operation and Maintenance Plan of the Project	2-82
2-5	Interventions for Capacity Building and Institutional Strengthening (Software-Component Programme)	
2-5-1	Programme Background	2-91
2-5-2	Objective of Program Intervention	2-95
2-5-3	Outputs of the Programme (Direct Effects)	2-95
2-5-4	Assignment of Personnel	2-98
2-5-5	Intervention Plan	2-100
2-6	Cost Estimation	
2-6-1	Project Cost Estimation	
2-6-1-1	Cost Borne by the Japanese Government	2-128
2-6-1-2	Cost Borne by the Gambian Government	2-129
2-6-1-3	Conditions for Estimation	2-130
2-6-2	Operation and Maintenance Costs	2-130

CHAPTER 3 PROJECT EVALUATION AND RECOMMENDATIONS

3-1	Project Effect	3-1
3-2	Recommendations	3-2

APPENDICES

APPENDIX 1	Member List of the Study Team	A-1
APPENDIX 2	Study Schedule	A-2
APPENDIX 3	List of Parties Concerned in the Recipient Country	A-4
APPENDIX 4	Minutes of Discussions	A-7
APPENDIX 5	Other Relevant Data/ Information	
	Ap 5-1 Operation and Maintenance Situation of Existing Water Supply Facilities with Japanese Assistance	A-27
	Ap 5-2 Results of Socio-Economic Survey	A-28
	Ap 5-3 Questionnaire Used for Sample	A-51
	Household Survey	
	Ap 5-4 Results of Geophysical Survey	A-58
APPENDIX 6	References	A-73

CHAPTER 1 BACKGROUND OF THE PROJECT

The Republic of The Gambia (hereafter referred to as the Gambia) is situated at the western end of Sub-Sahara of African continent, lat. 13 ° 28" N and long. 16 ° 34" W, fronting onto the Atlantic Ocean. The population is approximately 1.35 million (estimated in 2002) with GNI 320US\$ (World Bank, 2001). The Human Development Index (UNDP, Human Development Report, 2003) is ranked at 151 out of 175 countries with a gravely low development level of health and hygiene sectors among West African countries. Provision of improved social infrastructure services in the rural areas has been a significant development issue of the Gambia since late 1970s.

Upon receiving a request from the Gambian government, the Japanese government started the Integrated Water Use Project in 1992 composed of procurement of drilling equipment and construction of water supply facilities with boreholes. This project was, however, suspended at the 3rd stage of Phase I, divided into 4 stages in total, due to a political disorder, leaving 20 sites of 30 planned sites untouched.

Thereafter, a referendum of the revised constitution and presidential election were conducted in 1996, which was followed by a general election in 1997 to shift to the democracy. Observing these situations, the Government of Japan decided resuming the assistance to the Gambia in March 1997 and held policy discussions in 1998 as to the grant aid and technical cooperation schemes.

Meanwhile, the Gambia drew Poverty Reduction Strategy Paper (PRSP) in 2002 as well as a long term development plan, Vision 2020, in 1996 to improve living standards of the population and sanitation, hygiene and primary health care sectors wherein supply of the good quality potable water in rural areas is the highest development priority. With these the Government of the Gambia has constructed water supply facilities with boreholes and provided the population with technical support for operation and maintenance. However, the nationwide water supply coverage rate is as low as 62% and 53% for rural areas, which means that one third of the national population is forced to drink unhygienic water.

As an effort to improve safe and stable water supply in the rural areas, the Government of the Gambia formulated the Integrated Water Use Project (Phase 2) and requested a grant aid assistance to the Government of Japan in 2001 to resume the initial project which had been suspended since 1994. Japan International Cooperation Agency (JICA) dispatched a study team in January 2002 to check conditions of the

equipment procured in 1992 in the previous grant aid project and to make necessary follow-up. The procured drilling machine is still made full use after 10 years of its procurement, yet some equipment needed spare parts and repairs. A support for procurement of spare parts of the existing drilling equipment and repair works by the Japanese expert were rendered as a scope of the follow-up study.

Further, the Government of Japan entrusted JICA to conduct a basic design study to examine contents of the request from the Gambian government and to formulate basic design of the project consistent with conditions of the Japan's grant aid assistance. For this purposes, JICA dispatched a basic design study team between 20th August to 14th September 2003 to discuss with the executing agency, Department of Water Resources (DWR), and other relevant organisations and to conduct a basic design study entailing natural and social conditions surveys of the target areas for examination of feasibility of the project.

(1) Contents of the Initial Request

Table 1-1 below shows contents of the initial request of the Gambian government for construction of piped water supply facilities at 30 sites and procurement of equipment and materials.

Table 1-1 Summary of Request

Scope	Project Components	
1. Construction of Water Supply Facilities	1) Construction of piped water supply facilities with solar pumping systems	20 sites
	2) Conversion of diesel generator to solar pumping system of existing water supply facilities constructed in the previous grant aid project	10 sites
2. Procurement of Equipment and Materials	1) Procurement of spare parts for drilling equipment and supporting vehicles	1 set
	2) Procurement of supporting vehicles <ul style="list-style-type: none"> ● Pick-up truck: 2 units ● 4WD station wagon: 1 unit 	3 units
	3) Procurement of spare parts and consumables for solar pumping system	1 set
3. Training	1) Borehole drilling technology (theory and practice)	1 set
	2) Groundwater development (hydrogeology, development of boreholes, and pumping test)	
	3) Geophysical survey (field reconnaissance and logging)	
	4) Repair and maintenance of drilling equipment	
	3) Support for establishment of operation and maintenance system of water supply facilities	

(2) Confirmation of the Requested Sites

The initial request targeted 30 sites located in 3 Divisions. However, it was revealed at the beginning of the basic design study that some of the sites had already been included in water supply projects funded by other donors. The Government of the Gambia, therefore, proposed replacing these sites with other ones in order to avoid duplication of projects at same sites. As a result of discussion, 7 out of 20 sites for construction of new water supply facilities with solar pumping system were excluded from the request to include other 7 sites. Table 1-2 shows names of these excluded sites and present situation of interventions by other donors. On the other hand, one site (Ndugu Kebbeh) out of 10 with the existing piped water schemes constructed in the previous grant aid project was deleted from the requested sites since the pumping system had already been solarised by EDF.

Table 1-2 Present Situation of 7 Sites Excluded from the Initial Request

Site No.	Division	Name of Site	Donor	Implementation Year	Situation of Project Implementation
N-5	NBD	Saba	EDF/SDRD/NAWEC	2003	Has peri-urban setting. Construction of a piped water scheme with solar pumping system is planned. More than 3000 served population.
N-6	NBD	Fass Njaga Choi	EDF/SDRD	2003	Construction of a piped water scheme with solar pumping system is in process. A borehole has already been drilled and excavation of pipelines is about to be completed with labour provision from the community. More than 3000 served population.
N-7	NBD	Illiassa	EDF/SDRD	2003	Construction of a piped water scheme with solar pumping system is in process. A borehole has already been completed. More than 2500 served population.
N-8	NBD	Munjagen	EDF/SDRD	2003	Construction of a piped water scheme with solar pumping system is in process. A borehole has already been completed. Approx. 2000 served population.
L-2	LRD	Jappine Marko	UNDP /UNCDF	2002	Construction of a piped water scheme with solar pumping system is in process with utilising an existing borehole. Installation of an elevated water tank and pipe laying work are almost finished. Approx. 2,000 served population.
M-7	CRD	Touray Kunda	EDF	2002	A piped water scheme with solar pumping system has already been completed and in operation. More than 6,000 served population.
L-4	LRD	Pakalinding	NAWEC	1994	After an implementation review of the project in 1992, distribution pipe of the water supply scheme in Soma was extended to this community located in peripheral area of Soma. Approx. 3,500 served population.

NDB : North Bank Division, LRD: Lower River Division, CRD: Central River Division

Due to a change of the requested sites as mentioned above, the basic design study was conducted for 29 sites instead of 30 located in 4 Divisions, namely North Bank Division (NBD), Lower River Division (LRD), Central River Division (CRD), and Western Division (WD). Breakdown of the requested sites is a) 20 sites for construction of new piped water supply schemes with solar pumping system and b) 9 sites for conversion to solar pumping system for existing water supply facilities constructed in the previous grant aid project. In addition to study on these 29 sites, field surveys were also executed in other sites as much as possible to learn conditions of the constructed facilities, operation of water supply facilities and impacts brought to the target communities by improvement of water supply in other donors' funded projects.

Table 1-3 List of Target Sites of the Basic Design Study (2003)

1. Construction of water supply facilities with solar pumping system (20 sites)	
Target Sites	Division
1. Medina Sering Mass	NBD
2. Tuba Kolong	NBD
3. Nawleru	NBD
4. Dumbutu	LRD
5. Jali	LRD
6. Nema	LRD
7. Massembe	LRD
8. Pakaliba	LRD
9. Wellingara Ba	LRD
10. Sukuta	CRD (North)
11. Nianija Bakadagy	CRD (North)
12. Sami Pachonki	CRD (North)
13. Dankunku	CRD (South)
14. Piniyai	CRD (South)
15. Saruja	CRD (South)
16. Galleh Manda	CRD (South)
17. Sambang Complex	CRD (South)
18. Jahally	CRD (South)
19. Sohm	WD
20. Sutusinjang	WD

2. Conversion of diesel generator to solar pumping system of the existing water supply facilities constructed in the previous grant aid project (9 sites)	
Target sites	Division
1. Fass Omar Sahor	NBD
2. Katchang	NBD
3. Njaba Kunda	NBD
4. Toniataba	LRD
5. Bureng	LRD
6. Baro Kunda	LRD
7. Mamut Fana	CRD (South)
8. Madina Umfally	CRD (South)
9. Brikama Ba	CRD (South)

NBD : North Bank Division (6 sites)
 LRD : Lower River Division (9 sites)
 CRD : Central River Division (12 sites)
 WD : Western Division (2 sites)

(3) Additional Request

For facilitation of operation and maintenance of the constructed water supply facilities, DWR additionally made a request to procure motorbikes for facilitation of community mobilisation/ sensitisation activities and a computer set as summarised in Table 1-4. Currently, operation and maintenance of water supply facilities are propelled to be decentralised and participatory through some rural water supply projects funded by UNDP/UNCDF and EDF. One or two motivators are attached to each Divisional Office by DWR to support the communities to establish and maintain the management system of the water supply facilities. However, motivators have difficulties to facilitate their activities efficiently due to insufficiency of reliable transportation. Having such problem, DWR requested procurement of motorbikes for use of the motivators.

Meanwhile, a database has been established under the project funded by another donor to monitor operation and maintenance of water facilities. A problem is that management and use of the existing database does not involve DWR on its own initiative, hence scattered information on operation and maintenance of entire rural water supply projects implemented by DWR. The Gambian side requested procurement of a computer set to be utilised for establishment of their database system which will record results of monitoring activities by DWR and provide necessary information to draw future projects.

Table 1-4 Additional Request for the Project

Item	Specification	Qty	Rationale of Procurement of the Item
<p>1. Equipment for Operation and Maintenance Activities</p> <p>1) Motorbike</p>	<p>Displacement 125cc</p>	<p>8 units</p>	<p>Means of transport are required for motivators to facilitate activities for community mobilisation and training of VWCs in the target villages during project implementation period as well as monitoring and follow-up after completion of the project.</p> <p>A motorbike was provided to each motivator in Divisions in past rural water supply projects funded by UNDP/UNCDF and EDF. As these motorbikes were procured in mid 1990s, their conditions are not reliable for continuous use due to exhaustion.</p>
<p>2) Computer</p>		<p>1 unit</p>	<p>A computer set is required to establish a database to be utilised for monitoring of operation and maintenance of the constructed water supply facilities.</p>