

**Ministry of Fisheries, Water Resources  
and National Assembly Matters  
The Republic of The Gambia**

**PREPARATORY SURVEY REPORT  
ON  
THE PROJECT FOR RURAL WATER SUPPLY PHASE III  
IN  
THE REPUBLIC OF THE GAMBIA**

**January 2010**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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**JAPAN TECHNO CO., LTD.**

**EARTH SYSTEM SCIENCE CO., LTD.**

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## **PREFACE**

Japan International Cooperation Agency (JICA) conducted the preparatory survey on the Project for Rural Water Supply Phase III in the Republic of The Gambia.

JICA sent to The Gambia a survey team from 11<sup>th</sup> March to 20<sup>th</sup> April, 2009 and from 24<sup>th</sup> May to 21<sup>st</sup> September, 2009.

The team held discussions with the officials concerned of the Government of The Gambia, and conducted a field survey at the project 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 outline 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 Republic of The Gambia for their close cooperation extended to the teams.

January 2010

Kikuo Nakagawa  
Director General  
Global Environment Department  
Japan International Cooperation Agency

January 2010

## LETTER OF TRANSMITTAL

We are pleased to submit to you the preparatory survey report on the Project for Rural Water Supply Phase III in the Republic of The Gambia.

This survey was conducted by the consortium of Japan Techno Co., Ltd. and Earth System Science Co., Ltd. under a contract to JICA, during the period from February 2009 to January 2010. In conducting the survey, 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 outline 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

Preparatory Survey Team on The Project for  
Rural Water Supply Phase III

The Republic of The Gambia

The Consortium of Japan Techno Co., Ltd. and  
Earth System Science Co., Ltd.

## **SUMMARY**

# SUMMARY

## 1. Outline of the Country

The Republic of The Gambia (hereinafter called “The Gambia”) is located south of the Sahel in West Africa and facing the Atlantic Ocean at the most western end of African Continent and its eastern, northern and southern borders are surrounded by Republic of Senegal from three directions. The Gambia has a total population of approx. 1.80 million (UNFPA, 2008) and a total land area of 11,295km<sup>2</sup> (approx. 3% of the national land of Japan). It is one of the least developed among developing countries having the Gross National Income (GNI) of 320 US dollars per capita (the World Bank, 2007) and it is ranked at 168th place among 182 countries in the world. Human Development Index (HDI) ranking of UNDP (Human Development Report 2009, UNDP). The situation of water supply and sanitary environment in this country needs to improve.

The climate of The Gambia is categorized into the tropical savannah climate in which the year is distinctly divided into the rainy season (July to September) and the dry season (October to June) and the yearly precipitation is as low as 400 to 850mm. The Gambia is a strip of land extending approx. 325km from east to west along The Gambia River and approx. 50km from north to south, and its natural environment is so severe that sea water goes upstream 200km or more from the river mouth in the full tide in the dry season. From the hydrological and geological point of view, its groundwater potential is so high that safe groundwater is available from boreholes (of 70 to 100m depth) according to the existing borehole information. However, about 80% of the population lives in rural village areas and there are some residents who use the water of rivers and ponds as drinking water and are exposed to risks of water-borne diseases. Therefore, it is an urgent necessity to acquire safe drinking water.

## 2. Background of the Requested Project

The Gambia formulated the “Poverty Reduction Strategy Paper” (PRSP-I, 2002) in accordance with the “National Development Plan, Vision 2020” ahead of other African countries, taking up the supply of good drinking water in rural areas as one of the highest priority issues in its efforts to improve the living standard of the nation. In 2006, the PRSP-I was revised into the “Secondary Poverty Reduction Strategy Paper” (PRSP-II, 2007 – 2011) and the “National Water Policy 2006” was formulated for the main purpose of making up a detailed plan of safe water supply and building the operation and maintenance system therefore.

The “National Water Policy 2006” was also linked with the UN Millennium Development Goals (MDGs) to launch the detailed action plan for the further development of the water supply and sanitation sector for the future 10 years (2006 – 2015), aiming at improving the present water

supply rate of approx. 64% (2006) to 90% by 2015, and 100% in 2020.

In order to move forward the goal of improving the water supply rate (the percentage of people with access to water) of 90% to 2011, the PRSP-II (2006) planned to additionally supply 200,000 people with safe drinking water and to construct new water supply facilities powered by solar power generation for 60% (120,000 people) of those beneficiaries. For the remaining 40% (80,000 people), it is planned to construct water supply facilities (boreholes or concrete-lined shallow wells) with hand pumps.

According to the UNDP/UNICEF (2008) reports, the water supply rate in rural areas in The Gambia was 81% in 2006, of which 5% was supplied with water via piping system and 76% was supplied with water from water supply facilities with hand pumps and from hand-dug wells. A greater part of existing water sources are traditional hand-dug wells or concrete-lined shallow wells of 20 to 30m deep. Therefore, many of these water sources are so insanitary that organic contamination has often been reported. So, many residents in rural areas are inaccessible to safe water.

In the preparatory survey for the Project, the safety of these water sources and the present status of water supply were investigated. As a result, it was made clear that most water sources at 18 project sites were contaminated with total coliform and coliform bacteria. The residents around such sites have no custom to boil drinking water and use contaminated unboiled water as drinking water and they are exposed to the risks of water-borne diseases (such as cholera, amebic dysentery and diarrhea).

Even in the condition that people are accessible to safe water, their nearby wells that they go to are far away and they have to wait for a long time until they draw water. So, the water-drawing work is a heavy burden for women and children in rural areas.

Taking account of the importance of the assistance to the water supply sector in The Gambia, the Government of Japan implemented two phases of grant aid project for construction of water supply facilities and procurement of equipment and materials, Phase I (1991 – 1993) and Phase II (2004 – 2006). In this project, piped water supply facilities were constructed in a total of 30 villages. In 20 villages of those, solar-powered piped water supply facilities (hereinafter called “solar-powered water supply facilities”) were constructed and 4 systems of diesel-type water supply facilities constructed in Phase I were converted into solar-powered water supply facilities, contributing to the optimization of operation and maintenance by the residents in such villages. However, the water supply rate remains low as ever. The Government of The Gambia submitted the request for grant aid for construction of solar-powered water supply facilities and procurement of equipment and materials at 30 sites in 4 Regions such as Western, North Bank, Lower River and Central River in August 2007.

In response to this request, Japan International Cooperation Agency (JICA) implemented the first field survey in The Gambia for the one-month period from March 2009, in which the necessity and urgency of the Project was confirmed. In the second field survey in The Gambia conducted from May to September 2009, the sociological survey, geophysical prospecting, test drilling and water supply planning survey were implemented in order to examine the optimum scale of this grant aid project. Through the analysis and examination in Japan, the outline of the basic design was explained to Department of Water Resources (DWR) of the Ministry of Fisheries, Water Resources and National Assembly Matters (MFWRNAM), that is the executing agency in The Gambia, and other related agencies. Then, this Report was finalized.

### 3. Outline of the Survey and Contents of the Project

The contents of the Project which have been agreed upon by both Governments based on the preparatory survey for the grant aid are the new construction and conversion of solar-powered water supply facilities with Soft Component assistance related to operation and maintenance of those facilities in 4 Regions as shown in the Table below.

Contents	Quantity	Details
1) Construction of piped water supply facilities	15 sites	Water sources: Successful boreholes in the test drilling will be used as the water sources. Power source: Solar power generation
2) Conversion of existing water supply facilities	3 sites	Water sources: After implementing pumping test and water quality analysis, the existing boreholes will be used as the water sources. Power source: Solar power generation
3) Procurement of equipment	1 set	Equipment for geophysical prospecting (a model that can be used for simple borehole logging)
4) Soft Component	18 sites	1) Assistance in establishment of operation and maintenance systems 2) Establishment of the structure of Water Committees 3) Assistance in water rate collection and conclusion of maintenance contracts 4) Awareness creation among villagers on health and hygiene education

#### 1) Construction of Facilities

For the water sources for the new piped water supply facilities to be constructed, 11 sites which were successful in the test drilling in the second field survey in The Gambia will be used as production boreholes. For the water sources of the existing water supply facilities at 2 sites to be converted, the existing water sources will be used. However, the water



sources for the 4 new sites and for one site for conversion will be constructed in the Project. The target year of the design for water facilities in the project will be 2020 in accordance with the “Vision 2020” and PRSP-II which are the master plans of The Gambia. The unit water supply rate is set to 35ℓ/capita/day, and the details of construction and conversion in the project are listed in the Table below.

Classification	Facility name	Facility components	Quantity
Piped water supply facilities (construction)	1) Water source facilities		
	Water sources	Boreholes with yields of 9.3 - 37.8m <sup>3</sup> /h	15 (including 11 test drilled boreholes)
	Pumping facilities	Submersible motor pumps Pump output: 2.2 – 7.5kW	15 units
	Power supply facilities	Solar power generation 220wPV panels: 23 - 79 panels/site	15 sets
	2) Water distribution facilities		
	Reservoirs	Elevated reinforced concrete structure: H=5m and V=30m <sup>3</sup> , 40m <sup>3</sup> , 50m <sup>3</sup> , 60m <sup>3</sup> , and 70m <sup>3</sup>	30m <sup>3</sup> x 7, 40m <sup>3</sup> x 3, 50m <sup>3</sup> x 3, 60m <sup>3</sup> x 1, 70m <sup>3</sup> x 1
	Water distribution pipelines	PVC pipes with diameters of 40 – 160mm	Total length of 55.23km
	Public faucets	Reinforced concrete structure with two taps	318 faucets
Subtotal of the number of facilities to be constructed			15 sites
Existing water supply facilities (conversion)	1) Water source facilities		
	Water sources	The existing boreholes with yields of 9.1~36.9 m <sup>3</sup> /h	3 boreholes
	Pumping facilities	Submersible motor pumps (for replacement) Pump output: 2.2 – 7.5kW	3 units
	Power supply facilities	Solar power generation (The diesel power generation facilities are to be replaced) 220wPV panels: 23 and 79 panels	2 sets
		National electric power supply	1 set
	Existing machine room	To be modified into a guardhouse	1 set
	2) Water distribution facilities		
	Reservoirs	Replacement of valve facilities	3 sets
	Water distribution pipelines	Replacement of valve facilities	3 sets
		Reinforced concrete structure with two taps	Repair 26 faucets
	Public faucets	Replacement of valves and installation of water meters	26 sets
Subtotal of the number of facilities to be converted			3 sites
Total number of facilities to be constructed			18 sites

## 2) Procurement of Equipment and Materials

Classification	Equipment name	Specifications	Quantity
Equipment for groundwater survey/monitoring	Geophysical prospecting equipment	A model that can be used for groundwater survey with surface electrical prospecting and simple borehole logging Specifications for vertical prospecting: Prospecting depth of 200m or more	1 set

## 3) Soft Component

At present, the operation and maintenance of piped water supply facilities is undertaken by the Village Water Committees (VWC), which will individually be organized for each of the facilities. However, the solar-powered pumping systems cannot be technically maintained by rural residents. Therefore, the executing agency provides technical assistance and necessary works such as monitoring under the maintenance contracts with the OM (Operation and Maintenance companies). In the Soft Component assistance in the Project, the following items of assistance will be provided under the operation and maintenance system for which three parties "residents – the OM companies – administrative agency" will tie up with each other:

- Assistance for establishment of the operation and maintenance system
- Organizing of the Village Water Committees
- Guidance of collection of water rates and reserve of maintenance fund
- Assistance in execution of a maintenance contract
- Activity of supporting residents for health and hygiene education

The population of beneficiaries of the above project will be approximately 43,200 (at the time of completion in 2012) and it is intended for acquisition of safe drinking water and improvement of living standard and sanitary environment.

## 4. Work Schedule and Project Cost Estimation

The Project will be implemented through the detailed design for approx. 8.5 months and the construction work for approx. 14 months after execution of the Exchange of Notes (E/N) and the Grant Agreement (G/A). The prime contractor for construction of facilities will be a Japanese company, which will implement the works on the following schedule on its sole responsibility in making use of local companies:

Classification	Facility construction	Construction supervision / technical assistance	Work period
Execution design	Preparation	Detailed design survey, preparation of tender documents, tender supervision, procurement and construction supervision and assistance in awareness creation among villagers	ca. 8.5 months
Construction works and Construction supervision	<ol style="list-style-type: none"> <li>1) Construction of water supply facilities in North Bank Region (3 sites)</li> <li>2) Construction of water supply facilities in the northern river bank in Central River Region (4 sites)</li> <li>3) Construction of water supply facilities in Western Region (2 sites)</li> <li>4) Construction of water supply facilities in Lower River Region (1 sites)</li> <li>5) Construction of water supply facilities in the southern river bank in Central River Region (5 sites)</li> <li>6) Conversion of existing water supply facilities in Lower River Region (3 sites)</li> </ol>	Procurement and construction supervision, Soft Component and assistance in awareness creation among villagers	ca. 14 months

The costs and expenses that The Gambia will share are as follows:

Responsibility	Estimation (million GMD)	Payer
1) Land acquisition and preparation	Provision free of charge	Villagers
2) Travel allowances and <i>per diem</i> of counterpart personnel	0.18	DWR
3) Fuel and maintenance costs of the vehicles for the counterparts	0.21	DWR
4) Personnel cost of motivators	0.32	DWR
5) Quality monitoring of water from boreholes	0.43	DWR
6) Notification fee for Authorization to Pay (A/P)	0.01	DWR
7) Commissions to the bank for banking services based upon the Bank Agreement (B/A)	0.11	DWR
Total	1.26	Equivalent of 6 million Japanese yen

Conditions for estimation

Time of estimation: September 2009

Currency rates: 1 EUR = 133.81 yen

1 US\$ = 97.55 yen

1 GMD = 3.6345 yen

## 5. Relevance of the Project

The effects and the extent of improvement expected from the implementation of the Project are as follows:

- Upon completion of the facility construction in 2012, 35ℓ/capita/day of safe water will be available to *ca.* 43,200 rural residents in the 18 sites in the four Regions.
- Safe drinking water in compliance with the Guidelines for Drinking Water Quality of WHO will be supplied.
- The awareness creation activities will improve residents' awareness of hygiene.
- A Village Water Committee will be established for the operation and maintenance of each piped water supply facility and the committee will operate and maintain the facility sustainably and independently.
- The Village Water Committees will conclude maintenance contracts with the OM companies under which the OM companies shall maintain the solar-powered pumping systems continuously.

In addition, implementation of the Project under the grant aid cooperation of Japan is considered relevant from the following viewpoints:

- The purpose of the Project is improvement of water supply/hygienic environment, one of the Basic Human Needs (BHN).
- The water supply facilities to be constructed in the Project will be operated and maintained under the responsibility of Village Water Committees with the revenue raised by collecting water rates.
- The Project is to improve living standards of the people through improvement of sanitary environment in rural areas in accordance with MDGs, PRSP and Vision 2020.
- Since the Project is to construct facilities for small-scale water supply systems for villages, it will have no negative environmental or social impact derived from groundwater development or daily operation of water supply facilities.

The Project will contribute to improvement of BHN of residents in rural areas which have large number of people in poverty by providing assistance in increasing the proportion of people with access to water in The Gambia as mentioned above. Since the significance of implementing such a project in the grant aid cooperation scheme of Japan is considered high, the implementation of the Project has sufficient relevance.

The considerations and recommendations to ensure that the Project will be implemented more effectively and efficiently will be described below.

1) Database for Monitoring Evaluation after Implementation of the Project

It is necessary to make the follow-up survey of water supply facilities every year to research intensively into the satisfaction grade of residents for the use of water supply facilities, the operation and maintenance activities of the OM companies, the activities of Village Water Committees, the problems with operation and maintenance, and the support conditions of Regional Governments and local municipalities. It is recommended to use the results of research for building the database for monitoring evaluation by the executing agency of DWR.

2) Reinforcement of the OM System and Tie-up of Related Agencies with Development Donors coordinated by DWR

In The Gambia, the solar power generation system is adopted as the power source for piped water supply facilities at present and the operation and maintenance systems are established by the cooperation of three parties, “residents – the OM companies – administrative agency”. The decentralization programme is also making progress to delegate the authority for the OM systems of these facilities to the individual Regional Government and local municipalities. In the Project, the Soft Component assistance will be provided to contribute to realization of this decentralization programme. However, the collection of water rates on a measured rate basis for the existing solar-powered water supply facilities in 2010, the uniform water rate in the entire country (2.1 GMD/m<sup>3</sup>) and the management of the Collective Maintenance Fund by the executing agency will be the basic requirements for securing safe drinking water for which the minimum price will be borne by rural residents impartially.

In addition, it is necessary to reinforce the sustainable maintenance systems which will meet the overall goal of poverty reduction and to promote the operation of those systems on the Collective Maintenance Fund through the mutualism of villages beyond the interests of individual villages and through the cooperation between Regional Government and local municipalities. It is also necessary for development Donors to take some measures such as excluding from the Project any villages which will not conform to the present operation and maintenance systems, and to promote the exchange of information and the mutual tie-ups. For this purpose, it is recommended for development Donors to strengthen the effective cooperation and mutual tie-ups and for DWR to hold regular seminars and coordinate the Donors for common use of information among Donors.



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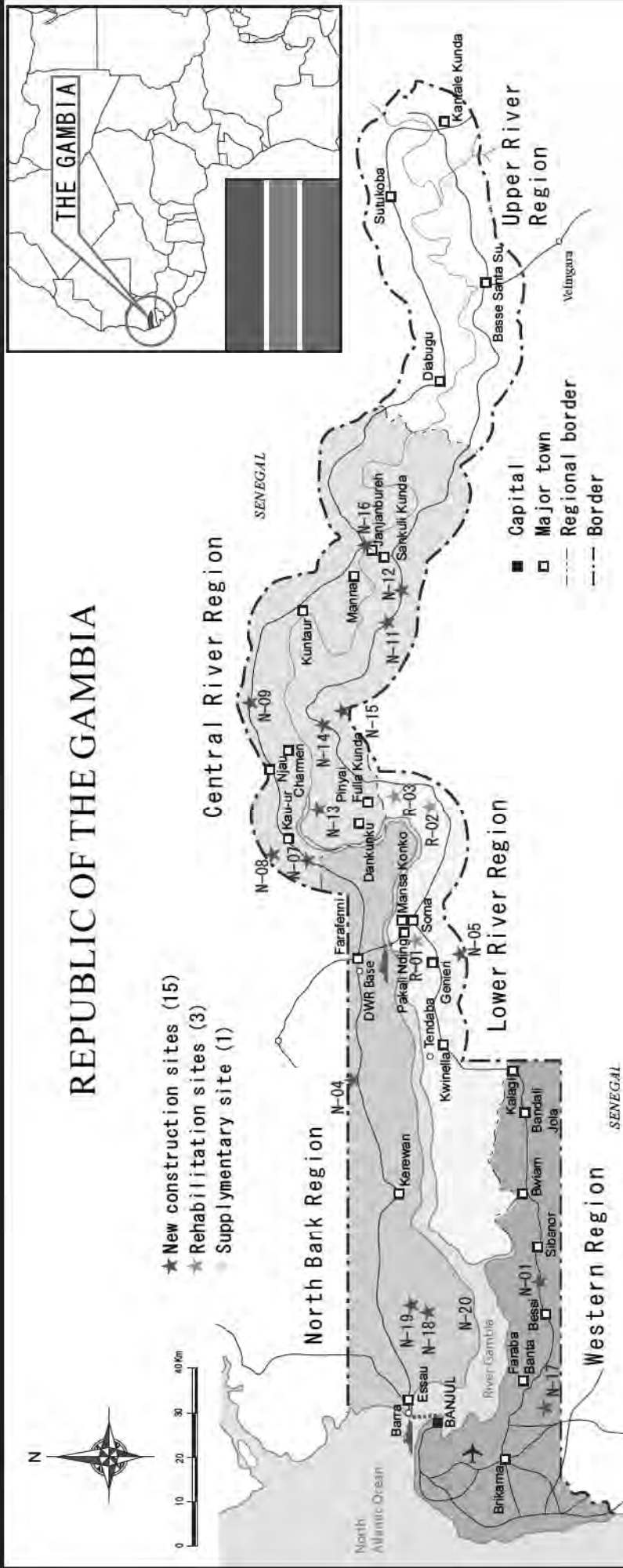
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# REPUBLIC OF THE GAMBIA



Western Region	Central River Region (South)	Central River Region (North)	North Bank Region
N-01 Kabocorr & Tampoto & Killy	N-11 Kerewan Samba Sira	N-07 Ballangharr Complex	N-04 Kerr Katim
N-17 Gidda	N-12 Fula Bantang & Sinchu Bora	N-08 Jimbala Complex	N-18 Kerr Mamma
Lower River Region	N-13 Jissadi Complex	N-09 Fass	N-19 Ker Cherno (Madina Bafuloto)
N-05 Madina Kaiaf (Sancha)	N-14 Sotokoi	N-16 Lamin Koto & Badala & Sotokoi	N-20 Banta Killing (*Supplymentary)
R-01 Toniataba (*Rehabilitation)	N-15 Macea & Njie Kunda		
R-02 Bureng (*Rehabilitation)			
R-03 Barrow Kunda (*Rehabilitation)			

## PROJECT SITE MAP AND SITE LIST

THE PROJECT FOR THE RURAL WATER SUPPLY PHASE III IN THE REPUBLIC OF THE GAMBIA





THE PROJECT FOR THE RURAL WATER SUPPLY PHASE III IN THE REPUBLIC OF THE GAMBIA

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## LIST OF ABBREVIATIONS

AfDB	African Development Bank
A/P	Authorization to Pay
B/A	Banking Arrangement
BHN	Basic Human Needs
CMF	Collective Maintenance Fund
CRR	Central River Region
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
EIA	Environmental Impact Assessment
FGD	Focus Group Discussion
E/N	Exchange of Notes
G/A	Grant Agreement
GMD	Gambian Dalasi
GNI	Gross National Income
HDI	Human Development Index
JICA	Japan International Cooperation Agency
LRR	Lower River Region
MDFT	Multi Disciplinary Facilitation Team
MDGs	Millennium Development Goals
NAWEC	National Water and Electricity Company
NBR	North Bank Region
NEA	National Environment Agency
NGO	Non-Governmental Organization
OJT	On-the-Job Training
OM	Operation and Maintenance
PDM	Project Design Matrix
PRA	Participatory Rural Appraisal
PRSP	Poverty Reduction Strategy Papers
PTA	Parent-Teacher Association
SDRD	Support to Decentralized Rural Development
TAC	Technical Advisory Committee
UPVC	Unplasticized Polyvinyl Chloride Pipes

UNCDF	United Nations Capital Development Fund
UNFPA	United Nations Population Fund
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
VDC	Village Development Committee
VWC	Village Water Committee
WR	Western Region
WHO	World Health Organization

**CHAPTER 1**  
**BACKGROUND OF THE PROJECT**

## Chapter 1 Background of the Project

### 1-1 Overall Goal and Project Purpose

#### (1) Background of the Project

The Republic of The Gambia (hereinafter “The Gambia”) is located at the western end of sub-Saharan Africa and bordered by the Atlantic Ocean to the west and the Republic of Senegal to the north, east and south, with a population of *ca.* 1.8 million (UNFPA, 2008), an area of 11.295 km<sup>2</sup> (*ca.* 3 % of the area of Japan) and *per capita* GNI of US\$ 320 (the World Bank, 2007). The Gambia is ranked 168th among the 182 countries in the world in the Human Development Index (HDI) rankings of UNDP (Human Development Report 2009, UNDP).

The Government of The Gambia is taking measures to improve the living standards of its people with sufficient supply of good-quality drinking water in rural areas as one of the highest priority in the “Poverty Reduction Strategy Paper 2007 - 2011 (PRSP-II, 2006).”

In addition, the Government of The Gambia formulated a National Water Policy, 2006, which provided a concrete plan and an operation system aiming at provision of safe water supplies for his people. On the basis of this policy, the government has constructed water supply facilities in rural areas with assistance from international organizations and bilateral cooperation. The Government of The Gambia estimates the proportions of people with access to water at *ca.* 66 % and less than 64% in the entire country and in rural areas, respectively. In other words, nearly a third of The Gambians are forced to use unsafe drinking water.

The Government of Japan, in response to the requests from the Government of The Gambia, implemented two grant aid projects for construction of water supply facilities and provision of materials and equipment (Firstly from 1991 to 1993 and Secondly from 2004 to 2006) and constructed piped water supply facilities in a total of 30 villages. In the second-phase project, solar-powered piped water supply facilities (solar-powered water supply facilities) were constructed in 20 villages, and four diesel-powered water supply facilities constructed in the first phase were converted to the solar powered ones. However, since the proportion of people with access to water still remains low, the government submitted a request for construction of solar-powered water supply facilities and procurement of materials and equipment at 30 sites in 4 regions, Western, North Bank, Lower River and Central River Regions, in August 2007.



## (2) Overall Goal and Project Objectives

UNDP/UNICEF (2008) reports that 81 % of the people in rural Gambia had access to water in 2006, with 5 % having access to piped water and 76 % having access to water supplied otherwise. A great majority of the existing water sources are traditional hand-dug wells with depths of 20 – 30 m and concrete-lined shallow wells. Many of the water sources are unsanitary. This survey confirmed that most of these water sources were contaminated with plate count and coliform bacteria. The people are not used to boiling water and they drink contaminated water without any treatment. Therefore, they are exposed to the risk of water-borne diseases.

To solve the problem mentioned above, PRSP-II, the master plan of The Gambia, sets the target of increasing the proportion of people with access to water in rural areas to 90 % by 2011 and plans to provide 200,000 additional people with safe drinking water. According to PRSP-II, water supply facilities powered by solar power generation will be constructed for 60 % of the new beneficiaries (or 120,000 people). For the remaining 40%, water supply facilities (boreholes or concrete-lined shallow wells) equipped with hand pumps will be constructed.

In line with this overall goal, this project aims at supplying safe drinking water constantly with 35 l/capita/day to the beneficiary population of *ca.* 43,200 (35,100 as of 2020) from the new facilities and 8,100 (as of 2009) from the rehabilitated facilities), with construction of new piped water supply facilities at 15 sites and rehabilitation of existing facilities at 3 sites. Thus, implementation of this project is expected to increase the proportion of people with access to safe water by 1.9 %.

### **1-2 Environmental and Social Conditions**

#### (1) Legal System of The Gambia

The National Environment Management Act of 1994 is The Gambian law stipulating environmental and social considerations. “The Environmental Impact Assessment Procedure,” which came into force in July 1999, provides concrete procedures of environmental impact assessment (EIA) (Figure 1-1).

Owners of all projects are required to submit the screening forms to the National Environment Agency (NEA).



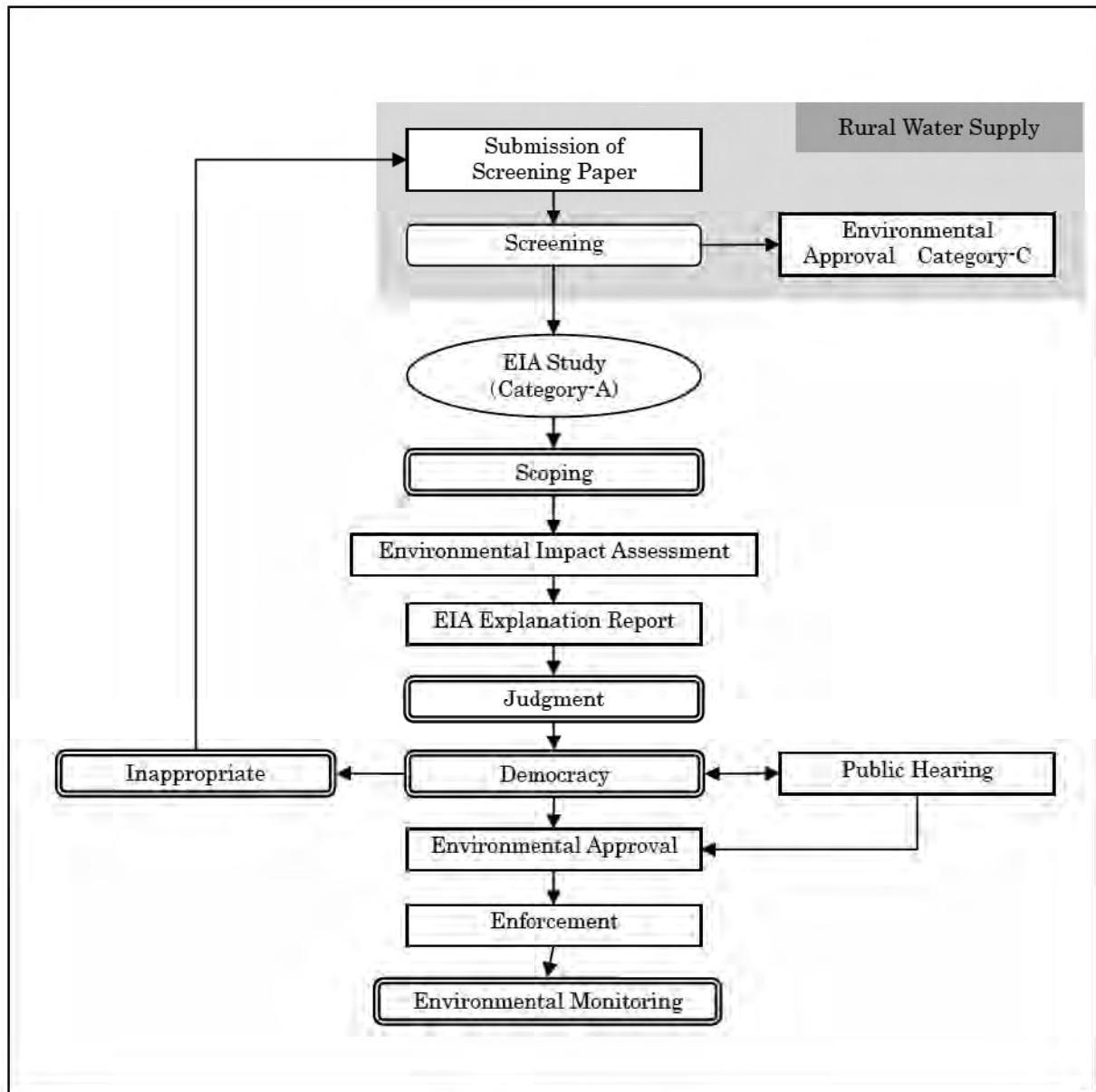


Fig. 1-1 EIA Procedure

(2) Environmental Conformity of the Project

The executing agency of the project, DWR, already submitted the screening form for the project to NEA. Relevant officials of NEA and DWR conducted a field confirmation survey at the project sites. Based on the results of the survey, the project was classified as a Category C project, which does not need EIA in accordance with the environmental standards of The Gambia, on 25th of August 2009 and Environmental Approval NEA/ADM112/01/1V (32) was issued to the project on 8th of September 2009.

NEA explained the category classification relevant to the project as described below and that this project was classified as a Category C project, which did not require the EIA procedures, because all the drinking-water supply facilities would be constructed in rural areas.

In urban areas, Category A requiring EIA equivalent

In semi-urban areas, Category B requiring IEE equivalent

In rural areas, Category C requiring neither EIA equivalent nor IEE equivalent.

The impact of the borehole construction on environment in this project will remain minimal. Air pollution, water pollution, soil contamination, noise, subsidence, soil erosion, impact on social security, damages to health, etc. will be minimal. For these reasons, the project was classified into Category C.

### (3) JICA's Environmental Categorization

This project is equivalent to a Category D project in JICA Guidelines for Environmental and Social Considerations. Table 1-1 shows the environmental and social impact that implementation of the project will have at and around the project sites and countermeasures against the impact.

Table 1-1 Results of Categorization of each Environmental Issue

	Impact Item	Category	Reasons and Countermeasures
[Environmental Impact]			
1	Air pollution	D	Emission from construction vehicles and machinery during the facility construction will be so small that implementation of the Project will have no adverse impact on the atmosphere. Since the facilities will use solar-based power source or commercial electric power source, operation of the facilities will have no adverse impact on the atmosphere.
2	Water pollution	D	<p>Waste slurry generated during the construction work with the use of the slurry drilling method will have no adverse impact on the water quality in the surrounding area because countermeasures such as installation of drainage pits will be taken.</p> <p>Wastewater and surplus concrete generated at the time of concrete casting during the water facility construction will have no adverse impact on water quality because they are appropriately treated and disposed of at designated places. However, necessary measures will be taken, whenever they seem to be required.</p> <p>Use of public taps will generate domestic wastewater. However, since its quantity is small and it will flow into prescribed infiltration trenches, it will not have such adverse impact as to create water pollution.</p>

3	Soil contamination	D	Since procurement of materials and field mixing for concrete casting will be done under the supervision of a Japanese engineer and the scale of casting is small, there will be little surplus. The surplus will be treated and disposed of appropriately in accordance with the local environmental guidelines. Therefore, no soil contamination will be created from the concrete casting. In addition, since no special chemical, which may become a source of contamination, will be used during the construction, there will be no possibility of contamination by chemicals. Nonetheless, the work will be implemented and managed with sufficient consideration to environment.
4	Waste	D	Waste generated during the work will be disposed of appropriately on the responsibility of the contractors under the supervision of the consultant.
5	Noise and vibration	D	Although noise and vibration will be created temporarily during the work, they will have no adverse impact on environment because the scale of the work is small. The facilities use solar power generation or commercial electric power as their power sources, there will be no noise or vibration generated by their operation.
6	Subsidence	D	Since yields from the wells are decided properly within the range of safe yield as a result of pumping test, subsidence will not occur.
7	Odor	D	There will be no activity which can generate odor in the Project.
8	Topography and geology	D	Since the facilities to be constructed in the Project are small-scale structures, they will have no impact on topography or geology.
9	Soil erosion	D	No activity which may cause forest destruction or soil erosion will be implemented in the Project.
10	Sediment	D	No activity which may have adverse impact on sediment in rivers and lakes will be implemented in the Project.
11	Groundwater	D	The design yields are very small compared with groundwater potential. Wells will be used with appropriate yields so as not to lower groundwater levels.
12	Lakes, wetland, river flow	D	There is no lake or wetland to be protected in the river systems in the Project Area. Yields from wells will be too small to have adverse impact on rivers.
13	Coasts and sea areas	D	No activity in the Project Area will have adverse impact on coasts and sea areas.
14	Fauna, flora and ecosystem	D	No activity in the Project will have adverse impact on national parks and ecosystems in the surrounding areas.
15	Climate	D	The facilities are too small to have adverse impact on climate. No activity in the Project will have adverse impact on the weather.

16	Landscape	D	Installation of water storage tanks and solar panels will not damage the landscape.
17	Accidents	D	Construction management will be strictly enforced to prevent accidents during the work.
18	Global warming	D	CO <sub>2</sub> emission from construction vehicles will be too small to have impact on the global warming. Since the facilities will use solar-based power sources, they will not generate CO <sub>2</sub> . Although use of the commercial electric power is associated with generation of CO <sub>2</sub> at a power plant, emission from its use in the Project is minute.

	Impact Item	Category	Reasons and Countermeasures
<b>【Social Impact】</b>			
1	Involuntary resettlement	D	There will be no need for resettlement due to the implementation of the project.
2	Local economy including employment and means of livelihood	D	Since there are few water vendors in the area, the Project will have no impact on the local economy. The Project is expected to allow people to have more time for productive activities by reducing time required for fetching water.
3	Land use and use of local resources	D	An agreement has been reached with leaders of the villages concerning land use.
4	Social structure such as social capital and decision making bodies	D	When deciding the Project sites, consideration will be given not to infringe local decision-making process by respecting opinions of traditional village chiefs.
5	Existing social infrastructure and social services	D	Since no activity affecting existing social infrastructure or social services will be implemented, the Project will have no adverse impact on them.
6	Division of area	D	Only small-scale facilities are to be constructed in this Project, there is no possibility that implementation of the Project results in division of the area.
7	The poor, indigenous peoples and ethnic minorities	D	Since there is no population of the poor, indigenous people or ethnic minority in the Project area, there is no need to consider impact on them.
8	Uneven distribution of damages and benefits	D	Since installation of public water taps was so designed as to distribute water equally to residents in the service area in accordance with the consensus of the residents, there is no possibility of uneven distribution of damages or benefits.
9	Conflict of interests in the community	D	There is no conflict of interests because the facilities concerned are highly public facilities that the residents earnestly want.
10	Water use and water rights	D	Water will be pumped up from wells at appropriate yields. There is no borehole near the project sites which may suffer from the impact of lowering of groundwater level.

11	Gender	D	Women's participation in water committees will be promoted. Reduction in the time women spend fetching water is expected.
12	Children's rights	D	Children will have more opportunities to study because the time they spend fetching water will be reduced.
13	Cultural heritage	D	The Project Area has no remain or cultural heritage to be affected by the Project.
14	Health and sanitation Infectious diseases such as HIV/AIDS	D	Reduction in the number of water-borne disease cases is expected. There is no possibility of spread of HIV/AIDS

(Categorization)

- A: Significant adverse impact on the environment is expected.
- B: Some adverse impact on the environment is expected.
- C: Extent of adverse impact on the environment is unknown.
- D: Minimal or no adverse impact on the environment is expected.

**CHAPTER 2**  
**CONTENTS OF THE PROJECT**

## Chapter 2 Contents of the Project

### 2-1 Basic Concept of the Project

#### (1) Contents of the Request and Confirmation of the Contents

The Survey Team had discussions with the executing agency of the recipient country, the Department of Water Resources (DWR), the Ministry of Fisheries, Water Resources and National Assembly Matters (MFWRNAM), about the contents of the request submitted by the Government of The Gambia to Japan in 2007 during the Preparatory Survey (March and May 2009). Table 2-1 below shows the contents agreed upon between the two parties in the discussion.

Table 2-1 Contents of the Request

Content of the Request (2007)	Confirmation of the Content of Request (Mar. 2009)	Confirmation of the Content of Request (May 2009)	Scope of the Assistance (Dec. 2009)
1) Construction of piped water supply facilities at 30 sites	<p>① It was agreed that the maximum number of the construction sites would be 15 taking into account duplication with other donors' projects and JICA's security measure.</p> <p>② It was agreed that a survey would be conducted at 15 priority construction sites and five supplementary sites (Table 2-2). The Project sites will be selected from these 20 sites based on the results of the survey.</p> <p>③ Relevance of use of solar power generation as the power source described in the request will be examined by studying use of diesel generators, national electric power and solar power generation comparatively.</p> <p>④ The project target year will be 2020.</p>	<p>① It was agreed that 19 sites, excluding one site where duplication of assistance by another donor's project had been confirmed, would be surveyed.</p> <p>② At R-02 site, national electric power will be used as the power source.</p> <p>③ The size of the beneficiary population in 2020 will be estimated from the population data obtained in the survey conducted in 2009 to decide appropriate scales of the water supply facilities.</p>	<p>1) 15 sites for construction of new facilities</p> <p>2) The beneficiary population is <i>ca.</i> 35,100.</p>
2) Rehabilitation of existing water supply facilities	<p>① The executing agency requested rehabilitation at three sites (Table 2-2).</p>	<p>① The three rehabilitation sites will be surveyed.</p> <p>② The size of the beneficiary population should be the population size at the time of the survey in May 2009, because the rehabilitation involves only power sources.</p>	<p>1) 3 rehabilitation sites</p> <p>2) The beneficiary population is <i>ca.</i> 8,100.</p>



<p>3) Procurement of equipment</p>	<ol style="list-style-type: none"> <li>1) Two pickup trucks</li> <li>2) One cargo lorry:</li> <li>3) One four-wheel-drive station wagon</li> <li>4) One vehicle-mounted air compressor</li> <li>5) One generator for pumping test</li> <li>6) One set of high capacity submersible pump</li> <li>7) One set of equipment for water quality analysis</li> <li>8) One video camera</li> <li>9) One set of equipment for geophysical prospecting (resistivity method)</li> <li>10) One set of equipment for borehole logging</li> <li>11) One set of GPS</li> <li>12) One set of spare parts for the equipments mentioned above</li> </ol> <p>① It was explained that it was difficult to assist procurement of equipment.</p>	<ol style="list-style-type: none"> <li>1) Two pickup trucks</li> <li>2) One vehicle-mounted air compressor</li> <li>3) One generator for pumping test</li> <li>4) One set of high capacity submersible pump</li> <li>5) One set of equipment for geophysical prospecting (resistivity method)</li> <li>6) One set of equipment for borehole logging</li> <li>7) One set of GPS</li> <li>8) One set of spare parts for the equipments mentioned above</li> </ol> <p>①Necessity for and relevance of the procurement of the above equipment will be examined.</p> <p>②Past use and planned future use of vehicles will be examined to decide whether to procure the vehicles or not.</p> <p>③It was agreed that equipment for water quality analysis or a video camera would not be procured.</p>	<p>1) Geophysical prospecting equipment (with simple borehole logging module)</p>
<p>4) Technical assistance</p>	<ol style="list-style-type: none"> <li>① Technical assistance in groundwater development and monitoring technology will be provided as OJT while the Survey Team conducts field survey (geophysical prospecting and test drilling)</li> <li>② The possibility of operation and maintenance of the water supply facilities by villages in the Project Area or at the local government level will be investigated during the implementation of the Project</li> </ol>	<p>①Technical assistance in groundwater development and monitoring technology was provided as OJT by the Survey Team through field survey (geophysical prospecting and test drilling)</p>	<p>1) Soft Component plan for operation and maintenance of the water supply facilities</p>

The original request included 30 sites in rural villages located in Western, North Bank, Lower River and Central River Regions. Since the scale of the request was too large for the scheme, the Japanese and The Gambian sides agreed to include a maximum of 15 villages in the Project scope. Meanwhile, in accordance with a security measure of Japan International Cooperation Agency (JICA), which restricts visit of Japanese staff to the areas near the border with Casamance Region of Senegal, a total of seven sites, three, two and two in Western, Lower River



and Central River Regions, respectively, were excluded from consideration for this Project.

Additional eight sites were excluded from this Project, because duplication of assistance by other donors was found at these sites. DWR included five alternative sites in the request considering that the field survey might result in further reduction in the number of sites. DWR requested a new assistance to rehabilitation of the diesel-powered water supply facilities installed in the past grant aid project of Japan to solar-powered ones at three sites. Therefore, it was decided to examine relevance of the project implementation at the 23 sites listed in Table 2-2 below in the survey.

Although completion of the construction of new water supply facilities is expected in 2012, the project design period is 2020. Therefore, an estimate of the population size in the Project area in 2020 will be adopted as the size of population benefiting from the construction. Meanwhile no expansion of the capacities of the existing facilities is expected at the sites where conversion of the power source from diesel-power generation to solar-power generation is planned, the current population size will be regarded as the size of population served with water supply.

Although DWR had estimated the current (2009) rural population based on the population statistics (Census 2003), the field survey conducted in this Survey revealed discrepancy between the estimates and the reality. Therefore, the Survey Team (JICA 2009) implemented a new survey on the current population (Table 2-18). The population size of 2020, the project target year, estimated from the result of the new survey of 2009 has been adopted as the size of the population served with water supply.

Table 2-2 Survey Target Site (DWR March 2009)

No.	Village Name	Region	District	Population 2003	Population (DWR2009)
<b>【Priority 15 Sites by DWR】</b>					
N-1	Kabocorr Tampapo & Killing	WR	Foni Bintang	842	1010
N-2	Berending	NBR	Lower Nuimi	1440	1728
N-3	Kekuta Kunda Complex	NBR	Central Baddibu	1008	1209
N-4	Kerr Katim Wolof + Fula	NBR	Central Baddibu	820	984
N-5	Madina Kaif (Sancha)	LRR	Kiang East	966	1159
N-6	Dongoroba	LRR	Jarra East	898	1077
N-7	Ballangharr Complex (Kerr Nderi, Mbentenki, Hoi)	CRR North	Lower Saloum	2340	2808
N-8	Jimbala Complex	CRR North	Lower Saloum	1147	1376
N-9	Fass	CRR North	Upper Saloum	937	1124
N-10	Kuntaur Fula Kunda & Jakaba	CRR North	Niani	1177	1412
N-11	Kerewan Samba Sira	CRR South	Fulladu West	1589	1906
N-12	Fula Bantang & Sinchu Sora	CRR South	Fulladu West	1111	1333
N-13	Jissadi	CRR South	Niamina DKK	910	1092
N-14	Sotokoi	CRR South	Niamina East	897	1076
N-15	Maka and Njie Kunda	CRR South	Niamina East	1252	1502

No.	Village Name	Region	District	Population 2003	Population (DWR2009)
<b>【Supplementary 5 Sites】</b>					
N-16	Lamin Koto + Badala+ Sotokoi	CRR North	Sami	1400	1680
N-17	Gidda + Talokoto	WR	Kombo East	870	1044
N-18	Kerr Mama	NBR	Upper Nuimi	560	672
N-19	Kerr Chernoo	NBR	Upper Nuimi	803	963
N-20	Banta Killing	NBR	Upper Nuimi	724	868
<b>【Rehabilitation 3 Sites (Rehabilitation of Diesel into Solar)】</b>					
R-1	Toniataba	LRR	Jarra West	1228	1473
R-2	Bureng	LRR	Jarra East	1434	1720
R-3	Barrow Kunda	LRR	Jarra East	2314	2776

## (2) Contents of the Project

Table 2-3 below shows the contents of the Project required for achieving the purpose of this Project on the basis of the matters confirmed in the discussion mentioned above, the results of the field survey (from March to September 2009) and the results of data processing in Japan. In the project, in addition to construction of 15 new piped water supply facilities and rehabilitation of three facilities making a total of 18 sites in the four regions, procurement of equipment for geophysical prospecting and the “Soft Component” plan will be implemented.

It is expected that implementation of the Project enables stable supply of safe drinking water, which will increase the proportion of people with access to water and improve sanitary conditions in the Project Area. The sizes of beneficiary population are *ca.* 35,100 (for the new construction) in 2020, the project target year, and *ca.* 8,100 in 2009 at the rehabilitation sites. Thus, the size of the beneficiary population of the Project is estimated at *ca.* 43,200.

Table2-3 Outline of the Project

Contents of Project	Quantity	Project Description
1. New Construction of Water Supply Facility	15 sites	Water Source: Successful Boreholes from Test Drilling Power Source: Solar Power Generation
2. Rehabilitation of Water Supply Facility	3 sites	Water Source: Existing Boreholes with Pumping Test & Water Quality Test Power Source: National Electricity (1 site) Solar Power Generation (2 sites)
3. Equipment Supply	1 set	Geophysical Survey Equipment with Potable Logging Probes
4. Soft Component	18 sites	1) Institution of Operation and Maintenance System Support 2) Organization of Village Water Committees 3) Community Mobilisation 4) Hygiene Education

On the basis of the discussion mentioned above, the Survey Team proposes the overall goal, project purpose, outputs, activities, objectively verifiable indicators and means of verification as shown in Table 2-4.

Table 2-4 Logical Framework of Project Design Matrix (PDM)

Project Title: Rural Water Supply Project Phase III  
 Target Group: Beneficially of the Project  
 (Approx. 43,200)

Target Area :  
 18 Villages in 4 Regions  
 Project Period: 2010~2012

Ver. 3.0  
 Edited: January 2010

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
<p><b>Overall Goal</b></p> <p>□ Living conditions of Project area are improved.</p>	<p>□ Safe drinking water fetching population of Project area is increased.</p>	<p>□ Statistic data from DWR, hospital and health of regional and district offices</p>	
<p><b>Project Purpose</b></p> <p>□ Safe, adequate drinking water of Project area will be supplied.</p>	<p>□ Water supply population of target 4 regions increases about 43,200 at the Project completion year of 2012.</p> <p>□ Water fetching hours and heavy burden decreases, especially for women and children.</p> <p>□ 35 lit/capita/day of water is supplied from the constructed water supply facilities throughout the year.</p> <p>□ Incidence of water related diseases decrease.</p>	<p>□ Project completion report and static data</p> <p>□ Monitoring report &amp; hearing from villagers</p> <p>□ Records of operation &amp; hearing from villagers</p> <p>□ Regional health centre &amp; hospital</p>	<p>□ Provision of the primary health care services in the target area will be improved.</p>
<p><b>Output</b></p> <p>1. Water supply facilities are constructed at all target sites.</p> <p>2. The community based operation and maintenance system of the constructed water supply facilities is established at the target sites.</p>	<p>1-1 New water supply facilities of 15 sites and rehabilitation of 3 sites are installed solar pumping system by 2012.</p> <p>2-1 Village Water Committee (VWC) is installed at all target sites.</p> <p>2-2 Operation and maintenance cost are covered by water rate paid by villagers of target sites.</p> <p>2-3 Local OM company is selected and maintenance contract is concluded.</p>	<p>□ Project completion report</p> <p>□ Activity report of soft component</p> <p>□ Accounting record of VWC</p> <p>□ Maintenance contract between VWC and Local OM company</p>	<p>□ Groundwater potential does not aggravate.</p> <p>□ Water quality from the sources does not deteriorate.</p> <p>□ Socio-economic conditions at target sites do not aggravate.</p>
<p><b>Activities</b></p> <p><b>【Facility Construction】</b></p> <p>1-1 New solar powered water supply facilities are constructed at 15 target sites.</p> <p>1-2 Solar pumping system is installed at the 3 existing water supply facilities.</p> <p><b>【Equipment Procurement】</b></p> <p>2-1 To procure geophysical survey equipment for groundwater survey and monitoring</p> <p><b>【Support for Capacity Building on O&amp;M and Hygiene Education through Soft Component】</b></p> <p>3-1 To conduct participatory institution of O&amp;M and conduct training of the committee members for capacity building</p> <p>3-2 To conduct a programme of hygiene education and improvement of hygiene behaviour</p> <p>3-3 To conduct the conclusion of maintenance contract between VWC and selected local OM company for solar-powered water supply facilities</p>		<p><b>Inputs</b></p> <p><b>【Japanese Side】</b>                      Human resources:                      Detailed design survey team, Consultant team for supervision of the project implementation, Contractor for construction works and procurement of equipment                      Equipment &amp; Materials:                      Construction equipment and material, Geophysical survey equipment                      Support:                      Soft component for establishment of operation and maintenance                      Fund:                      Japan's Grant Aid</p> <p><b>【The Gambian Side】</b>                      Human resources:                      Counterpart technical personnel, Motivators                      Equipment &amp; Materials:                      Transport vehicles                      Fund:                      Project Operation Cost                      Local Cost:                      Fuel, Accommodation, Field Allowance</p>	<p>1. Groundwater development will be successes at target sites.</p> <p><b>Precondition</b></p> <p>2. The political situation will not be changed in The Gambia.</p>