

**BASIC DESIGN STUDY REPORT  
ON  
THE PROJECT FOR RURAL WATER SUPPLY  
AND SANITATION  
IN  
OYO STATE  
IN  
THE FEDERAL REPUBLIC OF NIGERIA**

**June 2002**

**JAPAN INTERNATIONAL COOPERATION AGENCY  
PACIFIC CONSULTANTS INTERNATIONAL**

## PREFACE

In response to a request from the Government of the Federal Republic of Nigeria, the Government of Japan decided to conduct a basic design study on the Project for Rural Water Supply and Sanitation in Oyo State and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Nigeria a study team from September 24 to November 14, 2001 and from February 4 to March 14, 2002.

The team held discussions with the officials concerned of the Government of Nigeria, 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 Nigeria 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 Republic of Nigeria for their close cooperation extended to the teams.

June 2002

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Takao Kawakami  
President  
Japan International Cooperation Agency

June 2002

**LETTER OF TRANSMITTAL**

We are pleased to submit to you the basic design study report on the Project for Rural Water Supply and Sanitation in Oyo State in the Federal Republic of Nigeria.

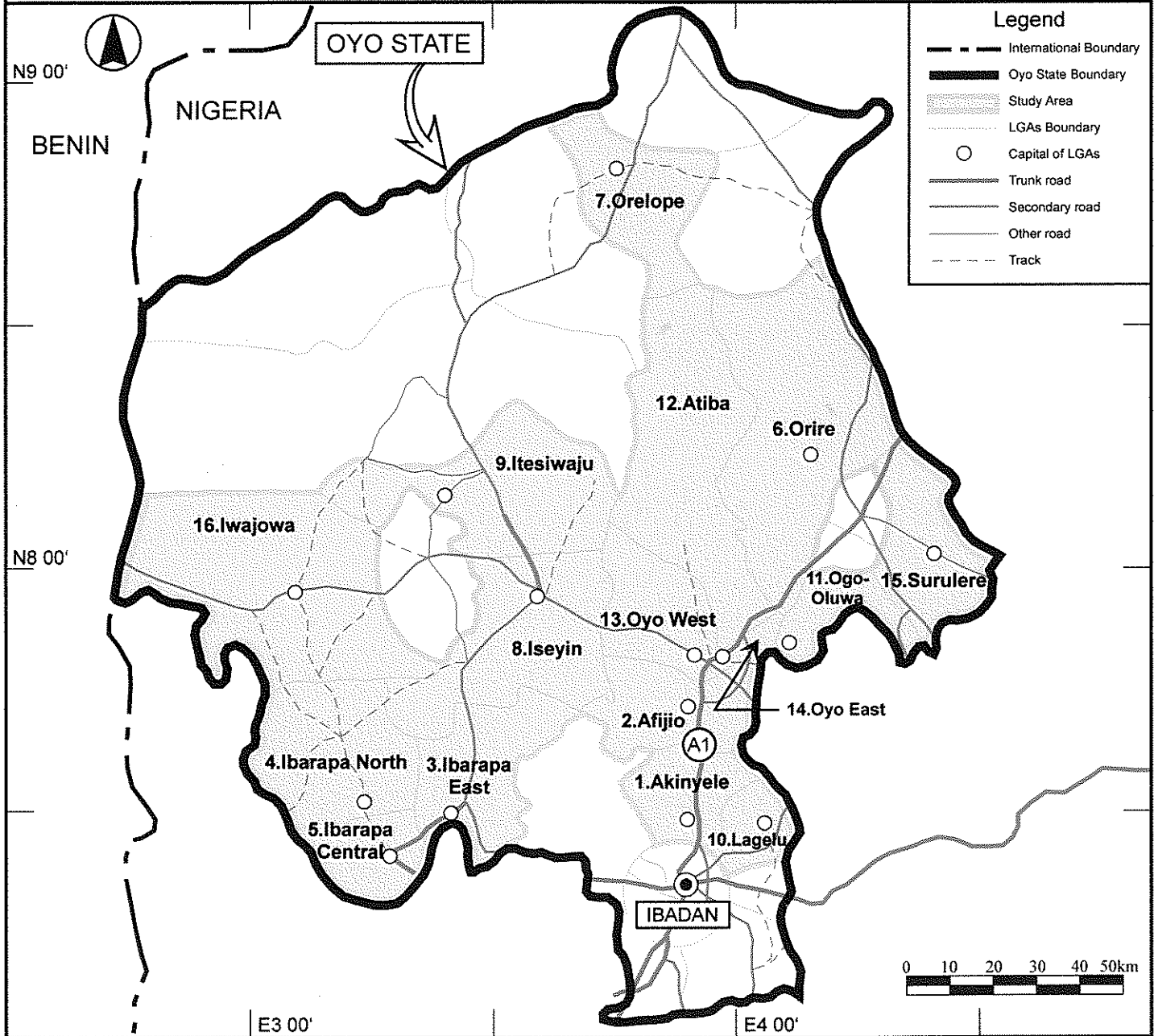
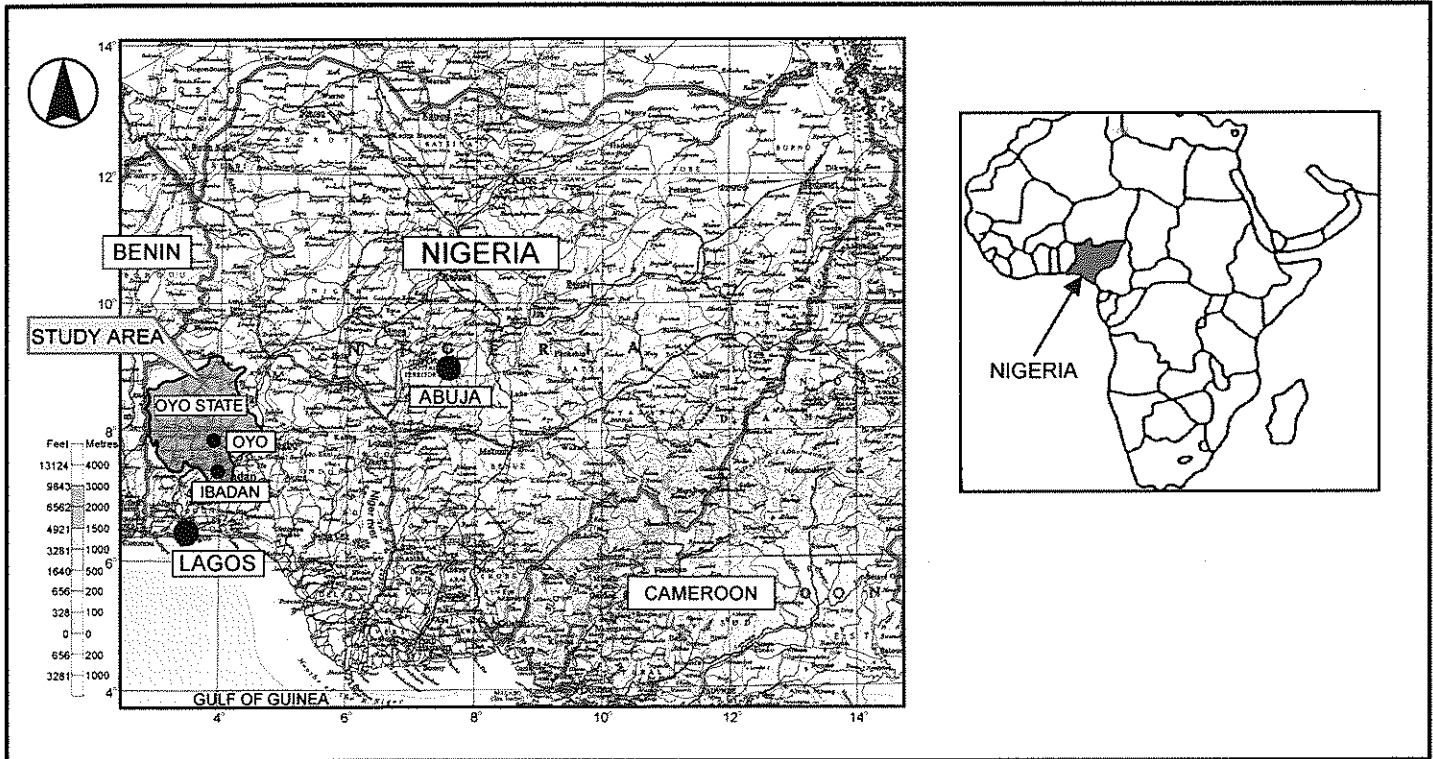
This study was conducted by Pacific Consultants International, under a contract to JICA, during the period from September, 2001 to June, 2002. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Nigeria and formulated 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,

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**Yutaka Shiono**  
**Project Manager,**  
**Basic Design Study Team on**  
**The Project for Rural Water Supply and**  
**Sanitation in Oyo State**  
**Pacific Consultants International**



Location Map

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### Abbreviations

AfDB	African Development Bank
ASTM:	American Society for Testing and Materials
A/P:	Authorization to Pay
B/A:	Banking Arrangement
BS:	British Standard
DIN:	Deutsche Industrie Norm
DTH:	Down the Hole hammer
E/N:	Exchange of Notes
FMWR:	Federal Ministry of Water Resources
ISO:	International Organization for Standardization
JICA:	Japan International Cooperation Agency
JIS:	Japanese Industrial Standard
LGAs:	Local Government Areas
LWC:	LGA WATSAN Committee
M/D:	Minutes of Discussion
MEWR:	Ministry of Environmental Water Resources Oyo State
NGO:	Non Governmental Organization
NPC:	National Planning Commission
OJT:	On the Job Training
O/M:	Operation and Maintenance
PVC:	Polyvinyl Chloride
UNDP:	United Nations Development Programme
UNICEF:	United Nations Children's Fund
VLOM:	Village Level Operation and Maintenance
VWC:	Village WATSAN Committee:
WATSAN:	Water and Sanitation
WB:	World Bank
WES:	Water and Environmental Sanitation Programme

### Exchange Rate

1US\$ = 126.80 Yen

1US\$ = 122.44 ₦

1 ₦ = 1.036 Yen

## **Summary**

## **Summary**

The Federal Republic of Nigeria (hereinafter referred to as “Nigeria”) is located in Western Africa, facing the Gulf of Guinea on the south, and bordering to Cameroon and Chad on the east, Niger on the north and Benin on the west. The land area of the country is 923,773km<sup>2</sup>. The climate is a subtropical zone in southern part and shifts to a savanna zone in the northern part and sub-desert in northern part of the boundary with Niger. The population is approximately 107 million (Federal Ministry of Water Resources 1999: hereinafter referred to “FMWR”) and about half of the population live in rural villages. Accordingly, about 70% of its population lives in rural areas if small towns with less than 20,000 inhabitants are included.

According to the report prepared by FMWR in 1999, the water supply rate in Nigeria is 46% in urban areas of 20,000 inhabitants or more, 36% in small towns, and 29 % in rural villages. Likewise, the United Nations annual report 1993 indicated 26% in rural areas. In either case, the water supply rate in rural areas is low. Consequently, most of the population in rural areas have no choice but use unsanitary water sources such as shallow wells, hollow ponds and so on. As a result, epidemics of water-borne diseases such as guinea worm and diarrhea are common in these areas.

The Government of Nigeria established its national plan in “Vision 2010”. In line with it, FMWR formulated “National Water Supply and Sanitation Policy”, which aims to achieve the following objectives in regard with water supply situation.

- (i) The initial target is to meet the national economic target of improving national average water supply rate from 40% to 60% by the year 2003.
- (ii) Further improvement of water supply rate to 80% of the whole population by the year 2007.
- (iii) Extension of water supply rate to the whole population (100%) by the year 2011.
- (iv) Sustain the full ratio (100 %) of water supply service beyond the year 2011.
- (v) Rural water supply will be guaranteed with the minimum level of 30 liters per capita per day within the distance of 250 meters in the community, serving about 250 to 500 persons per water point.

Nigeria decided that the cooperation from Japan was essential in order to improve the situation of water supply and sanitation in the rural areas. In October 1999, Nigeria made a request for Japanese Grant aid concerning the project that included procurement of drilling rigs, etc. for 36 States and the Federal Capital Territory (F.C.T) in the country. After that, Japan proposed to revise the contents of request in accordance with the report of project identification survey carried out in March 2000. Nigeria accepted the proposal and reduced the number of states from 36 to 6.



In February 2001, Nigeria made new requests for Japanese Grant aid for 3 projects that included the procurement of drilling facilities and the construction of boreholes in 3 States (namely, Oyo, Rivers, Plateau) out of 6 States agreed by the project identification survey. Finally, the Japanese government decided to carry out the basic design study for Japanese Grant Aid in Oyo State, taking into consideration the security situation and the disease rate of guinea worm, etc.

In the rural area of Oyo state, about 600 boreholes were constructed in 600 communities by Oyo State Water and Sanitation (hereinafter referred to as "Oyo State WATSAN" since its establishment in November 1992). Currently, about 150,000 people are receiving safe water supply. However, except for the state capital Ibadan city in Oyo state, the number of communities in 28 Local Government Areas (hereinafter referred to as "LGAs) has increased to 14,000 (out of the total population of 3.5 million people). In the entire rural area of Oyo state, the water supply rate is 4.28%, which is extremely low in comparison with 29% of the national average. Consequently, the residents are using unsanitary streamlets, hollow ponds, and shallow wells as water sources.

In these areas, infection of Guinea worm is a typical water related disease. In the last decade, the number of infections has decreased from about 3,000 cases (1991) to 344 cases (2000), owing to the statewide activity of UNICEF and NGOs to distribute filters for drinking water filtration. However, in some LGAs, the Guinea worm infection is reported to have increased. It is suggested that there is a limit to the ability of water filters to exterminate the Guinea worm epidemic. Therefore, the construction of boreholes for the improvement of the water supply situation is one of the urgent needs in this region in order to improve sanitation conditions.

Hence, the Government of Oyo state has planned the construction of borehole facilities, aiming to raise the current low water supply rate in the rural areas of the state, from 4.28% to about 17.5% by 2006. To achieve this plan, the Government of Oyo state has requested Japanese Grant Aid through the Government of Nigeria.

Japan International Cooperation Agency (hereinafter referred to as "JICA") sent a study team to Nigeria on two occasions to confirm the background, contents and scope of the request: from 23 September to 16 November 2001 and from 3 February to 15 March 2002. After they returned to Japan, the team carried out further studies and completed a draft basic design report, taking into consideration the requested contents, the adequacy of cooperation and the suitability of the basic plan. Then, the mission was sent to Nigeria in order to discuss the draft basic design from 11 to 25 May 2002.

In the first basic design study carried out from September to November 2001, the basic plan of project was the construction works of 100 boreholes and procurement of equipment. However, for

efficient utilization of the Grant, considering the fact that Oyo State WATSAN has been directly carrying out borehole construction works, study team suggested in the second basic design that the construction work of the project should be executed by the Nigerian side while the technical assistance will be provided by the Japanese side. The Nigerian side agreed with the suggestion made by the Study Team. However, due to the restriction in the budget amount, the Nigerian side requested the Japanese side to procure a part of the materials necessary for the construction work. Thus, in principle, the Nigerian side shall procure consumable materials such as bentonite, and the Japanese side shall procure the other materials for construction work.

As the result of discussion mentioned above, both sides confirmed that the Project will have following components: (i) procurement of equipment for groundwater development and construction materials for borehole facilities, (ii) provision of technical assistance through “soft component”. It is noted that the Nigerian side should be responsible for the construction works.

The basic design of the Project is as follows:

#### Procurement of Equipment and Material

	Item	Contents and Quantity
1	Drilling Equipment	Drilling rig ( 2 units ) 、 Drilling tools and Accessories ( 2 sets ) 、 Drilling tools (2set), Grouting pump and Mixer (2 units), Compressor (2 units)
2	Geophysical Survey Equipment	Electromagnetic Survey Equipment (1unit), Resistivity Survey Equipment (1unit)
3	Survey Equipment	GPS (2 units), Radio telecommunication equipment (Base camp: 1 unit, mobile: 3 units), Water level detector (2 units), Triangle weir (2 units), Two types of Submersible pump (2 units) and Engine generator (2 units), Borehole logging equipment (2 units)
4	O&M Equipment	Bearing puller, (2 units), Nozzle and Injection Puller (Large and small each 2 units), Pressurized steam washing machine (1 unit), Hydraulic Garage Jack (2units), Air compressor (1 unit), Riveting machine (2units), Mechanical tools (2sets)
5	Hand Pump	VLOM type hand pump (100units), Maintenance kits and tools (1 set)
6	Water analysis Apparatus	Reagent ( 1 lot for 100 boreholes ) , Spectrophotometer (1 unit)
7	Vehicle	Pick up car (3 units), Cargo truck with Crane car (2 units), Water Tanker (2 units)
8	Borehole construction material (100 boreholes)	Casing and Screen, Gravel pack, Mud-Water Admixture and Forming Agents, Cement, Aggregate, material for Soakage pit
9	Existing drilling rig	For drilling tool such as Cross over sub, Drill collar, Bit sub etc. (1 set)

The “Soft Component” of the Project consists of the following three components:

- Construction Guidance
- Instruction of the equipment maintenance and management
- Support for public education and institutional strengthening for facility operation,

**maintenance and management by the local communities**

**19 months will be required for the implementation of the Project including the detail design stage (0.4 months), procurement stage (9 months), “soft component” period (12 months) and borehole facilities construction period (12 months). For implementation of the project, the budget to be borne by the Nigerian side is 35million Naira (36 million Japanese Yen) as the Nigerian finance, in addition to the Japan’s Grant Aid finance.**

**Upon the completion of construction of 100 boreholes, 36,000 people can receive safe water and the water supply rate in the target areas will increase from 4.28% to 5.31%. Furthermore, Oyo State WATSAN will have new drilling rigs and related equipment. These rigs and related equipment will be used by Oyo State WATSAN to continue rural water supply and sanitation projects after this Project is completed.**

**Owing to the “ Soft Component” composed of construction guidance and instruction of the equipment maintenance and management, drilling expertise and ability of Oyo State WATSAN personnel for operation and maintenance will be upgraded. Furthermore, due to the support for public education and institutional strengthening for facility operation, maintenance and management by local communities, Village WATSAN Committees (hereinafter referred to as “VWC”) will be established in 100 communities and the ability of operation and maintenance for hand pumps will be improved. At the same time, the awareness of residents of the water charge, hygiene and environmental sanitation will be enhanced. As a result, the sustainable management of borehole will be realized.**

**As an indirect effect, owing to the reduced distance of carrying water to less than 250m in average, workload of women and children for obtaining water will be reduced.**

**In order to execute the maintenance of equipment procured under the Project and manage the sustainable rural water supply project, it is indispensable to consider the following aspects.**

- Securing budget for groundwater development and continuity of organization structure**
- Water quality control of raw water**
- Continuous collection of water charge by community**
- Establishment of spare parts supply system for hand pumps**

**In addition to the above, in order to execute the project smoothly and effectively, the following matters shall be improved and enhanced.**

- Resident participation and public education by Oyo State WATSAN and officials concerned**
- Campaign on a country scale for health and sanitation**

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