

**The Republic of Kenya
Ministry of Water and Irrigation
Rift Valley Water Service Board**

**THE SECOND PREPARATORY SURVEY
ON
THE PROJECT
FOR
RURAL WATER SUPPLY IN BARINGO
COUNTY
IN THE REPUBLIC OF KENYA**

NOVEMBER 2011

JAPAN INTERNATIONAL COOPERATION AGENCY

**CTI ENGINEERING INTERNATIONAL CO., LTD.
OYO INTERNATIONAL CORPORATION**

PREFACE

The Japan International Cooperation Agency (JICA) has decided to conduct the preparatory survey and entrusted the survey to CTI Engineering International Co., Ltd. and OYO International Corporation.

The survey team held a series of discussions with the officials concerned of the Government of Kenya, and conducted field investigations. As a result of further studies in Japan, 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.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Kenya, for their close cooperation extended to the survey team.

November 2011

Shinya EJIMA
Director General
Global Environment Department
Japan International Cooperation Agency

SUMMARY

1. Outline of the Republic of Kenya

The Republic of Kenya (hereinafter referred to as Kenya) with the population of 3,980 million people (2009: World Bank) is situated in eastern Africa with 58.3 million square kilometers of land area (approximately 1.5 times larger than Japan). The official languages are Swahili and English.

More than 80 percent of the land belongs to the dry areas of tropical or semi-arid regions. Central highlands of the country are cooler than coastal areas. The period from October to December is usually designated as the small rainy season while March to May is the main rainy season. Monthly rainfall during the rainy season is generally 50mm to 200mm; rainfall beyond 300mm per month occurs only in a limited area.

The agricultural sector continues to dominate Kenya's economy with the production of coffee, tea and other horticultural products. Approximately 25% of GDP is gained from agriculture, which accounts for about 60% of the workforce. Tourism is also another relevant income source for Kenya. The economy after 2008 aggravated, with the post-election turmoil in late 2007, which caused many involuntary displacement of civilians. Drought and the global financial and economic crisis severely hit the domestic industries, which dragged down the economic growth to a modest 1.7% in 2008.

The economy began to recover gradually, led by the growth of construction and tourism industries, with nearly 5% growth in 2010. In June 2008, the Government of Kenya announced a long-term economic development strategy aiming at becoming a middle-income nation (Vision 2030) and the first five-year medium-term plan was announced

2. Background and Outline of the Project

Kenya Vision 2030 is a long-term national development strategy until the year 2030 and it is also the basis for the rural water supply sector targeting 70% of rural water supply coverage by 2030. In addition, in accordance with the new Water Act (WA: Water Act of 2002), the provisions of the National Water Services Strategy shows the basic strategy of the new water sector (NWSS: National Water Services Strategy, 2007-2015). The goal of water supply by 2015 is to increase the 57% (60% urban, 40% in rural areas) in 2005-2006 up to 80% in urban and 59% in rural areas. In addition, it is expected that the distance between the nearest public water faucet to residences in rural areas will decrease to less than 2km. The Project with the above goals is positioned as part of the comprehensive approach to contribute to improving rural water supply.

The target area of the Project; namely, Baringo Central, North Baringo, Marigat and East Pokot in Baringo County with a population of 390,000, has approximately 24% of safe water supply coverage through piped systems and boreholes. People are then forced to use spring water, unsanitary ponds and hand-dug wells in the reservoir bed, proving that water is an urgent need.

The Project with 90 target sites in Baringo area aims to improve access to safe and stable water for 60,000 population, i.e., to improve water supply from 24% to 37% with the construction of water supply facilities. This is to contribute the overall goal “to improve the living condition in rural communities.” Challenges identified in the rural water supply sector are as discussed below.

(1) Assurance of Safe and Stable Water Sources

In the target areas, the Government of Kenya and NGOs are constructing water supply facilities, but the coverage rate remain as low as 15-34% even in the provincial urban areas. The target communities for this study are using mostly rivers and springs, or hand-dug wells on the riverbeds. Communities using the borehole of other communities have also been identified, in which case the transport distance exceeds 5km. It is a pressing challenge to build water supply facilities in these communities to improve the water supply.

(2) Improvement of Operation and Maintenance of Sustainable Water Supply Facilities

The maintenance of water supply facilities is part of the strategy for sustainable operation and maintenance of rural water. As to the sustainable use of water supply facilities, the challenge is to improve the system of operation and maintenance, including operational management through training and education on hygiene. It is also necessary to improve the water and sanitary environment along with the reservoir for livestock water and the hand-dug wells in the muddy riverbeds.

Based on the above issues related to water supply, the Government of Kenya (Kenya) requested the Government of Japan (GOJ) for assistance in the construction of 100 independent solar water facilities for the country in July 2009. JICA, the agency entrusted with the implementation of cooperation programs of the GOJ conducted the First Preparatory Study in June 2010, and validated the need for the projects requested by Kenya.

The operation and maintenance of existing solar facilities were carefully studied during the First Preparatory Study. It was found that the survey area has no water supply facility and water demand is extremely high, confirming the necessity and appropriateness of the projects requested. Upon consultation of the JICA Study Team with the Government of Kenya, it was agreed that the Second Preparatory Study will cover options other than independent solar pumping system facilities, hand pumps, including equipment procurement and social mobilization schemes (software component).

(3) Outlines and Contents of the Project

To achieve the goals mentioned above, the project shall construct individual rural water supply facilities for the communities. Necessary materials and equipment for operation and maintenance are to be procured for the efficient and sustainable use of facilities.

A request for the construction of water supply facilities was made for 100 sites. The success rate was estimated and it was concluded that 125 sites are needed to produce 100 productive boreholes including reserved sites. The study on local natural and social conditions revealed that drilling is possible at 118 sites.

Considering the success rate, the project objective is set at 90 successful boreholes for construction. The remaining 28 sites are kept as reserved sites. In addition, a soft component program will assist in the establishment of water users associations at the communities and training for the staff of the district water offices. Through the implementation of the project, it is expected that the capacity of local administration and communities is enhanced for the operation and maintenance of water supply facilities.

The following is an overview of the cooperation project components.

Table 1 Overview of the Cooperation Project Component

Item	Contents	Overview
Construction of facilities	Independent water supply facilities	90 sites (Borehole drilling, pumping facilities, water storage tank, communal faucets, transmission pipes and water trough for livestock)
Procurement of equipment	Procurement for operation and maintenance	1 double cabin pick-up (4WD); 2 motor bikes (175cc); 1 desktop computer; 1 printer
Soft component	Capacity building on operation and maintenance	<ul style="list-style-type: none"> • Training of extension workers in the District Water Office • Establish Water Users Association, Training of the members of WUA

Table 2 Number of Sites by Power System

Districts	Solar Power	Commercial Electricity	Generator	Total
North Baringo	12	14	2	28
Marigat	9	5	0	14
Central Baringo	14	18	6	38
East Pokot	8	0	2	10
Total	43	37	10	90

a) Implementation Schedule

The duration of the construction work is 24 months.

b) Evaluation of the Project

Kenya enacted a new constitution in 2010 and the administrative boundaries are to be reorganized after the presidential election in July 2012. The current province-district boundaries were re-divided into 47 counties with the abolition of provinces. The 4 target districts in Baringo area was transformed into the Baringo County, and the old Baringo Central District Water Office was reorganized as the head water office for the entire Baringo County.

The beneficiaries of the project are the local communities with approximately 60,000 people in the Baringo area (North Baringo, Central Baringo, Marigat and East Pokot) of the Rift Valley Region. The water supply rate is expected to improve from 24% to 37%.

The water supply facilities will be operated and maintained by the water users associations established in each community. Water fees were set in the range of 2-3Ksh/20 liters, which is within the acceptable range based on the findings from a social survey.

Kenya aims to achieve access to water and sanitary facilities for all citizens in accordance with the Kenya National Development Plan (Vision 2030). In the medium-term plan for the Millennium Development Goals, the objective is set to increase the rural water supply rate from the current average of 40% to 59%. The target area's water supply rate is as low as 24%, which will be improved up to 37% through the implementation of the project.

The project hardly expects no significant adverse environmental and social impact, so that it falls under Category C according to the environment and social consideration guidelines of JICA.

(1) Quantitative Effects

Through the implementation of the project, the water supply population will increase by 59,000 and the water supply rate will increase also from the 24% in 2011 to 37% in 2015.

Table 3 Project Effects to the Water Supply Population

Indicators	Base Year (2011)	Target Population (2015)
Water supply population in the target area	Approx. 98,000	148,000 (+59,000)
Water supply rate in the target area	24%	37%

Indicators to measure the above objectives are the water supply population. The increase of service population is measured through monitoring and maintenance of water user associations.

(2) Qualitative Effects

Waterborne diseases such as diarrhea and dysentery are expected to decline in the target area through the implementation of the project.

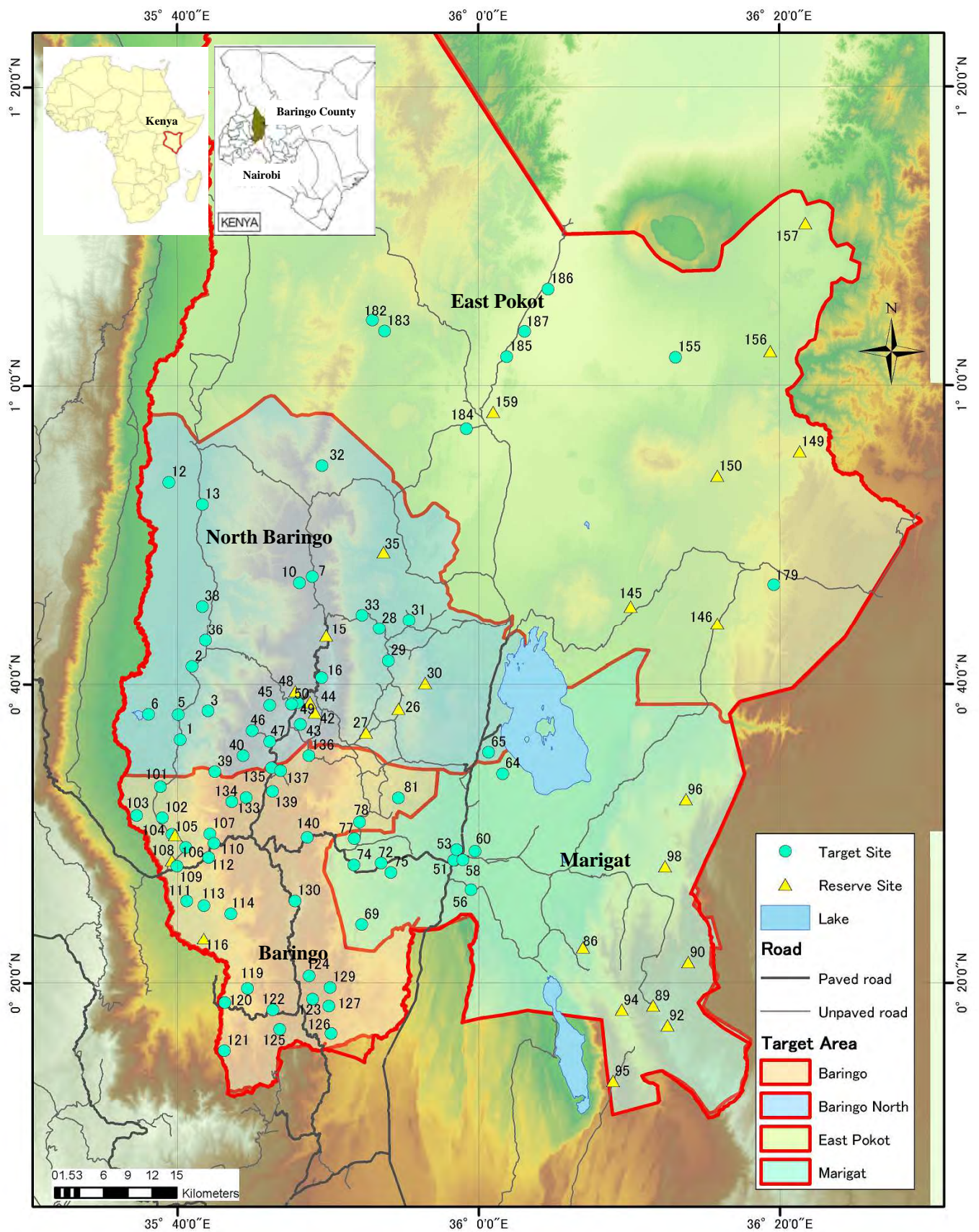
The burden of water fetching labour is reduced.

Water user associations are established at 90 sites. Through a soft component program, they will sustainably operate and maintain the facilities.

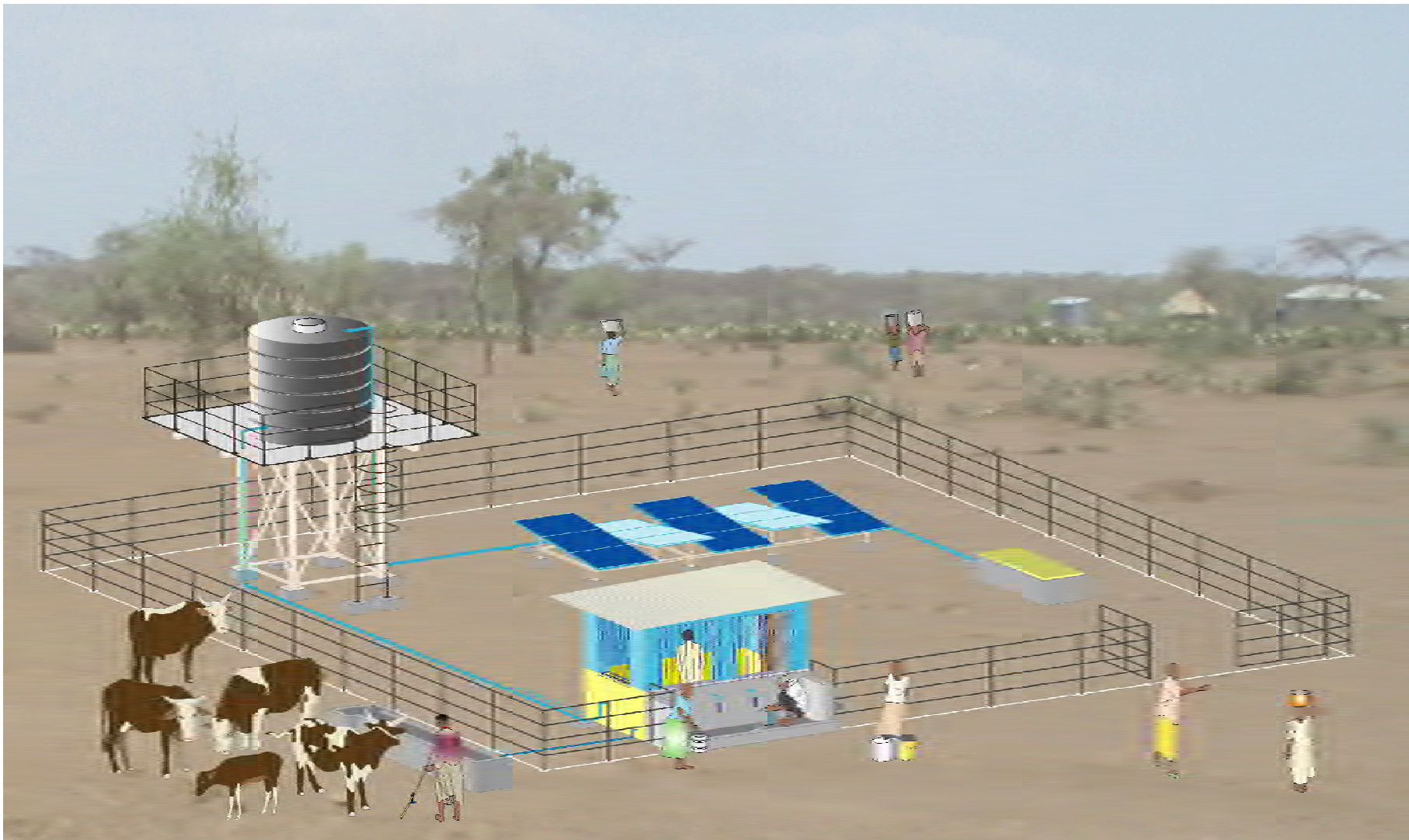
The relevance and effectiveness of the project have been analyzed as high from the above evaluation.

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LOCATION MAP



Perspective of the Project

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Abbreviations and Acronyms

AD	(Asset Development/Investment)
ADB	(African Development Bank)
AFD	(French Development Agency)
ASALs	(Arid and Semi-Arid Lands)
AWSR	(Annual Water Sector Review)
BAWASCO	(Baringo Water and Sanitation Co.)
BCM	(Bone Char methods)
BTC	(Belgium Technical Cooperation)
CDF	(Constituency Development Fund)
CDN	(Catholic Diocese of Nakuru)
CDNWP	(Catholic Diocese of Nakuru Water Programme)
CM	(Water Services Provision Coordination and Monitoring)
C/P	(Counterpart)
DANIDA	(Danish International Development Cooperation)
DMWS	(Design Manual for Water Supply in Kenya)
DWO	(District Water Office)
EC	(European Commission)
EIA	(Environment Impact Assessment)
EIAAR	(Environmental Impact Assessment and Audit Regulations)
EMCA	(Environmental Management and Co-ordination Act)
GTZ	(Deutsche Gesellschaft für Technische Zusammenarbeit)
HRMS	(Human Resource Management Strategy)
KfW	(German Government-owned Development Bank)
KSSP	(Kenya Water and Sanitation Programme)
MDGs	(Millennium Development Goals)
MWI	(Ministry of Water and Irrigation)
NIBs	(National Irrigation Board)
NEAP	(The Kenya National Environment Action Plan)
NEMA	(National Environmental Management Agency)
NWCPC	(National Water Conservation and Pipeline Corporation)
NWSS	(National Water Services Strategy)
RC	(Regional Coordination)
RV-WSB	(Rift Valley Water Services Board)
SIDA	(Swedish International Development Cooperation)
SWA	(Sector-Wide Approach)
UNICEF	(United Nations Children’s Fund)
WA 2002	(Water Act 2002)
WB	(World Bank)
WASREB	(Water Services Regulatory Board)
WRMA	(Water Resources Management Authority)
WSBs	(Water Services Boards)
WSPs	(Water Services Providers)
WSTG	(Water Sector Technical Group)
WUA	(Water Users Association)

CHAPTER 1 BACKGROUND OF THE PROJECT

1-1 Overall Goal and Project Purpose

The project area is located in the Rift Valley where volcanic geological formations are the prominent features. Due to this notable feature, the groundwater in the area contains a high rate of fluoride, which hinders development. The population that has access to safe water is approximately 100,000. The water supply rate remains as low as 24%, and many communities depend on unhygienic reserved ponds, springs and hand-dug wells on the riverbed.

In response to these challenges, the Government of Kenya requested the Government of Japan to construct 100 water supply facilities using solar pumps in July 2009.

Project Purpose: To increase the water supply rate and water supply quantity in the Baringo area.

Project Outcome: 100 water supply systems to be constructed

Outline of the Project:

Facility Construction: point source water supply system (level 1.5) 100 facilities (borehole, pumping facility, storage tank, communal faucet, transmission pipes, trough for livestock)

Procurement of Equipment: 1 pick-up truck (4WD), 2 motorbikes (175cc), 1 computer

Soft Component: measures for water supply facilities

Target area: Baringo area (the current North Baringo, Central Baringo, Marigat and East Pokot)

Supervision: Ministry of Water and Irrigation

Implementation Agency: Rift Valley Water Service Board

Based on the request, JICA undertook the first preparation study to confirm the contents of the request, needs and validity of the project. The following items were confirmed by first preparation study:

Point source system is selected for the water supply facility. The source of pumping power is not limited to solar power, but includes electric generator, commercial electric power and hand pump.

Procurement of equipment and materials (vehicle and motorbike) is planned, following the examples of similar projects.

A soft-component program is planned to support operation and maintenance of the water supply facility in conjunction with the formation of water users associations.

Table 1-1 Scope of the Project

Items	Contents	Outline
Facility Construction	Construction of Water Supply Facility	90 sites (borehole, pumping facility, storage tank, public tap, distribution pipe, trough for domestic animal)
Procurement of Equipment	Procurement of Equipment for operation and maintenance	1 double cabin pick-up (4WD), 2 motorbikes (175cc), 1 desktop computer, 1 printer
Assistance to Operation and Maintenance	Organizational capacity building training	<ul style="list-style-type: none"> • Training of extension workers in the District Water Office • Establish Water Users Association, Training of the members of WUA

1-2 Environmental Condition of the Project Area

1-2-1 Hydrological and Meteorological Conditions

(1) Hydrological Condition

The country is divided into five (5) main drainage areas as shown in Figure 1-. The project area belongs to the Rift Valley drainage area by this classification.

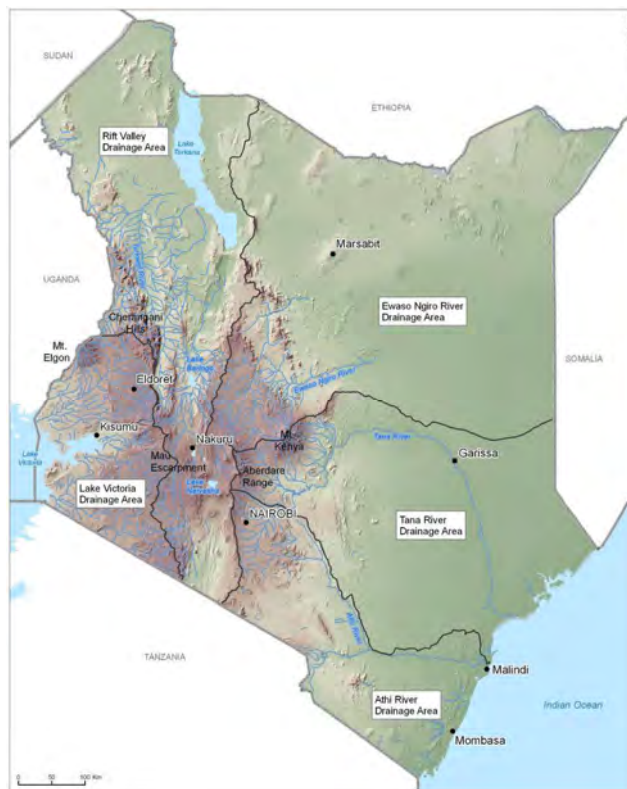


Figure 1-1 Classification of Drainage Areas in Kenya

The project area is located in an internal drainage basin, which has Lake Turkana at the lowest area. In detail, the project area is located between the origin and the middle reach of the Turkana internal drainage basin. The project area is divided into four (4) sub-basins as shown in Figure 1-; namely, Kerio

river sub-basin, Lake Bogoria (Hannington) sub-basin, Lake Baringo sub-basin and East Pokot sub-basin. Lake Bogoria and Lake Baringo sub-basins are internal drainage basins themselves.

There are few perennial rivers such as Kerio River, Molo River and so on. Sometimes, these perennial rivers become dry in the dry season.

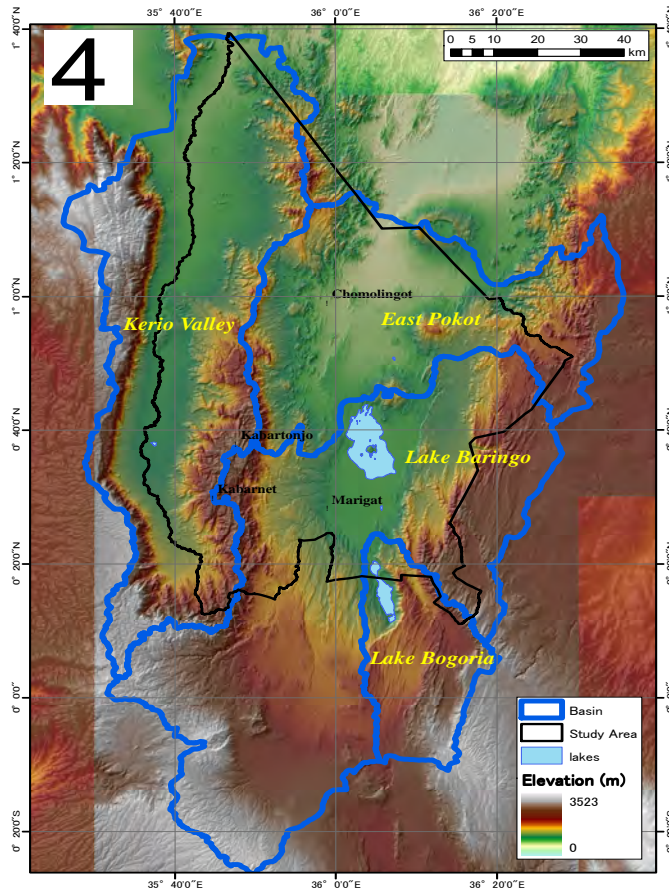


Figure 1-2 Sub-basins Related to the Project Area

(2) Meteorology of Kenya

The climate of Kenya is arid or semi-arid in the tropical area. The central highland regions are substantially cooler than the coast. Seasonal rainfall in Kenya is driven mainly by the migration of the Inter-Tropical Convergence Zone (ITCZ), a relatively narrow belt of very low pressure and heavy precipitation that forms near the earth’s equator.

The position of the ITCZ changes over the year: migrating southwards through Kenya in October to December, and returning northwards in March, April and May. This causes Kenya to experience two distinct wet periods: the short rains in October to December and the long rains in March to May. The amount of rainfall received in these seasons is generally 50–200mm per month, but varies greatly, exceeding 300mm per month in some localities. The movements of the ITCZ are sensitive to variations in the Indian Ocean Sea, i.e., surface temperatures vary from year to year.

One of the most well documented ocean influences on rainfall in this region is the El Niño Southern Oscillation (ENSO). El Niño episodes usually cause greater rainfalls than average in the short rainfall season (OND), while cold phases (La Niña) bring a drier than average season. (Source: UNDP Climate Change Country Profile)

(3) Meteorology of the Project Area

a. Rainfall

Meteorological data of the project area have been obtained from the Kenya Meteorological Department. The locations of weather stations are shown in Figure 1-3 (right). The annual rainfall distribution in the project area is shown in Figure 1-3 (right Figure). The source of annual rainfall distribution is the World Resources Institute (<http://www.wri.org/publication/content/9291#rainfall>). The observation periods of each obtained data are shown in Table 1-2.

