

TECHNICAL NOTES
ON
THE SECOND PREPARATORY SURVEY
FOR
THE PROJECT FOR THE IMPROVEMENT OF WATER SUPPLY SYSTEM OF JUBA
IN SOUTHERN SUDAN

Based on the Minutes of Discussions (hereinafter referred to as "M/D") on the Second Preparatory Survey for the Project for the Improvement of Water Supply System of Juba in Southern Sudan (hereinafter referred to as "the Project") signed on 30 June 2010 between the Second Preparatory Survey Team (hereinafter referred to as "the Team") of Japan International Cooperation Agency (hereinafter referred to as "JICA") and the Government of Southern Sudan, the consultant members of the Team had a series of discussions and conducted field surveys from 23 June to 5 August 2010.

As a result of the discussions and the surveys, both sides confirmed the technical conditions described as per the attached.

Juba, 4th August 2010

任田直人

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ATTACHMENT

Both parties agreed upon and confirmed the following items.

1. Selection of the sites for Public Tap Stands

120 public tap sites were identified one at each site as shown in Figure-1 in presence of a relevant Payam engineer, a water counselor member of each interested area and Team members. It was confirmed that all the sites identified were considered to be consented as a public tap site by all the concerned parties.

However, the Team expressed their concerns about appropriateness of some sites as follows:

- i) Since some sites were identified based on future road plans which do not have any concrete evidence, public tap stands and pipeline to the stands may be obstacle to future road alignment.
- ii) Some public tap stands require service pipe to be buried in land presently occupied by buildings and so on either illegal or legal basis.
- iii) Some public tap stands require long service pipe from distribution pipe.

The Team proposed that they would re-evaluate appropriateness of each identified public tap stand sites in their further study in Japan and Southern Sudan side accepted it.

2. Filling Station sites

8 sites of the filling station were identified one at each site as shown in Figure-1 in presence of a relevant Payam engineer, a water counselor member of each interested area and Team members.

At the earlier stage of this study the Southern Sudan side requested one of eight sites to be located in Northern Bari, considering the on going town expansion westward. The Team agreed to it and a Payam engineer together with the Team members tried to identify an available site in the target area. Since the land rearrangement works are undergoing there, the Payam engineer needed negotiation with persons of relevant communities. However, negotiation failed to reach agreement among the relevant persons at the time of the end of the consultant's field survey. Therefore, the filling station in Northern Bari was not fixed and instead an additional filling station was identified in western part of Munuki Payam (indicated as alternative FS in Figure-1), which is intended to be a base of tanker water delivery to Northern Bari.

The Southern Sudan side agreed to obtain written approval/consent to use the sites as a filling station by relevant authorities or organizations by 1st November 2010.

3. Acquisition of land for Service Reservoir site

In accordance with the agreement in the M/D, the Minister of Water Resources and Irrigation informed the Team of their decision to fix the site in one of the lots in the land next to the premises of Parliament building, which is currently owned by the Government of Central Equatoria State (for the location, refer to Figure 2). The Southern Sudan side and the Team agreed that the Team finalizes the facility plan based on this site and consequently carries out facility design works.

In addition, it was confirmed that the Southern Sudan side shall complete all the

land acquisition procedures and report it to JICA Southern Sudan Field Office in Juba by 1 November 2010 accompanying at least following documents so that JICA can proceed to the next step for realization of the Project:¹

- Drawings which show exact dimensions of the said land and its configuration to the present permanent structures in the vicinity. (ordnance maps are preferable)
- Official certificate which shows owner or authority managing the said land
- Official certificate by the owner or managing authority which shows approval for the land to be used as the reservoir/elevated tank site

As per the said documents above, a copy of the certificate for the allocation of the plot by MOPI may be effective.

It was also confirmed that the Southern Sudan side is responsible to keep the site vacant until the commencement of the project after acquisition of the land.

4. EIA

The Team had a meeting with Ministry of Environment to discuss required procedures to fulfill the Southern Sudanese environmental law system. Mr. Gabriel Modi Remijo, Senior Inspector for Environment, Ministry of Environment, instructed to submit Project Brief which covers the project profiles, expected environmental and social impacts by the project and mitigation measures against the expected adverse impacts to be taken to the Director General, Ministry of Environment and suggested that Director General would submit the environmental approval for the implementation of the project, which means the completion of the environmental procedure for the project implementation, after reviewing the Project Brief.

Accordingly, MWRI prepared the Project Brief and submitted it to Director General of Ministry of Environment for approval on 29 July 2010. MWRI was requested to obtain the environment approval and send its copy to JICA Southern Sudan Field Office by 1st November 2010.

5. Facility plan

The Team presented outlines of facility plan of WTP, Service Reservoir, filling stations and public tap stands as shown in ANNEX 1.

The Southern Sudan side accepted the plan in general.

6. Site for WTP expansion

The Team presented a provisional layout plan of WTP expansion focusing on facilities, structures and trees to be removed. Most of the structures and facilities to be removed are abandoned ones except a building (Building-1 in Figure 3) located at the west end of the WTP premises parts of which are presently used as contractor office.

The Southern Sudan Side agreed to the facility layout plan including removal of identified structures in general, but requested to rebuild this building in the Project to

¹ Mr. Emmanuel Matayo Wani, Director General, Ministry of Physical Infrastructure (MOPI), CES, confirmed and assured to the Team on 26 July 2010 that MOPI can submit a certificate which provides evidence that the plot is allocated to the MWRI for the use of Service Reservoir site.

accommodate the present functions of the building. The Team agreed to convey this request to JICA.

7. Provision for costs to be borne by the Southern Sudan Side

The Team reminded major costs to be borne by the Southern Sudan Side for the implementation of the Project as follows and requested to take budgetary steps at appropriate time:

- Installation of electric power line to the facility sites, i.e. WTP site, Service Reservoir site and filling station sites.
- Securing of sites for the contractor office with minimum material stock yard (approx. 400m²) nearby the WTP and a contractor camp site with material stock yard (approx. 10,000m²) at a proper location in Juba.
- Acquisition of lands for the reservoir/elevated tank, the filling stations and the public tap stand, if necessary.
- Costs for the reconnection work for the improvement of the existing distribution pipe.
- Bank Commissions

The Team will inform more detailed requirements and preliminary cost estimates at the time of Draft Report Explanation for Southern Sudan Side's convenience.

The Southern Sudan Side expressed understanding of it.

8. Rehabilitation of the existing distribution pipeline

The Team reported that they were conducting the topographical survey work to acquire necessary technical data for designing of the rehabilitation of the existing pipe in Japan in accordance with the agreement in M/D (refer to (4) of 7.2) and explained that they would discuss the conditionality of the said agreement in Japan.

In addition, the Team suggested that even though the appropriateness and necessity of the rehabilitation is confirmed in some extent, the Japanese Government may not approve the rehabilitation as the project components, if there are budget constraints or any other reasons.

9. Tax exemption

The Team reported that it was confirmed by the Ministry of Finance and Economic Planning² that all taxes, duties and levies applicable to goods and services to be rendered in relation with the project are exempted and there would be neither alternate tax payment by the responsible/implementing organizations nor the temporary payment by the contractor followed by refunding.

10. Pipe laying

The Team explained that, in principle, pipe laying would be positioned under the utility zone. However, the Team observed that in many sections the utility zone is either occupied by roadside trees, absent, too narrow, or functioning as drainage channel.

² Meeting with Mr. Gabriel Garang Deng, Director of Taxation, Ministry of Finance and Economic Planning, GoSS on 27 July 2010.

In this regard, the Team had meetings with MOPI³, Ministry of Housing and Physical Planning, GoSS⁴, and Ministry of Transport and Roads, GoSS⁵, to discuss the possibility of cutting trees down (with recovering by replanting) and pipe laying under pavement. The Team reported outcomes of the meeting as follows:

MOPI suggested removing obstacles occupying the utility zone since they are mostly illegal. However, the Team did not accept such removal because it had been agreed between the Southern Sudan Side and the Japanese side that any land which was presently occupied by dwellers, stores agriculture or so on were excluded from the land for the project to avoid dispute and compensation ((3), 7.3 of M/D). As conclusion, MOPI expressed their positive response to permit the pipe laying under the pavement in case where no other options exist.

Ministry of Housing and Physical Planning and Ministry of Transport and Roads also expressed positive opinion to the pipe laying under the pavement on conditions that no other options exist.

As such since the pipe laying under road pavement is considered unavoidable in the project and MOPI and Ministry of Housing and Physical Planning seem positive to this issue, the Team requested the MWRI to organize an inter-ministerial discussion to obtain permission for this issue at a proper time. MWRI agreed to it.

11. Operation records of WTP

With reference to the Request for the Information to MWRI dated 8 July 2010 (Ref No: 52-0300-011), the Team requested MWRI to make necessary arrangements to obtain the following data which are presently under custody of the Contractor who is not in position to open the data to the Team due to contractual obligation to Ministry of Housing and Physical Planning (MHPP). MWRI confirmed that they would take actions to obtain the data from the Contractor through MHPP and send them to JICA Southern Sudan Field Office by 31 August 2010.

- O&M Manuals provided by the Contractor
- Daily operation records since May 2009 to date, which shall include,
 - ✓ Raw water quality data, treated water quality data
 - ✓ Daily river water level
 - ✓ Water flow data

12. Supports to Topographic Survey Works

The Team is leaving Juba before the sub-contractor completing all the survey work. By kind instrumentality of the Southern Sudan side, it is believed that all the approvals/permissions necessary for the work have been obtained, hence the subcontractor will not have major difficulties in their work. However, in case the subcontractor encounters unexpected problems, the Team requested the Southern Sudan side to provide supports to them so as to be able to complete the all the work that are essential for the basic design work.

13. Interconnection between the existing and new systems

The Team explained that as agreed in M/D they would install an interconnection valve

³ Meeting with Mr. Emmanuel Matayo Wani, Director General, Ministry of Physical Infrastructure (MOPI) on 26 July 2010.

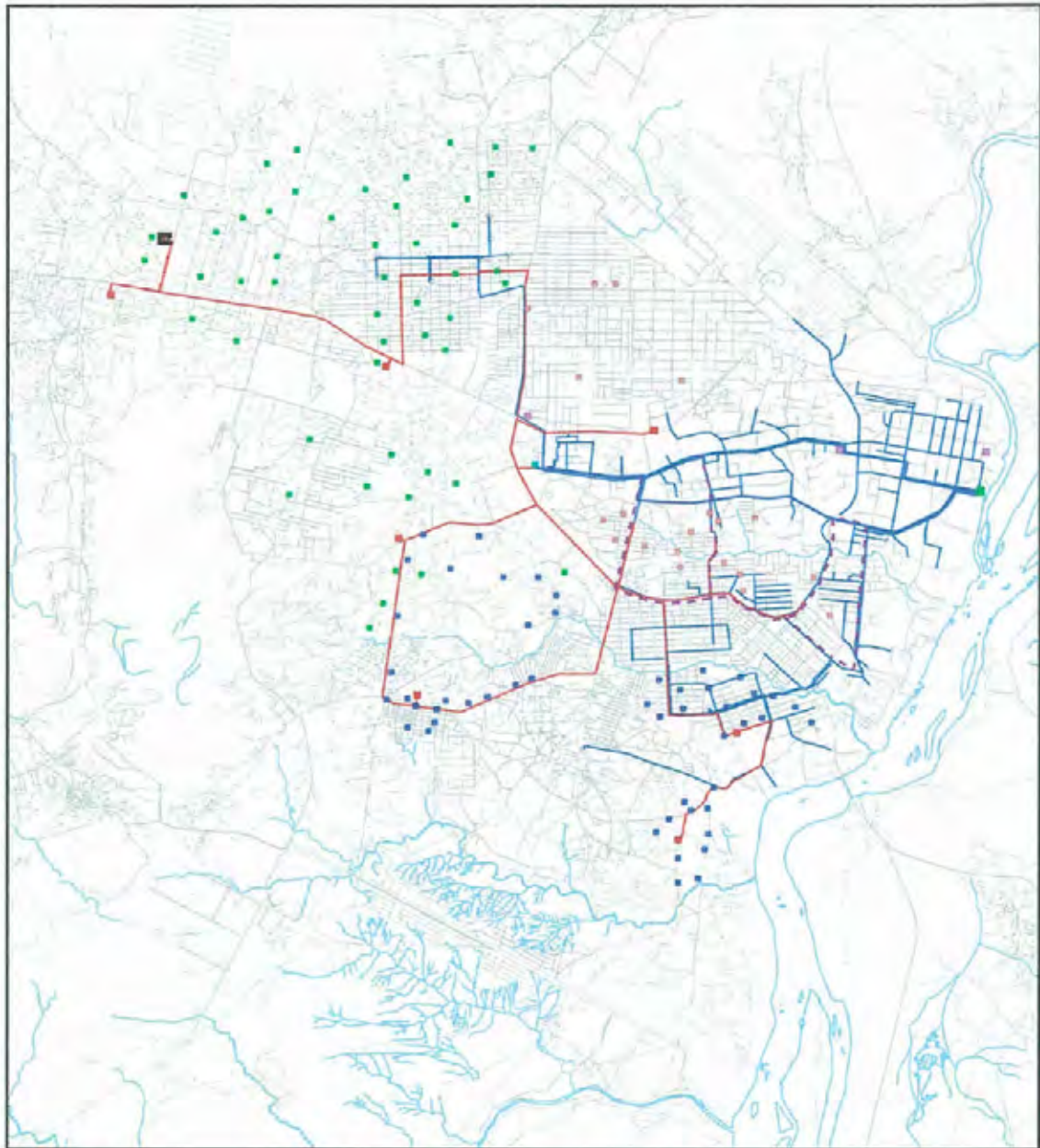
⁴ Meeting with Mr. Silvas Clark Amozay, Director General for Housing and Urban Development, Ministry of Housing and Physical Planning, GoSS on 27 July 2010.

⁵ Meeting with Mr. Otim Bong, Deputy Director, Urban Roads, Ministry of Transport and Roads, GoSS on 29 July 2010.

in the new system so that the Project can benefit the users of the existing system even if slightly by reducing a risk of water cut due to the existing system shut down.

However, the operation of the interconnection must be strictly limited in emergency case in order the new system exerts its planned benefits. While Southern Sudan concerned personnel were too busy to discuss this regard, the Team will prepare a draft of an operation policy of the interconnection valve in Japan and discuss it at the time of Draft Basic Design Explanation due in December 2010.

5



Legend

- Proposed WTP
- Proposed Reservoir
- Proposed TankerFS (■ shows alternative FS. Location)
- Juba Public Tap
- Munuki Public Tap
- Kator Public Tap
- New Transmission
- New Distribution
- Existing Pipes
- - - Rehabilitation



Figure 1 Location of Water Supply Facilities Identified

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Figure 2 Location of Service Reservoir Site

Note: Delineated by the Team on the Google image based on the plot allocation plan of the land west of the Parliament premises by MOPI which was given by MWRI on 13 July 2010. Securing of the preferable plots for the Service Reservoir site was confirmed by the Minister of MWRI on 20 July 2010.

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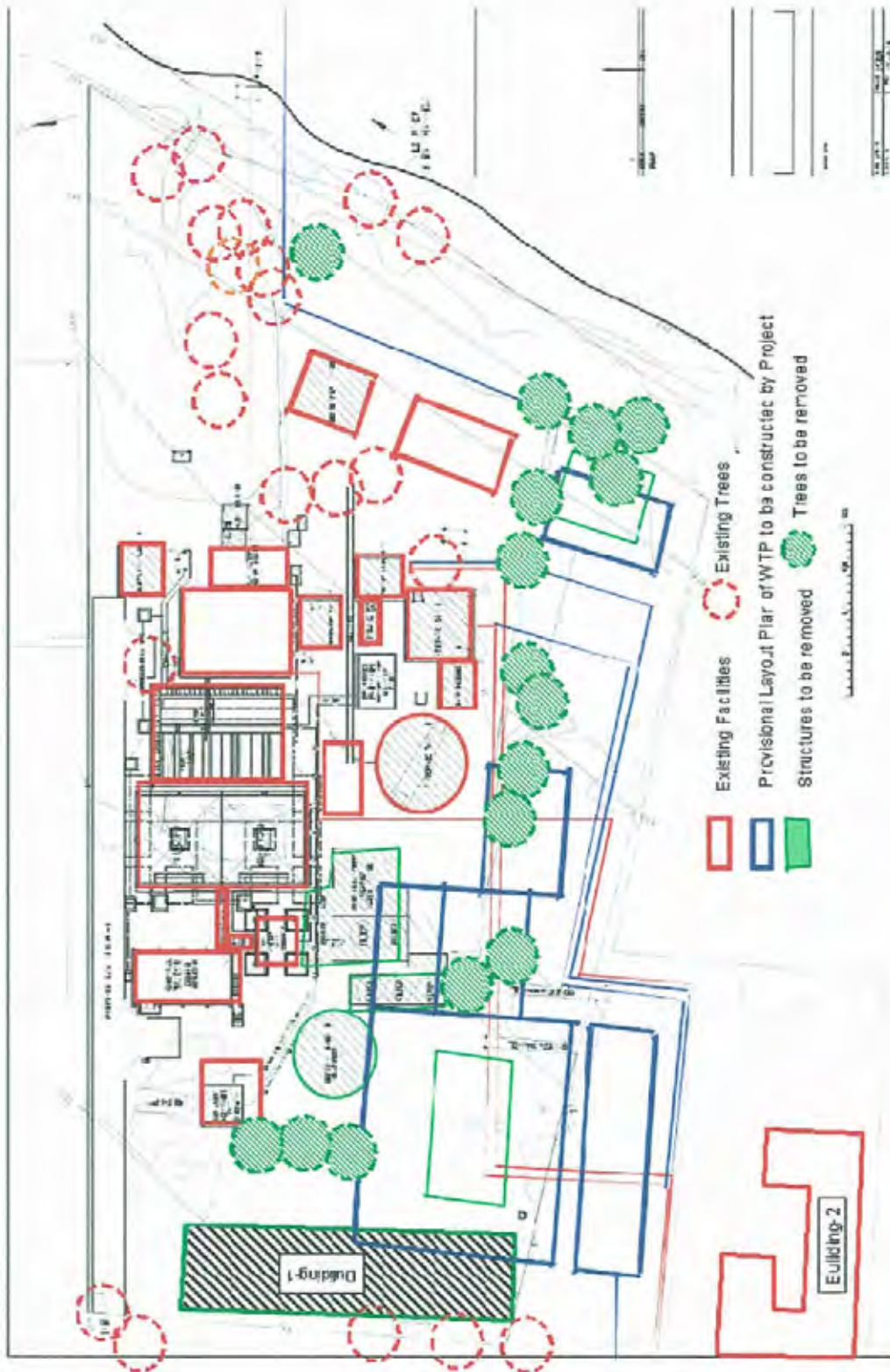


Figure 3 Provisional Layout Plan of WTP

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ANNEX-1

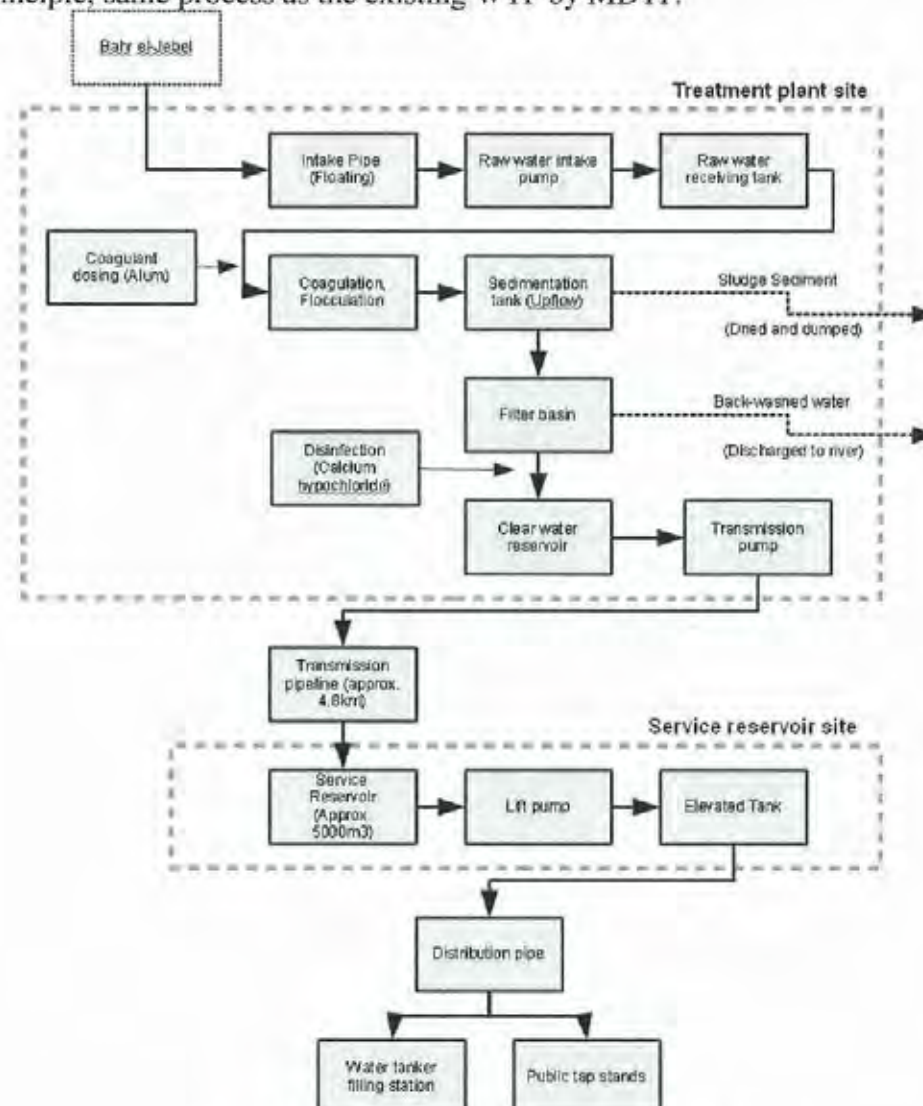
**THE SECOND PREPARATORY SURVEY
FOR
THE PROJECT FOR THE IMPROVEMENT OF WATER SUPPLY SYSTEM
OF JUBA IN SOUTHERN SUDAN**

1. Layout Plan of New Water Treatment Plant

- Demolishing the old plant facilities that are not in use.
- Current SPENCON office needs to be moved.
- Old pipes for Kator and Juba town need to be replaced since they exist under location of the proposed clear water reservoir.
- Intake facility
 - Float type (same type as the existing) is proposed
 - Approx. 15m upstream of the existing intake

2. Treatment Process

- In principle, same process as the existing WTP by MDTF.



Flowchart of Proposed Water Supply System

ANNEX-1

3. Design of Service Reservoir and Elevated Tank

- A service reservoir (above ground type, approx. 5000 m³), lift pumps and an elevated tank (approx. 16m in height, LWL: GL+12.5m) is tentatively proposed.
- Proposed site immediately to the west of the Parliament and in front of the Memorial Ground.

4. Water Tanker Filling Station (Gurai in Northern Bari Payam)

- 8 locations have been identified.

5. Public Tap Stands

- 120 locations for tap stands have been confirmed.
- Locations are to be verified from the following viewpoints:
 - Elevation of the land
 - Distance from the main pipeline
 - Pipeline route from the main pipe to the tap should be demarcated and cleared.
- In consideration of the above, the Team may propose alternative sites for some taps in December 2010 when Draft Final Report will be presented.
- Design of public tap stands; type of public tap stands shall be examined either of Munuki which was constructed by JICA, Kator by USAID, or water Kiosk which is common in Kenya.

6. Existing Distribution Pipes to be Replaced

- Information provided by SSUWC CES Juba seems insufficient. Further information and clarification is requested by the Team.
- Interview survey is carried out by the Team
- Diameters of the existing service pipe are reportedly of 15mm - 25mm. More information shall be collected from SSUWC CES Juba.

7. Design of New Pipeline

- Pipeline routes are proposed as Figure 1 of Attachment.
- Position of pipe installation:
 - To be designed in consideration of space for pipe installation (Utility zone).
 - Some part of the distribution mains are to be installed under the pavement, according to observation by the Team.
- Covering depth of pipe (Depth of covering soil above the pipe crown)
 - The team propose covering depth of 60cm in consideration of existence of hard rock in Juba.
 - In case of rocky terrain, min. covering depth of 20 cm is proposed. Appropriate pipe protection shall be considered, e.g. RC concrete plate.

ANNEX-1

	Normal soil	Rocky terrain
Non-paved road	<p>Covering depth: 60 cm Aggregate</p>	<p>Covering depth: min. 20 cm RC concrete (t=100mm)</p>
Paved road	<p>Covering depth: 60 cm Asphalt pavement</p>	<p>Covering depth: min. 20 cm RC concrete (t=100mm)</p>
Outside of road (Side walk, utility zone)	<p>Covering depth: 60 cm Backfill by excavated soil</p>	<p>Covering depth: min. 20 cm Backfill: excavated soil Concrete plate (t=60mm): 10 cm above pipe crown</p>

- Hydraulic design criteria:
 - Dynamic water pressure:
 - Minimum 1 bar (10m head) at water tanker filling station
 - Minimum 0.5 bar (5m head) at public tap stands
 - Hydrostatic pressure:
 - Maximum 7.5 bar (75m head) at the points of lowest elevation

ANNEX-1

8. Control System (pump facility)

- Manual on/off, inter-lock (auto-stop) by water level (LWL, HWL)
- Control between WTP and Service reservoir (approx. 4.8km) shall be done by telephone communication between operators

9. Engine Generator

- Back-up for power failure
- Oil tank capacity
 - New WTP: For 3 days (same as the existing WTP)
 - Service Reservoir: For approx. 5 days (more than WTP, considering possibility of infrequent tank filling)

10. Water flow meter

- One at outlet of WTP (Transmission Pump) and one at outlet of Elevated Tank
- Type of flow meter is to be mechanical turbine type (i.e. neither ultrasonic nor electromagnetic flowmeter that are difficult for maintenance)

11. Valves and fittings

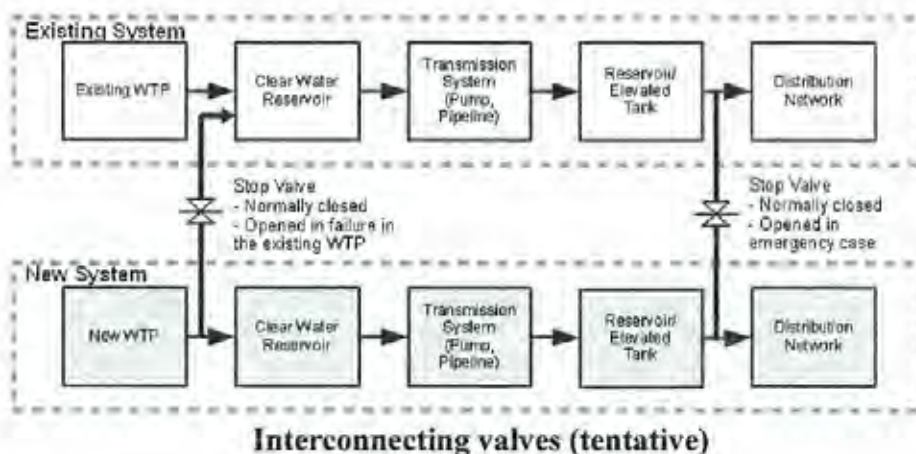
- Stop valve, washout valve, air valve
 - Design of valve chamber is to be modified so as to level with the road surface.
- Fire hydrant is not proposed in the pipeline route considering expensive cost, possibility of leakage and illegal use.
- One hydrant in each tanker filling station is proposed for fire-fighting purpose.

12. Design Criteria, Standard

- Water Quality Standard (Draft Southern Sudan Guideline)
- Technical Standard to be commonly applied is British Standard. Other international well known standards, etc. shall be employed as appropriate.

13. Interconnection between the existing and New Systems

- Interconnection between the existing and new system shall be considered as the back-up in emergency case in either system. For this purpose, connecting pipes and valves will be installed at the hydraulically appropriate points.



Appendix-5 Socio-Economic Survey Results

RESULTS OF SOCIO-ECONOMIC SURVEY

1. OBJECTIVES AND METHODOLOGY

The objective of the socio-economic survey was to investigate the social and economic living conditions of the people in the target areas (Payams) of Juba city. Along with this the study set out to examine the water use and supply patterns as well as the hygiene and sanitation conditions in homes and other premises.

A random sample of residents was selected in the Payams of Juba, Kator and Munuki to serve as respondents in the study with care being taken to include in the sample household in the low, middle and high income/social strata categories. Data was collected by interviewers using a questionnaire developed by the study team. The interviewers were selected on the strength of their local knowledge including their being conversant with both English and the local languages spoken in the survey areas. A total of two hundred (200) respondents were interviewed.

An excel spreadsheet was developed by the study team for the entry and analysis of the data. Data was entered by a data entry clerk and cleaned by members of the study team before analysis.

The field interviews started on 14th July and ended on the 19th of July 2010.

2. DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Out of the 200 respondents, 51.5% were male while 48.5% were female.

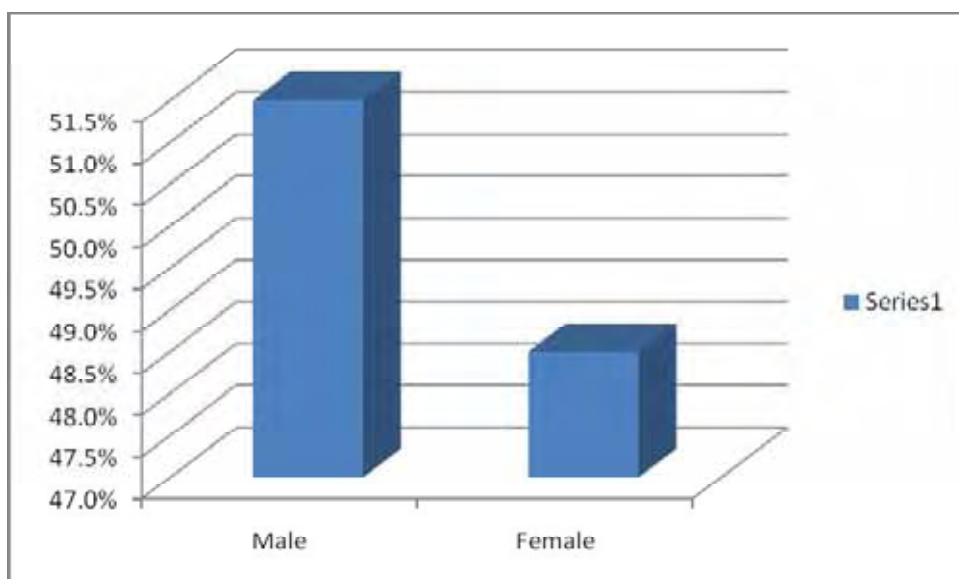


Figure 2.1: Gender of Respondents

The average age of the respondents was 35.9. The range was from 17 to 81 years.

3. SOCIO-ECONOMY

TYPE OF HOUSING

On the type of housing of the respondents, 34.5% of the respondents lived in traditional type of housing, 34% in semi permanent and 26% in concrete. Smaller percentages lived in 'self help', tin shack, and container type of housing.

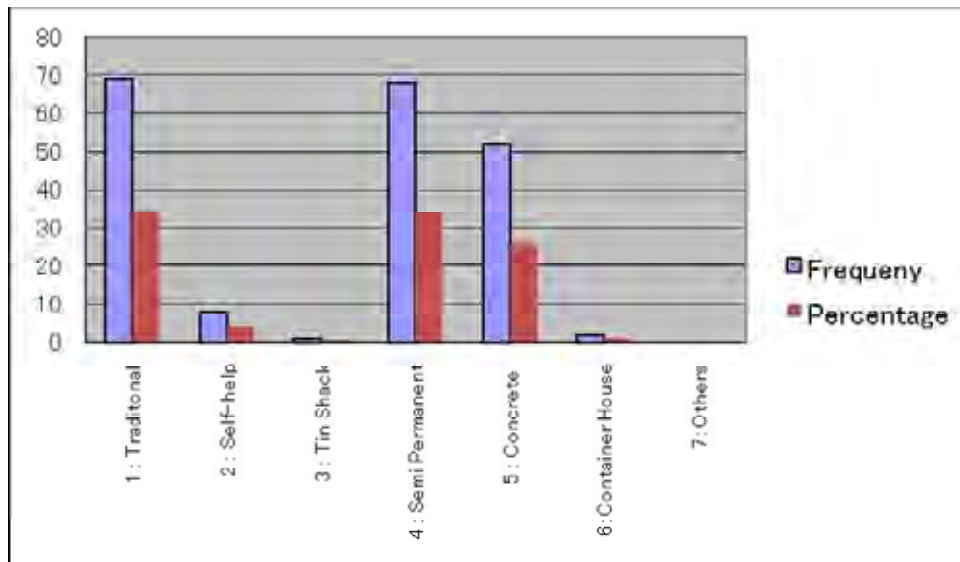


Figure 3.1: Type of Housing

OCCUPATION

On occupation, most of the heads of the households in the sample were either in a government job, NGO work or in business. Some 31% were in government job, 26% in business and 18.5% in NGO work. About 15% were unemployed. Because of the urban nature of the survey area, only 1.5% were engaged in farming.

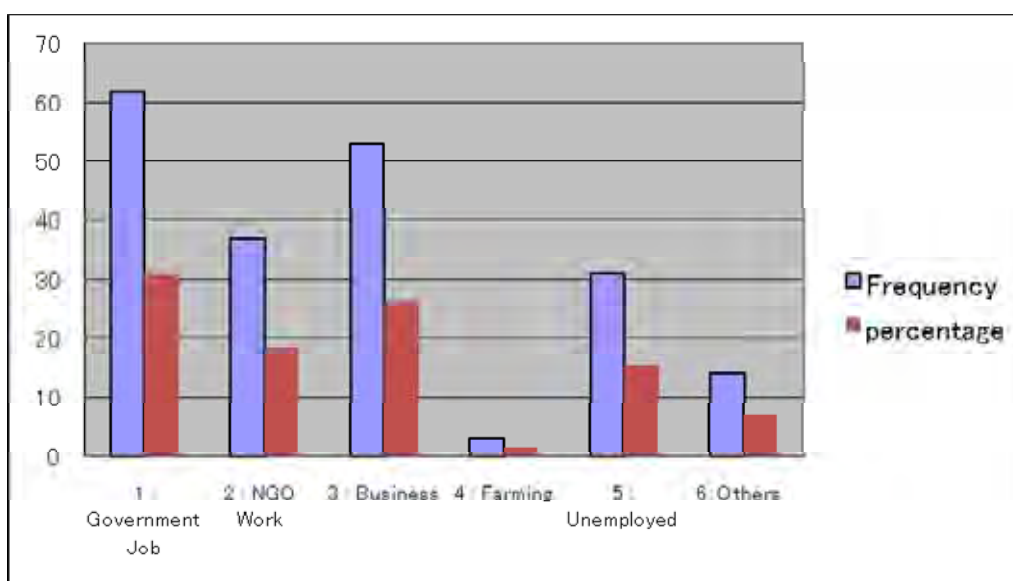


Figure 3. 2: Occupation of HH Head

FAMILY STRUCTURE

The average family size in the interviewed household is 7.2 persons/household; the range is from 1 person to 33 persons per household), and a large proportion of interviewed households has a family size of 6 persons.

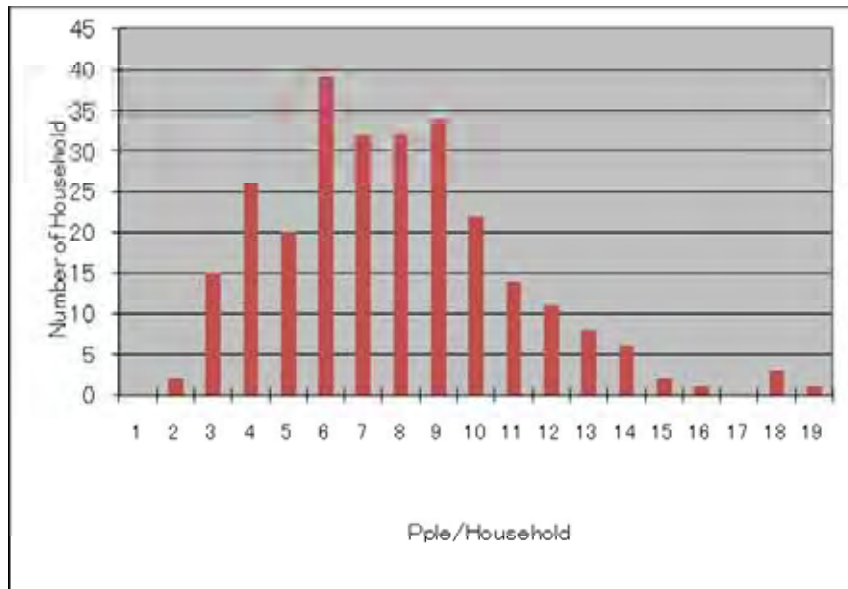


Figure 3.3: Family Size of the Interviewed Household

The average number of adult family members with income was 1.6 while the average number of children was 2.8. Many families also had adults without income.

MAJOR PROBLEMS OF HOUSEHOLD

Respondents were also asked to name and rank the major problems they face in the household with a view to establishing whether water and water related problems were among the most pressing. Table 1 below shows the results of the responses. Among the problems named the one ranked the highest is the one on water supply (Dirty, scarcity, distance to water, etc) with 154 people out of 200 naming it as 1st, 2nd or 3rd problem. Of the people who named it as a major problem, 57.1% named it as problem number one, 27.9% as problem number 2 and 14.9% as problem number three. Other major problems named in order of priority were, No Development (Poor Roads / Electronics, No transport etc), Famine (Little Food / Food Security etc), lack of health facilities and health related problems, unemployment and lack of educational facilities.

Table 1 Major problems of household

<i>Major problems of household</i>	<i>1st</i>	<i>2nd</i>	<i>3rd</i>	<i>Total (No.)</i>
<i>Water supply (Dirty, scarcity, distance to water ,etc)</i>	57.1%	27.9%	14.9%	154
<i>No Development (Poor Roads / Electronics, No transport etc)</i>	23.7%	40.3%	36.0%	139
<i>Famine (Little Food / Food Security etc)</i>	38.5%	46.2%	15.4%	52
<i>Lack of Health Treatment, Medical care, Health Facilities, Diseases, Sickness / Health Problem</i>	23.5%	43.1%	33.3%	51

<i>No Employment / Low Profits in Business</i>	53.6%	25.0%	21.4%	28
<i>No Serious Education (No school / No technical training / School fees etc)</i>	17.4%	26.1%	56.5%	23

EXPENDITURE OF HOUSEHOLD

Owing to the suspicions associated with collecting income figures, this survey sought instead to establish household financial status from the household expenditure. Average monthly expenditure of household is 1,515 SDG/month/household and the minimum and maximum monthly expenditures in the sample was 90 SDG/month and 6,100 SDG/month, respectively. Two thirds of all households fall in the range between 500 SDG/month and 1,749 SDG/month.

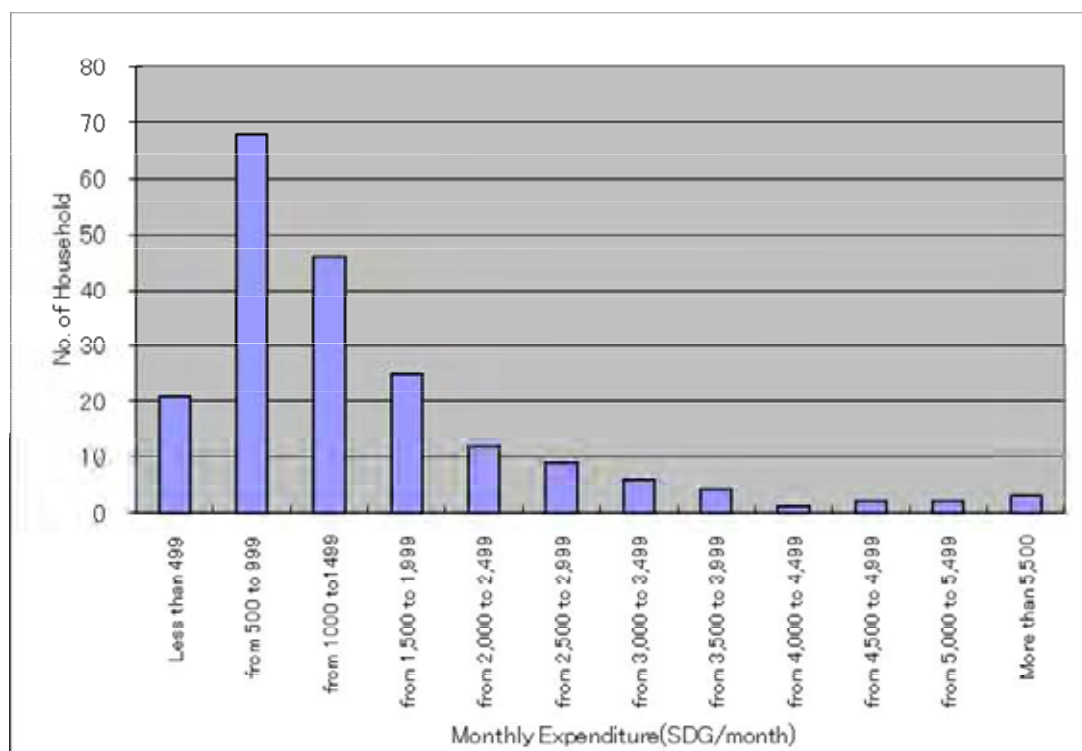


Figure 3.4: Monthly expenditure of Household

4. CONDITION OF WATER SUPPLY AND USAGE

SOURCE OF DRINKING AND COOKING WATER

The largest number of respondents indicated that their source of drinking and cooking water is the water tanker(112hh) and the public tap or well (102hh). Some household indicated that they use both sources for their drinking water.

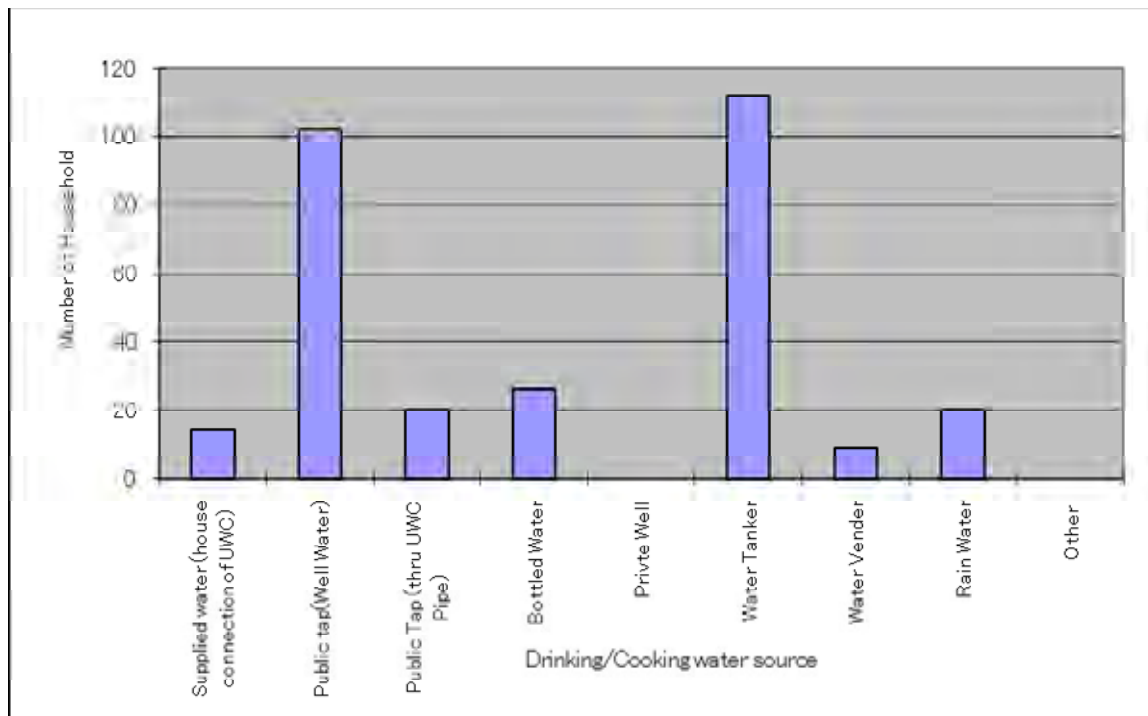


Figure 4.1: Source of Drinking/Cooking Water

SOURCE OF WATER FOR OTHER USES

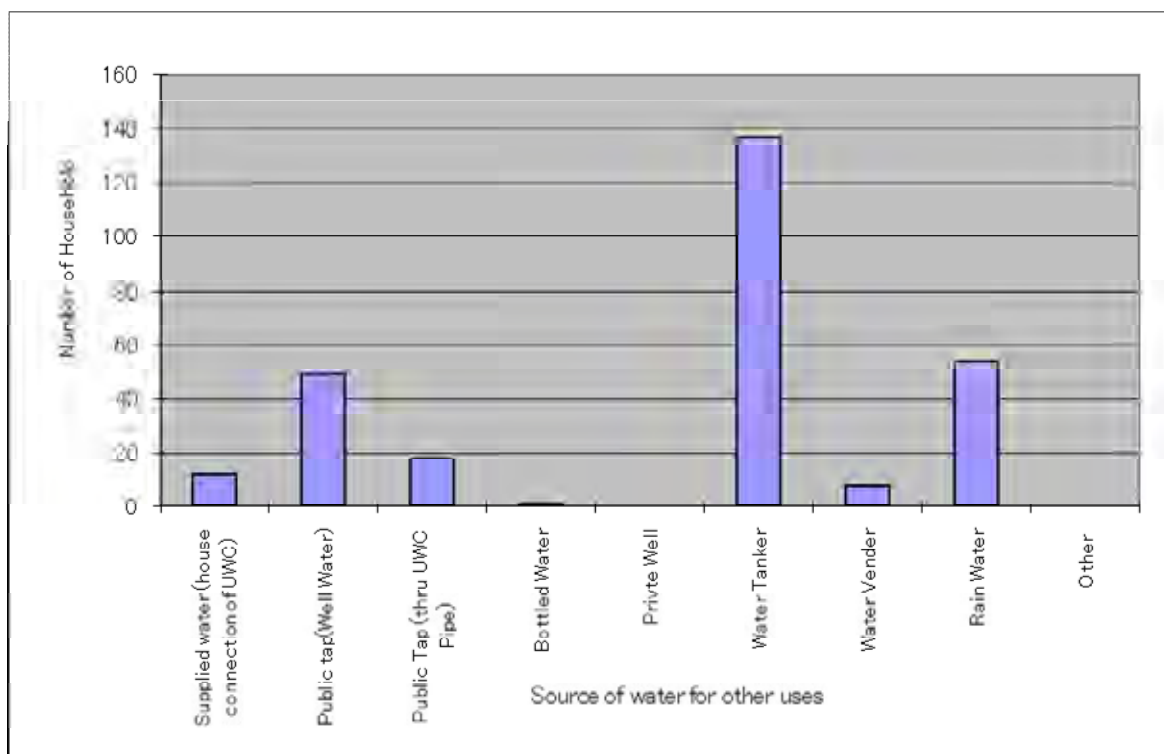


Figure 4.2: Source of Water for Other Uses

Regarding water for other uses, most of the people said that the source is the water tanker (137) followed by rain water (54) and public tap (49). Some homes use more than one source.

A comparison of the source of both drinking/cooking water and water for other uses shows that the main sources for both are the water tanker and the public tap. While water from the public taps comes from the Urban Water Corporation and it is treated, most water tankers get raw untreated water directly from the river. This underlines the need for the increasing of the points at which water tankers can get treated water. Also by implication, the greatest impact in terms of sanitation and access to clean water will be achieved first by increasing access and quality with respect to both public taps and water tankers.

SATISFACTION WITH DRINKING/COOKING WATER QUALITY

On the quality of drinking water, the greatest majority of the respondents at 52.3% reported that they are not satisfied with the quality of their drinking water. Some 17.6% of all respondents reported that they are satisfied with the quality of drinking water. Some 26% said that the quality of drinking water is acceptable. A casual tally shows that most of those that are satisfied either use piped water or bottled water. The problem most frequently reported in connection with drinking water is that it is not safe.

HOUSEHOLD WATER USAGE

According to the data from the survey, households use more water during the dry season as compared to the wet season. In the dry season, the average water use for drinking and cooking is 64 liters per day while the amount of water used for other purposes is 155 litres. In the wet season an average of 49 liters per day is used per household for drinking and cooking while 140 liters is used for other purposes. The average water usage per household for both seasons is 203.5 liters

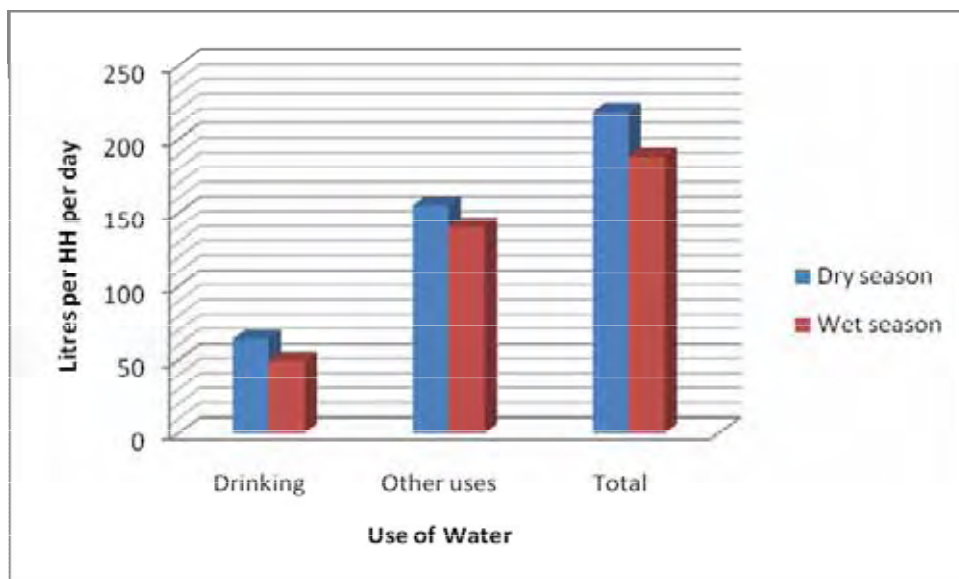


Figure 5.4: Household Water Usage

UWC SUPPLY TIME

Regarding the number of hours of water supply by the Urban Water Corporation, the response indicate that the average number of hour of daily supply is 6 while the range was from 1 to 12 hours. Respondents reported that although the water is supposed to come daily at the regular times, in reality it often does not come for

days. For that reason even these hours of supply are just indicative but in reality the supply is for fewer hours every week.

DISTANCE TO WATER SOURCE FOR USERS OF PUBLIC WATER TAPS AND BOREHOLES

The average distance to a public tap or borehole was reported at 163 meters but some indicated that they have to travel as long as 1,000 meters (1 km) and some only had to travel just 2 meters. For those who have to travel long distances this means time spent away from domestic responsibilities like child care and energy spent in the process. The average time taken to fetch water from these points was reported at 2 hours per household every day. This is a huge amount of time to be spent only in getting water and it is likely to influence decisions on hygiene and sanitation negatively.

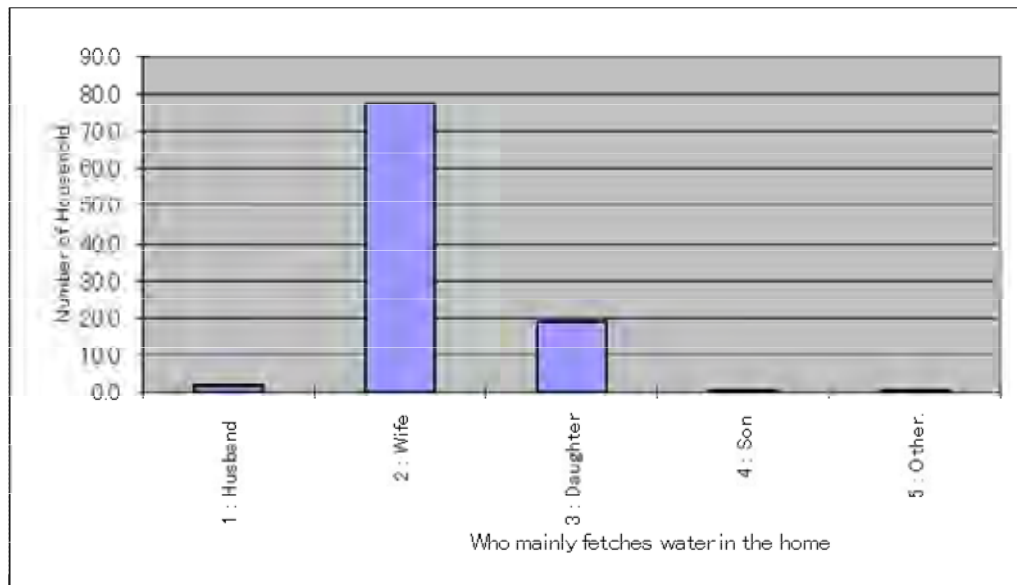


Figure 5.5: Who Mainly Fetches Water in the Home

Regarding who fetches water in the home the responses indicate that it is mainly the wife as figure 5.5 above shows. Households that responded to this question were 111. Of these, over 70% indicated the person mainly responsible for fetching water in the home is the wife. Households reported fetching water at all times in the course of the day with two clear peaks at 7.00 and again at 17.00 hrs.

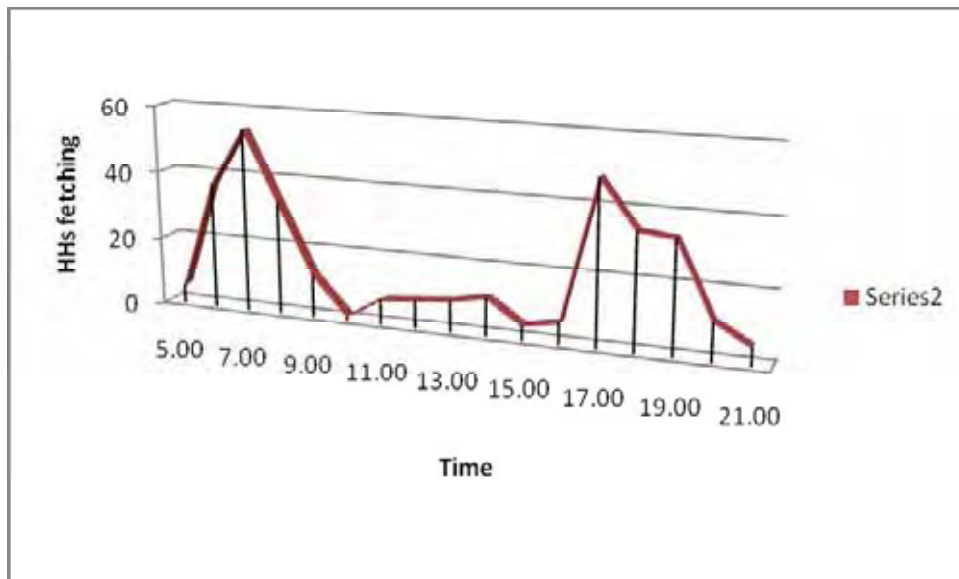


Figure 5.6: Times for Fetching Water

KIND OF WATER USED FOR DRINKING

On the water used for drinking, there are various options for making it safe. Most of the people reported that they treat it with chlorine to make it safe. 51% of the people who responded to this question said that they use chlorine. About 25% of the respondents indicated that they do not do anything to make the water safer. However this should not be alarming as this number includes those who use piped water from the UWC who stand at 8% of the people interviewed. Some people also use a combination of methods for instance they may use boiled water as well as bottled water. For those who use chlorination, the average number of chlorine tablets used a week was put at 17 tablets.

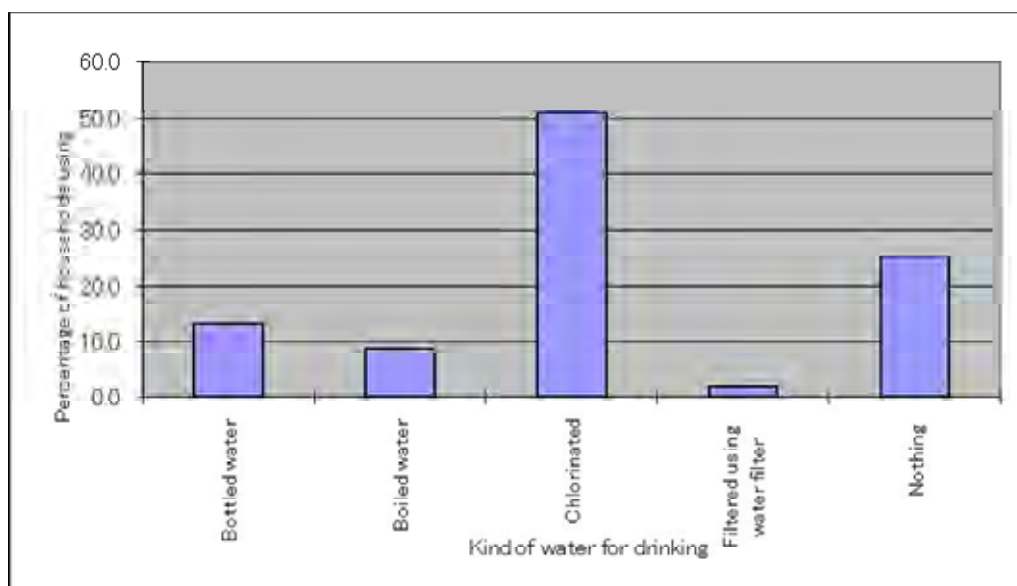


Figure 5.7: Kind of Drinking Water Used

IMPROVEMENT IN PIPED WATER SUPPLY SITUATION SINCE MAY 2009

Out of the two hundred respondents, only 16 or 8% were connected to the UWC mains. Of these, 11 (69%) reported improvement in the duration of the supply, 12 (75%) reported an improvement in the color of the water while 1 (6%) reported an improvement in both the colour and the taste. 8 (50%) reported an improvement in the pressure.

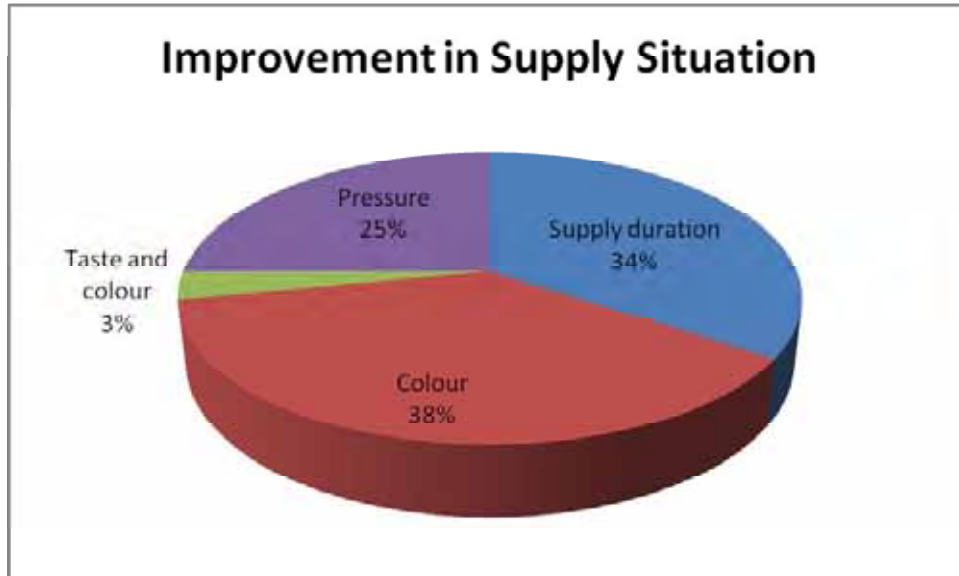


Figure 5.8: Improvement in Supply Situation Since May 2009

IMPROVEMENT OF WATER SUPPLY SERVICES FOR USERS OF PUBLIC STANDS IN KATOR AND MUNUKI

Nine people reported to be getting water from the new public taps in Munuki and Kator. Of these, 1 indicated that supply duration had improved by some two hours. The rest indicated that there had not been any improvement in the supply duration. Eight out of the nine people indicated that there had been improvement in the color and odor of the water. On the price compared to before the projects in those areas, 5 out of the nine people felt that it was high while 2 felt that it was appropriate. One felt that it was too high and one felt that it is too low. In all instances the price was reported at 25 cents for a 20 litre jerry can. In general it appears that the projects in Munuki and Kator have not improved supply conditions except for making the water points nearer. However it should be noted (as our study of the public tap systems showed) that supply conditions including the supply duration and the color and odor of the water are really determined by the UWC.

5: AWARENESS OF PEOPLE ABOUT WATER SUPPLY SERVICES

SATISFACTION WITH DRINKING WATER

When respondents were asked if they are satisfied with the existing water both for drinking and cooking majority indicated that they are not satisfied. With respect to drinking water 71% said that they are not satisfied. The biggest problem with drinking water is that it is not safe. However a large proportion of the respondents also said that there is also a problem with the taste.

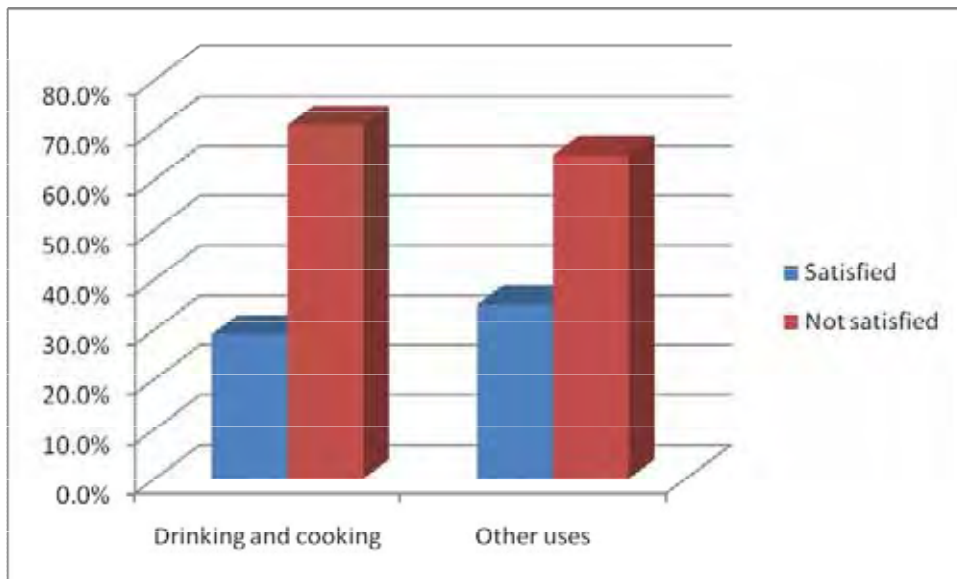


Figure 5.1. Satisfaction with drinking cooking and water for other uses.

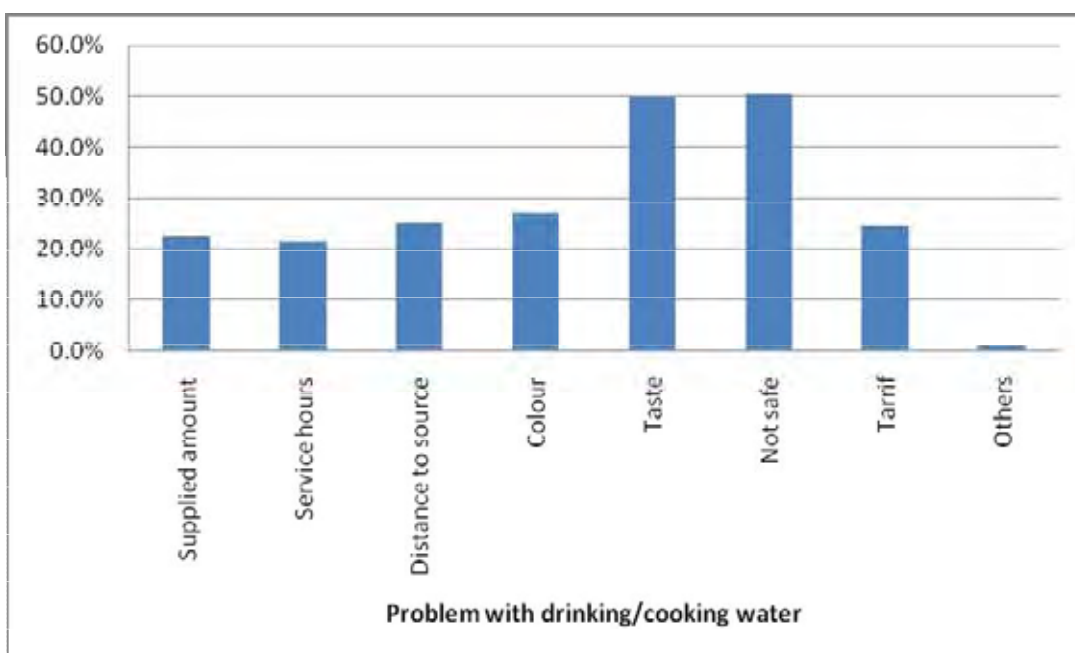


Figure 5.2: Problem With Drinking Water

SATISFACTION WITH QUALITY OF WATER FOR OTHER USES

Regarding water for other uses, only 35% of the respondents said that they are satisfied with the quality. For those who are not satisfied, the problem reported most frequently is that the water is not safe at 51%. This tallies closely with the problem reported in connection with drinking water with the major concern being the safety of the water. However unlike with the drinking/cooking water the where the second most frequently

reported problem is the taste, with water for other uses, the second most frequently reported problem here is the color. The tariff and the distance to the source are third and fourth most frequently mentioned problems.

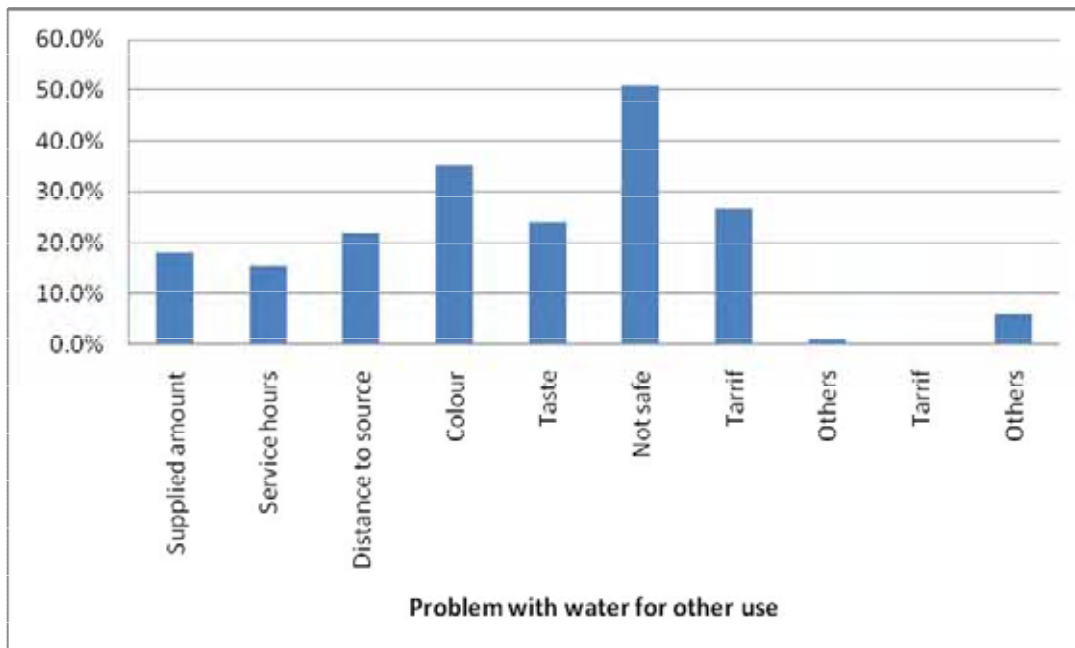


Figure 5.3: Problem With Water for Other Uses

But respondents were also asked to rank the problems to indicate the one they felt was the most pressing. The outcome of this ranking was as follows.

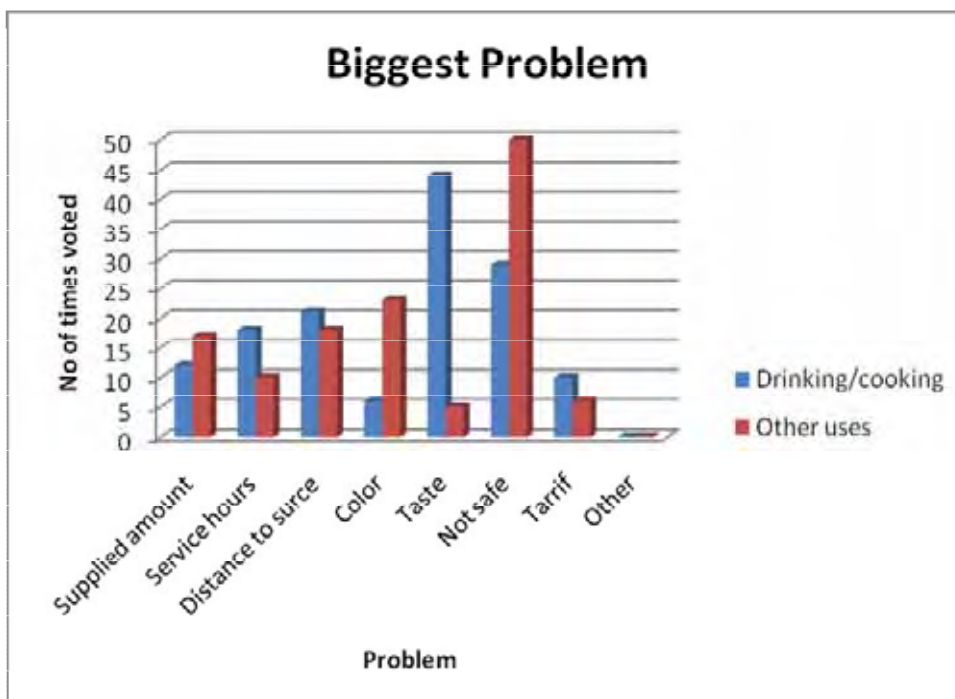


Figure 5.4. Problem with Water for Drinking/Cooking and Other Uses

The analysis shows that the problem voted as the biggest problem most frequently with respect to drinking water was taste. This is closely followed by the problem of 'not safe'. With respect to water for 'other uses' the problem which is most pressing is 'not safe' while the second most pressing is 'color'.

WILLINGNESS TO USE MORE WATER IF SERVICE IS IMPROVED AND THE PRICE REMAINS THE SAME

On willingness to use more water if the service is improved without raising the price, 41% of the respondents said that they would be willing to use more water. Some 59% said that they would not be willing to use more water even if the service is increased and the price remains the same. For those who are willing to use more water, the average amount they expect to use beyond what they are using at present is 159 liters per day. This is an increase of 78% percent given that the average current daily usage stands at 203 litres.

WILLINGNESS TO USE MORE WATER IF SERVICE IS IMPROVED AND THE PRICE LOWERED

The situation changes slightly when respondents are asked if they will be willing to use more water if the service is improved and price lowered. In this case, 52% of the respondents expressed readiness to use more water. The average increase in usage was indicated to be 170 liters per day which is a 83% increase given that the average current daily use is 203 litres. The conclusion from both the two questions above is that there is significant potential demand for water provided the quality and the price are right. Both the price and the quality of the water are significant factors in the amount demanded and improvement in both the quality and price of the water will lead to more than 50% increase in demand.

6. HEALTH AND HYGIENE AND SANITATION CONDITIONS

Regarding infection with water borne or water related disease in the previous year, 97%. of the households reported that that one or more members had contracted one or more of the diseases. Only 3% indicated that none of the family members had contracted any of the diseases. Figure 6.1 below shows the percentage of households that reported one or more of their members to have contracted each of the diseases indicated. 90% of the households reported that at least one member got infected with malaria, 59% reported infection with typhoid while 55% reported infection with diarrhea.

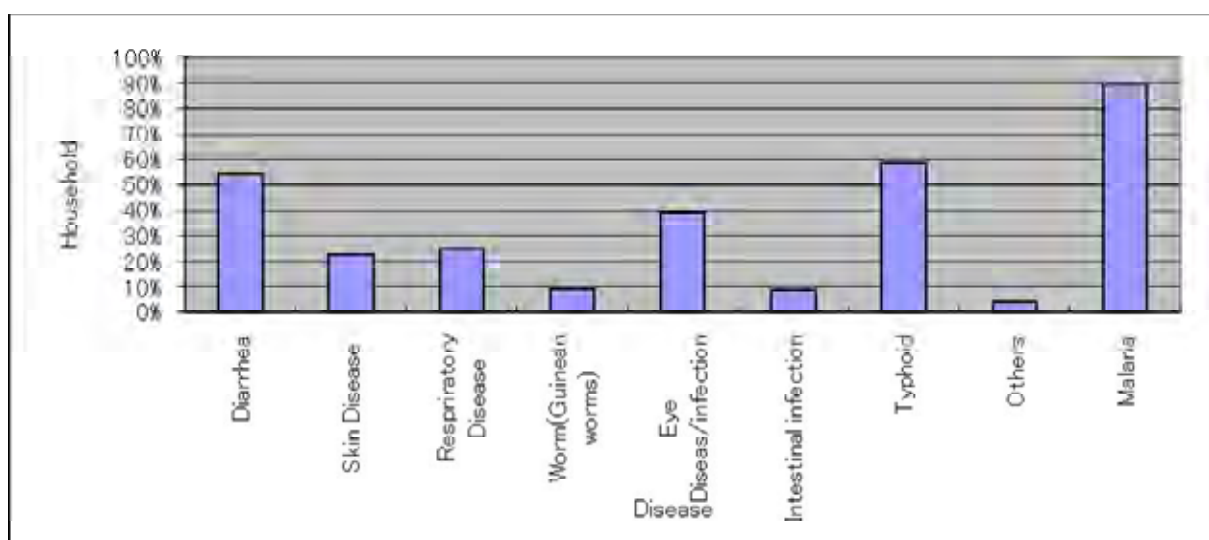


Figure 6.1: Diseases in Households

The average total number of people affected by water borne disease and malaria in each household is 3.9 consisting of an average of 2 adults and 1.9 children. The average cost of treatment for these diseases for a household was 1,574 SDG per year.

TABLE 1.0 FAMILY DISEASES IN 2009

	Ave. Adult	Ave. Children	Ave. Total
How many persons contacted disease in this year (person/hh)	2.0	1.9	3.9

TABLE 1.3 TREATMENT COST OF FAMILY DISEASE

	Hospital	Medicine	Transportation (to Hospital)	Total
Treatment cost of disease (SDG/year)	250	985	339	1,574

7. WATER TANKS SERVICES

DEMOGRAPHICS

All the operators of the water tanks interviewed were men. The average age for the respondents was 36.6 years.

NUMBER OF WATER TANKERS SOLD A DAY

The number of tankers sold in a day varied from 2 to 6 but the average is 2.6. The capacity of the tanks also varied from 2,000 liters up to 8,000 liters with the average capacity being 3,794 litres.

The amount of fuel used by each tanker operator also varied from 15 liters a day to 50 litres a day with most of the operators using 30 litres a day. The price of a litre of diesel was quoted by all truckers at 2.5 SDG meaning that most truckers spent around 75 SDG a day on fuel.

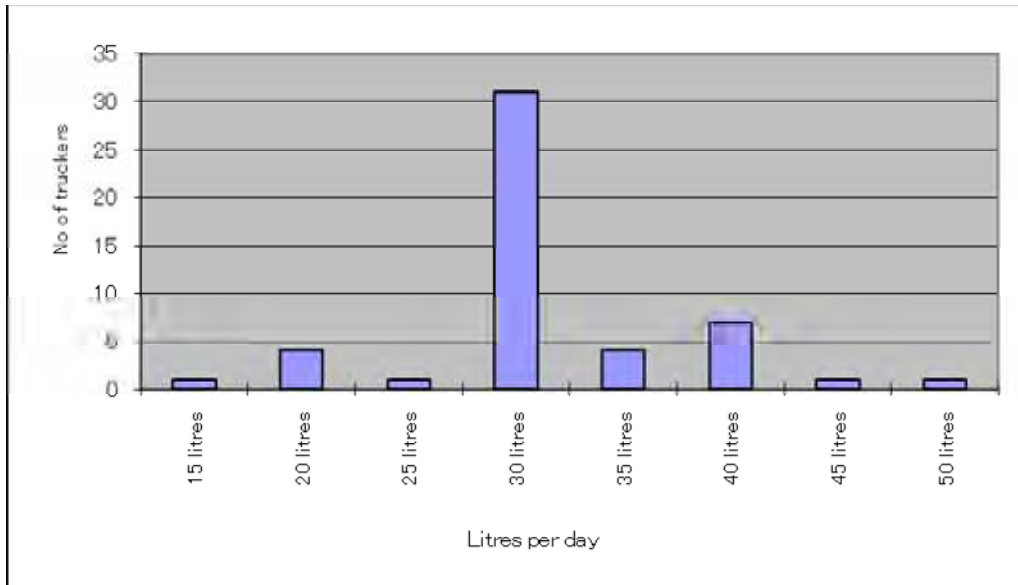


Figure 7.1: Fuel Used Per Day

PURCHASE AND SALE PRICE FOR WATER.

Tanker operators reported purchasing a full tank of water at between 5SDG for a 2,000 litre tank up to SDG 20 for an 8,000 litre tanker. The when tallied with the capacity of the tanker, the price varied depending on whether the water is raw water from the river or treated water from a filling station. On average the price of raw water from the river is 400 litres for one SDG while the price of treated water from a filling station is 200 litres for 1 SDG meaning that raw untreated water is approximately half the price of treated water. The number of truckers getting water from the river at 64% is however higher than those getting water from the filling stations at 36%. One of the reasons for this is the intermittent supply of water at the filling stations. The study team visited a sample of these stations and was confronted with long lines of trucks waiting for water without any certainty as to when it would come. When some of these truckers get tired of waiting they go the river and fetch the water from there.

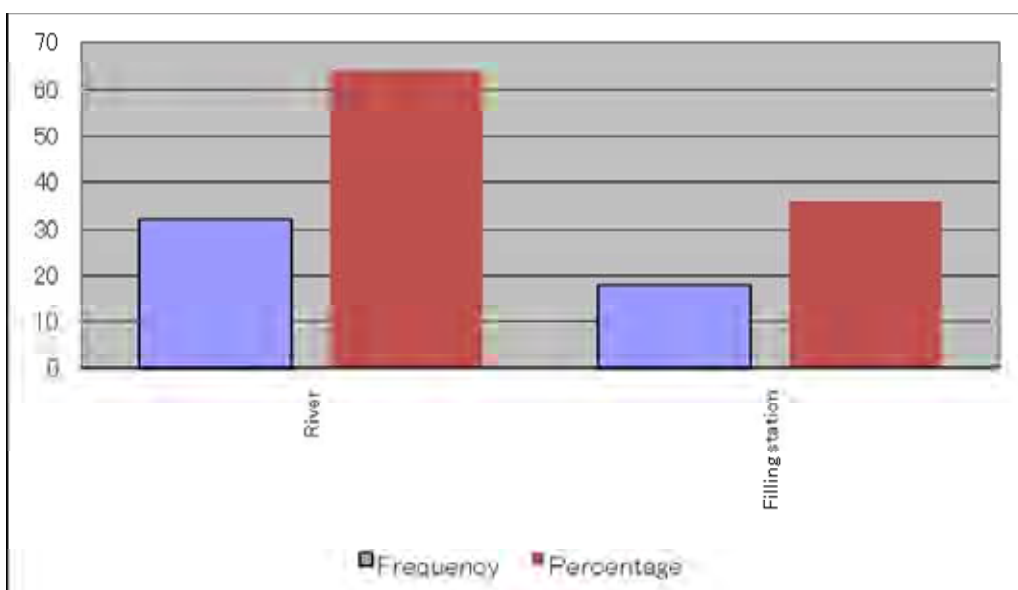


Figure 7.2: Source of water

The sale price for water was reported at between SDG 4 and 5 per 200 litre drum for raw river water and SDG 6 per 200 litre drum for treated water. The average price of water when all factors are combined is SDG 4.8 per 200 litre drum. One of the factors affecting the sale price of water is the distance that the tanker has to travel to the point of sale. Truckers reported travelling between 8 Km and 180 Km for their daily sale. The average distance is 99.6 Kms.

While at present most of the truckers get their water from the river, when they were asked whether they would prefer to take treated water, the great majority at 94% said that they would prefer to take treated water as opposed to 6% who were indifferent. Surprisingly when asked if they are willing to pay a better price for treated water and a better service, only 24% answered in the affirmative. 34 % said that they are willing to pay the price they are paying now while some 42% said that they would rather pay a lower price.

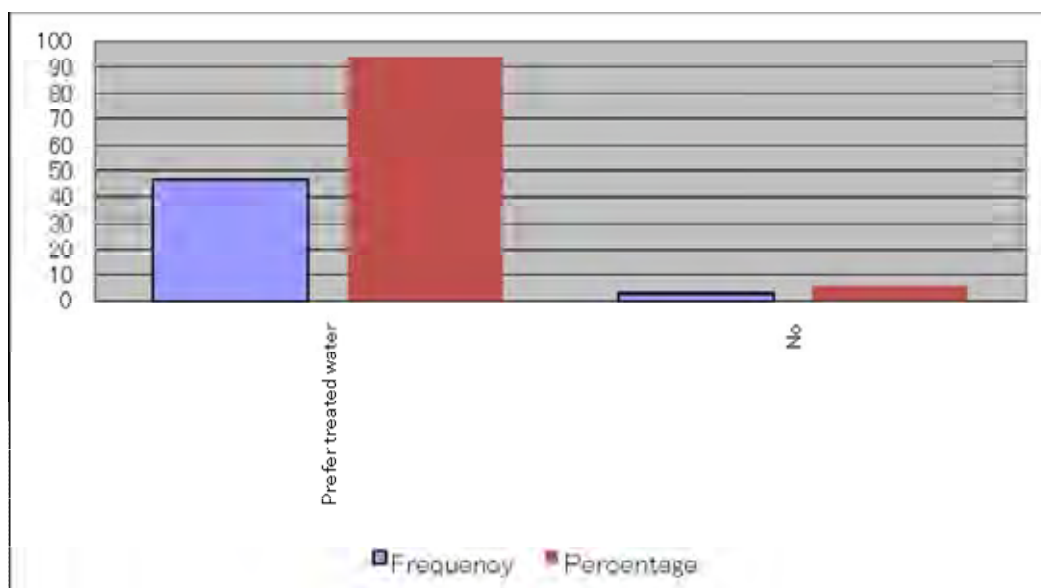


Figure 7.3: Willingness to Take Treated Water

On whether they are willing to reduce the price if the services are improved with new filling stations and easier access to water 74% said that they are willing to reduce the price while 26% said that they are not willing to reduce the price even if services are improved. The new price was put at an average of 4.2 SDG per 200 litre drum. This is lower by only .6 of an SDG.

CONCLUSION ON THE WATER TANKS

Both the tanker operators and their customers are aware about the need to use treated water as evidence by the higher price that both are willing to pay to get it. It is therefore reasonable to conclude that if more filling stations are provided it will enable more people to access treated water leading to better health and sanitation as well as reduction in the cost of treating water for domestic use. Most truckers also indicated that they would prefer to take treated water and in conversations with some of the reason given for not doing so are the long lines at the filling stations. From the relative price of a tanker of water and the selling price of a 200 litre drum of water it is clear that the tanker business would still continue to be profitable even if the price went up a little. There is therefore the need and the effective demand for the use of any new filling stations in the near future.

Appendix-6 Environmental and Social Consideration

- (1) Initial Environmental Examination**
- (2) Memorandum of Stakeholder Meeting**
- (3) Environmental Approval (February 2011)**
- (4) Permission on Land Use (December 2010)**

CHAPTER 1 INITIAL ENVIRONMENTAL EXAMINATION

1.1 Environmental Legislation Policy, Legal and Administrative Framework

(1) Environmental Protection Bill 2010

The draft version of Environmental Protection Bill 2010 has been prepared and still to be approved by the Government of Southern Sudan. The draft of this Bill includes 18 Chapters comprising a total of 115 Sections. The contents of the Bill are listed in the following Table.

Table 1.1 Content of Environmental Protection Bill (Draft)

Chapter Number	Content
1	Preliminary Provisions
2	General Principles
3	Establishment and Structure
4	Secretariat
5	Ministerial, State & Local Government Environment Committees
6	Environmental Planning
7	Environmental Regulation
8	Establishment of Environmental Standards
9	Management of the Environment
10	Waste Management
11	Control of Pollution
12	Environmental Restoration Orders and Environmental Easements
13	Records, Inspection and Analysis
14	Information, Education and Public Awareness
15	Finance, Audit and Reporting
16	Offences and Penalties
17	Judicial Proceedings
18	Miscellaneous provisions

Source: Environmental Protection Bill 2010 (draft)

The Bill emphasizes the promotion of wise use, development, and conservation of its natural and environmental resources, ecosystem services and integration of environmental considerations into development policies, plans, programs, and projects at the community, government and private sector levels. Section 29 under Chapter VII Environmental Regulation mentions about the process of Environmental Impact Assessment (EIA) and according to this Section, an EIA shall be undertaken by the Project Proponent for the Projects that are expected to have a significant impact on the environment.

(2) The Land Act 2009

This Act regulates land tenure and protects land rights in Southern Sudan. It comprises 16 Chapters including 101 Sections. The content of this Act is presented below. According to this Act, all land in Southern Sudan is classified as public, community or private land.

Table 1.2 Content of Land Act

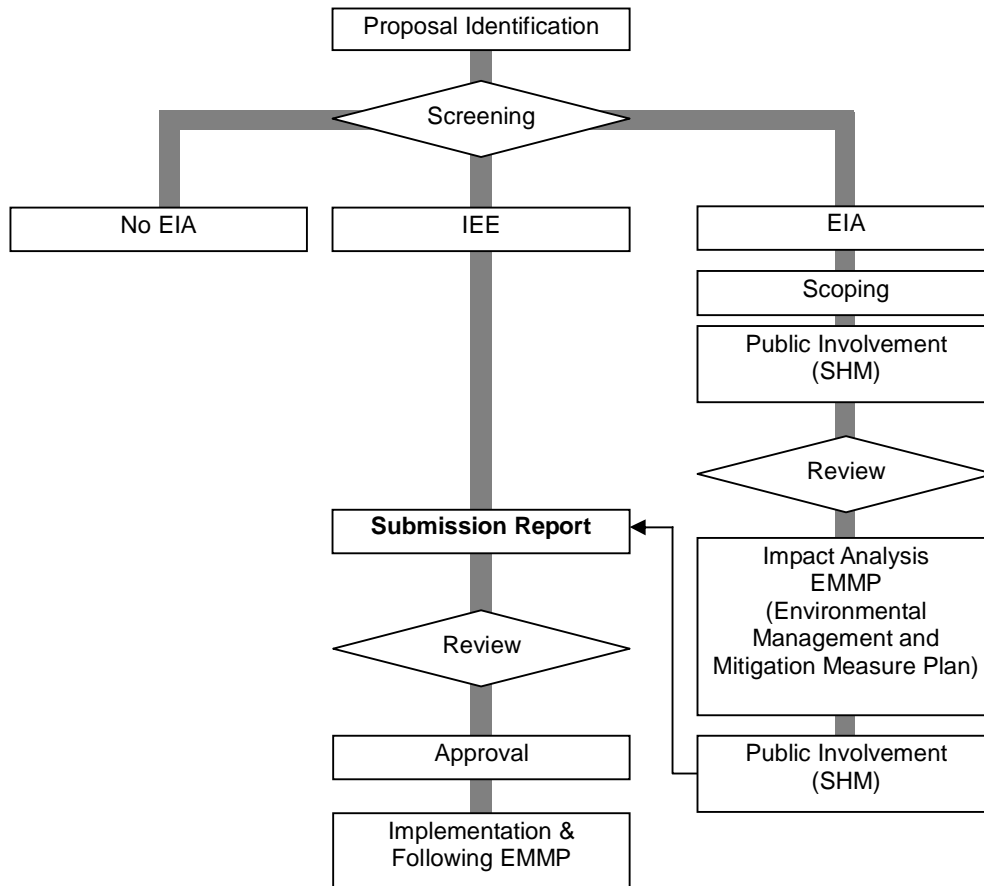
Chapter No.	Content
1	Preliminary Provisions
2	Land Ownership
3	Land Classification
4	Rights to Land
5	Customary Rights to Land
6	Derivatives Rights to Land
7	Land Administration and Management
8	Registration of Land Rights
9	Acquisition of Land for Investment Purposes
10	Pastoral Lands
11	Land Use, Social and Environmental Preservation
12	Expropriation of Land for Public Interests
13	Land Rights Restitution and Compensation
14	Unauthorized Occupancy
15	Land Dispute Settlement
16	Miscellaneous Provisions

Public land is the land owned collectively by all people of Southern Sudan and held in trust by the appropriate level of government. It includes the land owned by the Government of Southern Sudan (GOSS), State government or local government, all roads, railways, etc. Community land is held by communities identified on the basis of ethnicity, residence or interest. Private land is any registered land held by any person under a freehold tenure or under leasehold tenure. Chapter 12 of the Act describes about expropriation of land for public interests.

(3) Environmental Impact Assessment Process adopted for this Project

The Project components will have positive impacts in terms of improvement in water supply services for those areas that are still not covered by treated water supply. The project is not expected to have any significant negative environmental or social impacts.

Based on the discussion with the Ministry of Environment (MoE), the Guidelines and EIA policy is still in the draft stage. The draft EIA process described by the MoE is presented in Figure 1.1 below.



Source: Based on the interview with the Ministry of Environment

Figure 1.1 Law-based EIA Process (Draft)

1.2 Initial Environmental Examination

1.2.1 Scope of the Project for Initial Environmental Examination (IEE)

This project is aimed towards supplying water to those areas in Juba that is still not covered by clean water supply. To cover these areas, water is supplied from public taps and through water tankers.

The scope of this Project covers the expansion of the treatment facilities (with an additional capacity of 10,800 m³/day) and clear water reservoir at existing water treatment plant premises, and the construction of transmission pipelines, one service reservoir, lift pumps and elevated tank on the west of the Parliament, water tanker filling stations at 8 locations, public taps at 120 locations, and distribution network. The proposed main facilities are as presented in Table 1.3 and their location is shown in Figure 1.2. The detailed location of the proposed water supply facilities with picture of the sites are shown in Figure 1.3, 1.4 and 1.5.

Table 1.3 Components of Projects

Facility/Location	Area (ha)	WTP	SR	Pump	Pipe	Major activities
1. Expansion of Existing WTP in UWC compound (Juba Payam)	0.3	•	•	•		<ul style="list-style-type: none"> Expansion of existing WTP including raw water pump, sedimentation tank, chlorine dosing house, rapid sand filter, clear water reservoir and high lift pump station. Operation and maintenance of the treatment facilities
2. SR in the west side of parliament (Juba Payam)	0.48		•	•		<ul style="list-style-type: none"> Construction of a service reservoir, lifting pumps and elevated tank Operation and maintenance of pump
3. Construction of Transmission and Distribution Pipelines					•	<ul style="list-style-type: none"> Installation of pipelines Maintenance of network
4. Construction of Water Tanker Filling Stations at 8 locations	0.03-0.08				•	<ul style="list-style-type: none"> Construction of Facilities Operation and maintenance
5. Construction of Public Taps at 120 locations (20 in Juba, 50 in Kator and 50 in Munuki Payams)		-	-	-	•	<ul style="list-style-type: none"> Installation of public taps Operation and Maintenance

Note) WTP: Water treatment plant, SR: Service reservoir (Ground level and Elevated)

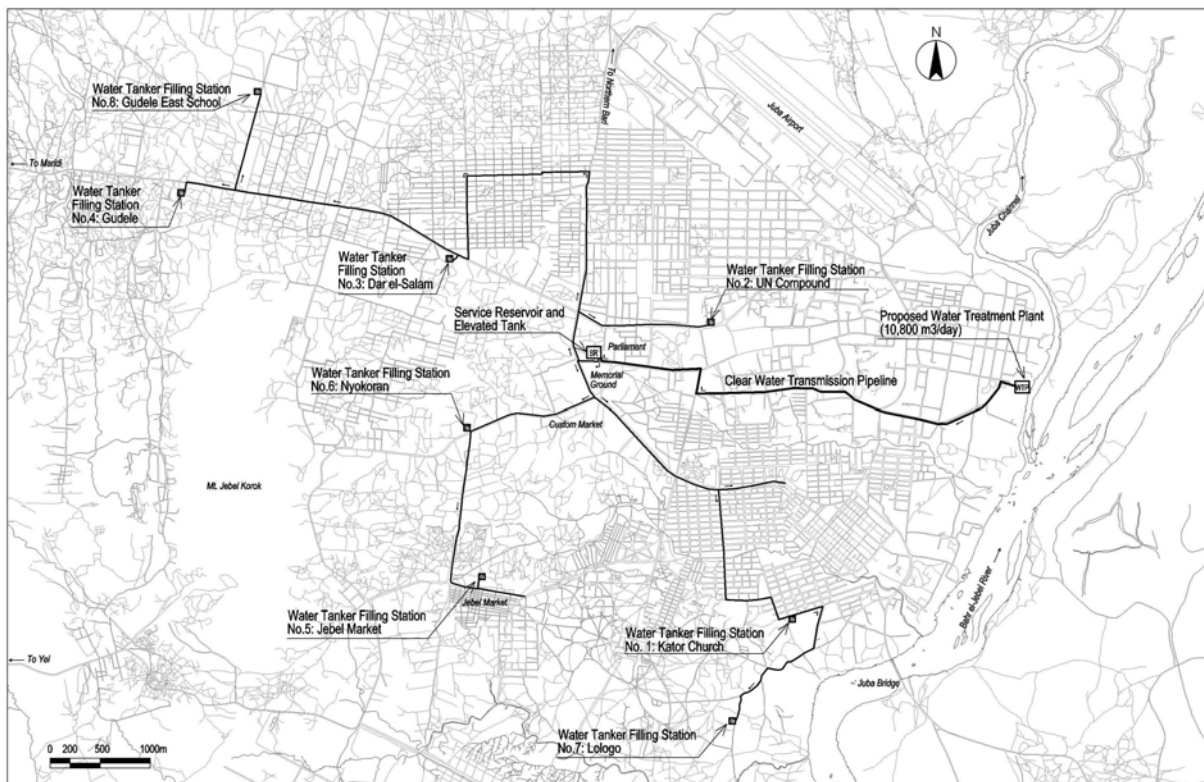


Figure 1.2 Location Map of Main Facilities in the Proposed Project



Figure 1.3 Detailed Locations of Proposed Facilities (1)



Figure 1.4 Detailed Locations of Proposed Facilities (2)

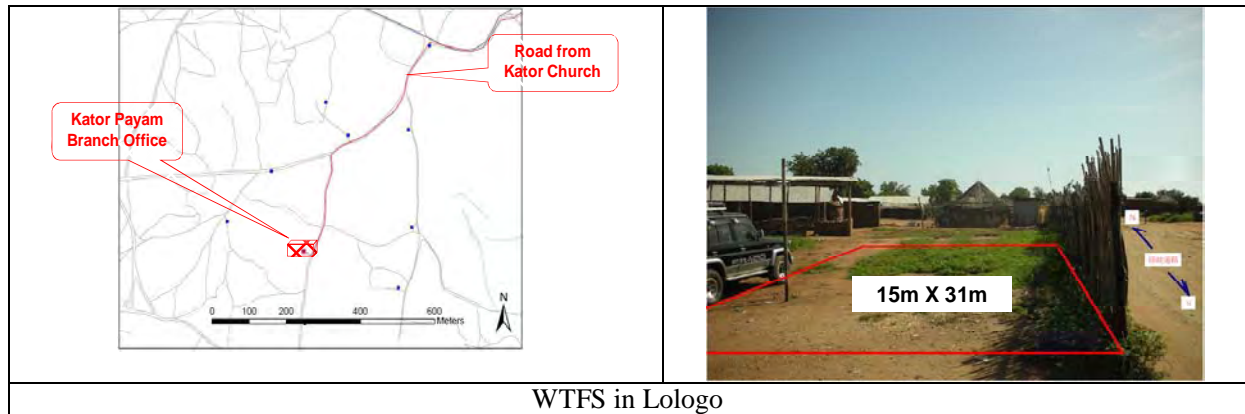


Figure 1.5 Detailed Locations of Proposed Facilities (3)

1.2.2 Scoping Matrix for Project Activities

The implementation of Project is expected to have several positive impacts. During the construction and operation and maintenance stages, working opportunities for local people will be generated. In the operation stage, the project will facilitate supply of clean and hygienic water to citizen of Juba in areas that are still not covered by water supply services of Southern Sudan Urban Water Corporation (SSUWC). The provision of clean water will also result into reduction of waterborne diseases such as cholera, diarrhea, typhoid and skin and eye diseases. However, the project is also likely to cause some negative impacts.

The level of negative impact due to Project activities is shown in Table 1.4. In general, the magnitude of negative environmental and social impacts of the project activities is not serious.

It is identified that in the construction stage, negative impacts could be in terms of air, noise and vibration; and loss of trees due to land clearance. During operation stage, increased amount of treated water might have negative impact on pump operators who fill in raw water into tankers along the river, although the magnitude and area of impact are generally not regarded as severe. Also, appropriate handling and disposal of generated wastewater will be required in long run.

Table 1.4 Predicted Impact Level of Project Activities

Major activities		Impact level	Main reasons
Planning	1. Land acquisition (Compensation and resettlement)	B-	Areas required for construction of facilities are not of very large scale as in projects such as building roads or dams. The land where project facilities are proposed either belong to the Government or are located in the right of way of the roads. However, in some cases, clearance of land may cause loss of trees and solid waste generation. Also, land use permission shall be required before the start of implementation stage.
During Construction	1. Land clearance	B+	Cutting and filling of land may cause dust which could affect the surrounding area. Construction machines may cause noise, vibration, dust and traffic accidents. Many workers will come to the project site. Most construction workers may be hired from the surrounding villages, while other technicians from other areas or countries. The increased chance of interaction may spread infectious diseases through sexual interaction.
	2. Cutting and filling land	B-	
	3. Operation of equipments and heavy vehicles	B-	
	4. Influx of construction workers, construction of base camp	B-	
Post Construction	1. Increase of water supply	B+	Provision of clean water supply through water tanker filling stations may have negative impact on the existing pump operators who pump raw water from the river to the water tankers. Improvement in water supply is expected to cause little increase in wastewater discharged by users because of similar pattern in water uses. The increase of discharged wastewater may cause deterioration of water environment of the Bahr el-Jebel and living environment. Discharged wastewater may also create a suitable habitat for malaria-infected mosquitoes even during dry seasons. Operation of water treatment plant and pump may increase the level of noise and vibration. Discharged solid waste from water treatment plant may cause negative impact through its dumping. Increased operation of water tankers may increase the level of noise, vibration and dust along the road. Also, at the location water tanker filling station and public taps, water logging may occur if proper drainage is not provided.
	2. Increase of discharged water (Wastewater)	B	
	3. Operation of facilities	B-	
	4. Operation of water tankers and public tap stands	B-	

Note: A: Serious impact expected; B: Certain impact expected
+: the strength of impact is bigger; - the strength of the impact is smaller.

1.2.3 Impact Items and Factors

Impact factors and degree of negative and positive impacts are checked in the scoping matrix and summarized in Table 1.5.

Table 1.5 Result of Scoping for Project Components

Impact Items		Impact Factors by stages																
	Likely Impacts	Overall Rating	Plannin g Phase	Construction Phase						Post Construction								
			Land acquisition/Compensation Change of Land use plan, Control of various activities by regulations for the construction	Reclamation of Wetland, etc.	Deforestation/Land Clearance	Alteration to ground by cut land, filling, etc.	Operation of Construction Equipment and Vehicles	Construction of facilities	Traffic Restriction in construction area	Influx of construction workers, construction of base camp	Removal old pipelines	Increase of Water Supply	Increase of Discharged Water	Appearance/ Occupancy of Facility and related building structures	Operation of Facility	Operation of Water Tankers		
Social Environment	No	Resettlement (or Loss of Properties)	B-			B-												
	2	Local economy such as employment and livelihood, etc.	B-															B-
	3	Land use and utilization of local resources	B-			B-												
	4	Social institutions such as social infrastructure and local decision-making institutions																
	5	Social infrastructures and services																
	6	Poor, indigenous and ethnic people (inclusive IDPs and refugees), gender and children rights																
	7	Misdistribution of benefits and damages	B											B				
	8	Cultural heritage (ex. Burial grounds)																
	9	Local conflict of interests																
	10	Water Usage, Water Rights or Common Rights																
	11	Sanitation	B												B			
	12	Hazards (Risks) Infectious diseases such as HIV/AIDS	B									B	B	B	B			
	13	Accidents	B						B									B
Natural Environment	14	Topography and Geographical features																
	15	Soil Erosion																
	16	Underground water																
	17	Hydrological Situation																
	18	Coastal Zone																
	19	Flora, Fauna and Biodiversity	B+			B+												
	20	Meteorology																
	21	Landscape	B													B		
22	Global Warming																	
Pollution	23	Air Pollution (dust)	B				B	B										B
	24	Water Pollution	B					B							B			B
	25	Soil Contamination																
	26	Waste	B				B										B	
	27	Noise and Vibration	B					B	B	B							B-	B-
	28	Ground Subsidence																
	29	Offensive Odors																
	30	Bottom sediments																

Rating: A: Serious negative impact is expected. B: Some negative impact is expected. C: Extent of impact is unknown (Examination is needed. Impacts may become clear as study progresses.) No Mark: Little impacts are expected and IEE/EIA is not necessary. +: the strength of impact is bigger; - the strength of the impact is smaller.

Each facility has some factors causing negative impacts during construction and operation phases. Clearance of construction site is needed for water treatment plant and in some cases along the pipelines. This might involve cutting some trees and therefore, mitigation measures must be undertaken.

In addition, operation of water treatment plant and pumps may generate noise. Also, with the operation of water supply facilities in this Project, increase in water uses is expected to generate increased wastewater. In long run, if generated wastewater is not collected and treated appropriately, it might cause pollution of receiving water bodies (river, etc.).

1.3 Mitigation Measures

The mitigation measures and monitoring items related to the negative impacts of the project components during construction and operation stages are proposed and summarized in Tables 1.6 and 1.7 respectively.

Table 1.6 Proposed Mitigation Measures during Construction Stage of the Project

Items	Impacts	Mitigation Measures
<Landscape>	No significant impact expected	<ul style="list-style-type: none"> • Installation of information desk to collect complaints from residents and neighborhoods.
<Air Pollution>	Generation of particulates and exhaust gases	<ul style="list-style-type: none"> • Dust control through water sprinkling at construction site • Preventive maintenance of construction machineries and vehicles • Attentive operation and speed restrictions of construction vehicles and equipment • Monitoring of air pollution parameter before and after project • Arrangement of information desk and deployment of responsible person
<Noise and Vibration>	Generation of noise and vibration from heavy vehicles and equipments	<ul style="list-style-type: none"> • Announcement of construction schedule and contents at site • Attentive operation and speed restrictions of construction vehicles and equipment • Monitoring of noise and vibration parameters
<Flora and Fauna>	Few trees might be required to cut in the proposed location of the WTP or along the alignment of the pipes	<ul style="list-style-type: none"> • Cutting of trees to be avoided as much as possible • In unavoidable cases, new trees to be planted after construction completes.

Items	Impacts	Mitigation Measures
<Traffic/ Public Facilities>	Carrying in and out of materials/construction waste can result into possible adverse impacts on health, air pollution level, and noise and vibration along access road	<ul style="list-style-type: none"> Announcement and public notification concerning construction contents and its schedule Assigning of watchman or traffic control staff Education on traffic rules for construction workers, drivers of water tankers and inhabitants Covering the loading platform
<Solid Waste>	Disposal of construction waste and soil	<ul style="list-style-type: none"> Promotion of reuse Disposal at appropriate location such as landfill site, etc.

Table 1.7 Proposed Mitigation Measures during Operation Stage of the Project

Items	Impacts	Mitigation Measures
<Noise and Vibration>	Noise from blower, pumps, and generators is expected	<ul style="list-style-type: none"> Facilities shall be installed inside buildings to reduce noise level significantly Noise and vibration to be monitored
<Water Pollution> <Public Health Condition>	Water uses pattern being same, very little increase in wastewater discharge is expected within few years.	<ul style="list-style-type: none"> In long run, planning is required towards appropriate handling and disposal of wastewater. Water quality to be monitored.
<Sludge Disposal>	Generated sludge will be from sedimentation tanks and not hazardous in nature	<ul style="list-style-type: none"> Sludge removed from sedimentation tank shall be thickened using new sludge tanks at WTP. Thick sludge can be removed through vacuum switch pump to sewage truck and be disposed off at appropriate landfill site.
<Loss of jobs in case of pump operators>	Due to operation of WTFS, several pump operators might lose present job.	<ul style="list-style-type: none"> Affected pump operators to be informed of project activities during implementation. When bidding is announced for O&M of these WTFS, pump operators to be informed as well.
<Water logging near WTFS and Public tap stands>	Operation of WTFS and public tap stands might result into water logging in its surroundings.	<ul style="list-style-type: none"> Operation to be carried out appropriately to avoid water logging in its neighborhoods. Appropriate drainage facilities to be considered if water logging is observed.

1.4 Monitoring Plan

It is proposed to undertake following monitoring plans related to the negative impacts that has been

described earlier. The monitoring plan is categorized under construction stage and operation stage. For preparing the monitoring plan, it is considered that during construction stage influence will be short duration and therefore it is important to have measurement result immediately rather than caring for the level of accuracy and accordingly measurement methods should be selected. However, in the operation stage it is required to evaluate the level of influence and make judgment. Also, it is required to find out if any new negative impact has come up during operation stage. Therefore, measuring method should be selected considering sufficiency in terms of accuracy and its simplicity in use. In case when new influence is expected in future, the measuring method should be improved based on the need of new impacts and desired accuracy or measured parameters. Monitoring programs for construction and operation stages are described below in Tables 1.8 and 1.9.

1.4.1 Construction Stage

On the access road and construction site, the noise generated by operation of vehicles carrying materials in/out of construction site and due to use of heavy construction machines should be measured using a portable noise level meter. When complaints are received from residents, the measurement result should be referred, and sound insulating wall should be installed if needed. Also, the reduction of operating speed of vehicles and sound reductions measures should be considered.

During construction activities, on the access road and the construction site, the particulates are generated by operation of vehicles carrying materials in/out and heavy construction machines. When complaints are received from residents at complaint window located on site, related to particulates in air due to project activities, the level of particulates along the access road and at construction site should be measured with a portable particulate measurement instrument. The measurement result should be referred and the frequency of water sprinkling should be reconsidered. In order to control the level of particulates in air, watering shall be carried out and measurement shall again be carried out in order to evaluate the effect. Monitoring program for construction stage is summarized in Table 1.8 below.

Table 1.8 Monitoring Program for Construction Stage

Object	Monitoring Location	Parameters	Frequency	Implementing Agency	Monitoring Cost*
Noise	<ul style="list-style-type: none"> - Access road - WTP - Reservoir 	Noise (maximum level)	Arbitrary number of times during the construction period, especially when the level is high.	SSUWC	30,000Yen (Expenses on buying equipments for measurement)

Object	Monitoring Location	Parameters	Frequency	Implementing Agency	Monitoring Cost*
Request and complaint from residents	– surrounding area of access road and construction sites	Contents and number of requests and complaints	During the construction, a reception counter to be installed to respond any time.	SSUWC	No expense
Air Quality (to be carried out if too much complaints from residents)	– Access road – WTP – Reservoir	Particulates	Arbitrary number of times during the construction period, especially when the level is high.	Contractor	300,000Yen (Expenses on buying equipments for measurement)

* Personnel costs are not included.

The result of monitoring shall be recorded in the monitoring form. Format which could be used for monitoring noise, surrounding environment and air quality during construction stage is presented in Tables below.

Table 1.9 Monitoring Form for Noise (Construction Stage)

Item	Unit	Measured Value (Max.)	Country's Standards	Standards for Contract	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level	dB				85 dB*	

* The regulation value in Japan (during construction work period)

Table 1.10 Monitoring Form for Surrounding Environment (Construction Stage)

Monitoring Item	Monitoring Results during Report Period
Number of requests and complaints	
Content of requests/complaints	

Table 1.11 Monitoring Form for Air Quality (Construction Stage)

Item	Unit	Measured Value (Max.)	Country's Standards	Standards for Contract	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Particulates						

1.4.2 Operation Stage

Periodical water quality measurement of inflow shall be performed. Also, water quality parameters should be measured periodically for treated water in the distribution facilities such as water tanker

filling stations outlet and public taps. For the sample of distribution facilities, measurement should be carried out for presence of hazardous substances on yearly basis.

The level of noise shall be measured outside the buildings of the pumps, generator and, blower facilities, and at the boundary of WTP. Although, it is judged that there is no influence on the neighborhoods, especially measurement of sound level at night is recommended.

It is also important to monitor the status of water logging near the water tanker filling stations on monthly basis. Monitoring program required at operation stage is summarized in Table 1.12.

Table 1.12 Monitoring Program for Operation Stage

Object	Monitoring Location	Parameters	Frequency	Implementing Agency	Monitoring Cost*
Water Quality	– Intake	pH, Turbidity	Daily	SSUWC	No Expenses
		Hazardous Substances (Fluoride, NO ₂ -N, NO ₃ -N, Mn, Fe)	2 times per year		No Expenses (Analytical instruments and chemicals for monitoring are supplied under capacity development project of JICA.)
	– Distribution Facilities	pH, Turbidity, Residual Chlorine	daily	SSUWC	No Expenses
		E Coli	Weekly		60,000 Yen/Year (Expenses on buying equipments for measurement)
		Hazardous Substances (Fluoride, NO ₂ -N, NO ₃ -N, Mn, Fe)	2 times per year		No Expenses
Noise	Outside the buildings of: – Pump – Generator – Blower, and WTP Site boundary	Noise (maximum level)	Monthly	SSUWC	No Expenses Measurement apparatus purchased for monitoring at construction stage is used.
Neighboring Environment	Near water tanker filling stations	Water logging	Monthly	SSUWC	No Expenses

* Personnel costs are not included.

The result of monitoring shall be recorded in the monitoring form. Format which could be used for monitoring water quality (both raw and treated water), noise, and surrounding environment during

operation stage is presented in Tables below.

Table 1.13 Monitoring Form for Raw Water Quality (Operation Stage)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Standards for Contract	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
pH	-			6.5 – 8.5			
Turbidity	NTU			5 NTU			
Fluoride	mg/l			1.5 mg/l			
NO ₂ -N	mg/l			2 mg/l as NO ₂			
NO ₃ -N	mg/l			50 mg/l as NO ₃			
Mn	mg/l			0.27 mg/l			
Fe	mg/l			0.3 mg/l			

Table 1.14 Monitoring Form for Supplied Treated Water (Operation Stage)

Item	Unit	Measured Value (Mean)	Measured Value (Max.)	Country's Standards	Standards for Contract	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
pH	-			6.5 – 8.5			
Turbidity	NTU			5 NTU			
Residual Chlorine	mg/l			0.1*		5**	
E. Coli	n/100 ml			ND			
Fluoride	mg/l			1.5 mg/l			
NO ₂ -N	mg/l			2 mg/l as NO ₂			
NO ₃ -N	mg/l			50 mg/l as NO ₃			
Mn	mg/l			0.27 mg/l			
Fe	mg/l			0.3 mg/l			

* Usually, 0.1 mg/l is secured in order to maintain disinfection property.

** In the WHO guideline, 5 mg/l is shown as upper limit.

Table 1.15 Monitoring Form for Noise (Operation Stage)

Item	Unit	Measured Value (Max.)	Country's Standards	Standards for Contract	Referred International Standards	Remarks (Measurement Point, Frequency, Method, etc.)
Noise level	dB				40 dB*	

* The regulation value in Japan (during night time)

Table 1.16 Monitoring Form for Surrounding Environment (Operation Stage)

Monitoring Item	Monitoring Results during Report Period
Water logging near water tanker filling stations	

1.5 Stakeholders' Meeting

Under this Stage of the Project, a Stakeholders Meeting was organized on 28th July 2010 to explain about the Project outline and objectives, facilities to be constructed and their locations, expected benefits and adverse impacts of Project activities at construction and operation stages, and mitigation measures to minimize the adverse impacts. The purpose was to obtain the understanding of the Stakeholders on the Project. The meeting was held with the following agenda.

Table 1.17 Agenda of Stakeholders' Meeting

Time	Activity
10:00	Opening Address Mr. Chamjok Chung General Manager, SSUWC
10:30	Explanation of Project Outline and Objectives Mr. Naoto Tohda Chief Consultant, JICA study Team
11:30	Explanation of Expected Project Impacts and Mitigation Dr. Alok Kumar Environmental and Social Consideration, JICA S/T
12:15	Coffee Break
12:30	Exchange of Opinion among Stakeholders
13:30	Closing Remarks Mr. Louis Gore George 1st Director General, MOPI, CES

After the presentations were made, a discussion was held among the Stakeholders. In the discussion, a number of issues pertaining to the project were brought up and the JICA team had the opportunity to respond to them. The Table below shows the main issues that were raised and the responses given.

Table 1.18 Summary of Discussions during Stakeholders Meeting

Name/Organization	Issues/Questions/Comments	Reaction/Comment
Chamjok Chung Witour (SSUWC)	Are we increasing the capacity by only 3000 m ³ /day? Is the site selected for the new treatment plant sufficient? Isn't the new plant going to make the current site congested?	Capacity is being increased by 10,800 m ³ /day. The team has surveyed all aspects of the site and the available space is suitable and big enough.
Louis Gore George (CE State)	JICA has made a master plan for Juba water supply to the year 2025. This project is only one phase of the plan but the town is growing fast. Can't JICA invite another partner to support so that even the next	If funds are available JICA will implement various projects in the master plan in phases. It is the role of the GOSS to solicit for support from other donors.

Name/Organization	Issues/Questions/Comments	Reaction/Comment
	phase can be implemented fast?	
Lawrence Muludyang (MWRI)	Is the storage capacity planned in this project sufficient?	Careful thought was given to all aspects of the project before this capacity was decided upon. There is also the issue of costs. The reservoir's capacity corresponds to the added capacity at the treatment plant. Fortunately, with reservoirs it is easier to expand later.
Alison Samuel (Munuki Payam)	What about the capacity of the transmission pipeline. If the treatment plant's capacity is further improved, is it able to take larger volumes or will it require laying of a new pipeline.	The design of the pipeline is not yet complete but the designs are based on 12 hour a day supply assumption. The proposed material of the pipe – polyethylene for the smaller diameter pipes and ductile iron for the bigger ones is considered quite durable and should be able to last a long time.
Samuel Taban (SSUWC)	The new pipeline will pass near the airport and there is no water at the airport. Can this project provide a diversion so that water can be taken to the airport as well?	The focus of this project is community. There will be no provision for extending water to the airport in this project as the goal is to maximize access for the ordinary Juba residents.
Tereniko Wani (Northern Bari Payam)	What was the criteria for the allocation of the public stand pipes and the tanker filling stations. Some of the Payams like Northern Bari are not catered for.	This was based on assessment of need. Some places have already got some facilities. The exact location of the taps was selected by the Payams again on the basis of need.
Peter Paul (MWRI)	The information that has come out of this study will be useful for the future planning and even other projects. What arrangements are in place to enable access to this information?	A complete report of the studies done in the preparation of the project will be available with the counterpart SSUWC and also with the MWRI.
Simon Awijak (MWRI)	What is the plan for the management of the public water taps and the tanker filling stations?	This project has provisions for capacity building for the management of the taps and the tanker filling stations.
Morris Lomodong (MHPP)	Can the project consider building a larger treatment plant since the population of Juba is growing very fast and this one with a capacity of 10,800 m ³ /day may not be enough.	In the master plan, another treatment plant is planned but this current project cannot change the capacity of the planned treatment plant. Therefore other plants will be built in the future to cope with the higher demand for water.
Alex Taban (SSUWC)	What mechanisms have been planned in the event of a fault or failure in the new facilities? In other words if there is a fault is there an alternative mechanism for providing water even as the repairs take place.	We hope to minimize failure and break downs through continuous maintenance and monitoring and to this end there are arrangements in this project for building the capacity of the SSUWC to enable them do this well.
Dominic Eryo (Hi Malakal Area)	Where there is an old pipeline alongside a new pipeline, will the old one also be rehabilitated?	No this is not in the plan but the maintenance of the old line is the function of the SSUWC.

There were several other contributions all giving information, encouraging the study team and appreciating the contribution of JICA to the welfare of the people of Juba.

1.6 Recommended Implementation Framework of Mitigation Measures and Monitoring

In principal, the proponent should carry out all activities of the proposed mitigation measures and

monitoring plan during the construction and operation stages. The contractor shall carry out monitoring during construction stage, and shall report to SSUWC. It is expected that through the ongoing capacity development project, the capacity of laboratory staff-members of SSUWC at Juba STP would also be enhanced. Therefore, during operation stage, the sampling and water quality analysis (for simple parameters) can be carried out by the WTP laboratory staff-members. However, for the parameters that are difficult to be measured by the WTP laboratory (hazardous substances), a suitable organization either within country or overseas (e.g. in Nairobi), who can carry out such analysis, should be requested.

Implementation of monitoring plan shall be recorded and reported to the Ministry of Environment and relevant authorities periodically.

In addition certain conditions have been mentioned in the approval letter of the Ministry of Environment for the implementation of this Project described in Table below.

Table 1.19 Conditions for Project Implementation according to Environmental Approval

Conditions	Activities	Responsible Agency
1. Project proponent and the implementer must comply with all the mitigation measures detailed in Tables 1.6 and 1.7	Mitigations measures to be undertaken as explained in mentioned Tables.	Contractor (Construction Stage) SSUWC (Operation Stage)
2. Proponent shall avoid destruction of any sites with high amenity values such as the Archaeological/historical remains, recreational sites, etc.	There is no such site at proposed locations of the Project. However, if any such sites occur at construction stage, care to be taken.	Contractor and SSUWC at construction stage
3. Proponent must take measures to closely monitor and repair damages causing leakages and contamination from cracked structures, damaged pipes, faulty valves, etc.	Proper regular inspections to be carried out for mentioned facilities and maintenance to be carried out timely whenever needed.	SSUWC
4. Proponent shall provide fencing to protect the water supply points	Fence to be provided	SSUWC
5. Proponent shall compensate the affected population according to the international/JICA's social safeguards guidelines and shall ensure adherence to the occupational health and safeguards requirement during different construction phases.	No population is affected in terms of resettlement related to project sites.	
6. Proponent and implementer shall throughout the project construction period, manage and mitigate all potential environmental impacts, keep high engineering and construction standards and practices.	High engineering and construction standards and practices to be followed.	Contractor SSUWC

Table 1.20 Environmental Checklist

Category	Environmental Item	Main Check Items	Confirmation of Environmental Considerations
1 Permits and Explanation	(1) EIA and Environmental Permits	<ul style="list-style-type: none"> ① Have EIA reports been officially completed? ② Have EIA reports been approved by authorities of the host country's government? ③ Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? ④ In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government? 	<ul style="list-style-type: none"> ① Environmental Protection Bill 2010 has been drafted and is still to be approved by the Government of Southern Sudan. According to the Ministry of Environment (MoE), the Guidelines and EIA policy is still in the draft stage. Based on the discussion with official of MoE and as per the requirement, the Initial Environmental Examination report for this Project was prepared including outline of Project activities, assessment of impacts and mitigation measures for adverse impacts, and submitted by the Ministry of Water Resources and Irrigation (MWRI) to the Ministry of Environment for approval. ② ③ Letter of approval from MoE, dated 2nd February 2011, has been received by MWRI. According to this letter, authorization has been given for implementation of Project with some conditions to be followed during implementation stage (Table 1.19). ④ No other environmental permits are required to obtain from other regulatory authorities.
	(2) Explanation to the Public	<ul style="list-style-type: none"> ① Are contents of the project and the potential impacts adequately explained to the public based on appropriate procedures, including information disclosure? Is understanding obtained from the public? ② Are proper responses made to comments from the public and regulatory authorities? 	<ul style="list-style-type: none"> ① Stakeholders' meetings have been held several times since the preparatory stage of this Project. In this Stage, stakeholders' meeting was organized to explain about the Project activities and potential impacts to obtain their understanding on the project. Also, during the field visit for site selection, discussion has been made with nearby residents. ② In the Stakeholders' meetings, proper responses have been made to the comments of participants (Table 1.18).
	(1) Air Quality	<ul style="list-style-type: none"> ① Is there a possibility that chlorine from chlorine storage facilities and chlorine injection facilities will cause air pollution? Do chlorine concentrations within the working environments comply with the country's occupational health and safety standards? 	<ul style="list-style-type: none"> ① Calcium hypochlorite (powder) will be used for disinfection. Storage facilities and injection facilities for this purpose will be designed considering safety. Workers shall use safety measures such as gloves, eye protection glasses, etc, to protect from exposure.
	(2) Water Quality	<ul style="list-style-type: none"> ① Do pollutants, such as SS, BOD, COD contained in effluents discharged by the facility operations comply with the country's effluent standards? 	<ul style="list-style-type: none"> ① The effluent discharges from water treatment facilities operations will not be significant. However, with the increase in availability of treated water, in long run it is expected that generated wastewater from users in domestic sector will increase and planning is required towards appropriate handling and disposal of wastewater. Also, appropriate drainage facilities should be considered to avoid waterlogging near water tanker filling stations and public tap stands.
2 Mitigation Measures	(3) Wastes	<ul style="list-style-type: none"> ① Are wastes, such as sludges generated by the facility operations properly treated and disposed of in accordance with the country's standards? 	<ul style="list-style-type: none"> ① Generated sludge will be from sedimentation tanks of water treatment plant, which is not hazardous in nature. Generated sludge will be thickened using existing sludge tanks and thickened sludge can be removed through vacuum pump to sewage truck to be disposed off at appropriate landfill site.
	(4) Noise and Vibration	<ul style="list-style-type: none"> ① Do noise and vibrations generated from the facilities, such as pumping stations comply with the country's standards? 	<ul style="list-style-type: none"> ① Pumps, blowers and generators for the proposed facilities shall be located inside buildings and proper care should be taken to limit the amount of generated noises. Also, during construction stage, mitigation measures should be undertaken to maintain the noise level within limits.
	(5) Subsidence	<ul style="list-style-type: none"> ① In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence? 	<ul style="list-style-type: none"> ① Under this Project, no extraction of groundwater will be carried out and raw water will be withdrawn from Bahr el-Jebel River. Therefore, there is no possibility of subsidence due to groundwater extraction.

3 Natural Environment	(1) Protected Areas	<p>① Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?</p> <p>① Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?</p> <p>② Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?</p> <p>③ If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?</p> <p>④ Is there a possibility that the amount of water (e.g., surface water, groundwater) used by the project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?</p>	<p>① No, proposed areas for facilities is not a protected one, and implementation of project will not affect the protected areas.</p> <p>①, ② Project area does not contain any kind of ecologically valuable habitats and does not encompass the protected habitats of endangered species.</p> <p>③ Significant negative ecological impacts are not anticipated. In long run, the authorities should carry on periodical and non periodical auditing as to take proper action with any environmental law violation(s).</p> <p>④ The water intake volume of entire water supply system after the Project will be about 0.02% of the minimum river flow. Therefore, amount of water used by project is not expected to have adverse effect on aquatic environment.</p>
4 Social Environment	(1) Resettlement	<p>① Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?</p> <p>② Is adequate explanation on relocation and compensation given to affected persons prior to resettlement?</p> <p>③ Is the resettlement plan, including proper compensation, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?</p> <p>④ Does the resettlement plan pay particular attention to vulnerable groups or persons, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?</p> <p>⑤ Are agreements with the affected persons obtained prior to resettlement?</p> <p>⑥ Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?</p> <p>⑦ Is a plan developed to monitor the impacts of resettlement?</p>	<p>①, ②, ③, ④, ⑤, ⑥, ⑦ The proposed area for construction of water treatment facilities is located within the premises of existing WTP owned by the Southern Sudan Urban Water Corporation. The proposed locations of service reservoir, and elevated tanks are owned by Central Equatoria State (CES). All distribution pipelines, water tanker filling stations, and public taps are proposed to be located along the roads (right-of-way) or lands owned by CES. Therefore, no resettlement is expected due to project implementation.</p>
(2) Living and Livelihood		<p>① Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?</p> <p>② Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect the existing water uses and water area uses?</p>	<p>① The Project will not have significant adverse impact on living conditions of inhabitants. In the operation stage, the Project will facilitate supply of treated water to areas still not covered by water supply services of SSUWC. This will result into reduction of waterborne diseases and improved living conditions. The project is also expected to have positive impacts on financial conditions of the inhabitants during construction phase. However, due to operation of water tanker filling stations, it is expected that several private pump operators (along river) might lose present job. Affected pump operators should be informed of Project activities during implementation and at the time of bidding announcement for water tanker filling station operation, these pump operators should also be informed.</p> <p>② The amount of water used by the Project will not have adverse impact on existing water uses in basin because groundwater will not be extracted and very small amount of river flow will be used as raw water source under this Project.</p>

	(3) Heritage	<p>① Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage sites? Are adequate measures considered to protect these sites in accordance with the country's laws?</p> <p>① Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?</p>	<p>① There is no possibility that the proposed projects will damage any local archeological, historical, cultural, and religious heritage sites. In draft of Environmental Protection Bill 2010, article is included on protection of natural heritage sites (Chapter IX, Article 54) and adequate measures should be considered during construction phase.</p>
4 Social Environment	(4) Landscape		<p>① Project activities will not have any significant adverse effect on local landscape as proposed area is located in the campus of existing WTP, along the road sides, or empty plots of land. However, few trees that exist in the premises of existing WTP or in areas along the proposed alignment of the pipes might be required to cut during construction. Cutting of trees should be avoided and in unavoidable cases, new trees should be planted after completion of construction.</p>
	(5) Ethnic Minorities and Indigenous Peoples	<p>① Does the project comply with the country's laws for rights of ethnic minorities and indigenous peoples?</p> <p>② Are considerations given to reduce the impacts on culture and lifestyle of ethnic minorities and indigenous peoples?</p>	<p>①,② Ethnic minorities and indigenous people are not settled in the project area and no serious impacts of project activities are expected on culture and lifestyle of ethnic minorities and indigenous people.</p>
	(1) Impacts during Construction	<p>① Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?</p> <p>② If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?</p> <p>③ If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?</p> <p>④ If necessary, is health and safety education (e.g., traffic safety, public health) provided for project personnel, including workers?</p>	<p>①,②,③,④ Serious impacts on the natural, and social environment are not anticipated. During the construction phase, appropriate technologies should be considered to reduce impacts due to noise, vibrations, turbid water, dust, exhaust gases and wastes and mitigation measures should be adopted. Also, measures of traffic safety and public health should be considered for project personnel during construction stage.</p>
5 Others	(2) Monitoring	<p>① Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?</p> <p>② Are the items, methods and frequencies included in the monitoring program judged to be appropriate?</p> <p>③ Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?</p> <p>④ Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?</p>	<p>① ② ③ ④ Suitable operation of water supply system shall contribute to improvement of natural and social environments. As of now, environmental regulations and standards prepared by MoE are still in draft stage and no monitoring activities are undertaken. Mitigation measures for potential impacts have been discussed in the Initial Environmental Report submitted to the MoE by MWRI. Detailed environmental monitoring plan is also prepared and activities included in the monitoring plan should be carried out at the construction and operation stages. Result of the monitoring activities should be submitted to the MoE in appropriate format.</p>
6 Note	Note on Using Environmental Checklist	<p>① If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).</p>	<p>① There is no expected impact towards boundary or global issues. The source of water for this Project is Bahr el-Jebel river which is tributary of river Nile, which is used by Egypt also. However, the amount of water withdrawn for this Project is estimated as only 0.02% of the minimum flow of river. Hence, it is not going to have any impact on water availability to users in downstream.</p>

1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are made, if necessary.
 In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).
 2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

**THE PROJECT FOR THE IMPROVEMENT OF WATER SUPPLY
SYSTEM OF JUBA IN SOUTHERN SUDAN
THE SECOND PREPARATORY SURVEY FOR THE PROJECT FOR
THE IMPROVEMENT OF WATER SUPPLY SYSTEM OF JUBA IN
SOUTHERN SUDAN**

NOTES FROM THE STAKEHOLDERS' MEETING

28TH JULY 2010 JUBA GRAND HOTEL

PROGRAMME

10:00	OPENING ADDRESS	MR. CHANJOK GENERAL MANAGER, SSUWC
10:30	EXPLANATION OF PROJECT OUTLINE AND OBJECTIVES	MR. NAOTO TOHDA CHIEF CONSULTANT, JICA STUDY TEAM
11:30	EXPLANATION OF EXPECTED PROJECT IMPACTS AND MITIGATION	DR. ALOK KUMAR ENV. & SOCIAL CONSIDERATION, JICA S/T
12:15	COFFEE BREAK	
12:30	EXCHANGE OF OPINION AMONG STAKEHOLDERS	
13:30	CLOSING REMARKS	MR. LOUIS GORE GEORGE 1ST DIRECTOR GENERAL, MOPI, CES

OPENING OF THE MEETING

The opening was officiated by the General Manager SSUWC Mr. Chamjok Chung. In his remarks he made the following points.

- For some time now JICA , working together with the UWC have been planning the expansion of the Juba Urban Water Supply System.
- This meeting marks the next step in the move towards the implementation of the project.
- Let us make constructive contributions so as to ensure that the project meets our requirements

REVIEW OF THE PROGRAMME

Steven Mukibi a member of the JICA study team outlined the programme of the morning and then asked the members of the study team to introduce themselves.

EXPLANATION OF PROJECT OUTLINE, OBJECTIVE, PROJECT FACILITIES AND LOCATION.

This was done by Mr Naoto Tohda. In the presentation he outlined the essentials of the project. Below are some of the key points in his presentation.

- The project will expand the treatment capacity from 7,300 cubic meters per day to 18,000 cubic meters per day.
- As part of the project a section of the existing pipeline will be replaced.
- 120 public stands will be set up in Juba, Munuki and Kator Payams.
- Other aspects of the infrastructure to be set up include a reservoir and pumping station near the parliament and six tanker filling stations.
- There are no provisions in this project for house water connections. The concept behind the design is the provision of safe water to the largest number of people in the community and the chosen strategy to this end is the use of public water taps.

Following Mr. Tohda's presentation, clarification was sought on a number of issues in the presentation and it was given.

EXPLANATION OF EXPECTED PROJECT BENEFITS, ADVERSE IMPACTS, AND MITIGATION MEASURES

This presentation was made by Mr. Alok Kumar. Some of the main points in the presentation were as follows.

- The project will have both positive and negative impacts on the environment but overall the positive impact far outweighs the negative ones.
- These impacts will be seen in the process of the construction of the facilities and then some later after the commissioning of the project.
- Impacts in the process of the construction are temporary and they include, noise, vibration, dust and the possible loss of some trees in some areas where the pipeline is to be laid.
- The longer term negative impacts will include increased effluent (sewerage and grey water) since people will have more water to use and possible loss of employment for the people that operate the pumps for filling tankers with river water at the moment.
- Mitigation for the interim (during construction) impacts will include construction management measures that minimise noise, vibration and dust. For the increased black and grey water, the construction of a larger sewerage treatment plant is part of the master plan for Juba water supply that has also been developed with aid from JICA.

Time was allowed for people to seek clarification on various points and then a 15 minute tea break was announced.

EXCHANGE OF OPINION AMONG STAKEHOLDERS AND CONSENSUS

In the discussion, a number of issues pertaining to the project were brought up and the JICA team had the opportunity to respond to them. The table below shows the main issues that come up and the responses given.

No	Issue/Question	Reaction/Comment
1	<p>Chamjok Chung (SSUWC) Are we increasing the capacity by only 3000 cubic meters?</p> <p>Is the site selected for the new treatment plant sufficient. Isn't the new plant going to make the current site congested?</p>	<p>Capacity is being increased by 10,700 cubic meters</p> <p>The team has surveyed all aspects of the site and the site is suitable and big enough.</p>
2	<p>Louis Gore (CE State) JICA has made a master plan for Juba water supply to the year 2025. This project is only one phase of the plan but the town is growing fast. Can JICA invite another partner to support so that even the next phase can be implemented fast?</p>	<p>If funds are available JICA will implement various projects in the master plan in phases. It is the role of the GOSS to solicit for support from other donors.</p>
3	<p>Lwrence Naludyang (MWRI) Is the storage capacity planned in this project sufficient.</p>	<p>Careful thought was given to all aspects of the project before this capacity was decided upon. There is also the issue of costs. The reservoir's capacity corresponds to the added capacity at the treatment plant. Fortunately, with reservoirs it is easier to expand later.</p>
4	<p>Alison Samuel (Munuki Payam) What about the capacity of the transmission pipeline. If the treatment plant's capacity is further improved, is it able to take larger volumes or will it require the laying of a new pipeline.</p>	<p>The design of the pipeline is not yet complete but the designer are basing on a 12 hour a day supply assumption. The proposed material of the pipe – polyetherine for the smaller diameter pipes and ductile iron for the bigger ones is considered quite durable should be able to last a long time.</p>
5	<p>Samuel Taban - UWC The new pipeline will pass near the airport and there is no water at the airport. Can this project provide a diversion so that water can be taken to the airport as well</p>	<p>The focus of this project is community. There will be no provision for extending water to the airport in this project as the goal is to maximise access for the ordinary Juba residents</p>
6	<p>Tereniko Wani (Northern Bari Payam) What was the criteria for the allocation of the public stand pipes and the tanker filling stations. Some of the Payams like Northern Bari are not catered for.</p>	<p>This was based on assessment of need. Some places are have already got some facilities. The exact location of the taps was selected by the Payams again on the basis of need.</p>
7	<p>Peter Paul (MWRI) The information that has come out of</p>	<p>A complete report of the studies done in the</p>

	this study will be useful for the future planning and even other projects. What arrangements are in place to enable access to this information.	preparation of the project will be available with the counterpart SSUWC and also with the MWRI
8	Simon Awijak (MWRI) What is the plan for the management of the public water taps and the tanker filling stations.	This project has provisions for capacity building for the management of the taps and the tanker filling stations.
9	Moris Lomodong (MHPP) Can the project consider building a larger treatment plant since the population of Juba is growing very fast and this one with a capacity of 10,800 cubic meters may not be enough	In the master plan, another treatment plant is planned but this current project cannot change the capacity of the planned treatment plant. Therefore other plants will be built in the future to cope with the higher demand for water.
10	Alex Taban (SSUWC) What mechanisms have been planned in the event of a fault or failure in the new facilities. In other words if there is a fault is there an alternative mechanism for providing water even as the repairs take place.	We hope to minimise failure and break downs through continuous maintenance and monitoring and to this end there are arrangements in this project for building the capacity of the UWC to enable them do this well.
11	Dominic Eryo (Hi Malakal Area) Where there is an old pipeline alongside a new pipeline, will the old one also be rehabilitated?	No this is not in the plan but the maintenance of the old line is the function of the UWC

There were several other contributions all giving information, encouraging the study team and appreciating the contribution of JICA to the welfare of the people of Juba.

CLOSING OF THE MEETING

The closing was officiated by Mr. Louis Gore from the Central Equatoria State. In his remarks he expressed appreciation for the input of everyone in the discussions and consultations . He also thanked JICA and the study team for the contribution they are adding to the welfare of the people of Juba and Southern Sudan in General. He added that where JICA faces challenges in the project especially is it has to do with land and sites they should also approach his office at CES so that solutions can be found. With those remarks he declared the consultative stakeholders' meeting closed.

The Second Preparatory Survey for the Project for the Improvement of Water Supply System of Juba in Southern Sudan

Notes from the Stakeholders' Meeting 28th July 2010 Juba Grand Hotel

List of Participants

S. No.	Name	Organisation/Designation	Tel.
1	Chamjok Chung	SSUWC	0477193152
2	Emanuel Samson Kirajo	Kator Payam	0918131776
3	Tereniko Wani Lores	Northern Bari Payam	0121019503
4	Simon Tombe	Chief Jebel Lada	012152642
5	Peter Paul	MWRI	0121827149
6	Helen Bando	SSB	0128857322
7	Edward Tombe	Juba Payam Eng.	0910386615
8	Lewis Gore George	MOPI	0122204739
9	Chief Ladu Lubang Banguele	Munuki Payam	0920378685
10	Swokirini Sabe	Juba Town Payam	0919790834
11	Khor Guang Loa	SSUWC	0955000529
12	Daniel Ali	Kator Payam	0905033398
13	Norbert Hagen	GTZ/DUWSSS	0900920304
14	Philip Ayur Mayer	MHPP	0477153588
15	Kiyotaka Tanari	JICA	091 4636201
16	Stella Jimmy	SSR	
17	Moris Lomo Dong	MHPP	1256477139938
18	Atem Nathan	MOH/Goss	0907710546
19	Zacharia Joseph Pitia	MWRI	0915158177
20	Dominic Iro	Hi Malakal Area	0907697751
21	Isaac Kenyi Scopas	Northern Bari payam	0911240538
22	Peter Jalyath Saver	MWRI	0918103249
23	Simon Otowny Awijak	MWRI	0918282085
24	Martin Andrew	DRWSS	0912871854
25	Hassan Agony	SSUWC CES/D/A/ Manager	0912898917
26	Alison Samuel	Munuki Payam	0904186505
27	John Thiyang Mhuirl	SSUWC	0955065437
28	Santrino Tongum	SSUWC	192893841
29	Gisma Jogot	MIT/ Reporter	0918107026
30	Joseph Ebere Amosa	SSUWC	0955414865
31	Laurence Nuludyang	MWRI	0905358171
32	Anthony Badha	Joint Donor Team	0907630074
33	Elisama Wani	DRWD/CES D/D	0955399162
34	Samuel Taban	SSUWC/ A Manager	047716444
35	Adam Taban	Swedish Free Univ.	0121418884
36	Nyasigin Deng Bar	MWRI - Goss	0913607635
37	Julia Sophia	MGC &S INP	0128834080
38	Taban Charles	Juba County	0126434935

JICA STUDY TEAM

1	Naoto Tohda	JICA Study Team Chief Consultant	
2	Akira Takechi	JICA Study Team. Water Supply Planning	
3	Alok Kumar	JICA Study Team Envi. And Social Specialist	0955473866
4	Steven Nkumbi Mukiibi	JICA Study Team Envi. And Social Specialist	
5	John Manyok	JICA Study Team Office Manager	0126501587

SECOND PREPARATORY SURVEY FOR THE PROJECT FOR THE IMPROVEMENT OF WATER SUPPLY SYSTEM OF JUBA IN IN THE SOUTHERN SUDAN

Stakeholders Meeting

28th July 2010

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
MINISTRY OF WATER RESOURCES AND IRRIGATION (MWRI)
MINISTRY OF PHYSICAL INFRASTRUCTURE (MOPI/CES)
SOUTHERN SUDAN URBAN WATER COOPERATION (SSUWC)

Please Register Your Name at Reception

AGENDA		
09:30	Registration	
10:00	Opening Address	Mr. Chanjok General Manager, SSUWC
10:30	Explanation of Project Outline and Objectives	Mr. Naoto Tohda Chief Consultant, JICA study Team
11:30	Explanation of Expected Project Impacts and Mitigation	Dr. Alok Kumar Env. & Social Consideration, JICA S/T
12:15	Coffee Break	
12:30	Exchange of Opinion among Stakeholders	
13:30	Closing Remarks	Mr. Louis Gore George 1 st Director General, MOPI, CES
13:45	Business Lunch	At restaurant and bar

Background

THE PROJECT FOR THE IMPROVEMENT OF WATER SUPPLY SYSTEM OF JUBA IN SOUTHERN SUDAN

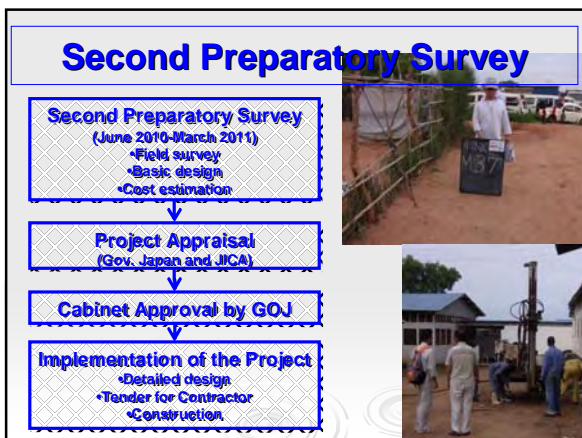
Grant Aid by JICA

> **JICA (Japan International Cooperation Agency):**

- Official agency of Japanese Gov.
- JICA provides:
 - Technical Cooperation
 - ODA Loan
 - Grant Aid
- Promotion of economic development and welfare in developing countries

> **JICA's Water Supply Projects in Juba**

- 2006 Emergency Study (Road, Water, River port)
- 2008-2009 Water Master Plan and Feasibility Study
- 2010- Preparatory Survey for the Grant Aid Project

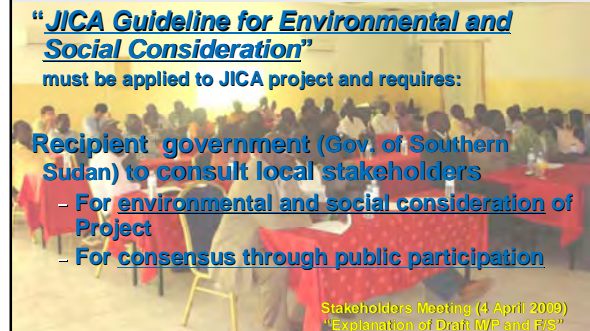
Why Stakeholders Meeting ?

"JICA Guideline for Environmental and Social Consideration"
must be applied to JICA project and requires:

Recipient government (Gov. of Southern Sudan) to consult local stakeholders

- For environmental and social consideration of Project
- For consensus through public participation

Stakeholders Meeting (4 April 2009)
"Explanation of Draft W/P and P/S"



Today's Meeting

- Explanation about JICA Project
- **Environmental and social consideration:**
 - Major positive / adverse impacts by the Project
 - Mitigation measures to be taken by the Project
- **Exchange of opinions**
 - To take opinions into consideration in project implementation
- Formulate **basic consensus** among the stakeholders

Green Signal to the Next Step

JICA PROJECT

THE PROJECT FOR IMPROVEMENT OF WATER SUPPLY SYSTEM OF JUBA

Objective of the Project

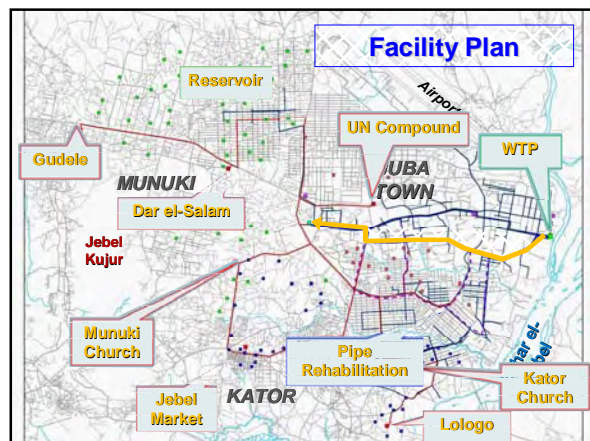
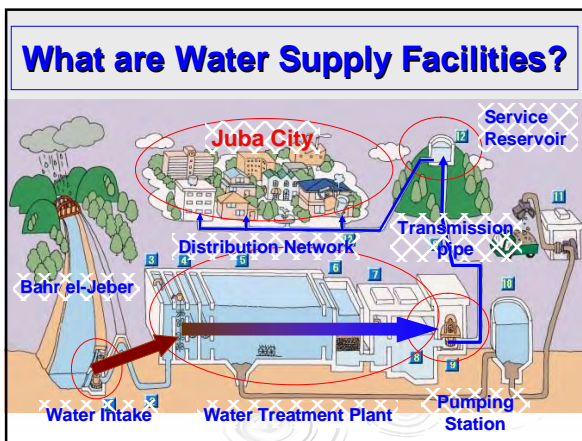
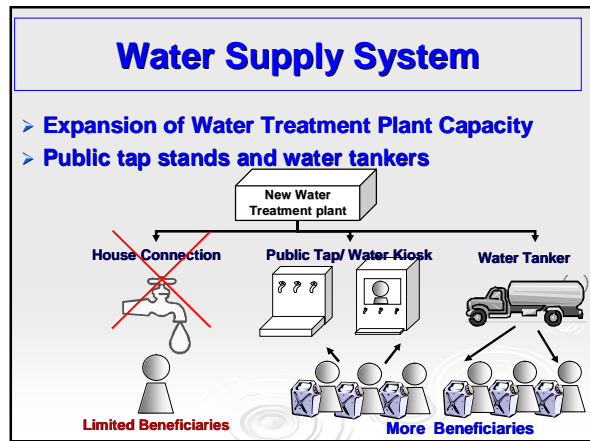
- ✓ To improve the water supply conditions in Juba
- ✓ By maximizing population getting access to clean water

Current

Approx. 90% of Juba citizen has no access to treated water

Year 2015

Additional 356,000 people (52% of Juba population) will be able to access to treated water



Outlook of Water Supply Facility



