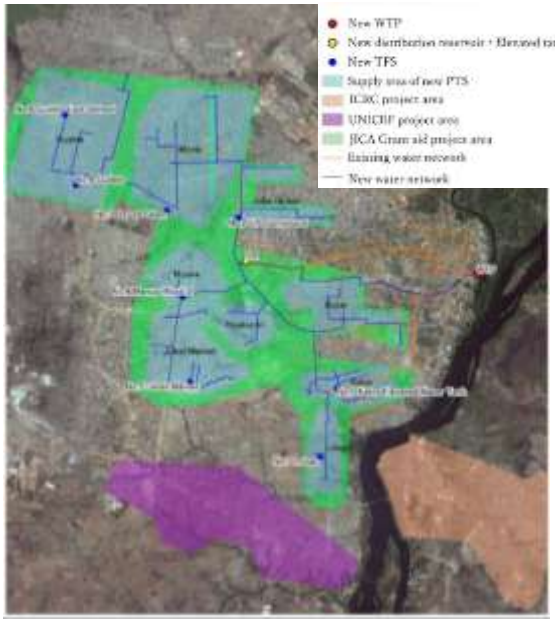
JICA PROJECT BRIEF NOTE

JUBA CITY CLEAN WATER SUPPLY PROJECT IN SOUTH SUDAN



Project Location

Project team and Counterpart

OJT on the new Water Treatment Plant

1.Background of the Project and Issues

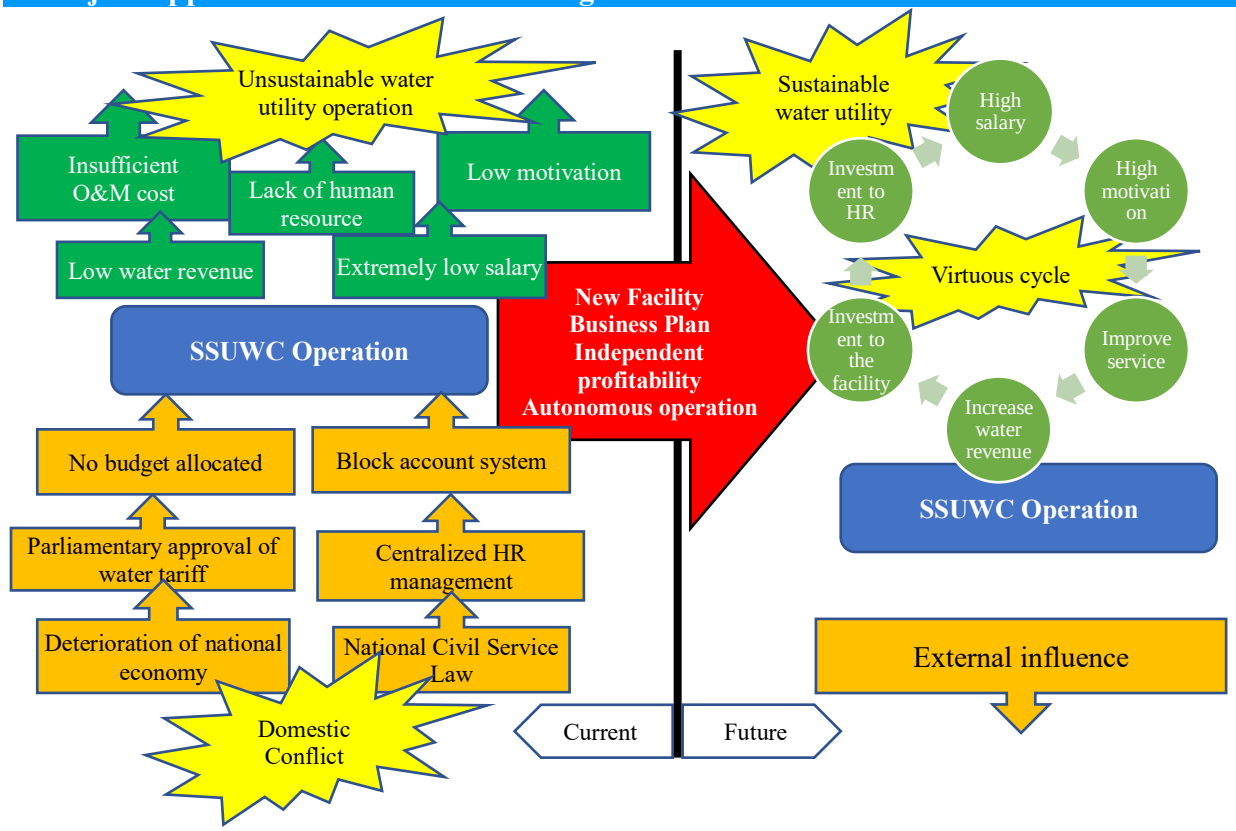
South Sudan became an independent country from Sudan in 2011, with its capital in Juba. People who had been displaced both internally and externally due to conflicts and recurrent civil wars with Sudan have been returning, leading to an increase in population and a sharp rise in water demand. Only 41% of the population has access to basic water services, significantly below the Sub-Saharan Africa regional average of 65% (JMP, 2021). The government has prioritized the construction and repair of water and sanitation facilities in urban areas, but the water supply coverage in Juba is only about 10%. Moreover, frequent breakdowns due to aging facilities and widespread leaks have resulted in inadequate water supply, forcing households connected to the water supply to purchase water from water tankers.

South Sudan Urban Water Corporation (SSUWC), responsible for water supply service, has been facing insufficient revenue due to water shortages and low collection of water tariffs. They have relied on support from donor agencies for chemicals, fuel costs, and other expenses for operating the system. Furthermore, the deteriorating national finances have led to low and delayed salaries for SSUWC staff, contributing to high rates of staff turnover and absenteeism.

To improve SSUWC's services, JICA has been implementing technical cooperation projects, " The Project for Management Capacity Enhancement of South Sudan Urban Water Corporation (Phase 1, Phase 2)". These projects aim to ensure proper and effective operation of facilities by providing support in creating necessary documents such as record formats, manuals, operation plans, and reports; acquiring and solidifying basic knowledge through classroom and on-the-job training; setting and monitoring performance indicators; and improving financial situations. However, due to repeated interruptions caused by civil wars and the COVID-19 pandemic, on-site activities have been partially restricted.

In February 2023, with the support of JICA's grant aid, new water treatment plant, eight tanker filling stations (TFS), and 120 public tap stands (PTS) were completed. Therefore, there is a need to establish a maintenance management system for the new facilities. Additionally, to aim for becoming a cost-recovery oriented organization, given the anticipated increase in revenue from the new facilities, a technical cooperation project aimed at capacity building for the Juba Station and strengthening supervisory capabilities at the HQs was initiated in March 2022.

2. Project Approach to Tackle the Challenges



SSUWC faces numerous challenges as depicted in the diagram above, with many issues that cannot be resolved solely through SSUWC's efforts. To minimize reliance on external influences and leverage the newly established facilities, the following approaches were used to solve the challenges.

Established milestones for activities coordinated with the Grant Aid Project

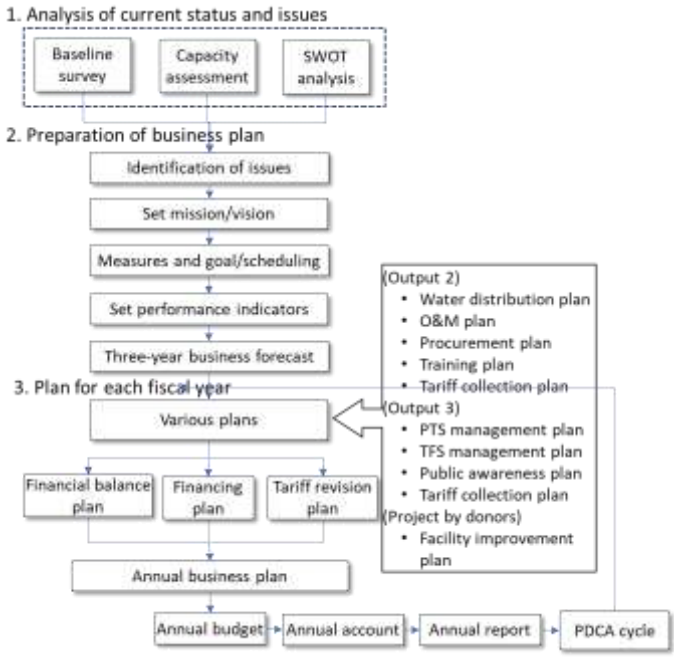
The primary objective of this Project is to enhance the capacity for the proper operation and maintenance (O&M) of the new facilities constructed by the Grant Aid Project. It is essential to establish an operational maintenance management system before the commencement of operations at the facilities. Three key milestones have been set, outlining activities to be completed by each point in time:

1. Five months before operation commencement: by the end of September 2022
   - Creation of draft business plan
   - Formulation of maintenance management organizational structure
   - Determination of operation methods for TFS/PTS, development of O&M manual
2. Before trial operation starts: by the end of November 2022
   - Approval of the business plan by the SSUWC board
   - Establishment of maintenance management organizational structure
   - Development of draft O&M plan and Standard Operating Procedures (SOP)
   - Establishment of organizational structure for the operation of TFS/PTS
3. At the commencement of operations: February 2023
   - Finalization of O&M plan and SOP
   - Establishment of operational structure for TFS/PTS

Development of a Business Plan for Achieving Self-Sustaining Water Utility

SSUWC aims to implement a pilot project to utilize the new facilities and cover all costs through water tariffs, thus achieving financial independence. Furthermore, the organization seeks to transition towards financial and personnel independence in the long term. To support this transformation, assistance is provided in developing a business plan.

- The planning period is set from January 2023 to June 2025, aligning with the fiscal year and SSUWC corporate plan.
- The focus is on increasing revenue and aiming for cost recovery of maintenance expenses, including electricity and chemical costs.
- Maintenance expenses and water tariff collection are calculated separately for new and existing water systems.
- Measures to enhance staff motivation will be introduced.
- The business plan will be linked with various plans (O&M, training, tariff collection, awareness campaigns, etc.), ensuring that all plans operate within the PDCA cycle under the business plan.



Business Plan Development Process and Content

Consideration of Performance Contracts

SSUWC learned about the Performance Contract practiced by the National Water and Sewerage Corporation (NWSC) of Uganda during the Phase 2 overseas training. This contract involves setting performance indicator targets by the HQ and branches, with the branches receiving bonuses for achieving the targets within the specified period and penalties for non-compliance. NWSC has successfully implemented this system among its HQ, branches, regional offices, branch managers, and staff, leading to operational success. SSUWC also created a Performance Contract between the HQs (Managing Director) and the Juba Station (Area Manager) in 2019, but it was not implemented due to economic downturns and instability in procurement of fuel and other supplies. In this Project, after confirming SSUWC's intentions, incorporating Performance Contracts into the business plan will be considered.

Establishment of Financial Management System and Water Tariffs for Financial Independence

Ensuring Profitability

The current challenges faced by the Juba Station include inadequate tariff collection due to low service coverage, inability to cover O&M costs, regular decline in staff motivation, shortage of personnel, and inability to repair or improve facilities, leading to a "negative spiral".

The new facilities, being independent of existing ones, can generate income from all produced water without being affected by existing facility problems (such as pump failures, distribution pipe damages, meter failures, etc.). They are considered effective "investments" towards breaking the negative spiral. Utilizing these new facilities and the income generated from them, the aim is to achieve financial independence after the facilities become operational.

Improving Financial Management

Both the SSUWC HQ and the Juba Station have low financial transparency, and the numbers in the income statement are not always reliable. To ensure transparency and accountability in management, it is essential to introduce financial management based on international corporate accounting standards and aim for improvement in financial management.

Flexible and Transparent Tariff Setting

The current tariff structure consists of both fixed and volumetric rates, making accurate revenue forecasting impossible. The primary tariff structure will be based on volumetric rates, ensuring that the total revenue,

including staff salaries and facility O&M costs, is adequately covered. Additionally, ensuring the supply of safe water is essential for human survival, efforts will be made to consider the needs of the poor.

Establish a Human Resource Management System to Enhance Sustainable Organizational Operation and Staff Motivation

One of the urgent challenges in organizational operation is ensuring staff motivation. With low salaries (average salary around $20/month), delayed payments, and diminishing value of the currency, staff motivation is significantly low, leading to an increase in absenteeism. Since salary issues are at the national level, they are not easily resolved. However, to effectively address staff recruitment and retention and to enhance staff motivation, it is necessary to consider broadly improving the human resource management system. Additionally, securing staff responsible for operational management is required as the new facilities are commissioned.

In considering the business plan, focus will be on the following four areas: 1) Allowances and welfare benefits system, 2) Remuneration based on performance, 3) Proper management of staff numbers, and 4) Recruitment strategy for attracting excellent talents.

Establishment of Operational Management System for TFS and PTS

Establishment of Operational Management System by Enhancing the Existing System

SSUWC's existing TFS have been under trial management by private operators since December 2021. As there has been an increase in income compared to when operated by SSUWC, delegation to private operators has proven effective. Investigating and understanding aspects such as selection of operators, contract terms, contract duration, operational structure, sales records, tariff collection, repairs, sanitation maintenance, and monitoring and supervision will serve as references for establishing the management system for TFS and PTS under the grant project.

Establishment of Management System and Monitoring System Before Facility Operation

With trial operation scheduled for November 2022 and full operation in February 2023, the following steps will be taken to prepare the operational management: 1) Evaluation of operational management methods and structures, 2) Selection of operational management methods and structures, development of maintenance manual and SOP, 3) Establishment of operational management structure, with implementation planned by December 2022. During the trial operation, operators will be deployed to learn facility functions and operation methods through practical training.

After full operation, focus will be on water supply, sales records, and tariff collection, with monitoring of the operator's financial status. Once the management is stable, attention will shift to hygiene considerations and verifying equitable water distribution.

Establishment of an Efficient Maintenance Management System for New and Existing Facilities

The new and existing water facilities operate as separate, independent systems. It is essential to establish an organizational structure that enables both facilities to be efficiently operated and maintained. When considering this, the following points should be taken into account:

- Due to low attendance of staff because of low salary and delayed payment, to ensure an adequate number of staff and deploy competent personnel is challenges. Until staffing stabilizes, flexible staffing arrangement based on the actual situation of SSUWC needs to be considered.
- Whether separate teams for existing and new facilities or one team for both should be determined based on the similarity of O&M tasks, workload, and the number and capabilities of personnel.

Construction of Training Building and Capacity Building

Early Construction of Training Building

The Project plans to construct a training building within

the SSUWC premises. While it is crucial to ensure that the construction of the training building does not impede the construction of the grant aid project, it is also essential to have the training building ready for immediate use upon completion of the grant aid project. Therefore, it is important to carefully plan the construction schedule, considering factors such as delays due to heavy rain and potential quality issues caused by rainwater mixing with concrete or mortar. To avoid the rainy season from April to October and mitigate accident risks, the construction of the training building is planned to take place between November 2022 and February 2023, after the completion of the new facilities.

Capacity Building Utilizing the Training Building

With the completion of the training building, the direction of future training activities at SSUWC will be considered. SSUWC currently faces organizational vulnerabilities and resource limitations for training instructors, making it challenging to sustain training activities as an entity. In such cases, it is necessary to provide a practical knowledge-sharing platform through activities that demonstrate effectiveness, such as "utilizing various opportunities to share experiences and knowledge within the organization and learn from each other."

While group discussions and OJT are expected to be central to daily capacity building, combining activities such as training sessions, workshops, seminars, and progress reporting meetings tailored to the progress of each project component will ensure timely consolidation of results, sharing of achievements within the organization, and enhancement of impact on activities. By repeatedly practicing knowledge-sharing activities within the organization, the aim is to strengthen the implementation structure and foster a culture of knowledge sharing.

Awareness Activities to Encourage Utilization of New Facilities

The aim of this Project is to conduct awareness campaigns targeting customers of both new and existing facilities, focusing on two main objectives: 1) promoting the use of PTS to be established through the grant aid project and 2) encouraging water usage and tariff payments among residents in the existing facility areas.

In particular, during the Term1, emphasis will be placed on objective 1), conveying the importance of clean and safe water to residents through hygiene awareness campaigns. Additionally, PR activities for the new PTS will be conducted, along with communicating that the water produced by SSUWC is clean and safe, aiming to promote the utilization of PTS.

3. Results of the Project Approach

Established milestones for activities coordinated with the Grant Aid Project

Activities were carried out in line with the milestones so that the SSUWC could operate and maintain the facility by 27 January 2023, the handover date of the new facility. The timing of the trial operation was changed from November 2022 to just before the handover, and the dispatch of JICA Experts was coordinated with this change. This allowed the Experts to participate in the training from the contractor to the SSUWC, resulting in a smooth O&M management after handover.

Development of a Business Plan for Achieving Self-Sustaining Water Utility

SSUWC received third country training at the NWSC to gain a better understanding of planning and execution, including objectives, action plans, implementation arrangements and monitoring. The results were used to develop a Business Plan for the period January 2023 - June 2025. The Business Plan set goals and KPIs for each of the four major areas of the SSUWC Corporate Plan: i) financial stability, ii) customer focus, iii) operational efficiency, and iv) institutional strengthening and capacity building. The organizational structure of the Juba Station was reviewed and the

desired organizational structure and the number of staff required were defined, including the integration of departments and the creation of future departments needed. Half-yearly targets are set and an activity plan for each department is prepared in order to achieve them. The progress of these activity plans is monitored in monthly reports and at monthly meetings.

The result for January-June 2023 was 24 out of 45 goals were achieved, with a 53.3% achievement rate.

Targets for KPIs and results in June 2023

Major KPI	June 2023 Target	June 2023 Result
Cost coverage ration (%)	109	116
TFS/PTS residual chlorine compliance rate(%)	95	75
Operational hour for new facility	20	22
Repair leakage and bust (day)	1.5	0.2～0.3
Number of customers supplied water	500	300
Collection ration in existing facilities(%)	55	45
Staff Attendance Ratio(%)	75	82

Achieved Not achieved

The project aims to achieve 80% of the KPIs, so further efforts are needed to achieve and improve on them.

Implementation of Performance Contracts

SSUWC decided to implement the Performance Contract as part of its business plan. The Performance Contract aims to promote and sustain improvements in the operational and financial performance of the Juba Station Office. The Contract defines the respective duties, responsibilities and rights of HQ and the Juba Station. Monthly minimum and target standards are set for the Juba Station to achieve, and bonuses are paid to the Juba Station according to the achievement of the standards.

Establishment of Financial Management System and Water Tariffs for Financial Independence

Financial forecasting and tariff setting

The Project made financial forecasts on the possibility of covering all maintenance and management costs through income. Cost recovery was forecast to increase from 104% in February 2023 to 131% in June 2025, which would be sufficient to cover maintenance and management costs, including personnel costs, and a forecast of 45 million SSP (approximately USD 64,000) to be set aside for major repairs to the facilities.

However, the exchange rate of the South Sudanese currency plummeted from 700 SSP per USD in December 2022, when the projections were made, to 1,000 SSP per USD in June 2023. As a result, the SSUWC was in deficit from May 2023 onwards, and the surplus was spent in February-April. Furthermore, a 20% tax on income has been decided by the National Revenue Authority (NRA), making it impossible to cover the necessary expenditure with income. Therefore, it is urgent to consider improving the rate of tariff collection and including tariff increases.

Flexible and transparent tariffs

The water tariffs that could achieve cost recovery with the new facilities were considered and settled upon.

The PTS was considered to be the lowest price among the various forms of water supply, as it is aimed at the poor. The price of 50 SSP for 2 jeri can was decided as there are no notes of less than 50 SSP in circulation and people come to buy water bringing two jeri can. According to preliminary research, the willingness to pay for a jeri can is between 35 and 46 SSP/ jeri can, which is a lower price. Furthermore, the existing PTS managed by SSUWC had previously sold the water at 100 SSP/jeri can, which was a significant reduction. However, as the price is higher than the water supplied by the distribution network, further price reductions need to be considered, including payment methods.

The water tariffs for the TFS and house connections were judged to be suitable as the financial forecasts showed that cost recovery was possible with the current tariffs, and that profits were kept to a minimum. Water tariffs will continue to be reviewed.

Establish a Human Resource Management System to Enhance Sustainable Organizational

Operation and Staff Motivation

Human resources management policies

For the initiatives to be included in the Business Plan, the policies and priority initiatives were selected from the issues and priorities to be addressed by the project, as shown below.

Immediate Actions (Until June 2023)

To return and secure the necessary staff for O&M.

- Provision of various allowances to supplement salaries (overtime, work allowances, transport and communication costs)
- Ensuring attendance management (payment of the above based on attendance).

Measures for sustainable organization (Until June 2025)

To secure and develop future staff, focusing on the following measures.

- Management of staff numbers
- Introduction of a motivation management system (periodic personnel evaluations, enhanced staff engagement, benefits according to position)
- Management and utilization of personnel management data
- Initiation and strengthening of human resources development activities
- Facilitation of the development of work responsibilities and job descriptions

Organizational strengthening

One of the Business Plan's strategies is to re-organize the Juba Station for its proper operation, and through the formulation of the operational responsibilities, the tasks that need to be addressed immediately were identified. The desirable organizational chart for the Juba Station and required number of staff by the end of June 2025 ware determined, taking into account the integration of departments and the creation of departments that may be needed in the future.

Organizational and human resources management

All personnel-related documents were handwritten on paper, so forms have gradually been introduced and electronic data management has begun for the management of staff registers, attendance, transfers and retirements, allowance payments, training history.

Establishment of Operational Management System for TFS and PTS

Establishment of a management system

A study of the management system of existing TFSs and knowledge of the system of neighboring countries led to the conclusion that a management system outsourced to private operators would be optimal.

The 10 TFSs and 121 PTSs, including existing ones, were divided into five areas, taking geographical conditions into account, and each area was outsourced to a private operator. Two profitable TFSs and less profitable PTSs were combined so that the PTSs could be operated in a sustainable manner.

It was recommended that as many people as possible be employed from the local community, with operators, security guards and cleaners.

Selection of private operators

In selecting private operators, advertisements were placed in newspapers and a shortlist was drawn up by applications from companies that had expressed an interest, followed by a tender procedure. The conditions were that the companies had to be majority-owned by South Sudanese, hold a certificate of incorporation and a business license, have an office in Juba City and have experience in similar or related work. Five companies were selected through a tender process and began operating the facility at the end of January 2023.

Preparation of operation and management manuals

An operating manual was prepared for the TFS/PTS describing operating procedures, daily operating procedures, daily records, weekly and monthly report preparation. The manuals were distributed to operators and explained to them during on-the-job training.

In addition, hygiene guidelines were developed for operators on standards of hygiene management in TFS/PTS facilities, raising awareness of hygiene among

operators and how to maintain the hygienic conditions of the facilities.

Establishing and implementing a monitoring system

A monitoring system has been established to ensure that the private operator is carrying out its responsibilities properly and that the facility is used optimally. Monitoring is carried out through (i) weekly and monthly reports from the private operators and (ii) regular patrol inspections by the SSUWC.

Establishment of an Efficient Maintenance Management System for New and Existing Facilities

Challenges in the water treatment plant O&M management system

In establishing the O&M management system for the new facility, the current status and challenges of the existing system were identified.

- Transfer of some tasks to other departments due to age of operators, lack of knowledge, physical strength, ability and willingness to work.
- Hand-written weekly shift schedules and time spent to adjust shift.
- Substitution of the duties of non-working staff due to illness, late payment of salaries, etc., for those of actual working staff in other departments.
- Lack of communication and unshared data between the Water Purification Department and the Water Quality Section

Approaches to the challenges

In response to the above-mentioned challenges, the following priority improvement areas and approaches were identified and activities were implemented.

- Examined the efficient O&M structure of newly operational facilities.
- Clarified the jurisdiction of the work and ensure that the person in charge on the SOP is the same as the person actually carrying out the work and ensure that this is disseminated within the department.
- Recruit young people basis to rejuvenate the organization.
- Integrated the Water Quality Section into the Water Purification Department, for example by centralizing the management of water quality data with water purification treatment data.
- Digitised data on water purification and treatment, promote information sharing within and outside the department, and improve operational and data use efficiency.

Construction of Training Building and Capacity Building

Construction of the training building

As it was decided to change the location of the training building, site survey was carried out, and the drawings and cost estimation were revised.

A contractor was selected through competitive bidding and construction started in January 2023. After the construction of the training building was completed, a completion inspection was carried out by SSUWC and an opening ceremony was held; the building was handed over to SSUWC on 27 June 2023.


Training building and opening ceremony

Training plans and development of manuals

The HR Department of HQ is responsible for management of training building and an operational policy was formulated. The HR Department was stationed in the administration office of the training building and promoted its use to the maximum extent possible so that it could be used as an extension of the daily work of HQ and Juba Station offices, regardless of training activities.

Apart from the capacity development plan of the Project, the SSUWC was willing to conduct its own training.

Therefore, a training needs survey and selection of potential lecturers will be conducted, with the aim of holding the training from the second phase of the project.

Awareness Activities to Encourage Utilization of New Facilities

Development of awareness-raising activity plan and preparation of materials

An awareness team was set up to plan awareness activities for the start of the new facility's operation, and an activity plan was drawn up with the following main objectives: (i) Publicize the opening of the new facility, (ii) Raise awareness of the importance of safe water, and (iii) Promote the use of the facility.

Banners for awareness activities

Implementation of awareness activities related to the new facility

Public awareness activities for the start of operation of the new facility included (i) SMS, (ii) Radio commercials, (iii) Roadshow track, (iv)Advertising car and (v) Open meetings with community representatives.


Roadshow track and Advertising car

TFS/PTSs are operated by private operators, who provide services to customers on behalf of the SSUWC. To improve the service provided by these operators, an operator award has been initiated. Operators are evaluated in terms of facility cleanliness, sales records, water loss and customer service, and selected operators are awarded every two months.

In addition, an awareness-raising action plan for existing customers was developed. The status of water supply was checked and awareness activities were carried out to educate active customers on the importance of safe water and payment of bills.

Changes in water supply conditions before and after completion of new facilities

Since February 2023, when the new facilities under the grant aid project were completed, the following improvements and changes have been observed in the water supply services in Juba city. Increased water supply capacity has enabled the SSUWC to provide safe water to 340,000 citizens, while the financial situation of the SSUWC has also improved.

	Before (Only Exisiting Facility)	After (New and Existing Facility)
Water supply population	34,000	340,000
Capacity of water production	7,200m^3/day	18,000m^3/day
Water surply hours	12-15hours	Existing:14hours New:22-24hours
Number of TFS/PTS	TFS:2 points PTS:1 point	TFS:10points PTS:121points
Water quality (T: Turbidity RC: Residual chlorine)	T:4.0 NTU RC:1.9 mg/l	[Existing] Same the left [New] T:1.8 NTU RC: 0.3-0.9 mg/l
Water revenue	19 million SSP	150 million SSP
Cost recovery	61%	102%

4. Findings and Lessons Learned

(1) Implementing Performance Contracts for Improved Performance at JS

A 'performance contract' system was contracted between SSUWC HQ and Juba Station, setting indicator targets for business operations and providing bonuses to the Juba Station from HQ if the targets are achieved within a certain period, which led to increased staff motivation.

This was the first attempt for SSUWC to operate the Performance Contract system, and there was some confusion at first, but a certain level of understanding was achieved by carefully explaining the framework and details to the staff. The entire staff will continue to deepen their understanding of the system and provide support to improve performance.

(2) Establish a human resource management system to improve staff motivation

SSUWC employees are national civil servants, and the personnel system is mainly regulated by national regulations. In response to issues identified in the current situation survey (e.g. low salaries, delays in salary payments) and to improve staff motivation, a human resource management system was established that can be implemented under the SSUWC's authority, such as managing attendance rates and providing allowances based on attendance rates.

Attendance management was implemented, commuting allowances and overtime allowances (e.g. for nights and weekends) were stipulated, and allowances could be paid that effectively supplemented salaries. This initiative has resulted in a significant change in staff motivation and a significant increase in staff attendance. However, there are still some staff members who do not perform their duties while at work and inaccurate attendance and attendance records, which will continue to be supported for improvement.

(3) Early Development of Capacity Development Plan and Training Activity Plan, and Agreement at JCC for Implementation

Drawing from the outcomes of the CA, specific plans were formulated for each field based on the following aspects: 1) future image of SSUWC, 2) current major issues, and 3) required training and activities for addressing issues. Early formulation will promote capacity strengthening of counterparts throughout the project period. In addition, understanding of the implementation was gained through agreement at a joint committee consisting of project stakeholders.

In accordance with the plan, the necessary training and activities will be implemented in each department in the first phase, and will continue in the second phase, making extensive use of the completed training building.

(4) Improvement of the monthly accounting report

A monthly accounting report format has been created using spreadsheet software, and the calculation function of the spreadsheet software automatically calculates the total, the balance of income and expenditure, and the ratio of each item. In addition, accounting data is entered daily, and monthly totals are automatically calculated. This made it possible to eliminate calculation errors and transcription errors as much as possible, and to promptly submit and distribute monthly accounting reports. In addition, by using general spreadsheet software instead of using special accounting software, not only did it not require additional costs, but the format could be revised flexibly internally.

As a result, monthly accounting reports are now submitted promptly, but inconsistencies in calculation results due to overwriting of Excel formulae were observed. Therefore, we will continue to support the preparation of appropriate accounting reports.

(5) Various Public Awareness activities to promote TFS and PTS and to raise awareness PTS operators

Residents will be able to obtain safe and affordable water after TFS and PTS are operational. To encourage more residents to use the PTS, it was necessary to inform residents about the launching of the facility. To reach with information on the launching of the facility, specifically, radio commercials, SMS services of mobile phone carriers and loudspeaker vans were used. In addition, as information dissemination by the local community is more effective, meetings were held with influential local people. Furthermore, as many people spend their holidays in markets and squares, a mobile

stage was set up in squares and public awareness events were held.

Meanwhile, the program to raise awareness among PTS operators is underway to award operators who are running PTSs well. Through this program, good practices will be shared with all operators, so that other operators can follow suit and improve their customer care.

(6) Involvement and Collaborative Efforts of Stakeholders (City Council, MWRI) to Reduce Water Tanker Sales Prices

Despite the SSUWC selling water to tankers at a relatively affordable rate of 500 SSP/m^3, the public purchasing water from these tankers pays 1,000 SSP/drum (200L) (equivalent to 5,000 SSP/m^3). The pricing of water tanker sales falls under the jurisdiction of the Juba City Council, even though it is controlled by a monopoly held by Eritrean individuals. The City Council has struggled to control the sales prices due to this monopoly. With the establishment of facilities (TFS/PTS) under the Grant Aid Project in the suburbs, the Project sought to revise the pricing of water tanker sales. Through multiple discussions with the Tanker Association facilitated by the Juba City Council, efforts were made to address the issue. The proposal to reduce the pricing was discussed and tentatively agreed upon by the Tanker Association, with an understanding of the benefits derived from using suburban water points. However, the actual implementation was not realized.

In May 2023, the water tanker prices were suddenly raised from 1,000 SSP/drum to 1,500 SSP/drum. In response, a collaboration involving the state government, MWRI, Ministry of Housing, Land, and Public Utilities, Juba City Council, and SSUWC ensued. The project also made proposals through the SSUWC.

(7) Employment and Utilization of Experienced Local Experts with Insights for Operations in the African Context

In this Project, the establishment of management systems for 120 PTS and 8 TFS facilities was required. As TFS and PTS facilities were unfamiliar in Japan, an experienced local expert with profound insights into TFS/PTS management in the African context were employed. This facilitated the smooth establishment, tendering and selection of a management system that was in line with the current situation in Juba, incorporating African methods.

NWSC's experts also contributed by drafting a performance contract, aligning obligations, responsibilities, and rights of both HQ and JS with NWSC's best practices.

(8) Establishment of WTP Operation Record System

The operation and inspection record forms that had been prepared for the existing WTP were rarely utilized, and the continuous O&M of the WTP had not been recorded for a long time. Therefore, an inspection record form was created, , which summarized the minimum items necessary to ensure the quality of drinking water and to grasp the status of operation and inspection of the WTP. Then, with the counterpart, the JICA Experts implemented on-site instruction to the WTP operators to fill in the form repeatedly.

In order to ensure more accurate recording, training materials were prepared for filling in the operation and inspection record forms and tests were also conducted. Through these activities, an operation recording system was established, but challenges remain. Recording in the forms continue to require major improvement.

(9) Installation of pulse loggers to confirm transmission and distribution water volume data

Transmission and distribution volumes at the grant aid project facilities are manually recorded hourly by the shift operators. However, records by operators cannot be used as basic data for considering pump operations because of missing or incorrectly filled out records.

A pulse logger was connected to the transmission flow meter in the WTP and the distribution flow meter in the Parliament reservoir to establish a system that enables

continuous flow data to be obtained. The data can be easily downloaded to a PC. The flow data can accurate data can be analyzed to plan pumping operations for water delivery and distribution.

(10) Installation of network cameras

The reservoir and elevated water tanks constructed under the grant project are located at a separate location from the water purification plant. As they were not automatically controlled, communication between the water treatment plant and the reservoirs, such as the start and stop of water supply and the adjustment of the amount of water supplied, was carried out via telephone. This was an inefficient method and caused problems such as overflow from the reservoir.

In response, an internet and network camera were installed in the water distribution ponds, and a system was established to enable real-time remote monitoring of water levels in the distribution ponds, elevated water tanks and water distribution volumes. This has prevented overflows and enabled efficient operation.

(11) Establishment of TFS and PTS Operations Models Considering Local Conditions

SSUWC has been operating two TFS and two PTS facilities. Initially managed by the JS and HQ, due to lower than anticipated revenue generated through direct operations, the management of the facilities was outsourced to private companies. Despite the increased revenue under private management, SSUWC faces challenges in managing the operation of 120 PTS and 8 TFS, given limited human resources.

SSUWC discussed management methods used in Uganda and neighboring countries during the third-country training. Leveraging private operators for management was deemed suitable. Considering the large number of facilities, it was decided to divide the management tasks among multiple entities. The approach of combining TFS and PTS for outsourcing was chosen, with segmentation into manageable regions. The number of PTS in a region was determined based on anticipated revenue, geographical coherence, and feasibility of management.

(12) Data Management using Online Cloud Storage Services

The Juba Station does not have an Internet server, and data and documents are stored on individual PCs or on paper, so there is no information or data sharing. In addition, various operation and management manuals and SOPs were not managed, and it was time-consuming to locate the same.

Therefore, Internet was installed at Juba Station to enable data sharing within the SSUWC organization, between SSUWC staff and JICA Experts. An online cloud storage service was utilized to facilitate information sharing, taking into account its ongoing use beyond the completion of this project. As a result, the data sharing system was established through an online cloud storage service.

Communication has been facilitated as experts were able to check and instruct on shared data online in the Absence of JICA Experts. In addition, a smartphone app enabled easy access to questions, instructions and consultations.

(13) Swift Sharing and Maintenance Response for TFS and PTS Issues via WhatsApp Groups

TFS and PTS maintenance issues are shared in weekly and monthly reports, this method can lead to delayed responses, necessitating timely solutions.

To address this, a WhatsApp group was formed, consisting of SSUWC HQ' management personnel, technical officers, the JS's manager, water distribution engineers, Revenue Department staff, WQ staff, and representatives from private operators. This group enables daily exchange of information, problem reporting, repair requests, and more.

(Project Period: From March 2022 to February 2025, Team-2: From March 2022 to August 2023).