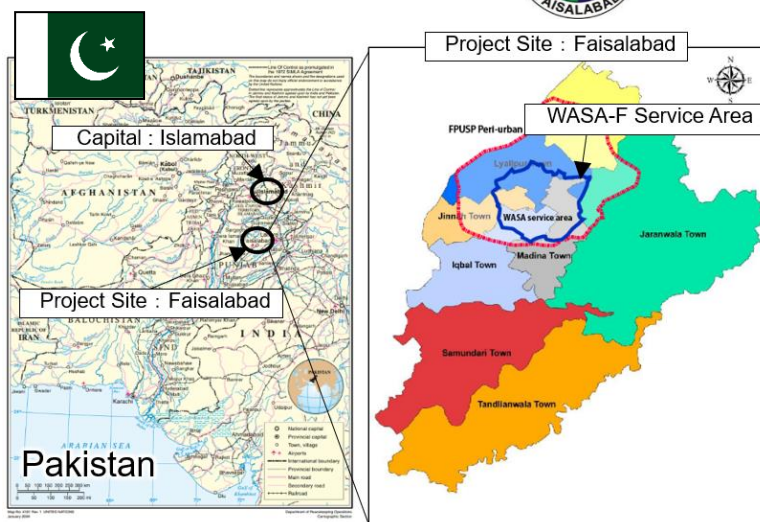


THE PROJECT FOR IMPROVEMENT OF MANAGEMENT CAPACITY OF WATER SUPPLY SECTOR IN FAISALABAD IN ISLAMIC REPUBLIC OF PAKISTAN

APRIL 2023



1. Project Background and Issues

1.1. Necessity of Management Capacity Improvement of the Water Supply Sector in Faisalabad

Faisalabad City in the Islamic Republic of Pakistan (hereinafter referred to as "Pakistan") has a population of 3.2 million and is the third most populous city in the country. Water supply services responding to the expansion of urban areas and increase in population are not being sufficiently provided in the city. It is a city where there is a particularly high requirement for improvement in the water supply sector.

The main issues facing the Water and Sanitation Agency, Faisalabad (hereinafter referred to as "WASA-F") are as follows:

- Low water service level: low customer satisfaction due to low water pressure, short water supply time, and low water quality
- Budget shortage due to low water tariff setting and collection rate
- Low operation rate due to budget shortage

- Residents' dependence on groundwater and low water service usage rate

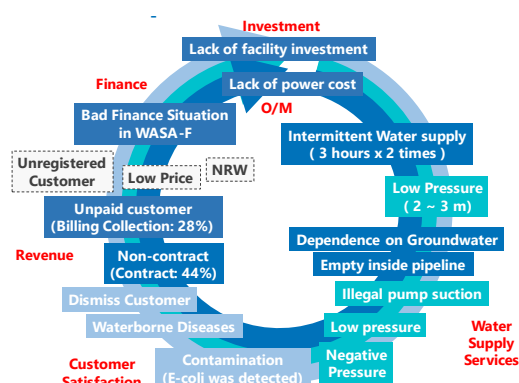


Figure 1 Vicious Spiral of WASA-F

Due to the low level of water supply services, residents are not satisfied with the services provided by WASA-F, and as such, there are many unpaid water tariffs. The water service usage rate is also declining as more residents have their own well and use groundwater and bottled water for their daily needs. As a result, WASA-F is not able to obtain enough revenue and thereby secure the necessary operation and maintenance (hereinafter referred to as "O&M") expenses. As a

result, a vicious cycle develops in which revenue does not increase and the level of service for water supply is reduced even further.

This project was planned to solve these problems and improve the management of WASA-F. Since other cities also have similar problems, it is assumed that the results of efforts in Faisalabad will be horizontally deployed to other cities.

The project will be divided into Phase 1 and 2. Phase 1 from February 2022 to April 2023 was completed and Phase 2 is implemented from May 2023 to February 2026.

1.2. Project Purpose and Activity

Overall Goal of the project: **“WASA-F's water supply business management situation is improved.”**

Project Purpose is **“The capacity of WASA-F that implements efforts aimed at improvement of business management is enhanced.”** To achieve these goals, this project lists the five expected outputs shown in **Table 1**:

Table 1 Expected Output

| No | Expected Output |
|----|--|
| 1 | The ability of WASA-F to formulate and execute water supply service improvement plans is strengthened. |
| 2 | The execution capacity of WASA-F for improving the efficiency of business operations is strengthened. |
| 3 | The ability of WASA-F to carry out customer-related work to increase revenue is strengthened. |
| 4 | The ability of WASA-F to improve finances is strengthened. |
| 5 | The ability of WASA-F to create Business Improvement Plan is strengthened. |

2. Approaches to Problem Resolution

2.1. Effective Project Implementation based on Cluster Strategy

JICA has set the Global Agenda "Sustainable Water Resources Management and Water Supply" as an strategic areas of its support and is promoting the Cluster Strategies 'Supporting the growth of water utilities'. In many water utilities in developing countries, citizen dissatisfaction due to the low service

levels, lack of trust in water utilities, inefficient business operations, and insufficient funds are often observed in vicious cycle. This Cluster Strategies aim to improve the operation and management of water utilities to put them on a growth trajectory by turning the vicious cycle into a virtuous cycle of improved service, more efficient operations, securing tariff income, and securing investment. Water service and management in Faisalabad are also entangled in a vicious circle, and the project aims to turn it into a virtuous circle based on a cluster strategy.

In Faisalabad, JICA experts were dispatched to WASA-F, and support for the creation of the Master Plan project (hereinafter referred to as the “M/P project”) was implemented. Based on the water supply development plan formulated in the M/P project, assistance was started with the aim of improving services and management through synergistic effects, with facility development through grant aid and this project.

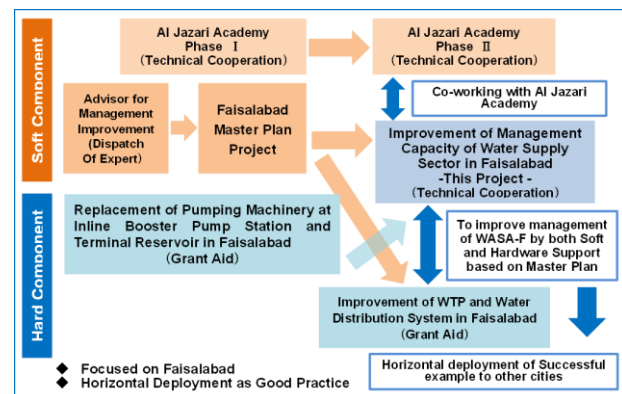


Figure 2 Flow Diagram of Japanese Support for Pakistani Water Sector

In addition, a technical cooperation project “the Project Improving the Capacity of WASAs in Punjab Province” (hereinafter referred to as “the Academy Project”) to strengthen the capacity of WASA in five cities in Punjab is underway, and synergistic effects with this project are expected.

Faisalabad's water sector project is being developed not only by Japan, but also by Agence Française de Développement (hereinafter referred to as “AFD”), and United Nations International Children’s Emergency

Fund's (hereinafter referred to as “UNICEF”) water well rehabilitation project is underway.

In this way, the main theme of activities is to produce synergistic effects in cooperation with other Japanese assistance projects and projects by other donors.

The next section describes the activities related to strengthening the capacity of WASA-F, which are planned in this project, for each output.

2.2. The ability of WASA-F to formulate and execute water supply service improvement plans is strengthened (Output 1)

In Output 1, setting standards for water supply services, selecting priority areas, formulating plans, and carrying out necessary construction, operation, and maintenance work are implemented with the aim of improving water supply services.

Through this series of activities, it is aimed that WASA-F improve its ability to independently formulate water supply service improvement plans and to improve its ability to implement plans.

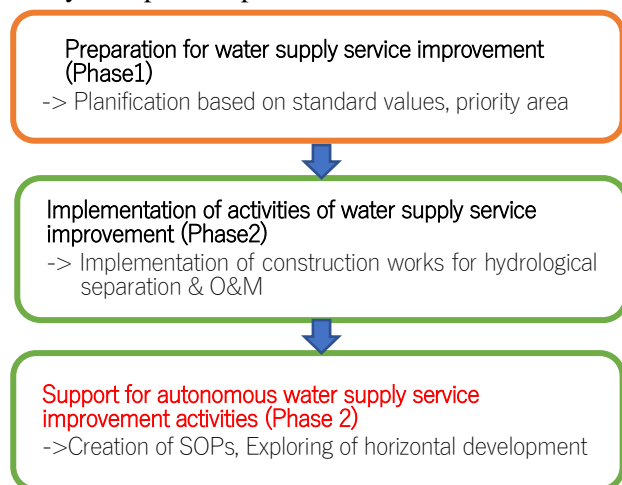


Figure 3 Flowchart of Output 1

As a specific method, as shown in the **Figure 4**, it is planned to establish a distribution management area that satisfies the standard values, such as securing the water pressure. (Hydrologically separate the pipelines in priority areas from the pipelines in other areas, e.g., by putting valves in the boundary pipes to separate them). In Phase 1, a plan aimed at improving the water supply

service will be formulated, and in Phase 2, construction work, and operations, maintenance, and management will be carried out to actually promote improvements in line with the content of the plan in Phase 1.

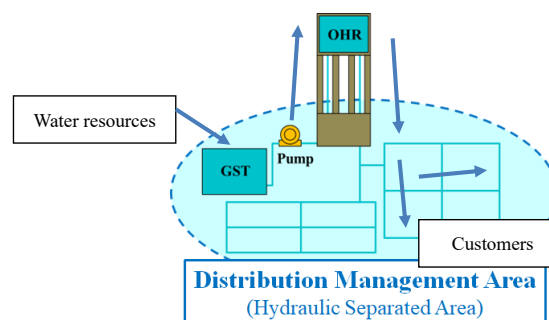


Figure 4 Image of water distribution management

2.3. The execution capacity of WASA-F for improving the efficiency of business operations is strengthened (Output 2)

In Output 2, the JICA Expert Team (hereinafter referred to as “JET”) analyzes the necessary efforts to improve the operational efficiency of WASA-F and determine the items and measures to implement.

In addition, efforts are made to reduce power costs for pump equipment, etc., which account for most O&M costs, to make effective use of existing water supply facilities, to improve the efficiency of various operations, and to organize manuals, Standard Operating Procedures (hereinafter referred to as “SOPs”), and forms for daily reports.

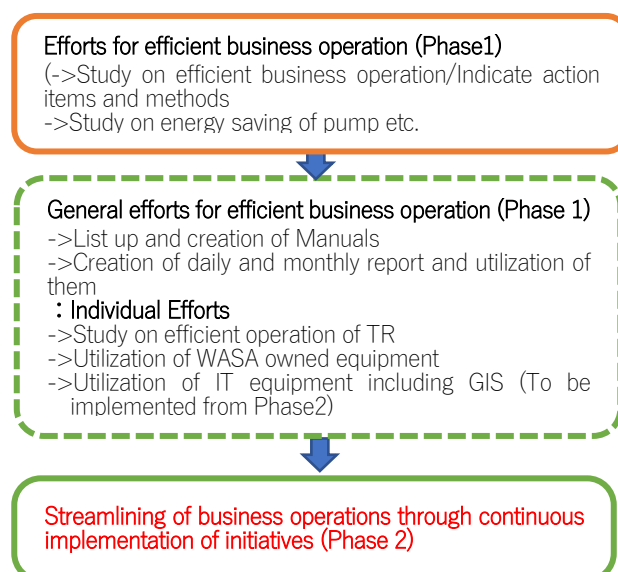


Figure 5 Flowchart of Output 2

Through this series of activities, it is hoped that WASA-F could improve the efficiency of their operations through the effective use of IT systems, streamline its business operations, and reduce its O&M costs.

2.4. The ability of WASA-F to carry out customer-related work to increase revenue is strengthened (Output 3)

In Output 3, a revenue increase activity plan will be formulated through understanding the current status of customer-related work that would lead to a revenue increase for WASA-F. This plan aims to increase revenues from two perspectives: improving the rate of charge collection and increasing the number of customers.

In addition, in order to promote the "transfer to metered tariff system (install water meters in each house and collect water tariff according to water consumption volume)", specification of meter to be installed, customer ledgers, meter reading and billing methods, and public relations/ awareness plan are organized.

Through this series of initiatives, it is hoped that WASA-F will increase income while developing trusting relationships with customers.

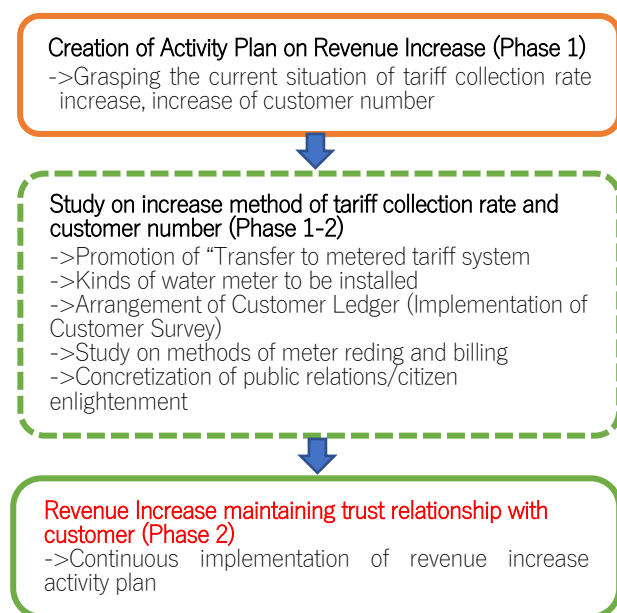


Figure 6 Flowchart of Output 3

2.5. The ability of WASA-F for financial

improvement is strengthened (Output 4)

In Output 4, capacity building for the financial improvement of WASA-F is carried out as part of efforts to become an independent entity in the future.

Specific initiative includes, preparing financial statements (balance sheet, profit and loss statement, and cash flow sheet) on a trial basis.

In addition, separate accounting is calculated for each water supply and sewage works, the unit costs of water supply and sewage works are calculated, and appropriate tariff levels are calculated based on the examined results and the estimated unit costs.

Through this series of activities, it is aimed that WASA-F would properly grasp the financial situation and promote financial improvement accordingly.

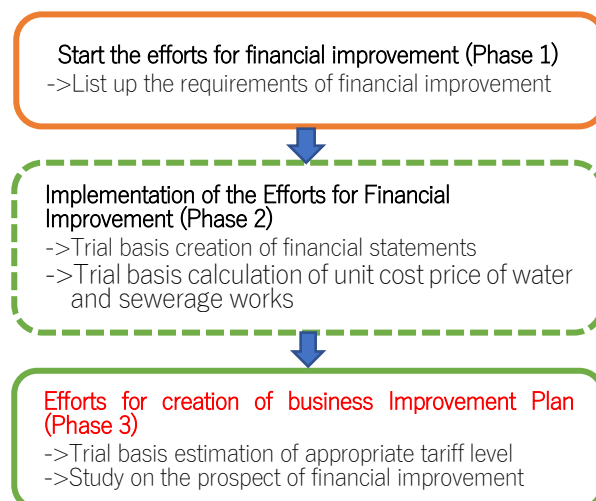


Figure 7 Flowchart of Output 4

2.6. The ability of WASA-F to create Business Improvement Plan is strengthened (Output 5)

In Output 5, based on the activities of Outputs 1 to 4, a business model, a mechanism to promote management improvement, is considered, and a management improvement plan for steadily implementing the model is formulated and implemented, with the aim to strengthening the capacity of WASA-F to formulate a management plan.

Specifically, it is aimed to consider and develop the business model together with WASA-F staff and with a common understanding, formulate a business

improvement plan that includes specific schedules, activities, and target values for its realization, and support implementation of WASA-F.

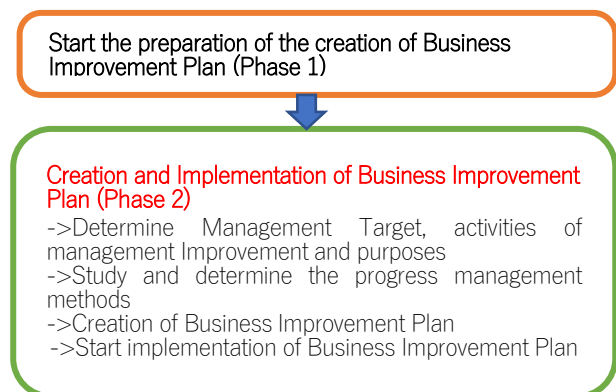


Figure 8 Flowchart of Output 5

3. Results of Applying these Approaches

Based on the planned approach, the following activities were implemented for each output:

3.1. Output 1

(1) The standard value for water supply service improvement is decided (Activity 1-1)

The following points were considered when setting the standard values.

- 1) The design criteria for the Government of Punjab stipulates a minimum water pressure of 12 m.
- 2) The minimum water supply time secures the required water pressure of 12 m according to the demand, and it is necessary to supply water for 10 hours or more to secure a water pressure of 12 m or more.
- 3) The water quality needs to improve following the World Health Organization (hereinafter referred to as “WHO”) Guidelines for drinking-water quality.

To set each standard, hydraulic calculations (refer to Activity 1-3) were implemented. As a result, it was found that at Peoples Colony, for example, if the water supply time is 8 hours or more, it is possible to secure a water supply pressure of 12 m or more.

Based on the above points, **Table 2** shows the standard values in priority areas in the Project, which have agreed

with the WASA-F.

Table 2 Standard values in priority areas of the Project

| Item | Value | Remarks |
|----------------|---------------------------|---|
| Supply hour | 8 hours | hydraulic calculations were implemented |
| Water volume | 40 gal/c/d (182 L/c/d) | Standards of Government of Punjab |
| Water pressure | 12 m | Standards of Government of Punjab |
| Water quality | R. Chlorine >0.1 mg/L | WHO guideline value |

(2) Priority areas aimed at improving water supply services are selected (Activity 1-2)

Selection of the priority areas was conducted from a fair perspective, such as effective use of existing facilities and payment status of customers.

In addition, it was found that in districts where water supply services were improved in pilot projects implemented in previous M/P projects, there has subsequently been a decrease in water supply hours and a decrease in water pressure. Therefore, it was decided to restore good services in these areas together with the priority areas,

Furthermore, the pilot project areas were independent small areas, which increased the sense of unfairness of water supply services among neighboring residents. To curb this sense of unfairness, it was decided to take into account that the service could be improved on an aerial basis by the pilot projects where improvements have already been made and the projects funded by Japanese grant aid where improvements will be implemented in the future.

From the above viewpoints, two priority areas were selected: Peoples Colony No.2 C block and Madina Town X block, as shown in **Figure 9**.

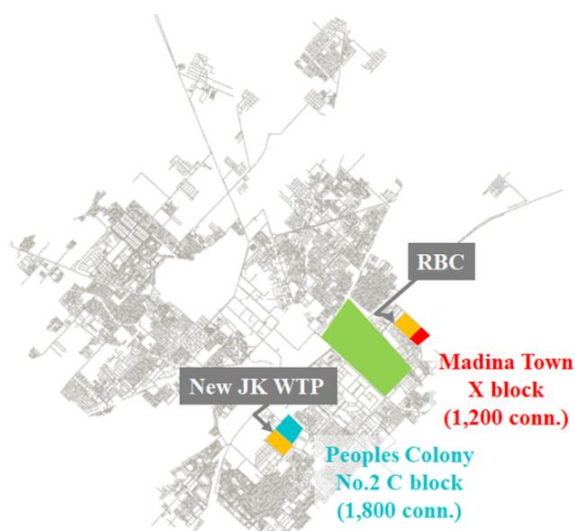


Figure 9 Selection of priority area

(3) A water supply service improvement action plan for the priority areas is created (Activity 1-3)

The water supply service improvement action plan was formulated to develop water distribution management area in the priority area (Activity 1-2) based on the standard (Activity 1-1). **Table 3** shows the outline of action plan in the phase 1.

Table 3 Outline of action plan in phase 1

| Items | Contents |
|--|--|
| Current water distribution management | - Water distribution management in the priority areas was summarized and reviewed in the M/P project. |
| Improvement of water distribution management | - Set standard value (water pressure, water supply time and water quality) by hydraulic calculation. - Set length of installation pipes in the construction |
| Construction plan and cost estimates | - Implementation of cost estimate - Set construction period |
| Operation and Maintenance | - Formulation of O&M to set standard values. - Calculation of O&M cost. |
| Billing collection | - Set the necessary number for the installation meter. |

To facilitate the understanding of the WASA-F staff regarding hydraulic calculations, an online workshop on water distribution management was held at the end of January 2023, and an OJT workshop was held in

February 2023 (Photo 1). In the next phase, hydraulic calculation in the priority area will be facilitated to develop WASA-F's capacity.

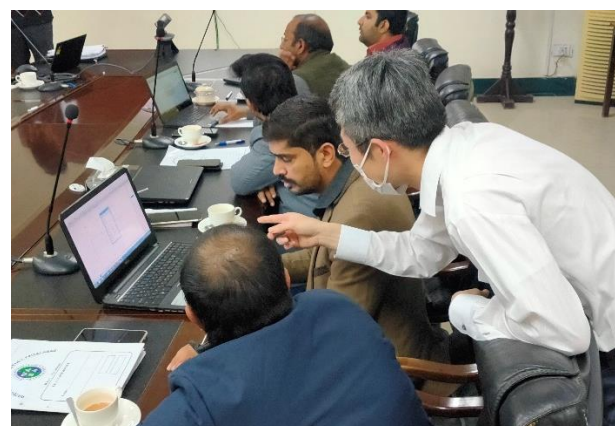


Photo 1 Mini Workshop

3.2. Output 2

(1) Efforts to improve business operation efficiency is examined, and the items of efforts and measures are shown. (Activity 2-1)

This activity analyses and determines the measures needed to improve the efficiency of WASA-F's business operations. First, the operation and implementation status of key facilities was checked. Based on the results, it was confirmed that the planned activities 2-2 to 2-7 listed in **Figure 10** were appropriate, and the activities were carried out while refining their content. Activities 2-2 to 2-7 are intended to be implemented not independently, but in conjunction with each other in order to achieve enhanced synergy effects.

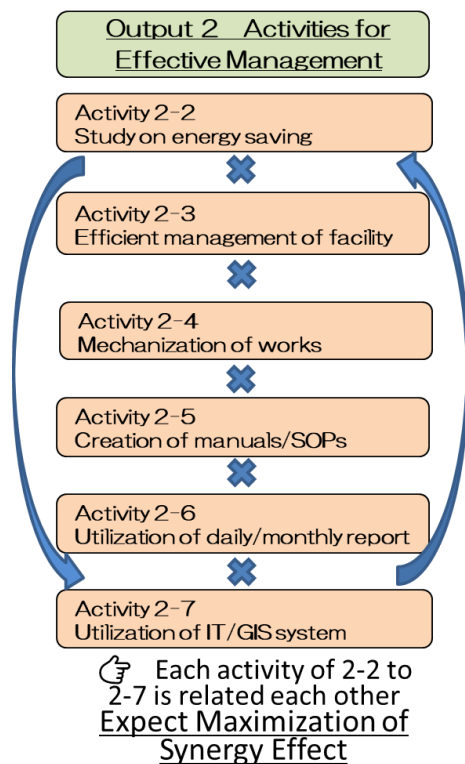


Figure 10 Image of synergy effects of each activity

(2) Efficient facility management through proper operation and management of pump equipment, etc., is examined, and improvement methods are proposed. (Activity 2-2)

In considering energy saving and efficient operation, Terminal Reservoir (hereinafter referred to as “TR”)-related facilities were firstly selected as target facilities in view of its importance. However, it was confirmed from the current operating data that there is little room for further energy conservation. JET examined the results of the energy efficiency audit and proposals previously made by WASA-F and confirmed that feasible measures had already been implemented. The quality of the power supply (voltage, current, power, etc.) was investigated using special equipment and it was confirmed that the installed Phase-advanced capacitors were not being utilized. The utilization of the Phase-advanced capacitors was proposed, as their utilization would reduce the reactive power not used by the equipment and lead to increased efficiency.

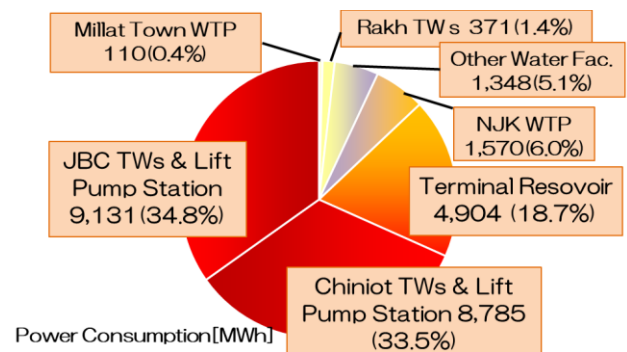


Figure 11 Electricity consumption of WASA-F water facilities (Jul-21 to Jun22)

(3) Utilization of existing facilities for the purpose of efficient business management is considered, and measures for it are proposed (Activity 2-3)

The O&M situation of TR and related facilities was analyzed. It was confirmed that it is necessary to extend the operating hours of TRs and secure water sources to increase the operation rate of TR-related facilities.

(4) Improvement of work environment and efficiency through mechanization of work are examined, and on-site work using the improved method is carried out on a trial basis (Activity 2-4)

A survey was carried out on the current condition of sewers and pumping stations in the area and surroundings where sewage overflows had occurred due to the increase in water supply under the improvement of the water supply service. As a result, sewers that could be subjected to a trial cleaning operation using appropriate mechanical methods were selected earlier than expected. In addition, with the cooperation of the O&M office of WASA-F, trial basis sewer pipe cleaning using proper method with machinery was implemented earlier than planned. Since WASA-F does not have a TV camera to check the inside of the sewer pipe, it was decided to carry out this activity in collaboration with the Academy Project by co-using the above instrument. A comparative check of the pipe’s internal conditions was conducted with WASA-F staff between pre- and post-operation.



Photo 2 Trial of Sewage Pipe Cleaning Work

(5) For the purpose of improving business operation efficiency, manuals and SOPs required for the entire WASA-F business are listed, and SOPs with high priority are created (Activity 2-5)

As a result of the survey, it was found that operation manuals and equipment manufacturer manuals provided by some donor projects were being stored but those manuals, including drawings, were not utilized and SOPs were not created/utilized. The reason why it was not utilized was that the implementation of the work was left to the site and was carried out only by experience. As a result, problems such as not being able to properly implement work and improvement cannot be expected, and not being able to respond appropriately when a failure or malfunction occurs are expected. Therefore, in this project, we will involve the person in charge at the site in the creation process and develop and utilize the manual/SOP to solve these problems and improve the efficiency of project management, which is the purpose of Output 2.

Manuals/SOPs necessary for WASA-F work related to the project were listed shown in Table 4..

Table 4 Results of the baseline survey of Manuals/SOPs

| Output | Facility / Works | Preparation Status | Priority |
|----------|---|--------------------|----------|
| Output 1 | GR/OHR – Priority areas | × | ○ |
| | Distribution pipes – Hydraulic separation | × | ○ |
| | House connection / Meter installation | ○ | Low |
| | Water meter management | × | ○ |
| | Water meter reading | ○ | Low |
| | Construction SV -Pipe installation | × | ○ |
| | Construction SV -WASA supervisor | × | △ |

| | | | |
|----------|-------------------------------------|---|---|
| | Construction SV -Safety management | × | △ |
| Output 2 | TR Pumping stations | × | ○ |
| | In-line Pumping stations | × | △ |
| | Tube wells Pump facility | × | ○ |
| | GR/OHR | × | △ |
| | Sewage Pumping stations | × | △ |
| | Sewer pipes O&M | × | ○ |
| | NJKWTP - AFD | ○ | △ |
| Output 4 | Preparation of financial statements | × | △ |

(6) Work efficiency improvement is considered and started by creating and utilizing work / business records such as daily reports and monthly reports (Activity 2-6)

A series of surveys was conducted on the current status of the preparation of operation records such as daily/monthly reports for WASA-F. While most of the offices were creating only handwritten daily reports, a couple of offices were using mWater, a data management platform, to digitize daily reports and create weekly/monthly reports.

As a trial-run, the applicability of mWater to this Project related works will be examined in some offices. By digitization of daily work/ operation reports, it becomes easier to create monthly/annual report and allows not only field staff but also management and administrative staff to have a better understanding of the current situation, which is extremely meaningful results to be expected.

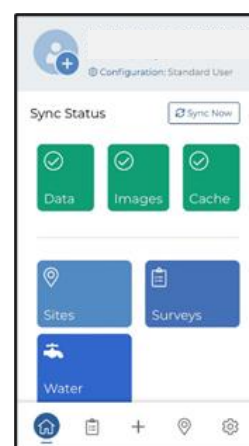


Figure 12 Utilization of mWater

Table 5 Current Status of Daily and Monthly Reports

| Facility etc. | Current Status | Priority |
|-----------------------------------|--|----------|
| ◇Facility related items | | |
| TR Pumping Stations | Handwriting daily reports/ Sum up to monthly reports | ○ |
| In-line Pumping Stations | Handwriting daily reports/ Sum up to monthly reports | △ |
| Tube wells Pump | Handwriting daily reports/ Sum up to monthly reports | ○ |
| GR/OHR- Other than Priority Areas | Handwriting daily reports | △ |
| Sewage Pumping Station | Handwriting daily reports | △ |
| Sewer pipes O&M | Handwriting daily reports (need to be verified) | ○ |
| ◇Customer related items | | |
| Measures for arrears | Daily/Monthly reports using mWater | × |
| Measures for potential customers | Studying of digitalization using mWater | ○ |

3.3. Output 3

(1) Establishment of revenue increase plan

The structure of revenue increase plan in the priority area is defined so that the objectives of each activity are clear.

Specifically, activities 3-2 to 3-9 of Output 3 are organized by purpose. As shown in **Figure 13**, it is proposed to categorize them into “(A) Improvement of tariff collection rate” and “(B) Increase customers”. As a result, the objectives achieved through each activity were clarified, and understanding within WASA-F was promoted.

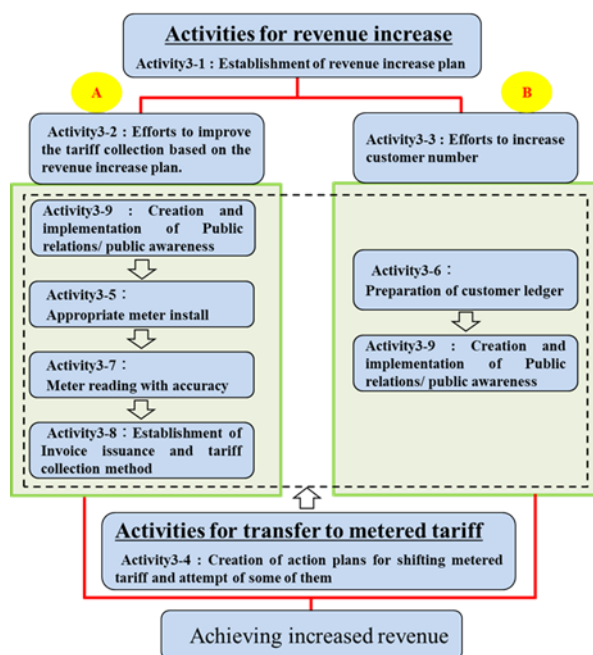


Figure 13 Activities by purposes

(2) Effort to improve the tariff collection rate and meter reinstallation

A customer needs survey was conducted targeted a total of 500 households, with 250 households selected from each of the two-priority area. The contents of the survey included the basic information of each family, the water supply situation, and requests to WASA-F.

To accurately understand customer needs, the survey included a predefined list of requests to WASA-F services, allowing respondents to select multiple options. **Table 6** presents the combined survey results for both areas, indicating that customers are dissatisfied with the level of water supply service in terms of water quantity, water pressure, and water quality.

Therefore, improving the water supply service, specifically addressing issues related to water quantity, water pressure, and water quality, is essential to enhance customers' willingness to pay.

Table 6 Requests in customer needs survey

| Contents of requests | No, | Percentage (%) |
|---------------------------|-----|----------------|
| Increase water pressure | 218 | 43.6 |
| Odorless water | 184 | 36.8 |
| Increase water volume | 162 | 32.4 |
| Water without turbidity | 159 | 31.8 |
| Longer water supply times | 122 | 24.4 |
| Quick leak repairs | 46 | 9.2 |
| Reasonable tariff | 32 | 6.4 |
| Improved staff competence | 9 | 1.8 |
| No answer | 6 | 1.2 |

| | | |
|--------------------------|-----|-------|
| Total number of requests | 938 | — |
| Number of surveys | 500 | 100.0 |

As for the payment amount, a comparison of **Figures 14 and 15** shows that many customers are willing to pay more than the current amount if the water supply service is improved. The survey clearly shows that it is necessary to carry out awareness-raising activities amongst customers, as the provision of good water supply services requires appropriate tariff payment.

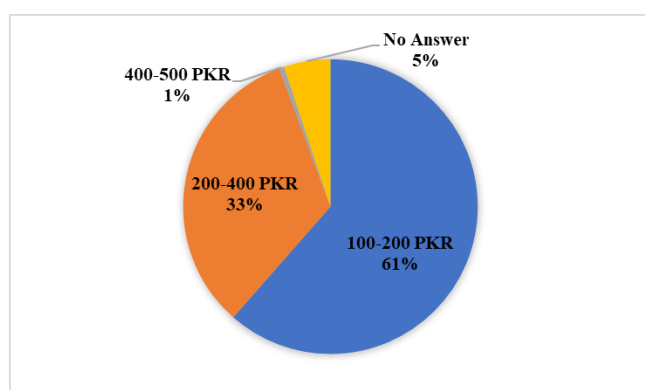


Figure 14 Tariff Payment for one month

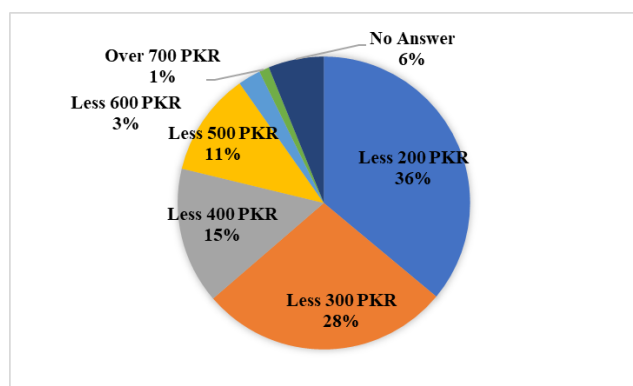


Figure 15 Amounts that may be paid after improved water supply service

To maintain the metered tariff system implemented in the M/P project in the pilot area, WASA-F re-installed meters for customers who had lost their meters. At the same time, awareness-raising activities related to meter management, etc., were carried out. In Phase 2, WASA-F will explore practical activities to encourage the improvement of tariff collection rates.



Photo 3 Activity in the pilot area

(3) Effort to increase the customer number and Preparation of customer ledger

A survey of all households in the priority district was conducted to understand the current situation of unregistered customers. In Madina Town 90 units were found to be unregistered customers, and in Peoples Colony, 244 units were found to be unregistered customers. Total 334 units were registered, and number of customers was corrected.

In Phase 2, after improving the water supply service in the priority districts, WASA-F will conduct a campaign to increase the number of customers targeting uncontracted potential customers. In non-project areas, WASA-F and JET have established a policy to increase the number of customers targeting the residents who already have secured appropriate water pressure.

3.4. Output 4

(1) Requirements and activities for financial improvement aimed at becoming an independent business entity are selected (Activity 4-1)

Although WASA-F carries out annual budgeting, it does not prepare the three financial tables. In this project following two issues were identified:

The first is the issue of conducting an elaborate financial analysis. Although WASA-F have an accounting system, there are some issues, such as a deficiency of manuals, unbalanced financial information, no input of data before system implementation, etc.

The second is the identification of challenges as a result of the financial analysis. As the financial statements have not been prepared, JET could not get the latest and most reliable information. Therefore, it is hard to take up issues specifically. Using the three provisional financial tables prepared through Activity 4-2 and the separate accounts for water and wastewater services and appropriate water rates considered through Activities 4-3 and 4-4, specific issues will be identified in the second phase. In the process of addressing the issues identified as a result of the financial analysis, medium-term income and expenditure estimates and financial improvement prospects will be examined, which is the content of Activity 4-5.

(2) A trial calculation of accrual accounting, including the creation of three financial tables and an asset ledger, and the calculation of depreciation are carried out in the limited range where data is available, and their necessity is confirmed. (Activity 4-2)

In the first phase, efforts were made in three areas: Preparing the creation of three financial tables & the fixed asset ledger, confirming the financial capacity of the staff, and calculating the three financial tables by trial basis.

As there are some problems regarding accuracy and comprehensiveness, therefore, it was decided to first narrow down the list to the most important accounts, then set the assumptions for trial calculations for each account, and then attempt a trial calculation of the three financial tables. Configuration of financial model for trial calculation is shown in following **Table 6**.

Table 6 Configuration of the WASA-F financial model

| Name of each sheet | Contents |
|--------------------|--|
| A. Note | Basic information, including an explanation of abbreviations in the relevant financial model |
| B. Assumption | List of assumptions and reference sheets for each account |
| C. FS Summary | Information summarizing the DFS sheets, with a minimum number of accounts |

| Name of each sheet | Contents |
|-----------------------|--|
| D. FS | Three financial statements |
| E. [Master]Actual | Data summarizing budgetary results |
| F. Sensitivity | Sensitivity analysis (to be updated in phase2) |
| 10. Bank | Bank Balance data |
| 20. AR | Trend in Revenue and Bills Receivables (Account Receivables) |
| 21. Demand Collection | Processed data output from Billing System |
| 30. FA/WIP | Trend in Fixed Assets, Work in Progress and Depreciation |
| 31. Aggregation | Compiled data from project list |
| 32. Dep Rate | Depreciation rate list based on audit reports |
| 35. Capex | Trend in Capital Expenditure (To be updated in phase 2) |
| 40. Other Assets | Trends in Other Assets (To be updated in phase 2) |
| 50. AP | Trends in Account Payables (To be updated in phase 2) |
| 60. Loan | Trend in Long Term Loans |
| 61. Punjab Govt. | Trend in Loan from Govt of the Punjab Lahore |
| 70. Grant & Other PL | Trends in Grant and other PL accounts |

(3) Separate accounting is calculated for each water supply and sewage work, and the unit costs of water supply and sewage work are calculated (Activity 4-3)

WASA-F implements water supply and sewerage services, and the separation of the two accounts is necessary to know the appropriate level of tariff for each service. However, both accounts are treated as one, and it is currently difficult to separate the accounts for the water and sewerage portions relying on the accounting system. There are no clear rules or assumptions regarding the allocation of the co-management part and indirect costs. In the three financial tables calculated in the first phase, costs are not broken down by the water and wastewater works. In the second phase, the first step will be to separate water and wastewater costs according to budget items, so that a rough estimate of historical costs by water and wastewater project can be made.

3.5. Output 5

(1) A business model that is a mechanism to strategically promote management improvement is formulated. (Activity 5-1)

In the pilot activities of the M/P project, it was confirmed that improving water supply service leads to an enhancement in tariff collection rates and customer increase, which, together with metered tariff system through meter installation, results in increased revenue. As shown in **Figure 16**, this system needs to be recognized as a business model for improving management (increase revenue).

In this activity, two brainstorming sessions were held with management layer to develop awareness of the business model and business improvement plan.

The theme of the first meeting was this business model, and it was recognized that revenue increase can be achieved not only by short-term tariff revisions but also by making necessary investments from a medium- to long-term perspective.

In the second session, it was discussed how to horizontally develop this business model and expand the water supply service improvement area. It was recognized that there is the possibility of improving a wider range of services through the development of facilities from water sources supported by Development Partners and the effective use of existing facilities.

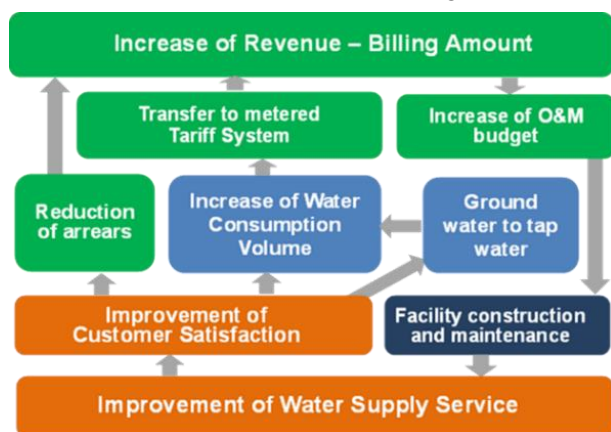


Figure 16 Business Model of WASA-F

4. Creative Solutions and Lessons in Project Implementation

The creative solutions and lessons learned in proceeding with the project are as follows:

- (1) Need for centralized management of water supply facility information

WASA-F, the operator of the water utility, is responsible for the proper management of its own assets, including the related information (Ex: location, material, year of burial, etc.) of water supply pipes.

However, there were many cases where this important information was lost. In response, in this project, site reconnaissance, specifically interviews with people involved in site construction and facility management, was one of the sources of information while giving utmost attention to the lack of credibility.

To address this issue, sharing the recognition of the current situation of information sources among the concerned parties and specify methods for collecting, updating, and accumulating information are needed.

One of the measures will be digitization. For example, the application of mWater, the data management platform introduced by the Academy project, has the potential to promote information management in WASA-F.

(2) Joint work among counterparts

The WASA-F staff, the counterparts of this project, are relatively young with a promising future. Until now, efforts are taken to promote mutual understanding of the current situation and future directions through phase 1 activities and training in Japan.

Each counterpart assigned to a department at Headquarters has the qualifications and abilities suitable for their position in WASA-F, but there is a sense of distance from the field, and it is presumed that they are not fully understanding the intentions of the field.

For the future execution of the project, it is necessary to create opportunities to increase direct interaction with field staff. For example, in Output 1 (construction work is scheduled to be implemented in Phase 2), each counterpart will be asked to visit the site directly to increase contact with field staff.

It is presumed that the ability improvement can be supported by gaining practical experience in the field and jointly gathering information hidden in the field.

(3) Responses based on an understanding of the WASA-F organizational structure

In promoting the improvement of sewage pipe cleaning methods (Activity 2-4), it was felt that it would be difficult for the O&M office to try the improved sewage pipe cleaning methods alone.

Since flooding from sewage pipes during the monsoons is an urgent issue for WASA-F, JET explained the importance of this activity to the Managing Director (MD) and Deputy Managing Director (DMD) and obtained their consent.

In the meeting that followed, the DMD visited the O&M East office, confirmed the plan with the participation of all concerned parties, from the Director to the Sub-Engineer, and decided to implement it.

It is presumed that the project cannot proceed with only field staff or management staff alone.

In Output 5, JET first discussed with the management staff the way of thinking related to the management planning policy. As a next step, the discussion involving the staffs who actually carry out the work should be required.

(4) Importance of Manuals/SOPs

WASA-F has not been proactive in preparing manuals/SOPs. Manuals stored at pumping stations, etc. are fragmentary documents and drawings provided by contractors and consultants without being listed.

Through this activity, it is speculated that the awareness of the potential for diversion and development from visualization through the digitization of data and the importance of maintaining SOPs and periodic inspection sheets among related parties has deepened, which leads to the effective use of manuals and SOPs created in this project.

(5) Digitization

In the WASA-F, the daily operation reports and work records were all handwritten. Management level staff such as directors do not see the daily report, so they cannot grasp the current situation. Even if there is a problem with the accuracy of the data, it is difficult for

them to understand and dealt with the accuracy problem because the data is not openly shared.

Currently, there is a movement to use mWater, a data management platform introduced by the Academy Project, in WASA-F's own activities, and this project has begun to support its use.

The digitization of field information can be easily used to create monthly/annual reports and lead to visualization of information, which contributes to grasping the current situation not only for field staff, but also for supervisory staff such as directors.

In Japan, for example, the heads of water treatment plants and water quality laboratories regularly check the monthly report (even before digitization) and grasp the current situation.

(6) Preconceptions about power/operating costs

Regarding the NJK water treatment plant, which was constructed using the rapid sand filtration method with AFD's grant aid, the operation rate of the facility remained at 48%, even though its operating costs, such as electricity consumption, are lower than those of other well water sources.

During the survey, it became clear that WASA has a preconceived notion that the larger the scale of the facility, the higher the cost.

Currently, WASA owns many facilities with low operating rates, but in the future, when increasing the water supply, it is recommended that WASA carefully examine the effects of increased electricity consumption, operating costs, and the amount of supply rather than making preconceptions and determining priority.

(7) Collaboration with other projects

WASA-F did not own a TV camera to check the sewer pipes before and after the work. For this trial, it was decided that the equipment owned by the Academy Project, supported by the Project for Improving the Capacity of WASAs in Punjab Province Phase 2, was

utilized. This has led to link 2 technical cooperation project activities and make effective use of equipment.

(8) Importance of customer ledger maintenance

As a result of conducting a customer survey for all households to create a customer ledger, it was found that there were many unregistered customers who used the water supply but did not pay the bill.

WASA-F staff in charge did not realize the importance of increasing revenue by accurately identify the customers and collecting bills.

It is presumed that through this activity, they have deepened their awareness of the importance of improvement of tariff collection rates by maintaining customer ledger.

[Project implementation period]

Phase 1: February 2022 - April 2023

Phase 2: May 2023 - February 2026 (planned)