CHAPTER 9

PROPOSED SOLUTIONS FOR WATER SUPPLY SERVICES IN UZBEKISTAN

Chapter 9 Proposed Solutions for Water Supply Services in Uzbekistan

One of the most important issues in operating water supply services is to eliminate the areas where has not been served with water supply services. Since its independence in 1991, various projects have been undertaken to promote water supply services at the level of the government, the local government and the people concerned with water supply services. According to the government, the area served with water supply services in nationwide was 30,000 in the beginning of 1990 and the area was expanded to beyond 50,000 in the end of 1999. The networks of water supply services were especially expanded into rural areas.

Another important issue is to establish a managerial foundation under a market economy, which enable to continuously supply necessary volume of water with certain water pressure and quality. Therefore, as mentioned in chapter 2, the people concerned with water supply services have been proceeded with reformation of the aspects in certain systems, such as clarifying the Vodokanals' managerial structure, increases in tariff, a transition towards metered rate system and promotion of meter installation and so forth.

However, there are various problems to be solved for implementing these reformations and certain aspects of the reformation have not been proceeded as planned. The Study Team examined those problems and the solutions for operating water supply services in both Tashkent and Chirchik City. Although elements of these problems may vary depending on each Vodokanal, certain problems must be in common and could be served as a reference for improving Vodokanals' management in other areas. In order to deal with other Vodokanals' improvements, there will be further promotion on improvement of management. It would be grateful if the solutions proposed by the Study Team could contribute to the management of Vodokanals.

Here are the important points to be concerned in promoting managerial solutions nationwide.

9.1 Legal and Institutional Issues

Public service utilities are, in principle, expected by the general public to pursue the augmentation of 1) efficiency, 2) fairness and transparency, and 3) security and stability as their primary management norms rather than to become simply profit-oriented, even under market economy. In the midst of overall structural changes in Japanese society, the Government of Japan in November 1994 issued the following basic principles which public service utilities in Japan are required to follow as their management targets and guidelines for tariff setting.

(1) Completion of rationalization and streamlining of management structure;

(2) Further deregulation of sector administration;

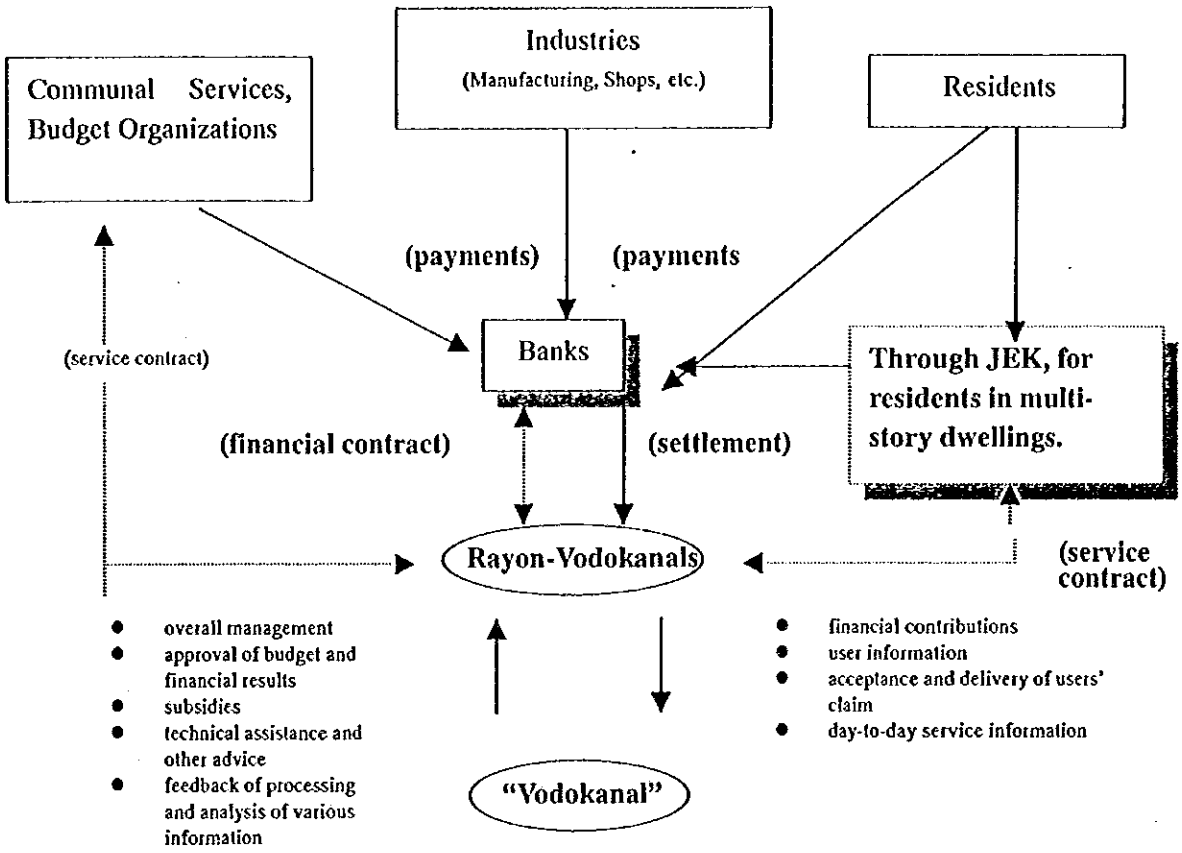
(3) More transparency through a policy of open access to information.

Since potable water supply and wastewater collection are core services to human life, these norms are particularly relevant to water service utilities. The following recommendations have been identified based on the findings during the first and second stages of the field study in 1999, and with due consideration of the basic management guidelines stated above.

9.1.1 Proposed Function of the Rayon-Vodokanals in Tariff Collection

As noted in 3.2.3, the details of the future structure and functions of the Rayon-Vodokanals is not available at the time of writing this report as the plan submitted by the Vodokanal is still under review by the TCMA. However, if implemented, the plan would change each Rayon-Vodokanal into a direct contact place with users whom the staff of Rayon-Vodokanal will be required to attend cordially, providing efficient repair services, notifying users of the necessary information and providing tariff collection services. Complaints from the users should be accepted here in principle at an exclusive reception desk. Regarding the tariff collection system, the new structure and the expected future role of the Rayon-Vodokanals are briefly summarized in the figure below.

Figure 9.1.1 Proposed Collection System in Tashkent City



In Japan, the day-to-day businesses conducted at normal service locations related to water tariff operations are as follows. A conceptual view of communications between the Rayon-Vodokanals and the headquarters is given in the Figure 9.1.2 .

(1) Reading meters and processing water tariffs at the station's window;

(2) Checking meter reading forms and relaying these forms to and from the data processing center;

(3) Preparing new meter reading forms, investigating payment notices not received, making on-the-spot adjustments to water charges and persuading users to switch to an automatic transfer system through banks;

(4) Refunding water tariffs in the case of incorrect or overlapping payments and reducing tariffs in the case of leakage;

(5) Handling overdue bills and the suspension of water supply for users in arrears;

(6) Depositing revenue from the settlement of overdue bills with financial institutions;

(7) Accepting users' complaints and delivering to their headquarters.

As noted already, the water supply service locations in Japan perform work other than water tariff collection, such as repair and maintenance of distribution pipes of small diameter, and installation of water supply services equipment and facilities. It should be noted that establishment and maintenance of service stations involves a large increase in expenses. For each service station in Japan, there are no financial constraints for fulfilling their duties because the service stations as a whole in Japan is like a department of waterworks bureau of a local government, and they do not have separate legal entity. There is no doubt that maintaining many service stations could be a heavy financial burden on local government. Redundancy should always be avoided, and meeting cost vs. benefit needs to be carefully analyzed. In parallel with the reorganization and expansion of the Rayon-Vodokanals, a review of the organization and the functions of JEK seems necessary.

Therefore, a in-depth study is required on the technical and financial requirements for working out future plans to change the Rayon-Vodokanals into self-financing organization eventually in terms of cost recovery and the ability to finance on-going operations and the replacement of equipment. Technical assistance on the introduction of a similar system of that of Japan will be available.

Steps and time required for establishing a service system are expected as follows:

Table 9.1.1 Rough Estimate of Steps and Required Time for the Service Locations

Steps	Time Required
Approval of the Central Government (esp. MOC)	3 months
Approval of the Hokimiyat, including amendment of existing rules	6 months
Preparation of the Budget	6 months
Staff Training	3 months
Rebuilding of existing Rayon-Vodokanals	12 months
(1 month x 12 buildings)	
Public Relations Activities	1 month
Total	31 months

Figure 9-1-2

Tariff Collection On-Line System in Japan Context Diagram

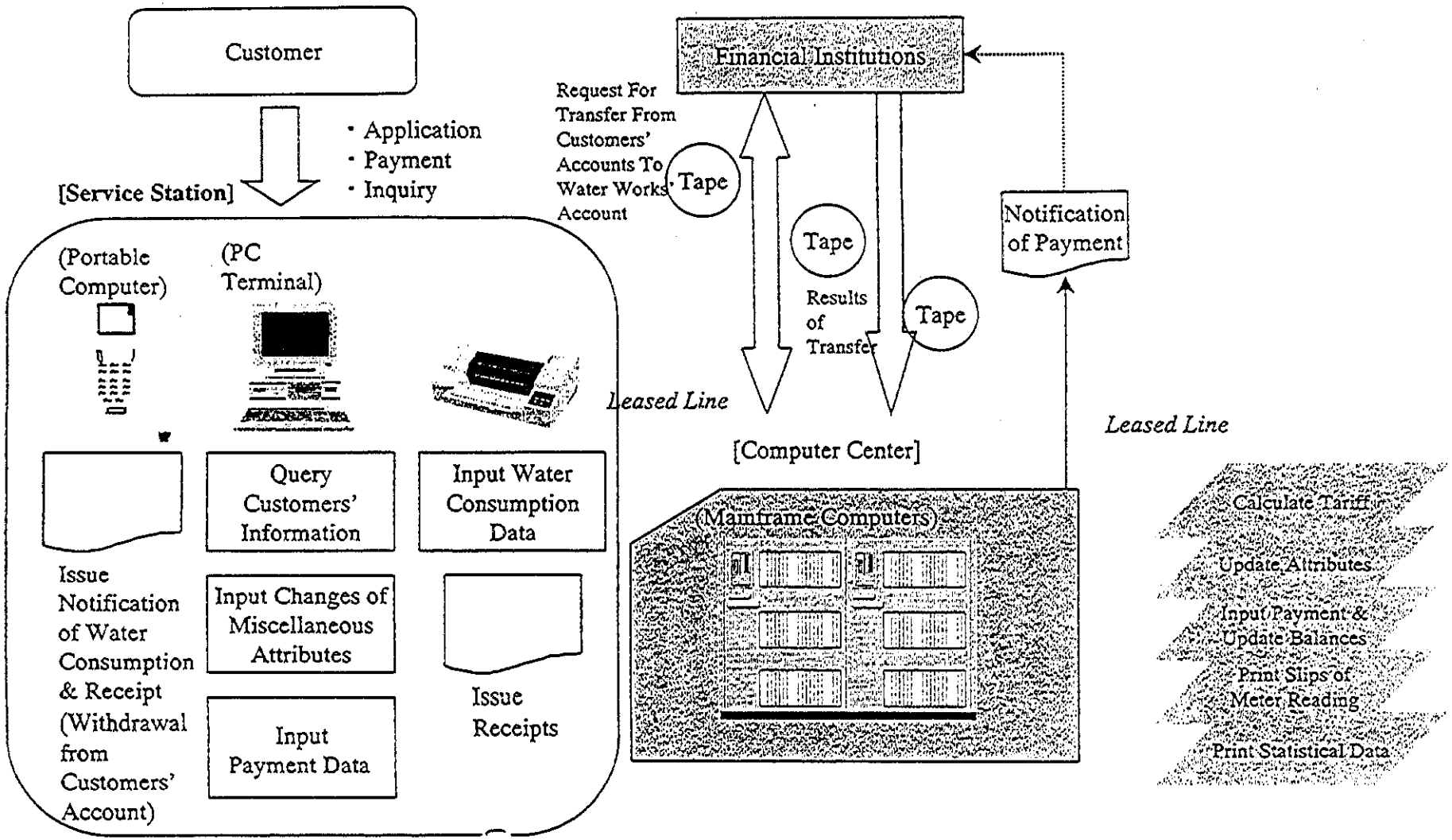
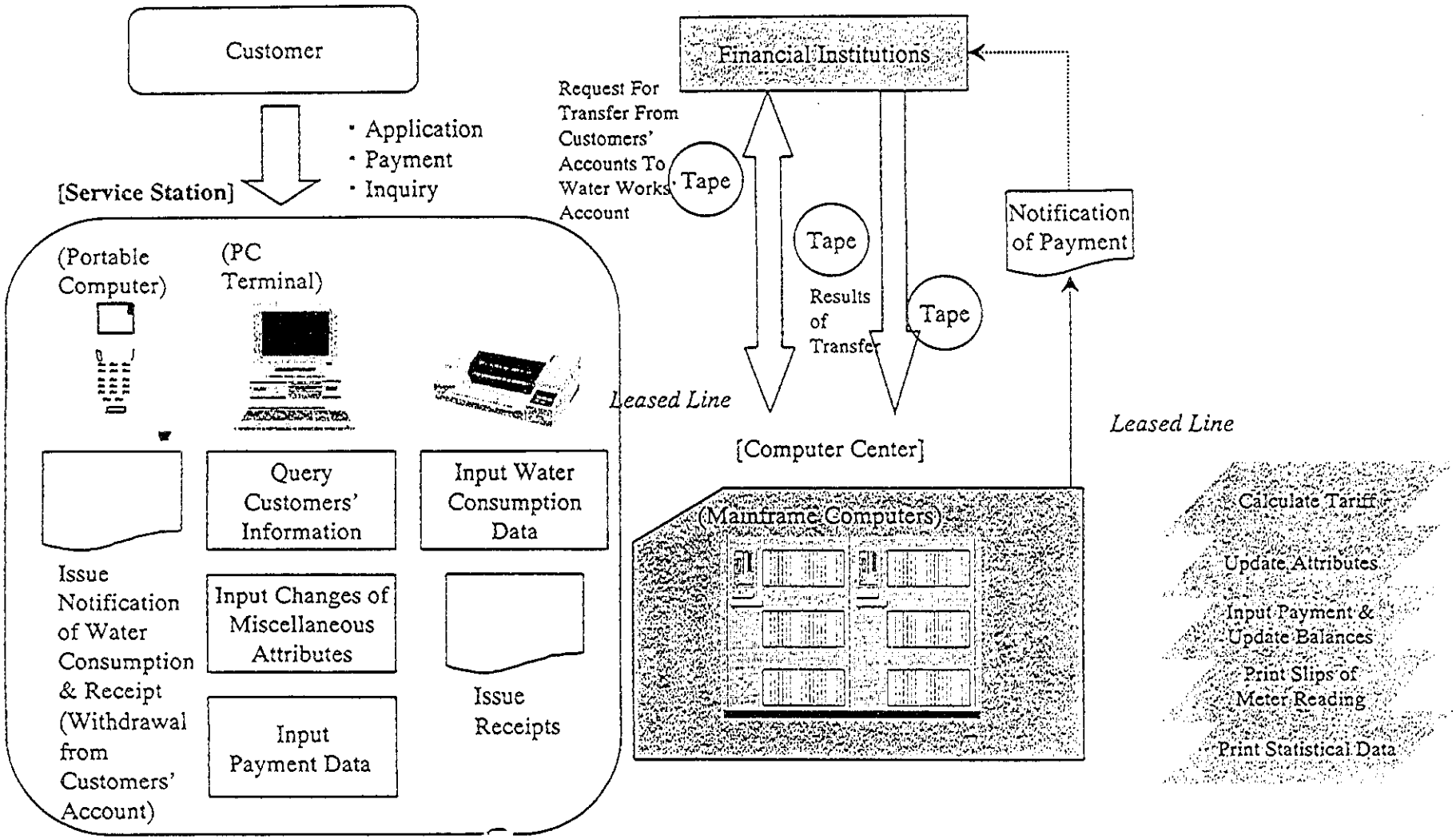


Figure 9-1-2

Tariff Collection On-Line System in Japan
Context Diagram



9.1.2 Efficient Tariff Setting Process

The current water tariff setting process and the related items including the departments responsible, points to be taken into account tariff setting and public relations activities in Tashkent City are summarized in Table 3.3.301. The following recommendations are the results of a comparison of the tariff setting processes in Tashkent/Chirchik Cities and Japan.

(1) As noted in 3.3.3, the system and process for the preparation of a proposed tariff should be streamlined and efficient. This would become possible by making a certain designated department solely responsible for the work. Clarification and transfer of the relevant responsibilities as well as the reorganization of Vodokanal will be necessary for this purpose.

(2) In Japan, rationalization and efficiency promotion plans in the waterworks system management, both technical and organizational, have become more and more crucial aspects in their tariff setting in order to obtain approval of the city assembly smoothly and eventually the understanding and acceptance of the users. This is often called a matter of accountability. As pointed out, this does not seem to have been given due consideration in the present tariff setting process in either Tashkent or Chirchik Cities.

Operating efficiency in water supply services in terms of the operation of the utilities can be measured by calculating the following ratios:

Table 9.1.2 Indices of Operating Efficiency

Ratio	*Numerator*	*Denominator*
Accounted-for-Water	Annual Accounted-for-Water	Annual Volume of Distributed Water
Facility Utilization Ratio	Average Volume of Distributed Water per Day	Distribution Capacity per Day
Operating Ratio	Average Volume of Distributed Water per Day	Maximum Volume of Distributed Water per Day
Maximum Operating Ratio	Maximum Volume of Distributed Water per Day	Water Distribution Capacity per Day
Usage Efficiency Ratio of Distribution Pipes	Annual Volume of Distributed Water	Total Length of Transmission, Distribution and Service Lines
Usage Efficiency Ratio of Fixed Assets	Annual Volume of Distributed Water	Amount of Fixed Assets
Unit Production Price	Water Sales Amount	Annual Volume of Accounted-for-Water
Unit Service Cost	Current Expenses (Note 1)	Annual Volume of Accounted-for-Water
Unit Service Population	Service Population	Number of Staff (Note 2)
Unit Service Volume	Annual Volume of Accounted-for-Water	Number of Staff (Note 2)
Unit Operating Profit	Operating Profit	Number of Staff (Note 2)

(Note 1): Accounted-for-water (AFW) = Water Actually Sold and Billed to Users

Unaccounted-for-water (UFW) = Total Water Distributed - AFW

(Note 2): Operating Expense and Other Expense

(Note 3): Only the staff engaged in construction works are excluded.

9.1.3 Transfer of Financial Burden on Vodokanals from Reduced Tariff

In developing future schemes to preserve the social safety net, the financial constraints faced by the Vodokanals should be given full consideration by the central and local governments. According to the Tashkent City Hokimiyat, the number of the beneficiaries of various allowances is approximately 350 thousand, and the total amount is roughly 450 million sum. In the water sector, a rough estimate of the amounts granted by the two Vodokanals are 48 million soums for Tashkent City Vodokanal and 7 million sum for Chirchik City Vodokanal, respectively.

Because the policies and schemes of providing a social safety net have been decided by the central government, the financial burden from providing these allowances currently born by the Vodokanals, should eventually be transferred to and carried by the central and local governments in the future. In Japan, the relevant financial costs are compensated by the general budgets of the respective local governments.

9.2 Multi-Support and Cooperation in Water Sector in Uzbekistan

9.2.1 Needs of Mutual Support and Cooperation among Multiple Utilities

The water supply businesses and their utilities each have their own characteristics and exhibit various differences among themselves owing to the different technologies and conditions related to their water in-take, water purification, water transmission/delivery. The institutional and management environment of the people living in different areas and their capabilities are also important factors affecting their business performances. Problems that may be serious to, and cannot be handled by, the utilities of certain cities may not be so serious to the utilities of other cities, or can be handled more easily. Naturally, the water supply utilities share tasks and obligations in common: delivery of a safe and secured water supply and sound institutional and financial management. They also may encounter interruptions in service or other crises at any time. Therefore, mutual support and cooperation among the multiple water utilities as well as shared information and communication are indispensable. Since water supply is one of the core communal services to maintain human life, this synergy could become even more crucial on such contingent circumstances as:

1) The accidental contamination of the water resources or their suburban areas;
2) the scarcity of water resources; and
3) malfunction of or severe damage to the facilities.

The mutual support of water resource, organizations for potable water and the related facilities, and the dispatch of experts and engineers are two major solutions to the outlined above.

Recently all over the world equipment for the measurement of water quality has developed, yet hazardous substances have ironically increased. As a result, both the number of cases of water contamination and the types of pollutants have been increasing. Recent phenomena such as strong earthquakes, drought, heavy rains and global atmospheric changes experienced both in Japan and worldwide have given a great impetus to arranging the logistics for such mutual support and cooperation in Japan.

9.2.2 Strengthening of Mutual Support

The initial and most important step toward developing a system of mutual support and cooperation in Uzbekistan would be the establishment of an effective communication networ, consisting of the group of Vodokanals, various central/local government agencies and representatives of the users.

The World Health Organization has been active internationally in the study of water quality and hazardous substances as well as in the dissemination of the related information to its member countries. This information and the actions to be taken in emergencies should be provided to all the Vodokanals in Uzbekistan and shared by them through a committee/agency responsible for this purpose, so that disaster recovery plans can be drafted and tested.

9.2.3 Effects

1) Reduction of Operating Costs

Contingency measures, if implemented effectively and systematically, would contribute to reducing operating costs, which otherwise would increase in the case of the contaminating water resources or other contingent incidents. All the Vodokanals and the government ministries/agencies and other related organizations should share the information available and the lessons learned through established channels. Japanese experience, knowledge and financial sources would be able to contribute to this effect.

2) Contribution to Sustainable Water Supply

The costs for sufficient preventive measures and for the equipment to handle water quality contamination are generally large, and the long-term costs for the preservation of the natural environment and the maintenance of a safe and secured water supply may be beyond the financial capacity of each individual water service utility. Therefore, these costs should be shared by mutual support and cooperation. From an administrative and technical point of view, mutual support and cooperation are indispensable as the water supply usually involves various regions.

9.2.4 Current Status in Japan

1) Nationwide Support and Cooperation

Three semi-governmental and non-profit organizations have been the leaders in the water supply sector in Japan. They are Japan Waterworks Association, Small Water System Association and Japan Industrial Waterworks Association, which cooperate with each other in holding nationwide seminars and in the dissemination of information to water supply utilities and the related organizations. As a legal basis has been given to these associations, they also determine the Design Criteria for Waterworks Facilities and issue the Guidelines for Waterworks Technical Management, to which all water service utilities are subject for their daily operations. They are also authorized as inspectors of parts and materials used in waterworks operations.

2) Local Government Basis

The waterworks bureaus of the local governments in Japan have shown an interests in maintaining close communication and mutual support, and the related systems are firmly established and are operating effectively. For example, Yokohama City has agreements with the member cities of the Six and Twelve Major Cities in Japan on the provision of potable water in crisis contingencies. They also hold seminars every year to exchange knowledge and experience. Each year a different city acts as host and prepares for the seminar. Each waterworks sends approximately five members as attendees. A report of each seminar is published as an effective means of disseminating the knowledge and experience discussed during the seminar and for further study.

9.3 Improvement on Technical Skills

9.3.1 Current Status

(1) Overview

Basic the water supply technology was introduced to Uzbekistan by the former Soviet Union. The technical level itself is not low but it includes a sufficiently necessary item into the contents in the technology standard 20 years before 15. However, these technologies have been left behind since the collapse of USSR as they have not been updated properly. Furthermore some facilities did not work as repairs and improvements to the facilities could not be conducted properly due to a shortage of funds. The viewpoint of those present is that the aforementioned relatively backward technology cannot be properly used in the water supply field of Uzbekistan.

The prevailing problems are identified as fellows:

- All design criteria and technical standards for equipment and facilities are still the same as former in the era of the Soviet Union and many of these do not meet the actual needs of Uzbekistan at present.

  Some of these equipment and facilities are impossible to obtain because production has already stopped.
- The existing water supply technology in Uzbekistan is not capable to cope with recent problems pertaining to their water quality standards, i.e., organic chlorine and agricultural chemicals.
- Most of the facilities have become outdated, therefore they have lost the function of operating automatically which was possible after their initial construction and they are now operated manually and are completely reliant on operation judgment.
- After all, the technical standard of water supply is not in a state as it takes in to the system and the facilities of the information equipment which is a trend in the world at all.

9.3.2 Countermeasures

(1) Investigation and Evaluation

First of all, a thorough review and fact finding survey on institutional, legislative, financial and technical aspects of the water supply sector should be carried out to identify problem areas and to draft countermeasures.

For this purpose, Macro Economy Statistics Ministry, Communal Services Ministry, Tashkent City and others should become a center, and establish, for example, "The National Water Supply Technology Improvement Committee". These public institutions should encourage the participation of experts from each subdivision conduct the following investigations and evaluations:

1) Identification of design criteria and technical standards which are deemed to be out of date;
2) Data acquisition and evaluation of available products and chemicals relating to the water supply;
3) Evaluation of existing water quality standards and analytical methods in Uzbekistan in comparison with those of the WHO and with other international standards;
4) Investigation and evaluation of the water supply facilities and the present status of maintenance management in Uzbekistan,
5) Introduction of new technologies, especially recently developed information/data processing technology, into the water supply sector; and
6) Identification of the problems and proposals for solution for i) to v).

(2) Countermeasures and Implementation of Improvements

The improvements must be conducted after identifying each problem based on the abovementioned investigation and evaluation, and after determining "The contents and annual plan for Improvements."

The following countermeasures are deemed to be required.

1) Improvement/updating of design criteria and planning fundamentals for the water supply systems;
2) Improvement of technical standards for equipment and machinery and recognition of manufacturers which can meet the new technical standards;
3) · Development of standardized analytical methods appropriate to the updated water quality standards;
4) · Development of technical standards for O&M; and
5) · Introduction of information/data processing equipment and technology.

9.4 Environmental Issues

9.4.1 Present Status

(1) Overview

The waterworks is deeply concerned with both the social and national environment in terms of the continuously high water consumption to sustain social activities. In Uzbekistan, because there is comparatively more rainfall in the mountain zone, in the districts which are close to that zone, the water resources are rich. However, the plain at the center of the country is lacking in water resources because there is little rainfall and, therefore, people in this district depend on river water flow from the upper district where there is more rain. However, river water is decreasing substantially because of the flow rate used due to the large volume of water used for irrigation particularly in the cultivation of cotton which is grown over a vast area. In a famous example, the surface of the Aral Sea is decreasing rapidly, and it has become a global earth environmental problem. Moreover, a lot of problems such as pollution by the agricultural chemicals and manure, and damage from salt water are occuring in area surrounding the Aral Sea as qualitative problems.

As described above, in Uzbekistan, water resource is leaning in the presence of quantity, and there are many districts which are lacking water resources and also have quality problems over the whole area. In this way, the waterworks of Uzbekistan is pressed by needs relating to the problems of quantity and quality of raw waters particularly at the center of the country.

On the other hand, in Uzbekistan, there are many Vodokanals which estimate that the percentage of leaking water (including leaks of water in buildings) exceeds 50% and they aren't effectively using their precious water resources.

The leaks often come from the distribution pipes, but the main characteristic of water leakage in Uzbekistan is the larger volume of leakage which is the responsibility of the individual owner. This leakage occurs below the of toilet tanks where they are connected sewer line and from the faulty service pipes or equipment which have problems related both to the material from which they are constructed and from technical problems connected with the plumbing.

(2) Problems

The problems about the environment are divided into an assailant or a victim to the waterworks, and are shown below:

Waterworks as assailant

1) Destruction of nature happens due to the construction of dams and other structures for the water supply system.
2) Waste of water resources is caused by leakage and inappropriate water use.
3) BOD concentration of raw sewage is too low for biological treatment with the leak of water from the distribution network, and therefore water pollution by influent BOD from the sewage treatment plants is occurring.
4) By watering gardens and the green belt, water penetrates the ground and river water decreases.
5) The drainage (washed water from filters and drained sludge from the sedimentation basins) from the water treatment plants is directly discharging without being treated.

Waterworks as victim

1) The river water flow rate diminishes as water resources are decreased, due to evaporation and the penetration of water in firm land with the huge usage of water for irrigation. Moreover, pollution by agricultural and other chemicals occurs, as well as increased salinity as the decrease in the river flow rate and the increase in underground water occurs.
2) The river water is polluted by drainage from the factories and others which is not sufficiently treated.
3) Because of water leakage of other waterworks, i) sewage treatment is insufficient and therefore the water source is polluted, and ② for example, gardening water which should flow into the river, penetrates the ground and thus the flow volume of rivers is decreased.

9.4.2 Countermeasures

Countermeasures are proposed for problems to both cases as assailant and victim as follows;

Waterworks as assailant

Most of the identified problems are related to leakage and wastage. A concrete plan to prevent leakage and wastage is described below.

1) The method to prevent leakage in homes is shown in 9.6.
2) A metered rate system and a disciplinary tariff structure by the installation of meters will be introduced.
3) Drainage from WTP should be treated properly.

Waterworks as Victim

1) Through a countrywide survey (as described below) water resources are to be allocated to agriculture, industry and urban life.
   - The available volume of water resources for each district,
   - Flow rate of the Amu-Daria River and the Sill-Dahlia River,
   - The volume of water consumption for every each district and the uses, and the water demand at present and in the future,
   - The discharge sources of water pollution and the polluted load in every basin, and
   - The water inflow and outflow balance of the Aral Sea.
2) Major waterworks shall be equipped with instruments capable of analyzing agricultural chemicals and organic chlorine and shall conduct these analyses. When a serious problem arises with the water quality, the water source shall be changed or the water shall be processed.
3) There should be a strengthening of the effluent quality standard by type of industry corresponding to water pollution conditions in the respective river basin.

9.5 Technical Cooperation by Dispatching Specialists

9.5.1 The Significance of Dispatching Specialists

The way to build up a strong foundation for the management of water supply services is to raise the level of knowledge and technical skills of the staff engaged in water supply services.

Since the ROU's independence in 1991, the water supply organizations have been attempting to introduce completely new or unfamiliar measures in the course of their transition to a market economy, such as conducting the water supply business as a self-supporting system, starting the collection of water charges based on meter readings to measure water consumption, and restructuring the utility fees charged. If the concept of privatization is taken into consideration, the water users have to be regarded as "customers" of the water supply organizations and can no longer be seen simply as the "receivers of administrative services."

Japanese specialists who have experienced similar situations can provide advice and practical guidance, and can give seminars based on their broad range of techniques and experience to the staff working at the water supply organizations in Uzbekistan in connection with the implementation of the solutions proposed by the Study Team. This will assist management in performing their duties and will contribute to an improvement in the level of the technical skills of their staff.

9.5.2 Areas for Improvement by the Specialists

In implementing technical transfer by dispatching Japanese specialists to Uzbekistan, the following areas for improving the efficiency level of water supply services in the organizations are provided as examples:

1) Budget system, cost calculation, design and construction of an information system supporting the decision-making processes by executive officers in accordance international standards (including financial accounting);

2) Designing a model for tariff policies considering the long-term maintenance of the facilities;

3) Standardization of procedures including the techniques for installing meters and the methods of inspection;

4) Enhancing of the charge collection system;

5) Improvements in the level of efficiency in running the purification facilities and introducing automation, and the effective use of gravitation in updating the water supply system;

6) Techniques to maintain and renew the water pipes, and a long-term maintenance plan for the water pipeline network; and

7) Public relations program to satisfy users' needs in the case of an increase in utility charges.

9.5.3 Period

The period for sending Japanese specialists to Uzbekistan depends on the content and extent of the services expected from the specialists, but, in principle, it will be either of the following:

(1)	Long-term specialist	2 years
(2)	Short-term specialist	less than 1 year

Discussions with the water supply service organizations who have requested specialists will be held so that the specific areas of technical cooperation and the period of their stay and other details can be determined.

9.5.4 Inviting Counterpart Personnel to Japan for Training

Technical transfer to support the water supply organizations in Uzbekistan does not only take the form of delegating specialists to go to Uzbekistan; it also involves inviting the key personnel from the water supply organizations in Uzbekistan to Japan for training. The trainees will be provided with an opportunity to attend seminars on various topics, for example, management and finance at water supply organizations in Japan, tariff policies, purification facilities, meter reading and the charge collection system, and so forth.

9.6 Countermeasures on Domestic Water Leakage

9.6.1 Current Status

(1) Overview

People are indifferent about water wasting and leakage in houses in Uzbekistan because piped water was almost free and meters were not installed characteristic of communist bloc countries. Examples of this may be seen in Tashkent City and in Chirchik City.

As a result, leakage from the water supply pipeline is also comparatively large but water leakage and wastage in buildings are larger. When including leakage in the building, the percentage of leaking water exceeds 50 % in both cities. Therefore, the prevention of these leaks in buildings is a very big problem at whole Uzbekistan

The causes of these leaks are mainly i) the ball-tap of the low tank of a toilet cannot stop water, and ii) leakage from corroded pipes, which were buried in housing land. The leakage of i) almost always occurs in apartment buildings and ii) occurs in detached houses which have buried pipes.

(2) Problems

The ordering problems described below;

1) Because a metered rate system has not yet been introduced at most of the houses and the apartments, even if there is a leak in the houses or buildings, the occupants are indifferent.
2) The quality of the water facilities is poor and the plumbing technology is low in the houses and buildings. Specifically, the service pipes are made of steel, which has no installed inner lining and thus rusts easily.
3) Even if their toilets leak water, the owners are not troubled by this at all; furthermore, there is no organization which can easily do plumbing repairs .
4) In addition, much of equipment is no longer being manufactured and the parts which can be bought do not fit the plumbing which is already installed.
5) Repair expenses are often high compared with the income of the occupants.

9.6.2 Countermeasures

The occupants cannot gain any benefit from paying for maintenance or repairs under the present system.

Therefore, switching over to a metered rate system and an incremental tariff system (this is a system under which the higher the water consumption, the higher price per cu. m) is the most effective solution. The distribution volume of water consumed in houses with leaks from toilets or service pipes amounts to more than 3 times than usual volume. Therefore, the water tariffs will rise substantially in switching over to a metered rate system, even if an incremental tariff system is not introduced, and the occupants will not be able to avoid repairing the water leaks.

However, the repair cost of a leaking toilet in apartment buildings is a maximum of 10,000 sum and that of laying new underground pipes to replace corroded ones at detached houses is more than 100,000 sum. There are many families, which cannot immediately pay for repairs which cost thousands of sum. On the other hand, families having a water leakage problem will be dissatisfied with the substantial rise in their water tariff because they cannot afford to repair the leakage points. Therefore, it is thought that a financing system must be formulated for the sake of these residents who used repairs.

The effect of the installation of water meters is significant, but the installation is not schedule to move ahead rapidly, and therefore countermeasures for the interim should be developed.

Countermeasures for cases whether or not meters are introduced are outlined as follows:

(1) Meter installation

1) Provision of loan assistance system to encourage repair of leaks,
2) Establishment of technical standards for repair materials and practices and an enforcement policy,
3) Vodokanal sells reproductions of spare parts and replacements for worn-out parts at actual cost to prolong the service life of the existing equipment and machinery.

(2) Prior to meter installation

1) For apartment buildings, Vodokanal or JEK shall conduct leakage inspections and appropriate repair work shall be recommended to the residents/owners, when leaks are found.

2) For detached houses, Vodokanal shall conduct acoustic leakage detection along the service pipes and appropriate repair work shall be recommended to the residents/owners. If these recommendations are not followed up properly, penalty charges shall be assessed against the residents/owners.

3) A loan assistance system to promote the above-mentioned repairs shall be established and implemented in order to implement this work smoothly.

9.7 Computerization of Water Supply System

9.7.1 Current Status

In order to achieve the continuous operation of the water supply services, monitoring, analysis and evaluation of operating conditions including the quality and quantity of the water supply are indispensable, based on past performance data and on forecasting future conditions.

In Japan, a book which is called "Water Supply Statistics" is published every year and it which includes the water supply volume, water quality, facilities and a managing index (for example cost and finance) for the national water supply business. In Uzbekistan, each Vodokanal must monitor and accumulate information about the operation of every constant period (hour, day, month, year)as well.

For this purpose, it is required that the measurement of essential items be conducted first. This measured value is accumulated and then analyzed and the accumulated and analyzed data are effectively used for further operations. Therefore, it is the present worldwide tendency that monitoring by equipment is conducted, the monitored results are processed by computer, and operations are carried out using this processed data and by judgement of the operations to a certain degree.

However, almost all flow meters which had been installed in the past are now out of order. Therefore, in most of cases, the water flow is measured directory by the overflow height of the dam or by estimating the volume given the operating time of the pump based on its known capacity.

Also, quantity analysis is frequently done but the data are only analyzed manually, and only kept after use for decisions on the percentage of chemical dosing.

As mentioned above, in Uzbekistan, the data on water quality and quantity are measured and/or analyzed manually and recorded after reporting. Neither computer-aided analysis nor operation/sequential control have yet been introduced.

9.7.2 Recommended Improvement Plan

The monitoring and control system shown in Figure 9.7.1 is the desirable configuration, although it is quite an advanced system for the present situation of Uzbekistan.

This system can handle not only the monitoring of the operating conditions of the water supply system, but can also provide feedback for sequential control of the whole system. The design concept is described below:

1) Overall information can be monitored at a supervisory control room in the water treatment plant and telecontrol is available from there.
2) Inflow and flow out volumes at the water treatment plants can be monitored.
3) Automatic measuring instruments are installed at the inlets of the water treatment plants to monitor the water turbidity and at the outlets of the plants to monitor the residual level of chlorine on a continuous basis.
4) By monitoring the water pressure at strategic locations within the distribution network, the distribution flow can be controlled automatically upon confirmation.
5) The storage volume can be continuously monitored by measurement of the water levels at the reservoirs.
6) Through data acquisition by a telemetering system, the data collected can be processed. The data logging, analysis and system control can all be handled by the computer system in the supervisory control room.

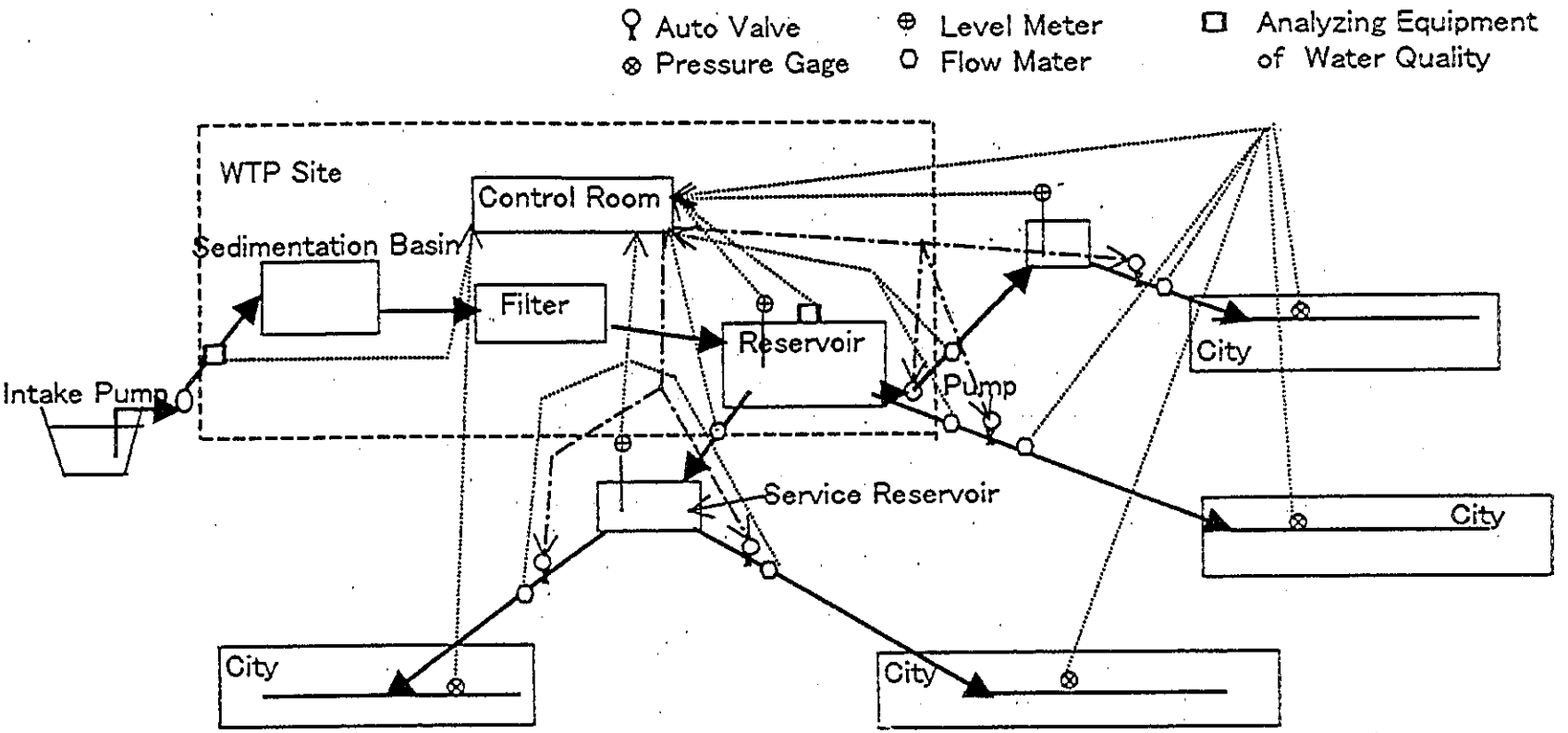


Figure 9.7.1 Model of Monitoring System

9.8 Implementation of Computer Systems for Water Works

The Study Team explained the "Improvement Plan for Tariff Collection Using Computer- Aided Systems" for Tashkent City Vodokanal in Chapter 7 and for Chirchik City Vodokanal in Chapter 8. In this section, we propose the introduction of computerized water works management systems in Uzbekistan.

First, we propose Chirchik City Vodokanal should be the pilot organization for the Tariff Collection System , which should be expanded to other Vodokanals excluding Tashkent City Vodokanal by 2010. Moreover, we propose that other administrative systems which are used by the staff in charge and by middle management be developed by making Chirchik City Vodokanal the pilot organization. For example, the accounting system, the human resources control system, and the assets control system should be included. The reason why Chirchik City Vodokanal should be the pilot organization is that they may encounter the same problems as other Vodokanals and, thus, the countermeasures implemented at Chirchik City Vodokanal could lead to standard solutions for other Vodokanals.

On the other hand, we propose that Tashkent City Vodokanal be the pilot organization for the management system, which should be expanded to other Vodokanals. The objective of the management system is that top management can make various decisions concerning water works management by transferring their requests through a computerized system. All administrative systems should be connected to the management system, because many kinds of information are kept in the various administrative systems.

Finally, we propose that all Vodokanals be connected to a network spanning the country. The water works in Uzbekistan should be totally overhauled in the future. Since the computer systems referred to above are large, we propose that this project become a nationwide project in which donor countries may become involved.

9.9 Exchanges on Technical Issues between Uzbekistan and Japan

For international development, many of the water supply utilities in Japan implement a policy of technical exchange with other countries. They establish communication which includes not only technology but also management issues in each country through an exchange of opinions on common themes and the introduction of new facilities. Many officers have visited their partner countries alternately every one/two years for the purpose of friendship. For Uzbekistan's water supply services, technology cooperation with a city in Japan seems to be indispensable when the time comes for the country to implement technical development and a stable water supply business.

Water supply utilities in Japan historically have experienced the following stages:

(1) The stage for solving problems such as water quality or epidemics
(2) The stage for expansion of the water supply facilities
(3) The stage for strengthening management
(4) The stage for maintenance of the water supply facilities
(5) The stage for ensuring the high quality or the water supply (by implementing advanced treatment, the membrane process, and automatic of the water treatment system)

Uzbekistan is at present in Stages (3)/(4) above. Mutual cooperation with the water supply utilities in Japan in experiencing Stage (5) seems to be very useful for the Uzbekistan water supply utilities. At present, there are about 2,000 water supply utilities serving a population of more than 5,000 in Japan. Japan has already established a water conserving society, and continues to make an effort to ensure stable business management and to innovate water supply technology. Continuous exchanges between Uzbekistan and Japan in the water supply sector can therefore be expected during the course of implementing technical cooperation with the ROU.

CHAPTER 10

PROPOSED ODA PROJECTS

Chapter 10 Proposed ODA Projects

In this chapter, we mention the proposed ODA project based on the proposals outlined in Chapter 7 and Chapter 8.

10.1 Necessity of the ODA Projects

We presented an overview of our proposed solutions for Tashkent City Vodokanal in Fig. 7.1.1 and these proposed solutions are similar to those for Chirchik City Vodokanal. Our proposed solutions indicate directions the GOU and the Vodokanals should take. As a next step, it is very important for the GOU and the Vodokanals to implement improvement programs based on the proposals. However the GOU and Vodokanals are not familiar with a market economy and also their financial resources are not sufficient to implement these projects. In this case, we believe that ODA (Official Development Assistance) projects launched by foreign countries would be useful and effective for Uzbekistan.

10.2 Explanation of Proposed ODA Projects

We examined applicable ODA projects in Fig. 7.1.1 and in Fig. 10.1.1 and also made a preliminary implementation plan for the applicable ODA projects which is presented in Tables 10.1.1 and 2.

We consider technical advice is necessary and useful in implementing the improvement programs mainly regarding the management portion. On the other hand, the improvement and replacement of certain water supply facilities is necessary for the technical portion and this requires an initial concrete study such as a feasibility study.

Technical Advice from Experts

(1) Improvement of the Tariff Policy and Rate Tables and Business Operating Activities

We proposed a revised tariff policy and rate tables. It is necessary for the GOU and the Vodokanals to understand the proposals thoroughly order to reflect them in the present tariff policy of the GOU because the GOU is not familiar with a the market economy, and the proposals are aimed at creating a self-supporting system under a market economy. In this case, technical advice from experts is useful and can be reflected the tariff policy of the GOU.

We proposed a flow chart for the future revision of the tariff tables. However, the Vodokanals are now installing the water meters and a period of 5 years will be necessary to complete the installation of the meters. When the GOU and the Vodokanals revise the tariff table, they should consider how the installation of meters is proceeding. There is also anxiety concerning unexpected future economic crises. In these cases, the technical advice of an expert would be useful and the period for technical advice would extend for more than a few years.

We propose an improvement program for efficient management and business operations. However, it will be difficult for only the GOU and the Vodokanals to implement these proposals. In this case, the technical advice of experts is useful and will be necessary.

(2) Study of How to Install Meters and Establishing Guidelines

We propose a analysis of the recent breakage of the water meters and a study of how to install these and then establishing guidelines. However, it will be difficult for only the GOU and the Vodokanals to implement these proposals. In this case, technical advice from experts is useful and will be necessary.

(3) Improvement of Maintenance of the Buildings and Prevention of Water Leakage

We propose an improvement of maintenance of the buildings and the prevention of water leakage mainly caused by the old toilet facilities in apartments. In this case, the introduction of the skills and experience of foreign countries will be useful and necessary.

(4) Improvement of the Tariff Collection System by Computerization

We propose improving the tariff collection system by further computerization. However, it will be necessary to draft a detailed design plan before implementing such new computer systems. In this case, the introduction of the skills and experience of foreign countries will be useful and necessary.

(5) Improvement of Operating Facilities (including pumping operations)

We propose the improvement of operating facilities, including pumping operations in order to reduce costs. However, it will be difficult for these proposals to be implemented successfully only by the GOU and the Vodokanals. In this case, technical advice from experts is useful and will be necessary.

(6) Introduction of a Public Relations Program for Enlightenment and Education to Save Water and to Establish Good Relationships with the Users

We propose the introduction of a public relations program for the enlightenment and education of the users. These public relations activities will promote the conservation of water and will establish a good relationship with the users. However, it will be difficult for only the GOU and the Vodokanals to implement these proposals. In this case, technical advice from experts will be necessary.

Improvement and Replacement of Facilities

(7) Replacement of Pipelines

We propose the replacement of old pipelines. However, a feasibility study is necessary before implement. In this case, technical support from foreign countries and the introduction of expertise from them would be useful and necessary for the GOU and the Vodokanals.

(8) Construction of Reservoirs

We propose the construction of reservoirs after the population has begun to conserve water and the volume of the water supply has decreased. However, a feasibility study is necessary before implementation. In this case, technical support from foreign countries and the introduction of expertise from them would be useful and necessary for the GOU and the Vodokanals.

(9) Improvement and Replacement of Water Treatment Plants and Pumping Stations

We propose the improvement and replacement of water treatment plants and pumping stations. However, a feasibility study is necessary before implementation. In this case, technical support from foreign countries and the introduction of expertise from them would be useful and necessary for the GOU and the Vodokanals.

Table 10.1.1 Implementation Plan by Uzbekistan Side

		2000	2001	2002	2003	2004	2005
	Technical Advice by Expert						
(1)	Improvement of the Tariff Policy & Tables and Business Operating Activity	◄———	———	———	———	———	———►
(2)	Study of How to Install Meters and Establishing the Guideline	◄———	———	———►			
(3)	Improvement of Maintenance for the Buildings and Prevention of Water Leakage	◄———	———	———►			
(4)	Improvement of the Tariff Collection System by Using EDP	◄———	———	———	———	———	———►
(5)	Improvement of Operating Facilities (including Pump Operation)	◄———	———►				
(6)	Introduction of the Public Relation Program for Enlightenment and Education to Save Water and to Establish Good Relationship with Users	◄———	———►				
	Improvement and Replacement of Facilities						
(7)	Replacement of Pipelines	◄———	———	———	◄———	———	———►
		Study			Implementation		
(8)	Construction of Reservoirs	◄———	———	———	◄———	———	———►
		Study			Implementation		
(9)	Improvement and Replacement of WTPs and PSs	◄———	———	———	◄———	———	———►
		Study			Implementation		

Note 1 EDP: Electric Data Processing
Note 2 WTP: Water Treatment Plant
Note 3 PS: Pump Station

Table 10.1.2 Implementation Plan by Uzbekistan Side

		2000	2001	2002	2003	2004	2005
	Technical Advice by Expert						
(1)	Improvement of the Tariff Policy & Tables and Business Operating Activity		←——→	——→	----→		
(2)	Study of How to Install Meters and Establishing the Guideline		←→				
(3)	Improvement of Maintenance for the Buildings and Prevention of Water Leakage		←→				
(4)	Improvement of the Tariff Collection System by Using EDP		←→	----------	----------	----→	
(5)	Improvement of Operating Facilities (including Pump Operation)		←→				
(6)	Introduction of the Public Relation Program for Enlightenment and Education to Save Water and to Establish Good Relationship with Users		←→				
	Improvement and Replacement of Facilities						
(7)	Replacement of Pipelines		←——→		←——→		
			Study		Implementation		
(8)	Construction of Reservoirs		←——→		←——→		
			Study		Implementation		
(9)	Improvement and Replacement of WTPs and PSs		←——→		←——→		
			Study		Implementation		

Note 1 EDP: Electric Data Processing
Note 2 WTP: Water Treatment Plant
Note 3 PS: Pump Station