CHAPTER 6

FIELD SURVEY IN CHIRCHIK CITY

Chapter 6 Field Surveys in Chirchik City

6.1 Questionnaire Surveys on User Awareness

6.1.1 Conclusions of the Surveys

(1) Outline of the Questionnaire Surveys

The first and the second questionnaire surveys on the Users' Awareness of Waterworks Improvement in connection with the Study for Improvement of Water Supply Management and Tariff Policy were carried out as follows by Japan International Cooperation Agency (JICA) in cooperation with the Ministry of Communal Services (MCS).

Table 6.1.1

The Survey Area, Dates and Number of Questionnaires

Survey Area	Chirchik City	
Subjects	Residential Users	Corporate Users
Survey method	Distribution/collection of questionnaires to/from households and company offices selected by random sampling	
Minimum number of samples to be collected	600	150
Dates	First Survey	August 1999
	Second Survey	November 1999

1) Objectives of the Surveys

The objectives of the surveys in Chirchik were to evaluate the residential users' or the corporate users' awareness of the following key issues:

i) Water conservation

ii) User participation

iii) Willingness and ability to pay the present water tariff and the future tariff system's impact on the future improvement program

iv) Water leakage

v) Need for possible improvements in services

2) Purposes of the Surveys

The main purposes of the study were:

i) To reflect the study results on both the water tariff system and water supply management from the users' point of view as participant.

ii) To reflect the study results in making practical education programs for an awareness improvement plan for the users.

3) Methodology

The survey was administered out twice by distribution/collection of questionnaires to/from households and company offices selected by random sampling in the Study Area with the first stage in August 1999 and the second stage in November 1999.

The questionnaire forms were prepared in and translated into Russian and Uzbek. The surveys were carried out with the use of the Russian or Uzbek questionnaire form.

4) Study Area and Numbers of Forms Collected

The Study Areas cover Chirchik City.

The numbers of available questionnaires collected were as follows.

We used 3 types of residential categories for the residential users and 3 types of industry categories for the corporate users. The questionnaires collected were as follows:

Table 6.1.2

The number of questionnaires and types of residential and industry categories

	Number of Available Questionnaires Collected	
	First Survey	Second Survey
Residential users	600 (100%)	600 (100%)
Apartment Residential Users without meters	77%	66%
Apartment Residential Users with meters	1%	2%
Residential Users	22%	32%
Corporate users	150 (100%)	200 (100%)
Manufacturing Industry	6%	22%
Commerce	56%	68%
Other Industry except Communal Services	38%	10%

5) Key Issues in the Questionnaire

i) The First Survey

The questionnaire for the first survey included the following key issues:

a Water corsewahis

b Contentment with the water supply services of Vodokanal

c Improvements in communication necessary between users and the water supply services.

d Affordability the existing tariff

e Water leakage

ii) The Second Survey

The questionnaires for the second survey included the following key issues:

a Affordability the tariff based on the actual quantity of water consumed as

b Practical warp for Water Saving

c Repauiy water leaks

d Areas for Vodokanal to inproue in the future

(2) Conclusions of Key Areas in the Surveys

1) Awareness on Water

i) Awareness of water

a Residential Users

A large number (81%) of the total residential users interviewed are surprisingly well awaren of the saving water. As an analysis, 79% of the apartment residents without meters, 100% of the apartment resident with meters and 89% of the showed that they could save water. As family members, 86% of single users, 74% of 2-family member users, 84% of 3-5 family member user and 75% of family of more than 6 members expressed a positive opinion on water. It turns out that they show their awareness on saving water as a moral issue, even though they are now charged a fixed rate of water tariff. We evaluated the residential users' awareness of environmental issues as quite normal on this viewpoint.

It may, however, be assumed that most of the actually have nots intentionally tried to save water give the present situation without meter reading. The current fixed rete water tariff systems does not give any incentive such as cost reduction to the user for conserve water. In addition, they do not have any measure of the exact volume they require in their daily life in order to use this as a benchmark for saris water.

b Corporate Users

A large number (91%) of the total corporate users interviewed surprisingly shied an awareness of the saving water. Whether or not, they have meters 100% of the corporate users without meters showed a positive awareness on saving water as well as 92% of those with meters.

As an analysis, 92% of the corporate users in manufacturing industries, 90% in commerce and 100% in other industries, except for communal services, are aware the need to conserve wake.

It turns out that corporate users, on the whole, are very concerned about saving water and that their awareness of saving water conservation is higher than that of residential users. The may be because of their keener sense of cost management.

ii) Methods of Conse with Water and Saving Expenditures for Water Supply Serves (Second Survey)

a **Residential Users**

In the new tariff collection system based or meter readings is implemented for all residential users, it was found that, to reduce the charges for wasted water, 40% of the interviewed residential users would be responsible for finding water leaks from them in-house water pipes and for the repairs. This shows that more than 2/5 of them recognize that they waste a considerable amanty water because of in-house water leakage.

It was noted that at least 2/5 of the residential users will be very concerned about in-house water leakage after the new system is implement. The users, therefore, may be more sensitive to the quality of the repairs, such as the material of the water pipes or repair skills for replacing any broken or old water pipes, as they are trying to save water to in-house water leakage. The issue of the replacement of in-house water pipes is potentially involved in the issue of

Subsequently 19% of the users would turn off them taps tightly after using water. It turns out that the new collection system will motivate more than half (40% plus 19%) of the users to take practical measures to reduce the large volume of water wasted. The wasted water currently has no benefit to the users' daily life, nor to

Vodokanal's revenue under the fixed tariff system after the meter reading system in operating .

29% chose the method of carefully checking the water volume consumed and the water tariff charged on each invoice they receive after them meter reading. 6% of the residential users interviewed needed more information on how to save water efficiently. 5% of the people chose instructing their family members to better cooperation in saving water in order to reduce expenditures.

b **Corporate Users**

31% of the corporate users interviewed would like to assume the responsibility for finding water leaks from the water pipes inside them offices or factories and for repairs.

This shows that approximately 1/3 of them recognize that they are wasting a lot of water because of inside water leaks.

24% of the users would like to turn off the taps tightly after using water. It turns out that more than half (31% plus 22%) of the users try (or will try) to take practical action to reduce the large volume of wasted water, which does not benefit their business.

24% chose the method of carefully checking the water volume consumed and the water tariff charged every time they receive a water tariff invoice issued after meter reading. 13% chose the method of instructing their employees to better cooperation and what measure to take in order to save water and reduce costs. 10% needed more information on how to save water efficiently.

2) Awareness of User Participation

i) Awareness of the Need for Better Communication with Vodokanal (The First Survey)

a Residential Users

A large number (72%) of the residential users surprisingly have a positive awareness of the need for more public relations activities on the Chirchik VodokanalChirchik City Vodokanal.

The best communication channels for enhanced public relations activities which 28% of the users chose were the mass communication media such as newspapers and radio. This shows that the users are very interested in what happens in their lives and that by accessing the mass media.

The most preferable type of information with would be provided by Vodokanal is the quality of the water supplied and ways to save water chosen by 25% of the users. This shows that they are also very interested in public safety and in the issues in the water supply sector, because the quality of water supplied and water means, respectively, safety for the users and the protection of a limited natural resource.

In addition, it turned out that users are willing to communicate our the with Chirchik City Vodokanal. 21% show that they need direct communication with Vodokanal by question and answer when there is a water supply problem, which is the second means of public relation activities they asked for in this survey. It also shows that there has been something of a lack of communication between Chirchik City Vodokanal and the users.

b **Corporate Users**

A large number (70%) of the corporate users surprisingly have a positive awareness of the need for more public relations activities by Chirchik City Vodokanal.

The most preferable information contents from Vodokanal that users chose were quality of water supplied (24%) and ways to save water (20%). This shows that they are very concerned about their own management issues, because saving water and the quality of water supplied affects, respectively, the business cost and safety issues of the product or quality services.

As in the residential users' case, it turned out that the users are willing to communicate with Chirchik City Vodokanal. 21% responded that they need direct communication with Vodokanal by question and answer when there is a water supply problem, which is what they asked for as the second point of public relations activities in this survey. This also shows that there has been somewhat of a lack of communication between Chirchik City Vodokanal and the users.

ii) **Disclosing the Cost Elements or Showing Vodokanal management (The Second Survey)**

a **Residential Users**

The majority (88%) of residential users indicated that Vodokanal should disclose the cost elements of the water tariff or demon shake their management performance. It means that asking for management disclosure of Vodokanal will become more important after the fixed water tariff is changed to the new tariff system based on the actual quantity of water consumed.

b **Corporate Users**

77% of company users feel that Vodokanal should disclose the cost elements of the water tariff or explain their management performance. The corporate users are

more interested in the management of Vodokanal than the residents are.

3) Willingness and Ability to Pay the Present Water Tariff

i) . Ability to pay the present water tariff

a Residential Users

The majority (65%) of residential users has a negative awareness of affordability to pay for the present water tariff. It turned out that even users living in apartment-style residences have a negative awareness of affordability to pay for the present water tariff.

In addition, the number of users satisfied with the present water supply services of Chirchik City Vodokanal was found to be surprisingly low (28%).

The main reasons for this discontent are the quality of water (27%), the water tariff (26%) and water supply interruptions (23%). This means that the users imply that the safety of the water supplied and the water tariff are key areas for Vodokanal to improve from the users' point of view.

It turned out that residential users in Chirchik have three main criteria, and them priorities, according to the ranking below, in evaluating the count water supply services were as forlorn:

1) Safety of water supplied for protecting their lives and health
2) Affordability of the water tariff
3) Stable water supply for the users' daily life (cooking, drinking, washing, etc.)

This shows that the affordability of the present water tariff is ranked as the secant highest criterion as well as the safety of water supplied(the highest ciderion).

Thesis of the affordability to pay the water tariff is, therefore, evaluated as a key area to consider in raising the present water tariff. It is advisable for Chirchik City Vodokanal to take care of users who cannot afford to pay and to improve other issues such as the quality of water and water interruption. Most of them think that the present water tariff collection method is convenient.

b **Corporate Users**

Nearly 70% of the corporate users are willing and able to pay the present water tariff. 62% answered that the present tariff is appropriate and 80% answered that it is in expresser.

As industry analysis, however, it turned out that 80% of the manufacturing industry users interviewed answered that the present tariff is expensive. It shows that they have a negative awareness of affordability to pay for the present water tariff. On the other hand, the rest of industry, 77% commerce and 64% other services (except for communal service) show a positive awareness of willingness and affordability to pay for the present water tariff.

This means that a water tariff systems charged by meter readings will impose a heavy burden on production costs, in the manufacturing industry because they need more water for their production than other industries. The more water they consume, the more water tariff they will have to pay. In addition, it is assumed that the manufacturing industry sector in Chirchik reflects local area conditions, such as a smaller volume of business, and lower profitability than urban areas and so on.

4) Willingness and Ability to Pay the Future Water Tariff

i) Water tariff concept based on volume of water consumed

a Residential Users

81% of residential users consider that it is fair that the water tariff should be calculated and charged based on the volume of water consumed.

19% of them world not agree to pay according to the volume of water consumed.

b Corporate Users

68% of corporate users belies that it is fair that the water tariff be calculated and charged based on the ordure volume of water consumed.

32% of them world not agree to pay according to the volume of water consumed.

ii) Tariff system based or meter readings

a Residential Users

More than half (63%) of the residential users interviewed agreed whit paying a water tariff according to their actual volume of water consumed as or these water by meters.

37% disagreed with this system. It turned out that most opponents of the system stipulated the meed for a saial safety net for the poor and for the pensioners in the system.

53% of the people who answered "No" word agree to pay according to the meter if there a soual safety net for those who are poor cent for pensioners in the form of a discounted water tariff. 43% of the people who answered "No" would agree to pay according to meter hooding if the water tariff were reduced for those whose standard of living is low.

Social net imder the new tariff system

We analyzed the reasons of the opponents of the metered rate tariff system.

57.2% of the apartment residents and 46% of the homeownerswho oppose the meter reading system feel that a tariff system based on meter readings should have a social safety net in the form of a discounted water tariff for the poor and the pensioners. This shows that a new tariff system based solely on consumption is not fully complete. It is noteworthy that the opponents stand against the system not only because of the increase the water tariff.

Most opponents feel that it is better and fairer to the community for the system to have a social safety net for the poor, and for the pensioners groups, and so on, so that rhere residential users can keep their standard of living.

b **Corporate Users**

Most corporate users interviewed would agree to a tariff system to pay for the water tariff according to their actual volume of water consumed as shown on them water match 62% of the companies interviewed agreed with a matured rate system, but 38% did not agree with this system.

It turned out that more than half of the opponents of the system stioulsted the need for a safety net for priority businesses. 59% of the companies which answered "No" would agree to a metered rate septum if the system were to keep the tariff at a level which is less or not more than the present one for ordinary business.

41% of the companies who answered "No" would agree to a meted sate sysre if there is a safety net for priority businesses to have a discounted water tariff.

iii) **Payment period for the cost of installation of the water meter**

a **Residential Users**

79% of users would prefer that the installation cost of a meter be divided up and included in the monthly tariff. This means that for most people the installation cost is expensive, and would they are not willing or able to pay it all at once. 15% of the people prefer to pay for the meter installation cost in ore payments after installation. We can suppose that 15% of the people interviewed have the financial ability to pay it oll at once. but 6% of the people prefered other ways.

b **Corporate Users**

53% of the companies interviewed would like the installation cost of a meter to be divided into the monthly tariff. This means that most companies prefer to pay a partial every month. 44% of the companies interviewed would like to pay for the meter installation cost in one payment but 3% of the companies prefer other ways.

iv) **Frequency of the visits by Vodokanal staff to read the wata meters**

a **Residential Users**

A quarterly bass is the most preferable frequency for Vodokanal's staff to visit in order to read the meters, for the residential users. Users also supported a monthly bases. 41% of the people prefered to see Vodokanal's staff quarterly for the in meter reading. This means that for most interviewed people, it is optimal that the meta reading be neither too often nor too seldom.

35% of the users would like Vodokanal's staff to visit every month. This shows that more than 1/3 of those interviewed need to know the exact volute water consumed and the monthly tariff. This means that 1/3 of the residential users will be the best users in terms of Vodokanal's cash flow management astray will chooe a monthly tariff settlement and may increase the efficiency of water consumption by saving

water.

18% prefered that their meters be checked only once a year. This means that almost 1/5 of the residential users interviewed fell that it is adequate to read themeters once a year. 6% or the least number of people, prefer to be visited every two months.

b **Corporate Users**

It turned out that a surprisingly large number of the companies interviewed preferred to have Vodokanal staff visit each mark to cead the mow. 73% of the companies interred would like to have their meters read every month. In general, from a management point of view, a well-managed company needs information or the exact volume consumed water and would prefer a monthly tariff in are to prepare the monthly report for management.

In addition, the present tariff for the companies seems to be expensive enough to make there users more sensitive to how much they consumed and to what their water tariff is. They will be the best users for Vodokanal's cash flow management by their monthly water tariff settlement if the monthly tariff collection system works well.

19% of the companies would like to be visited by the Vodokanal's staff on a quarterly bases. 4% of the companies prefer to be visited every two months and 4% of them prefer their meter to be checked once a year. 23% (19% plus 4%) of the corporate users interviewed prefer to delay payment for more than 3 months. They will be a potential negative factor in terms of the improvement of vodolcanal's cash flow.

v) **Preferable methods of payment of the water tariff**

a **Residential Users**

For most users it is most convenient to pay at Vodokanal's office. 41% of those interviewed would like to pay theis water tariff directly at the office of Vodokanal. 35% would prefer to pay at a bank or post office, this is was the second preference. 14% of the residents world prefer to pay by automatically withdrawal from their own bank accounts. Not as many people prefer to pay from their bank accounts, because most of them are not familiar with this practice, and do not have bank accounts.

b **Corporate Users**

91% of the companies interviewed would prefer to pay the water tariff from their bank account without the users' approval. This shows that automatic deduction is more convenient for the majority of companies than the present method which requires their approval. 9% do not prefer this way. This means that most companies feel it is inconvenient to pay by withdrawing money from their bank account and giving vodokaxal there approval.

5) **Awareness Water Leakage**

i) **Water Leakage**

a **Residential Users**

41% of the residential users answered that they had noticed water leakage from the water distribution pipes inside their houses. They, however, seem to rank water leakage as a lower priority than others problems such as the quality of the water because of the present fixed water tariff system. It was pointed out that they are interested in this issue and to see the results of saving water in a reductor of then tariff under the new metered tariff system. 40% of the residential users intevieued

would be responsible for finding water leaks to be repaid from the in-house water pipes.

Their awareness of water leakage, therefore, is evaluated as a high potential issue for the implementation of the water tariff collection system based or meter readings.Water leaks from the water distribution pipes between the meters and the water faucets inside the houses will increase the water tariff charged and will impose an additional burden on the residents who must repair the leales for themselves.

71% of the residential users interviewed said they were not satisfied with the quality of the repair services avaikblel. 55% of them want improvements in the quality of the repair service for water leakage. It was noted that only 16.2% of the apartment residential users were content with the services rendered by JEK.

b **Corporate Users**

22% of the corporate users in tervieured answered that they had noticed water leakage from the water distribution pipes inside their companies. It was pointed out that they need information to prevent water leakage and that this should be provided by t Vodokanal.

It was found that corporate users have much concerned about water leakage. Even in the case of manufacturing industries who use a high volume of water for production, water leaks inside their factories directly impact the increase in production costs under a metered tariff collection system.

ii) Repairer services for water leakage

a Residential Users

50% of the people apply for JEK service. 27% of the people ask Vodokanal to recommend an other shop or specialist. 21% apply to some repair shop or specialists. 2% of the residents prefer other ways including doing the repairs themselves.

These, 2/5 of the apartment residents do not ask JEK to repair their in-house water leaks. Only 61.9% of the apartment residents answered that they use JEK. The remaining 38.1 % use repair services recommended by Vodokanal (19.8%), repair shops which they selected (15.8%), or other ways (2%). This shows that the users in Chirchik tend to contact Vodokanal whenever they encounter water problems.

b Corporate Users

53% of the companies interviewed ask Vodokanal to recommend some repair shop or specialist. This shows that nearly half of the corporate users need repair information from Vodokanal. In the case of repairing water leaks in offices or factories, most cases may be so serious and complicated that the repair team is required to have considerable experience and skill. The users seem to contact Vodokanal to ask their professional advice and for a recommended repair service with plumbic skills. 42% of the cooperate users apply to some repair shop or specialists. They may have a connection to the repair shop or the specialists. 5% choose other ways.

iii) Satisfaction with repair services

a Residential Users

The majority of the people interviewed were dissatisfied with the repair services reordered. 71% of them were norsahstud with the repair service for water leakage.

29% of people are satisfied with the repair service which they applied for.

Most users expressed with JEK's repair service. Only 16.9% of the apartment residential users were content with the services of JEK. 83.8% were not happy with JEK's services.

b **Corporate Users**

It turns out that the majority of were content with the services rendered. 57% of the companies interviewed were satisfied with the repair services. 43% of the companies were not satisfied with repair service which they applied for.

iv) **Areas for improvement in water leakage repair services**

a **Residential Users**

From the users' point of view, the area require the most improvement is the quality of the repair services for water leakage. 55% of the residential users were not satisfied with the quality of the both in the quality of materials (i.e. spare parts) and of the repair skills. 22% of them considered that the repair fees were expensive. The fees may not hahve been reasonable enough to meet the quality of service they expected. 22% requested that the repairs be completed as soon as possible, once the booking has been confirmed. 1% waned improvement in other auras.

The apartment residents users who use JEK, whether they are content or not, indicated that the quality of the repair services should be improved. The apartment residents who use repairers other than JEK also responded that the quality of the services should be improved. It turned out that JEK's repair services for water leaks inside apartments (including skills, technology, technical training, and so on) were outdated and did not meet the users expectations.

b **Corporate Users**

It turns out that, from the users' point of view, the area requires the most inprsvement was the quality of the repair services for water leaks. 51% the of companies interviewed need more improvement in the quality of the repair services. This means that most companies have a keener sense of the quality of the repairs to stop water leakage, even though they expressed with the repairs. This supports the idea that corporate users requirea higher quality of materials (i.e. spare parts), and higher technical skills for repairing water leaks. 25% of the companies requesed that the repairs be completed as soon as possible once their bookings have been confirmed. This shows that the repair shop may not keep to their scheduled deadlier to finish the repairs. 24% responded that the repair fees were expensive.

6) **Areas for Vodokanal to Improve in the Near Future**

a **Residential Users**

The highest priority area to improve from the users' point of view is the issue of the safety of water quality for health reasons. 50% of interviewed users chose the item of safety of water quality for health. This means that nearly half of interviewed residential users are much concerned whether the quality of water maintains a safety level for their health, which they use in their apartments or houses in their daily life. It fits in with the result that the quality of water was the most reason why users were discontent with the present Vodokanal. In addition, we evaluate residential users' awareness on environmental issues is quite normal on this point that they are much concerned about the safety of drinking water.

The following priority area to improve is the issue of stability of water supply. It includes the water interruption and low pressure of water issues. 32% chose the item of stability of water supply. It also fits in with the result that the water interruption and the low water pressure were main reasons why users were discontent with the present Vodokanal

The third priority area to improve is the current water tariff including the price. 16% wish to decrease or improve the current water tariff. 1% of people accordingly answered that they would like to have a better tariff collection system. 1% need more communication with Vodokanal.

b **Corporate Users**

The most priority area to improve from the users' point of views is the issue of the safety of water quality for health. 46% of interviewed companies wish to improve water quality. It fits in with the result that the quality of water was the most reason why users were discontent with the present Vodokanal.

The following priority area to improve is the issue of the stability of water supply. 31% of them would like to have more stable water supply. It includes the water interruption and low pressure of water issues. It also fits in with the result that the water interruption and the low water pressure were main reasons why users were discontent with the present Vodokanal

The third priority area to improve is the current water tariff including the price. 16% of companies wish to decrease or improve tariff system. 3% and 3% of interviewed companies answered,respectively, that they prefer to have more communication with Vodokanal and better tariff collection system. 1% companies chose other items.

6.1.2. Findings on the First Survey

(1) Contentment with the Present Chirchik City Vodokanal

1) Residential Users

28% of the residential users interviewed answered that they were content with the present Chirchik City Vodokanal. This shows that the number of users satisfied with the present water supply services of the Vodokanal was surprisingly small.

The main reasons for 72% of the user discontent were water quality problems (27%), water tariffs (26%), water supply interruptions (23%), and so on.

This means that family finance issues as well as the safety and high quality of the water are highly ranked as significant factors for evaluating vodokaral's water supply services.

Result 1.1
Are you content with the present Vodokanal?
- Yes – 28%
- No – 72%

If "No", what is the reason?
- Water tariff – 26%
- Water tariff collection method – 3%
- Water supply interruptions – 23%
- Water quality problems – 27%
- Low water pressure – 18%
- Other – 3%

2) Corporate Users

In all 52% of the corporate users interviewed answered that they were content with the present Chirchik City Vodokanal. This shows that the majority of the corporate users were satisfied with the present water supply services of Chirchik City Vodokanal.

The rest (48%), however, were discontented with Chirchik City Vodokanal. This shows that many corporate users are not satisfied will the present water supply services of Vodokanal. The main reasons for the 48% rate of user discontent were the water quality problem (35%)

and water supply interruption (30%). This means that safety and the high quality of the water and a stable water supply are highly ranked as significant factors for evaluating Vodokanal's water supply services.

Looking at the answers, use roted that the water tariff (12%) and the water tariff collection method (11%), were ranked relatively lower in the user's awareness than the reasons given above.

Result 1.2
Are you content with the present Vodokanal?
- Yes – 52%
- No – 48%

If "No", what is the reason?
- Water tariff – 12%
- Water tariff collection method – 11%
- Water supply interruptions – 30%
- Water quality problems – 35%
- Low water pressure – 11%
- Other – 1%

(2) Satisfaction with the Water Quality

1) Residential Users

68% of the residential users interviewed answered that they were discontent with the quality of water supplied from Chirchik City Vodokanal.

The reasons for the discontent were turbidity (52%), red water (27%), and strange odor or taste (21%).

Result 2.1
Are you content with the quality of the water?
- Yes – 32%
- No – 68%

If "No", what is the reason?
- Red water – 27%
- Turbidity – 52%
- Strange odor or taste – 21%

2) Corporate Users

Approximhtrly 46% of the corporate users interviewed answered that they were discontent with the quality of water supplied from Chirchik City Vodokanal.

The reasons for the discontent were strange odor or taste (41%), turbidity (33%), and red water (26%).

Result 2.2
Are you satisfied with the quality of the water?
- Yes – 54%
- No – 46%

If "No", what is the problem?
- Red water – 26%
- Turbidity – 33%
- Strange odor or taste – 41%

(3) Water Supply Interruptions

1) Residential Users

81% of the residential users interviewed answered that they had suffered water supply interruptions.

In terms of the frequency of these interruptions, 35% of the residents answered that they had frequently experienced this inconvenionce.

Result 3.1
Do you encounter water supply interruptions?
- Yes – 81%
- No – 19%

If "Yes",
- Frequently – 35%
- Sometimes – 65%

2) Corporate Users

Some 69% of the corporate users interviewed answered that they had suffered water supply interruptions.

In terms of the frequency of these interruptions, 21% of the above users answered that they had frequently experienced this inconvenience.

Result 3.2
Do you encounter water supply interruptions?
- Yes – 69%
- No – 31%

If "yes",
- Frequently – 21%
- Sometimes – 79%

(4) Water Pressure

1) Residential Users

60% of the residential users interviewed answered that they had proper water pressure.

Result 4.1
Do you have proper water pressure?
- Yes – 60%
- No – 40%

2) Corporate Users

In all 89% of the corporate users interviewed answered that they had proper water pressure.

Result 4.2
Do you have proper water pressure?
- Yes – 89%
- No – 11%

(5) Water Leakage Inside Houses

1) Residential Users

41% of the residential users interviewed answered that they had noticed water leakage from the water distribution pipes inside their houses.

Result 5.1
Have you noticed water leakage from the water distribution pipes in your house?
- Yes – 41%
- No – 59%

2) Corporate Users

Approximately 22% of the corporate users interviewed answered that they had noticed water leakage from the water distribution pipes inside their companies.

Result 5.2
Have you noticed water leakage from the water distribution pipes in your company?
- Yes – 22%
- No – 78%

(6) Willingness and Ability to Pay the Present Water Tariff

1) Residential Users

i) Awareness on the present water tariff

47% and 18% of residential users interviewed STET answered "Expensive" or "Cannot pay" with respect to the present water tariff.

The majority (65%) of the users have negative awareness on ability to pay for the present water tariff.

On the other hand, 7% and 28% of the residential users interviewed, STET answered "Cheap" or "Proper level" for the present water tariff (Result 6.1).

ii) Type of residence

In terms of type of residence (apartment building, apartments with meters, houses), the awareness of the users interviewed or the present water tariff is shown in Table 6.1.3 below.

It turns out that the majority of the residents of apartment buildings both with and without meters answered that they were newilling or unable to pay the present water tariff.

To put it concretely, 51% and 21% of those interviewed who live in apartment building without meters answered "Expensive" and "Can-not pay," respectively, for the present water tariff. 33% and 33% of users living in apartment building with meters answered "Expensive" and "Can not pay," respectively, for the present water tariff.

On the other hand, only a majority (60%) of houses were willing and albe to pay the present water tariff. 48% and 12% of the residential users interviewed answered "Cheap" and "Proper level," respectively, for the present water tariff.

iii) Number of family members

In terms of thenumbers of family member (single, 2 members, 3-5 members, more than 6 members), the lever of awareness of the users interviewed on the present water tariff is shown in Table 6.1.4 below.

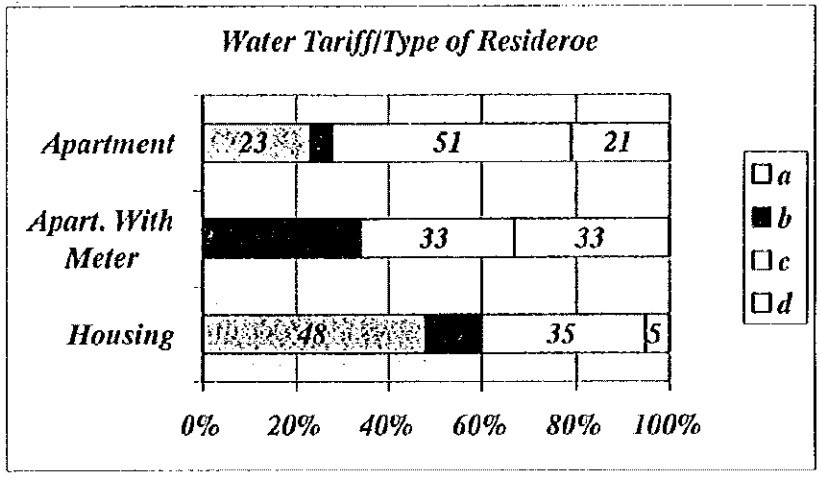
This shows that a majority each family category has a negative opinion of the ability to pay the present water tariff.

Result 6.1

What do you think about the present water tariff?

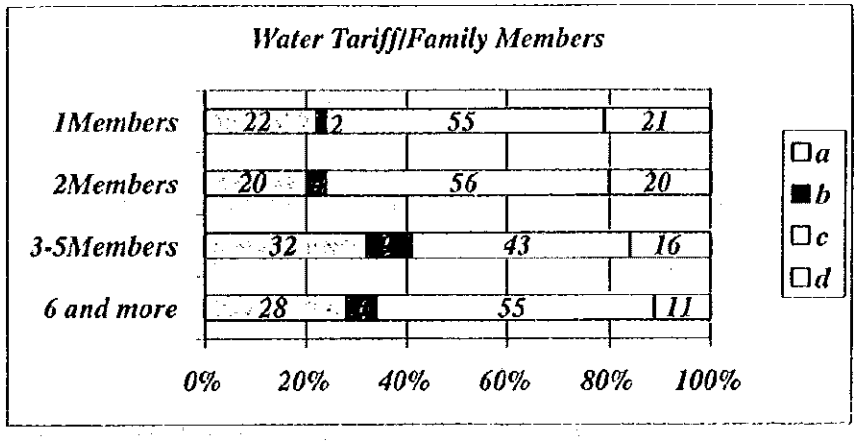
- Proper level – 28%
- Cheap – 7%
- Expensive – 47%
- Cannot afford to pay – 18%

Table 6.1.3



a) Proper b) Cheap c) Expensive d) Cannot afford to pay

Table 6.1.4



a) Proper b) Cheap c) Expensive d) Cannot afford to pay

2) Corporate Users

i) Awareness of the present water tariff

Some 8% and 62%, of the corporate users interviewed answered "Cheap" and "Proper level," respectively, for the present water tariff (Result 6.2). This means that a majority (70%) of the users are willing and able to pay the present water tariff.

On the other hand, 30% and 0% answered "Expensive" and "Cannot afford to pay", rasped very, for the present water tariff. Some 30% of the users have a negative awareness on ability to pay for the present water tariff.

ii) Type of industry

In terms of the type of industry (manufacturing industry, commerce, other industries except for communal services), the awareness of the users interviewed on the present water tariff is shown in Table 6.1.5 below.

It turns out that a majority (80%) of companies in the manufacturing industry sector surprisingly answered that they were usurllry is unable to pay the present water tariff. To put it concretely, 80% and 0% of the corporate users interviewed in the manufacturing industry sector answered "Expensive" and "Cannot afford to pay," for the present water tariff.

On the other hand, it turns out that a majority (more than 70%) of the corporate users in both commerce and other services answered that they were willing and able to pay the present water tariff.

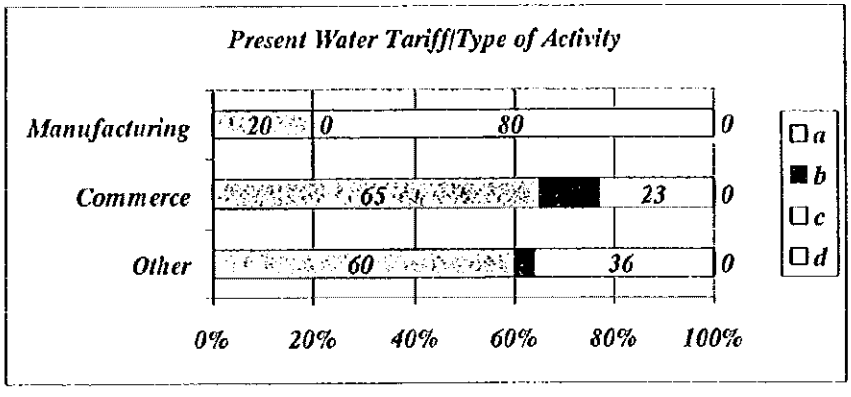
To put it concretely, 65% and 12% of the corporate users interviewed in the commerce sector answered "Proper" and "Cheap," respectively, for the present water tariff. Some 60% and 4% of the users in other services answered "Proper" and "Cheap," respectively, for the present water tariff.

This shows that a metered-rabe water tariff on system would impose a heavy burden in terms of increased production costs on the manufacturing industry sector because these compare need more water for production than other industries. The more water they consume, the higher the water tariff they would have to pay. In addition, most of the manufacturing companies in Chirchik are not considered financially strong.

Result 6.2

- **What do you think about the present water tariff?**
- Proper level – 62%
- Cheap – 8%
- Expensive – 30%
- Can not afford to pay – 0%

Table 6.1.5



a) Proper
b) Cheap
c) Expensive
d) Cannot ollord to pay

(7) Present Water Tariff Collection Methods

1) Residential Users

55% of the users interviewed answered that the present water tariff collection method was convenient.

Result 7.1
Are these payment methods convenient for you?
- Yes – 55%
- No – 45%

2) Corporate Users

51% of the users interviewed answered that the present water tariff collection method was inconvenient.

The alternative methods collection which they prefered were: "Withdraw from your bank account – (50%) ," "Pay to Vodokanal's collector or agent (37%) ," and so on.

Result 7.2
Are these payment methods convenient for you?
- Yes – 49%
- No – 51%

If "No", which method do you prefer?
- Pay to Vodokanal's collector or agent – 37%
- Pay to Vodokanal directly or through a bank – 9%
- Withdraw from your bank account – 50%
- Other – 4%

(8) Awareness on the Needs of More Communication with Chirchik City Vodokanal

1) Residential Users

i) More public relations activities

72% of the users interviewed answered that Chirchik City Vodokanal should

emphasize public relations more. The shows that most of the users are aware on the need for more communication with Chirchik City Vodokanal.

Result 8.1.1
Do you think that Vodokanal should emphasize more public relations

- Yes – 72%
- No – 28%

ii) **Content of information to be provided**

The quality of the water supply (25%), Water corseruch or (20%), Ways of preventing water leakage (12%),and Advising of water supply interruptions (11%) were the main issues or which the users need information from Chirchik City Vodokanal.

Result 8.2.1
If Vodokanal conducts more public relations activities, which areas should they emphasize?

- Service activities of Vodokanal office – 8%
- Technology of the waterworks systems – 8%
- How to implement water conservation – 20%
- Quality of water supply – 25%
- Water shortage at the source of the water supply – 8%
- Issues eorcering the management of Vodokanal – 2%
- History of water supply – 3%
- Ways of preventing water leakage – 12%
- Advising of water supply interruptions – 11%
- Schedule of the construction of waterworks – 3%
- Other – 0%

iii) **Communications media for public relations**

Advertising in newspapers or on the radio (28%), Question and answer services by direct contact (21%), and Posters (17%) are the main communications media through which Chirchik City Vodokanal should publicly communicate with the users.

Result 8.3.1
If Vodokanal initiates more public relations activities, how should they be conducted?

- Advertising in newspapers or on the radio – 28%
- Setting up internet guide for the users – 7%
- Posters – 17%
- Issuing regular newsletters – 7%
- Making brochures – 12%
- Inviting the users to Vodokanal's facilities – 6%
- Giving question and answer services which feature direct contact – 21%
- Other – 2%

2) Corporate Users

i) More public relations activities

Around 70% of the users interviewed answered that Chirchik City Vodokanal should emphasize more public relations activities. This shows that most of the users have an awareness of the need for more communication with Chirchik City Vodokanal.

Result 8.1.2
Do you think that Vodokanal should emphasize more public relations activities?

- Yes – 70%
- No – 30%

ii) Content of information to be provided

Quality of the water supply (24%), Water conservation (20%), Ways of preventing water leakage (13%), and Technology of the waterworks systems (10%) were the main issues an which the users need information from Chirchik City Vodokanal.

The Finding that water conservation issues along with water leakage issues are of great concern proves that corporate users are very interested in cost saving by putting in a water tariff collection system charged by means of reading meters for corporate users.

In addition, the quality of the water supply was as a great concern. This shows that corporate users are very interested in the quality of their product from the viewpoint of the safety of the water supplied.

Result 8.2.2
If Vodokanal conducts more public relations activities, which areas should they emphasize?

- Service activities of Vodokanal office – 7%
- Technology of the waterworks systems – 10%
- How to carry out water saving – 20%
- Quality of water supply – 24%
- Water shortage at the source of the water supply – 4%
- Issues averring the management of Vodokanal – 6%
- History of water supply – 2%
- Ways of preventing water leakage – 13%
- Advising of water supply interruptions – 9%
- Schedule of the construction of waterworks – 5%
- Other – 0%

iii) **Communications media for public relations**

Advertising in newspapers or on the radio (32%), Question and answer services by direct contact (21%), and Posters (16%) the main communications media through which Chirchik City Vodokanal should publicly communicate with the users.

Result 8.3.2
If the Vodokanal initiates more public relations activities, how should they be conducted?

- Advertising in newspapers or on the radio – 32%
- Setting up an internet guide for the users – 6%
- Posters – 16%
- Issuing regular newsletters – 4%
- Making brochures – 13%
- Inviting the users to Vodokanal's facilities – 7%
- Giving question and answer services while feature direct contact – 21%
- Other – 1%

(9) Awareness of Water Saving

1) Residential Users

i) Willingness to save water

81% of the users interviewed answered that they could save water. Most of the users surprisingly have a positive awareness on the necessity of saving water (Result 9.1).

ii) Type of residence

In terms of type of residence (apartments, apartments with meters, houses), the awareness of the interviewed users of water is shown in Table 6.1.6. below.

More than 80% of each type of resident answered that they well willing to save water.

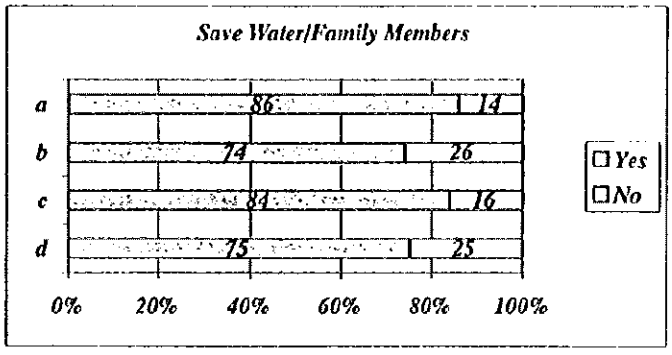
iii) Number of family members

In terms of the number of family members (single, 2 members, 3-5 members, more than 6 members), the awareness of the users interviewed on saving water is shown in Table 6.1.7 below.

More than 70% of each category answered that they were willing to conserve water.

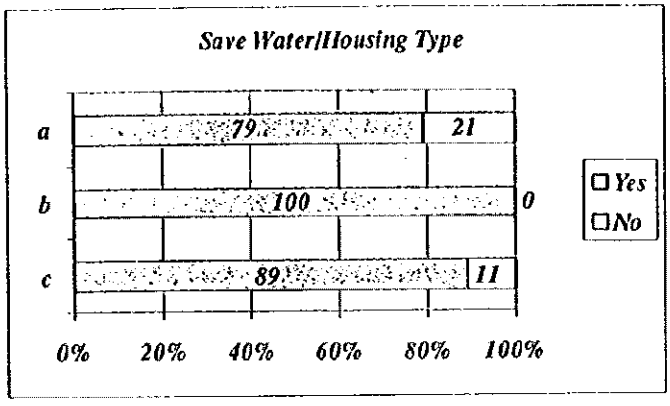
Result 9.1
Can your family save water?
- Yes – 81%
- No – 19%

Table 6.1.6



d. Apartment building
e. Apartment building with meters
f. Houses

Table 6.1.7



a. 1 member b. 2 members c. 3-5 members d. more than 6 members

2) Corporate Users

i) Willingness to conserve water

In all, 91% of the users interviewed answered that they could save water. Most of the users surprisingly have a positive awareness of saving water (Result 9.2).

ii) Meters

In terms of meters (corporate users with meters, corporate users without meters), the awareness of the users interviewed on saving water are shown in Table 6.1.8 below. More than 90 % of each type of corporate user answered that they were willing to save water. To put it concretely, 92% and 100% of corporate users with meter, and corporate users without meters, respectively, answered that they can save water. This shows that saving water is an issue that corporate users are highly concerned about.

iii) Type of industry

In terms of the type of industry (manufacturing industry, commerce, other industries except for communal services), the awareness of the users interviewed on the present

water tariff are shown in Table 6.1.9 below.

It turns out that most industries are aware of the need to conserve water.

To put it concretely, 90%, 92% and 100% of the manufacturing, commerce and other service industries, respectively, answered that they can save water.

Result 9.2
Can your company save water?
- Yes – 91%
- No – 9%

Table 6.1.8

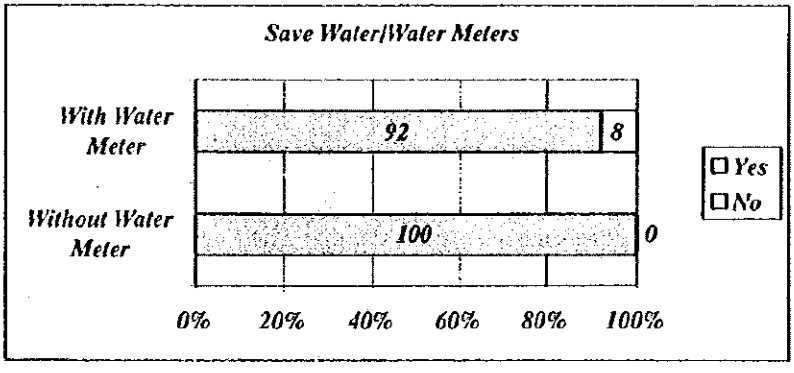
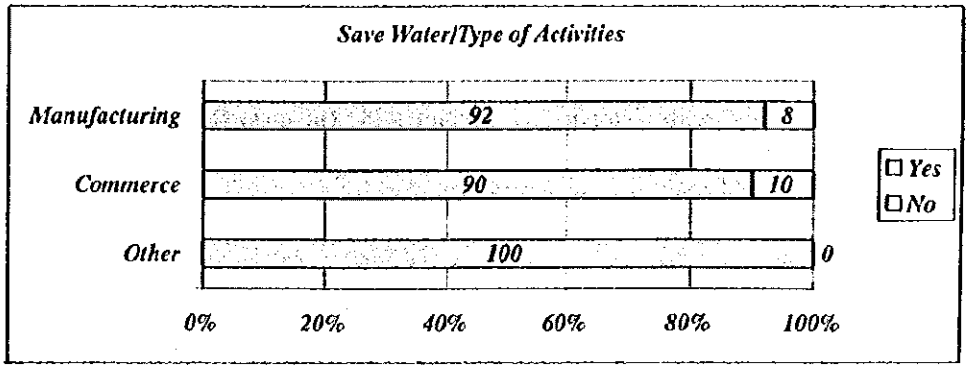


Table 6.1.9



6.1.3 Findings on the Second Survey

(1) Concept of a Water Tariff Based on the Volume of Water Consumed

1) **Residential Users**

Results show that most residential users believe that the water tariff is a fair tariff concept, and that charges should be calculated based on the volume of water consumed. 81% of the residential users interviewed answered that they would agree to pay more or less for the quantity of water they conserve.

However, 19% of them would not agree to pay according to the volume of water they consumed.

Result 1.1
Do you think it is fair to calculate and charge a water tariff based on more (or less) water consumed, i.e. the more (or the less) you consume the more(or less) have to pay in water tariff?
- Yes – 81 %
- No – 19%

2) **Corporate Users**

Results show that most corporate users consider that a metered water tariff is a fair concept and that charges should be calculated based on the volume of water consumed. 68% of the companies interviewed answered that they would agree to pay more (or less) for more (or less) water consumed.

However 32% of them would not agree to pay according to the volume of water consumed.

Result 1.2
Do you think that it is fair to calculate and charge a water tariff on the more (or the less) water consumed, the more (or the less) they above have to pay in water tariff?
- Yes – 68%
- No – 32%

(2) Metered Rare Tariff System According to Meter

1) **Residential Users**

Th Results prove that most residential users interviewed would agree to pay the water tariff according to the actual volume of water consumed as indicates by the meter readings.

63% of people agree with is system.

37% however, disagree with this system..

It turned out that more than half the opponents of the system need a safety net for the poor and the pensioners wither the system.

53% of the people who answered "No" would agree to pay according to meter if there is a safety net for those who are poor and for pensioners, and for there users to have a discounted water tariff.

43% of the people who answered "No" would agree to pay according to the meter reading if the water tariff is reduced in ondy for them to maintain their standard of living.

4% of the people who disagreed, would agree to pay under certain other conditions as follows: the tariff system should have a discount for a family with many children.

Result 2.1 **Do you agree that we need a tariff system based in meter readings to measure the actual volumes water consumed and to pay a fair amount for the water tariff ?** • Yes – 63% • No – 37%
If the answers is "No", **In order for you to agree to a metered rate tariff system to measure the actual water volume consumed and to pay a fair amount of water tariffs, what conditions would you need? Please choose one.** • We can keep or reduce the present water tariff for standard living – 43% • The system should have a safety net for those who are poor and for pensioners, and have a discounted water tariff for standard living. – 53% • Other – 4%

i) Analysis of type of housing

a Apartment Residents

Table 6.1.10 shows that 21.1% of the apartment residents disagred with the concept of a water tariff system which is based on the volume of water.consumed. 37% of these residents did not agree with a metered rake system to pay in the water tariff.

b Residents of Houses

On the other hand, 13.6% of homeowners disagreed with the concept of a water tariff system based on the volume of water consumed. 40.2% of the resident of houses did not agree with a nelered rate system to pay their water tariff.

This shows that residential users who live in defaced houses oppose the new tariff system even more than apartment residents do.

House residens users may feel that they will pays higher water tariff under this system than under the present fixed rate tariff system if they contirretocnsccme the same volume of waker.

They tend to consume a large volume of water because, in general, the number of family members in each house is higher than the number of residents in apartment unite and the area of each house is larger than that of an apartment unit.

Table 6.1.10
The Ratio of "No" Responses for Result 1.1 (R1.1) and Result 1.2 of resident (R1.2) to the Total Numbers of Each Residential Type
And The Reasons for "No" for R1.2 Residential users in Chirchik (%)

	"No" - R1.1 /Residence	"No" - R1.2 /Residence	The Reasons for "No" for R1.2 *		
			a	b	c
Apartments	21.1	37.0	41.4	57.2	1.4
Houses	13.2	40.2	46.0	46.0	8.0

*

Code	Conditions for agrllisp to a metered rate tariff system
a	New system should keep or reduce the level of the present water
	tariff for standard living.
b	New system should have a safety net discounted
	tariffs for those who are poor and pensioners for standard living.
c	Other

ii) **Social safety net under the new tariff system**

We analyzed the answers of those residential users who agreed with the water tariff concept in Result 1.1, but who disagree with a entered rate tariff system. Of the total number of residential users, this group accounts for 18% (81% "Yes" in Result 1.1 minus 63% "Yes" in Result 2.1).

18% show that they understand the concept itself, but are worried about a higher tariff as a result of the new metered rate tariff system.

We analyzed the reasons gwen by the opponents of the metered rate tariff system.

57.2% of apartment residents users and 46% of homeowner were against any system based on meter readings (Table 6.1.10) and feel that a tariff system based on meter readings should have a safety net which offers a discounted water tariff for the poor and for pensioners.

This shows that a revised tariff system based solely on the volume consumption would not be fully accepted. It is noteworthy that the opponents stand against the system, not only because of the increase in the water tariff, but because of their concerns about preserving the social safety net.

Most opponents feel that it is better and fairer to the community for the system to have a social safety net for the poor, the pensioners, and so on, so that the residents can maintain their standard of living.

2) **Corporate Users**

The results prove that most of the corporate users interviewed agreed to pay the water tariff according to the actual volume of water consumed as measured by the mater readings.

62% of the companies interviewed agreed with a metered rate system, but

38% of them did not agree with this system.

It turns out that more than half of the opponents of the system expressed a desire for a safety net for priority businesses.

59% of the people who answered "No" would agree to pay according to the meter readings if there were a safety net for priority businesses to have a discounted water tariff.

41% of the companies who answered "No" would agree to pay according to the meter if the system were to keep the tariff level less or not more than the present one for ordinary businesses.

Result 2.2 **Do you agree that we should have a metered rate tariff system based on the actual volumes water consumed and to pay a fair amount for the water tariff ?** • Yes – 62% • No – 38%
If answer "No", **In order for you to agree to a tariff system by reading meters to measure the actual water volume consumed and to pay the fair amount of water tariff , what conditions do you need? Please choose one.** • We can keep or reduce the present water tariff for ordinary business – 41% • The system should have a safety net for those who are in priority business of, to have a discounted water tariff to maintain their standard of living – 59% • Other – 0%

i) Analysis Type of Business

a Manufacturing Industry

25% of the corporate users in the manufacturing industry sector disagreed with the concept of a water tariff system based on volume of water the consumed. Also 34% of them did not agree that it is fair to pay for the water tariff according to the volume of water consumed as indicated in the meter readings.

53% of the companies which answered "No" would agree to pay according to the meter readings if the system aueieto keep the tariff level less or not more than the present one for ordinary businesses.

47% of the companies which answered "No" would agree to pay according to the meter readings if there is a safety net for priority businesses to have a discounted water tariff, and 0% of the people who disagreed practicint some other way.

b Commerce

36.5% of corporate users in commerce disagreed with the concept of water tariff based on the volume of water consumed. 40.1% of them did not agree that it is fair to pay in the meter readings according to volume of water consumed as indicated.

36.4% of the companies which answered "No" world agree to pay according to the meter readings if the system were to keep the tariff level less or not more than the present one for ordinary businesses. This was the smallest figure.

63.6% of the companies which answered "No" would agree to pay according to the meter readings if there were a safety net for priority businesses to have a discounted water tariff, and 0% of the people who disagreed prefer some other way.

It turnes out that the commerce users seem to feel that they should have a discounted tariff for being the priority industry in the country and most of them are private companies which want more support from the government.

c Other Industries

10.5% of the corporate users in other industries disagreed with the concept of a water tariff based on the volume of water consumed. Also, 26.3% of them did not agree that it is fair to pay according to the volume of water consumed as indicated in the neture readings. Both figures ware the smallest.

60% of the companies which answered "No" would agree to pay according to the meter readings if the system were to keep the tariff level less or not more than the present one for ordinary businesses.

40% of the companies who answered "No" would agree to pay according to the meter reading if there were a safety net for priority businesses to have a discounted water tariff, and 0% of those people who disagreed prefered some other way.

Most of the other industry users seem feel that the present tariff is not too expensive for them, even under a metered rate tariff syste. Some industries in this category responded that the water tariff should be kept the present level or discounted.

Table 6.1.11
The ratio of "NO " Responses for Result 1.2 (R 1.2) and Result 2.2 (R 2.2) to the Total Number of Each Industry
And The Reasons for "No" for R 2.2 Corporate users in Chirchik (%)

	"No" - R 1.2 /Industry	"No" - R 2.2 /Industry	The Reasons of "No" - R 2.2 *		
			a	b	c
Manufacturing	25.0	34.0	53.0	47.0	0
Commerce	36.5	40.1	36.4	63.6	0
Other	10.5	26.3	60.0	40.0	0

*

Code	Conditions for agreeing to a metered rate tariff system
A	New system should keep or reduce the level of the present water tariff for ordinary businesses.
B	New system should have a safety net with discounted tariffs for those who are priority businesses.
C	Other

(3) Disclosing Cost Elements and Transparency of Vodokanal Management

1) Residential Users

The results prove that the majority of residential users are interested in such information. 88% of the people interviewed would like Vodokanal to explain its management policies, but 12% of them responded that they do not need to know this information

Result 3.1
Do you think that the Vodokanal should disclose the cost elements of water tariff which the users pay, and should management reveal to the public their efforts to attain business efficiency?
- Yes – 88%
- No –12%

2) Corporate Users

The rResults prove that the majority of companies are interested in such information. 77% of the companies interviewed would like Vodokanal to explain its management policies, but 23% responded that they do not need to know this information.

Result 3.2
Do you think that the Vodokanal should disclose the cost elements of the water tariff that the users pay, and should management reveal to the public, their management efforts to attain business efficiency?
- Yes – 77%
- No – 23%

(4) Methods of Payment for the Cost of Installing the Warer Meters

1) Residential Users

79% of the users would prefer to pay for the installation of the meter by dividings the cost into the monthly tariff.

This means that, for most people, the installation cost is expensive, and they did not show the willingness or ability to pay it all at once.

15% of the people would interviewed prefer to pay for the meter installation cost all at once after installation. We can assume that this 15% have the financial ability to pay it all at once.

6% of the people would prefer other ways of payment.

Result 4.1
If you have to pay the installation cost of the meter, what method of payment would you prefer?
- To pay the entire cost once at the time of the installation – 15%
- To pay the cost divided into the monthly water tariff after the installation – 79%
- Other – 6%

2) Corporate Users

53% of the companies interviewed would like to pay for the installation of the meter by dividing the cost into the monthly tariff. This means that most companies would prefer to pay a portion of the cost every month.

44% of the companies interviewed would like to pay the entice meter installation cost all at one time, but 53% prefer to pay by monthly instalments,.3% of companies would prefer other

ways of payment.

Result 4.2
If you have to pay the installation cost of the meter, what kinds would payment do you prefer?

- Pay the entire cost once at the time of the installation – 44%
- Pay the cost divided into the monthly water tariff after the installation – 53%
- Other – 3%

(5) Frequency of Vodokanal Staff Visits to Read the Meters

1) Residential Users

The esults prove that a quarterly basis is the most popular frequency for Vodokanal staff visits to do the meter readings, at the homes of residential users. Users also supported a monthly basis.

41% of the people would prefer to see Vodokanal staff quarterly for meter reading. This means that for most people interviewed, it is optimal to be visited neither too often nor too seldom.

35% the of users would like Vodokanal staff to visit every month. This shows that more than 1/3 of the interviewed people need to know the exact volume water consumed and the monthly tariff charge. This means that 1/3 of the residential users will be the best users for Vodokanal's cash flow management in terms of monthly tariff settlement. This indicates a desire to achieve efficiency of water consumption by pacfiuip water conservator.

18% of them would prefer that their meter be checked once a year.
This means that almost 1/5 of the residential users interviewed feel that it is adequate to read the meter once a year.
6%, or the least number of people, would prefer to be visited every two months.

Result 5.1
How often do you think employees of Vodokanal should visit you for reading meter?

- Monthly – 35%
- Every 2 months – 6%
- Quarterly – 41%
- Once in a year – 18%

2) Corporate Users

It turnes out that a surprisingly large number of the companies interviewed would prefer to have Vodokanal staff visit monthly for meter reading.

73% of the companies interviewed would like to have their meter reading every month.

In general, from a management point of view, a well-managed company needs the information of exact volume of water consumed and the tariff on a monthly basis in ord to prepare their monthly report for management.

In addition, the present tariff for the companies seems to be expensive enough to make the users more sensitive as to how much water they consume and what their water tariff is. Nearly 3/4 of corporate users, therefore, seem to have a keen sense of their water costs for management purposes.

They will be the best users for Vodokanal's cash flow management in terms of their monthly water tariff settlement if the monthly tariff collection system works well.

19% of hte companies would like to be visited quarterly by Vodokanal staff.

4% of the companies prefer to be visited every two months

4% of them prefer their meters to be checked onaiy once a year

23% (19% plus 4%) of the corporate users interviewed would prefer to delay payment for more than 3 months. They will be a potential factor against the improvement of Vodokanal's cash-flow shortage and this is a tariff collection issue for Vodokanal management to consider.

Result 5.2
How often should employees of Vodokanal visit and read the meter?

- Monthly – 73%
- Every 2 months – 4%
- Quarterly – 19%
- Once a year – 4%

(6) Preferred Way of Paying the Water Tariff

1) Residential Users

The results show that for most users it is convenient to pay at Vodokanal's office.

41% of the people interviewed would like to pay the water tariff directly at the office of Vodokanal.

35% of them would prefer to pay at the bank or post office. This is the second most popular way.

14% would prefer to pay by having the money automatically with drawn from their own bank accounts. Not as many people prefer to pay from their bank accounts, because most of them are not familiar with this practice, and do not have bank accounts.

10% of the people would prefer other ways.

Result 6.1
Which is the best way of paying of the water tariff? Please choose one.

- Visit Vodokanal office to pay directly – 41%
- Visit a bank or post office to pay – 35%
- Have the payments with drawn automatically from your bank account – 14%
- Other – 10 %

2) Corporate Users

Automatic payment from the company's bank account without any prior approval was the most popular response.

91% of the companies interviewed would prefer to pay the water tariff from their bank account without users' approval. This shows that automatic deduction is more convenient for the majority of companies than the present method which requires their prior approval.

9% do not prefer this way.

This means that most companies feel it is inconvenient to pay by withdrawing money from their bank account with their approval.

Result 6.2
Do you think that it is reasonable for Vodokanal to with draw water tariff amounts from the company's bank account without any approval?
- Yes – 91%
- No – 10%

(7) Methods of Conserving Water and Saving on the Related Expenditures

1) Residential Users

40% of the residential users interviewed would like to take responsibility for finding water leaks from their own in-house water pipes for repair. This shows that 2/5 of them recognize that they waste water because of in-house water leakage.

19% of the residents would like to turn off the taps tightly after using water.

It turns out that nearly 60% (40% plus 19%) of the residents are auare of wasting water supply or the risk by such ways.

However, a potential factor to improve the efficiency of water supply consumption is whether the users will take practical measurly, such as above, to reduce the volume of wasted water, which neither benefits the users in daily life nor Vodokanal's revenue. In this case the meter reading system is expected to work well.

29% (1/3) of them chose carefully checking the volume of water consumed and the water tariff charged every time they receive the water tariff invoice issued after each meter reading.
5% of people chose instructing their family members how to conserve action to save water and to reduce expenditures to encourage their cooperate.

6% of the residential users interviewed said that they needed more information on how to save water efficiently.
1% of them would prefer other ways.

Result 7.1
If you have a meter in your house and you decide to reduce your monthly water tariff, which methods would you choose? Choose 3 of the items below.

- Carefully monitor the water volume consumed and the water tariff amount charged every time – 29%
- Be careful to find water leaks from your water pipes for repair – 40%
- Be careful to completely close all the water faucets in your house whenever you finish using water – 19%
- Collect more information on how to conserve water – 6%
- Give instructions on how to save water to your family members to encourage family cooperation – 5%
- Others – 1%

2) Corporate Users

31% of the corporate users interviewed would like to take responsibility for finding water leaks from the water pipes inside the office or factory which require repair. This shows that 1/4 of them recognize that they waste water because of leakage at the office or factory.

22% of the corporate users would like to turn off the taps tightly after using water.
It turns out that more than half (31% plus 22%) of the users try (or will try) to take practical action to reduce the volume of wasted water, which has no benefit to their business.

24% of the corporate user chose carefully checking the water volume consumed and the water tariff charged every time they receive the water tariff invoice issued after the meter reading. This shows that nearly 1/4 of the users are sensitive to how much water they consumed and to

how high the water tariff is under the present tariff system.

13% of the cony units chose instructing their employees to cooperate in taking measures to save water and water cost.

10% of the interviewed corporate users need more information on how to save water efficiently.

0% of them would prefer other ways.

Result 7.2
If you already have a meter, and you decide to reduce your monthly water tariff, which methods would you choose? Choose 3 of the items below.

- Carefully monitor the water volume consumed and the water tariff amount charged every time – 24%
- Be careful to find water leaks from your water pipes for repair – 31%
- Be careful to completely close all the water faucets in your offices or factories whenever you finish using water – 22%
- Collect more information on how to conserve water – 10%
- Give instructions on how to save water to your employees to encourage their cooperation – 13%
- Others – 0%

(8) Repair Services Used to Repair Water Leaks

1) Residential Users

50% apply for JEK repair service.

27% ask Vodokanal to recommend a repair shop or specialist

21% apply to some repair shop or specialist or do the repairs themselves.

2% prefer other ways.

Result 8.1
Whom do you ask to repair water leakage in your house, if you have trouble?

- JEK – 50%
- Ask Vodokanal to recommend repair shops or repair professionals – 27%
- Ask repair shops or repair professionals – 21%
- Other – 2%

Utilization of JEK

Table 6.1.12 shows that approximately 2/5 of the apartment residential users do not ask JEK to repair their in-house water leaks.

Only 61.9% of the apartment residential users answered that they use JEK. The remaining 38.1 % use repair shops recommended by Vodokanal (19.8%), repair shops selected by the users (15.8%) or other ways (2.5%).

Table 6.1.12
Repairer services used by Apartment Residents in Chirchik City and Satisfaction with their service

Repair services used by Apartment Residents	Number		Satisfaction of their services		
	Person	%	Yes No	Person	%
JEK	247	61.9	Yes	40	16.2
			No	207	83.8
Repair shops or professionals Recommended by Vodokanal	79	19.8	Yes	18	22.8
			No	61	77.2
Repair shops or professionals Selected by users themselves	63	15.8	Yes	21	33.3
			No	42	66.7
Others	10	2.5	Yes	5	50.0
			No	5	50.0
Total	399	100.0	Yes	84	21.1
			No	315	78.9

2) Corporate Users

53% of the companies interviewed ask Vodokanal to recommend a repair shop or specialist. This shows that more than half of the corporate users need repair information recommended byfrom Vodokanal.

The users are supposed to contact Vodokanal to ask for their professional advice, well as, for a recommended repairer service with plumbing skills.

42% apply to a repair shop or specialist themselves. They may have a connection to the repair shop or the specialist.

5% find other ways to repair the leaks.

Result 8.2
Whom do you ask to repair water leaks at your company?
- Ask Vodokanal to recommend a repair shop or repair professional – 53%
- Ask other repair shops or repair professionals – 42%
- Other – 5%

(9) Satisfaction with Repair Services

1) Residential Users

The results show that the majority of the homeousners intervieuled were not satisfied with the repair services.

71% of them were discontent with the repair service for water leaks.

29% of the residents were satisfied with the repair services.

Table 6.1.12 shows that repair professionals in Chirchik, in feneial, are not supported by the majority of apartment residents.

Result 9.1
Are you satisfied with the repair services?
- Yes – 29%
- No – 71%

Dissatisfaction with JEK

Table 6.1.12 shows that most users are not satisfied with the repairs done by JEK.

Only 16.2% of the apartment residents users who use JEK for repairs are content with the services rendered by JEK. The majority, or 83.8%, are dissatisfied with JEK's services.

2) Corporate Users

It turns out that the majority of the corporate users were content with the services rendered.

57% of the companies interviewed were satisfied with the napair services. 43% of the companies however, were not satisfied with the repair services.

Result 9.2
Are you satisfied with the repair services, which you usually use?
- Yes – 57%
- No – 43%

(10) Areas Repair Services for Water Leaks to be Improved

1) Residential Users

The results show that, from the point of view of the homeowners, the which requests the most improvement is the quality of the repair serves for the water leaks. 55% of the residential users interviewed were not satisfied with the quality of these services. Which needs to be improved both in terms of the quality of materials (i.e. spare parts) and of the skill for repairing water leaks.

22% of the residents considered that the repair fees were expensive. The fees may not be reasonable enough to meet the quality of repairs which the residents expect.

22% of them requested the repairs be completed as soon as possible once a booking has been confarmed is confirmed.

1% want service to improve the other areas.

Result 10.1
Which areas should be improved by the repair service?
- The quality of the service – 55%
- Price of the service – 22%
- Schedule to finish to repairs – 22%
- Other – 1%

Low Quality of Repair Service

Table 6.1.13 shows that the apartment residents users who use JEK, whether they are satisfied or not, think that the quality of repair services should be improved.

In addition, most apartment residential users who use the recommended repairers by Vodokanal consider that the time schedule to finish as well as the quality of the service should be improved.

It turned out that JEK's repair services for water leaks inside apartment building including skills, technology, technical training, and so on, are outdated and do not meet the users expectations.

Table 6.1.13
Repair services used by Apartment Residents in Chirchik City and Areas of Service which Require Jupuovenent

Repair services to be hired by Apartment Residens	Satisfaction with repair their services		Areas for improvement*				
	Yes / No	Number of people	a	b	c	d	Total (a-d)
JEK	Yes	40	52%	30%	18%	0%	100%
	No	207	67%	20%	13%	0%	100%
Repair shops or Professionals Recommended by Vodokanal	Yes	18	50%	11%	39%	0%	100%
	No	61	31%	30%	39%	0%	100%
Repair shops or professional Selected by the users themselves	Yes	21	76%	14%	10%	0%	100%
	No	42	46%	33%	19%	2%	100%
Others	Yes	5	80%	0%	0%	20%	100%
	No	5	60%	20%	0%	20%	100%

*

Category	Areas to be Improved
a	Quality of Services
b	Price Services
c	Time schedule to finish the repairs after booking
d	Other

2) **Corporate Users**

It turs out that from the corpnate users' point of view, the area to improve the most is the quality of the repair services for the water leaks. 51% of the companies interviewed mentioned the need for improvement in the quality of repair services. This means that most companies have a keener sense of the quality of repairs to stop water leaks, even though they expressed overall satisfaction with the repair services as shown above (12). This is supported by the fad that corporate users require a higher quality of materials (i.e.Spare parts) and higher technical skills for repairing water leaks.

25% of the companies requested that the repairs be completed as soon as possible once their

booking has confirmed. This shows that the repair professionals may not be meeting theis deadlines for repairs.

24% of the copoate users responsed that the repain fees were expensive.

None of them indicated that other areas.

Result 10.2
Which areas should be improved by the repair tervtels? Please choose any item

- The quality of the services – 51%
- The price for the services – 24%
- Time to finish the repairs – 25%
- Other – 0%

(11) Areas to be Improved by Vodokanal in the Near Future

1) Residential Users

The highest priority area, from the users' point of view, is the issue of the safety of the water quality for health.

50% of the users interviewed chose the item safety of water quality for health. This means that half residential users interviewed are concerned about whether the quality of the water is kept at a safe level for their health. They use this water in their apartments or houses, and in their daily life.

The priority area chosen was the issue of the stability of the water supply.

32% chose the item "stability of water supply."

The third priority area is the current water tariff including the price.

16% want to decrease or improve the current water tariff.

1% and 1% answered that they would like to have a better tariff collection system and more communication with Vodokanal, respectively.

0% of them wonld prefer other areas.

Result 11.1
Which areas should be improved by Vodokanal in the near future?

- Safety of water quality for health (according to GOST "Drinking water") – 50%
- Stability of the water supply (i.e. prevent water interruptions, mairtain proper water pressure) – 32%
- Rreduction or improvement IN the current water tariff – 16%
- Improvement IN the current water tariff collection system – 1%
- Communication with the users (disclose management results of Vodokanal, provide the users with useful information, or set up a public relations section to ask answer questions) – 1%
- Other – 0%

2) **Corporate Users**

The highest priority area, from the corporate users' point of view is the issue of the safety of water quality for health. 46% of companies interviewed wish to improve the water quality.

The following priority area is the issue of the stability of the water supply. 31% would like to have a more stable water supply.

The third priority area is the current water tariff including the price.

16% of the companies wish to decrease or improve the tariff system.

3% and 3% of the companies interviewed answered that they prefer to have more communication with Vodokanal, and a better tariff collection system, respectively.

1% prefer other areas.

Result 11.2
Which areas should be improved by the Vodokanal in near future? Please choose 3 items below and state their in priority.

- Safety of water quality for health (according to GOST "Drinking water") – 46%
- Stability of the water supply (i.e. prevent water interruptions, keep proper water pressure) – 31%
- Reduction or improvement of the current water tariff – 16%
- An improvement of the current water tariff collection system – 3%
- Communication with the users (disclose management results of Vodokanal, provide the users with useful information, or set up a public relation section to answer any questions) – 3%
- Other – 1%

6.2 Water Consumption Research

6.2.1 Outline of Research

The target water demand for Chirchik City was set by Vodokanal at 400 L/cap/day. However, as this was not based on actual data, it is virtually unsupportable.

The results of water meter measurement using show that the actual consumption is probably one half to one third of this target demand. The target demand value should therefore be compared with the actual data.

The original scope of this study was to install water meters and conduct measurement only in Tashkent; however, it was decided to conduct the same survey in Chirchik to examine the average water demand per capita, as it is one of the most important fundamental factors for the planning of a water supply system and the design of the facilities.

In Chirchik, water meters have been installed in a few dozen houses and these households are being billed for their water consumption, however, no apartment buildings have yet had installed.

6.2.2 Selection of Target Area

(1) Selection of District and Installation Sites

The criteria for water meter installation in Chirchik were basically same as in Tashkent. Fifty detached (individual) houses, ten apartment buildings of four to five-stories each, and one 12-story apartment building were selected, as shown in Table 6.2.1. This 12-story apartment building is the only one higher than nine-stories in Chirchik.

After discussions with Chirchik City Vodokanal concerning appropriate sites for water meter installed, the Study Team selected the Ozotchik District for a measurement survey since this area has hundreds of similar types of houses located close to each other. These houses are about ten years old and typical example of residential housind in Chirchk City.

The Ozotchik District is located at a high altitude in the northeastern end of the city.

Table 6.2.1 Number of Meter Installation

Type of Housings	No. of Meters	Diameter of Meter
Detached houses	50	20 mm
Apartment Buildings (4to 5 stories)	10	50 to 80 mm
Apartment Buildings (12 stories)	1	80 mm

Ten apartment buildings of four to five stories were selected in the N10 District near the Ozotchik District. The 12-story apartment also selected is located in the Construction District on a hilly area in the center of the city.

Figure D.6.2.1 shows the location of detached houses and apartment buildings the selected in Chirchik.

(2) Selection of Detached Houses

The location of the selected houses with installed meters is presented in Figure 6.2.1.

The average area of premises is about 400 sq.m with a house area of 100 sq.m. People do not yet have private cars nor do they raise cattle.

After the meter installation started in August, progress was slow due to the objections of certain residents. Only 30 houses had meters installed as of 10 September; however all 50 units had been installed as of the end of September.

Table D.6.2.1(1) presents a summary of the basic data collected in early September on 24 houses.

O Houses in Which Water Meter were Installed

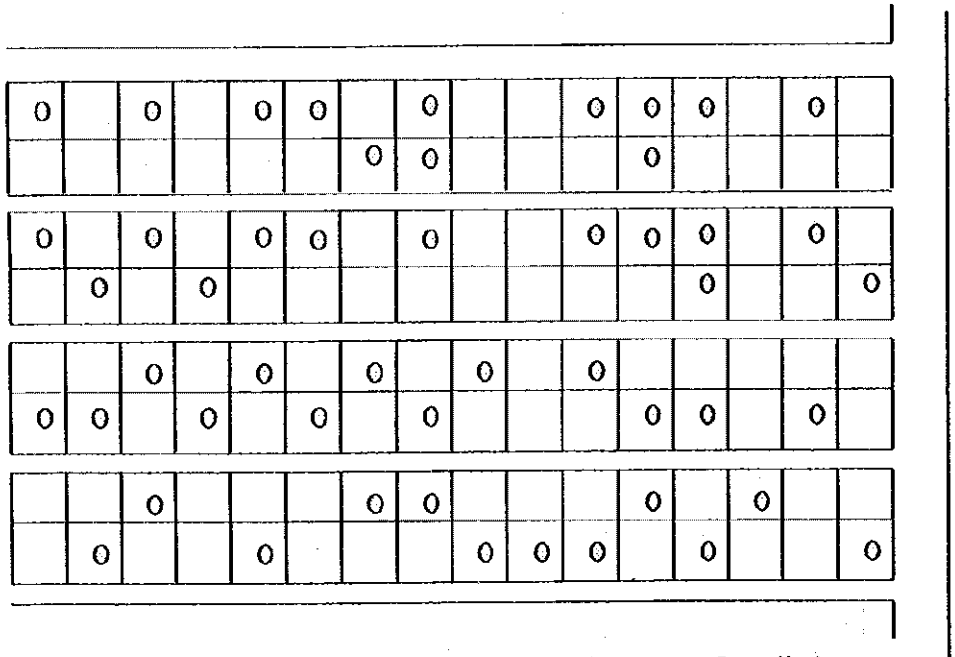


Figure 6.2.1 Detached Houses in Which Water Meter were Installed

The average number of family member; per household in the Ozotchik District is 3.4. Houses have an average garden area of 70 sq.m which requires watering. There are no houses which having swimming pools or fountains of the premises.

The Ozotchik District has a sewer system. All houses selected for water meter installation were connected to the sewer system.

(3) Selection of Apartment Buildings

Figure 6.2.2 shows the location of the apartment buildings in the N10 District and the 12-story apartment building in which water meters were installed. The basic data for these apartment buildings are shown in Table D.6.2.1(2).

Out of 11 apartment buildings, four have 32 units each and six have 90 units each. The 12-story apartment building has only 48 units.

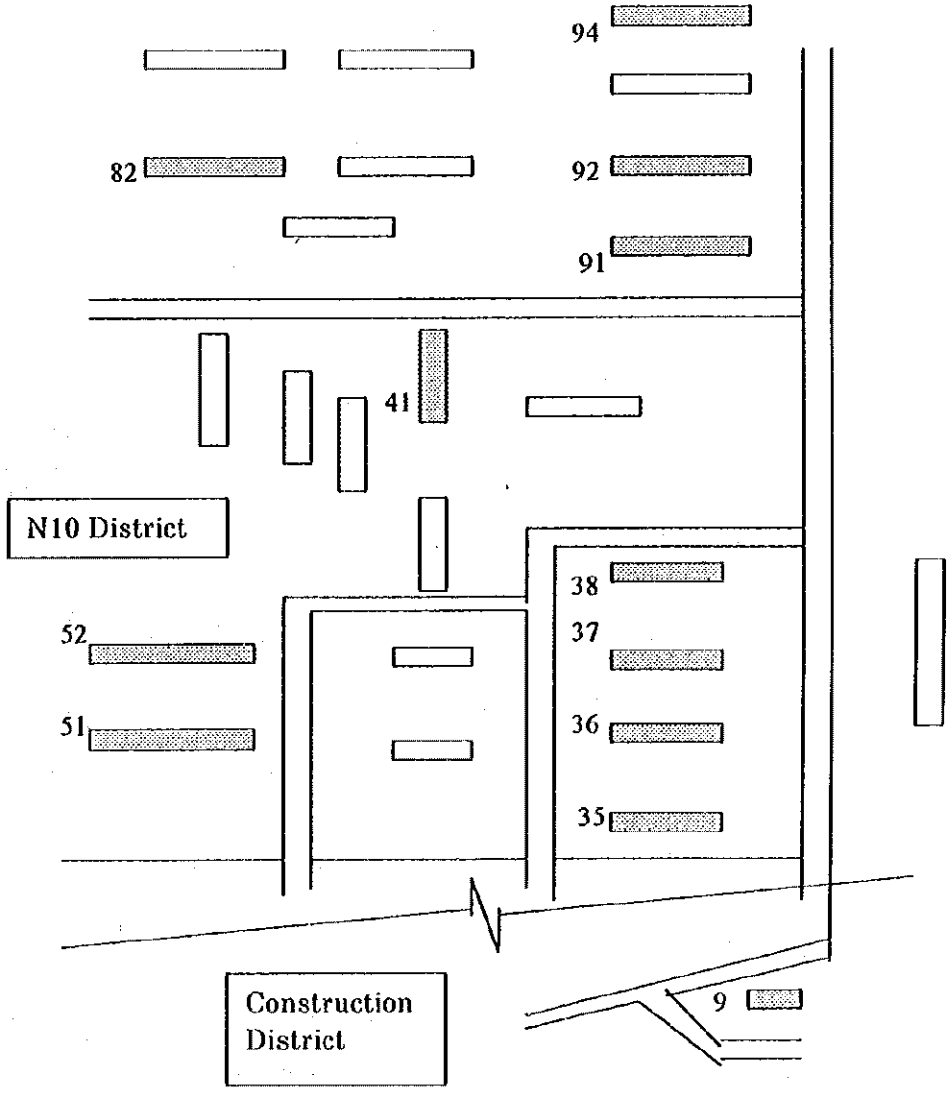


Figure 6.2.2 Location of Apartments Buildings with Water Meters

Out of these 716 apartment units, only 613 were occupied; thus, the vacancy rate was 14 percent. From the total population of 1,687, the average number of family members was calculated at 2.95, which is lower than 3.4 for the detached houses.

In the sample population surveyed for water meter installation, the number of occupants in the apartment buildings was ten times higher than that of the detached houses (50 houses x 3.4 = 170).

6.2.3 Installation of Water Meters

(1) Detached Houses

The objections of certain residents for installing water meters, installation was carried out only in those houses whose residents agreed to the installation. As most of the connecing pipes are laid shallower than 0.5 m in the ground in the Ozotchik District, meter installation was conducted easily.

Photo 6.2.1 shows a typical view of the housing in the area of the water meter installation.

Photo 6.2.1 An avenue in the Azotchik District

As in Tashkent, water meters are defined as the property of the owners of the houses and are installed inside the premises of each house.

Photos 6.2.2 and 6.2.3 show the water meter installation work and an installed meter, respectively.

(2) Apartment Buildings

Apartment buildings in Tashkent and Chirchik have basements rooms and are supplied with drinking water, hot water, gas, sewage facilities and electricity.

Photo 6.2.2 Installing a water meter in a detached house

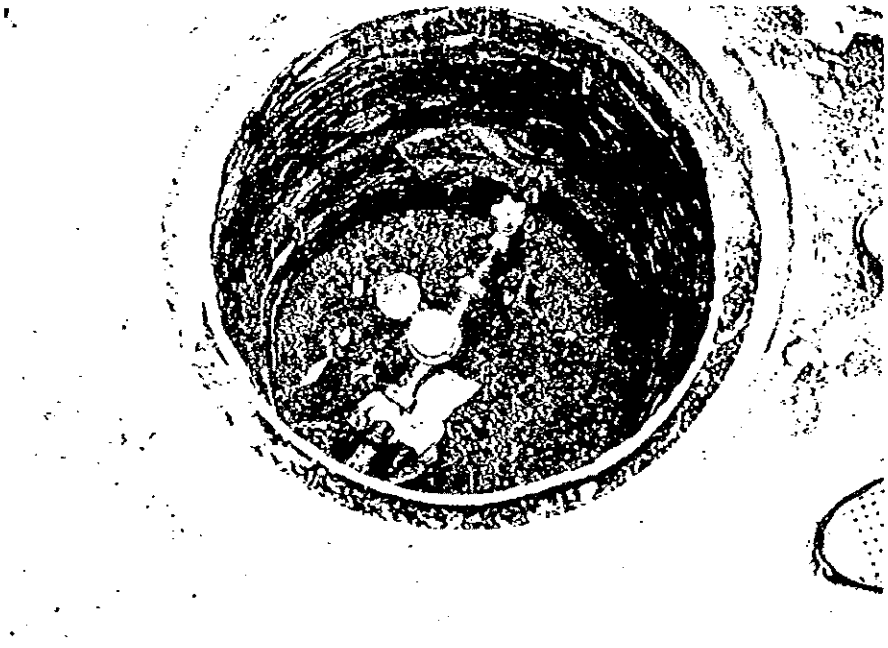


Photo 6.2.3 A water meter in installed detached house

Although the water supply pipes were designed to accommodate a water meter to be installed in a basement, the Study Team installed the water meters, cutting and welding the pipes to fit the purchased meters at location deemed suitable.

Photo 6.2.4 shows an installed water meter.

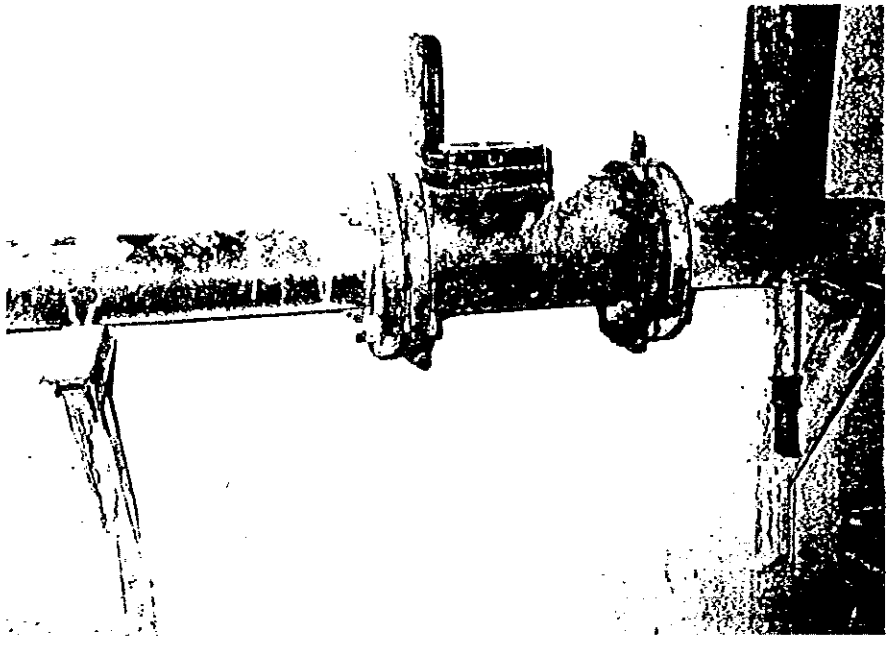


Photo 6.2.4 A water meter installed in an apartment Building

6.2.4 Measurement of Water Consumption with Meters

(1) Survey Sheet

The survey sheets used for Chirchik are same as those used for Tashkent, which were designed to include that basic data for each house and the meter readings. Meter reading were scheduled to be carried out three times, once each in August, September, and November. Readings in some areas were, however, delayed to September for the first reading. Survey sheets are to be collected after each reading while new sheets are distributed for the consecutive readings.

For apartment buildings, two types of survey sheets were prepared in Russian from the original sheets shown in Table D.5.2.3, D.5.2.4 (1) and D.5.2.4(2) in English. A survey sheet in Table D.5.2.4 (1) is used to collect the basic data on the apartment buildings and the result of the meter readings. The survey sheet in Table D.5.2.4 (2) is designed for specific data for each apartment unit.

Meter reading is to be conducted three times as well at the detached houses. Both sheets in Table D.5.2.4 (1) and (2) were collected after the first reading; and only the data portion of Table D.5.2 4 (1) were distributed to be filled in.

(2) Meter Reading at Detached Houses

The results of three times measurement at detached houses are summarized in Table D.6.2.2(1) to (3). The daily date readings of 24 houses were data of 24 houses were conducted from August 24 to September 8 an the first reading, those of 46 houses were made from September 20 to 26 as the second reading and those of 34 houses were made from November 22 to 28 of the third.

Table 6.2.2 shows the results of the first measurement and the data for each detached house. The data of each measurement in these tables show large water consumption of 636 L/capita/day as the first measurement, of 748 L/capita/day as the second and of 507 L/capita/day as the third on the average. This consumption tendency was very similar to the first and the second measurement result of Tashkent.

But third measurement decreased to one third of first and second measurement, however that of Chirchik only decreased to 80 %.

The reason of this difference is likely that the water tariff of Tashkent City was collected by the meter rate systems but that of Chirchik City was Collected made per capita. Therefore people of surveyed area in Tashkent City saved water made but not in Chirchik City.

(3) Meter Readings of Apartment Buildings

Table D.6.2.3 shows the results of three times measurement for apartment buildings. Out of 15 water meters installed, one meter could not measure flow due to mechanical problems in the first and the second measurement. The data from 10 buildings were collected from August 25 to 30 as the first measurement, the data from 10 buildings were collected from September 23 to 29 as the second and the data from 11 houses were collected from November 23 to 29 as the third.

Table 6.2.3 presents both the basic data and three times measurement results for the selected apartment buildings. The calculation was made for the average consumption per capita of all the apartment buildings. The average consumption of the first measurements was similar to the figure of the detached houses, 685 L/capita/day. The second and the third measurement result decreased to 70% to 80% of the first. It seems that the cause is significant low consumption of only three or four apartment buildings. The apartment with the consumption less than 100 L/capita/day is excepted, and the average consumption of the rest because 516 L/capita/day as the result of the second and 569 L/capita/day as the third.

Table 6.2.2 Water Consumption at Detached House

No.	House No.	Address	No. of Occupants	Total Area(x100sq.m) Total	House	Garden	No of Taps	Other Cars	Other Poos/ Fountains	Water Consumtion Profile (1) Aug.25 to Sep.8 Cu.m/d	Cu.m/d.person All	Cu.m/d.person Omit too little and much	Cu.m/d.person Omit too little	Water Consumtion Profile (2) Sep.20 to Sep.26 Cu.m/d	Cu.m/d.person All	Cu.m/d.person Omit too little and many	Cu.m/d.person Omit too little	Water Consumtion Profile(3) Nov.22 to Nov.28 Cu.m/d	Cu.m/d.person All	Cu.m/d.person Omit too little and many	Cu.m/d.person Omit too little
1	2		5	4	1	-	2	-	-	4.00	0.800	0.800	0.800	1.00	0.200	0.200	0.200	2.17	0.433	0.433	0.433
2	4		3	4	1	1	2	-	-	3.62	1.207		1.207	4.33	1.444		1.444	1.17	0.389	0.389	0.389
3	5		2	4	1	1	2	-	-	2.50	1.250		1.250	2.50	1.250		1.250	1.83	0.917	0.917	0.917
4	6		2	4	0.8	1	2	-	-	0.92	0.460	0.460	0.460	0.67	0.333	0.333	0.333				
5	9		5	4	0.9	1	3	-	-	1.82	0.364	0.364	0.364	1.17	0.233	0.233	0.233	1.50	0.300	0.300	0.300
6	11	Marshak	5	4	1.2	1	2	-	-	1.00	0.200	0.200	0.200	0.67	0.133	0.133	0.133	2.00	0.400	0.400	0.400
7	12	Street	3	4	1	1	3	-	-	2.23	0.743	0.743	0.743	2.33	0.778	0.778	0.778	0.33	0.111	0.111	0.111
8	13		7	4	0.9	-	1	-	-	1.00	0.143	0.143	0.143	1.00	0.143	0.143	0.143	1.50	0.214	0.214	0.214
9	18		1	4	1	1	2	-	-	1.31	1.310		1.310	0.67	0.667	0.667	0.667	2.00	2.000		2.000
10	20		2	6	1	0.3	2							10.00	5.000		5.000				
11	21		5	4	1.2	1	2	-	-	3.46	0.692	0.692	0.692	1.17	0.233	0.233	0.233	1.17	0.233	0.233	0.233
12	23		2	4	1	1	2	-	-	1.69	0.845	0.845	0.845	2.67	1.333		1.333				
13	24		2	4	0.8	1	1	-	-	0.92	0.460	0.460	0.460	0.33	0.167	0.167	0.167				
14	28		5	4	1.2	1	2	-	-	1.62	0.324	0.324	0.324	0.67	0.133	0.133	0.133	1.67	0.333	0.333	0.333
15	29		3	4	1.1	-	1	-	-	1.38	0.460	0.460	0.460	1.00	0.333	0.333	0.333	1.33	0.444	0.444	0.444
16	32		6	4	1.2	-	5	-	-	2.69	0.448	0.448	0.448	9.33	1.556		1.556	1.33	0.222	0.222	0.222
17	33		1	6	1	0.3	2							1.00	1.000	1.000	1.000	1.17	1.167		1.167
18	36		4	6	1	0.3	2							0.67	0.167	0.167	0.167				
19	37		2	4	1	1	1	-	-	0.85	0.425	0.425	0.425	1.83	0.917	0.917	0.917	0.67	0.333	0.333	0.333
20	39		2	4	1.1	1	2	-	-	1.23	0.615	0.615	0.615	0.67	0.333	0.333	0.333	2.00	1.000	1.000	1.000
21	40		5	4	1	1	2	-	-	1.92	0.384	0.384	0.384	0.83	0.167	0.167	0.167	1.00	0.200	0.200	0.200
22	42		1	4	1	1	2	-	-	0.77	0.770	0.770	0.770	0.67	0.667	0.667	0.667	0.50	0.500	0.500	0.500
23	43		2	4	1	1	2	-	-	1.21	0.605	0.605	0.605	0.50	0.250	0.250	0.250	1.83	0.917	0.917	0.917
24	45		2	4	0.9	1	2	-	-	1.08	0.540	0.540	0.540	0.83	0.417	0.417	0.417	1.33	0.667	0.667	0.667
25	49		3	4	1	0.3	2	-	-					0.67	0.222	0.222	0.222	2.00	0.667	0.667	0.667
26	2	Semashko	4	4	1	0.3	2	-	-					0.67	0.167	0.167	0.167	2.17	0.542	0.542	0.542
27	3	Street	6	7	1	0.36	3	1	-					2.67	0.444	0.444	0.444	1.83	0.306	0.306	0.306
28	4		5	6	1	0.3	2	1	-					1.00	0.200	0.200	0.200	2.17	0.433	0.433	0.433
29	5		2	6	1	0.29	2	-	-					3.17	1.583		1.583	1.50	0.750	0.750	0.750
30	6		2	6	1	0.29	3	-	-					0.33	0.167	0.167	0.167				
31	7		7	6	1	0.3	3	-	-					0.67	0.095			2.17	0.310	0.310	0.310
32	9		3	4	1	-	3	-	-	2.46	0.820	0.820	0.820	3.50	1.167		1.167	1.50	0.500	0.500	0.500
33	11		3	4	1.2	-	2	-	-	2.23	0.743	0.743	0.743	4.67	1.556		1.556	1.67	0.556	0.556	0.556
34	13		5	4	1	-	3	-	-	3.31	0.662	0.662	0.662	1.17	0.233	0.233	0.233	1.50	0.300	0.300	0.300
35	16		3	6	1	0.29	1	-	-					13.00	4.333		4.333	1.67	0.556	0.556	0.556
36	17		5	6	1	0.3	3	1	-					7.17	1.433		1.433	2.00	0.400	0.400	0.400
37	21		5	6	1	0.3	3	1	-					6.33	1.267		1.267	0.83	0.167	0.167	0.167
38	22		4	6	1	0.3	3	-	-					0.67	0.167	0.167	0.167				
39	24		6	6	1	0.3	2	-	-					0.83	0.139	0.139	0.139	2.17	0.361	0.361	0.361
40	30		3	6	1	0.4	3	-	-					1.33	0.444	0.444	0.444				
41	31		11	6	1	0.3	2	-	-					1.00	0.091			1.83	0.167	0.167	0.167
42	35		5	6	1	0.3	1	-	-					0.33	0.067						
43	14	Abdulla	1	7	1	0.4	3	-	-					0.50	0.500	0.500	0.500				
44	16	Kahor	5	6	1	0.4	3	-	-					0.50	0.100	0.100	0.100				
45	24	street	1	6	1	0.3	1	-	-					0.50	0.500	0.500	0.500				
46	80		3	6	1	0.4	2	-	-					5.00	1.667		1.667	1.33	0.444	0.444	0.444
Average			3.7	4.9	1.0	0.5	2.2	-	-	1.88	0.636	0.479	0.636	2.221	0.748	0.281	0.794	1.265	0.507	0.374	0.507

Table 6.2.3 Apartment Data and Water Consumption

No. of Apartment Building	Adress	Stories	No. of Apartment Units	No. of Occupied Units	Occupants	Average Number	Water Consumption Aug.25 to Aug.30		Water Consumption (cu.m/d) (2) Sep.23 to Sep.29			Water Consumption (cu.m/d) (3) Nov.23 to Nov.29		
							Total	/person	Total	/person	Omit too little	Total	/person	Omit too little
35	No.10	4	32	30	112	3.73	100.60	0.898	29.17	0.260	0.260	101.33	0.905	0.905
36		4	32	29	106	3.66	67.00	0.632	54.17	0.511	0.511	54.17	0.511	0.511
37		4	32	28	98	3.50	65.00	0.663	69.17	0.706	0.706	69.17	0.706	0.706
41		4	32	28	107	3.82	80.00	0.748	33.83	0.316	0.316	33.83	0.316	0.316
51		5	90	83	205	2.47	114.20	0.557	106.00	0.517	0.517	106.00	0.517	0.517
52		5	90	79	195	2.47	88.60	0.454				106.00	0.544	0.544
82		5	90	85	190	2.24	74.20	0.391	113.83	0.599	0.599	113.83	0.599	0.599
91		5	90	57	161	2.82			81.17	0.504	0.504	81.17	0.504	0.504
92		5	90	71	198	2.79	176.80	0.893	149.00	0.753	0.753	149.00	0.753	0.753
94		5	90	75	214	2.85	212.60	0.993	19.83	0.093		19.83	0.093	
9	Constr	12	48	48	101	2.10	43.20	0.428	23.33	0.231	0.231	23.33	0.231	0.231
Total				613	1687		1022.2		679.5			857.7		
Average						2.75		0.685		0.455	0.516		0.508	0.569

6.2.5 Estimate of Water Consumption Tendency

(1) Detached House

1) Average Consumption

Table 6.2.4 shows the data of the household survey for detached houses and Table 6.2.5 shows the average of water consumption volume per capita. The results of three surveys suggest the followings:

- The house lot in Chirchik is rather small comparing with the one in Tashkent and less resident and car owner. No livestock owner.
- At first measurement, there are many houses a water meter is not installed and only survey data of 24 points were available. At second measurement, the number increased upto 46. At third measurement, the number of survey data reduced due to the meters out of order.
- At second measurement, the average water consumption is increased. This may be caused by the increment of the number of large consumption houses, that is, the water consumption of detached houses is more than 700L/capita/day in summer.
- In Chirchik, the water consumption in November is not reduced as much as in Tashkent. This is because motivation for saving is not given to the residents of Chirchik since the installation of water meter is only for experiment and the calculation of water tariff maintained the same old which reckoned only by the number of the family members.

Table 6.2.4 Average Basic Data of Detached House

Item	No. of Occupants	Total Area(x100sq.m)			No of Taps	Possession	
		Total	House	Garden		Cars	Livestock
Value	3.7	4.9	1.0	0.5	2.2	8.7%	0%

Table 6.2.5 Average Water Consumption Volume/ Capita

Water Consumption＼Measurement		First	Second	Third
Measurement Number		24	46	34
Measured Month		Aug.	Sep.	Dec.
Consump-tion: cu.m/cap/d	All Average	0.636	0.748	0.507
	Omit too Large and Little	0.479	0.281	0.374
	Omit too Little	0.636	0.794	0.507

- There observed the trend that the limited number of the consumers consumes extremely big volume in chirchik, as well.

2) Analyzing Water Consumption Tendency

Analyze the water consumption tendency of detached houses by using the average figures of first and second measurements. Table 6.2.6 shows the trend of water consumption (supplied volume) of each house. The table explains that 13 % of total households consumes 46 % of total consumption. Table 6.2.7 shows , in like manner, the trend of individual water consumption.

Table 6.2.6 Water Consumption of Each Housing

Classification cu.m/day	Number		Average	Total Volume	
	Number	Rate %	Volume cu.m/cap./day	Volume cu.m/day	Rate %
<0.5	2	4.3	0.330	0.7	0.6
0.5-0.75	10	21.7	0.618	6.2	6.0
0.75-1.0	7	15.2	0.887	6.2	6.0
1.0-1.25	6	13.0	1.056	6.3	6.2
1.25-2.0	4	8.7	1.386	5.5	5.4
2.0-3.0	8	17.4	2.457	19.7	19.1
3.0-5.0	3	6.5	3.531	10.6	10.3
>5.0	6	13.0	7.919	47.5	46.3
	46	100.0		102.7	100.0

Table 6.2.7 Water Consumption per Capita

Classification cu.m/day	First and Second Measurement					Third Measurement				
	Number		Average Volume Cu.m/cap./day	Total Volume		Number		Average Volume Cu.m/cap./day	Total Volume	
	Number	Rate %		Volume cu.m/day	Rate %	Number	Rate %		Volume cu.m/day	Rate %
<0.1	3	6.5	0.084	0.3	0.7	0	0.0	0	0.0	0.0
0.1-0.15	3	6.5	0.127	0.4	1.1	1	2.9	0.111	0.1	0.6
0.15-0.2	5	10.9	0.167	0.8	2.4	2	5.9	0.167	0.3	1.9
0.2-0.3	5	10.9	0.278	1.4	4.0	4	11.8	0.217	0.9	5.0
0.3-0.4	3	6.5	0.369	1.1	3.2	8	23.5	0.329	2.6	15.3
0.4-0.5	7	15.2	0.454	3.2	9.1	6	17.6	0.426	2.6	14.8
0.5-0.6	3	6.5	0.500	1.5	4.3	5	14.7	0.531	2.7	15.4
0.6-1.0	5	10.9	0.826	4.1	11.8	5	14.7	0.783	3.9	22.7
1.0-1.5	8	17.4	1.190	9.5	27.3	2	5.9	1.083	2.2	12.6
>1.5	4	8.7	3.146	12.6	36.1	1	2.9	2.000	2.0	11.6
	46	100.0		34.9	100.0	34	100.0		17.2	100.0

The column of total volume have been computed multiplying the number of the houses with the average consumption, so same resident numbers will get the same overall trends. As shown in the table, the results explain that only 9 % of the residents consume more than 36 % of the whole and 26 % of the residents consume 63 % of the total consumption.

The figures measured in November doesn't show the partial distribution.

Figure 6.2.3 shows the relation between land area per head (house lots in the districts for survey are almost equal so that the figures are smaller with more residents) and water consumption per capita. The figures are dispersed, although, the trend is observed that there more house lot area per head (less residents), more water consumption.

Figure 6.2.4 shows the number of each group classified by the consumption per capita and the average consumptions of the groups. The distribution is equally made into all the levels in this classification.

The analysis on the consumption of car owners and livestock owners:

- Total average of water consumption of the two measurements is 676 L/capital/day,
- 592L/capita/day for car owners only, and
- 816L/capita/day for livestock owners only, which shows the trend of increment.

Figure 6.2.3 Relation of Water Consumption and General Area/Capita

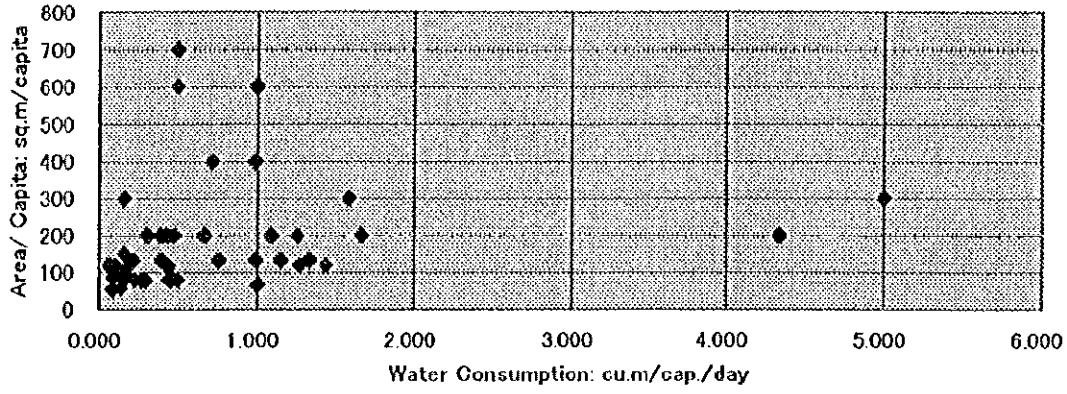


Figure 6.2.4 Water Consumption Tendency of Detached house

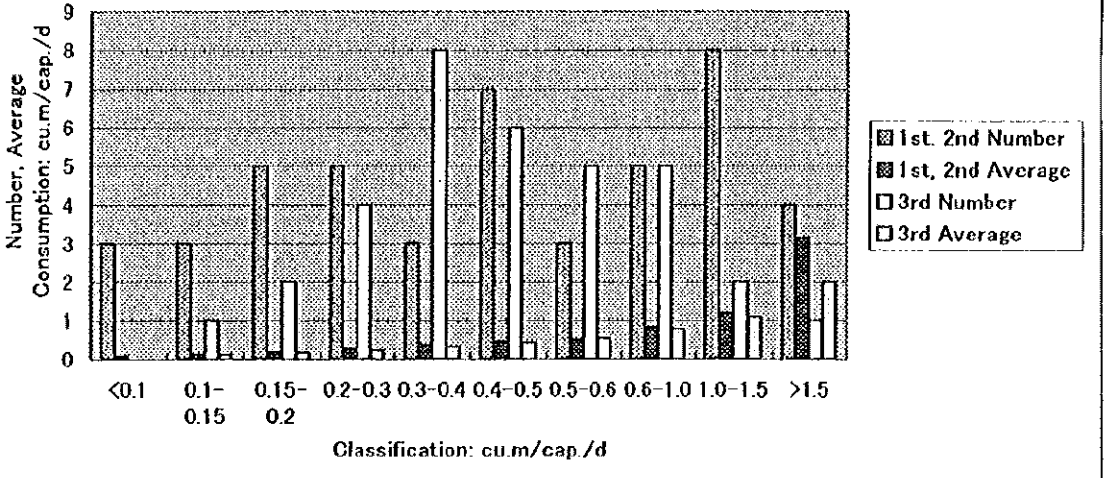
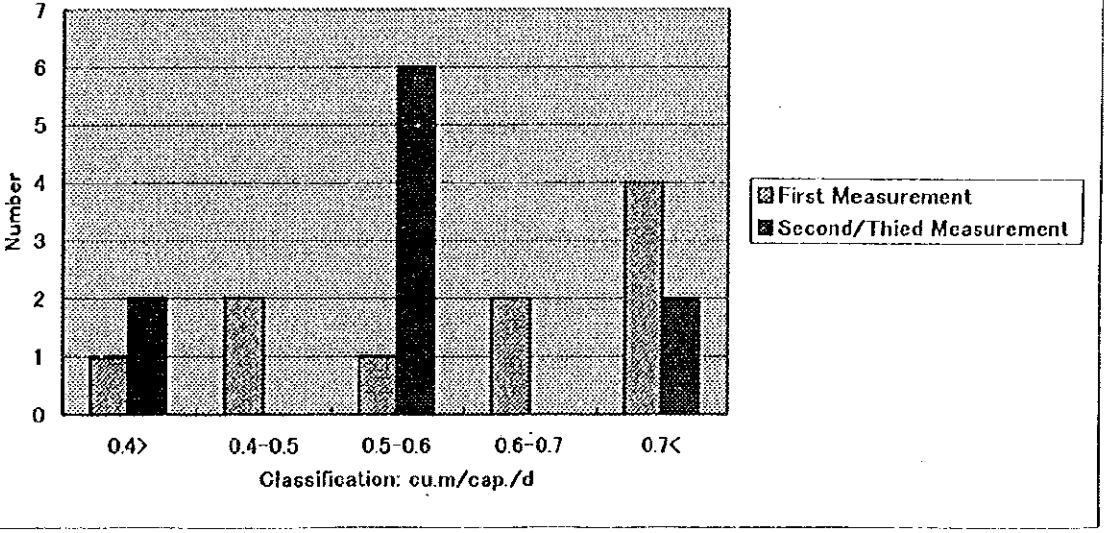


Figure 6.2.5 Water ConsumptionTendency of Apartment Building



(2) Apartment Building

1) Average Consumption

Table 6.2.8 shows the basic data of apartment buildings and Table 6.2.9 shows the results of the demand surveys made twice in September, and once in November. The results show that it consumed more at the first measurement and reduced significantly at the second and third measurements, of which trend is applied to all the items.

Except one which shows extremely low consumption, all consumes more than 500 L/capita/day.

According to this result, the water consumption of first measurement was large and that of the second and the third showed similar tendency each other and were sharply decreased.

Table 6.2.8 Average Basic Data of Apartment Building

Item	Occupied Units	Occupants
Value	59.7	153.4

Table 6.2.9 Water Consumption Volume/ Capita

Item		Measurement		
		First	Second	Third
Consumption (cu.m/capita/day)	All	0.685	0.455	0.508
	Omit too little	0.685	0.516	0.569

2) Analyzing Water Consumption Tendency

Since the figures of second and third measurements show the similar trends, the averages of those measurements are compared with the one of first measurement, disregarding the extremely low data.

Table 6.2.10 shows the numbers of households of each classified group and the averages of each group. The consumption volumes measured in November have wholly shifted lower and there observed aprtments with extremely low consumption.

Figure 6.2.5 shows the degree of the dispersion of the table.

Table 6.2.10 Water Consumption per Capita

Classification cu.m/cap./d	First Measurement			Second/ Third Measurement		
	Number		Average cu.m/cap./d	Number		Average Cu.m/cap./d
	Number	Rate %		Number	Rate %	
0.4>	1	10.0	0.391	2	20.0	0.274
0.4-0.5	2	20.0	0.441	0		
0.5-0.6	1	10.0	0.557	6	60.0	0.543
0.6-0.7	2	20.0	0.648	0		
0.7<	4	40.0	0.883	2	20.0	0.729
Total	10	100.0		10	100.0	

(3) Real Water Consumption in Chirchik City

As studied in the chapter Support 6.2.1 "Analyzing Water Consumption in Chirchik", individual water consumption per capita in Chirchik is shown in Table 6.2.11.

This is because the data are not available in Chirchik and the study has been made using Japanese basic water consumption.

There are big difference between the figures of the above and the actually surveyed ones. It is understood that the diffence is brought from the domestic leakage and wasting.

The study is to be made for the volume of leakage by using the figures mentioned in the table below.

Table 6.2.11 Real Water Consumption of Indivudual.

Item		All	Apartment Buildings	Detached House
Maximum	L/cap./d	300	260	420
Average	L/cap./d	240	230	300