

## Chapter 7 Project Evaluation

### 7.1 Economic Evaluation

#### 7.1.1 Economic Benefits

##### (1) General

There are two major benefits deriving from the implementation of the Project.

One is the time benefit. Under the present circumstances people in the eleven centers more or less go to the far-away springs/streams and/or public fountains every day to fetch water. The time spent in such a way comes to an enormous amount when it is aggregated as an annual total for the whole town.

If the Project is implemented, less people will go to the above-mentioned water sources as more people will use house connections or yard connections. That is to say, the time for water fetching will be greatly reduced.

The JICA Study Team calculated the time to be reduced annually for the whole town in the future years under the "with project" conditions.

Eventually, the team converted the time into financial terms. This is the time benefit.

Another is the reduction of water-borne diseases. When the Project is implemented, more people will have an access to clean piped water. It will reduce the opportunities for them to get in touch with contaminated water and contract such diseases as diarrhea, dysentery, typhoid and scabies.

However, how many such cases will be reduced is very hard to estimate. Therefore, the team just wants to remind people that such an important benefit will be realized in the "with project" case.

##### (2) Calculation of Economic Benefits

How the above-mentioned time benefit was calculated is summarized below:

As a result of the socio-economic questionnaire survey conducted by JICA, the following information was collected:

Users	Time spent at a time (min.)	Daily frequency (times)	No. of persons at a time
Public fountains	30	3.0	1.4
Springs/streams	60	2.4	1.4

If the number of households using public fountains and the number of households using springs/streams is estimated in both the "without project" and "with project" cases in the

target years, one can work out the total time spent fetching water every year in both cases by utilizing the above tabulated information.

The respective number of households using the above two water sources in the "with project" case was estimated based on the service population projection in the other chapter. The respective number of such households in the "without project" case was calculated on the assumption that piped water users will increase by 2% every year.

Then, the difference in the aggregated annual water-fetching time between the two cases was calculated for each year.

Finally, such a time was converted into financial terms by using the following information:

Monthly household Income (birr)	Family size (persons)	Waking hours in a day	Time value per hour (birr)
A	B	C	$D=A/30/B/C$
253	6.8	16	0.0775

The results are shown in Table 7.1.1.

### 7.1.2 Cost

The cost can be divided into capital cost and operation and maintenance (O & M) cost.

Capital cost is huge compared to the economic benefits resulting from the reduction of water fetching time. If one could quantitatively incorporate the subdual of water-borne diseases, benefit related to WID and multiplier economic effect into benefits, then one could consider the total cost including capital cost. But, the reality is such that one considers O & M cost - actually, a part of it - only for the sake of convenience.

O & M cost consists of electric cost, fuel cost, disinfection cost, personnel cost, installation cost of connections, purchase cost of water meters and other cost. (For more details refer to 4.5.) It was estimated as an annual recurrent cost for future years.

It turned out that the whole O & M cost is too large in comparison with the above benefits. Eventually, personnel cost was plucked up, representing O & M cost.

The personnel cost used here is the incremental one, that is to say, the difference between the personnel cost in the "with project" case and the personnel cost in the "without project" case.

### 7.1.3 Economic Evaluation

Based on the data calculated in the above-mentioned way, cost benefit streams were prepared as shown in Table 7.1.2.

As it shows, the cumulative cost and benefits for 30 years come to 3,753 thousand birr and 3,233 thousand birr respectively. It means benefits are 86% of cost at the discount rate of zero.

That is to say, the cumulative benefits of the reduction of water fetching time for 30 years are equal to 86% of the cumulative personnel cost of WSS at 0 opportunity cost.

It is to be noted that time benefit resulting from project implementation is substantial, comparable to the personnel cost of WSS.

Table 7.1.2 Cost Benefit Streams

CC=Capital Costs; OM=O/M Costs; CS=Costs; BF=Benefits  
 CF=Cash Flow (=BF - CS)

NO. YEAR	CC	OM	CS	BF	CF
1 1996	0	0	0	0	0
2 1997	0	0	0	0	0
3 1998	0	0	0	0	0
4 1999	0	83	83	17	-66
5 2000	0	87	87	32	-56
6 2001	0	92	92	40	-51
7 2002	0	96	96	50	-47
8 2003	0	101	101	59	-41
9 2004	0	105	105	70	-35
10 2005	0	109	109	80	-29
11 2006	0	119	119	94	-26
12 2007	0	129	129	107	-22
13 2008	0	139	139	122	-18
14 2009	0	149	149	136	-13
15 2010	0	159	159	152	-7
16 2011	0	159	159	152	-7
17 2012	0	159	159	152	-7
18 2013	0	159	159	152	-7
19 2014	0	159	159	152	-7
20 2015	0	159	159	152	-7
21 2016	0	159	159	152	-7
22 2017	0	159	159	152	-7
23 2018	0	159	159	152	-7
24 2019	0	159	159	152	-7
25 2020	0	159	159	152	-7
26 2021	0	159	159	152	-7
27 2022	0	159	159	152	-7
28 2023	0	159	159	152	-7
29 2024	0	159	159	152	-7
30 2025	0	159	159	152	-7

(Unit: thousand birr)

Table 7.1.1 Saved Time and Benefit

Year	Saved Time (hours)	Benefit (birr)
1996	0	0
1997	0	0
1998	0	0
1999	219,664	17,027
2000	409,249	31,722
2001	521,432	40,417
2002	639,895	49,600
2003	764,935	59,292
2004	896,865	69,518
2005	1,036,027	80,305
2006	1,207,361	93,585
2007	1,384,807	107,339
2008	1,568,623	121,588
2009	1,759,079	136,350
2010	1,956,452	151,649
2011	1,956,452	151,649
2012	1,956,452	151,649
2013	1,956,452	151,649
2014	1,956,452	151,649
2015	1,956,452	151,649
2016	1,956,452	151,649
2017	1,956,452	151,649
2018	1,956,452	151,649
2019	1,956,452	151,649
2020	1,956,452	151,649
2021	1,956,452	151,649
2022	1,956,452	151,649
2023	1,956,452	151,649
2024	1,956,452	151,649
2025	1,956,452	151,649

## **7.2 Financial Evaluation**

### **7.2.1 Calculation of FIRR**

Regarding detailed information on revenues and cost, refer to Section 4.5.

#### **(1) Initial Cost**

It was assumed initially that the central government would provide subsidy to the Bure WSS amounting to 80% of initial cost.

It is to be noted that the cost related to the construction of accommodation facilities as well as WSSD's management is not included in the above initial cost.

Based on the revenues and cost estimated in Section 4.5 under such an assumption, cost benefit streams were prepared for the 30 years starting in 1996.

Using them, financial internal rate of return (FIRR) was calculated. As a result, it worked out to 0.9%.

The value is judged to be too low in any circumstances.

After repeated simulation, it was finally decided that the subsidy ratio of initial cost would be 95%.

#### **(2) Final Results**

Under the above-mentioned subsidy conditions, cost benefit streams were prepared as shown in table 7.2.1.

Using the streams, FIRR was calculated. As a result, the value of 4.1% was obtained.

The value exceeds 1%, which is the assumed interest rate of external loan by 3.1%. It is judged to be sufficiently and reasonably high considering the nature and objective of the Project.

### **7.2.2 Sensitivity Analysis**

To see how the value will be affected under different circumstances, sensitivity analysis was conducted. The conditions and results are shown below:

Item	Conditions	Results	Difference from Base Case
1. Case 1	Benefits : -10%	FIRR: 2.6%	-1.5%
2. Case 2	Initial Cost : +10%	FIRR: 3.5%	-0.6%
3. Case 3	Progress of : 1997=70% Construction 1998=30%	FIRR: 4.4%	+0.3%
4. Case 4	Progress of : 1998=70% Construction 1999=30%	FIRR: 3.5%	-0.6%

In Cases 3 and 4 detail design will be done in 1996 and 1997 respectively.

As the table shows, the value of FIRR is robust enough by maintaining the level of significantly more than 1% under adverse circumstances conceivable.

Case wise, the shortage of revenues will deal the strongest negative impact on the financial feasibility of the Project, followed by cost overrun and the delayed progress of works, cost overrun, while earlier completion of works will raise the feasibility by a substantial margin.

Table 7.2.1 Cost Benefit Streams

CC=Capital Costs; OM=O/M Costs; CS=Costs; BF=Benefits  
CF=Cash Flow (=BF - CS)

(Unit: thousand birr)

NO.	YEAR	CC	OM	CS	BF	CF
1	1996	85	104	189	68	-121
2	1997	2229	106	2336	69	-2266
3	1998	2229	109	2338	71	-2267
4	1999	0	256	256	214	-42
5	2000	0	268	268	334	66
6	2001	0	321	321	386	64
7	2002	0	333	333	427	94
8	2003	0	344	344	468	124
9	2004	0	355	355	510	154
10	2005	0	366	366	551	185
11	2006	0	448	448	638	190
12	2007	36	469	505	712	206
13	2008	180	490	670	785	115
14	2009	180	511	691	858	167
15	2010	0	533	533	931	398
16	2011	0	378	378	894	516
17	2012	13	378	390	894	504
18	2013	13	378	390	894	504
19	2014	0	378	378	894	516
20	2015	0	378	378	894	516
21	2016	0	378	378	894	516
22	2017	0	378	378	894	516
23	2018	0	378	378	894	516
24	2019	0	378	378	894	516
25	2020	0	378	378	894	516
26	2021	0	378	378	894	516
27	2022	0	378	378	894	516
28	2023	0	378	378	894	516
29	2024	0	378	378	894	516
30	2025	0	378	378	894	516

### 7.3 Organizational Evaluation

The existing organizational situation related to water supply and sanitation in Bure can be summed up as follows:

- The WSS of Bure is expected to financially stand on its own feet. But, it is not given the power commensurate with financial independence.
- The WSS of Bure is financially deeply in the red. As a result, workers are underpaid, they have little supplies and equipment for operation and maintenance and there is a shortage of skilled manpower.
- Sanitation functions in the WSS of Bure have been totally neglected. But, the sanitary situation in the town is such that organizational/institutional countermeasures are urgently required.
- A key for a successful implementation of water supply/sanitation projects lies in community involvement. It seems that the authorities have not given proper consideration in this regard.
- Another key for a successful implementation of water supply/sanitation projects lies in female participation. It appears that the authorities have not been properly aware of it.

To rectify the above situation, the following organizational/institutional measures have been proposed.

- Autonomy is a trump for a financially good performance. It is essential for the WSS to be institutionally given its own decision-making power regarding the revision of water tariff, hiring and firing of staff, remuneration, execution of small-scale rehabilitation or new works, purchasing of supplies and equipment, etc. Approval will be given by the regional organization, and it will be reported to the central organization.
- The fundamental conditions for any WSS to have a successful financial performance are to have a sufficient supply of water on one hand and to have a reasonable level of water price on the other. Both conditions are hopefully expected to be satisfied through the Project. If the WSS of Bure has a successful financial performance and its own decision-making power as well, then the accompanying difficulties such as low remuneration, shortage of skilled manpower and little availability of equipment and supplies will be eventually overcome.
- The organization related to sanitation will be newly established in the organizational set-up of WSS after the Phase 1 Project is completed in 1998. It will perform loan service and promotion activities regarding the installation of sanitation facilities.

- Sanitary/Health Committee will be organized in the town. The members will be composed of representatives from schools, hospitals, Weroda council, municipality, the bank, central and regional water supply organizations, WSS and community. The major objective of the committee is coordinating and unifying the related activities so that sanitary awareness of the townspeople and the installation of sanitation facilities will be effectively promoted.
- Public fountains to be newly constructed in future will be managed by the community if people are overwhelmingly in favor of it. According to the socio-economic questionnaire survey conducted by JICA, they strongly side with it. People will be freed from the frustrations and constraints they experience every day today in connection with the opening hours, breakdowns and repairs, water tariff, etc. The community will have decision-making power in financial, personnel and technical terms subject to WSS's approval. The community is expected to financially stand on its own feet.
- Construction of community toilets will be promoted. Financial resources may come from the community itself or other sources. Sanitary/Health Committee and WSS will assist in the acquisition of funds. A strict financial management of the toilet will be required. The maintenance and operation, payment and collection of the user charge, the decision on user charge, etc. will be totally in the hand of the community. Sanitary/Health Committee and WSS will be always ready for helping the community in this regard.
- It is also proposed that the female participation ratio in the workforce of WSS, the community managed public fountain and the community toilet be more than 50%.

#### 7.4 Technological Evaluation

The proposed water supply system is composed of relatively simple facilities, those of which are not quite different from existing ones. Although new material made of fiberglass reinforced plastic is to be introduced into such work as well casing, the light material could facilitate the construction work very smoothly. The material is also expected to be long life-span comparing to other conventional material, thus maintenance and renewal cost could be reduced in the long run.

In the Project, three number of boreholes are newly required in year 2005 and those including existing springs are located with certain distance from each other or sometimes away from another. Therefore, mobilization is due required for the daily operation of those boreholes. In this regard, transportation must be strengthened by means of vehicle or motorbike, otherwise well attendant is additionally required in the number.



## 7.5 Environmental Impact Assessment (EIA)

Currently, there are not Ethiopian laws or regulations which stipulate that development activities represented as a project require an EIA prior to the approval of the project. However, the procedure to establish the EIA is going on within the relevant authority as of 1995.

In this Study, Initial environmental examination (IEE) firstly had been carried out throughout Phase I study and supplemented during the field survey of Phase II, based on the "Guideline of Environmental Consideration for Groundwater Development" prepared by JICA. IEE conducts preliminary assessment in terms of social environment, natural environment and public nuisance, as summarized on the formats in relevant appendix "Result of Initial Environmental Examination". The formats of project and site descriptions brief the content of the Project and the site, thus facilitate the relating person/organization to understand the outline of the Project at the early stage. The scoping format categorizes the environmental component with a classification mentioned below by screening the each component.

- A; Advance impact is expected by the Project,
- B; Negligible impact is expected by the Project,
- C; The impact is Unknown at present, and
- D; Enhancement is expected by the Project.

No Advance impact classified "A" above is shown on the format, and most components are expected to undertake negligible impact from the Project. Also enhancement is expected in some components such as economic activities, public health and hygienic condition.

The components classified as "C" are identified as the ones to be considered for EIA. The result of EIA is described below, and no negative environmental impact is expected.

### 7.5.1 Vested Rights

Although the facilities planned are small in the scale, a part of dwelling and commercial areas, and such properties as houses and trees might be affected, to which compensation shall be made in accordance with government regulation. With consideration above, facilities have been so planned that such circumstance be avoided as much as possible in the design stage. With reference to the outcome of GEP survey, probable water sources had been planned away from dwelling areas, and new reservoir sites planned nearby existing ones or away from dwelling areas, from which little effect is expected. Also, main distribution lines had been designed alongside existing roads to avoid any considerable resettlement.

There are water vendors whose income source relies on selling water, however the income is conjectured to occupy a part of their whole income. Therefore, the loss of vending water is not expected to give any considerable effect.

As mentioned above, any vested right in terms of properties, land right and vending water could not be seriously affected by the Project.

### 7.5.2 Public Health and Hygienic Condition

The improved water supply will increase the quantity of waste water. If the drainage system was not accompanied, it could lead to unhygienic condition and leave people vulnerable to water-borne diseases.

In this Study, sewerage is regarded as a component of the Project and not as a mitigative measure. During field survey, the areas had been delineated, which were suffering from poor drainage condition at present and also toilet condition had been investigated. Based on those assessment, the improvement of drainage and toilet had been proposed in this Study. Disposal of spillage water at public fountains has also been designed in such manner of soakaway pit or connecting to an existing drainage.

With the implementation above, public health and hygienic condition could be enhanced rather than negative impact by the Project.

### 7.5.3 Accidental Damages to Existing Facilities

Although construction of pipeline network and reservoir may be expected to give damages accidentally to the dwellers and existing facilities, such cases have not been reported based on the previous construction experiences. Under proper supervision of the construction, such damages can be avoided or reduced to negligible level even if any.

### 7.5.4 Soil Erosion

Judging from the construction scale, little soil erosion is expected both during and after the construction. Although minor soil erosion may be expected in case of sandy and silty formation of the ground, such erosion has not been reported in noticeable level based on previous construction experience. It is also recommended that construction work be carried out during dry season not only to facilitate the construction work but also to reduce the soil erosion as much as possible.

### 7.5.5 Groundwater Quality and Quantity

The current water source is a spring. There may be a possibility that the existing springs could be affected due to over-exploitation of groundwater by this Project. However, with reference to the scheme mentioned below, employed in the design of this Project, it is expected that any noticeable effect to the existing springs could not be arisen.

The location of new boreholes has been designed with a distance from the existing springs enough to avoid any influence to the water table for the existing ones.

The maximum of groundwater extraction in this Project has been designed to be within the recharge in five (5) year return period of drought. This concept enables the new well designed in this Project to avoid noticeable over extraction of groundwater, leaving the springs unaffected.

### 7.5.6 Traffic Nuisance

Some water distribution pipelines had to be designed to cross a road, and the installation work may interrupt traffic and cause nuisances. Based on the site investigation, two (2) installation methods were identified; namely to install the pipe through existing drainage under across the road, and to install half of the pipe first and then the remainder by shift. The shifting installation method usually requires one (1) day work. Therefore, any traffic nuisance to be caused by the installation of pipeline could be avoided, because the nuisance could be acceptable judging from the installation term of just one (1) day even in the case that the sifting installation method is employed.

## 7.6 Indirect Benefit Evaluation

### 7.6.1 Subdual of Excreta and Water Borne Diseases

Excreta and contaminated water are the major sources of diseases in Bure. From the field survey that has been carried out by the Project, the incidence of diseases as reported by Bure Health Center for the year July 1993- June 1994 is indicated below.

<u>Top Ten Diseases</u>	<u>Number of Cases</u>
1. All types of intestinal parasites	3,744
2. Infection of skin and subcutaneous tissue	2,281
3. All types of diarrhea	1,374
4. Bronchitis	1,374
5. All types of TB	1,374
6. All types of venereal diseases	1,233
7. Upper respiratory tract infection	1,047
8. Gastro-enteritis	1,025
9. All types of rheumatoid arthritis	782
10. All types of pneumonia	<u>744</u>
Total	<u>15,112</u>

The estimated number of cases per year as a percentage of population comes to about 30.7%. These cases are very high. The excreta and water borne diseases among above could be subdued on condition that the followings are made in line with the improvement of water supply.

- Provision of toilets that will eliminate the use of open field for excreta disposal.
- Undertaking regular and timely operation and maintenance of the toilet facilities.
- Providing effective user's education to properly use the toilets and care for them.
- Identification and elimination of faecally contaminated sites that breed insects.
- Treatment of sewage and sullage, if possible, prior to discharge.
- Improvements of domestic water supply of Bure to reduce the effect of contaminated water to health.

- Undertaking sustained and effective sanitary education programme to improve environmental, domestic and personal hygiene.
- Making the communities in Bure to participate in the planning, choice and constructing toilet facilities; and to take over the operation, maintenance and management of these facilities.

### 7.6.2 Benefit Related to WID

Maximizing the piped spring water available, increasing the number of public fountains available and providing a longer service time for public fountain and private connection users. This will provide benefits to women in particular and to girls to a lesser extent. There will be some savings accrued by a few men and boys also. This will allow these women, girls, men and boys more time for other activities including relaxation or income generation activities and improved sanitary behaviors. It will allow girls and to a lesser extent boys more time for studying. All together it will make Bure a more pleasant place to live.

The construction of additional public fountains in areas where there are none using community labor and supporting community management of the piped water supply system will allow the process of community development to commence. This will have far reaching benefits giving men and women confidence to influence their environment and conditions they live in for the better. With this confidence, they will realize that they have the ability to help themselves.

Public latrine (not pour flush) with an income generating public shower in the center of town to finance the cleaning and maintenance of the facility, and perhaps provide additional funds can also be used as an empowerment tool. This will have the benefit of encouraging men and women to undertake broader community development activities and improve their self-esteem and well-being. Latrines will also benefit women in particular allowing them freedom and privacy which they do not enjoy at present.

Community latrines to be constructed mostly with water for handwashing in areas where people are living in rented Kebele housing with priorities given to poorest elements of the community, these can be community managed with support from the Authorities. Such initiatives will benefit the poorer members of the community and reap benefits of community mobilization and empowerment. This can be done effectively through the work of the CPPs in the sanitary education program.

Benefits of income generation will particularly help women headed households to become more financially secure. This will impact on their personal sense of security and elevation of their status in society and the business world.

### 7.6.3 Economic Activities

There are prerequisites for a town to grow economically. Physically, it must have a sufficient level of basic infrastructure such as, road, electricity and water. Socially, it must have, above all, a sufficient educational and medical level.

Road is essential for exchange of materials, finished goods and persons with outside areas. Both electricity and water constitute indispensable components for manufacturing industry. Also, they are a necessity for commercial activities.

A sufficient level of education begets an enlightened type of people with a desire and will for better life. A sufficient medical level makes a healthy people and a healthy people can easily turn a hard working people.

If these five factors are satisfactorily combined, a town is ready for an economic growth.

Bure has a certain level of road, education and medical facilities. Regarding electricity and water, the center suffers from an acute shortage of both of them. The electricity problem is going to be resolved in the near future, while the water problem is expected to be resolved through this Project.

If things are managed well by the authorities, the center will have a capacity and prospect for future economic growth.

Water has especially strong impacts on manufacturing industry such as food & beverages, chemicals, mineral products, iron & steel and machinery & equipment, hotels, restaurants & bars, and hospitals. In an event water is sufficiently supplied through this Project, Bure's economic activities may be stepped up centering on them.

#### 7.6.4 Benefit Related to Others (i.e. religion and tribe)

The level of access to water and sanitation currently existing for Muslims and Christians is the same. No differences could be picked up between different ethnic groups either. The level of income for these groups is also comparable. As a result the benefits of the project are likely to permeate to all ethnic groups and religious groups at a similar level. The benefits are time and energy savings allowing time for other things, an improved level of health and well-being and increased feelings of power over their own lives. These should be carefully monitored by segregation of data collected during the following phases to make sure that the benefits are being gained equitably.



## **Chapter 8 Conclusion and Recommendation**

### **8.1 Conclusion**

Study on Water Supply and Sanitation Improvement has been carried out in Bure along with other 10 centers. The center is suffering from acute water shortage and deteriorating sanitary condition.

Water service coverage in Bure is currently 83 %, however the water consumption per capita per day is extremely low with the amount of 10.7 lpcd in average. Although water quality of the sources is acceptable according to WHO drinking water guideline in terms of physico-chemical aspects, many faecal coliforms have been detected in samples collected from connections and household containers. This means the contamination is expected in such ways of through cross-connections, leaking and back-siphonage associated with aged facilities.

Sanitation condition prevailing in Bure stays at low level. Although their awareness is relatively high, the majority of the people dispose off their body wastes in open fields and in traditional pit latrines. Toilet coverage is 57 %, and those are mostly ill-maintained and poorly designed/constructed in terms of emptying and ventilation. Emptying toilet usually has to wait for long time due to unavailability of vacuum truck, and also there is no dumping site prepared for the emptied disposal near the center. Drainage facilities are not well equipped except ones along the main road, constructed by road authority. However the existing drainages are not well maintained and often blocked with garbage and refuse, creating stagnation of water.

Taking above situation into consideration, water supply has been planned in terms of both rehabilitation and new-construction with the target years of 2005 and 2010. In this Study, water coverage in year 2010 is targeted to be 95 % with reference to the current condition. Water demand is to be realized after completion of the Project with the volume estimated on the basis of 15 lpcd for public fountain, 35 lpcd for yard connection and 60 lpcd for household connection respectively.

For sanitary improvement, some types of toilet such as individual, community and public have been designed, those of which can be easily copied to facilitate the diffusion of such toilets. Typical sections of drainages are also shown in this Study, and those can be constructed by community level. Also, sillage disposal pit was shown, contributing to the disposal of household waste water. Sanitary education video and education manual will greatly contribute to the diffusion of sanitary education program, getting community involved, participated and motivated.

With reference to above, this Project shall be put high priority in the water supply sector for rural towns and be commenced immediately to mitigate the deteriorating condition. With completion of this Project, the followings are to be realized:

- Improvement of current deteriorating water supply
- Improvement of poor sanitary condition prevailing centers

- With both above completed, subdual of water/excreta born diseases, enhancement/strengthening of community, motivation of community, reduction of overburden incurred by fetching water for specially women and girls, and enhancement of economic activities, thus achieving the sound life in Bure.

## 8.2 Recommendation

As mentioned above, this Project was concluded to be carried out immediately taking into consideration both current deteriorating condition and the effect to be born by the Project. Followings are recommendations to be undertaken during construction work as well as after completion of the Project:

- Coordination among related departments located under Ministry of Water resources (central government) shall be made with Water Supply and Sewerage Service Department being the pivot, and coordination among the central, the regional and the center shall also be effectively made. For this purpose, the Project Manager shall be appointed and a committee composed of above three level is required under the manager in order to coordinate and facilitate the implementation.
- In line with the implementation of water supply project, progressive water tariff structure and double entry accounting system should be introduced. The former scheme can raise the average water tariff without affecting low-income households. The latter can draw real picture incorporating depreciation and interest payment so that WSS can have not only enough operation and maintenance cost but also fund to expand the water supply system by themselves.
- The related organizations, specially WSS, should be strengthened as programmed in order to manage the enhanced water supply and sanitation facilities effectively. WSS will have authority to revise water tariff, dismiss or employ its staff and launch on new investment subject to regional office, so that WSS will have self-independent sense and can stand on their own feet.
- A committee, composed of health/sanitary relating organizations, shall be established in the center in order to improve sanitary and health condition. This committee can also coordinate communities in preparing sanitary facilities such as toilet, sullage disposal site, drainage and etc. WSS should facilitate the coordination of the committee.
- Survey shall be carried out along planned rising and distribution pipelines, at well sites and reservoir sites during detail design stage. Land acquisition, where required in such works of rising main, reservoir and well, shall be made in time before the commencement of the construction.
- To get the community motivated and empowered, it is very efficient if the management and operation of facilities are made by the community itself. In this regard, " Community Management of Public Fountain " and " Community Management of Community Toilet " are recommended. According to the household



survey, the majority of people are in favor of the public fountain managed by the community.

- Community, particularly women and girls, must be involved in confirmation of the water supply and sanitation facilities design, system and devices at the commencement of the implementation stage. This is made specially for finalization of public fountains' design and location, design of toilet facilities, and management scheme of those facilities. Exercises of involving the community are extremely motivating factor. It provides them with a feeling of involvement and thus provides empowerment.
- Community participation promoter should be assigned in line with the implementation of the Project, who will be responsible for coordinating instructions for the community members on the design, construction and operation and maintenance of the water and sanitation facilities as part of the long term sustainability. Also, a CPP supervisor shall be dispatched from WSSD on occasional basis to facilitate the CPP's work.
- Sanitary education manual and video titled "Simple Steps...for Better Health" should be fully utilized for the purpose of diffusion of sanitary education program as well as motivating the population for better sanitary activities. The sanitary education manual will be modified, if necessary, according to the response of the attendants, since the manual has not been tested.
- Results of the analysis for access and control suggest that they share resources with men equally within the home but that female headed households tend to be poorer than their male counterparts. Female headed households are particularly vulnerable and special attention must be paid to them during implementation to make sure that they are benefiting adequately from the Project, and this should be monitored.
- Monitoring should be made in line with the project cycle to confirm and measure the benefits to be born by this Project, those of which are increase of water coverage and water amount, subdual of water/exereta borne diseases, motivating community, reduction of time for fetching water and activating economy.









JICA