

7.3 Organizational Evaluation

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

- The WSS of Dejen is expected to financially stand on its own feet. But, it is not given the power commensurate with financial independence.
- The WSS of Dejen is financially in the red consecutively these years. As a result, workers are under-paid, they have little supplies and equipment for operation and maintenance and there is a shortage of skilled manpower.
- Sanitation functions in the WSS of Dejen 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 Dejen 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 I 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, two and another two number of boreholes are newly required in years of 2005 and 2010 and those including existing one 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 BIA 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 BIA. The result of BIA 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 GBP 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 Water Quality and Quantity

The current water source is groundwater, and there may be a possibility that the existing source 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 source could not be arisen.

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

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 existing source 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 Dejen. From the survey of 100 households carried out at Dejen by the Project, several cases of incidence of diseases have been noted. The report of Dejen Health Center from July 1993-June 1994 has indicated the following top ten diseases with number of cases of each occurring during this year.

<u>Diseases</u>	<u>Number of Cases</u>
1. Pneumonia	876
2. Skin infection	474
3. Rheumatism	448
4. Gastritis	371
5. Diarrhea	328
6. Intestinal parasites	297
7. Venereal diseases	283
8. Acute fevrile illness	282
9. Malaria	229
10. (Accidents)	202
Total Number of Cases	<u>3,790</u>

The estimated number of cases per year as a percentage of population comes to about 11.1%. 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.

- Improvement of domestic water supply of Dejen 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 Dejen 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

Benefits relating to WID from the implementation of this project are as follows:

By improving the piped water supply to Dejen, the intended benefits will include the significant reduction of time and energy spent in collection of water, particularly for women but also for girls. This will allow women more time for other activities including relaxation or income generation activities and improved sanitary behaviors. It will allow girls more time for studying. This should improve the quality of life for these social groups including making Dejen a more pleasant place to live. It will also have the effect of reducing sickness and reducing the time women spend in taking care of the sick family members. It will generally improve the health and well-being of the residents.

By providing people with toilets, women and girls can have privacy which they have not enjoyed previously, being able to excrete and attend to menstrual flow unseen even during daylight hours.

The project will allow the community to determine the positioning and style of water and sanitation facilities in Dejen, increasing their sense of power over their own environment. In addition, the project will give women income generation and employment opportunities at the implementation as well as the operation and maintenance stages. The employment in the latter stage is often permanent. Female employment en masse at this stage will contribute to the elevation of female status in society and the business world. The poorest income groups of female headed households and Christians should benefit most from the project.

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.

Dejen has a certain level of road, electricity and education. Regarding medical personnel/facilities and water, the center suffers from an acute shortage of both of them. As the population of the town is fast growing, increasingly more electricity and water will be required in future. 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, Dejen'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 very similar. The level of income for these Muslims is higher on average. The level of ethnic variation in Dejen is almost none. However, the benefits are expected to accrue to each religion and ethnic group at the same level. The benefits of time and energy savings which allow time for other things will occur to both groups equally. This will allow time for other things and give an increased level of health and being, including the increase of power over their own lives. These should be carefully monitored by segregation of data collected during the following phases, to make certain that this is happening.

Chapter 8 Conclusion and Recommendation

8.1 Conclusion

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

Water service coverage in Dejen is currently 83 %, however the water consumption per capita per day is extremely low with the amount of 9.9 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 Dejen stays at low level. Their awareness is relatively low, and the majority of the people dispose off their body wastes in open fields and in traditional pit latrines. Toilet coverage is 52 % only, 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, sullage 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 Dejen.

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.
- Although hydroelectricity is scheduled to come by the time of first target year of 2005 to this center, the supply shall be made in keeping pace with the completion of this Project since operation cost of hydroelectricity could be about 60% of that of diesel generator (Financial analysis was made on condition that the hydroelectricity was available).
- 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.

- 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.
- 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 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/excreta borne diseases, motivating community, reduction of time for fetching water and activating economy.

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