## 7.3 Organizational Evaluation

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

- The WSS of Chagni is expected to financially stand on its own feet. But, it is not given the power commensurate with financial independence.

- The financial performance of the WSS of Chagni is going down year by year, and now the WSS is in the red. 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 Chagni 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 Chagni 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 chairman will be elected from Weroda council. 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 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 fund. 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, four and three 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 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 groundwater, and there are springs undertaken for drinking purpose. There may be a possibility that the existing sources 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 sources could not be arisen.

The location of new boreholes has been designed with a distance from the existing sources 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 a part of great amount of recharge in the catchment area. This concept enables the new well designed in this Project to avoid noticeable over extraction of groundwater, leaving the sources 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 Chagni. From the field survey of 100 households that has been carried out by the Project, the incidence of diseases as reported by Chagni Health Center for the year July 1993-June 1994 show the following top ten diseases.

| Diseases | Number of Cases |
|---|---|
| 1. Unspecified malaria | 1,834 |
| 2. Infection of the skin and subcutaneous tissue | 1,475 |
| 3. Other helmantitis or intestinal parasite | 1,436 |
| 4. All other respiratory diseases | 1,199 |
| 5. Other unspecified dysentery | 1,173 |
| 6. Muscular rheumatism and rheumatism unspecified | 1,159 |
| 7. All other diseases of skin | 1,015 |
| 8. Acute upper respiratory infection | 873 |
| 9. Amoebiasis excl. symptomless | 852 |
| 10. Hook worms | 766 |
| Total Number of Cases | 11,782 |

The estimated number of cases per year as a percentage of population comes to about 13.2%. The excreta and water borne diseases among above could be subdued on condition that the followings are made in line with 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 Bati 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 Bati 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

The benefits related to WID were as follows:

By improving the piped water supply to Chagni, the intended benefits would include the significant reduction of time and energy spent in collection of water, particularly for women but also for girls and boys under the age of 15 years. This would allow women more time for other activities including relaxation or income generation activities, and improved sanitary behaviors. It would allow girls and boys more time for studying. This should improve the quality of life for these social groups including making Chagni a more pleasant place to live and improving health and well-being of the residents. It would also reduce the amount of time that men and women spend in taking care of sick family members.

By providing people with toilets, women and girls can have privacy which they have not been allowed to have. Also females would be freed from inconvenience peculiar to them in the absence of a proper latrine.

The project would allow the community to determine the positioning and style of water and sanitation facilities in Chagni, increasing their sense of power over their own environment. In addition, the project would give women employment opportunities at the implementation as well as the operation and maintenance stages. The employment in the latter was often permanent.

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 enlighted 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.

Chagni has a certain level of road, education and medical facilities. However, as the population of the center is fast growing, their per capita level is inevitably dropping. 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, Chagni's economic activities may be stepped up centering on them.

7.6.4 Others (in terms of religion and tribe)

The basic approach was outlined in the Main report. In addition there were some specific items relating to Chagni.

Christians with control over land for latrines tended to have and use latrines, and where they did not have access and control over the land, they did not have latrines. This was not the same for Muslims according to the household survey. The need for allocation of land for community or for private latrines was of utmost importance for any sanitary improvement program. Special attention needs to be given to the causes of the possible difference in access to sanitation facilities in Chagni. Sharing and management of community latrines must be determined by the users of those facilities in order to meet their needs fully. For example Muslim communities would prefer to share facilities with groups of people of the same sex rather than by groups of families. There must be opportunities for the community to participate throughout the implementation and longer term of the program. Those people with latrines already have other problems. There must also be a forum for their needs to be met through the project.

The level of access to water facilities and non-latrine sanitary behaviors existing for Muslims and Christians was almost the same. The level of income for these two religious groups was also very similar, but Muslim households tended to be one income group poorer. The level of ethnic variation in Chagni was moderate relative to other towns in the Study. However they were still too low to determine the relative levels of service enjoyed by the different ethnic groups and to pick up inequalities. It would appear that ethnic groups in Chagni other than Amhara (mostly Agew) were likely to be Christians.

The benefits of the project were likely to permeate to all religions and tribes to a similar degree, but possibly more to Christians. These would be the benefits of time savings allowing people to did other activities in that time, an improved level of health and well-being and increased feelings of power over their lives. These benefits should be carefully

monitored by segregating data collected during the implementation and operation and maintenance phases to ensure that the benefits were being accrued equitably.

# Chapter 8 Conclusion and Recommendation

## 8.1 Conclusion

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

Water service coverage in Chagni is currently 46 % only, and the water consumption per capita per day is extremely low with the amount of 12.3 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 Chagni 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 58 %, 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 track, and also there is no damping 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 75 % 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 Chagni.

## 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.

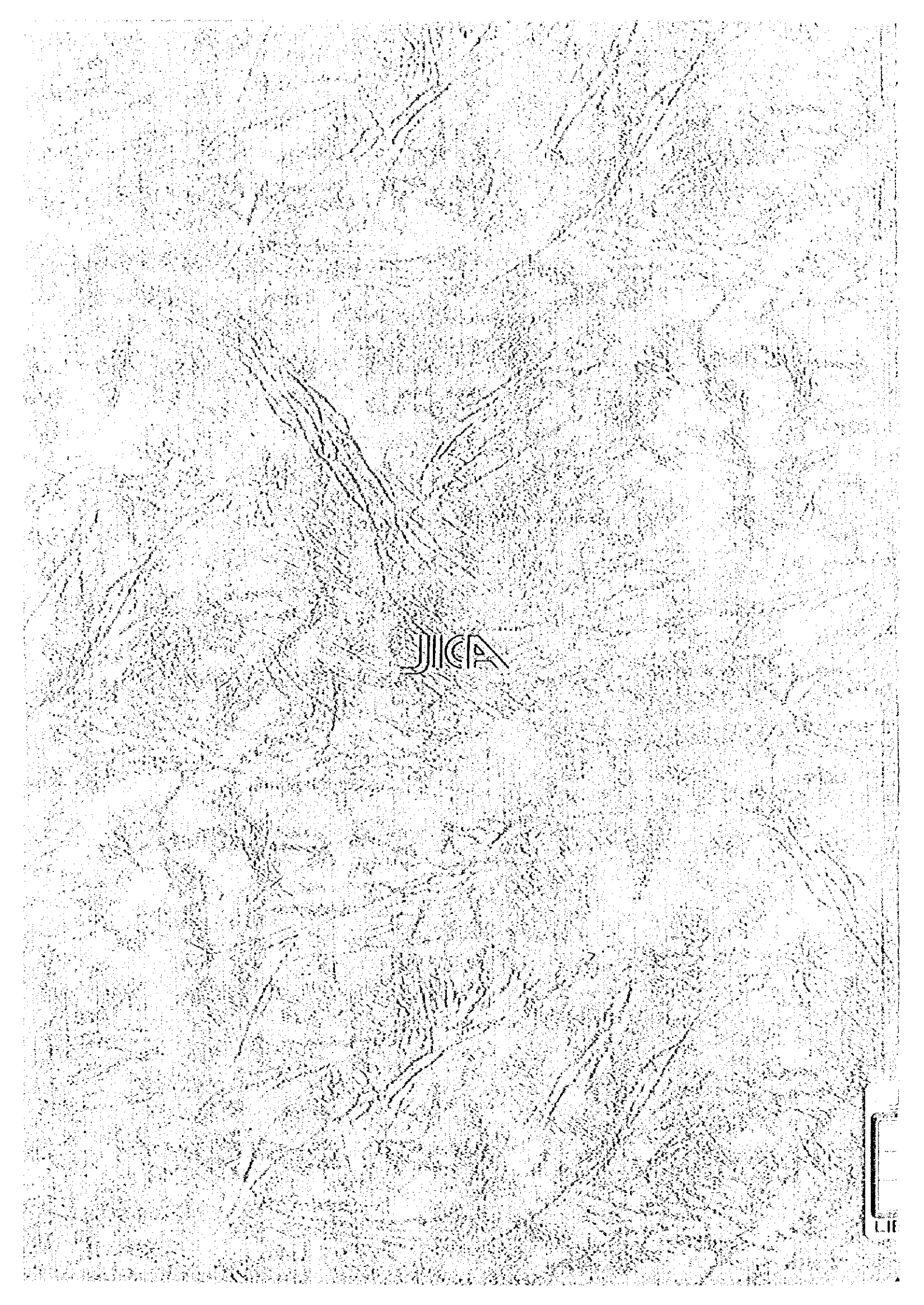
- Community, particularly women and girls, must be involved in confirmation of the water supply and sanitation facilities design, system and devices at the commencement of the implementation stage. This is made specially for finalization of public fountains' design and location, design of toilet facilities, 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/excreta borne diseases, motivating community, reduction of time for fetching water and activating economy.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