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NATIONAL RIVER CONSERVATION DIRECTORATE (NRCD)  
MINISTRY OF ENVIRONMENT AND FORESTS**

**THE STUDY  
ON  
WATER QUALITY MANAGEMENT PLAN  
FOR  
GANGA RIVER  
IN  
THE REPUBLIC OF INDIA**

**FINAL REPORT**

**VOLUME IV FEASIBILITY STUDY FOR PROJECT CITIES**

**VOLUME IV-3 FEASIBILITY STUDY FOR ALLAHABAD CITY  
PART III PUBLIC PARTICIPATION AND AWARENESS PROGRAMME**

**JULY 2005**

**TOKYO ENGINEERING CONSULTANTS CO., LTD.  
CTI ENGINEERING INTERNATIONAL CO., LTD.**

**FINAL REPORT**  
**ON**  
**WATER QUALITY MANAGEMENT PLAN FOR GANGA RIVER**  
**JULY 2005**

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## ABBREVIATIONS

AJS	Allahabad Jal Sansthan
ANN	Allahabad Nagar Nigam
BOD	Biochemical Oxygen Demand
CBO	Community Based Organisation
CMO	Chief Medical Officer
CPCB	Central Pollution Control Board
CTC	Community Toilet Complexes
DUDA	District Urban Development Authority
FGD	Focus Group Discussion
GUP	Government of Uttar Pradesh
HIG	High Income Group
HRD	Human Resources Development
JICA	Japan International Co-operation Agency
LCS	Low Cost Sanitation
LIG	Low Income Group
MC	Municipal Corporation
MIG	Middle Income Group
MLD	Million Litres per Day
MPS	Main Pumping Station
NGO	Non-Governmental Organisation
NRCD	National River Conservation Directorate
PCM	Project Cycle Management
PIC	Project Implementation Committee
PLA	Participatory Learning and Action
PMC	Project Management Consultant
PP/PA	Public Participation/Public Awareness
PRA	Participatory Rural Appraisal
PS	Pumping Station
RRA	Rapid Rural Appraisal
SPS	Sewage Pumping Station
STP	Sewage Treatment Plant
SCC	State Co-ordination Cell
TOR	Terms of Reference
UP	Uttar Pradesh
UPJN	UP Jal Nigam
YAP	Yamuna Action Plan



**CHAPTER 1**  
**INTRODUCTION**

## **PART III PUBLIC PARTICIPATION AND AWARENESS PROGRAMME**

### **CHAPTER 1 INTRODUCTION**

For the sound operation and maintenance of sanitation facilities, generally, 'Public Participation' is indispensable. The construction and operation of such systems alone will not attain desired improvement in environmental sanitation, public health, surrounding environment and abatement of pollution of river water bodies. Therefore, greater public awareness on the health and environmental impacts, importance of those systems and facilities among communities, and the encouragement of their positive participation in the share of the obligation is essential. This would help work out problems related to operation and maintenance and long-term sustenance of these systems and facilities.

Therefore, in this study, the JICA Study Team shall elaborate programmes on related activities and campaigns to promote public participation and heighten public awareness (PP/PA) for the four cities. This has been based on participatory techniques and the concept of the hygiene education which has been prepared by the study team earlier and specifically responds to each event proposed in the Feasibility Studies in the four cities.

Based on the above, the JICA Study team discusses the programmes on PP/PA for Allahabad City is elaborated in the document.

**CHAPTER 2**  
**PROFILE OF ALLAHABAD CITY**

## CHAPTER 2 PROFILE OF ALLAHABAD CITY

### 2.1 BACKGROUND

The city of Allahabad is among the largest cities of Uttar Pradesh and is situated at the confluence of three rivers - Ganga, Yamuna and the invisible Saraswati. The meeting point is known as 'Triveni' and is especially sacred to Hindus.

Emperor Akbar founded this city in 1575 AD by the name of 'Illahabas' which has now become modern Allahabad. It is today an important city where history, culture and religion create a magical confluence, much like the sacred rivers that caress this blessed land. Due to its religious importance, many pilgrims come to Allahabad in the bathing season.

Today the city supports a population of 1.05 million according to the Census of India, 2001 and is 98 m ( lat. 25.28 N, long. 81.54 E) above the mean sea level. According to report on the 'Study on Water Quality Management Plan for Ganga River in The Republic of India', Volume III-3, Sewerage Master Plan Allahabad City, the population in 2003 has reached 1,101,205.

### 2.2 SOCIO-ECONOMIC SITUATION

#### 2.2.1 Social and Cultural Features

Social and Cultural Features of Allahabad City are summarized as follows.

- There are two major religious communities: *Hindu and Muslim*. *Hindus* are 80% of the total population while *Muslims* are 18% of the population. Other religious communities like Sikhs, Christians and Buddhists are also present but their percentage is insignificant.
- Hindus are divided into different castes and these caste identities are very strong. Important castes are *Brahmin, Thakur (Kshatriya), Bhumiars, Vaishya, Yadava* and Scheduled Castes and OBCs.
- *Muslims* are divided into two sects: Shias and Sunnis but Allahabad does not have significant Shia population.
- In *Hindu* tradition rivers in general and Ganga in particular is regarded as sacred.
- Majority of the population speak *Hindi* but some people also speak *Bhojpuri* (a dialect spoken in eastern U.P. and Bihar)
- The life in Allahabad starts early in the morning and does not last too late in the night. People prefer simple living and are frugal in their expenditure.
- In Allahabad, several festivals, small and big, are celebrated. Important among them are: *Mahashivratri* in the month of February, *Holi*, in the month of March, *Navratri* in the months of March-April culminating in *Ramnavami* and in month of October, *Krishna Janmashthami* in August-September.
- The Hindu month of Magh is from mid January to mid-february. During this month, a great gathering and fair called Magh Mela takes place on the sands. Every 12th year when the waters are felt to be especially purifying, Allahabad holds a much greater festival called Kumbh Mela. Many millions of pilgrims attend this festival, coming from all over India. It is believed that bathing during Kumbh cures the bather of all sins and evils and grants the bather salvation.
- In 1885, Mark Twain wrote about Allahabad Kumbh -"Pilgrims plodded for months in heat to get here, worn, poor and hungry, but sustained by unwavering faith".
- There are some specific days in the year when Hindus take dip in holy river Ganga. Important among them are *Paush Purnima and Makar Samkranti* in January *Mouni Amvasya* And *Basant Panchami* and *Magh Purnima* in Februray and Mahashivaratri in March.
- One very important fact is that the city has always been known for its '*Babu Culture*' implying slow and lazy nature of people. For the same reason it is also named as the *Sleepy City*

### **2.2.2 Social Stratification**

As has been mentioned in the interim Report of JICA study team there are three main classes along which the society is divided into any city i.e. High, Middle and Low income classes better known as HIG, MIG and LIG. The sewerage facilities and programmes targeting the same will mainly influence the MIG and HIG classes and to some extent the LIG classes that live in authorised settlements. The rest of the city people, which will mainly comprise the LIG living in slums and unauthorised settlements will be targeted under the non-sewerage component.

Consultations and discussions were held with various people in the city on the general nature of behaviours observed by them in the people towards sanitation in the city, and attitude towards payments for additional infrastructure provided at various points in time.

- People in all the sections of the society in general are very inactive and do not come forward to participate in any common agenda. They are equally uninterested in making payments for any conveniences provided.
- City of Allahabad is popularly known as the sleeping city and so do the behaviours reflect.
- The topography of the city is very unique so the main issue for the people is disposal of wastewater especially at times of rain.
- After the episode of manmade floods that occurred in the city in the year 2000 due to irresponsiveness on the part of municipality workers the people have lost faith totally in the government machinery and feeling is the same through all sections of the society.
- The upper (HIG) and middle income group (MIG) people are though most vociferous in commenting against government officials.
- The slum inhabitants are seen as the group that is most interested in paying if the facilities are provided adequately and are properly maintained. These people have also lost faith in the government functionaries but are not a vociferous group because they are unaware of their rights.
- So it is realised that in the parallel there is also a need for capacity building and awareness of the government agencies so that the credibility with people can be restored and a relationship of faith is established. The workers need to be made sensitive towards their duties and responsibilities.

In addition, the public awareness survey, which was conducted by the JICA Study Team, identifies people's perception as follows.

- People in all the income groups show an interest towards participating (81.9%) in the public campaigns and perceive them to be useful but till date they have not participated in any of the activities (88.6%) that have been happening in the past.
- The largest ratio of people willing to participate is among the HIG class (84.1%), though a very few (15.9%) have actually participated till date
- The reasons to this fact that they have not been participating have not been inquired for.
- The people feel a need to be involved in awareness programmes but the preferred themes is not environment but "Sanitation", "Solid waste and Cleanliness" and "Health and Sanitation".
- As sensitivity to the issue is concerned the situation in Allahabad is nothing better with only 35.36 % people have been complaining about sanitation and other problems

## **2.3 ENVIRONMENTAL HEALTH AND SANITATION SITUATION**

### **2.3.1 Health Risk**

The perceived health risk in the city has been estimated by looking at the data from the CMO's (Chief medical Officer) office, which is responsible for the collection of data from hospitals, urban family welfare centres, and voluntary organizations etc for communicable diseases. Table 2.1 shows the number of reported cases of communicable diseases in Allahabad.

**Table 2.1 Number of Reported Cases of Communicable Diseases in Allahabad**

Year	Gastroenteritis		Diarrhoea		Jaundice		Khasra (measles)		Food Poisoning	
	A	D	A	D	A	D	A	D	A	D
2000	45	2	2	0	795	13	0	0	0	0
2001	4	0	673	4	11	0	22	0	0	0
2002	0	0	426	10	8	0	2	0	0	0
2003	0	0	875	10	0	0	2	0	0	0
2004	0	0	639	8	0	0	0	0	25	0

Source: Health Directorate, Allahabad  
 A- Affected, D – Deaths

According to the table, diarrhoea cases have been reported constantly. In the year 2000, jaundice has been reported in epidemic form with 13 deaths being reported.

The city of Allahabad has grown in the plains left by the river Ganga when it diverted its course. Many of the present housing societies are located in these flood plain areas and in the year 2000 the city had to fight a manmade flood. Due to malfunctioning of one of the pumping stations on a rainy day the sewer water flowed back into the city streets and houses of the people.

The figures listed in the table are an underestimation of the original figures. This statement can be made based on the response to discussions held with prominent doctors in the city. All of the doctors confirmed the fact that gastroenteritis was a regularly reported problem and on an average 50% of the patients treated by them daily are suffering from water borne diseases.

### 2.3.2 Water Supply and Environmental Sanitation<sup>1 2</sup>

#### (1) Pollution in River Ganga

The pollution load in river Ganga at Allahabad can be judged from the table provided at the CPCB website. The river gets a large amount of pollution load from the tanneries of Kanpur as Allahabad is down stream and it enters the city with the burden. In Kanpur, 350-odd leather-making units add to the pollution of the holy river. Resultantly, further down, Allahabad gets more toxic water.

**Table 2.2 Pollution load in Ganga at Allahabad**

Location	pH	DO	BOD	Conductivity	Nitrogen	TSS	F-Coli	Critical Parameter
Rasoolabad	A	A	B	A	A	P	C	TSS
Sangam	B	A	C	A	A	P	P	TSS, F-COLI

Source Central Pollution Control Board

- A- Drinking water source without conventional treatment but after disinfection
- B- Bathing swimming and recreation
- C- Drinking water source after conventional treatment
- D- Propagation of wildlife, fisheries
- E- Irrigation, Industrial cooling and controlled wastes disposal

<sup>1</sup> Ganga River Pollution Control Project at Allahabad; *Urban Environmental Services Master Plan for Allahabad 1996 – 2021*; PMU, Dept. Of Urban Development, Govt. of UP; NRCD, MOEF, Govt. of India; Overseas Development Administration, Govt. of UK

<sup>2</sup> JICA Study Team; *Water Quality Management Plan for River Ganga in Republic of India, Sewage Master Plan for Allahabad*; NRCD, MOEF, Govt. of India; 2003

(2) Water Supply

Present situation of water supply in Allahabad can briefly be described as follows.

- Total population served in the city by Municipal System is 1,091,800 out of a total of 1,101,205, which is 99% of city population.
- A total water demand is estimated by UPJN to be 210 MLD, out of which 130 MLD only be treated.
- City demand is met through a combination of sources, which include municipal river (80 MLD), Municipal Wells (137 MLD) and private sources (54 MLD).
- Approximately 36% of the water demand is met from river water.
- At present intermittent system of water supply is being followed in the city which puts the consumers to considerable risks due to contamination with raw sewage and waste water in rains.
- A very particular problem in the city is the presence of old pipes for supply of water.
- Water supply, at places, passes through drains and in old city areas are laid very close to the sewage lines.
- In times when the water supply lines are empty the sewage and wastewater is likely to flow in these through weak joint and corroded areas, thus contaminating the entire water system.
- While such epidemics are dramatic, the regular endemic toll of such diseases is also high as is evident from the CMO reports.

(3) Sewerage and Sanitation

Present situation of sewerage and sanitation can briefly be summarized as follows.

- The existing sewerage system in Allahabad comprises of a network of Sewers, Pumping Stations, Treatment Plants and Sewage Farms.
- Sewage is discharged untreated into Nalas and then into the Ganga River.
- All the raw sewage collected through the five trunk sewers flow into the Gaughat MPS that has handling Capacity of 1,850l/s at the peak rate of flow.
- The collected sewage is then pumped to the rising main passing the railways bridge. After crossing the bridge, the collected sewage is distributed through two rising mains and after being treated in Naini STP the treated effluents is supplied to the Daini sewage farm and Naini Farm in the Naini Sewerage Zone for the irrigation purpose.
- Allahabad has one STP namely Naini STP that is located at the right hand side of Yamuna River in Naini areas. It has a design capacity of 60MLD and uses Activated Sludge Process of sewage treatment at present.
- Sewer Infrastructure is old and poorly maintained
- At present the total domestic wastewater load is about 226 MLD vs. an installed treatment capacity of 60 MLD.
- On an average 66 MLD is collected and diverted to treatment plants and the rest is discharged into Ganga and Yamuna through open drains.
- The problem in sanitation sector seems to be very severe. In the areas that are already connected to sewers, the existing system does not work and the waste finds ways into surface drains via direct pumping or the increasingly popular flushing of waste into Nalas or local surface drains.
- Plastic is sighted as a major problem by all the city residents.
- In a previous effort to avoid solid waste flowing directly in the river the mouths of the outlet pipes were fitted with meshes so that filtered water flows through. But in the present situation these get blocked by the plastic waste and need regular maintenance by staff
- In areas that are not connected to sewer system, leaching pits and septic tanks are being increasingly used. These systems are less of a hazard but only if proper design specifications

are followed and they are emptied hygienically.

- The location of water extraction pumps also in the vicinity of such systems poses another problem because people end up drinking contaminated water.

(4) Solid Waste

The latest data on the amount of waste discharged has not been obtained yet, but the amount is estimated to be 475 t/d in year 2000 and around 591 t/d in 2005.

The growth rate of the amount of waste discharged per capita is 1.33%. If the amount discharged (475 t/d) in 2000 is multiplied by the population growth (12.43%), the amount of waste discharged in 2001 is estimated to be around 530 t/d. If collection rate is estimated at 70%, the amount of collection would be around 370 t/d. Hence, the waste of around 160 t/d remains uncollected or illegally dumped.

Mainly, handcarts are used for the primary collection of domestic waste and road sweeping waste. Secondary collection depots are the collection depots with roof, concrete and steel containers.

The present disposal site is around 2 km at the south near the intersection of the Railway Over-Road Bridge on the Ganga River and Mirzapur State Highway.

**2.4 SLUMS AND DHOBIGHATS**

**2.4.1 Slums in the city**

The city has 185 slums with a total population of 3, 30,000 covering almost 27.4% of the total Allahabad population with 111 CTCs. The literacy level in Allahabad is approximately 43%. The decadal increase in slum population is given in Table 2.3

**Table 2.3 Slum population of Allahabad (1991-2001)**

Year	Total Population (in lakhs)	Slum Population (in lakhs)	Percentage of total Population
1991	7.93	0.83	10.5
2001	12.06	3.30	27.4

*Source: Census of India, SUDA*

The three-fold growth of slums in the last decade can be attributed to a combination of factors summarised below as

- Poor economic conditions - can neither pay rent for proper housing nor can afford to buy a house
- Desire to live close to one's own community
- Involvement of religious or political groups who have vested interests in developing slums
- Inability on the part of the local administration to prevent encroachment of government-owned land
- Large-scale emergence of nuclear families
- Migration from the rural areas in search of a livelihood as, urban areas provide the commercial and industrial set-up that offers greater employment opportunities;

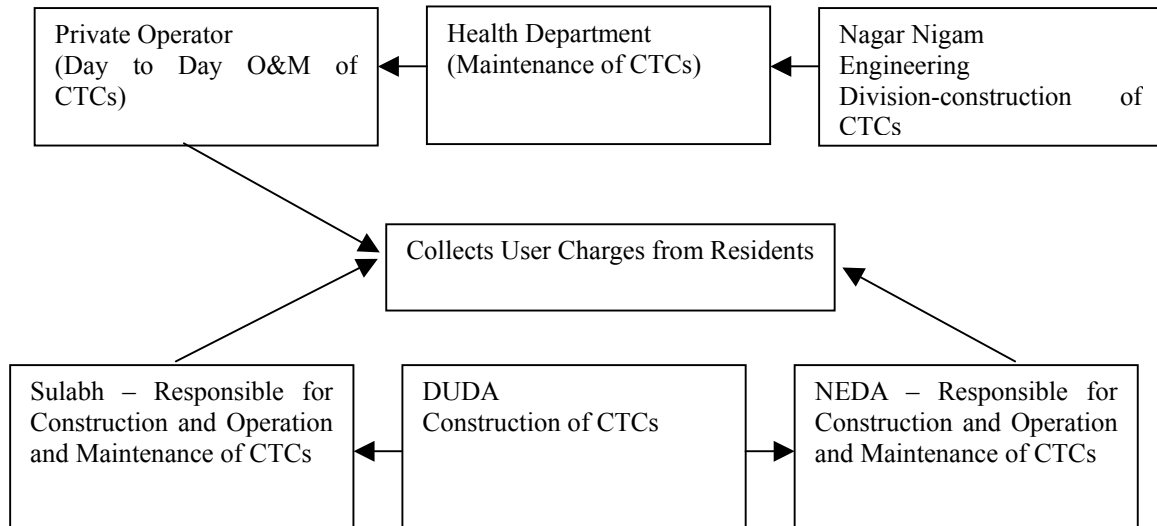
The rapid growth and development of slums in the Allahabad city area has led to deterioration of its physical environment. Majority of slums have very poor water supply and sanitation facilities; most are either un-sewered or partially sewerred, with disposal of household waste water and solid wastes taking place directly into open nalas, which adversely affects drainage in these areas, leading to water logging. The poor environmental conditions within the slum areas have adversely affected the health of the residents. Financial constraints on the part of civic authorities and un-authorized nature of the slums have also contributed to non-delivery or partial delivery of basic amenities.



(1) Status of LCS and CTC facilities

There are 111 existing CTC's out of which 84 are connected to sewer lines and 27 have septic tanks. The responsibility of construction of these CTC's is with the Nagar Nigam and DUDA. Nagar Nigam directly constructs through the engineering division and DUDA generally hires agencies like Sulabh and NEDA. The operation and maintenance is mainly done through the private contractors hired by either of the agencies or Nagar Nigam itself.

In return to this people have to pay user charges. The system works out as depicted in the figure 2.1



**Figure 2.1 Existing Structure for O&M of CTC's**

**2.4.2 Dhobighats**

Allahabad has 5 constructed Dhobighats

- Civil Lines (Kanpur Road)
- Lala Lajpat Rai Road
- Mumfordganj
- Medical Chauraha (Panna Lal Road)
- Cantonment Area

Although dhobighats are prohibited on river banks, some clandestine activity goes on river Yamuna banks.

(1) Health Condition and Risks at Dhobighats

The washer men collect soiled clothes from households, hotels, hospitals and other establishments for cleaning. These clothes may be soiled with pathogenic bacteria and other hazardous stuff.

Chemicals used by dhobis. i.e. detergents, solvents, bleaching agents, dyes, cause various diseases including skin diseases. Common diseases prevalent among the dhobis include Dermatitis, Eczema, Throat Irritation, Dizziness, Chronic Bronchitis, Asthma, Amoebiasis, Gastroenteritis ( Diarrhoea & Dysentery), Worm Disease (Ascariasis), Hook worm Disease (Ankylostomiasis), Anemia, Conjunctivitis, Cataract, Miscarriage, Typhoid, Malaria and dengue

(2) Environmental Status at Dhobighats

The waste water from the Dhobighats goes directly into the open drains without any treatment and the Dhobighats do not have adequate toilet facilities. Disposal of waste water without any preliminary treatment to the drains finally finds its way to the river, contributing to the river pollution. The lack of toilet facilities at the Dhobighats also leads to open defecation or urination. The general maintenance of the ghats was found to be poor, the Nagar Nigam is responsible for the overall management of these ghats, but the day to day maintenance is taken care of by their respective associations. Majority (>80%) of the respondents are of the opinion that the ghats should be managed by their own association i.e. continuation of the present practice. Most of them do not have sheds for shelter, toilets, small drying space, resting place etc.

**CHAPTER 3**  
**INSTITUTIONAL ARRANGEMENTS**  
**FOR**  
**PP/PA PROGRAMMES**

## CHAPTER 3 INSTITUTIONAL ARRANGEMENTS FOR PP/PA PROGRAMMES

### 3.1 EXISTING IMPLEMENTATION STRUCTURE FOR PP/PA IN ALLAHABAD

#### 3.1.1 Present official Institutional Situation for PP/PA Activities

Table 3.1 summarizes present official institutional aspects of the sewerage scheme and related PP/PA activities in Allahabad.

**Table 3.1 Present official institutions related with works in the sewerage scheme and PP/PA Activities**

Entities	Activities on Sewerage and Non-Sewerage Schemes	Activities on PP/PA
State Urban Development Authority (SUDA)	<ul style="list-style-type: none"> <li>- The apex, policy making and monitoring agency for the urban areas of the UP</li> <li>- Provides overall guidance to DUDA for implementation of community development programmes related to water and sanitation.</li> </ul>	<ul style="list-style-type: none"> <li>- No activity for PP/PA</li> </ul>
District Urban Development Authority (DUDA)	<ul style="list-style-type: none"> <li>- Development of slum communities</li> <li>- Construction of community toilets in slums</li> <li>- Assistance in construction of IHLs.</li> <li>- Construction of drains and small bore sewers in slums;</li> <li>- Up-gradation of streets and roads</li> </ul>	<ul style="list-style-type: none"> <li>- Coordination with Community Development Societies (CDSs) for awareness building and community participation</li> </ul>
UP Jal Nigam	<ul style="list-style-type: none"> <li>- Construction of water supply and sewerage networks.</li> <li>- Maintenance of trunk sewers</li> </ul>	<ul style="list-style-type: none"> <li>- Human Resource Development Cell is in charge of PP/PA related programmes in the field of water supply and sewerage schemes, which consists of CP wing and HRD wing as follows.</li> <li>- Community Participation Wing (CP) conducts IEC Programmes for creating awareness among the population.</li> <li>- Human Resource Development Wing (HRD) conducts Training Programmes for Capacity Building.</li> </ul>
Allahabad Jal Sansthan	<ul style="list-style-type: none"> <li>- Ensuring potable water supply</li> <li>- Operation &amp; Maintenance of Water Supply and Sewerage Networks</li> <li>- Collection of water and sewerage charges</li> <li>- Maintenance of main sewer sewers</li> </ul>	<ul style="list-style-type: none"> <li>- Regular Information dissemination on the need for better water storage practices and water pollution through newspaper.</li> <li>- Have a complaint cell that registers people's grievances 24 hours in a day. Telephone nos. of the cell advertised in paper</li> </ul>
Allahabad Nagar Nigam (Health Department)	<ul style="list-style-type: none"> <li>- Cleaning of the sewage lines in case of blockage</li> <li>- O&amp;M of Community Toilet Complexes</li> <li>- Management of ghats primarily through dhobighat associations</li> </ul>	<ul style="list-style-type: none"> <li>- There is a team of two doctors in the ANN which is responsible for spreading awareness in the slums.</li> <li>- The Health Department of ANN is in charge of sanitation in the city, protection of citizens from epidemics, and protection of food handling.</li> <li>- They also coordinate with the CMO office for</li> </ul>

Entities	Activities on Sewerage and Non-Sewerage Schemes	Activities on PP/PA
		conducting Swasthya camps (Health Check camps) - Managed campaign to control polythene through civil defence volunteers and NCC
<i>Allahabad Nagar Nigam (Engg. Department)</i>	- Repair and Maintenance of the Branch Sewers - Construction of Community Toilet facilities in slum areas	- No activity for PP/PA
<i>Health Directorate</i>	- No related activities for sewage scheme but is a state level agency responsible to care for the health of citizens	- Some public awareness programme on hygiene practices is co-ordinated through the district CMO's in the state.
<i>Chief Medical Officer</i>	- No related activities for sewage scheme but are a District Level agency responsible to care for the health of citizens.	- Assistant CMO (urban) is responsible for conducting the awareness programme in the city as per the directions of the health directorate. - Programmes mainly concentrating in slum areas through health workers

*Sources: Interim Report, UP Jal Nigam, Allahabad Jal Sansthan, Allahabad N.N, Health Directorate, CMO*

In addition, Table 3.2 summarizes problems and difficulties to be overcome for effectively implementing the PP/PA activities which are perceived by those official entities.

**Table 3.2 Problems and Difficulties for PP/PA associated with the Sewerage works Perceived by the Official Entities**

Entities	Problems and Difficulties
<i>UP Jal Nigam</i>	- Age-old traditions, habits such as open defecation on riverbanks and religious faith like disposal of dead bodies and animal carcass into the rivers are the biggest hurdle in having desired effects of mass awareness campaign. - The problem can be overcome by extensive IEC methods for awareness on a regular basis, which is not possible at present due to non-availability of adequate funds. - At present the Jal Nigam does not have any expert staff on matters of PP/PA.
<i>Allahabad Jal Sansthan</i>	- People do not respond to the campaigns - They do not trust the system which is evident from the low no. of complaints received in the complaint cell - They do not have any power to take offensive action against people. - Plastic poses a major problem as sewers occasionally get jammed
<i>Allahabad Nagar Nigam</i>	- Lack of funds – starting projects is not a problem but sustaining them becomes always difficult - Irresponsible and unaware staff – the sweepers clean the drains of blockages from plastics but stack them near the outlet itself, so that on drying it flies back causing same problem again - Lack of learned staff for co-ordinating PP/PA - Political lobby are one of the main problem makers when some law has to be made and enforced – biggest issue when campaign against plastics was underway. - People's behaviour takes time to change and funds do not allow consistency in programmes.
<i>Chief Medical Officer</i>	- People forget the instructions as soon as they are given to them - The funds provided are for program based e.g. polio, TB etc and not for general awareness which is required.

*Sources: Interim Report, UP Jal Nigam, Allahabad Jal Sansthan, Allahabad N.N*

In addition to these official entities there exists an 'Allahabad Citizens Committee' constituted by the Allahabad high Court after a PIL by some citizens after flood in the year 2000. The monitoring committee has to meet every month to review condition of civic amenities and the accountability of the officials to people's needs. The committee is constituted of eminent personalities of the city from

fields of literature, law, science and various backgrounds.

In addition to that it is felt by people that the awareness programmes are more in the form of instructions given either in written or dictated at the time of outbreak of some epidemic. These information are distributed in the most uneventful and uninteresting way that people are unable to perceive them as being important enough.

It may thus be inferred that

- The programme have to built a two way dialogue so that the faith of people can be restored on the government bodies and they have security of the fact that the services being promised will be delivered to them.
- Also the campaigns need to be interesting enough to attract attention and leave some impact on the minds of the people.
- 

The observations show that there seems to be lack of vertical integration among the different government structures in the hierarchy. The UP Jal Nigam at the state level has the power to control the funds and management of the project. At city level then there may be conflicts among Jal Sansthan and Municipal Corporation. Interaction among the different government agencies whatsoever for the purpose of implementation of the programs is recommended to effect higher levels of coordination. To create public awareness about the 'Water Quality Management Plan for River Ganga in the Republic of India' and its sustainability, a project officer has to be able to network with different government departments such as health and others, so that the idea can be approached as an integrated effort.

For the public awareness program the lowest level relevant structure may be the Health department of the Municipal Corporation. The Health department has two major functions – sanitary and health services in the municipal area. The sanitary wing is responsible for collection and disposal of garbage. The health wing provides free medical service to the people. The male and female health workers of the health wing of the municipality work in close contact with the people and that too at a vulnerable time (i.e. spread of epidemic etc) when a message regarding health will seem to be most sensible. They have the potential to encourage public participation with the respect to programs relating to health.

Apart from that there are other set of problems that can be identified w.r.t the construction maintenance of Community facilities in low-income settlements. They are

- Lack of availability of space for construction of CTCs and/or IHLs
- Limited disposal options for the waste water as majority of areas are not covered by the existing sewerage system
- Lack of sense of ownership among the residents - facilities are looked upon as something that has been provided by the government, and it is the government's responsibility to "run" the CTCs
- Almost no involvement of the residents in design, location or O&M of the CTCs
- Difficulty in maintaining facilities that are affected by poor quality of construction resulting in frequent breakdowns, and eventual non-functioning of the CTCs
- Erratic power supply leading to non-functioning of pumps and thereby inadequate water supply affecting the cleaning of CTCs
- Resistance to payment of user charges in certain pockets leading to inadequate financial resources for O&M - "why pay for poor facilities?"
- Lack of cohesiveness or coordination between different agencies in implementation of the LCS programmes
- No mechanism for obtaining feedback from the users for any improvements

### 3.1.2 Present Situation of Community and Private Sector for PP/PA Activities

Here it becomes important to look at the existing informal setups because these have a potential to become the backbone of the whole project. Routing an idea for public participation becomes a lot easier if it is through such agencies. The selection of target groups to reach the population thus shall be based on observations made in this section.

#### (1) Community Structures in Allahabad

It has been identified that at present there does not exist any Community structure in the city that is strong enough and can be taken as a base to spread the message.

##### 1) Resident Associations

It has been identified that at present there does not exist any Community structure in the city that is strong enough and can be taken as a base to spread the message.

Some individual efforts are made at the level of residential associations where people are coming together to pool in money and employ sweeper at the society for regular cleaning and collection of solid waste. But these systems have not been institutionalised in any form and operate at a very miniscule level. Examples of these are very few and the existing ones are also only in the areas with recent development and not in the core (old) city.

##### 2) Durga Puja Samities

Durga Puja is an important festival for the Hindus and is celebrated with lots of Vigour. Each resident society organises celebrations at this festival time for which they have Durga Puja Samities. The main function of samities is to collect money and organise the function. They are otherwise dormant for the whole of the year and become active only during Puja time.

##### 3) Dhobighat Associations

These associations exist in the respective dhobi ghats and are responsible for the O&M of the places.

#### (2) NGOs and CBOs in Allahabad

##### 1) NGO's in Allahabad

It is estimated that several hundred NGOs/CBOs are existing in the city but a comprehensive list of the same could not be obtained. A few NGO's known in the city and working in the fields of Environment and Sanitation are listed thus

**Table 3.3 List of NGO's and their area of expertise**

Name of NGO	Areas of Expertise
Sulabh	<ul style="list-style-type: none"> <li>- Water and Sanitation Issues</li> <li>- Hygiene promotion</li> <li>- Environmental Health</li> </ul>
CURE	<ul style="list-style-type: none"> <li>- Hygiene Promotion</li> <li>- Environmental Health</li> </ul> <p>* was Contracted for formative research and Hygiene Promotion Component of Environment Health Consultancy under <i>Ganga River Pollution Control Project</i></p>

Name of NGO	Areas of Expertise
Utthaan	<ul style="list-style-type: none"> <li>- Economic empowerment of Women's – encouraging formation of Self Help Groups and establishing small scale enterprises</li> <li>- Micro Finance and Micro-credit</li> <li>- Enhancing Livelihood means through promotion and marketing of local art and craft</li> <li>- Training and Awareness programmes</li> </ul>
Bharat Vikas Parishad	<ul style="list-style-type: none"> <li>- People's empowerment</li> <li>- Community Development</li> <li>- Rehabilitation and resettlement through participatory approaches</li> <li>- Known for its works in Street Children in Bombay</li> <li>- Urban Land and Housing</li> </ul>
Sewa Bharati	<ul style="list-style-type: none"> <li>- Women's Empowerment</li> <li>- Community development</li> <li>- Health of Women and Children (RCH)</li> </ul>
Arthik Anusandhan Kendra (Alah)	<ul style="list-style-type: none"> <li>- Environmental education</li> <li>- Use of Renewable energy</li> <li>- Afforestation</li> <li>- Land and water management</li> </ul>
Indian institute for development studies and research (Alah)	<ul style="list-style-type: none"> <li>- Environmental education</li> <li>- Raising fruit tree plantation</li> <li>- Social forestry</li> <li>- Conducting an evaluation study of Drought-Prone Area Programme (DRAP)</li> </ul>
Kailash chandra seva ashram (Alah)	<ul style="list-style-type: none"> <li>- Environmental education camps</li> <li>- Tree planting</li> </ul>
National forum for environmental studies and conservation (NESCO) (Alah)	<ul style="list-style-type: none"> <li>- Conducting training workshop for teachers</li> <li>- Participation for the UNEP sponsored campaign 'clean up the World'</li> <li>- Environmental research and surveys</li> <li>- Providing consultancy services</li> <li>- Promoting afforestation and preservation of biodiversity</li> </ul>
Vinoba adarsh shiksha samiti (Alah)	<ul style="list-style-type: none"> <li>- Environmental Education</li> <li>- Providing safe drinking water in village</li> <li>- Tree planting</li> <li>- Taking steps to protect local wild animals and birds</li> </ul>

*Source: Information gathered through discussions and meetings*

## 2) Community-Based Organizations

The various community-based organizations form the last, but probably the most critical link between the authorities and programme implementing agencies. These organizations are involved in community development activities and therefore, play the role of "catalyst". Their position is vital to the success of future low cost sanitation programmes in the target cities. In Allahabad the CBO's exist but only in slum areas and have been constituted by DUDA. They have a three-tiered structure which comprises of

Community Development Societies (CDSs)  
 Neighbourhood Committees (NHCs)  
 Neighbourhood Groups (NHGs)

### Community Development Societies

CDSs or Samudai Vikas Samitis comprise 10 or more NHCs representing about 2500 families. These societies or samitis are created among communities to empower women in the decision-making process and enable them to put forward their needs and demands. The number of samitis in Allahabad is 30. Typically, each "samiti" has 20 members, all women, and is headed also by a woman. Meetings are held every month and proposals for funding



are presented to the “Nagar Ayukta” for possible financial support. These “samitis” also network with the Health Department of the Nagar Nigams and other urban development organizations. The duties attributable to the “samitis” include:

- Identification of beneficiaries;
- Preparation of community plans and mobilizing resources;
- Monitoring of repayment and recovery;
- Liaise with Governmental and non- governmental agencies; and
- Creation of community assets and maintenance of the same.

#### Neighbourhood Committees

NHCs comprise 10-12 Resident Community Volunteers (RCVs) representing about 250. They are responsible for identifying the local “problems”, motivating the NHGs and developing community-based credit thrift societies. They also facilitate the process of identifying the training needs and capacity building programmes.

#### Neighbourhood Groups

NHGs comprise of women from 10-40 households with a RCV as its head. They facilitate the processes related to:

- Planning, implementation and monitoring of activities at the cluster level
- Formation of credit and thrift society
- Collection of household data

### (3) Ward committee

At the present there do not exist any Ward Committees that are functional in Allahabad. Area representatives known as Ward Councillors are elected every 5 years that represent a particular ward but the residents complain that these councillors can be seen in the area only at the time of the elections, and work more to their own benefit.

The discussions with the authorities at ANN revealed that it is mandatory for the councillors to meet once in two months but only 2 meetings were held last year and this year till date only 1 has been organised. In these also the participation rate of councillors is very low – about 20%.

An executive committee is required to be constituted to examine the work of the councillors but the city does not have any.

Ward Committees may be considered for involvement in the PP/PA programmes but there will be a need to initially create the setups before a programme or activity can be routed through them. Ward Committees may be considered for involvement in the PP/PA programmes but there will be a need to initially create the setups before a programme or activity can be routed through them. Ward committees are the grass root bodies that have been vested with the financial and administrative powers after 74<sup>th</sup> Constitutional Amendment Act. The elected representatives of the ward committees shall be the members in the Municipal Council. The committee is an important elected body that will interact with the people at the grass root level and also has members nominated by the State government.

The constitution of ward committees in urban areas has a great potential to empower women and other weaker sections of the society who otherwise find it difficult to voice their opinion in any public forum. However, it must be pointed out that except for Ahmedabad the Ward Committee is not been working effectively in any other city, town or urban area in the country. The problem lies with the State

government and the municipality who have not been able to delegate both administrative and financial powers to the Ward Committees. There is an urgent need to harness the potential of the Ward Committees to help urban governance particularly with grassroots participation.

(4) Mass Media in Allahabad

There exist several mass media in Allahabad and play important role in information dissipation.

Various local Electronic Media popular in the local masses are

- TV Channels – Doordarshan, Rashtriya Sahara (UP), Etv Uttar Pradesh
- Radio - Akash Vani, FM radio

Various Regional Newspapers and those that have local additions for the city are being listed in table 3.4.

**Table 3.4 Mass Media in Allahabad**

Status	No.	Name	Language
Daily	14	Amrita Prabhat	Hindi
		Northern India Patrika	English
		Nyayadheesh	Hindi
		Roznama Safeer-E-Nav	Urdu
		Hindustan Times	English
		Times of India	English
		Amar Ujala	Hindi
		Danik Jagran	Hindi
		United Times (Bharat)	Hindi
		Hindustan	Hindi
		Navbharat Times	Hindi
		Rashtriya Sahara	Hindi
		Swatantra Bharat	Hindi
Rashtriya Chetna	Hindi		
Monthly	1	Nutan Kahaniyan	Hindi

*Source: Indian Newspaper Survey; 2001*

(5) Organisations having influence on Religious communities

Because Hindus and Muslims are the two major religious communities in the city so the influential groups identified with these two.

1) Hindu

Vishva Hindu Parishad (VHP)  
 Rashtriya Swam Sewak Sangh (RSS)  
 Bajrang Dal

2) Muslim

Clerics and priests in local Mosque and Madarasas have religious followings.

(6) Clubs

Lions and Rotary are the two famous clubs of the city which attend to the elite class. These clubs have

their separate Women's wings and are involved in social activities like health camps and workshops with school children etc.

Another Inner Wheel Club is exclusively ladies club and has a large group of people from the affluent society as its members.

Allahabad Cricket Club and Allahabad District Cricket Club are famous among the youth

(7) Others

1) Shops along the Ganga

There exist Shops along the Ganga along the river that are doing good business and are popular among the pilgrims. These shops can be used to reach pilgrims who contribute a lot to the pollution load of the Ganga.

2) Educational Institutions

The city has a rich culture in literature which has been influenced by the Islamic tradition. The presence of various well reputed educational institutions supports the fact. A large number of people living in the city are directly or indirectly related to these institutes or have their children studying in them so programmes routed through the institutes may have a mass appeal.

The various reputed institutes are

- Allahabad University
- Motilal Nehru National Institute of Technology
- U.P. Rajashri Tendon Open University
- Allahabad Agriculture Institute
- Indian Institute of Information Technology

3) Health Institutes

The main hospitals in the city are:

- Sawroop Rani Nehru hospital
- Beli Hospital
- Vatsalya Hospital
- Kamla Nehru Hospital
- Nazreth Hospital
- Dufferin Hospital
- Moti Lal Nehru Hospital
- Jeevan Jyoti hospital

4) Volunteers

NSS (National service Scheme) and NCC (National Cadet Core) are two main voluntary organisations where youth are the active participants. These groups have been involved with the municipal authorities in their drive to stop the use of plastics in the city.

In all the Missionary schools in the city regular LTS (lecture Training sessions) are undertaken where the students are updated on issues of environment.

These groups have a large potential to be involved in advocating the cause between the city

people and some special programs and workshops at the beginning can be introduced to actively involve these groups.

5) Prayag Sangeet Samiti

The city has a history deeply rooted in literature and many great Indian laureates have born and rose in the city. Prayag Sangeet Samiti was one of the best Music Schools in India but from the past 8 – 10 years it has not been able to sustain itself but still the people of the city have respect for the institution.

The institution has been regularly organising Short Play and song competitions every year and is attended by the people in the city.

The Samiti given its infrastructure and background in art can be effectively used as a medium to propagate the message in the city.

6) Yearly event

One of the regular yearly events in the city is the one organised by Prayag Sangeet Samiti as mentioned in the previous section 6 (b).

Another event is the *Saag-Bhaji Pardarshani* (Vegetable Expo) organised at Alferd Park which is attended by a large crowd from, all the sections in the city. It may become an important event to club with some of the PP/PA activities to have a greater impact on people

7) Boatmen Community

This is a section of society that earns their livelihood directly out of river based activity i.e. boating. They are the ones that shall have a direct benefit out of the clean river programme and can thus be easily influenced.

**Table 3.5 Analysis for Community and Private Sector Institutes**

Institution (non- Govt.)	Present Status	Can it be used in PP/PA		Reason	Perceived role and Required Effort
		Yes	No		
Resident Associations	Exist in very few areas		X	Will take effort to create and may not have a long term sustenance need	-
Durga Puja Samities	Exist	√		Active during a festival when the Idols immersed in the river contribute significantly to river pollution	As carriers of the idea for dissuade people from idol immersion or the use of safer materials Efforts have to be made to contact and make them active much before the Puja
Dhobighat Associations	Exist	√		Are already in O&M of dhobighats	Participating willingly for makeover of the dhobighats Training and capacity building for better management of new installations
NGO's	Exist	√		Organisations directly linked to the people	As Grassroots' implementing agencies
CBO's	Exist	√		Are involved in community development activities	As agencies or groups for operation and maintenance of the constructed community facilities Capacity building programmes will be required
Ward Committees	Do not Exist	√		They have a legal status, and formation if these is mandatory for every city municipality	The lowest level in hierarchy, the community representatives from these ward committees may link with the implementing agencies and the people, informally a part of the implementing structure They have to be formulated in each of the 100 wards of the city
Clubs	Exist	√		Are popular in the high income groups which are otherwise difficult to capture attention of	To get the HIG people interested in the idea. The club organisers have to first agree with the idea
Religious Organisations	Exist	√		Religious leaders have say in their respective communities	Initially to reach people in various communities. First they themselves have to be convinced with the idea, but care must be taken that we do not breed competition among various leaders and help them formulate separate lobbies for their own interest.
Media	Exist	√		Best way to reach the people	For the publicity campaigns to reach the people.
Shops along the river Ganga	Exist	√		Are directly associated with an activity that relates to the <i>Ganga</i>	Located along the banks they may be effective carriers of the idea The shop owners can be used to reach pilgrims.
Educational Institutes	Exist	√		Are centres of Youth activity	Spreading into children and Youth Special programmes targeting them.
Health Institutes	Exist	√		Can best propagate the idea of Hygiene Education	To spread the idea Doctors have to be committees so that imparting hygiene education becomes a part of their routine

Institution (non- Govt.)	Present Status	Can it be used in PP/PA		Reason	Perceived role and Required Effort
		Yes	No		
Volunteers	Exist	√		Work because they feel for the cause	During various activities to implement these
Prayag Sangeet Samiti	Exist	√		Has been cultural hub for the influential in the city	Help organise theme plays, acts or lend artistic strength to programmes to propagate the message. Can be an initial channel to build the idea in thoughtful few of the city
Yearly event	Exist	√		Attended by many	Place to advertise and propagate message
Boatmen Community	Exist	√		They are the class that is the direct beneficiary from a clean river because they draw livelihood out of it	They can be effective to spread idea/control the ill-effects by tourists Can be made responsible for cleaner banks

## 3.2 PROPOSED INSTITUTIONAL STRUCTURE

### 3.2.1 Basic Concept and Approach for the Structure

#### (1) Constraints and the Concept to Overcome those Constraints

In the preview of the Present Institutional Situation for PP/PA Activities, the problems and difficulties mentioned above, which can be referred to as “constraints”, a concept to overcome those constraints which was discussed in the Hygiene Education Plan by the JICA Study Team mentions the need for a specific function among the official sector and private sector to have a holistic approach for the PP/PA programmes. The concept to overcome those constraints discussed in the Hygiene Education Plan is as follows:

#### **The Concept to Overcome the Constraints:**

- *The best use of competence, expertise and ability of each actor*
- *A multi-sectoral cooperation*
- *The full utilization of available equipment and tools at present*
- *Positive introduction of the public participation approach*

#### (2) Approach of Intermediation by Local Bodies

As discussed in the Hygiene Education Plan Study by the JICA Study Team, an “Approach of Intermediation by Local Bodies” shall in principle be employed for considering the function. The approach is as follows.

**Approach of Intermediation by Local Bodies:** *In order to efficaciously implement the ‘Public Participation’, intermediation of local governmental bodies is necessary. The Constitution (74<sup>th</sup> Amendment) Act 1992 has empowered the Urban Local Bodies as self-governing local institutions. Therefore, their active involvements in the Public Participation are expected as follows.*

- *The intermediation of the Human Resource Development (HRD) cell at UP Jal Nigam, Nagar Nigams, as Project Implementing Agencies (PIA) in the four cities is required for the approach, which may be the basic idea of PP/PA activities of YAP-I, proposed institutional arrangements for YAP II by NRCD as discussed section of ‘Multi-Sectoral Cooperation’.*
- *Because these local authorities are placed between the related ministries/agencies at the central*

*government level, and the private sector including individuals so as to be able to work as the intermediate actors for connecting and communicating between them.*

- *As well, local functions of each Ministry such as the Hospitals, Health Posts, Health Centres, elementary and secondary schools, and public mass media like the national TVs are expected to work as the intermediate actors.*

(3) Role of *Nagar Nigam*

In addition to the approach, considering the nature of PP/PA programmes, for effective and direct communication with the communities and population of Allahabad City, *Allahabad Nagar Nigam* needs to play a critical and central role in the function to be proposed for PP/PA programmes. Relation with other entities is discussed in the following sections.

(4) Horizontal Cooperation

In accordance with above noted concepts and the Hygiene Education Plan by the JICA Study Team, the institutional arrangements as well as the experiences from PP/PA activities of *Varanasi Nagar Nigam* can be referred as example and utilized for other three municipalities, termed as '*Nagar Nigam –Nagar Nigam Cooperation*'. The horizontal cooperation system should be adopted for effective implementation of the PP/PA programmes in *Allahabad Nagar Nigam* as well as other three municipalities.

### 3.2.2 Proposed Structure

A review of the existing situation reveals that there is no structure at present that takes care of the PP/PA activities in the state. There is only one Human Resources Development wing in the *Jal Nigam* that manages some IEC activities.

Similar structures at the city levels that is into coordinating work of this nature exists only in *Varanasi* but the need of time is to have an agency that can lead to a coordinated effort in all the four cities. The idea of creating a new structure at city level for a short period of five years may not be very feasible because this would add on to the complexity of existing functions. Thus the proposal looks at the State Co-ordination cell to be the nodal agency for monitoring and co-ordination of the work in four cities.

For implementing the works Health officer in the *Nagar Nigam* will be the main authority answerable to the Municipal Commissioner and provided with additional technical staff to support on the programme. This addition of technical staff is very important because at present the *Nagar Nigam* does not have a qualified person to deal with the PP/PA issues and monitor its progress.

The hierarchy of the implementation structure is as explained in figure 3.1. The emphasis at the implementation level shall be on the *Nagar Nigams* of the four cities. The details functions of the various divisions shall be as described

(1) NRCD

NRCD is the nodal central entity to deal with river water quality management. As has been reviewed in the 'Hygiene Education Plan for Urban River Environment' prepared by the JICA Study Team, NRCD has proposed organizational arrangements of '*Suggested Institutional Framework for YAP II*' and '*Proposed National Public Participation & Coordination Cell (NPPC)*' for the implementation of PP/PA activities under the YAP II.

1) New Organizational Arrangement for NRCD PP/PA Cell

The basic idea of those organizational arrangements can in principal be supported for the

effective implementation of the PP/PA programmes for the priority projects of the sewerage scheme of Allahabad City. However, those organizational arrangements are at a proposal stage and there does not exist any such function in NRCD at present. Therefore, a PP/PA Cell, which tentatively may be referred to as NRCD PP/PA Cell (NPPAC) shall be exclusively set up for overseeing and advising PP/PA programmes in Allahabad City as well as in other three cities of Lucknow, Kanpur and Varanasi which are the study area.

In accordance with the priority projects' schedules, NRCD shall constitute NPPAC to enforce necessary actions as shown in table 3.6.

**Table 3.6 Organizational Arrangements for NRCD**

<b>New Section</b>	<b>Position</b>	<b>People</b>	<b>Establishment Year</b>
NRCD PP/PA Cell (NPPAC)	Under the 'Joint Secretary (project)'	3	2007

2) Necessary Staff

In accordance with the construction works in Allahabad City as well as other three cities, NPPAC section will advice and coordinate with related official entities to oversee PP/PA programmes in Allahabad City and other cities.

As discussed in the 'Hygiene Education Plan', the following expertise and disciplines shall be in any event incorporated into those arrangements (NPPAC) to be upgraded as a new function of NRCD for sound implementation of the 'Hygiene Education' and heightening public awareness on hygiene, mutual understanding among actors, burden sharing and urban river environment through the PP activities and other approaches.

- Public Health and Environmental Sanitation
- Public Education
- Environmental Education as a Whole

Therefore, three people in charge of NPPAC are required to implement the related activities as summarized in table 3.7.

**Table 3.7 Necessary Staff for NRCD**

<b>Position</b>	<b>No.</b>	<b>Expertise</b>	<b>Main Activities</b>
Chief	1	Public Health Expert	Management and Planning
Staff A	1	Public Education Expert or Social Science Expert	Coordination on related activities
Staff B	1	Environmental Education Expert including Social Environment Consideration Expertise	Coordination on related activities
<b>Total</b>	<b>3</b>	-	-

(2) Committees

Two committees shall be formed in 2007 to vertically and horizontally overlook each related actor and entity from the state level and the community level, the programme implementation and the success. Based on above discussion, the committees are proposed as shown in Figure 3.1.

1) Sanitation Promotion Committee

This committee shall be at the local city level to monitor the progress of work and shall consist of representatives from Nagar Nigam, Jal Nigam, Jal Sansthan and DUDA (District



Urban Development Authority)

The main functions of the PIC shall be

- Overall supervision of the PP/PA programmes in Allahabad city.
- Setting and monitoring of yearly targets
- Consultation with and making advices and supervising to Local Consultants to be employed for the PP/PA programmes and related activities
- Internal consultation and, coordination with, technology transfer and reporting to the committee members, and feed backing to the State Co-ordination Cell on the PP/PA activities in Allahabad City.
- All the yearly campaigns and programmes to be executed in the city will need sanction by this committee.

Frequency of meetings – every month to review progress

The meetings shall be chaired by the Municipal Commissioner and supported by Health Officer of the city.

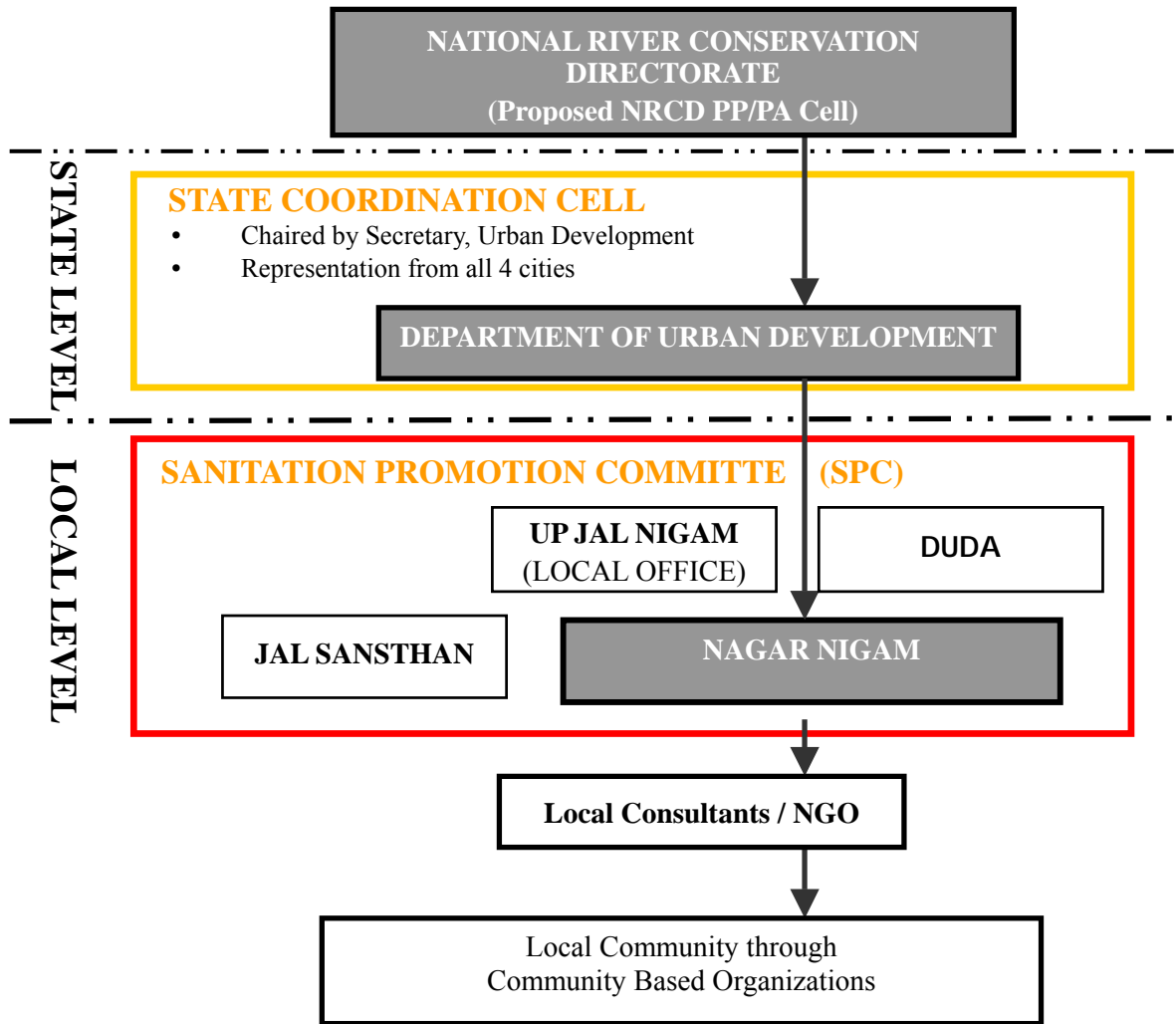
## 2) State Co-ordination Cell

This shall be the committee through which works in the four cities will be co-ordinated. The cell shall consist of members of the PIC of the four cities and representatives from ministry of Urban Development, NRCDC and the central level Project Management Consultant.

The main functions of the cell shall be

- Overall supervision of the PP/PA programmes in the four cities.
- Consultation and coordination with other relevant Ministries and other official entities like Health & Family Welfare, Human Resource Development, CPCB and etc. to get necessary technical advices and information to be required to perform technical advices on the PP/PA programmes in all cities.
- Consultation with and making advices and supervising to all the Nagar Nigams for the PP/PA programmes and related activities

Frequency of meetings – every three months with rotation in the four cities and shall be chaired by the secretary Urban Development.



**Figure 3.1 Proposed Organisational Structure of the Implementing Agency**

(3) Local Bodies in Allahabad

The various functions and structures to be added in the local institutions are as explained below

1) Nagar Nigam

The Health Department of *Allahabad Nagar Nigam* (ANN) is in charge of health and environmental matters. The department consists of three sections among which the Environmental Sanitation Section exclusively handles hygiene and sanitation issues. However, there is no specific section or personnel handling PP/PA activities at all in ANN at present.

For smooth implementation of the PP/PA programmes in Allahabad City, as mentioned above, ANN shall perform a critical and central role for effective and immediate communication and interaction with the communities, the private sectors including NGOs and CBOs and individuals in Allahabad City.

Therefore, it is advised that the Health officer at the Nagar Nigam shall be given the responsibility of managing the programme in their respective cities. To provide for the lack in a technical person knowledgeable in the field of PP/PA work additional staff on contract basis shall be provided to the Health Department and one assistant that shall also take care of

the extra administrative work that may accrue to the office owing to the additional responsibility.

**Table 3.8 Staff Required at Nagar Nigam**

<b>Position</b>	<b>No.</b>	<b>Expertise</b>	<b>Main Activities</b>
<i>Project Officer</i>	1	Public Education Expert or Social Science Expert	Management, Planning and consultation with UPJN, AJS, SCC and other official entities Coordination and Facilitation with Local Consultants, NGOs and CBOs and Communities
<i>Assistant</i>	1	Person with secretarial qualifications	Assistance to Project Officer

The project officer has two roles to play in the whole system.

One is providing help to the Local Consultative Group in conducting the programmes in the city i.e. act as a facilitator to the whole project (For example the project officer may help the Consultative Group provide links to the various government officials when their role is required in the awareness programme and make sure of their availability etc). It shall be coordinating efforts with the Local Consultative Group to streamline things in the municipal corporation for better communication with the public and making the whole effort more transparent. This is very important because the present structures are hierarchal bodies where the voice of people is given very little importance.

Secondly it will be coordinating with the PIC to synchronise the developments in PP/PA with other programmes being undertaken as the overall project and that may have relevance to PP/PA. Through him the need to have training programmes for the staff of the municipal corporation for better communicating skills towards participatory planning can be conveyed and thus effective capacity building held. He shall also be responsible to coordinate with the Jal Nigam and Jal Sansthan, keeping the officers there updated for the latest progress in work and managing program execution.

2) Allahabad Jal Sansthan

*Allahabad Jal Sansthan* (AJS) is in charge of the operation and maintenance including collection of water and sewerage charges. Therefore, one or two officials of AJS shall be assigned for the coordination and consultation for facilitating the programmes in addition to their daily duties.

They shall represent the concerns of AJS in the PIC meetings and it shall be essential for one person atleast to be present in the meetings.

(4) DUDA (District Urban Development Authority)

DUDA is the nodal agency responsible for the construction of CTC and Dhobighats in the district. Therefore it is important to have the presence of one of the officials for coordination and consultation with the PIC and State Co-ordination Cell for the PP/PA programmes in Allahabad City  
 One officer at DUDA shall be given the additional responsibility for representing the concerns of DUDA in PP/PA work in Allahabad city. He shall also be responsible that DUDA is adequately represented in the PIC meetings and co-ordinate works with the Municipal Corporation.

(5) UP Jal Nigam

As mentioned above, UP Jal Nigam has Human Resource Development (HRD) Cell through which PP/PA related activities are facilitated in Allahabad City. Therefore, HRD function can be utilized as a suitable institutional organization for coordination and consultation with the PIC and State Co-ordination Cell for the PP/PA programmes in Allahabad City. One or two officials of HRD shall be assigned for representing the concerns of UPJN in the PIC and co-ordination wherever required in addition to their daily duties.

It shall be essential for one person at least to be present in the meetings of PIC.

(6) Project Management Consultant

The PMC shall be the nodal person establishing the much-needed link between NRCD and local level implementation. It shall have a reporting relation to NRCD and consultation and receiving reports at the local level.

Apart from that his office shall be responsible for monitoring work progress in the four cities and ensuring that horizontal co-operation happens. He shall be present in the meetings of the State Co-ordination Cell that are held every three months with rotation in the four cities. He shall also be responsible for technical advices to the municipal Corporation whenever required.

Monthly, Quarterly and yearly review reports shall be sent to NRCD and their comments on the work progress monitored. It shall be the duty of the PMC to make sure that the suggestions made by NRCD are incorporated at the grass root implementation level.

In terms of the horizontal Cooperation the main duties of PMC shall be

- To share each experiences and issues of setting up institutional arrangements, preparation of PP/PA programmes, communication with communities and so on.
- To share necessary resources for the PP/PA programmes.

(7) Local Consultant/NGO

The body shall be hired by the respective Nagar Nigams and will execute the work in the city under the guidance of Health officer and appointed persons at the Nagar Nigam.

The consultant shall be the link between the authority and people and will be reporting regularly on monthly basis to the office at Nagar Nigam. The agency shall execute the programmes through Ward Committees who shall have required representation of civic society groups.

(8) Local Groups

The people as of themselves cannot interact with the agency or government on individual basis but will have to be formed into groups through which the programme will be routed. These groups will then join at the ward level to form ward committees which shall interact with the implementing agency.

1) Ward Committees

It shall be inquired if there are existing ward Committees in the four cities and what is their status in terms of legal powers, representation and effectiveness in reaching the people. As per the results it shall be decided if new Committees have to be constituted in the cities or the existing ones have to be strengthened.

The main idea is to have adequate people's representation in these committees. People's

representation will be such that the elected representatives of the Resident Welfare Association, Community Groups and other Civil Society Groups find place in the Committee and have influence over the decisions that will take place.

The ward (despite its shifting ward boundaries based on electorates) can be seen as a basic unit for carrying and coordinating the activities. At an ideal of 30,000 persons (6000 families) it can offer a people centric framework with the "Ward Committee" as an accountable elected representative at the helm of a transparent plan as a platform for change and investments.

Workshops and the monthly review meeting of these committees with the NGO shall be regularly organised. In the workshops, the area officers of Police, Allahabad Jal Sansthan, and Development Authority will also be present. These meetings will be used to discuss the work progress in the areas and their problems and find out mutually agreed upon solutions to these problems. The budgets for these meetings shall be from within the budgets for the yearly campaign.

Apart from that this shall be the group that has to be present for the Necessary Explanatory Meetings as described in section 4.2.2

## 2) Associations / Community Groups

These groups may be referred to as 'Mohalla Committees', 'Community Groups', 'Resident Welfare Associations' or something of the like according to the nature of people that formulate the group. These associations will form of group of families residing in one geographical location and will select representatives from among themselves.

According to the previous analysis the suitable groups may be from within or exclusively of Durga Puja Samities, Ward Committees, Clubs, Religious Organisations, Swimming Clubs, Educational Institutes, Health Institutes, Shops along the river Ganga, Volunteers, Prayag Sangeet Samiti etc.

The elected representatives will be responsible for conveying the people's message to the Ward Committees and the programmes and policies to the people. They will be the link for effective participation. For execution of any programme for awareness these representatives shall be contacted by the local NGO and they will ensure public support in their area.

## Slum CBO

In case of Slums and works related to non-sewerage works, special groups shall be constituted known as Slum CBO's. One Slum CBO shall comprise of 10 slum Neighbourhood Groups which in turn will roughly comprise of 2000 persons or 400 families. This number may vary depending on the physical distribution of slums but only to the extent of 5%.

## 3) Citizens Committee

Citizens committees exist in all the four cities but are not very active. These committees shall be strengthened and the PIC shall regularly inform about their decisions and future plans to the committee and the ward committees.

The citizens group shall also submit monthly reports of work progress to PMC, who shall also receive report from PIC, and thus monitor the work progress.

**CHAPTER 4**  
**PROGRAMMES TO BE IMPLEMENTED**

## **CHAPTER 4 PROGRAMMES TO BE IMPLEMENTED**

### **4.1 BASIC STRATEGY FOR PROGRAMMES**

Based on discussions previously in the document a basic strategy to be employed for the PP/PA programmes for Allahabad city may be summarised as follows.

- Based on health situation in Allahabad city, it is reasonable to say that health benefit can be used as an incentive to initiate the PP/PA programmes.
- Based on the people's perception and the nature of sewerage scheme, it is reasonable to say that main target of the PP/PA programmes for sewerage shall be HIG and MIG.
- Based on the nature of non-sewerage scheme it is reasonable to say that the main target for PP/PA programmes on non-sewerage shall be the slum and LIG communities
- Overall the PP/PA programmes detailed in the report shall cover the entire city and all its inhabitants.
- There will be two faces to the PP/PA Programmes - ones that shall be planned and conducted in parallel with the schedule of the events and topics of the priority projects of Allahabad and second the regular programmes revolving around the Hygiene Education Concept to establish the needed link between sanitation and Health.
- The main focus for the programmes associated with the sewerage component shall be to generate an improved understanding of health-hygiene as well as to generate willingness to pay
- The main focus of activities related to non-sewerage shall be on improving their facilities by providing low-cost sanitation systems which will have more direct correlation with their improved health and hygiene
- The activities are being designed for the first phase of the priority projects up to the year 2010.
- Most of HIG homes are well connected to sewer lines or have installed systems of their own, so it seems that HIG do not perceive health as a big personal problem, even then it is a community problem and there is a risk of health for them as well. Therefore HIG shall be involved as the main target to share issues and the cost accordingly.
- All programmes should move towards building a relation of trust between the people and government machinery.
- Programmes will ensure active involvement of community and officials at all stages of decision-making.
- The programs shall be routed through the existing community structures.
- The existing Music and drama schools are to be made an active part of campaign.

### **4.2 PRIORITY PROJECTS AND TIMING OF PP/PA RELATED ACTIVITIES**

According to the construction and rehabilitation schedule of the priority projects prepared, the main PP/PA related activities and the suitable timing are summarized in Table 4.1.

The first four activities are related to the setting up of the Structures for the execution of the PP/PA programme which has been explained in the previous section and the details of the PP/PA programmes shall follow further in the report.

**Table 4.1 Priority Projects and Timing of PP/PA related Activates**

Priority Project, Allahabad			Implementation Plan					
No.	Item	Description	2007	2008	2009	2010	2011	2012
<b>District A</b>								
(1)	Naini STP	Augmentation				*****	*****	
(2)	Lukerganj SPS	Augmentation				*****		
(3)	Proposed Trunk Sewer	New Construction				*****	*****	*****
(4)	Rehabilitation of Existing Trunk Sewer	Rehabilitation				*****	*****	
(5)	Rehabilitation of Existing STP, SPSs	Rehabilitation				*****	*****	
<b>District B</b>								
(6)	Numaya Dahi STP	New Construction				*****	*****	
(7)	Ghaghar Nala SPS	New Construction				*****	*****	
(8)	Rising Main from Ghaghar Nala SPS	New Construction					*****	
(9)	Sasur Khaderi SPS	New Construction				*****	*****	
(10)	Rising main from Sasur Khaderi SPS	New Construction				*****	*****	
<b>District D</b>								
(11)	Rajapur STP	New Construction				*****	*****	
(12)	Alopibagh SPS	Augmentation					*****	
(13)	Rising Main from Alopibagh SPS	New Construction				*****	*****	
(14)	Proposed Trunk Sewer	New Construction				*****	*****	*****
(15)	Rehabilitation of Existing Trunk Sewer	Rehabilitation				*****	*****	
(16)	Rehabilitation of Existing SPSs	Rehabilitation				*****	*****	
<b>District E</b>								
(17)	Ponghat and Kodara STP	New Construction					*****	*****
<b>PP/PA related Activities</b>			<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>
1.	Organizing NPPAC	NRCD	***_	-----	-----	-----	-----	-----
2.	State Co-ordination Cell	NRCD, UPJN, AJS, ANN	***_	-----	-----	-----	-----	-----
3.	Program Implementation Committee (PIC)	ANN, CBOs, NGOs etc.	***_	-----	-----	-----	-----	-----
4.	PP/PA Programmes	Campaigns, and others	▲	▲	▲	▲	▲	▲

\* Construction and preparation, --- operation and execution, ▲ PP/PA Activities

### 4.3 APPROACH AND TECHNIQUE

#### (1) Approach

Based on the discussion at the Hygiene Education Plan by the JICA Study Team, the approach to be employed to the explanatory meetings and programmes mentioned the following section is the 'Participatory Approach'.



(2) Technique

In addition to the approach, the leading participatory techniques of RRA, PRA (PLA: Participatory Learning and Action: more process oriented technique of PRA) and PCM can be utilized to find some problems, solutions and make plans in the meetings. Those techniques are summarized in table 4.2.

**Table 4.2 Participatory Analysis and Planning Techniques**

<b>Participatory Planning Techniques</b>	<b>Description</b>
RRA (Rapid Rural Appraisal)	A social appraisal approach for development assistance projects using interviews and other methods. This is said to be an effective way to understand the qualitative needs of residents in the project area within a relatively short period.
PRA (Participatory Rural Appraisal)	The basic concept is the same as for RRA, except that this method is more oriented to regional residents than RRA. Among the RRA approaches, this method utilizes means (discussions among residents, etc.) that allow implementation by residents themselves.
PCM (Project Cycle Management)	A method to control a series of cycles including planning, implementation, and evaluation of the development project by means of a project outline table called the Project Design Matrix (PDM).

*Source: 'Tentative Guidelines for Optimisation of Operation and Maintenance of Sewage Works in Developing Counties', IDA Water Series No.12, October 2001, Infrastructure Development Institute (IDI) – Japan*

**4.4 NECESSARY PROGRAMMES TO BE IMPLEMENTED**

As has been observed earlier the programmes being elaborated further shall be seen in two sets:  
 SET I –These are the necessary programmes that have to be undertaken in accordance to the timings of the projects as detailed in the master plan. These shall include

- Committee Meetings
- Necessary Publicity Programmes
- Necessary Explanatory Meetings
- Demonstration Programmes

SET II – These are the second set of programmes that shall run parallel to the first set and shall communicate the ideas on Health, Sanitation and better living Environment in accordance with the Hygiene Education Concept of JICA Study team. The end achievable of this set of activities shall be to generate willingness to pay in the city people. The programmes shall constitute

- Entry point Activities
- Regular Publicity
- Yearly Campaign
- Clean River Day and Clean river week
- Regular activities in Slums and Dhobighats
- Special Activities

The above-described set of programmes shall make use of various tools and activities, the description of which shall be given at the end of the section.

#### **4.4.1 Committee Meetings**

##### **(1) Objectives of Committee Workshops**

Committee (Sanitation Promotion Committee) Meetings shall take place every month to monitor the progress of work on PP/PA in Allahabad City. The principal objectives of the committee meetings are as follows.

- To discuss the progress of work on PP/PA and update the next month activities
- To heighten co-ordination between the authorities and share their expected roles, especially brief on the works that will need the concerned department's support or clearance etc.
- To discuss and decide related activities such as details of programmes to be launched, and decide on timings of explaining it to the people.

#### **4.4.2 Explanatory Meetings**

##### **(1) Objectives of Explanatory Meetings**

In Explanatory Meetings, PP/PA activities shall be discussed with communities and stakeholders. These shall be undertaken twice a year, one meeting proceeding the PP/PA activities in the city to discuss the plans and other after the completion to discuss achievements and shortcomings of past. The principal objectives of such meetings are as follows.

- To inform related actions on the priority projects and the necessary arrangements on PP/PA activities to the communities and stakeholders.
- To encourage public participation in the related actions on the priority projects
- To heighten public awareness on the priority projects and their expected roles.
- To share the common issues on the priority projects, the sewerage schemes and river water pollution within the public and the private sector.

##### **(2) Necessary Explanatory Meetings**

In accordance with the schedule of the priority projects in Allahabad City and campaigns the necessary explanatory meetings for the priority projects and the timing are summarized as summarised in table 4.3.

The frequency of the meetings has been decided as per the details given in Appendix A1.

**Table 4.3 Explanatory Meetings**

Year	Timings and Agenda*	Frequency
2007	- Immediately after recruitments in ANN and allotting of new responsibilities to staff to inform the roles and functions	1
2008	- Immediately after deciding of details of Yearly campaign (2a) - After finishing each campaign implemented to inform the evaluation of all results of each campaign (2b)	2
2009	- Immediately after deciding of details of Yearly campaign (3a) - After finishing each campaign implemented to inform the evaluation of all results of each campaign (3b)	2
2010	- Immediately after deciding of details of Yearly campaign (4a) - After finishing each campaign implemented to inform the evaluation of all results of each campaign (4b)	2
2011	- Immediately after deciding of details of Yearly campaign (5a) - After finishing each campaign implemented to inform the evaluation of all results of each campaign (5b)	2
2012	- Immediately after deciding of details of Yearly campaign (6a) - After finishing each campaign implemented to inform the evaluation of all results of each campaign.(6b)	2

\* In all explanatory meetings the community, stakeholders and Mass media in Allahabad shall be involved

#### **4.4.3 Publicity Programmes**

The publicity programmes shall be planned and implemented to advertise widely the information on the projects as detailed in the master plan, to the population in Allahabad City through the mass media and printed materials to ensure that the city population is adequately informed about the actions and invited to participate at free will.

Apart from these programmes tied to the priority projects, publicity will also be undertaken regularly as will be discussed further in section 4.5.5. However, the necessary publicity programmes in this section may be detailed under two heads as follows

##### (1) Publicity Programme on Opening of the Public Awareness Section & Targets

In 2007, new staff shall be recruited in the ANN and new duties shall be assigned to the Health Department of ANN. These functions need to be made public so that people are aware of the authorities to contact in case of any need. Therefore, a publicity programme shall be launched in 2007 for several days to inform the functions and the expected roles to population of Allahabad City through the specified activities.

The target groups for main activities of the programme are

- The sewerage schemes are being implemented in districts A, B, D and E so people living in districts A, B, D and E are the direct beneficiaries –Target Group 1
- Because the cell is to become an integrated part of the ANN so the whole of the city population becomes a beneficiary (indirect) –Target Group 2
- The PP/PA programme of the non-sewerage scheme will be co-ordinated through this cell as well so they become the future beneficiaries –Target Group 3

As per the target groups the activities (details in table 5.1, section 5.3) are summarised in table 4.4.

**Table 4.4 Publicity Programmes on Opening of PP/PA Cell (PP 1)**

Sr. No	Category	Activity	Duration	Message
1	Target Groups 1	Information Mela	1 week	<ul style="list-style-type: none"> <li>- Information on the new Cell is disseminated.</li> <li>- Involvement in the sewerage schemes of the primary target groups is encouraged.</li> </ul>
		Information Van	2 weeks	
		Information Kiosk*	1 month	
2	Target Groups 2	Information Mela	1 week	<ul style="list-style-type: none"> <li>- Information on the new Cell is disseminated.</li> <li>- Future involvement in the sewerage schemes of the secondary target groups is encouraged</li> </ul>
		Information Kiosk**	1 month	
3	Target Groups 3	Information Kiosk***	2 months	<ul style="list-style-type: none"> <li>- Information on the new Cell is disseminated.</li> <li>- Related information, concept, future plans and actions are disseminated to the remainders.</li> <li>- As for the LIGs, coordination with the PP/PA programmes for the non-sewerage scheme is necessary</li> </ul>
		Information Mela	1 week	

\* One kiosk each in district A, B, D and E.

\*\* One kiosk on a frequently visited public place or near an important public office like Nagar Nigam.

\*\*\* This Kiosk shall be near the slums rotating to four areas (2 days per area). Location selected shall be such so as to have maximum coverage.

(2) Publicity Programmes on the Priority Projects & Targets

From 2010 to 2012, new construction and rehabilitation of the sewerage schemes are planned as the priority projects in Allahabad City as shown in table 4.1. Similarly under the non-sewerage scheme activities towards construction and rehabilitation of CTC's and Dhobighats are planned from year 2007 to 2010.

Therefore, publicity programmes on new construction and rehabilitation shall be launched through the beginning to the end of the project i.e. year 2007 to 2012 accordingly, to inform of those projects outlines, schedules & construction timings, projects' benefits, starting of operation of the projects and so on to the population of Allahabad City.

The **tools** to be utilised for publicity in this section are: Hoardings, Banners, and Advertisements in newspaper and T.V., Posters, Pamphlets, Hot Air Balloons and News in local channels the details about which can be referred to in section 5.3 table 5.1 on communication tools.

For the projects under the non-sewerage component the necessary publicity will take place only in the year 2007 when the demonstration projects for these are being constructed and these will at two times before and after completion of each construction/rehabilitation.

The target groups and main activities for projects under sewerage scheme the programmes can be summarised in from table 4.5 to 4.6.

**Table 4.5 Publicity Programmes on the Sewerage Projects (1)**

Projects	Category	Target Groups	Information publicised
<ul style="list-style-type: none"> <li>- Augmentation of <i>Naini STP</i> District A of Allahabad city</li> <li>- Augmentation of <i>Lukerganj SPS</i> in District A</li> <li>- New Construction of <i>Proposed Trunk Sewer</i> in District A of Allahabad city</li> <li>- Rehabilitation of <i>Existing Trunk Sewer and Existing SPS</i> in District A of Allahabad city</li> </ul>	<p>Primary Target Group</p>	<ul style="list-style-type: none"> <li>- The direct beneficiaries of the projects live in the district A, B and D</li> <li>- Direct beneficiaries may be defined as ones that have connections to or have their sewage flowing through the respective sewerage scheme component</li> </ul>	<ul style="list-style-type: none"> <li>- Information on the new constructions is disseminated before the constructions in 2010.</li> <li>- Direct benefits of the project are informed in 2010.</li> <li>- Progress of the constructions is informed in 2010 and 2011.</li> <li>- Completion of the constructions and starting of the operation is informed in 2010, 2011 and 2012.</li> </ul>
<ul style="list-style-type: none"> <li>- New Construction <i>Sasur Khaderi SPS</i> and <i>Rising main from Sasur Khaderi SPS</i> in district B of Allahabad city</li> <li>- New Construction of <i>Numaya Dahi STP</i> and <i>Ghaghar Nala SPS</i> in district B of Allahabad city</li> <li>- New Construction of <i>Rajapur STP</i> in district D of Allahabad city</li> </ul>	<p>Secondary Target Group</p>	<ul style="list-style-type: none"> <li>- The indirect beneficiaries of the projects live in the district A, B and D</li> <li>- The indirect beneficiaries may be defined as ones those shall be connected to the respective sewerage component in near future through individual efforts or by the government agency</li> </ul>	<ul style="list-style-type: none"> <li>- Information on the new construction is disseminated before the construction in 2010.</li> <li>- Indirect benefits of the project are informed in 2010.</li> <li>- Future plans and actions of the sewerage schemes are informed to the secondary targets in 2010 as well as in 2012</li> <li>- Progress of the constructions is informed in 2011 and 2012.</li> <li>- Completion of the constructions and starting of the operation is informed in 2010, 2011 and 2012.</li> </ul>
<ul style="list-style-type: none"> <li>- New Construction of <i>Rising Main from Alopibagh SPS</i> and <i>Proposed Trunk Sewer</i> in district D of Allahabad city</li> <li>- Rehabilitation of <i>Existing Trunk Sewer and Existing SPSs</i> in district D of Allahabad city</li> </ul>	<p>Tertiary Target Groups</p>	<ul style="list-style-type: none"> <li>- The remainders are considered as future beneficiaries.</li> <li>- Primarily the slum population and LIG* to some extent that may be connect in some far future but only though government efforts and are presently being covered under the non-sewerage component.</li> </ul>	<ul style="list-style-type: none"> <li>- Information on the new construction is disseminated before the construction in 2010.</li> <li>- Future plans and actions of the sewerage schemes are informed to the reminders in 2010.</li> <li>- As for the LIGs, coordination with the PP/PA programmes for the non-sewerage scheme is necessary</li> </ul>

\* If there are direct and indirect LIGs, such LIGs shall be excluded and treated as direct and/or indirect beneficiaries

**Table 4.6 Targets & Main Activities for Publicity Programmes on the Sewerage Projects (2)**

Projects	Category	Target Groups	Information publicised
<ul style="list-style-type: none"> <li>- Augmentation of Alopibagh SPS in district D of Allahabad city</li> <li>- New Construction of <i>Rising Main from Ghagar Nala SPS</i> in district B</li> <li>- New Construction of <i>Kodara and Ponghat STP</i></li> <li>- <i>Interceptor Sewer</i> in district E of Allahabad city</li> </ul>	Primary Target Groups	<ul style="list-style-type: none"> <li>- The direct beneficiaries of the projects live in the district B, D and E</li> <li>- Direct beneficiaries may be defined as ones that have connections to or have their sewage flowing through the respective sewerage scheme component</li> </ul>	<ul style="list-style-type: none"> <li>- Information on the new construction and rehabilitations are disseminated before the construction/rehabilitations in 2011.</li> <li>- Direct benefits of the projects are informed in 2011</li> <li>- Progress of the construction/rehabilitations is informed in 2011.</li> <li>- Completion of the construction/rehabilitations and starting of the operation is informed in 2011 and 2012.</li> </ul>
	Secondary Target Groups	<ul style="list-style-type: none"> <li>- The indirect beneficiaries of the projects live in the district B, D and E</li> <li>- The indirect beneficiaries may be defined as ones those shall be connected to the respective sewerage component in near future through individual efforts or by the government agency</li> </ul>	<ul style="list-style-type: none"> <li>- Information on the new construction and rehabilitations are disseminated before the construction/rehabilitations in 2011.</li> <li>- Indirect benefits of the projects are informed in 2011.</li> <li>- Future plans and actions of the sewerage schemes are informed to the secondary targets in 2011 as well as in 2012</li> <li>- Progress of the construction/rehabilitations is informed in 2012.</li> <li>- Completion of the construction/rehabilitations and starting of the operation is informed in 2011 and 2012.</li> </ul>
	Tertiary Target Groups	<ul style="list-style-type: none"> <li>- The remainders are considered as future beneficiaries.</li> <li>- Primarily the slum population and LIG* to some extent that may be connect in some far future but only through government efforts and are presently being covered under the non-sewerage component</li> </ul>	<ul style="list-style-type: none"> <li>- Information on the new construction is disseminated before the construction in 2011.</li> <li>- Future plans and actions of the sewerage schemes are informed to the reminders in 2011.</li> <li>- As for the LIGs, coordination with the PP/PA programmes for the non-sewerage scheme is necessary</li> </ul>

\* If there are direct and indirect LIGs, such LIGs shall be excluded and treated as direct and/or indirect beneficiaries

#### 4.4.4 Demonstration Programmes

##### (1) Demonstration Programmes for Sewerage Works

In accordance with the priority projects' schedule, demonstration programmes on the new and rehabilitated facilities (relief sewers, pumping stations and so on) shall be launched at the start of operation of these facilities to demonstrate and show them to the population. In addition, the programme shall include publicity on the primary projects' incentive of health benefit, burden sharing and Polluter Pays Principal (PPP) to get the residents' cooperation and public participation in advance for the necessary operation and maintenance of those facilities.

The target groups and main activities for the programmes can be summarised in table 4.7, 4.8.

**Table 4.7 Targets & Main Activities for Demonstration Programmes on the Sewerage Projects (1)**

Projects	Category	Target Groups	Main Activities
Augmentation of Alopibagh SPS in district D of Allahabad city  New Construction of <i>Rising Main from Ghagar Nala SPS</i> in district B  New Construction of <i>Ponghat and Kodara STP</i> in district E	Primary Target Groups	<ul style="list-style-type: none"> <li>- The direct beneficiaries of the projects live in the district B, D and E</li> <li>- Direct beneficiaries may be defined as ones that have connections to or have their sewage flowing through the respective sewerage scheme component</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Site Visits:</b> after the completion of the rehabilitation of the system in 2012</li> <li>- <b>Group Discussions:</b> The direct benefits, several constraints and burden sharing of the operation and maintenance of these facilities are informed to and shared with the target groups at the time of the demonstration and site visits.</li> </ul>
	Secondary Target Groups	<ul style="list-style-type: none"> <li>- The indirect beneficiaries of the projects live in the district B, D and E</li> <li>- The indirect beneficiaries may be defined as ones those shall be connected to the respective sewerage component in near future through individual efforts or by the government agency</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Site Visits:</b> after completion of these facilities in 2012</li> <li>- <b>Group Discussions:</b> Indirect benefit like health and environmental sanitation improvement, future plans and actions of the sewerage schemes are informed to the secondary targets after completion of these facilities in 2012.</li> <li>- Information also to be dissipated on the agencies to approach and ways to connect to the facilities.</li> </ul>
	Tertiary Target Groups	<ul style="list-style-type: none"> <li>- The remainders are considered as future beneficiaries.</li> <li>- LIGs* of Allahabad City are considered as future beneficiaries as well but shall be treated by the PP/PA programmes for the non-sewerage scheme like LCS and CTC to be prepared by the JICA Study Team.</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Publicity:</b> Information on the new construction is disseminated before the construction in 2011.</li> <li>- Future plans and actions of the sewerage schemes are informed to the reminders in 2011.</li> <li>- As for the LIGs, coordination with the PP/PA programmes for the non-sewerage scheme is necessary</li> </ul>

\* If there are direct and indirect LIGs, such LIGs shall be excluded and treated as direct and/or indirect beneficiaries

The site visits shall be undertaken for two groups, the general public and school students of the locality. During the site visit for students they shall be informed about the working of the system and benefits

that shall occurs to the overall surroundings of the city. The site visits may be clubbed with painting competitions and extempore.

**Table 4.8 Targets & Main Activities for Demonstration Programmes on the Sewerage Projects (2)**

Projects	Category	Target Groups	Main Activities
<ul style="list-style-type: none"> <li>- Augmentation of Alopibagh SPS in district D of Allahabad city</li> <li>- New Construction of <i>Rising Main from Ghagar Nala SPS</i> in district B</li> <li>- New Construction of <i>Kodara and Ponghat STP</i> in district E</li> <li>- <i>Interceptor Sewer</i> in district E of Allahabad city</li> <li>- Trunk Sewers in District A and D</li> </ul>	Primary Target Group	<ul style="list-style-type: none"> <li>- The direct beneficiaries of the projects live in the district A, D and E</li> <li>- Direct beneficiaries may be defined as ones that have connections to or have their sewage flowing through the respective sewerage scheme component</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Site Visits:</b> after the completion of the rehabilitation of the system in 2012</li> <li>- <b>Group Discussions:</b> The direct benefits, several constraints and burden sharing of the operation and maintenance of these facilities are informed to and shared with the target groups at the time of the demonstration and site visits.</li> </ul>
	Secondary Target Group	<ul style="list-style-type: none"> <li>- The indirect beneficiaries of the projects live in the district A, D and E</li> <li>- The indirect beneficiaries may be defined as ones those shall be connected to the respective sewerage component in near future through individual efforts or by the government agency</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Site Visits:</b> after completion of these facilities in 2012</li> <li>- <b>Group Discussions:</b> Indirect benefit like health and environmental sanitation improvement, future plans and actions of the sewerage schemes are informed to the secondary targets after completion of these facilities in 2012.</li> <li>- Information also to be dissipated on the agencies to approach and ways to connect to the facilities.</li> </ul>
	Tertiary Target Groups	<ul style="list-style-type: none"> <li>- The remainders are considered as future beneficiaries of sewerage scheme.</li> <li>- Primarily the slum population and LIG* to some extent that may be connect in some far future but only through government efforts and are presently being covered under the non-sewerage component</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Publicity:</b> Information on the system rehabilitated is informed after completion of these facilities in 2012</li> <li>- Indirect benefit like health and environmental sanitation improvement, future plans and actions of the sewerage schemes are informed to the Tertiary targets after completion of these facilities in 2012.</li> <li>- As for the LIGs, coordination with the PP/PA programmes for the non-sewerage scheme is necessary</li> </ul>

\* If there are direct and indirect LIGs, such LIGs shall be excluded and treated as direct and/or indirect beneficiaries

(2) Demonstration Programmes for Non-Sewerage Works

The non-sewerage activities include construction of CTC and Dhobighat facilities which total to almost 200 or above in the city. The large numbers of facilities that have to be constructed put a restriction on the fact that each of these can be accompanied with a demonstration programme as have been the sewerage activities.

Therefore in the non-sewerage works the demonstration projects (5 CTC and 2 Dhobighats) will be accompanied with demonstration programmes. Here the start and completion of the construction shall be treated as an event marked with associated functions. The community people will be invited to the place and the detail designs of the respective facility shall be displayed and explained. The opportunity shall also be taken to announce the next activity as well.



Apart from the community the invitees shall include people from the office at Nagar Nigam, local NGO, local press and some prominent people in the city.  
Each even to will be managed in a sum of app. Rs 15,000/-

#### **4.5 REGULAR PROGRAMMES**

In addition to the specific programmes discussed above, in order to maintain sustained public participation and public awareness on the environment, health, sanitation, and burden sharing of the sewerage projects, continuous efforts shall be made with the following general actions.

- Entry Point Activities
- Regular Publicity
- Regular Activities executed under the Yearly Theme Campaign in Allahabad City
- Periodic Activities such as setting up “Clean River Day” and “Clean River Week”
- Regular activities for community building (CBO formation) in the slums
- Special Programmes at the time of festive celebrations at Sangam

##### **4.5.1 Entry Point Activities**

To build a platform for initiating the programmes in the city certain activities have to be undertaken in the first year. Apart from the formulation of PIC and the required cells the need shall be towards creation of informal groups in each of the cities with representatives that will co-ordinate with the PIC and also serve as programme ambassadors so that the programme can reach all to the end.

Also slums will be targeted as special areas to build faith in the people there. They are being treated as special places because the socio-economic conditions of the people and the area restrict the reach and people’s participation in programmes going on in the city.

The first year shall be entirely committed to building a platform for formation of these groups and advocating the idea within people so that they become receptive to the future programmes.

##### **(1) Community Workshop**

The workshop shall invite the people from city from various walks of life and build an informal group that shall commit themselves to participate regularly in the explanatory meetings and act as ambassadors to communicate with the people.

Invitees shall include doctors, Lawyers, Leaders (political and religious), prominent women activist, artists, government officials, Architects, Academicians, Environmentalist, Sociologist and other professionals so as to have a representative group for a mix of ideas. The idea here shall be to invite people from all parts of the city so that they can then help to form ward committees in their area and also other groups. If there are existing citizens’ committee in the city then the primary objective of the workshops shall be to strengthen them to act as the needed group.

One special workshop shall be taken up solely for people from the slums and the venue will also be near a slum area. This is done to ensure that idea reaches to lowest section of society, and the invitees will include forward-thinkers from the slums and NGO’s working with them. Here 50% of the invitees have to be women that live in the slums and have been working for socio-cultural and other needs in their community. The help of NGO locally working in the area may be sought for deciding the invitees.

Each workshop shall be in the form of a series of interactive sessions over a time of three months as detailed. Overall three workshops will be held considering the city’s 2 geographic areas and the slum localities.

### **Session I**

The first session shall introduce the team to the people and the basic idea of having these sessions. This first session has to be followed by designing questionnaires and decide sample size for survey that shall collect information on the health of the people.

Women shall be important invitee list because they are the main family member responsible for health and hygiene in the house and so shall be practicing local doctors as they will certainly have a basic idea of the status of the locality and will be trusted by the people.

The agenda of this session shall be to

- Introduce people to project team and survey team
- Brief people about the programme idea (this particular programme but not the whole awareness campaign)
- Discuss general health problems faced by the people on regular basis (the emphasis shall be on the diseases because of environmental health and not go to lifestyle diseases).
- Introduce them to the idea of conducting the survey and need for their co-operation
- Invite their suggestions of basic design of the questionnaire.

At the end of the day the session shall be deemed successful if a support has been gathered from the people for co-operating in the survey that is being conducted.

### **Session II**

Now after having a feel for the area and its needs this session shall concentrate on development of the questionnaire for the survey and that shall remain the soul agenda.

The basic important information, the survey should provide is

- Nature of the disease
- The frequency of contacting the illness
- The average duration that people fall sick for
- The age group and sex most vulnerable
- The average amount of money spent each time

This information may also be collected using means other than a survey like focus group discussions and other participatory methods. The decision to this effect shall be taken by the agency working in the area depending on the people's behaviour in the locality which can easily be made after the first session. In fact a discussion to this effect can also be done in the first session if an agency seeks to use other means.

### **Session III**

As a preliminary to this the health data for the locality shall be tabulated and results examined. The analysis will tabulate the health effects in terms of the total days of work lost by a single individual and the amount of money spent each year on an average for treating these diseases.

The background study reflects on the prevalence of water born diseases and the survey should also not show much varied results.

The team shall be carrying before hand materials to link the presence of the disease to its causes establishing linkages here with sanitation.

Agenda

- Discuss results of survey with the people

- Involve local doctors to bring forward the reasons for the spread of these diseases
- Generate interest through charts and other interactive media to explain the chain and linkage to poor sanitation.

This session should end leaving people thinking on the situation and no interest should be shown towards discussing the sanitation situation in the area. This point shall be taken up in the next session.

#### **Session IV**

If the earlier three sessions have left any mark on the minds of the people then this session will not need any initiation and talk itself will flow over to the existing situation in the area that may lead to these causes.

Thus the agenda here shall be

- Discuss present situation in the locality
- Discuss people's personal behaviours – practicing hygiene and other daily practices
- Narrow down on the causes that are most important and need to be tackled immediately
- The measures that can solve these problems.

Leave the session letting people think of ideas on means and measures that should be used to spread the message in the general public

#### **Session V**

Discuss the programmes that people suggest for implementation.

Note – the Authorities need not be the top officials because their availability may at times hamper the progress of the workshops. These can be people of the cadre of assistant engineers and ones that work at sites and actually interact with the people.

#### **(2) Introductory Sessions**

A team of people comprising members from the various cadres of the implementing agencies i.e. PIC, NPPAC, ANN, and Local Consultant shall visit each of the city wards and organise informal groups and introduce themselves and the idea of the whole campaign within the people, encouraging them to look forward to forthcoming programmes

These sessions shall follow the Community Workshops and shall try to include people that have attended the workshop to facilitate in their respective locality.

The group may target 5 – 6 places in a day. Their targets shall include city Wards, Clubs, Swimming Clubs, Educational Institutes, Schools, slums etc. Care must be taken that one of the areas visited in two days has to be a slum. They shall also go down and get groups of people at parks and community places to spread the idea. The activity shall be completed within a period of 4 months after holding the community workshops.

#### **4.5.2 Regular Publicity**

Publicity on regular basis is important to keep the message fresh in the minds of the people. This effort shall ensure that the much needed relation between Health and Sanitation is made clear in the minds of the people. The publicity shall be making use of communication tools as explained in section 4.5. The messages sent to the public can be

- Importance of sewage in the city and impact on health due to lack of the same

- Better Hygienic practices
- Necessity of a cleaner Environment
- The fate of Holy River if present situation continues
- Dissuade from use of mud idols and wheat deepak (light cup) for immersing in river Ganga etc

The themes shall be decided by the PIC in consultations with the community (esp. women) and stakeholders but the emphasis in Allahabad shall be to impact people's minds through a rationale approach for adverse health effects. Though people perceive the river Ganga as sacred, it does not get reflected in their behaviour. So a message rooted in sentiments may not have desired impact.

#### **4.5.3 Yearly Campaign**

As one of the important actions for the continual efforts, a yearly campaign should be implemented in Allahabad City in accordance with public participatory approach and the stepwise planning as has been discussed in the Hygiene Education Plan by the JICA Study Team.

The yearly campaign will set the tone for the entire PP/PA program of the year. Activities of yearly program will be spread over the year and timings of these activities will be decided by the PIC and discussed in the community workshops. However inaugural program will be held early in the year. The yearly campaign shall comprise of a mix of the communication activities as have been listed in section 4.5. The appropriate mix shall be approved by the PIC.

The yearly campaign shall have specific themes. Based on the setting of the PP/PA Cell of ANN in 2007, the priority projects of Allahabad City from 2007 to 2012 and those concepts, the suitable themes and a list of activities are proposed in table 4.9.

Some main points to be taken care of while deciding the programmes for yearly campaign shall be

- The aim unto the end shall be to generate willingness to pay in the people
- Gear up **publicity** and have special **transect walks** and **information kiosks** around *Mahashivratri, Holi, Ramnavami* and *Krishna Janmashthami*.
- Have **competitive programmes** for hotels and *dharamshalas* to mark them as eco friendly hotel or most hygiene conscious *dharamshala* or something of the like.
- Religious leaders and religious messages need to be included – especially the **seers that perform rituals on the banks** should be formed into groups and special group discussions and training programmes shall be arranged for them to educate on use of materials and means that do not harm nature.
- **Swasthya Mela** once in the year shall be compulsory arranged on river bank, at a place that is landscaped and managed beforehand. The idea would be to let people enjoy the river bank and carry with them this dream for future.
- Drive to **reduce the use of plastics** because they are a serious problem in the city

**Table 4.9 Themes for the Yearly Campaign**

Year	Yearly Themes	Activities
2008	- <i>Health and Sanitation condition in Allahabad</i> - <i>Pollution in Ganga</i>	Focus Group Discussions (FGD's), Transect walks
2009	- <i>Waste water management and health linkage</i> - <i>Necessity sewerage systems.</i>	Competitive programmes Programmes for women,
2010	- <i>Responsibilities of citizens and civic authorities of Allahabad for better sewerage management</i>	Information Mela
2011	- <i>Constraints on construction, rehabilitation, and O&amp;M of Sewerage Systems</i>	Description of all has been given in table 5.1, sec 5.3 and the programmes will make use of the communication tools described in table 5.2, sec 5.3
2012	- <i>Environment Friendly City and Burden Sharing especially generating willingness to pay</i>	

#### **4.5.4 Regular Activities**

The main aim of the Sewerage Project is 'Abatement of Pollution in River Ganga' so this aspect has to be highlighted and kept fresh in the minds of the people throughout the period. For the same regular activities shall be undertaken as described.

##### (1) Clean River Day

A Clean River Day shall be set up twice a year as a public day or a public holiday in Allahabad City. The day may be selected at the day on the 'International Environmental Day' or other important day related to Ganga River or immediately before Durga Puja when many idols are immersed in river Ganga to raise awareness.

The day may recognize the importance of "Clean River" with several activities:

- A ceremony of the day with speech by environmentalist
- Dissemination of related information to the people in Allahabad City through the mass media and printed materials
- Dissemination related information to pilgrims, tourists and business trippers in Allahabad City through the mass media and printed materials in cooperation with local hotels
- Exhibition/Demonstration on Clean River such as methods of wastewater treatment
- Trips and picnics for School Children with competitions held on river banks, with special attention to include slum children.
- Display of some Demonstration Project like a Wetland Park along river bank
- Transect walk along river, covering communities settled along the river to be a part.
- River cleaning drive

The Clean River Day shall have specific theme every year for one day. Based on the projects of Allahabad City from 2008 to 2010 and the public participatory approach and the stepwise planning concepts, the suitable themes are proposed as shown in table 4.10.

**Table 4.10 Yearly Themes for the Clean River Day**

Year	Yearly Themes	Activities
2008	- <i>Health and Sanitation Condition in Allahabad</i> - <i>Pollution in Ganga</i>	<i>Ceremonial Speech, Information Mela on River Banks Transect Walk, School programmes River Cleaning Drive</i>
2009	- <i>Waste water management and health linkage</i> - <i>Necessity of sewerage systems.</i>	
2010	- <i>Responsibilities of citizens and civic authorities of Allahabad for better sewerage management</i>	
2011	- <i>Constraints on construction, rehabilitation, and operation and maintenance of Sewerage Systems</i>	
2012	- <i>Environment Friendly City and Burden Sharing especially generating willingness to pay</i>	

(2) Clean River Week

A Clean River Week shall be organised once a year for seven days at a stretch. The week will highlight the importance of “Clean River” to the people of Allahabad specially schoolchildren, who are the future actors and information disseminators for their family members, and sensitize on wastewater management and clean river environment. Swasthya Mela and School Programmes as has been explained in section 4.4 shall be an essential part of this week every year along with a mix of other activities. Some suggested activities during Clean River Week may be:

- Dissemination of related information to the people in Allahabad City specially children through the mass media and printed materials
- Dissemination related information to tourists and business trippers in Allahabad City through the mass media and printed materials in cooperation with local hotels
- Exhibition/Demonstration/ Rallies on Clean River such as methods of wastewater treatment, sewerage management
- Painting Competition/ Debates/ Essay Competition on ‘Clean River’
- Transect walk Rally along the Ganga River
- Sports Competitions on the bank of Ganga
- Workshop/Seminars/Awareness Camps to discuss cause and effect of river pollution and the solution
- Clean River drive

The Clean River Week shall have specific theme every year for one week. It shall be taken care that of all the activities 25% are directed towards the slum population. Based on the priority projects of Allahabad City from 2008 to 2010 and the public participatory approach and the stepwise planning concepts, the suitable themes are proposed as shown in table 4.11.

**Table 4.11 Yearly Themes for the Clean River Week**

Year	Yearly Themes	Activities
2008	- <i>Health and Sanitation Condition in Allahabad, Pollution in Ganga</i>	<i>Publicity, Film Screening at public places, Transect Walk, River Cleaning Drive, Sports Competitions along river, Workshop/Seminar/Awareness Camps, School Programs</i>
2009	- <i>Waste water management and health linkage as well as necessity sewerage systems.</i>	
2010	- <i>Responsibilities of citizens and civic authorities of Allahabad for better sewerage management</i>	
2011	- <i>Constraints on construction, rehabilitation, and operation and maintenance of Sewerage Systems</i>	
2012	- <i>Environment Friendly City and Burden Sharing especially generating willingness to pay</i>	

#### **4.5.5 Regular Activities for Slums and Dhobighats**

(1) Regular Visits

Slums and Dhobighats have to be treated as special areas. The reasons for the same may be elaborated as

- The interface for interaction between the community and the official of the local body is non-existent.
- Heterogeneity of community structure is a major constraint. It is felt that formulation of CBO and achievement of strategic consensus is a much easier task within homogenous communities.
- In heterogeneous communities one organized institutional structure is difficult to formulate.
- Mobilizing these communities, as a vehicle of participation is the most difficult task.
- To build trust within the communities to participate in the sanitation programme is major constraint. Experience shows that a considerable amount of time and commitment is required on the part of NGO for this activity.
- Social habits of the community are also a major constraint.
- Dhobighats are also heterogeneous areas the people working generally come from slums and display similar characteristics.
- Associations for the management of Ghats exist but a major constraint with them is the adoption of new work culture.

#### **For Slums**

To overcome these problems and especially for the creation of neighbourhood groups and then CBO's it is essential that the local NGO' visits these areas on a regular basis and keeps hammering upon the idea constantly.

For this purpose the city shall be divided as per the sewerage zones and yearly budget allocations for each zone shall be made based on the slum population and number of ghats falling in the area. The local NGO shall appoint zonal in charge for these and they shall work to achieve target. The usage of funds and the activities undertaken will be to the discretion of area in-charge but they have to be compiled and reported on monthly basis.

Each cluster of app 400 households shall be clubbed into a Slum Neighbourhood Group (SNG) and 10 SNG's shall comprise one Slum CBO. Community-Based Organizations (CBOs) would need representation of both the elders/community leaders, who are looked up to as well as the youth for guiding them to the path of better living. CBOs are expected to not only function as managers of CTCs, but also as multipurpose societies. One of the major objectives may be to act as credit societies, which can help setting up small business as avenue for income generation. CBOs can involve some of the semi-trained/trained residents, and pay them service charges for routine management and maintenance work. Those at lower rung of ability and education can be appointed for cleaning, gardening and other simple activities and earn a reasonable income.

The slum community programme will move with the intention of propagating the hygiene virtues and making PP/PA a continuous process. Inculcating the sense of ownership and ensuring proper operation and maintenance are key to meeting the stated objective of cleaning Ganga and her tributaries. The ultimate objective of the PP/PA programme should be to raise the consciousness to a level where inhabitants begin to demand their rights and carry out their duties without external impetus and move towards a regime of self-help. These regular visits may be planned in three phases as explained below

- 1) Phase I – Awareness for needs and design (Pre-Construction Phase)- 3 months

Interactions should be organized at the community level to explain the objective and benefits of the LCS programme. These should clarify roles and responsibilities of different stakeholders, and the key elements of the LCS programme such as the lay-outs, construction material, and importance of treatment of waste water before disposal, and O&M issues etc. Topics should be designed in a manner that they encourage participation of all sections of the stakeholders. The target group would include persons of all age groups, women and children; vulnerable sections must be given special attention. The programme should cover the following aspects:

- Problems of arising from "un-sanitary" conditions, such as adverse impact on health and the vicious cycle of poverty, pollution and ill-health.
- Initiatives that would help in improving the living conditions through improved sanitation i.e. long term benefits of health , better earnings and living standard;
- The need to keep one's environment clean.
- Rationale behind the proposed action plan must be explained and their objections and fears looked after.
- The design of facilities shall be discussed and inputs sought from the community
- The inputs received from the community can form the basis of initiation and content of PP/PA programme.

## 2) Phase II - Training - a participatory approach (Construction Phase) - 2 months

This phase runs parallel to the construction phase, and continues after the construction activities are completed, wherein people's participation in the entire process is further encouraged or strengthened by stressing on issues related to hygiene, "right" sanitation practices etc. This will focus on training of trainers -mostly community workers. They should be given special orientation in PR work and behavioural aspects of communities and hands on training for use of various training tools. This training should ideally be imparted by experts in group psychology and organisational behaviour. It will involve:

- Formation and training of women's groups - recent success stories have shown that women play an important role in the creation of Self Help Groups (SHG);
- Audit of CTC construction;
- Developing CTC not merely a place for public "conveniences", but as a centre of community activities with various allied facilities such as a community centre with some basic recreation facilities, landscaping etc.;
- Environmental education for school children;
- Hygiene assessment and "collective" action.

This phase could also be utilised for selection of managers, operators from among the literate/educated members and formation of formal CBO.

## 3) Phase III - Final Phase (Operation and Maintenance) - 5 months

This phase should have a separate module for prospective managers, operators and supervisors etc. training would include lessons in running repairs, trouble shooting, efficient O&M practices, simple account keeping, handling of chemicals and cleaning agents and approach to improving ambience. They should also be given insight into topics like water /hydrological cycle and need to conserve water, water borne diseases, causes and their prevention, cost benefit aspects of sanitation, environmental issues and ambience of neighbourhood.

It is expected that by the time the third phase begins, the construction process of CTCs would either be near completion or would have been completed in certain areas. For the



community as a whole, Phase III should be treated as a continuation of PP/PA programme and cover, inter alia, formal and informal education, , vocational training to help setting SMEs, or jobs in them; issues like housing and development, drainage, electricity, water, rights and duties leading to empowerment and welfare possibilities and gender bias. The emphasis of this phase would be on the following aspects:

- Maintaining cleanliness of CTC
- Prudent usage and conservation of water;
- "Dos and Don'ts" of using the sanitation facilities;
- Need to assist O&M regime;
- Be role model for other communities.

### **For Dhobighats**

The role of PP/PA does not get diminished for Dhobighats by virtue of their relative simplicity of O&M. In addition to educating the members about the norms to be observed for use of ghat, use of chemicals and monitoring devices, they can also be assisted in preparing checklists and fixing periodicity for O&M. As in the case of CTCs, role of PP/PA can extend beyond O&M and supervision, and include extension programmes for family and community welfare. The PP/PA programme in case of Dhobighats will have to address some of the following critical issues:

- Educating the Dhobis on the negative impact of washing clothes/fabrics on the river banks;
- Explaining the benefits of constructed Dhobighats;
- Developing a CBO wherein an environment to facilitate exchange of ideas on adopting new practices (e.g. better detergents instead of a harmful mix of acid and "soda") can be created;
- Involving the association(s) of Dhobis to build a sense of ownership, and transfer the responsibility of O&M to the users of the constructed Dhobighats; this can not only facilitate change in practices, but also encourage acceptance of "new" ideas, and facilitate suitable cost recovery model - "pay-as-you-use";

### **Capacity building and awareness campaign**

Orientation workshop should be held so as to include representatives of dhobis associations and their sub-groups from all the ghats. The recommended agenda for these workshops is as follows:

- Presentation on institutional arrangement
- Overview on formation of CBO
- Overview on functioning, role and responsibility of CBO
- User charges and collection; accounting and book-keeping
- Role of urban local bodies
- Operation and maintenance
- Monitoring of Dhobighats
- Maintenance of water pump and other facilities at the constructed Dhobighats
- Reporting to the Nagar Nigam
- Mobilizing membership
- Setting ground rules for members User charge recovery accounting and bookkeeping
- Operation and maintenance log
- Monitoring of Dhobi ghats

The targets to be achieved are summarised in table 4.12 and 4.13.

**Table 4.12 Targets for Slum Area Programmes**

Stages		Target	
2007 ↓ 2012	Stage I	- Development of faith in the community	Pre-Construction Phase
	Stage II	- Articulation of the process of CBO formation. The identification of key persons in the area that may act as catalyst must be completed. - Analysis of community for their ability to pay and preferred payment mechanisms in detail as per areas - Identification of site - Initial discussion on the preferred design	
	Stage III	- Formalization of process of CBO formation - Adequate willingness in people to use the facility - Finalisation of designs	
	Stage IV	- Finalization of the payment mechanisms – may differ from area to area depending on community need - Operationalisation of CBO/neighbourhood groups in areas where construction gets completed. - Working of CBO/ neighbourhood groups with assistance of NGO - Implementation of the preferred payment mechanisms	Construction Phase
	Stage V	- The NGO intervention is reduced and the built facilities move towards sustainable operation and maintenance - Substantial amount of users are making use of the facility - Payment mechanism is formally in place - If need be liaison is initiated/completed with private companies for O&M of facilities through the CBO/ neighbourhood groups	Post Construction Phase
	Stage VI	- The NGO withdraws and CBO's start working on their own – help is extended only if they demand - The payment mechanisms are working smoothly - Sustainability to some extent is achieved.	

**Table 4.13 Yearly targets for Dhobighat Programme**

Stages		Target	
2007 ↓ 2009	Stage I	- Development of faith in the Dhobis and their associations - Willingness of Dhobis to use the new type of facility - Initial discussion on the preferred design - Initial discussion on O&M required - Training on the use of new type of facility and associated changes	Pre-Construction Phase
	Stage II	- Fully equipped association takes charge - O&M by associations initiated with help from NGO - People willingly using the facility	Construction Phase
	Stage III	- If need be liaison is initiated/completed with private companies for O&M of facilities through the associations - Association maintaining the facility with very little help from NGO	Post Construction Phase
	Stage IV	- The facilities are operating well on their own - NGO starts withdrawal	

(2) Community Workshops for Slums and Dhobighats

These workshops are held for the capacity building of the slum CBO's and their inclusion in the mainstream programme activities. These shall be held at regular frequency of 2 WS per month for years 2009-2012.

For adequate representation of the 0.33 million slum community it is advised that four representatives from each of the CBO will be attending the meeting. One Slum CBO shall comprise of 10 slum Neighbourhood Groups which in turn will roughly comprise of 2000 persons or 400 families. This number may vary depending on the physical distribution of slums but only to the extent of 5%.

Overall 10 CBO's will attend a WS which estimates to 50 persons (40 from CBO's and 10 from administration, NGO etc)

The objectives of the workshops shall be to

- Review the work in progress in the slum communities
- Review the reach of other regular city programmes to these communities
- Discuss the agenda of Explanatory meetings held in recent past and elect representatives from them to attend the next explanatory meeting (will be only twice a year)
- When relevant decide on the activities and how these communities can participate in city activities of 'Clean River Day' and 'Clean River Week'

(3) Health Camps

Health camps will be organized in/around the slums on a regular basis of 2 per year for three years (2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> year).

Free checkups medicines will be given to all the slum dwellers. For the first year the camp will be open to all but for the next two years people will have to approach through the neighbourhood groups. People who do not agree to the idea of improved sanitation shall not be receiving this benefit.

#### **4.5.6 Special Activities**

Magh Mela is held every year on the banks of Sangam in the month of Magh (Jan-Feb); hence Magh Mela. During this period about two or three million of devotees throng in Allahabad, and a whole new tent city comes up for more than a month. Different Hindu religious organisations erect their camps, different stories and scenes from Hindu religious texts are staged by the folk theatre groups at different places in the mela area. Many devotees live in camps and ashrams for the whole duration of the mela and lead a sacred life. This is called *KALPAVAS* and these people are called *KALPVASEE*.

Due to the nature and magnitude of the festival it adds on a lot to the pollution load in the river. Also the festival is related to the river directly so an intricately designed message may have the desired effect.

The following activities as detailed in table 4.14 should be undertaken at Mela site in the consecutive years

**Table 4.14 Special activities at Magh Mela**

Year	Activity	Aim
2007	Exhibition gallery	Display information on the programme and its intent Use of graphics to depict present state of river and future if pollution continues to be the same way. What can be done to save the sacred river Try evoking the religious sentiments of people using graphic displays
	Survey	Undertake to make an inventory of the performance (folk and theatre etc) groups present in the area and also their resources and frequency of visit to mela
2008 - 2012	Pre-mela activity	Contact the performance groups that are probable to appear this year as well and give them some theme to make a play on relating to theme of yearly campaign. In response to this, promise them a specific space and certain infrastructure at the site. If required the play may also be funded.
	Theme Plays	The contacted groups shall perform the theme plays specially prepared atleast once in a day and this shall be ensured
	Exhibition gallery	Use of graphics to emphasise the theme of yearly campaign Rest all can be as discussed in column above
	Publicity	Through Banners, Pamphlets, Hoardings, Posters etc
	Movie shows	Certain space shall be booked beforehand and free movie shows shall be held twice a day (the documentary films that have been prepared by ad agency)

Note: the description of these special activities is not given in section 4.5 on communication tools and activities.

#### 4.6 COMMUNICATION TOOLS TO BE UTILISED

In Allahabad and other parts of India, a lot of communication tools have been applied for PP/PA activities as reviewed in the Hygiene Education Plan. Among and in addition to them, table 4.15 summarizes those communication tools, which could be utilised in combination to promote the PP/PA programmes and related activities in Allahabad City.

**Table 4.15 Communication Tools**

Communication Tools	Description	Target population
<b>Media</b>		
<b>Press</b>	Press is the most important tool to reach the public at their doorsteps and has mass appeal. Press releases should precede any event being organised so that public is aware of it and may attend if they wish so. After the event the proceeding and findings (if any) should also be published.	<b>All Population</b>
Press Conference		
Press Release		
Articles		
Advertisements	Advertisement in 4 newspapers with local edition.	
<b>Television</b>	The attempt should be to make them interesting	
Talk shows	Regularly on local regional channel	
Advertisements	On local Cable TV and channels targeting Allahabad/UP	
News	Awareness and participation with the help of TV news	
<b>Other Publicity Materials</b>		
Hoardings	These mediums will generate the much needed flavour in the city and will be the most appreciable visual changes. The magnitude should be such that no person in the city is left untouched by these	
Banners		
Posters		
Pamphlets		
Hot Air Balloons		
<b>Other means</b>		
Theme plays	Theme Plays, Street Plays etc. in the target areas. They may also be referred to as <i>Nukad Nataks</i> when performed in streets	General Public, Slum public
School	Painting Competition, Debates, Essay Competition, Rallies of children	School

<b>Communication Tools</b>	<b>Description</b>	<b>Target population</b>
Programmes	etc Shall be organised in Schools with themes defined in yearly campaign	Children
Information Kiosks	Small setting like a hut to distribute related information on Priority projects and themes of other activities as decided, installed at various locations as need may be during the programme	People in vicinity of location
Power Point Presentations	They can be used to target the youth in colleges and universities where a technical message might have a better appeal than the general one. One college can be targeted at the initial from where a group of volunteers may be picked and trained to take the action further in other colleges.	College Youth, Professors, High School Children
Documentary Films	Films on appropriate sanitation practices, health and hygiene should be relayed. Such shows should be held in public places on large projector screens like outside multiplexes and theatres, public gardens, Swimming clubs etc.	General Public
Information Van	Property of the ANN it may be a small four-wheeler like Maruti Van able to move freely on narrow and congested roads, well equipped with mediums like projector, screen, public address system etc and will be used for publicity at various stages in the PP/PA activities also to distribute publicity materials whenever required. Can be covered from two sides with slogans or message related with the activity.	General Public
Site Visits	Visits (Sewers are underground. But symbolic sites of related to the system like a manhole of the starting point of the system and so on) on the facilities constructed and rehabilitated shall be undertaken after completion of these facilities	General Public
Shrm Dan	Organised with the slum community to let them have ownership feeling for the assets being created for them. Here in the intention is that the people come forward and participate in the activities for building assets for them.	Slum Populations

Apart from these tools the various activities that will make effective use of these tools communication are listed further in table 4.16.

**Table 4.16 Activities for Communication**

<b>Communication Activities</b>	<b>Description</b>	<b>Intended Target population</b>
Focus Group Discussions (FGD's)	These discussions are meant to build a consensus among the influential people in the city - those having a mass appeal so that they may later act as volunteer ambassadors spreading the message. Another Group of discussions shall try to build on the existing organisations like the resident associations discussed in section 3.1.3 to build them as examples to be presented to the people.	Lawyers, Doctors, Professors, Religious Leaders, Political Personalities, Municipal Officers, RA's and other Professionals
Transect walks/Padyatras	Walks through locality to identify unhygienic points and disease breeding locations with the individuals of the locality	Women and Youth
Workshops	These shall be discussion more oriented for the general residents of the societies and can be arranged in each of the wards. Here the discussions can be held on health and sanitation, progress of priority project etc. Besides these discussions free medical checkups can be an incentive to people attending.	Beneficiaries and future beneficiaries of priority projects
Swasthya Mela in city	This can be part of yearly campaign where discussion over health issues, check-up camps etc. will be organised. Women shall be encouraged to come up as leaders and representatives of their respective communities.	General Public encouraging women in particular.

<b>Communication Activities</b>	<b>Description</b>	<b>Intended Target population</b>
Health Camp for slums	These will target only the slum population shall be organised as a part of entry point activity to build faith in the slum community. This shall comprise free checkups and distribution of medicines	Slum community
School Programmes	Painting, Essay and Debate competitions and Sports events (inter-school) etc shall be organized in schools with specific themes to sensitise school children and develop them as change agents in the community in order to address sanitary conditions in the community. Visits of children to sites of priority project like STP, SPS, CTC, LCS and Dhobighats etc can be used to sensitise them to need and working of these.	School Children
Programmes for women	Women are instrumental in household decisions especially relating to health as has been observed in sections earlier in study. Apart from encouraging women's participation in workshops special attention shall be paid to ensure presentations are made in women's clubs, Bhajan Mandalies etc and gathering support Special Programmes like kitty and some lecture or theme based sales and exhibitions (furniture, kitchen accessories) will also be designed.	Women
Information Mela	An event to attract and generate special public interest. Can be clubbed with some activity like payment of house tax etc and then the message required to be publicised is given along.	Beneficiaries and future beneficiaries of priority projects
Competitive Programmes	These shall be in form of healthy competitions between commercial enterprises like clubs, hotels, industries etc giving them titles like Eco-enterprise so that they are included in the programme.	Clubs, industry houses, hotels, private hospitals

The tools and activities that have been listed in this section shall form the basic part of all the programmes to be implemented that have been discussed further in section 4. A mix of all the activities and tools shall constitute a programme and the appropriate mix shall be selected by the implementing agency as per the guidelines given in the TOR and budgetary allocations that have been made.

#### **4.7 MONITORING AND EVALUATION**

There will be two parallel monitoring and evaluation structure for the entire PP/PA program:

- i) Official - In the official format ANN will prepare reports on the progress of work by the local consultant (based on monthly reports from local consultant) and send to NPPAC.
- ii) People's - On the people's side the groups of communities (ward committees and the Citizens Committee in each city) will report to PIC and PIC will report to State Co-ordination Cell. These reports will be sent on quarterly basis.

Such a system will ensure that a check is maintained on the works that are being undertaken and the budgets allocated are utilized properly. Evaluation of Programme will be done in the regular State Co-ordination Cell meetings and once a year evaluation reports are a must.

For the purpose of evaluation a set of Impact Indicators shall be developed by the local consultant that henceforth shall be circulated to the PIC, ANN and the local groups who all shall rate the programmes. These indicators will be developed in consultations with the community and Stakeholders as a part of agenda set in the community meetings. These shall also be reviewed at every consecutive community meeting.

The essential function of the impact indicators is to evaluate the effectiveness of PP/PA programmes. The evaluation shall be consistent with the objectives of the programmes and the results will be utilised for further programme implementation (during defining the activities for Yearly campaigns and other demonstration programmes). They can be devised under two heads

- Operational – measure information provision, feasibility, and duplicity of each
- Effect – Direct and Indirect influences

On the basis of reports and evaluation of the PP/PA Programme necessary changes in the content and direction of the programme will be made, if required, to make it more effective.

Table given below provides an indicative list of indicators for evaluation of PP/ PA programmes particularly relevant in case of non-sewerage activities.

**Table 4.17 Evaluation Items**

<b>Effect</b>	<b>Indicators</b>
Improvement in general health	<ul style="list-style-type: none"> <li>• Money spent on medications/ physicians for health problems related to vector and water borne disease.</li> </ul>
Higher level of awareness on health and hygiene in comparison to the situation before the PP/PA	<ul style="list-style-type: none"> <li>• Increased demand for CTCs</li> <li>• Increased demand of IHLs</li> <li>• Decrease in open defecation</li> <li>• Increase in water consumption for personal hygiene.</li> <li>• Demand for bathing facilities</li> <li>• Concern over general hygiene conditions among family members</li> </ul>
Increased awareness, knowledge about environmental conservation.	<ul style="list-style-type: none"> <li>• Decrease in littering</li> <li>• Decrease in burning leaves and garbage</li> <li>• Increase in burial of biodegradable waste</li> <li>• Decrease in wastage of water</li> <li>• Decrease in cutting of trees</li> </ul>
Improvement in general cleanliness of habitat	<ul style="list-style-type: none"> <li>• Decrease in disposal of garbage in drains</li> <li>• Alternate garbage disposal mechanisms.</li> <li>• Cleaner pavement</li> <li>• Decrease in use of open drains as urinals and toilets</li> <li>• Restricted movement of cattle (if any)</li> <li>• Decrease in littering of food waste</li> </ul>
Higher demand of Municipal support	<ul style="list-style-type: none"> <li>• Spraying of insect repellent</li> <li>• Regular lifting of garbage</li> <li>• Sweeping of lanes</li> <li>• Clean water supply</li> <li>• Cleaning of Septic tanks and sewer ( if any)</li> <li>• Reporting municipal irregularities to higher authorities</li> </ul>
Reflection of higher self esteem among women	<ul style="list-style-type: none"> <li>• Increased demand for IHLs/CTCs</li> <li>• Demand for adequate bathing facilities resulting in privacy</li> </ul>
School children as agents of change	<ul style="list-style-type: none"> <li>• Averse to open defecation</li> <li>• Propagation of ill effects of the same at home</li> <li>• Developing of hygienic habits</li> <li>• Trying to inculcate the same among family members and peer group</li> <li>• Sensitive to apathy towards health and hygiene issues</li> </ul>
Elderly as guardian of society	<ul style="list-style-type: none"> <li>• Active participation in awareness campaign.</li> <li>• Act as opinion leaders during social functions</li> <li>• Influence children to develop hygienic habits</li> </ul>

**CHAPTER 5**  
**TERMS OF REFERENCE**



## **CHAPTER 5 TERMS OF REFERENCE**

### **5.1 INTRODUCTION**

This TOR is being developed for the implementation of the PP/PA Program for Sewerage Works, under ‘The Study on Water Quality Management Plan for River Ganga in Republic of India’. At the city level it is proposed to work predominantly through the Nagar Nigam offices as has been explained under the section 3.2 on Implementation Structures, and to support most of their activities, a local consultant shall be engaged.

This document shall not be considered in isolation but be seen in continuation to the report prepared on the city. Some of the sections identified (as listed below) for detailing in the TOR have already been covered in the report and shall be referred to from there.

1. Project Overview and Background  
*(As detailed in section 1.0 of main PP/PA report)*
2. Implementation Structure and Role of Participating Organizations  
*(As detailed in section 3.2 of main PP/PA report)*
3. Selection Criteria for Consultants/ NGO’s
4. PP/PA Activities Anticipated  
*(Take from main PP/PA report)*
5. Costs and Budgets
6. Guidelines for the implementation of proposed Activities

### **5.2 SELECTION CRITERIA FOR CONSULTANTS/NGO’S**

For the successful delivery of the PP/PA activities to main levels of engagement of external individuals, organizations are anticipated in the role of:

- Program Level PP/PA Technical Specialist, working across all 4 towns
- Local Consultant/ Organizations familiar with and working in their specific town

#### **5.2.1 Program Level PP/PA Technical Specialist**

Given the limitations faced by the state level Project Implementing Agency (PIA) namely the Jal Nigam regarding the PP/PA activity implementation and management, it is suggested that an expert be engaged as part of the role of the Project Management Consultant (PMC) to:

- Guide the PIAs on the PP/PA processes at the state level and oversee the state level PP/PA strategy implementation
- Advice NRCD on the progress of work
- Consultation and coordination with the State Co-ordination Cell
- Advise the local consultants engaged by each municipality and the people in municipality

It is suggested that the PP/PA Technical Specialist is appointed in consultation with NRCD, UPJN, and the Nagar Nigams of the 4 municipalities that are the focus of this project. All these people will form a part of the NPPAC cell that has been suggested, and so the selection will follow the establishment of the cell.

It is essential that the PP/PA Technical Specialist is a person of repute who can develop or currently has a comfortable working relationship with the State Government and other NGOs based in the State, as well as is widely respected for her/his professionalism and objectivity towards the work in hand, harbouring no bias or ill will towards any NGO, CBO or other agencies based in the state. Given the

fact that this position is of critical importance to ensure the smooth functioning of PP/PA activities under the project in the State, these suggested parameters for selecting such a person assumes immense significance. In addition, the individual should meet the following selection parameters:

- Over 15 years of work experience on state level environmental and social issues
- An advanced degree in social sciences and/or social work
- History of having worked in a consultative/advisory capacity with the state government, municipalities, other government departments, NGOs, donor agencies, CBOs and other voluntary organizations
- Experience of having worked in YAP I towns (desirable)
- At least 5 years of work experience in designing and implementing environmental/social awareness activities
- Demonstrated capabilities in the use of folk media, print media and developing and using information and communication technologies for the purpose of environmental and social awareness activities
- In depth understanding of the local ethos and competence of organizing/ working with communities on issues related to
  - o Environment education and awareness, especially in themes related to river/water pollution & urban environment
  - o Water conservation, recycling/harvesting and other river Conservation projects
  - o Health, hygiene & sanitation

### **5.2.2 Guidelines for the Selection of Local Consulting Organization/ NGOs/CBOs/ Other Agencies that could undertake / Facilitate the Implementation of PP/PA Activities**

The successful implementation of PP/PA activities under this project is largely dependent on the selection of the right agencies for undertaking/facilitating the process of implementation of these activities. It is suggested that the process of selection of these agencies be made as transparent as possible with clearly defined indicators for the selection of such agencies. An indicative set of criteria for pre-qualification, shortlisting and selection of such agencies (primarily NGOs, CBOs and VOs) include:

- History of working with Government (projects, grants, consultancy, partnership)
- Length of experience in environmental awareness/ community participation related activities (minimum 5-10 years)
- Competence for working in slums and town communities, with experience in one or more of the following:
  - o Environment Education and Awareness (especially in themes related to river/water pollution & urban environment)
  - o Slum rehabilitation, resettlement.
  - o Health, hygiene and sanitation
- Working with municipalities and other urban local bodies
- Formation and training of community groups/CBO on themes like Water conservation, recycling, harvesting, River conservation etc
- Experience of working with local communities, in the town(s) concerned.
- Partnership with other NGOs and networking with other agencies.
- Multi disciplinary team (with skills in PRA, communication & media management, training, community work, non-formal education etc.)
- Experience in traditional media, electronic media, development and use of printed resource material.
- Previous experience of similar PP/PA work in an earlier River Action Plan.
- Organizational & Financial capability of managing large projects.
- Capacity to start work at short notice.
- Project management, evaluation and project designing skills.

It is however suggested that the pre-qualification stage of the selection process, be kept open to all types of organizations (i.e. let the pre-selection not be restricted only to NGOs, CBOs and VOs). The eligibility criteria should be advertised in at least one national English newspaper and one national Hindi newspaper. It should also be published in at least one local English newspaper and one local Hindi daily. The information required from the organizations should be sought under the following heads:

- Information about the organization and its key functionaries, which would include but not be restricted to:
  - o Name of the organization
  - o Whether the organization is registered with the Registrar of Societies or Registrar of Trusts or the Registrar of Companies or any other authorized body of the Government of India
  - o Registration Number and the Year of Registration/Incorporation
  - o The address of its registered headquarters
  - o Addresses of other offices (if any)
  - o Telephone numbers, fax numbers, etc. of all its offices
  - o Names, residential addresses and other contact details of the key functionaries of the organization
  - o Number of years of operation of the organization
  - o Key sectors/areas in which the organization operates
  - o Last 3-5 years of audited financial statements of the Organization
  - o Permanent Account Number (PAN) of the organization
  
- Information regarding the relevant experience base of the organization. Information sought under this head would include, but not be restricted to:
  - o The organization's history of working with Government, multilateral and bilateral donor agencies, corporate houses and other organisations (i.e. either on projects, grants, consultancy, partnership or any combination hereof)
  - o Length of experience in environmental awareness/ community participation related activities (minimum 3-5 years)
  - o Competence for working in an urban area in one or more of the following:
    - o Environment Education and Awareness (especially in themes related to river/water pollution & urban environment)
    - o Health, hygiene and sanitation
    - o Working with municipalities and other urban local bodies
    - o Formation and training of community groups/CBO.
    - o Working on projects related to water conservation, recycling, and harvesting and other river conservation projects,
    - o Experience of working with local communities, in the town(s) concerned.
    - o Experience in traditional media, electronic media, development and use of printed resource material.
    - o Previous experience of similar PP/PA work in an earlier River Action Plan.
  
- Information regarding the organization's ability and willingness to work for PP/PA activities under short notice. Information sought under this head could include details such as:
  - o The presence Multi disciplinary team (with skills in PRA, communication & media management, training, community work, non-formal education etc.)

Information on the various parameters mentioned above will be collected at the very start of the Project. The PIAs in the respective towns can collect this information and build up a database of organizations capable to implement the PP/PA activities.

The PP/PA Technical Consultant engaged would assist the PIAs in evolving a methodology where the

various parameters mentioned above could be given due consideration in selection.

### 5.3 COSTS AND BUDGETS

The costs for successfully addressing the PP/PA activities are categorized as expenditure to be incurred on:

- Program Implementation
- Consulting Services
- Organizational Capacity Building Budgets

**Table 5.1 Overall PP/PA Costs in Allahabad**

Cost Item	Description	Budgetary Allocation
Program Implementation Costs	<ul style="list-style-type: none"> <li>- This includes the expenses to be incurred on all PP/PA activities till from the year 2007 to the year 2012 for sewerage related activities.</li> <li>- The management of expenditure of these funds is to be handled by the Nagar Nigam, with guidance as given in the implementation structure.</li> </ul>	- Approx. Rs. 2,78,00,000
Consulting Services Costs	<ul style="list-style-type: none"> <li>- Under this section funds for the engagement of local consultants have been made. This amount is expected to cover the entire period of engagement from the year 2007 to the year 2010 for sewerage related activities.</li> <li>- These funds will be disbursed by the Nagar Nigam.</li> </ul>	- Approx. Rs. 82,00,000
Organizational Strengthening Costs (Local Level)	<ul style="list-style-type: none"> <li>- Under this section funds will be allocated for the strengthening of local organizations for the specific purpose of PP/PA. These funds will provide for engagement of PP/PA specialist staff, related administrative staff, limited office infrastructure, travel budgets, etc.</li> <li>- As outlined in the communication tools, a van equipped with specialist equipment, as well as its operation and maintenance budgets for the duration of this project will also be provided to the Nagar Nigam.</li> </ul>	- Approx. Rs. 41,00,000
Organizational Strengthening Costs (Program Level)	<ul style="list-style-type: none"> <li>- Under this section funds will be allocated for the functioning of the NPPAC.</li> <li>- This funding is reflective of 1/4<sup>th</sup> the overall budgets required, being distributed in budgets computed for each of the 4 cities.</li> </ul>	- Approx. Rs. 58,00,000
Overall Costs	- Total of all cost items	- Approx. Rs. 4,59,00,000

The fund allocations have been rounded off, with details provided in Appendix A.2.

At the state level however, to facilitate coordination across the 4 cities, and to provide technical guidance, under the Program Management Consultant, a technical specialist be engaged.

## 5.4 GUIDELINES FOR IMPLEMENTATION OF PROGRAMMES

### 5.4.1 Communication Tools and Activities

A list of programmes to be implemented has been provided tables 5.2 and 5.3 of the main document and this section shall be seen in continuation of section 4.5.

**Table 5.2 Specifications for Communication Tools**

Tools	Theme	Specifications
<b>Media</b>		
<b>Press</b>		
Press Conference	Information on progress of physical works and future timelines Yearly/Monthly/Weekly agendas for the awareness activities. Initially in the first conference: the stake and role of various government and non-government bodies	To be accompanied by tea and snacks A press kit with a brief on the intentions of the conference Inviting at least a week ahead of the program followed phone calls a day ahead. Local Consultant to introduce the main speaker (Local PPAC Chairman/Convener or Nagar Ayukt) Maintain a record of happenings and participation with contact details (minutes of the meeting). Follow up of the coverage. Prepare a dossier of each press conference with clippings, VCD with dates.
Press Release	Relation between health/hygiene and sanitation	On one of the preferred themes from the list.
Articles	The benefits of the project Present health status of the city and the intended effects after the project interventions The role and responsibilities of various government bodies The channels of approach for reaping benefits by individuals	Informative with technical inputs Generally in 3 – 4 prominent newspapers (equal representation of Hindi, English, and Urdu) Preferable the regular column should appear in 3 main papers and some articles at certain times may appear in other papers to ensure public coverage.
Advertisements	The need of public participation and the role and responsibilities of the people emphasising in an underlined way the need for willingness to pay Progress of various awareness activities and also their timings and venues Progress of work at various stages	On one of the preferred themes from the list. An add agency to be hired for the purpose Ads to be specially designed for each theme Message to be interesting and eye catching
<b>Television</b>		
Talk shows	Relation between health/hygiene and sanitation The need of public participation and the role and responsibilities of the people in making such projects successful The need and nature of awareness programmes Public opinion on the work progress	In a few national channels – famous talk shows More regularly special talk shows on local channels Equal mix of shows in Hindi, English and Urdu.
Advertisements	Same as ads for the press	Same ad agency employed for newspaper ads. Ads to be specially designed for one of the themes from the list Messages to be interesting to people at al

Tools	Theme	Specifications
		ages and not in the form of sermons
News	Progress of works Schedule of awareness activities and their results	-
<b>Other Publicity Materials</b>		
Hoardings	Relation between health/hygiene and sanitation The benefits of the project Present health status of the city and the intended effects after the project interventions	In the form painted boards
Banners		Painted on piece of cloth
Posters		Maximum of A2 size
Pamphlets	The role and responsibilities of various government bodies The channels of approach for reaping benefits by individuals	Coloured with use of graphics and text both (esp. pamphlets with only text to be avoided)
Hot Air Balloons	The need of public participation and the role and responsibilities of the people emphasising in an underlined way the need for willingness to pay Progress of various awareness activities and also their timings and venues Progress of work at various stages	Maximum of A4 size Coloured with use of graphics and text both (esp. pamphlets with only text to be avoided)
<b>OTHER MEANS</b>		
Painting Competition, Debates, Essay Competition, Rallies of children	Relation between health/hygiene and sanitation Vision of the future city Importance of river Vision of future river bank (Individual as well as part of clean river day, clean river week)	Programmes to be both at city level as well as individual school level as decided in programme meetings. Schools selected to be a mix of both public and private ones Competitions to be accompanied by certificates and prizes Request school administrations to send one teacher to accompany students Reimburse for communication
Information Kiosks	As per the need of the Communication activity that it is a part off.	Temporary information booths in the localities where beneficiaries of priority project stay 2 people each shall manage booths. Booths will provide information on local PPAC, priority projects through distribution of literature. Facility for collection of taxes and bills can be an incentive. These booths will operate for a minimum period of 3 weeks.
Power Point Presentations	As per the need of the Communication activity that it is a part off.	-
Documentary Films	Relation between health/hygiene and sanitation Hygienic practices Environmental sanitation Behavioural changes	Prepared by the same ad agency Maximum 30 min film in colour
Information Van	As per the need of the Communication activity that it is a part off.	Property of Local Municipal Corporation Four wheeler Equipped with Projector, Screen, Public address system (mike, speakers etc)

**Table 5.3 Specifications for Communication Activities**

Activities	Theme/Tools to be Used	Specifications
Focus Group Discussions (FGD's)		<p>Selected list to include opinion makers, scholars, experts, and activists from stakeholders.</p> <p>Invitation to be sent atleast a month before the event followed by phone call a day ahead. Ensure participation of at least 100 persons.</p> <p>An information kit containing background literature on the topics to be discussed.</p> <p>Discussion to be more interactive and technical.</p> <p>Maintain a record of happenings and participation with contact details.</p>
	PRA tools may be used	<p><b>For Slums</b></p> <p>These shall also be taken up specifically in slums as a part of the regular visits that are being undertaken</p> <p>It shall take place at the house of one of the slum dweller or an open area in the locality</p> <p>A few brochures relating to the topic may be distributed</p> <p>Maintain a record of happenings and participation</p>
Transect walks	Group discussions Pamphlets	<p>Walk for minimum half hour</p> <p>Accompanied by a person who is knowledgeable about the priority project and related PP/PA</p> <p>The person accompanying the team should have made the walk earlier and should be aware of the problem areas to highlight.</p>
Community workshops	Power point presentations Posters Publicity Van, Banners Distribution of pamphlets	<p>Accompanied with food/refreshments.</p> <p>Publicise for the workshop for at least one week with the help of Publicity Van, Banners and distribution of pamphlets</p> <p>Make arrangements for exhibition where panels of photographs of priority projects, environmental status in the city and the posters/paintings etc generated at school competitions is displayed</p> <p>A senior officer involved with priority project should address the participants and explain those benefits of priority projects.</p> <p>Distribute written literature in Hindi.</p> <p>Maintain a record of participation and happenings</p>
		<p><b>For Slums</b></p> <p>Publicise for the workshop for at least one week with the help of Publicity Van, Banners and distribution of pamphlets – target area should be the participating slum localities</p> <p>Distribute written literature in Hindi.</p> <p>Maintain a record of participation and happenings</p> <p>50% of the participants shall be women from the slums</p> <p>presence of practicing doctors/Quacks/MRPs from the locality will be ensured</p> <p>Accompanied with food/refreshments.</p> <p>An area near the slum locality – possibly MCD school ground or open area with tented arrangements</p> <p>It shall be ensured that people from Nagar Nigam, Jal Sansthan are present</p>
Swasthya Mela	Posters Pamphlets Information Kiosk Information Van	<p>Organised in open grounds</p> <p>Doctors for free health checks especially for water related disorders, free eye checks etc can be added incentive</p> <p>Various private health institutes, medicine houses, medical equipment manufacturers etc can be invited to propagate themselves.</p> <p>Every person visiting should have a compulsory medical check-up (mainly to check for water related disorders) and their health status should be recorded. This shall help review health status for water borne diseases.</p>
Health Camp for slums	Posters Pamphlets Information Kiosk	<p>Special camps targeting slum population to be organised separately</p> <p>Organised in open grounds near the slum area</p> <p>Doctors for free health checks especially for water related disorders, free eye checks etc can be added incentive</p>

Activities	Theme/Tools to be Used	Specifications
	Information Van	Every person visiting should have a compulsory medical check-up (mainly to check for water related disorders) and their health status should be recorded (if possible locality wise). This shall help review health status for water borne diseases. For first year the camps are open to all but subsequently only NHG members Some private company may sponsor the event
School Programmes	Painting Competition, Debates, Essay Competition, Rallies of children	As described in table on information tools
Programmes for Women	Talk shows with special themes attended only by women - Themes to be gender sensitive Group Discussion	Invitees to represent all walks of life – professionals, experts on women's issues and working and non-working women.
Information Mela	Information Kiosk, Information Van, Posters, Pamphlets, Hoardings, Banners	Held in open grounds at an area within the main city so that it is not difficult to reach. Tax collection or something of the like shall be offered to people as incentive to visit 5 – 6 kiosks giving information of different subjects like organisation and duties of ANN, PP/PA, sewerage schemes, non-sewerage schemes, etc All new recruits to ANN and Local Consultant shall be present with badges for their names and designation. Information shall also be given on their duties.

#### 5.4.2 Slums / Dhobighat Related Works

For activities related to slums and dhobighats the consultant shall

- Have a separate team of 4-5 field workers per sewerage district for carrying out the regular slum activities
- Each team of sewerage district will consist of one leader and rest field workers.
- All field workers should be from social work background with at-least a bachelors in social work or 2-3 years of field experience in related activities
- The team leader should be minimum bachelors in Social work/related field and 2-3 years experience of working with the slum communities
- The team should have minimum 50% female members
- The tea shall be in-charge to cover all the slums that fall under one sewerage district
- In case the slum falls under two sewerage districts then it shall automatically move into the jurisdiction of the team that has lesser population under its cover
- The team has to visit each of the slum and a minimum of two visits per month are compulsory
- The activities will be undertaken in three phases as detailed in section 4.5.5
- Records to be maintained for all the activities and monthly reports to be sent separately to in-charges
- Before the commencement of the work each team shall be given a time of two months to access the situation in their respective area and set targets for themselves.
- The targets have been defined in section 4.5.5 table 4.12 and 4.13, but the timeline for these targets will be defined by the respective teams
- Timelines for different groups may vary according to the local conditions
- After 6 months once a chance will be given to all to revise timelines if required after which these



shall be final and treated as monitoring and evaluation tools.

- The involvement of voluntary groups and school children will be vital

## *Appendix A*

APPENDIX A.1 PP/PA Program Schedule for Allahabad

Year	January	February	March	April	May	June	July	August	September	October	November	December
2005	SCC Meetings		Necessary Explanatory Meeting 1a						Clean River Day	Clean River Week		
	Publicity Programmes	Lucknow			Allahabad			Kanpur			Varanasi	
	Regular activities for slums and Dhooghats				Necessary Publicity							
	Entry Point Activities				Community Workshops					Interactive Sessions		
2006	Necessary Explanatory Meeting 2a										Necessary Explanatory Meeting 2b	
	SCC Meetings	Lucknow			Allahabad			Kanpur			Varanasi	
	Publicity Programmes			Shall include necessary publicity and the regular publicity programmes explained in the main document								
	Regular Programmes								Clean River Day	Clean River Week		
2007	Yearly Campaign											
	Regular activities for slums and Dhooghats											
	Special Programmes											
	Necessary Explanatory Meeting 3a										Necessary Explanatory Meeting 3b	
2008	SCC Meetings	Lucknow			Allahabad			Kanpur			Varanasi	
	Publicity Programmes			Shall include necessary publicity and the regular publicity programmes explained in the main document								
	Regular Programmes								Clean River Day	Clean River Week		
	Yearly Campaign											
2009	Regular activities for slums and Dhooghats											
	Special Programmes											
	Necessary Explanatory Meeting 4a										Necessary Explanatory Meeting 4b	
	SCC Meetings	Lucknow			Allahabad			Kanpur			Varanasi	
2010	Publicity Programmes			Shall include necessary publicity and the regular publicity programmes explained in the main document								
	Regular Programmes								Clean River Day	Clean River Week		
	Demonstration Programmes			As per the timings of Priority Projects explained in section 4.4.4 of main report								
	Yearly Campaign											
2010	Special Programmes										Necessary Explanatory Meeting 6b	
	Necessary Explanatory Meeting 6a										Varanasi	
	SCC Meetings	Lucknow			Allahabad			Kanpur				
	Publicity Programmes			Shall include necessary publicity and the regular publicity programmes explained in the main document								
2010	Regular Programmes								Clean River Day	Clean River Week		
	Demonstration Programmes			As per the timings of Priority Projects explained in section 4.4.4 of main report								
	Yearly Campaign											
	Regular activities for slums and Dhooghats											
Special Programmes												

Appendix A.2 Cost for PP/PA for Allahabad (1/2)

Main Activity	Details	2007			2008			2009			2010			2011			2012		
		Frequency	Cost per event	Total	Frequency	Cost per event	Total	Frequency	Cost per event	Total	Frequency	Cost per event	Total	Frequency	Cost per event	Total	Frequency	Cost per event	Total
SEFT I																			
Committee Meetings		12	1,000	12,000	12	1,000	12,000	12	1,000	12,000	12	1,000	12,000	12	1,000	12,000	12	1,000	12,000
Necessary Publicity Programmes																			
	Information Kiosk (Ref pt 1)			72,000															
	Information vans	1	150,000	150,000															
	Working the information van			30,000															
	Publicity tied with cons/ rehab of non-sewerage works (Ref pt 6)			30,000															
	Necessary Explanatory Meetings	2	15,000	30,000	2	15,000	30,000	2	15,000	30,000	2	15,000	30,000	2	15,000	30,000	2	15,000	30,000
	Demonstration Programmes																		
	for Non-Sewerage	14	15,000	210,000															
SEFT II																			
Entry Point Activities																			
	Community Workshops			720,000															
	GS&L 18 sessions	18	40,000	720,000															
	Introductory Sessions			40,000															
	Regular Publicity (Ref pt 2)			300,000															
	Yearly Campaign			800,000															
	Clean River Day			1,400,000															
	Mela	1	60,000	60,000	1	60,000	60,000	1	60,000	60,000	1	60,000	60,000	1	60,000	60,000	1	60,000	60,000
	Transect Walks	6	5,000	30,000	6	5,000	30,000	6	5,000	30,000	6	5,000	30,000	6	5,000	30,000	6	5,000	30,000
	School Programmes			20,000															
	River Cleaning Drive			10,000															
	Misc activities			10,000															
	Clean river walk			20,000															
	Publicity			20,000															
	Film Screening at public places (Ref pt 3)	10	15,000	150,000	10	15,000	150,000	10	15,000	150,000	10	15,000	150,000	10	15,000	150,000	10	15,000	150,000
	Transect Walk	14	5,000	70,000	14	5,000	70,000	14	5,000	70,000	14	5,000	70,000	14	5,000	70,000	14	5,000	70,000
	River Cleaning Drive	1	15,000	15,000	1	15,000	15,000	1	15,000	15,000	1	15,000	15,000	1	15,000	15,000	1	15,000	15,000
	Sports Competitions	1	30,000	30,000	1	30,000	30,000	1	30,000	30,000	1	30,000	30,000	1	30,000	30,000	1	30,000	30,000
	School Programs			20,000															
	Misc			20,000															
	Retailer activities for slums and Dhabhahats			1,900,000															
	Regular Visits (Ref pt 4)			1,900,000															
	Slum Community WS			240,000															
	Health camps	2	120,000	240,000	2	120,000	240,000	2	120,000	240,000	2	120,000	240,000	2	120,000	240,000	2	120,000	240,000
Special Programmes																			
	Exhibition gallery			100,000															
	Survey			20,000															
	Pre-mela activity			10,000															
	Theme Plans			50,000															
	Publicity			80,000															
	Movie shows			10,000															
Fixed Costs (Equipments for ANN)																			
	Information Van			600,000															
	Regular equipments like mikes, speakers, etc that is required for a workshop			20,000															
	Documentary films (5 nos as per specification)			2,500,000															
	3 Computers (1 shall be purchased in the third year)			75,000															
	Printer			5,000															
	Misc Equipment			10,000															
Costs for Implementation				4,932,000															
Administrative Activity																			
	Administrative Activity			5,000															
	once every year in each city	1	5,000	5,000	1	5,000	5,000	1	5,000	5,000	1	5,000	5,000	1	5,000	5,000	1	5,000	5,000
	Local Consultant (NGO (Ref pt 5))			1,166,000															
	NPPAC Cell			750,000															
	ANN			50,000															
Overall Administrative Costs				1,905,000															
	Overall Administrative Costs			1,905,000															
Overall Yearly project Cost				9,529,000															
Overall Implementation Costs				31,660,000															
Overall Cost Inc Administrative and Fixed Costs				69,38,000															
Overall Cost Inc Administrative and Fixed Costs				45,995,000															

**Appendix A.2 Cost for PP/PA for Allahabad (2/2) - Estimation Conditions**

1. 

overall budget for the activity			
Information kiosk			
	Units	Per month	
	6	50000	300000
Salary	14 months	80000	1120000
Material			120000
  
2. 

The yearly budget requirements shall include the cost of publicity programmes associated with the priority projects (Sewerage Works) as well
3. 

2 phases in the city for 5 days  
cost of film production and the projector have been covered elsewhere
4. 

The cost is estimated as a percentage of overall budget spent as capital costs for Non-Sewerage works.  
The items being  
1. The project limits for the PP/PA work with the respective Master Plan Intervention  
2. The size the number of facilities being constructed vary for the four towns and are even not synchronised with the numbers of slum population in the city.  
**It is important to note that these costs include the daily/monthly (as the case may be) allowances of the team that visits these areas on regular basis i.e. the field staff**  
Thus the Budget is

Regular activities in Slums and Dhabbahs	865661000
<b>Total estimated cost</b>	<b>865661000</b>
<b>Contingency provision</b>	<b>86566100</b>
(10% of estimated Capital cost)	
  
5. 

Salaries	1600000	Based on a team of 4 to 5 senior persons.
Office and Administrative Expenses	6000000	Food and supply staff locally
Local transportation expenses	1200000	Costs for working full time for
Per year	1000000	one year
Per year	1200000	Per year
Contingencies	11000000	Costs
	11000000	
6. 

**Other than the priority town areas etc this budget is mainly meant to undertake activities like street plays, Shram Dan Shivers etc in the slums**

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
NATIONAL RIVER CONSERVATION DIRECTORATE (NRCD)  
MINISTRY OF ENVIRONMENT AND FORESTS**

**THE STUDY  
ON  
WATER QUALITY MANAGEMENT PLAN  
FOR  
GANGA RIVER  
IN  
THE REPUBLIC OF INDIA**

**FINAL REPORT**

**VOLUME IV FEASIBILITY STUDY FOR PROJECT CITIES**

**VOLUME IV-3 FEASIBILITY STUDY FOR ALLAHABAD CITY  
PART IV INSTITUTIONAL DEVELOPMENT PROGRAMME**

**JULY 2005**

**TOKYO ENGINEERING CONSULTANTS CO., LTD.  
CTI ENGINEERING INTERNATIONAL CO., LTD.**

**FINAL REPORT**  
**ON**  
**WATER QUALITY MANAGEMENT PLAN FOR GANGA RIVER**  
**JULY 2005**

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## ABBREVIATIONS

AL	Aerated Lagoons
ASP	Activated Sludge Process
BOD	Bio-chemical Oxidation Demand
CCTV	Closed Circuit Television
DOH	Department of Housing
DUD	Department of Urban Development
DUDA	District Urban Development Authority
DUEPA	Department of Urban Environment and Poverty Alleviation
FAB	Fluidised Aerated Bio-reactor
HDB	Housing Development Board
HP	Horse Power
HRD	Human Resources Development
IDCB	Institutional Development and Capacity Building
IDP	Institutional Development Programme
IMS	Information management system
JICA	Japan International Cooperation Agency
JS	Jal Sansthan
M&E	Mechanical and Electric
MIS	Management Information System
MLD	million litre per day
MLSS	Mixed Liquid Suspended Solid
NLCP	National Lake Conservation Plan
NN	Nagar Nigam
NRCD	National River Conservation Directorate
NRCP	National River Conservation Plan
O&M	Operation & Maintenance
PCB	Pollution Control Board
PMC	Project Management Consultant
SPS	Sewage Pumping Station
STP	Sewage Treatment Plant
SUDA	State Urban Development Authority
TSS	Total Suspended Solid
UASB	Up-flow Anaerobic Sludge Blanket
UP	Uttar Pradesh
UPJN	Uttar Pradesh Jal Nigam
WSP	Waste Stabilisation Pond

**CHAPTER 1**  
**INSTITUTIONAL BACKGROUND**



## **PART IV INSTITUTIONAL DEVELOPMENT PROGRAMME**

### **CHAPTER 1 INSTITUTIONAL BACKGROUND**

#### **1.1 EXISTING ORGANISATIONS INVOLVED IN SEWERAGE**

The major administrative units that are closely related to water quality management under Ganga Action Plan (GAP) are shown in Figure 1.1. It presents hierarchic tiers of the national, the state (Uttar Pradesh (UP) State Government) and the municipal levels of organisations. There are two major groups of organisations: One group is associated with urban development and the second group is associated with environmental conservation and pollution control. Both groups are administratively separate entities and fall under different Ministries. However, for implementation of NRCP activities, coordination amongst these organisations is vital. The details about organisations discussed here are based on the review in the Volume III-9, Institution Development Programme, in the Master Plan Report.

##### **1.1.1 National Level Organisations**

At the central government level, the present study is administratively related with

- National River Conservation Directorate, Ministry of Environment and Forests
- Department of Urban Development, Ministry of Urban Development and Poverty Alleviation.

National River Conservation Directorate (NRCD) was created in 1985 as a wing of the Ministry of Environment and Forests. It provides fund for and oversees implementation of National River Conservation Plan (NRCP) and National Lake Conservation Plan (NLCP) in all states of India. The GAP under NRCP is being implemented in 59 cities/towns in 5 states. The implementing agency in the state of Uttar Pradesh is UP Jal Nigam. Under Ganga Action Plan Phase-I, Rs. 4,517 million (US\$ 103 million) investment has been made in 25 cities/ towns in these five states, which includes six districts of UP.

##### **1.1.2 State Level Organisations**

At the Uttar Pradesh State government level,

- Department of Urban Development (DUD), Department of Urban Environment and Poverty Alleviation (DUEPA), and Department of Housing (DOH) under the Ministry of Housing, Ministry of Urban Development and Urban Poverty Alleviation.
- UP Pollution Control Board under the Ministry of Environment.

Under DUD, there is Directorate of Local Bodies and UP Jal Nigam as depicted in Figure 1.1. Directorate of Local Bodies is overseeing, advising and transferring the state subsidy to local bodies at Municipal Corporation, Municipalities, or Nagar Panchayats for cities and towns, respectively. UP Jal Nigam (Water Corporation) is planning and constructing water supply and wastewater facilities for all the local bodies. Constructed facilities are to be transferred to the local bodies for their operation and maintenance.

Under DUEPA, there are State and District Urban Development Agencies. They plan and develop plots of land in and around the local bodies, particularly larger cities. In these land development projects, they develop roads, drainage and sewers, besides constructing buildings for sale. However, some drains and sewers, it is reported, are not connected to the existing facilities properly to discharge

storm water and wastewater. Also, there was strong perception that there was an urgent need for better coordination with the future plans that cities and other agencies were envisaging.

Under DOH, there are State Housing and Development Board, and City (District) Development Authority. Both develop new colonies on their own plans. They are also responsible for installation of sewers and drains within their colonies. Once these colonies are sold out, maintenance of sewers and drains as well as solid waste disposal comes under the responsibility of respective local bodies.

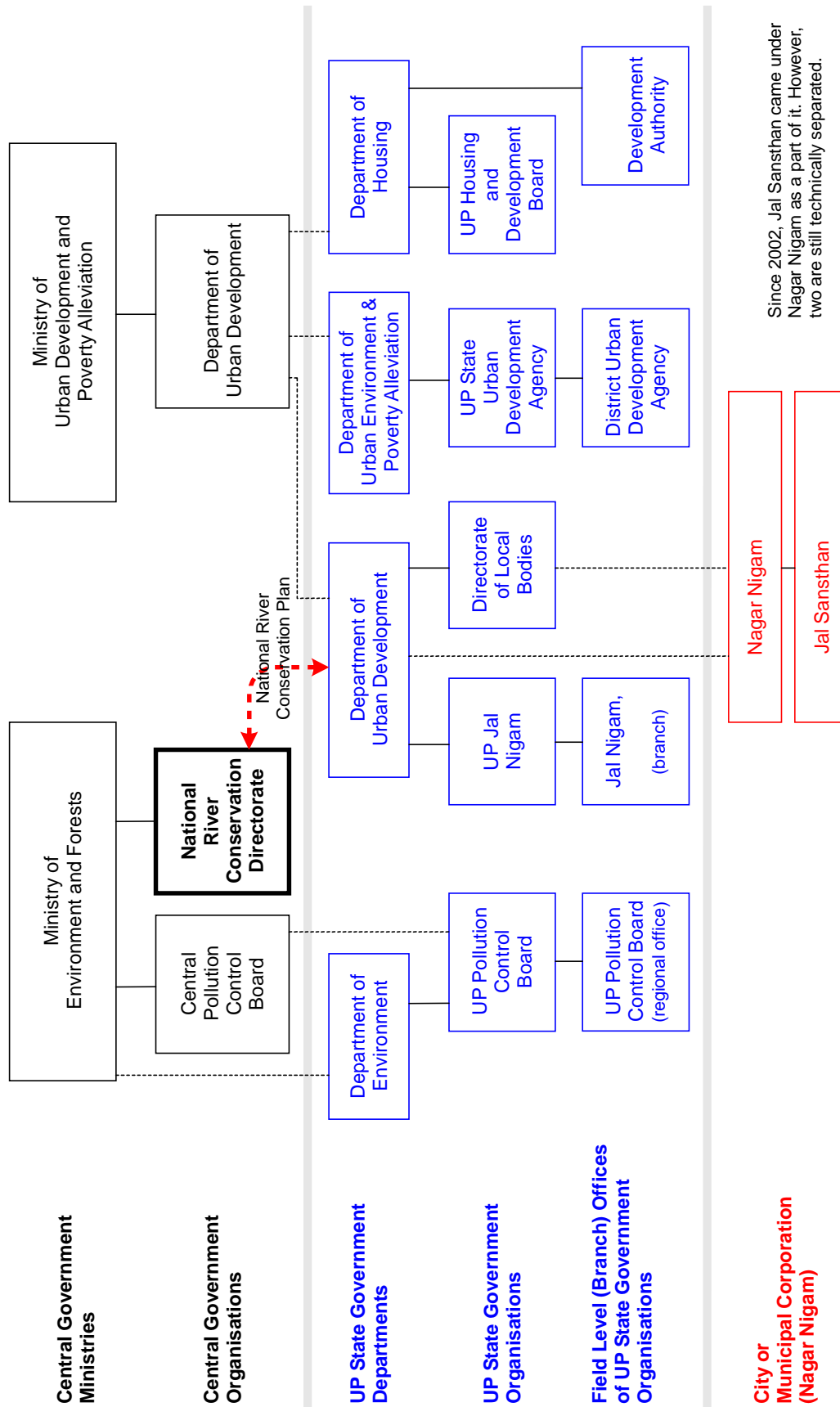


Figure 1.1 Institutional Alignment related to Water Quality Management under GAP

The division of responsibilities amongst local and state organisations, for development and maintenance of sewerage collection and treatment systems is summarized as follows:

**Table 1.1 Management Responsibilities for Environmental Public Services**

MANAGEMENT RESPONSIBILITY	ORGANISATION	FUNCTIONS
<ul style="list-style-type: none"> <li>• Master planning</li> </ul>	UPJN (Jal Nigam)	<ul style="list-style-type: none"> <li>• Physical Infrastructure</li> <li>• Capacity and location of facilities</li> </ul>
	DA	<ul style="list-style-type: none"> <li>• Spatial arrangement</li> <li>• Land use</li> <li>• Population projections</li> </ul>
<ul style="list-style-type: none"> <li>• Design and construction</li> </ul>	JS (Jal Sansthan)	<ul style="list-style-type: none"> <li>• Physical Infrastructure for water supply facilities</li> <li>• Capacity and location of facilities (water supply)</li> </ul>
	UPJN	<ul style="list-style-type: none"> <li>• Sewerage infrastructure for River Pollution Abatement Action Plans.</li> <li>• Water supply and sewerage infrastructure for urban development</li> </ul>
	DA (Development Authority)	<ul style="list-style-type: none"> <li>• Infrastructure for new development areas</li> </ul>
<ul style="list-style-type: none"> <li>• Operation and maintenance</li> </ul>	HDB (Housing Development Board)	<ul style="list-style-type: none"> <li>• Infrastructure for state housing developments</li> </ul>
	UPJN	<ul style="list-style-type: none"> <li>• Trunks sewers</li> <li>• Interception and treatment works</li> <li>• Storm water pumping stations</li> <li>• Compliance with environmental regulations</li> </ul>
	NN (Nagar Nigam)	<ul style="list-style-type: none"> <li>• Storm Water Drains</li> <li>• Solid waste disposal</li> </ul>
<ul style="list-style-type: none"> <li>• Pollution control and monitoring</li> </ul>	JS	<ul style="list-style-type: none"> <li>• Sewers and pumping stations</li> <li>• Water supply treatment and distribution works</li> </ul>
	UPPCB (Pollution Control Board)	<ul style="list-style-type: none"> <li>• Monitoring and preventing entry of polluted wastewater (if they do not meet discharge standards) into nalas and rivers.</li> <li>• Regulating industries</li> </ul>

### 1.1.3 Planning

*The Allahabad Development Authority (ADA)* at the local level is responsible for preparing spatial master plans for land use. It does not however prepare infrastructure master plans.

Town and country planning is supposed to prepare overall development master plans including infrastructure servicing.

*Jal Nigam (UPJN)* at the state and local level prepares plans for water supply and sewerage systems, primarily for expansion in response to population growth. They are also supposed to prepare master plans.

### 1.1.4 Design and Construction

*Jal Nigam (UPJN)* at the state and local level designs some sewerage systems, primarily trunk sewers, and all sewage treatment installations. For nearly 2 decades their primary focus has been pollution control in response to NRCD's River Pollution Abatement Action Plans because sewerage development was given a lower priority in earlier development plans and consequently meagre funding was available in this sector.

*The Allahabad Development Authority (ADA) designs and constructs the sewerage system for the new development areas of Allahabad City falling under ADA jurisdiction.*

*The Housing Board (UPHB) at the state level designs and constructs sewerage systems for new state housing projects.*

### **1.1.5 Operation and Maintenance**

The responsibility for operation and maintenance of the sewerage system currently rests with the Jal Sansthan.

Under the terms of the UP Water Supply and Sewerage Act, 1975, the functions assigned to Jal Sansthan in relation to sewerage are:

- (1) “Where feasible, to plan, promote and execute schemes of, and operate, sewerage, sewage treatment facilities and disposal and treatment of trade effluents.”
- (2) “To manage all its affairs so as to provide the people of the area within its jurisdiction...where feasible, with efficient sewerage service.”

*Jal Nigam (UPJN)* at the local level has in most cases retained physical possession of all the assets created under the Ganga River Action Plan. It was expected to transfer the facilities to the city governments (local bodies). However, they are at present carrying out operation and maintenance of sewage treatment works, pump stations (sewage and stormwater) and interceptor sewers. Jal Nigam has also retained responsibility for planning and implementing sewerage schemes.

*Jal Sansthan* (which legally became part of the Municipal Corporation in 2002) carries out all water supply operation and maintenance and sewerage maintenance activities. In most cases Jal Sansthan has not yet taken over responsibility for O&M of assets created under GAP.

*The Allahabad Nagar Nigam* carries out maintenance of surface drains (nalas) and canals.

## **1.2 KEY ISSUES**

There are several institutional and financial weaknesses that adversely affect the quality and extent of sewer coverage as well as ability to provide adequate operation and maintenance:

- (1) No master plans for urban infrastructure

There is no master planning for physical infrastructure. The absence of a M/P leads to the fragmented and uncoordinated implementation of infrastructure by several implementing agencies, each fulfilling their immediate short-term objectives. As a result several schemes cannot be integrated into the main trunk sewer network.

- (2) Lack of single point responsibility

Several implementing agencies at state and local levels are developing land and infrastructure in the City. Their efforts are not well coordinated, especially in the absence of a master plan. Although taxes and water charges are collected at the local level, accountability to the citizens for sewerage and drainage problems is obscured by the lack of single point responsibility. Similarly, accountability for achieving water quality objectives is unclear.

(3) Insufficient revenue for O&M

Municipal corporations have the power to impose a tax for water, and a separate sewer/drainage tax. These taxes are based on the annual rental value of the property which does not reflect the real value of the property. Municipal corporations also collect revenue from the sale of water through their Jal Sansthan; however the state government controls the water tariff. Municipal corporations are allowed to pool all sources of revenue to finance maintenance and development of municipal infrastructure. The revenues are at present insufficient to cover O&M costs. Measures are required to increase revenues to cover the true cost of service delivery.

UPJN has no such source of revenue. It depends on state funding to operate and maintain facilities. At present, local Jal Sansthan are expected to operate all new assets created by other implementing agencies however they do not in general have the required financial or human resources. As a result most Jal Sansthan have refused to accept responsibility for O&M of assets created by UP Jal Nigam.

### **1.3 RECOMMENDATIONS FOR INSTITUTIONAL STRENGTHENING**

The overall effectiveness of sewerage systems and the ability to implement O&M improvements will be directly affected by the above key institutional issues.

Institutional restructuring is necessary to realize improvements in sewerage services both in terms of coverage and quality, as well as a reduction in unit costs.

The following priorities for restructuring are set in response to the institutional issues that significantly affect operation and maintenance of proposed sewerage projects:

- (1) Reorganise at the state level to provide a single point of responsibility for planning and implementation of water and sewerage infrastructure
- (2) Reorganise at the local level to provide a single point of responsibility for O&M of sewerage with accountability to people of Allahabad.
- (3) To move towards a commercially viable operation, becoming financially sustainable in terms of covering O&M expenditure and decreasing transfer of funds/subsidy from state government.

#### **1.3.1 Institutional Arrangements for Improving Planning and Implementation**

Recommendation:

Create a nodal agency at the state level that is responsible for developing water and sewerage infrastructure master plans. The nodal agency would be responsible for reviewing all development projects proposed by state and local authorities for conformity with master plans. Development should not proceed without approval from the nodal agency. Projects prepared by Jal Nigam, Development Authority and Housing Board should be coordinated through the nodal agency.

UPJN at the state level should continue with implementation of capital projects for trunk sewer and treatment facilities in accordance with master plan proposals. UPJN would carry out preparation of detailed design reports and project management services for construction. The funding for infrastructure projects would be provided by Central and State government however a formal mechanism for sharing investment costs with development authorities (public and private) and municipal corporations is required.

#### **1.3.2 Reorganisation for Single Point of Responsibility**

The proper functioning of branch sewers and trunk sewers is closely linked to the operation of sewage pumping stations. Therefore, it is operationally desirable for the functions to be performed by one

agency because the degree of coordination otherwise required between two organisations may be very difficult to achieve.

**Recommendation:**

Transfer the responsibility for O&M of all sewerage assets to Jal Sansthan. UP Jal Nigam at the local level should provide technical support and specialised skills to Jal Sansthan on a contract basis. Alternatively Jal Sansthan can contract to the private sector. This option would strengthen accountability to the people of Allahabad. It also improves the linkage between revenue collection and the funding of O&M expenditures at the local level.

The main difficulty in transferring assets to Jal Sansthan is that currently they do not have the capacity to undertake all of the O&M functions. For effective implementation of the above recommendations it would be necessary to create additional capacity in Jal Sansthan especially in the context of managing complex sewerage schemes.

**Recommendation:**

Transfer responsibility for O&M of drains and storm water pumping stations to Jal Sansthan Sewerage division.

There are a few permanent and temporary storm water pumping stations which are currently operated by UPJN. These are operated only in the event of heavy rainfall, resulting in flooding of the drains. This event occurs infrequently and as such the main function is to maintain the pumps, diesel engines and emergency power generators. Storm water drains are maintained by NN and are currently poorly maintained.

The sewerage and drainage systems have many aspects in common and there is considerable operational advantage in bringing the two systems under the management of one authority. These are:

- responsibility for all water born pollution would clearly be placed in the hands of the single body
- single point responsibility for surface drainage leads to greater accountability and better maintenance of the pump stations
- technical expertise in all areas of operations management can be concentrated in a “centre of excellence”.
- The skills required for operating and maintaining storm water pumping stations are the same for sewage pumping stations and as such the two functions can easily be handled by the same agency
- Both systems have similar needs for map based records and condition information systems
- A single unit would simplify implementation of the short term proposal for diverting polluting flows from the nalas to the trunk sewers
- A large pool of resources is directly available to meet emergency situations
- Amalgamation of maintenance of pumping stations in particular would enable a higher level of technical resource to be supported for the combined total units.

### **1.3.3 Recommendations for Financial Strengthening**

**Recommendation:**

Municipal corporations through their Jal Sansthans can gradually increase water and sewerage taxes to properly fund O&M. Initially, state government should subsidize funding shortfalls for O&M budgets. In addition, the following measures can be implemented by Jal Sansthan to increase revenues:

- Improve collection efficiency
- Install water meters in commercial/industrial, larger households
- Regularize illegal/informal water connections

Recommendation:

The UPMC act should be amended:

- to change tax rate based on property value instead of rental value
- to reassess property values every 5 years
- to authorize local bodies to increase tax rates as required to cover provision of services

Recommendation:

ADA in its sale price of property can build in an amount (10%) which can later be transferred to JS for O&M of assets created.

Management organisation and improvements for operation and maintenance are discussed in the following Chapter.



**CHAPTER 2**  
**OPERATION AND MAINTENANCE**  
**OF**  
**EXISTING SEWERAGE SYSTEM**

## **CHAPTER 2 OPERATION AND MAINTENANCE OF EXISTING SEWERAGE SYSTEM**

### **2.1 EXISTING SEWERAGE FACILITY**

#### **2.1.1 Collection System**

##### **(1) General**

The existing sewerage system for sewerage districts A, D, and B and E have been discussed in detail in F/S report of sewerage priority projects. The total picture is summarised below:

- 20.22 km of trunk sewers – only 4.75 km stretch is of concrete pipes, rest are brick sewers.
- Gaughat SPS – 160 MLD.
- Chachar nala – 57 MLD.
- Lukerganj PS – 18.3 MLD.
- Alopibagh – 74 MLD.
- Mori gate SPS – 20 MLD.
- Allahpur SPS – 5.61 MLD.
- Daraganj – 5.2 MLD.
- Mumford ganj – 13.7 MLD.
- 60 MLD Naini STP based on ASP process.

##### **(2) Present Condition of Sewerage System**

Typical sewerage O&M system problems are the following:

- ➔ Improper installation of property connections by individuals, plumbers or contractors.
  - ➔ Surcharge of some sections of the sewer system and excessive residence time of wastewater and solids in other sections due to lengthy power failure at pumping stations or lack of cleaning.
  - ➔ Problems of recurrent nature in the collection system, such as accumulation of grease and debris which result in stoppages or restrictions that reduce the capacity of the sewers.
  - ➔ Problems related to an old and neglected sewerage system.
- Trunk sewers
    - 1) Inadequate population and area coverage
    - 2) Silting of sewers – All the existing lines have heavy silt deposition.
    - 3) Choking of sewers due to ingress of solid waste – The solid waste of the city is finding its way into the sewers, choking the pipelines and manholes.
    - 4) Poor maintenance – The present measures for cleaning the sewers are inadequate. Maintenance practices are reactive rather than proactive.
    - 5) Variations in existing slopes – Sewer lines show large variation in constructed slopes probably as a result of errors during construction. This has resulted in reduced capacities and siltation in certain stretches.
    - 6) Old infrastructure – Some of the pipe stretches are more than 70 years old and need replacement / augmentation.
    - 7) Structural damage – Some of the old sewers are damaged due to corrosion. In certain places, sewer overflows have been solved by diverting the flows into surface drains.

- Pump stations

Except for the two SPS at Daraganj and Allahpur, raw sewage at all other SPS is overflowing untreated to the rivers Yamuna / Ganga due to design deficiencies and / or inadequate capacities.

The situation is worsened by the long power cuts in the city during which time DG sets cannot be operated due to non-availability of diesel.

- 1) Gaughat Pumping Station

Pumps installed in the P/H are vertical centrifugal type, incorrect alignment of the shaft between the pump and the respective motor results in tremendous vibration of the pumping sets. Mechanical Bar Screens and conveyor system provided are not functional and need immediate replacement. Standby DG sets are present but there is no diesel to operate these in the event of a power failure. Hence, the sewer system remains surcharged resulting in backflow. The sewers are hydraulically over loaded resulting in settlement. The wet sump is inadequate for the ultimate discharge.

- 2) Mumforganj Pumping Station

There is neither mechanical nor manual bar screen provided in the system. The rising main is laid through the flood control pumping station for pumping of sullage to Alopibagh. There is a single Panel 11 KV HT feeder for pump house. There is one stepdown transformer as well. There is no standby feeder for H.T supply from any other source. However, 63 KVA Gen Set is provided but there is no diesel oil for running it.

- 3) Chachar Nala SPS

The present peak flow is more than the installed pumping capacity. Existing wet sump capacity is inadequate. There are no Mechanical / manual bar screens provided before the wet sump. Diesel Generator has been provided but there is no diesel oil to operate it.

- 4) Lukerganj Pumping Station

The SPS is designed to receive flow from a 27 inch gravity sewer. However, as this line is choked, the SPS does not function most of the time. There are no bar screens for removal of the floating matter.

- 5) Daraganj Pumping Station

There is no screening arrangement (either manual or mechanical) before the wet sump. Electrical supply is from the public distribution system from overhead main on LT. No dedicated feeder has been provided. Nor does the SPS have a DG Set for operation of pumps during a power failure. The pumps along with control valves may have to be replaced due to age factor.

- 6) Allahpur SPS

There are neither mechanical nor manual bar screens before the wet sump & after the collection chamber. Electrical system is presently working satisfactorily. However switchgear will need to be replaced in future. The pumps & controlling valves will also be requiring replacement having worked successfully through their useful life. Generator set as standby power is available but it is not operated due to non-availability of diesel.

- 7) Mori Gate Pumping Station

Mechanical bar screens have to be provided for removal of floating matter. Electrical system needs

major replacement / augmentation. The connection is given through pole mounted step down transformer of UPPCB across the Bandh Road. The MCCB and other switchgears need to be replaced on priority, the wiring of the control panel needs to be replaced and measuring instruments need be provided.

#### 8) Alopibagh Pumping Station

The capacity of the wet sump is not adequate for retention of 5 minutes. There is no mechanical bar screen. However, manual bar screens are provided in the wet sump and floatings are collected manually by the cleaning staff by physically entering into wet sump and picking the floating matter with their bare hands.

There is only one source of power supply on 11 KV system. However, there should be a standby feeder from other source to take care of pumping in the event of failure of the first source. The pumping capacity is not adequate for the discharge from the various trunk sewers and rising mains from other pumping stations. A DG set of 160 KVA is provided but there is not diesel oil to operate it.

#### (3) Some likely reasons for sewer blockages

##### 1) Ingress of Solid Waste

The solid waste of Allahabad finds its way into sewers, it is probably being dumped inside via manholes. A number of manholes are choked full with plastic bottles, plastic bags etc.

##### 2) Inadequate slopes

All the trunk sewers show tremendous variations in constructed slopes; self cleansing velocity cannot be developed in the stretches with inadequate slopes, resulting in silt deposition.

### **2.1.2 Sewage Treatment Plants**

#### (1) General

The plant appears to have been poorly maintained as good preventative maintenance should have been sufficient to prevent several of the faulty conditions noted.

#### (2) Structural Conditions

The structural condition of plant and non-plant units is in general satisfactory.

#### (3) Electric and Electro- Mechanical Equipment

The E&M equipment is approaching the end of its useful design life although UPJN has not recommended replacement of any equipment.

- As per the ground staff, the surface mixers of the digesters do not function most of the time.
- Gas production is very less, possibly the main reason for this is very low inlet SS, as explained above and inadequate mixing of the contents.
- The equipment for production of power from sewage gas (DF engines, gas scrubbers etc.) are lying unused as diesel required for operating the DF engines is not available.

#### (4) Routine Operation of Equipment and Treatment Units

The treatment plant operations and sludge removal of 60 mld plant has been contracted out to a professional contractor M/s Legend India Environmental Protection Pvt Ltd., Lucknow, India with Mr M K Mishra as its proprietor. The contract has been finalized since commissioning of the plant about 2 years ago. The monthly contract value for O&M (routine operation and maintenance) is about Rs 200,000. Out of this an amount of Rs 60,000 is to be recovered from the sale of sludge. Therefore UP Jal Nigam makes a net payment of Rs 140,000 per month towards the O&M of the plant. However, it was learnt that the contractor is facing some problems in receiving regular and timely payments for the last few months and therefore was not very serious about maintenance of these facilities. Similarly UPJN officials were not insisting maintenance as per manual/schedule as they were not able to make regular payments for a considerable time. Major repair and maintenance are being carried out by UPJN.

The general impression is that the works are not well operated and maintained. This is particularly evident at the screen and grit removal units where screenings and grit lie on the surrounding ground surface.

Other major impressions are that insufficient safety precautions are taken with moving machinery, and that personnel health codes are violated by allowing operatives to handle screenings, and the sludge purchasing contractors' operatives to handle sludge, using bare hands.

#### (5) Process Control and Monitoring of the Treatment Efficiency

CPCB has monitored the performance of Naini STP 22 times between July 1999 and March 2002. As per data published by CPCB, the treated effluent BOD showed significant variation (in excess of 10%) over the discharge requirement (30mg/l) in 5 out of the 22 samples. Similarly, SS values were significantly higher in 8 of the 22 samples collected and tested. The incidence of failure to meet discharge requirements is thus on the higher side.

However, as per the data supplied by UPJN to the Study Team, for March-May, 2004, there was no incidence of violation of desired effluent quality values with regards to SS. BOD values are reported to have exceeded the desired limit only for 4 days in the three months, but even for these 4 days, they remained within +10% of the limits. However, BOD values have not been reported in the data for 14/70 days.

The UPJN has not been maintaining any such data on the basis of which a performance review could be carried out. Some data is available in the CPCB publication, "State of Environment, Allahabad" (CUPS/55/2003-04). This has been reviewed and the general observations are:

- The plant does not show any consistency as regards process performance.
- Due to low inlet SS values, design MLSS in aeration tanks are rarely achieved.
- The DO levels in aeration tanks dip below the desired values, in general, when the inlet BOD exceeds 100mg/l. On the basis of the data in the CPCB publication and general observations during the site visits, it is concluded that the aerators do not function to the full capacity quite often; the reasons would have to be investigated in details further. However, a preliminary observation suggests frequent power failures as a possible cause.
- Gas bubbles were observed in the thickener. One possible reason is that the design capacity far exceeds the required capacity, increasing retention in the thickener, due to which the sludge probably starts decomposing. The mixing of the secondary sludge prior to the PST units also contributes to the poor performance of the thickener. The gas bubbles prevent the sludge from settling.
- One or more aerators were found to be un-operational during most of the visits to the plant.

## **2.2 EXISTING OPERATION AND MAINTENANCE MANAGEMENT**

### **2.2.1 O&M Organisation: Jal Sansthan**

#### (1) General

Jal Sansthan is responsible for operation and maintenance of water supply and sewerage systems. Since 2002, it has been placed under the Nagar Nigam. Therefore, legally it is a part of Nagar Nigam, yet the two organisations (Allahabad Nagar Nigam and Jal Sansthan) still operate independently and are technically separate entities. The Jal Sansthan still maintains its own organisation, financial accounts and revenue collection unit, which is totally separate from that of Nagar Nigam.

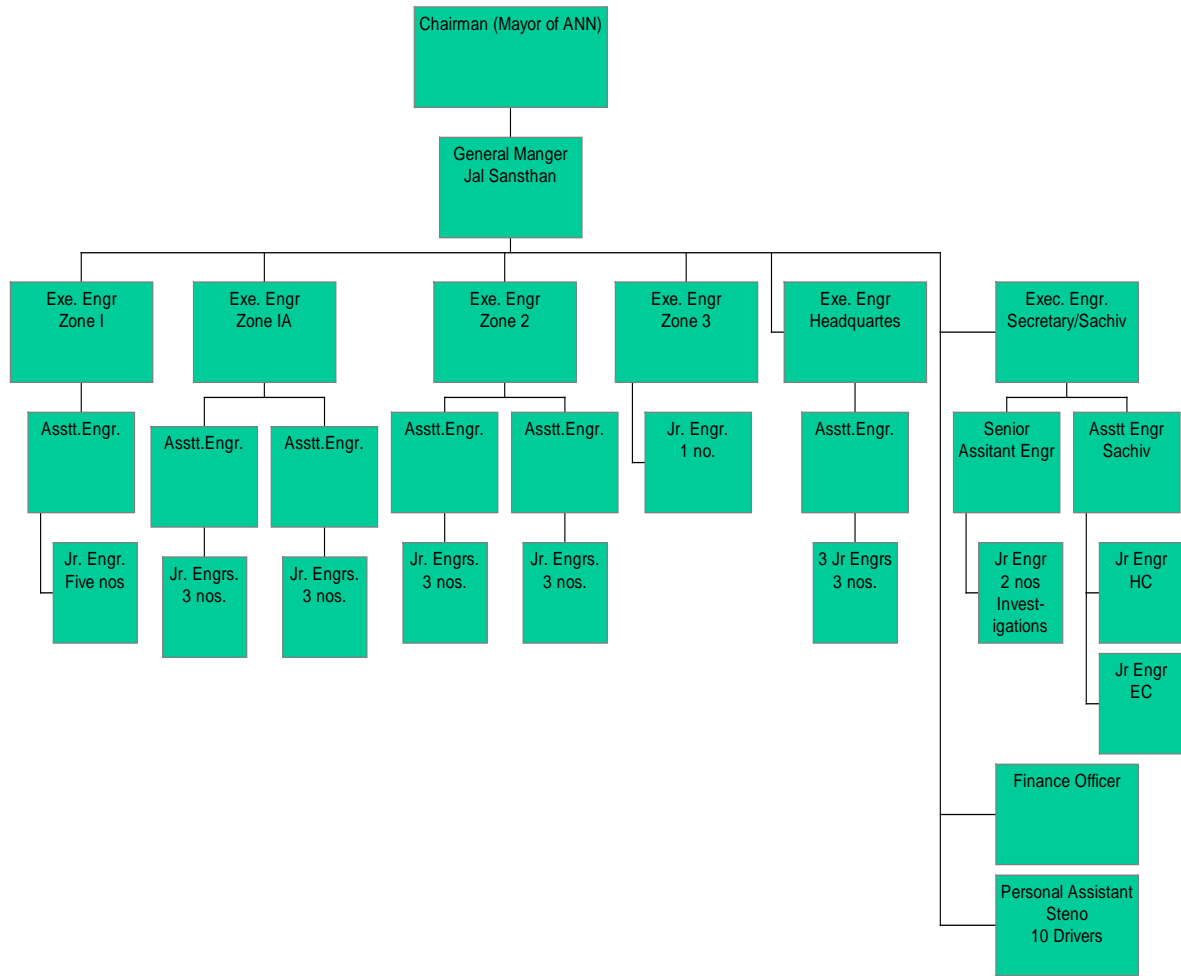
Water and sewerage tax/charges are sources of *Jal Sansthan's* income. In the absence of water metering, both taxes are assessed on percentages of the annual rental value of residents' property. According to Jal Sansthan data, approximately 56 percent bills are being collected in recent years. However, even if all the bills were collected, it would not be sufficient for the operation and maintenance of the water supply and sewerage facilities installed and transferred to it by UP *Jal Nigam* and other state level organisations like District Urban Development Agency.

One of the major issues has been the problem in assessment of annual rental value and 5 yearly re-assessment, which has not been practiced by Allahabad Nagar Nigam. This is leading to low revenue for the Jal Sansthan, whose charges are as a fixed % of property tax. Further, they are also not allowed to increase the rates, mostly due to political pressure. Second issue has been the ban on general recruitment, which is making the organisation less efficient. Thirdly, there are no funds available for training, human resource development and infrastructure development, which is seriously affecting the performance of the organisation. In absence of these, the organisational culture of Jal Sansthan is far below the desired levels. At present, local Jal Sansthans are expected to operate all new assets created by other implementing agencies. However, in absence of adequate financial or human resources, Jal Sansthan is not able to take over the responsibility for O&M of assets created by UP Jal Nigam. This aspect has been reviewed and improvements have been suggested elsewhere in the report.

#### (2) Organisational Structure

The organisational structure of the Jal Sansthan (Allahabad) is presented in Figure 2.1. The organisation is headed by a General Manager and takes care of both water supply and sewerage management functions for the city of Allahabad. However, in practice, the major focus is on water supply, whereas sewerage management receives very low priority. The organisation chart indicates that the Sansthan has been organised to cater to geographical areas of Allahabad and responsibilities have not been defined on functional basis.

The organisation has 1 General Manager, 4 Executive Engineers, 7 Assistant Engineers and 25 junior engineers amongst a total staff of 818 as detailed in Table 2.1. Besides, administration and finance division, it has planning and construction divisions for water supply. It also has operation and maintenance division for water supply functions. However, for sewerage services, such system does not exist. In fact, sewerage is a minor function of most water supply engineers. The organisation has been engaged in sewerage management for quite a number of years and therefore has the technical capabilities and manpower to plan, develop and maintain such facilities. The infrastructure and equipment available with the organisation are quite old and not much addition of equipment has taken place during last few years. Overall, for sewerage management the equipment could be categorised as old or obsolete.



**Figure 2.1 Organisation Chart of Jal Sansthan (Allahabad)**

**Table 2.1 Staff of Allahabad Jal Sansthan**

Sr. no.	Position	Numbers	Qualifications
1	General Manager	1	B.E. (Civil/Mechanical/Electrical)
2	Executive Engineer	4	B.E. or Diploma (Civil/Mechanical/Electrical)
3	Assistant Engineer	7	B.E. or Diploma (Civil/Mechanical/Electrical)
4	Junior Engineer	25	Diploma (Civil/Mechanical/Electrical)
5	Finance Officer	1	Graduate (Commerce), promoted from Acctt. Officer
6	Accounts Officer	1	Graduate (Commerce) with 10 Years experience
7	Assistant Accounts Officer	2	Graduate (Commerce) with 7 Years experience
8	Accountant	2	Graduate (Commerce) with 5 years experience
9	Accounts Clerk	4	Graduate (Commerce)
10	Audit Officer	1	Graduate
11	Auditor	2	Graduate
12	Head Clerk	1	Intermediate (Typing)
13	Clerk – I	4	Intermediate (Typing)
14	Clerk – II	36	Intermediate (Typing)
15	Chief Chemist	1	Graduate (Chemistry)
16	Chemist	1	Graduate (Chemistry)
17	Personal Secretary (GM)	1	Intermediate (Typing and Shorthand)
18	Stenographer	1	Intermediate (Typing and Shorthand)
19	Pumping Station Superintendent	3	Diploma (Mechanical/Electrical)
20	Shift In-charge	4	I.T.I (Electrical/Fitter)
21	Foreman	3	I.T.I (Turner/Fitter)
22	Assistant Cashier	1	Intermediate (Commerce)
23	Revenue Inspector	1	Intermediate
24	Meter Reader	9	I.T.I. (Instrument Mechanic)
25	Driver	8	Junior High School (Driving License)
26	Pump Operator	13	I.T.I. (Related Trade)
27	Fitter	11	I.T.I. (Related Trade)
28	Electrician	7	I.T.I. (Related Trade)
29	Surveyor	12	High School
30	Wire-man	1	I.T.I. (Related Trade)
31	Turner	3	I.T.I. (Related Trade)
32	Meter Mechanic	5	I.T.I. (Instrument Mechanic)
33	Black Smith	1	I.T.I. (Related Trade)
34	Welder	1	I.T.I. (Related Trade)
35	Assistant Meter Inspector	1	I.T.I. (Related Trade)
36	Mason	1	I.T.I. (Related Trade)
37	Pump Attendant	202	I.T.I. (Related Trade)
38	Hammer man	1	Junior High School
39	Junior wire-man	1	I.T.I. (Related Trade)
40	Junior Fitter	3	I.T.I. (Related Trade)
41	Daftari	1	Junior High School
42	Khalasi (cleaner, sweeper)	276	Literate
43	Chowkidar (security assistant)	34	Literate
44	Peon (attendant)	5	Literate
45	Gardener	4	Literate
46	Orderly	4	Literate
47	Safai Nayak	7	Literate
48	Sewer Beldar	98	Literate
49	Sweeper (for office)	2	Literate
	<b>GRAND TOTAL</b>	<b>818</b>	

(3) Qualifications, Experience and Competence of Personnel

Qualifications and experience of personnel and staff training records were not made available and therefore it is not possible to appraise detailed competencies of group of individuals. However, from the discussions and site visits, it could be stated that maintenance management (for sewerage as well



as for water supply) is undertaken on an ad hoc basis. It was also observed that the work gangs usually do not know which work they will be doing during the day, until they report to work.

The site work was not always carried out in an organised way. Indeed, at some of the sites, it was not very clear, who was the in-charge official(s). Working practices were observed to be not in accordance with The Manual on Sewerage and Sewage Treatment (i.e. The Manual on Sewerage and Sewage Treatment, Second Edition prepared by the Expert Committee constituted by the Ministry of Urban Development, Government of India, and published in 1995). During maintenance works, the site safety was either non-existent or of very poor quality.

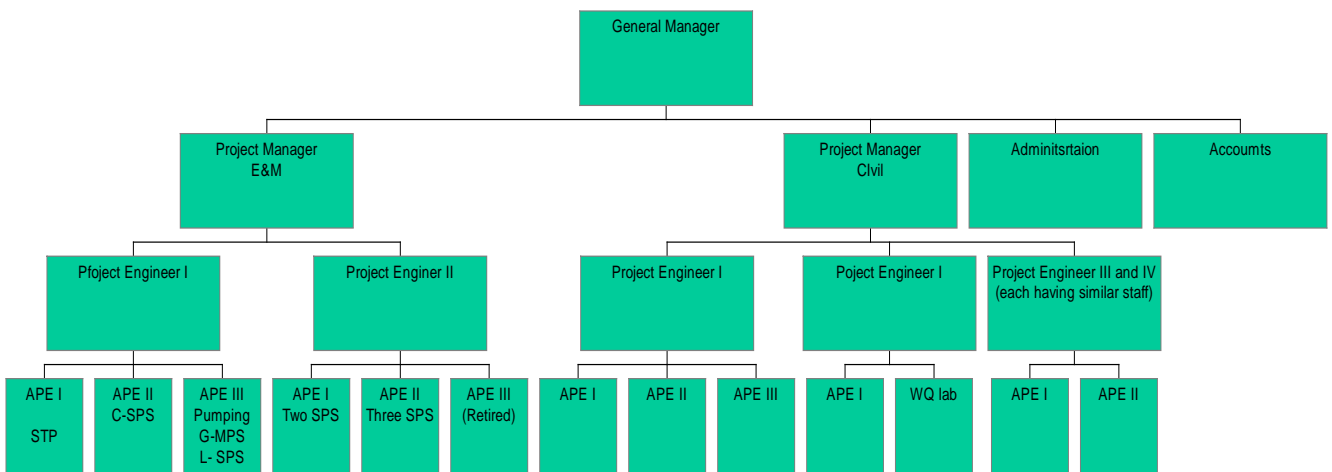
(4) Current Maintenance Practices

The current maintenance practices are reactive rather than preventive and routine as per manual. Most of the maintenance is carried out in response to customer complaints related to overflows etc. These problems are normally resolved by clearance of blockages in the sewer. There is no evidence of a planned regime of cleaning or inspection of the system. Any repairs to the system arise from problems noted during blockage clearance or from customer complaints. Besides this, record keeping was highly limited and in some cases even inaccurate.

**2.2.2 O&M Organisation: UPJN**

(1) Organisational Structure

The organisation chart of the Jal Nigam, Allahabad, for construction and O&M of sewerage management facilities is presented in Figure 2.2.



**Figure 2.2 Organisation Chart of Jal Nigam (Sewerage)**

(2) Present Human Resources and Equipment for Sewerage

The Construction and O&M Division for sewerage functions within UPJN is headed by a General Manager (in the rank of superintending engineer), who takes care of sewerage facilities including pumping stations developed during Ganga Action Plan. It has 2 project managers (in the rank of executive engineers), 7 project engineers (in the rank of assistant engineers) and 12 assistant project engineers (in the rank of junior engineers) amongst a total staff of 224 for the purpose.

### (3) Qualifications, Experience and Competence of Personnel

Similar to JS, full details of qualification and experience of the personnel and staff training records could not be made available and therefore it is not possible to appraise competencies of group of professionals. However, from the available information, it emerges that most of the engineering staff either had a degree (4-5 years course) in civil/mechanical/electrical engineering disciplines or a diploma (3 years course) in above disciplines. They have not undergone any specific training in environmental aspects, or wastewater treatment etc. Further, the team drew the impression that maintenance management was practised very much on an ad hoc basis. It also emerged that the work gangs usually did not know, which works they would be undertaking during the day, until they report to work.

### (4) Current Maintenance Practices

The current maintenance practices are reactive rather than preventive or as per manual. Most of the maintenance is carried out in response to observed errors, information related to overflows and backing up of customer's discharges. These are normally resolved by clearance of blockages in the sewer. There is no evidence of a planned regime of routine maintenance of the plant and pumping systems. Any repairs to the system arise from problems noted during general check up and or if observed by pump operator etc. Maintenance records were either very poorly maintained or were absent.

The site work was mostly carried out in an unorganised way. Working practices were observed to be not in accordance with The Manual on Sewerage and Sewage Treatment (i.e. The Manual on Sewerage and Sewage Treatment, Second Edition prepared by the Expert Committee constituted by the Ministry of Urban Development, Government of India, and published in 1995). Further, similar to Jal Sansthan, the site safety was of very poor quality, except when entering the manholes. Even then, it was of low quality and cannot be specified as per standards.

The operation and maintenance regime at pumping stations is unclear. A common factor is that pumping is intermittent on the basis of lengthy daily power outages during which diesel generators are not put into operation.

Station attendants have limited functions. They turn pumps on or off at pre-defined times with limited reference to incoming flow levels. They are not required or trained to be able to carry out any basic maintenance such as tightening of gland packing. This level of maintenance is the responsibility of a travelling fitter and labourers who are supposed to attend to the station each day to carry out routine maintenance duties.

Minor electrical problems are to be attended by a visiting electrician on notification by the station attendant. Any more advanced maintenance is in theory supposed to be contracted out to pump manufacturers but there is little evidence that such work is carried out.

As built drawings are not kept and maintenance records are limited.

## **CHAPTER 3**

### **OPERATION AND MAINTENANCE IMPROVEMENTS**

## **CHAPTER 3 OPERATION AND MAINTENANCE IMPROVEMENTS**

### **3.1 COLLECTION SYSTEM**

#### **3.1.1 Types of Maintenance**

Good operation and maintenance practices for sewerage systems are well documented in both the Indian Manual of Sewerage and Sewage Treatment, and the Sewer Inspection and Rehabilitation Manual sponsored by the Foundation for Water Research (WRc) of the United Kingdom

These documents identify the full range of activities necessary to keep a sewerage system in good condition. Ideally all elements of a sewerage system should receive the highest levels of maintenance to ensure its performance is not compromised in any way. However, this is an unrealistic aspiration for any sewerage authority to contemplate.

There are three broad policy options:

- Purely reactive
- Totally planned
- Selective planned/reactive

A more appropriate and cost-effective approach is to achieve a balance between planned and reactive maintenance in providing an acceptable and reasonable level of service.

Reactive maintenance is responding to problems as they occur and will always be required even where there are planned programmes of maintenance. Typical examples are blockage clearance and repair of collapsed pipes. This is a crisis maintenance approach where maintenance and rehabilitation is triggered by failure. For the critical parts of the system it is difficult to equate this option with any move towards optimal cost effectiveness. It ignores the growing deterioration problems, technological developments and any need to improve efficiency. It may lead to a total breakdown of the system at some time in the future requiring massive capital investment.

Planned maintenance is a system of inspection and maintenance aimed at reducing the frequency or risk of failure. It is not the same as routine maintenance where activities are carried out on a fixed, regular frequency. It requires an assessment of the need for and frequency of maintenance operations in order to balance the cost of maintenance with the level of service provided.

Many parts of a sewer system operate quite satisfactorily with minimum maintenance. Research has shown that for approximately 80% of the system the cost of dealing with problems reactively is sufficiently low for this to be the most cost effective solution. For these areas, planned maintenance cannot be justified. However, for the more expensive 20% of the system, the studies have demonstrated that detailed inspection and planned maintenance can be justified because it reduces the frequency and the costs associated with repairing or replacing major assets.

The key to a cost effective maintenance strategy is the recognition that maintenance and rehabilitation programmes should retain as much as is practicable of the existing network by a combination of optimising hydraulic performance and the use of renovation.

Therefore, regular inspection and assessment is required to identify those elements of the sewer system that will require attention on a regular and planned basis. Elsewhere the sewers only need to be dealt with on a reactive basis.

### **3.1.2 Maintenance Objectives**

At present there is concern that assets are not being properly maintained or operated thereby compromising on asset life and project objectives such as pollution control. Maintenance is currently carried out on a reactive basis and relevant records do not appear to be maintained.

Proper collection system maintenance is required to maintain an integrated network of sewers with the capacity to receive and convey efficiently and effectively to treat all suitable domestic, industrial, institutional and commercial wastewaters.

Operation and maintenance of the collection systems should therefore evolve to include more planned maintenance. As well as being more cost effective, a planned maintenance programme will minimise nuisance to customers.

The maintenance management programme should be designed to meet set objectives such as:

- 1) To ensure the structural integrity of each element of the sewerage system thereby protecting the significant investment in infrastructure.
- 2) To ensure that all work is carried out in a cost effective, safe and timely manner.
- 3) To monitor the performance of the sewerage systems by inspection, flow measurement and modelling.
- 4) To reduce the impact of sewer operations on the public and on the environment.

### **3.1.3 Immediate Priorities**

#### **(1) Establish System Records and Maps**

Planned maintenance will be dependent upon obtaining, verifying and maintaining proper system records. The study team emphasises the need to collect and to store centrally all existing records of the sewerage network by setting up a comprehensive computerised database at the local level. This database is typically referred to as a sewer inventory.

A sewer inventory should include the following data: sewer ages, shapes and materials, their depth and cover levels, inlet and outlet sewer sizes, their structural conditions and need for rehabilitation. The sewer inventory database should also include a record of all maintenance activities carried out.

Initially an intensive programme of field survey work will be required in order to establish a sewer inventory database. Data collection must be supported by appropriate developments in hardware and software tools. The following steps will be required to establish sewer inventory and base maps:

- 1) Collect all existing records and as built drawings
- 2) Conduct a geo-referenced alignment survey of all trunk, lateral and branch sewers
- 3) Conduct CCTV inspection of all major sewers
- 4) Develop GIS based sewer system maps
- 5) Develop GIS based applications for visual interpretation of database on maps.

Remarks:

- 1) As built drawings should be converted into digital format and archived in a computer based document system.
- 2) The records of property connections to the sewers should be linked with the records held by the billing departments so that the GIS data-base becomes a joint technical and financial tool.
- 3) A procedure should be set up to continually supplement and up-date the sewer inventory.

- 4) The system should be set up to ensure that up-to-date records are available to all those who should make use of the information: planners, designers, personnel in charge of operation and maintenance.
- 5) GIS based applications that are commercially available can provide collection system operators with the tools to evaluate large wastewater collection systems and to plan sewer system maintenance and improvements. GIS can provide spatial and visual presentation of data thereby enhancing the ability to interpret data and identify problems.

## (2) Inspect Critical Sewers and Assess Conditions

A comprehensive survey of critical sewers is required in order to:

- Develop the sewer inventory data
- Assess the physical condition of sewers
- Identify critical sewers and priorities
- Identify maintenance, rehabilitation or replacement needs

The WRc manual defines critical sewers as those where the consequences of a collapse would be the most severe, costly and disruptive. These critical sewers should therefore be inspected periodically and maintained in good condition.

The initial planning prior to the inspection should cover:

- Selection of sewers for CCTV or man entry
- Identification of flow by-pass arrangements
- Improving manholes where access for the necessary surveys is inadequate

The comprehensive survey and inspection will identify the defects and form the basis for preparing a planned sewer maintenance and rehabilitation programme.

## (3) Upgrade Pumping Stations O&M Procedures

The primary objective of operating and maintaining a pump station is to keep the station in continuous operation in order to prevent sewage overflows to the environment and flooding in upstream reaches of the incoming sewers.

There is an urgent need to formalize operational procedures and record keeping. The project considers that the following activities are critical to the successful operation of pumping stations:

- Developing equipment operation and maintenance manuals
- Developing procedures for normal, abnormal, and emergency conditions
- Developing systems for recording daily operating conditions
- Establishing systems for recording equipment maintenance and breakdown history

Operation manuals and specifications are indispensable for operation control and maintenance of pumps. To prevent wrong operation of equipment, operation manuals should be prepared and ready for reference at any time. Operation manuals that normally come with the equipment will do, but it should be noted that such manual content is often limited to the equipment concerned and lacks a description of the system as a whole, such as the interlock with surrounding equipment.

Emergency response procedures should be developed for abnormal conditions such as pump failure, power failure, and high water levels in the sump. The emergency response manual should include the following items:

- List of contact addresses of equipment manufacturers, etc.
- Job assignments for all personnel in emergencies

- Emergency communication network
- Procedures for contracting emergency work.

To ensure efficient operational control of the pumping station and to enable early detection of any abnormality, it is indispensable to record operating conditions in daily and monthly logs. It is also important to record all maintenance activities, including equipment failures, and repairs in order to develop historical data and analyse failure trends to justify the economics of replacement.

### **3.1.4 Typical Routine Maintenance Activities**

#### **(1) Sewer Maintenance**

##### **1) Sewer and manhole mapping**

Location and surveying of sewerage assets to form a record of the system. The need is determined for the extent of records available of the existing system and information available from third parties at time of takeover.

##### **2) Routine, systematic inspection and cleaning of sewers**

Every year, the whole sewer network should be visited, about 5 to 10% of the network should be inspected by CCTV camera, and a systematic cleaning of about 20% of the network should be undertaken.

As the system record evolves, and as the results of future, planned CCTV sewer surveys are analysed and added to the records, it will be possible to identify those areas of the sewerage system which, although appearing to function adequately, are in need of maintenance.

The problems within the system may include silt, sediment, garbage, rags, grease, building debris and rubbish and/or household rubbish, or they may be technical, such as slack gradients or poorly made property connections.

The operation and maintenance sewerage management team will be able to assess the problems, and formulate structured planned maintenance schedules to reduce the number of emergency incidents.

Where the problem cannot be dealt with cost effectively by short-term maintenance, then appropriate repair works or rehabilitation works will need efficiently to be programmed.

##### **3) Emergency cleaning and blockage clearance of sewers**

Cleaning and blockage clearance will involve a mixture of reactive and planned maintenance work:

- Reactive maintenance will be needed to clear blockages which may cause localised flooding or restricted toilet use.
- Where there are persistent problems it may become necessary to carry out sewer cleaning on a planned maintenance basis (see below).

All work carried out, including the exact location and cause of the problem, will be logged into the data base in order to ensure that the problem has been resolved efficiently and as a guideline to any future systematic planned maintenance procedures.

##### **4) Repairs to sewers and manholes**

Repairs to sewers and manholes involve also a mixture of reactive and planned maintenance work.

Reactive maintenance will be needed to carry out emergency repairs to minimise any risk to health and safety arising from collapses, to maintain the fabric of the sewerage systems, to minimise the number of collapses and to reduce infiltration and ex-filtration from the system.

When there are repetitive problems, then repairs can be done on a planned maintenance basis (see below).

All work carried out, including the exact location and nature of the problem, should be logged into the data-base in order to ensure that the problem has been resolved efficiently and as a guideline to any future systematic planned maintenance or major capital procedures.

#### 5) Routine, systematic maintenance and rehabilitation of sewers and manholes

Historically it has been international practice to assume that a sewerage system has a finite life of between 30 and 100 years after construction. It then needs replacement.

Current international practice is to implement a rehabilitation policy whereby the condition of the existing sewerage network is improved by systematic renovation or, if this will not achieve the required result, by the replacement of parts of the system by new pipelines. Thus the major expense of total renewal will never be necessary and the sewerage system will have an infinite life.

The sewerage network should be analysed in detail to assess the structural and service conditions of the system, to verify information and to quantify 'the local knowledge' of the system – that is the situation where customers are aware of sewerage system problems, but they have not bothered reporting the problems.

The problems, whether structural condition, service condition or other known problems, should then be assessed in detail in order to:

- Set priorities against each problem and need.
- Consider rehabilitation options and develop integrated solutions to problems.
- Identify the most cost effective solution.
- Update the sewerage records on the sewerage base plan or data-base.

#### (2) Installation and Inspection of Service Connections

Old service connections should be checked at a rate of about 20 to 30% per year. New service connections should be installed as per requirements.

#### (3) Control of Storm Water Discharges into Sewers

Storm water drains have been connected to sewerage systems in order to divert both sullage and storm water to the sewers. The sewerage systems have not been designed to take storm water flows and the practice of connecting the storm water system into sewers gives rise to:

- Sewage surcharge from the system as the sewers become overloaded.
- Flows far in excess of the design flows reaching the existing sewage treatment works resulting in discharges of untreated sewage into the nala.

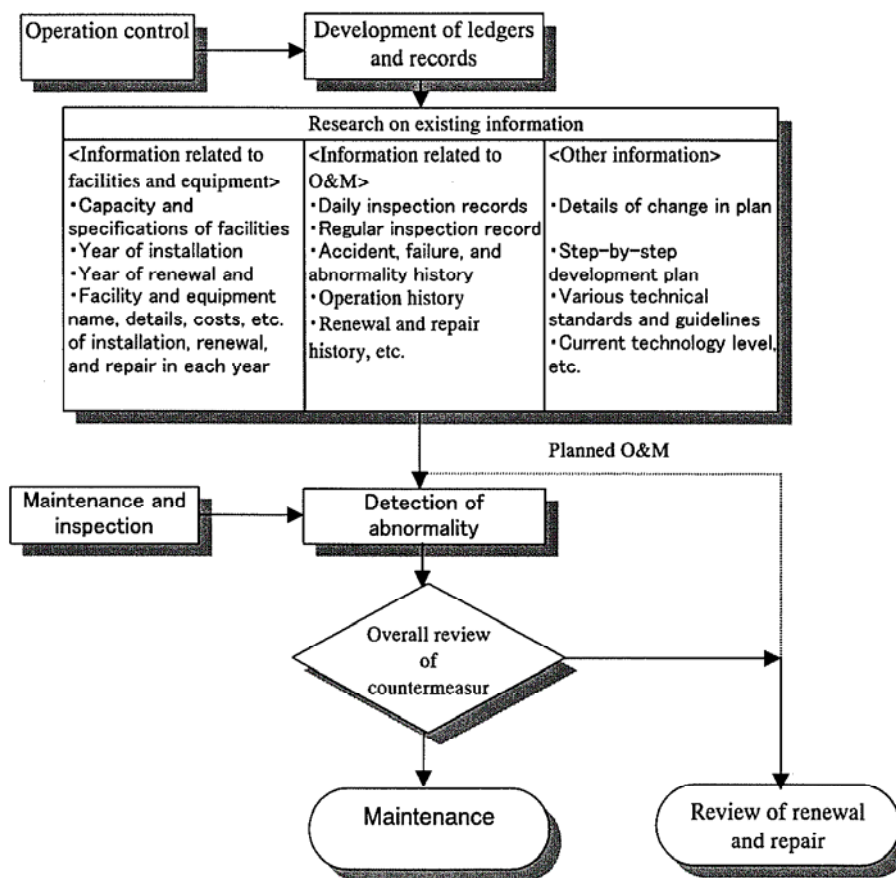
From the comprehensive data-base records of the sewerage systems and their ancillaries it will be possible to identify each and every connection from the storm water system into the sewerage system. After identifying the connections it will then be possible to:-



- Prepare standard drawings for the construction work required to remove each connection without causing community problems, which effectively means after the storm water drains have by others been made to function properly.
- Identify and quantify the extent of the problem caused to the sewerage system by the connection.
- Set priorities for disconnecting these connections.
- Phase the work to suit other needs, for example sullage diversion out of storm water drains into sewers.

(4) Pump Station Operation and Maintenance

Pumping station O&M activities should be re-organised along the lines shown in the following flow chart with emphasis on proper record keeping.



The most important aspect of pump maintenance is lubrication. It is often observed that lubricating oils/grease of adequate viscosity is not supplied as required to gears and other operating parts, causing unnecessary wear and tear. It is important to ensure oil supply without fail by promoting recognition of its importance as a basic and elementary step in operation and maintenance of machinery. It is essential that operators recognize the fact that machinery as well as the pump facilities do not always operate simply by turning ON power supply and cannot withstand severe or abnormal operating conditions.

Maintenance requirements for pumps, motors and switchgear at pumping stations is identified in Table 3.1 below

**Table 3.1 Maintenance of Mechanical and Electrical Equipment at Pump Stations**

Item	Daily	Monthly	Every 3 Months	Every 6 Months	Every year
<i>Pumps</i>	<ul style="list-style-type: none"> <li>- Leakage through packing</li> <li>- Bearing temperature</li> <li>- Undue noise or vibration</li> <li>- Pressure voltage and current readings</li> </ul>			<ul style="list-style-type: none"> <li>- free movement of gland on the stuffing box</li> <li>- cleaning and oiling of gland-bolts</li> <li>- inspection of packing and repacking if necessary</li> <li>- alignment of the pump and drive</li> <li>- cleaning oil lubricated bearings and replenishing clean oil</li> <li>- if bearings are grease lubricated the condition of grease should be checked and replaced to correct quantity if necessary</li> </ul>	<ul style="list-style-type: none"> <li>- cleaning and examination of all bearings for flaws</li> <li>- examination of shaft sleeves for wear or scour</li> <li>- checking clearances of wear rings</li> <li>- examine impellers and vane tips for pitting or erosion</li> <li>- check for end-play on bearings</li> <li>- re-calibrate all flow meters and instruments</li> <li>- test pump to determine if proper hydraulic performance is being obtained</li> <li>- for vertical turbine pumps the above inspections should be bi-annual</li> </ul>
<i>Motors</i>	<ul style="list-style-type: none"> <li>- Check bearing temperature</li> <li>- Undue noise or vibration</li> </ul>	<ul style="list-style-type: none"> <li>- Nothing special</li> </ul>	<ul style="list-style-type: none"> <li>- Blow away dust and clean any splashing of oil or grease</li> <li>- Check wear of slip ring and brushes; smoothen contact surfaces or replace if necessary.</li> <li>- Check cable connections and terminals and insulation near the lugs</li> <li>- Check to be sure there is no water in the stators of the electric submersible pump sets</li> <li>- Clean and tighten all contacts</li> </ul>	<ul style="list-style-type: none"> <li>- Check condition of oil and grease and replace if necessary</li> <li>- Test insulation by megger</li> </ul>	<ul style="list-style-type: none"> <li>- cleaning and examination of all bearings for flaws</li> <li>- check end-play of bearing and reset</li> </ul>
<i>Switchgear, starters</i>	<ul style="list-style-type: none"> <li>- Check the phase indicating lamps</li> <li>- Note readings of voltage current, and frequency</li> <li>- Note energy meter readings</li> </ul>	<ul style="list-style-type: none"> <li>- Examine contacts of relay or circuit breaker. Clean if necessary</li> <li>- Check setting of overcurrent relay, low-voltage coil and tripping mechanism; oil in the dash-pot relay</li> </ul>	<ul style="list-style-type: none"> <li>- Check fixed and moving contacts of circuit breakers</li> <li>- check condition and quality of oil/liquid in circuit breaker, and auto transformer starter.</li> </ul>	<ul style="list-style-type: none"> <li>- Clean and blow clean transformer cells, electrical cabinets.</li> </ul>	<ul style="list-style-type: none"> <li>- Calibrate all indicating meters.</li> </ul>
<i>Transformer substation</i>	<ul style="list-style-type: none"> <li>- Nothing special</li> </ul>	<ul style="list-style-type: none"> <li>- Nothing special</li> </ul>	<ul style="list-style-type: none"> <li>- Check condition of high tension bushings</li> <li>- Check condition of the de-hydrating breather and replace the silica gel charge if necessary</li> </ul>	<ul style="list-style-type: none"> <li>- Check di-electric strength and acid test of transformer oil and filter</li> <li>- Test insulation by muggger</li> <li>- Check continuity to proper earth connections</li> </ul>	<ul style="list-style-type: none"> <li>- Check resistance of ground electrode</li> <li>- Bi-annual: complete inspection including internal connections, core and windings</li> </ul>

(5) Screen and Grit Removal

Screen and grit chambers require daily inspection. Equipment selection and facility design should be simple to operate and minimize labour.

Due attention should be paid to the following points regarding flow velocity control in the grit chamber:

- An excessively high water level in the chamber causes a decrease in flow velocity, resulting not only in sedimentation of sludge and corrosive organic matter, but also settling of sand in conduits.
- Contrary to this, excessive lowering of the water level causes deterioration of the sedimentation efficiency, allowing sand to flow into the collection system and the treatment plant.

Accordingly, it is important to find out the appropriate water level in the chamber. It is also important to select the pump control method that enables adequate water control (setting of the pump operation level and ON/OFF control in the pumping well).

Considerations during daily control activity are as follows:

- Removal of screenings as frequently as possible
- Immediate removal of grit accumulated in the sand pit.
- Immediate disposal of removed screenings and grit because they will decay and present sanitary problems, such as generation of offensive odours and flies.

### 3.1.5 Summary of Collection System Maintenance Programme

The proposed sewerage maintenance programme is summarized in the following Table 3.3.

**Table 3.2 Sewerage Maintenance Programme**

Type of activity	Description	Frequency
Sewer inventory	GIS base maps, data collection, updating	Permanent Initial 3-year programme to implement software and populate the data base using specialist consultants.
Sewer survey and inspection	cleaning, CCTV inspection, assess condition, identify critical sewers	Initial 3 year programme using contractors and specialist consultants
Routine inspection & cleaning	Follow-up routine cleaning	20% network / year
	CCTV Survey	5 to 10% network / year
Emergency blockage clearance	Sewer clearance	Permanent
Sewer & Manhole repairs	Emergency repair	Permanent
Planned maintenance & rehabilitation	Sewer replacement or other rehab. Technologies	Permanent
Service Connections	Check and repair of existing connections	20% of total No. / year
	Installation of new connections	As required (according to sewer system expansion)
Control of storm water discharge into sewers	Identification of connections	Permanent
	Remove connections	Permanent

The immediate priorities are:

- to establish adequate records of the critical sewers
- to complete structural surveys of critical sewers

- upgrade equipment and O&M procedures at pumping stations

These activities can be run concurrently but they will take time to implement. The implementation of sewer inspections and GIS based maps as outlined could require at least 3 years before it can be integrated into a planned maintenance and rehabilitation programme.

It is an inescapable consequence of introducing more detailed maintenance and planning methods that the acquisition and analysis of data will be much more demanding in manpower and financial resources than a reactive crisis management approach. Local bodies do not have the resources or skills to organise or fund these activities. It is clear that a significant level of technical assistance and external funding will be required.

### **3.2 SEWAGE TREATMENT OPERATION AND MAINTENANCE IMPROVEMENTS**

#### **3.2.1 General**

The Project has appraised the existing sewage treatment works operation and maintenance and has stated that the works are not well operated and poorly maintained.

Operation and maintenance improvements should initially be carried out at the existing sewage treatment works, but this works will effectively be a training ground for establishing procedures and an organisation capable of running the proposed future sewage treatment works.

The Project emphasises the need to set up and to maintain accurate records which give full details of the design criteria and sizes of treatment units, etc. and comprise a diary of every significant event at the works. These records should be checked on each routine supervisory site visit. The records should include comprehensive details, with drawings and service manuals, for all electrical and mechanical components indicating their dates of manufacture and installation, and a detailed service/maintenance history for each unit. Detected faults should be recorded and reported to ensure that remedial action will be taken as soon as possible to have the faults rectified.

#### **3.2.2 Routine Inspections of the Works**

Weekly routine inspection of the mechanically cleaned screen should be made to ensure its efficient operation. This includes checking its mechanical operation for any abnormal noise, that it is running on normal amps, the control panel for “trip” lights, the state and cleanliness of the brush cleaning mechanism, the efficiency of the wash water jetting, etc.

Weekly routine inspection of the grit removal plant should be made to ensure its efficient operation. This includes checking its mechanical operation for any abnormal noise, that it is running on normal amps, the control panel for “trip” lights, the state and cleanliness of the unit, particularly that of the grit washer.

On every visit of supervisors (at least once a week), the buildings and concrete structures, such as the aerated tank beams, should be checked for evidence of damage and deterioration, with appropriate records kept and monitored.

Every month, the same should be inspected in detail.

#### **3.2.3 Routine O&M of The Screening and Grit Removal Units**

The manually raked screens should be raked as found necessary, but at least once per day, allowing screening materials to drain and be disposed of in a skip or bin, and then cleaned and brushed

afterwards. The skips should be checked on every supervisory visit for containment of material, drainage of water and for sanitary disposal of their contents as necessary.

The following programme is proposed:

**Table 3.3 Maintenance of Screening and Grit Removal Units**

<b>Daily</b>	<b>Regularly</b>	<b>Weekly</b>	<b>Every Month</b>	<b>Every 3 Months</b>
Remove grit and screenings	Hose down all screening plant	Check all emergency stop buttons Inspect mechanically cleaned screen Inspect grit removal plant	Drain grit chamber Remove grit from site Check building and concrete structures (aerated tank beams)	Check all inlet and outlet penstocks in screening unit Drain screen chamber and remove grit and debris Check channel seals

### **3.2.4 Repair and Overhauling of Electrical and Mechanical Equipment**

Electrical and mechanical equipment at the treatment works that is in very poor condition should be repaired/replaced as soon as possible and brought up to the required, safe electrical standards.

Planned preventative maintenance procedures should thereafter be implemented to ensure that all equipment is properly maintained so that it will fulfil its purpose.

The maintenance programme of mechanical and electrical equipment is proposed in the following Table 3.5.

**Table 3.4 Maintenance of Mechanical and Electrical Equipment of Waste Water Treatment Works**

	<i>Weekly</i>	<i>Monthly</i>	<i>Every 3 Months</i>	<i>Every 6 Months</i>	<i>Every year</i>
<i>Greasing</i>	<ul style="list-style-type: none"> <li>- Check levels and quality of oils, fill up if necessary</li> <li>- Grease certain components manually – slide of screens, etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Grease pump parts – joints, plummer blocks, etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Check levels and qualities of oils in pumps</li> <li>- Change oil in compressors</li> <li>- Grease hoisting apparatus</li> <li>- Grease fans</li> </ul>	-	<ul style="list-style-type: none"> <li>- Change oil in reducers</li> </ul>
<i>Mechanical equipment</i>	<ul style="list-style-type: none"> <li>- Check clogging conditions of sieves, filters and various units, and clean</li> </ul>	<ul style="list-style-type: none"> <li>- Check tightening of stuffing boxes</li> <li>- Check alignments of couplings</li> <li>- Check tightening of chains and belts</li> <li>- Check pump vibration</li> <li>- Check wearing of chains, pinions, etc.</li> <li>- Carry out operating test for valves and priming pumps</li> <li>- Carry out on-load tests of power generators sets while checking operating parameters (pressure, temperature, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>- Check wearing of grit extraction pumps and other pumps, classifiers screws, filtering panels and lifting screws</li> <li>- Check equipment of compressors, blowers and miscellaneous rotary machines</li> </ul>	<ul style="list-style-type: none"> <li>- Check wearing of screen slides, rollers and plummer blocks of conveyor belts</li> <li>- Check scrapers, scum skimmers of settling tanks, etc.</li> </ul>	<ul style="list-style-type: none"> <li>- Carry out checks and compulsory regular tests of pressure units and hoisting machinery</li> <li>- Check pump, motor, etc. bearings</li> </ul>
<i>Electrical equipment</i>	<ul style="list-style-type: none"> <li>- Check levels of electrolyte in and charge batteries (if need be)</li> <li>- Check carbons, rings, starting devices, etc.</li> <li>- Clean probes</li> </ul>	<ul style="list-style-type: none"> <li>- Check insulation</li> </ul>	<ul style="list-style-type: none"> <li>- Check to be sure there is no water in the stators of the electric submersible pump sets</li> <li>- Check centre columns of radial bridges of circular structures</li> <li>- Check cables and lugs</li> </ul>	<ul style="list-style-type: none"> <li>- Clean and blow clean transformer cells, electrical cabinets and motors</li> </ul>	<ul style="list-style-type: none"> <li>- Carry out compulsory check of conformity.</li> </ul>

### **3.3 CONTRACTING OUT**

#### **3.3.1 General**

The Project recommends strengthening the capacity of local Jal Sansthan for O&M of sewerage. The establishment of a new Sewerage Division within Jal Sansthan is discussed in elsewhere.

All sewerage operations and maintenance activities should be reviewed for suitability of contracting to private sector or public service providers. Employing contractors provides an opportunity of minimizing internal costs with the advantage of competition in the market place. Alternatively it can be used to provide resources to meet short-term peaks in workload or provide services that require specialized skills or equipment.

Before deciding staffing levels, training and equipment needs for the new sewerage division, it should be decided what, if any services should be contracted out. A decision regarding what tasks/components will be 'Contracted out' and for what total periods needs to be treated as an urgent matter, as it will greatly effect the labour force held by the sewerage authority.

Even if it is decided to let some tasks out to another public agency (e.g. UPJN) or to private sector contractors, the Sewerage Authority should always retain overall responsibility for and should closely control and supervise the work carried out by others, and so it will still require competent managers and supervisors.

#### **3.3.2 Scope**

'Contracting out' can make good sense economically. It can be an alternative in the following alternatives:

(1) Design

The standard scenario for 'Contracting out' is when there is a 'one-of' task to be performed, for example the design of a new sewage treatment works. The reasoning is that it would be uneconomic for the new Authority to set up and train a specialist team of designers capable of designing a modern sewage treatment works, when there is only a few works to be designed.

The economic solution is to hire a firm of consulting engineers who have a team that specialises in the design of sewage treatment works, and let them carry out the design. A variation would be to hire a specialist company that will provide the complete sewage treatment works on a turn-key basis.

(2) Operation and Maintenance

Servicing and maintenance of specialised plant by Contracting out can also be economically sensible, based upon the similar reasoning that it may not be worth training an in-house team to service and maintain particular specialised plant when the supplier of the specialised plant already has a team of persons who can carry out this work.

(3) Labouring jobs

Even labouring jobs can often economically be Contracted out, but for rather different reasons. For example, the reason may be that the work in question is seasonal, and it would be uneconomical for the Authority to appoint permanent staff for such seasonal work because of the difficulty of finding work to give the labourers to do out of season.

Another economic reason could be that privately employed labourers could receive higher wages than

the Authority is allowed to pay for particularly unpleasant jobs which Authority labour will not carry out.

(4) Specific tasks

There are specific, relevant tasks that could be contracted out, as described in the following clauses.

1) Contracting Out Sewer Inspection Surveys to Establish the Sewer Inventory

All the trunk and secondary lateral sewers need to be surveyed in detail in order to build up the data base recommended as being absolutely necessary.

Developing the sewer inventory and GIS applications, as well as the initial inspection and condition assessment of the sewer system are considered to be specialized projects that would be implemented by external resources. These projects would include capacity building and technology transfer to a specialized unit within the new sewerage division.

After the initial development and assessment, the on-going routine inspection of the sewer system can be carried out by the specialized sewer inspection unit and external contractors for CCTV and cleaning works.

2) Contracting Out Design

In this context, the term 'design' should be taken to include also the preparation of specifications, bills of quantity and working drawings.

It may be noted that the Contracting out design still requires that the Authority has staff capable of drafting and negotiating the Agreement which confirms the appointment of the contractor or other Authority and tells them what is required and to what criteria and standard the work is to be done.

Design of new trunk sewers, pumping stations and treatment works can ideally be contracted out to specialist engineering consultants. Project management for engineering studies and detailed designs could be contracted out to UPJN.

3) Contracting Out Sewerage Construction Supervision

'Contracting out' this type of work can also be economically sensible, provided that is remembered that the Authority has to supervise closely the supervisors.

4) Contracting Out Sewage Treatment Construction Supervision

This type of 'Contracting out' can also be economically sensible, although not so positively in that, as the proposed new sewage treatment works will be expanded regularly in the future, it may pay the Authority to build up its own, in-house competent Civil Engineering Construction Supervision team.

If the design and construction are let under a 'turnkey' arrangement, the Authority will still need to supervise the work.

5) Contracting Out Sewerage Operation And Maintenance

The responsibility for Sewerage O&M is already partly transferred to City Municipal Corporation. Whether or not additional assets can be transferred in the near future needs to be considered by policy and decision makers.



There are however aspects that can and probably should be contracted out, such as CCTV surveys to inspect sewers, sewer rehabilitation, cleaning using specialized equipment and the construction of property drains.

6) Contracting Out Sewage Treatment Operation And Maintenance

Contracting out of the servicing and maintenance of specialised plant can make economic sense.

The operation and maintenance of the proposed new sewage treatment works for a fixed period could be included as part of a 'turn-key' design and construction contract.

Overall, both UPJN and Jal Sansthan have qualified and experience people to manage sewerage facilities, once installed. However, based on discussions, it is our perception that they lack planning and management perspective of sewerage management. Further, both the organisations were not observing proper maintenance management guidelines. The major reasons seems to be: lack of specialised designated staff in adequate numbers, knowledge of staff, lack of training and availability of maintenance manual, finance, poor organisational culture etc. Poor record keeping was observed to be a common feature amongst both the organisations.

**CHAPTER 4**  
**HUMAN RESOURCES DEVELOPMENT**

## **CHAPTER 4 HUMAN RESOURCES DEVELOPMENT**

### **4.1 HUMAN RESOURCES, FACILITIES AND EQUIPMENT FOR OPERATION AND MAINTENANCE**

#### **4.1.1 General**

The Project recommends strengthening the capacity of local Jal Sansthan for O&M of sewerage. The establishment of a new Sewerage Division within Jal Sansthan is discussed in the following Chapter.

Before deciding staffing levels it is important to decide what, if any services should be contracted out. Since there is probably not enough time to hire and train staff for all O&M activities associated with the project it is assumed that the following functions will be contracted out:

- cleaning of sewers using high pressure sewer jetting equipment
- the initial inspection and condition assessment of sewers using CCTV
- development of GIS tools, sewer inventory and base maps
- operation and maintenance of treatment plants
- development and delivery of training programmes

The following staffing proposals are for the immediate future, to achieve immediate improvements in sewer maintenance. Staffing and the training of personnel, both supervisory and field workers, will be a major initial task for the new authority. It is therefore recommended that a special Human Resources Cell be created for the duration of the re-organisation project. This cell would be responsible for developing job descriptions, job re-classification, hiring management and supervisory staff and delivery of training programmes.

The suggested human resource requirements for pump stations and treatment plants are in accordance with directives issued for GAP projects by UP Ministry for Urban Development as well as additional guidelines of UP Government. However, efforts have been made to reduce the number of employees, wherever possible. Annual recurring costs on staffing are based on the salaries, which have been used by UPJN in estimating O&M costs for the year 2004-05.

#### **4.1.2 Staff Requirements**

##### **(1) General**

Jal Sansthan has a total of 1 Superintending engineer, 4 Executive Engineers, 7 Assistant and 25 Junior Engineers and a large number of operatives to operate and maintain the water supply and sewerage system within the municipal areas. The sewage treatment works created under Ganga Action Plans are operated and maintained by UPJN with a total of 22 engineering professionals and a total workforce of 224.

Considering the fact that under new institutional arrangements, all the three facilities (sewer lines, pump houses and STPs) would be maintained by one single organisation (Jal Sansthan – as suggested) and the project recommends that the overall management of the “Sewerage Division” should be with one Superintending Engineer.

##### **(2) Recommendations on requirement of operation and maintenance staff for sewers**

#### ***General***

Sewer maintenance generally involves regular inspection of all sewers, sewer cleaning operations, both preventive and corrective, and occasional repairs to manholes. Categories and extent of personnel

required for these activities have been worked out on the basis of quantity of work. To determine personnel requirements reference was made to the following indicative rates, as presented in Table 4.1, which have been applied to other countries similar to India.

**Table 4.1 Indicative Numbers of Manpower and Equipment**

Description	Minimum No of Operatives	Frequency	Equipment	Remarks
Routine inspection	2 operatives	2 hours/km,	Medium sized van	
Mechanical cleaning of sewers	4 operatives	5 to 10 km/year	Truck with mechanical equipment	
Pressure cleaning of sewers	2 operatives	200 to 400 m /day (for diameter of 200-500 mm)	Pressure Jetting Unit	Suggested to contract out
Emergency blockage clearance	2 operatives	1 to 4 hours each	Pressure Jetting Unit	Suggested to contract out

***Inspection and routine, systematic cleaning of sewers***

The project recommends the length for annual inspection of sewers should be 1/3 of the total length; it indicates that all the sewers will be inspected and cleaned once in 3 years. However, a priority shall be put on critical sewers and the frequency of inspection and cleaning should be prioritised. **Generally it is more cost effective to use contract services for CCTV inspection** since the equipment is specialised and costly to repair and maintain. Man-entry inspections would be carried out by inspectors specially trained to recognize sewer defects. Therefore, it is recommended to contact out this service also. However, annual contracts for cleaning and CCTV inspection would be supervised by in-house staff. Therefore it is recommended that a specialized inspection unit be created within the new sewerage division to:

- Monitor sewer inspection and cleaning contracts
- Maintain sewer inventory database
- Carry out man-entry inspection of sewers
- Review CCTV tapes and assess physical conditions
- Identify priorities for maintenance and rehabilitation

The Project recommends the following staff and equipment for regular inspection and cleaning:

- Regular inspection and cleaning team: headed by 1 junior engineer
- Inspection team: comprising of 1 driver, 1 inspector and 2 operatives equipped with a medium sized van for normal man-entry inspections, mechanical cleaning, and supervision of CCTV surveys, etc.
- Routine cleaning team: comprising of 1 driver and 3 operatives equipped with a pressure jetting/ vacuum unit.

The medium sized vans would be equipped with drain rods and fittings, road and pedestrian warning signs and three safety frames to surround open manholes, picks, shovels, brooms, sledge hammers, wheelbarrow and manhole lifting keys. There would also be boxes containing personnel safety equipment such as safety helmets, spark proof hand lamps, gas detection equipment, gloves, harnesses and ropes. A comprehensive first aid box with barrier creams, and also rags and disinfectant for cleaning both persons and equipment, should also be provided on every vehicle.

***Emergency cleaning and blockage clearance of sewers and repairs to sewers and manholes***

The Project recommends the following staff for cleaning and blockage clearance and emergency repairs:

- Emergency cleaning and blockage clearance and repair team: headed by 1 junior engineer
- Manual cleaning teams: equipped with a medium sized van for mechanical cleaning. Each team would comprise of a driver and three operatives. The vehicles should be equipped as described above.
- Pressure cleaning teams: equipped with a pressure jetting unit for tasks within the sewerage system, which can not be carried out by sewer operatives equipped solely with drain rods. Each team would comprise of a driver and three operatives. The vehicles will be equipped in a similar manner to the medium sized vans but with additional equipment including a variety of nozzles.

All the vehicles would be equipped with a mobile radio for communication between the teams and controllers to ensure that the teams are able to carry out emergency sewer cleaning and blockage clearance tasks without the need to visit the depot between jobs.

- Emergency repair team: comprising of 2 drivers and 5 operatives, equipped with a large size van with the same equipment as indicated above and a medium sized vehicle for the transport of additional equipment - warning signs, traffic barriers and temporary fencing, materials, compressors, waste materials etc., as necessary for the works.

In the short term the Project has assumed that all emergency repairs to the sewerage system will be carried out by excavation and also that any excavation needing specialist excavation plant and machinery will be contracted out or carried out by a special division within the proposed organisation (Jal Sansthan). That is, such work will not be deemed to be part of operations and maintenance.

#### ***Planned, systematic maintenance and rehabilitation of sewers and manholes***

Workload will be based on annual inspections. In general the workload is expected to be quite high initially because maintenance has been neglected and observed conditions are poor. Specialised sewer rehabilitation work would be contracted out. However this work would need to be supervised by the inspection unit. Supervision of specialised rehabilitation could be outsourced to UPJN.

The Project recommends the following staff for planned maintenance:

- Planned maintenance team: comprising of 1 junior engineer, 1 driver and 3 operatives and equipped with a medium sized van. Additional materials to be carried on the vehicle to include manhole detection equipment and small tools such as hammers and chisels, sand and cement.

These teams will carry out planned works including locating and raising manhole covers and frames, replacing manhole steps and minor repairs to shallow sewers.

#### ***Assessment of structural condition***

The Project recommends the following staff to assess structural condition of sewer:

- Structure assessment team: comprising of 1 junior engineer, 1 driver and 3 operatives, equipped with a medium size van with the required tools to assess sewer condition.

#### ***Recommendations on Staffing and Equipment for Sewer Maintenance***

**Table 4.2 Recommendations on Staffing and Equipment for Sewer Maintenance**

No.	Type of activity	Description	Junior Eng.	Staff			Equipment / team
				Operative/inspectors	Drivers	Total	
1	Routine inspection & cleaning	Man-entry inspection	1	3	1	4	Medium Van + mechanical cleaning equipment (rods)
		Cleaning		3	1	4	Pressure Jet Machine
2	Emergency blockage clearance and repair	Sewer clearance	1	3	1	4	Medium Van + mechanical cleaning equipment (rods)
				3	1	4	Pressure Jet Machine + set of nozzles
		Emergency repair		5	2	7	Large Van + mechanical cleaning equipment Medium lorry + works material, equipment, tools
3	Planned maintenance & rehabilitation	Sewer replacement or manhole repairs	1	3	1	4	Medium Van + equipment for manhole repair, etc.
4	Assessment of structural condition		1	3	1	4	Medium Van + equipment for structural assessment

***Proposed staff requirement for sewerage maintenance***

The proposed staff requirement for sewerage maintenance is estimated by following steps:

- Estimate the total length of sewer pipelines in the city including trunk, lateral and branch sewers. The length is calculated assuming the coverage area of branch sewers and 385 m/ ha of average branch sewer length.
- Work out the number of teams for routine inspection and cleaning team assuming the criteria of 2 hours/km for inspection and if required cleaning and 1/3 of the total sewer distance for inspection and cleaning

The calculation process is attached in Table 3 in ANNEX. The following is summary of proposed staff requirement for sewer maintenance.

**Table 4.3 Recommendations on Staffing and Equipment for Sewer Maintenance (Allahabad)**

	Type of activity	Description	No. of Teams	Total
1	Routine inspection & cleaning	Man-entry inspection	1	4
		Cleaning	1	4
2	Emergency blockage clearance and repairs	Sewer clearance	1	4
			1	4
		Emergency repairs	1	7
3	Planned maintenance & rehabilitation	Sewer replacement or manhole repairs	1	4
4	Assessment of structural condition		1	4
	Total		7	31

(3) Recommendations on requirement of operation and maintenance staff for pumping stations

***General***

The routine operation and maintenance of pumping stations would be the responsibility of the Pump Station Manager. The personnel requirements for operation and maintenance of sewage pumping

stations varies depending on the size of pumps or handling capacity per day of the operating pumps at the station. The total number of pump station facilities including those operated by UPJN for GAP related projects is 8 and 1 more has been sanctioned by NRCD under GAP Phase II from the proposed Salori STP. In addition, 4 more are proposed by JICA Study. These 13 pumping stations will require considerable human resources for their smooth functioning.

Pumping station operation requires the provision of teams of operators on shift to cover the 24hr period. A minimum of three operators per station would be required. General housekeeping maintenance of the stations and their campus would be the pump operator's responsibility (It needs to be included in their responsibilities as a part of their posting/appointment offer).

Introduction of telemetry and automatic control can reduce manpower requirement particularly at the smaller stations but requires economic and reliability analysis to justify the capital expenditure. These advanced techniques have not been recommended under the present context.

Maintenance of the pumping stations can be split into three types:

- Routine/preventive maintenance of M&E equipment,
- Emergency servicing, and
- Planned repair and replacement of equipment.

#### ***Routine maintenance and planned repair or replacement of the M&E equipment***

Basic servicing of equipment for the pump stations can be carried out in-house by teams of qualified electrical and mechanical technicians. The *routine servicing* of electrical and mechanical equipment would be the responsibility of the Electrical and Mechanical Supervisors (1 each). The work should be scheduled based upon both operating and maintenance manuals and also upon the in-house recording and monitoring systems.

For routine maintenance and overhauls on pumping stations, it is recommended that a group of electrical and mechanical teams would look after pumping stations comprising 1 of electrical, 1 mechanical and 1 helper/apprentice. The teams would be mobile and responsible for a certain number of facilities therefore they would be equipped with 1 medium sized van. The medium sized vans would be equipped with tools, miscellaneous small parts and fittings for routine electrical/mechanical maintenance. It would also have the provision for personnel safety equipment such as safety helmets, spark proof hand lamps, gas detection equipment, gloves, harnesses and ropes, road safety equipment. A comprehensive first aid box with barrier creams, and also rags and disinfectant for cleaning both persons and equipment, should also be provided on every vehicle.

Overhauling of equipment should be based upon the recommendations of operating and maintenance manuals. Substantial overhaul works (e.g. large pumps) should be contracted out to the specialist contractors or pump manufacturers. Necessary mechanical tool kits, chain and pulley blocks etc. should be made available for repair and maintenance.

#### ***Emergency repairs and servicing of electrical and mechanical equipment***

The Project recommends that the pump stations should be manned twenty four hours, all 365 days of a year and hence it will be necessary to implement a shift system of working with emergency call out procedures and to appoint more competent operatives as shift leaders. The Project recommends that all existing electrical and mechanical equipment at the works should be repaired as soon as possible after a problem occurs. Substantial repair and replacement work should be contracted out to specialised agencies or pump manufacturer. Allowance should be made within the budget for a percentage of the capital cost of the M&E equipment to cover for repair and replacement together with an amount for basic servicing materials and consumables. Each team would comprise of 1 driver, 1 electrician (or

mechanic) and 1 apprentice. The teams would be mobile and would respond to emergency calls. Each team would be equipped with 1 medium sized van.

#### **UP State guidelines**

The staff requirement for pumping station according to the directives issued by UP Department of Urban Development for GAP works is summarised in following table:

**Table 4.4 Staff Requirement for Operation and Maintenance of Pumping Station**  
(Guidelines of UP Department of Urban Development)

Level	4	5	5	5	5	5	Total
Post	Jr. Engineer	Mech cum fitter	Electrician	Pump Operator	Beldar	Sweeper	
Capacity							
90 HP	0.25	0.5	1	3	2	1	7.75
150 HP	0.25	1	1	3	2	1	8.25
300 HP	0.5	1	1	3	2	1	8.50
500 HP and above	1	1.5	1	3	2	1	9.50

#### **JICA Recommendation**

The number of employees has been reduced by JICA Study Team from those provided in the above UP guidelines wherever possible. The following table summarises the staffing for operation and maintenance of pumping station as recommended by JICA Study Team.

**Table 4.5 Recommendations of JICA Study Team on Staff Requirement for Operation and Maintenance of Pumping Station**

Level	4	5	5	5	5	5	Total
Post	Jr. Engineer	Mech cum fitter	Electrician	Pump Operator	Beldar	Sweeper	
PS capacity							
90 HP	0.25	0.25	0.25	3	1	1	5.75
150 HP	0.25	0.25	0.25	3	1	1	5.75
300 HP	0.5	0.5	0.5	3	1	1	6.50
500 HP and above	1	1	1	3	2	1	9.00

Note: Assistant engineers should be assigned to large, important pumping stations or a cluster of pumping stations where necessary for appropriate management.

The total number of staff for O&M of pumping stations is calculated using the table below. These staff shall be distributed to two special teams comprising of routine & planned maintenance team and emergency repair team as described in the table below.

**Table 4.6 Staffing and Equipment for Pump Station Operation & Maintenance**

Type of activity	Staff / team				Equipment / team
	Mechanical	Electric	Helper/ Operator	Driver/ Labour	
Routine maintenance & planned overhauls	1	1	1	1	Medium van + tools/parts
Emergency repairs	1	1	1	1	Medium van + tools/parts
Pump operation	-	-	3	-	1 team for each pump station for 3 shifts in 24 hrs operation



***Proposed staff requirements for O&M of pumping stations***

The total number of O&M staff required for pumping stations is estimated as below and the detail numbers are estimated in Table 3 in ANNEX.

**Table 4.7 Staff Requirement for Pump Station Operation & Maintenance (Allahabad)**

<b>Level</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>Total</b>
<b>Title</b>	<b>Ex. Engineer</b>	<b>Asstt. Engineer</b>	<b>Junior Engineer</b>	<b>Mechanic</b>	<b>Electrician</b>	<b>Pump Operator</b>	<b>Labour/Beldar</b>	<b>Sweeper</b>	
Nos. of required staff	0	1	5	5	5	27	13	9	65

- (4) Recommendations on requirement of operation and maintenance pump stations sewage treatment plants

***Routine operation and maintenance of the treatment units***

The routine operation and maintenance of the treatment units would be the responsibility of the Operations (Process) Supervisors and a workforce. The Project recommends that the treatment works should be manned twenty four hours each day and hence it is essential to implement a shift system of working with emergency call out procedures and to appoint more competent operatives as shift leaders.

***Repair and servicing of electrical and mechanical equipment***

The Project recommends that all existing electrical and mechanical equipment at the treatment works should be repaired/replaced as soon as possible after a breakdown.

The *emergency repair* and overhauling of electrical and mechanical equipment would be the responsibility of the Electrical and Mechanical Supervisor and the skilled operatives (electricians and mechanics). Overhauling of equipment should be based upon the recommendations of operating and maintenance manuals.

The *routine servicing* of electrical and mechanical equipment would also be the responsibility of the Electrical and Mechanical Supervisor and the skilled operatives (electricians and mechanics). The work should be scheduled based upon both operating and maintenance manuals and also upon the in-house recording and monitoring systems.

***Process control and monitoring of the treatment efficiency***

The chemical laboratory would fall under the responsibility of the Laboratory Chemist. The Laboratory has to have sufficient equipment and apparatus to perform its desired functions i.e. from sampling to final analysis and reporting.

***UP State guidelines***

The personnel requirements for operation and maintenance of treatment plants vary depending on the size of the plant and type of plant. The staff requirements for GAP projects for some of the common processes and capacities are determined by UP Ministry for Urban Development guidelines as presented in Table 1 in ANNEX.

### ***JICA Recommendation***

The JICA Study Team considers that by combining the management of different STPs under one single umbrella, proposed treatment works can each be operated and maintained by a reduced number of properly trained staff and workforce of personnel. The staffing for O&M of sewage treatment plants recommended by JICA Study Team based on UP state guidelines is presented in the table below with details in Table 2 in ANNEX. The major differences are as follows:

- Number of labours are reduced considerably
- Staff requirement for UASB+ Aerated Lagoons (AL) is added
- Staff requirements for large capacity STPs (Activated Sludge and UASB+AL) are added.

**Table 4.8 Recommendation of JICA Study Team on Staff Requirement for Operation and Maintenance of Sewage Treatment Plant**

Process	Level	2	3	3	4	4	4	5
	Post Capacity	Ex. Engineer	A.E (E&M)	A.E. (Civil)	J.E. (E&M)	J.E. (Civil)	Chemist	Total 5 Level
Activated Sludge Process	10 mld		1		4			38
	40mld		1		4			51
	80mld	1	1		6	1	1	71
	120mld	1	1	1	6	2	1	85
	200 mld	1	1	1	6	2	1	98
Aerated Lagoons	10 mld		1		4	1		19
	40mld		1		4	1		22
	80mld		1		4	1		37
	120mld		1	1	4	2		42
Oxidation Pond / Waste stabilisation Pond	10 mld		1			1		15
	40mld		1			1		19
	80mld		1			1		32
	120mld		1			1		40
H.Rate Filtration	10 mld		1		4			38
	40mld		1		4			50
	80mld	1	1		6	1	1	70
	120mld	1	1	1	6	2	1	83
Oxidation Ditch	10 mld		1		4	1		30
	40mld		1		4	1		34
	80mld	1	1		6	1	1	61
	120mld	1	1	1	6	2	1	66
UASB + Aerated Lagoons / Fluidised Aerated Bio-Reactor	10 mld		1		2	1		31
	40mld		1		2	1		35
	80mld	1	1		4	1	1	63
	120mld	1	1	1	4	2	1	74
	200 mld	1	1	1	4	2	1	85
300 mld & above	1	1	1	6	3	1	96	

Note: see Table 2 in ANNEX.

**Proposed staff requirement for O&M of sewage treatment plants**

The staff requirement for O&M of sewage treatment plants is summarised in table below and the details are enclosed in Table 3 in ANNEX.

**Table 4.9 Staff Requirement for Operation and Maintenance of Sewage Treatment Plants (Allahabad)**

No.	STP	District	Status	Design Capacity (MLD)		Process	Level/Number of required staff							Total
				Stage I	Stage II		2	3	3	4	4	4	5	
							Ex. Eng.	A.E (E&M)	A.E. (Civil)	J.E. (E&M)	J.E. (Civil)	Lab chemist	Level 5 total	
1	Naini STP	A	Exist/Augmnt	80	80	ASP	1	1	0	6	1	1	71	81
2	Numaya Dahi STP	B	Proposed	50	50	WSP	0	1	0	0	1	1	24	27
3	Salori STP	C	Sanctioned	29	35	FAB	0	1	0	2	1		33	37
4	Rajapur STP	D	Proposed	65	80	UASB++	1	1	0	2	1	1	52	58
5	Kodara STP	E	Proposed	15	30	UASB++	0	1	0	2	1	1	31	36
6	Ponghat STP	E	Proposed	10	10	WSP	0	1	0	0	1		15	17
	Total			254	285		2	6	0	12	6	4	226	256

(5) Other major staff requirement

***Staffing for contract operations***

It is highly probable, for economic and logistic reasons, that operation and maintenance of the new treatment works will be contracted out to the private sector. However, it is very essential for the “Sewerage Division” in Jal Sansthan to monitor the performance of the contract operator to ensure that assets are well maintained and the effluent discharges are within required limits/standards. Under the contracting out scenario, a specialised unit within the sewerage division needs to perform the following functions:

- Supervise all preventive maintenance activities on critical mechanical and electrical equipment to ensure that they are carried out in accordance with maintenance schedules
- Supervise repairs and overhauls
- Ensure that adequate maintenance records are kept by the contractor and transfer the data into the Sewerage Division’s maintenance database
- Sample treatment plant effluent and carry out lab analysis
- Ensure that the contract operator is properly recording and reporting treatment plant process parameters
- Assist the contract operator in troubleshooting

The section should consist of:

- 1 assistant engineer responsible for contract administration and reporting as well as overall staff supervision supported by requisite staff

***GIS base map and sewer inventory database***

Record keeping and mapping are mainly office based activities and would require 1 junior engineer for the inventory data, and 1 junior engineer together with computer operator for GIS mapping. A team of 5 people would be adequate for a system of this size.

***Others***

Other staff requirement is listed in Table 5.1 in Chapter 5.

(6) Summary of required engineering professional

It is recommended that for three major technical facilities, following management professionals are required:

- For sewer lines and pumping stations: 1 Executive Engineer, 3 Assistant Engineers and 11 Junior Engineers besides required staff
- For the six sewage treatment plants: 2 Executive Engineers, 7 Assistant Engineers and 23 Junior Engineers besides required staff

**4.1.3 Manpower Costs for Operation and Maintenance**

Manpower costs of operation and maintenance for all the facilities including existing, sanctioned and proposed facilities have been estimated in Table 3 in ANNEX and the summary of manpower costs are summarised in the following table.

**Table 4.10 Summary of Manpower Costs for O&M (Allahabad)**

Facility	Cost in 1,000 Rs.
Sewers	3,617
Pumping Stations	6,138
Sewage Treatment Plants	22,546
Total	32,301

Note: The cost estimation includes all the facilities (existing, sanctioned and proposed).

## **4.2 HUMAN RESOURCES DEVELOPMENT**

### **4.2.1 General**

This discussion concerns the perceived level of skills in the public sector regardless of which agency possesses the skills.

It should be noted that it is not part of this Project to determine in detail the level of the skills of individuals. Therefore, what follows is necessarily a generalisation.

A general assessment of current human resources development for operational and maintenance management among the two organisations (UPJN and JS) indicates the following common trends:

- Limited technical skills to plan and implement projects
- Limited managerial skills
- no technical operations and maintenance skills
- no budgets for training and development

Ability to manage the environmental impacts of its operations is inadequate. Inadequate staffing levels compound the training and human resources development (HRD) issues. The current mix of skills within public service utilities is inadequate for effective management and performance of pollution control and wastewater infrastructure. Properly trained personnel are essential at all levels if the sewerage operation function is to be carried out efficiently and effectively.

The following training issues are identified:

- the majority of managers and engineering staff have not received training since their formal pre-service education
- Most managers and engineers have not had formal technical training in wastewater engineering or operations management
- Training needs are conducted irregularly
- Training courses are not readily available

Human resources development must anticipate future trends and react well in advance with an appropriate staffing and training strategy. The following training objectives are set in response to foreseeable development of sewerage infrastructure:

- Develop a cadre of environmental management professionals within both organisations
- Improve managerial and technical skills for planning, design, implementation and evaluation of investments in sewerage infrastructure
- Increase the level of specialization in operation and maintenance units, whose activities have a direct impact on pollution prevention efforts and water quality objectives.

- Where possible, re-train and upgrade skills of existing personnel to meet the changing skill sets required for environmental management.

Unless these objectives are achieved, large investments in sewerage development will not provide the intended benefits.

#### **4.2.2 National/ State Capacity for Training**

Both at state level and national level, there are a large number of colleges, vocational institutions and training organisations, which provide training. For different levels of training, we are considering different institutions. Although Allahabad has an educational infrastructure that could potentially meet the institutional requirements for training but the present education generally lacks planning and practical operating needs of the urban environmental sector and current curriculum and pedagogical methods are inadequate for our needs. Besides these, there are limitations in sanitation training capacity, which would limit the quality of output due to the following reasons:

- A limited number of training institutions for higher level training.
- Absence of sector specific equipment required for practical, operational-oriented training.
- Inadequate linkages between government entities and educational/training institutions resulting in differences between the training offered and operational sector requirements.

Technician level training is provided exclusively by vocational institutions (Industrial Training Institutions), but they do not maintain adequate links to urban utilities therefore the training tends to be impractical and not sufficiently up-to-date. These vocational schools offer general training aimed to develop students/trainees as fitters, welders, blacksmiths, carpenters, mechanics, electricians, motor mechanics, instrumentation mechanics etc. with no specific focus on specialised skills for urban infrastructure. Further, their current infrastructure availability is a matter of concern. However, they possess a potential knowledge and skill base and therefore these institutions could be used with some inputs from the project, adaptation to project needs and with some infrastructure addition.

General financial management, bookkeeping and accountancy training offered are generally business oriented and don't focus on the specific needs of urban/municipal finance. Further, local bodies are in the process of introducing double entry accounting system, which would require specialised institutions/resource persons.

##### **(1) Available Options**

A number of national, regional and local engineering colleges offer civil/mechanical/ electrical/ environmental engineering degrees at Bachelor's level with specific specialization at Master's level. Various distinguished colleges like MLNIT, Allahabad; Aligarh Muslim University, IIT, Kanpur etc. offer even specialisation in wastewater treatment. Therefore, arranging technical training at these institutions could be one of the options. Some of them do offer regular training activities but the regular training activities may not meet our objectives. In that case, if needed, the project should plan for customised training programmes. These customised programmes would be designed and delivered based on specific requirements and on dates convenient to the organisations. Although their cost could be little higher than conventional training programmes and have limited peer learning component into it, they would be able to meet the project needs better.

For managerial subjects, a good number of training institutes provide a wide range of potentially relevant training in areas such as Project Planning and Management, Financial Management, Marketing Management, Corporate Strategy, Human Resources Management. However, they lack specific focus on the requirements of urban water and sewerage utilities. These organisations could be

very useful, as they would be willing to adapt to meet our requirements. However, the project management unit should be able to express the specific objectives and learning objectives of each HRD/training activity, and should be able to check, if the suggested curriculum and training delivery strategy, training materials and resource person(s) – as suggested by a typical training organisation – could meet the project requirements and standards. This activity could be managed by the HRD cell, which could be established within the project at the state level rather than at City level.

Improving capacity within selected training institutions is not a specific objective of the project. However, development of institutional training capacity can occur through the proposed HRD strategy by involving local training institutions in training events, course design and direct provision of in-service training.

## (2) HRD Strategy

In the short term, HRD is modulated by the need to provide staff with the required qualifications and in sufficient numbers to carry out the many new tasks that come with the proposed investment projects and programmes being implemented by NRCDC.

The strategy for achieving the proposed HRD objectives will consist of re-training and/or hiring personnel to meet the needs of individual investment projects and programmes. Thus each future investment project should include a comprehensive HRD component to ensure successful and sustainable implementation of the project.

For structural projects (e.g. wastewater treatment plants), all organisations involved in the project decision-making hierarchy will be included in the HRD component. This will include organisations involved in the initial planning, design, implementation and finally operations.

In developing specific HRD programmes for each organisation the following methodology should be applied:

- Identify all organisations that will be involved in the investment or capacity building project
- Identify the existing skill sets, and supporting systems or tools in each organisation and compare to those required
- Identify existing staff that have the potential to upgrade their skills or achieve the desired qualifications
- Hire qualified staff in appropriate numbers to fill the gaps
- Provide technical assistance, training and tools (software, hardware, equipment) to support staff.

In the longer term, there will continue to be a large number of investment projects in the sector whose funding can support staff training and technical assistance. However, by the mid-term each organisation should strive to increase the level of funding in their annual operating budgets for HRD. In this way, organisations can develop some autonomy and develop their own HRD programmes customized to meet their specific needs. HRD should be aimed at maintaining the skills of professionals, managers, and operators trained on previous projects.

A cadre of environmental management professionals will eventually be established. Organisations will need to plan for the eventual replacement of highly trained managers, technicians, and operators. In addition to the on-going training required to maintain acquired skills, HRD programmes should also focus on hiring and training potential candidates to assume key positions in the organisation.

## (3) Implementation of HRD

Training will be delivered by:

- technical assistance at the project identification and planning stage,
- formal training courses during project implementation
- on-the-job training during the commissioning period, and
- technical assistance for a period of at least two years after the implementation of a project

The training programme developed under the project should have three parts:

- basic management skills for all administrators and unit managers
- intensive and specialized technical training for operators
- specialized vocational skills training for maintenance personnel

#### 1) Management Training

The management training needs identified by the project at managerial and professional levels are the following:

- Project planning,
- Project management,
- Financial management, life cycle cost analysis, cost accounting
- Human resource management,
- Records management (GIS, database),
- Reporting,
- Operation and maintenance management,
- Procurement,
- Contract supervision.

#### 2) Technical Training

It is expected that many of the technical functions in the sewerage sector will be contracted out in the future. However, this does not mean that the in-house technical professionals can be less skilled. Indeed, they will need to be as skilled as if they were to carry out all the functions themselves, because they will have to instruct and supervise and control closely those to whom the work is contracted out (and who may have profit as their main motive for taking on the work).

The technical training needs identified by the project at professional and technical operations levels are the following:

- Emerging Wastewater/Sewage Treatment Options
- Automation and Process Controls in Sewerage/Wastewater Treatment
- Monitoring and Evaluation of Sewerage Facilities including Plant Performance: setting evaluation criteria in local context, developing data collection strategies and methodologies, evaluation, cost effectiveness of evaluation etc.
- Wastewater sampling and laboratory analysis
- Maintenance Management Systems for Sewerage Facilities
- Basics of Information Management Systems and Financial Information Management Systems
- Sewer Inspection Programme Management and Rehabilitation Techniques
- Design of Pump Stations
- Pump Hydraulics
- Sewer Design and Sewer hydraulics –including some software applications
- Computer skills to use information management system (IMS) and FIMS
- Basics of GIS for Urban Infrastructure (sewerage management focus)



- Database Management
- Selection of Equipment for Specific Applications (operations management, data analysis etc.)
- Construction Supervision
- Quality Assurance Systems in Construction and Operation of Sewerage Facilities
- Techniques of Environmental Monitoring and their Interpretation
- Sewage Farming
- Development of greenbelts and their maintenance

Electrical and mechanical maintenance personnel should also be included in a similar training programme but at a less advanced level.

### 3) Training for Sewer Maintenance Field Staff

All collection system personnel should be trained to maintain sewers and manholes safely by teaching the skills and knowledge needed to clear sewers of silt and blockages.

Safe working practices should be taught concerning all sewer and manhole cleaning and maintenance operations.

The training should include such details as:

- Characteristics of sewerage systems
- How to recognise different types of sewer and manhole construction materials
- The nature of sewage and common causes of sewer blockages
- The interpretation of sewerage plans and drawings
- The importance of safe working procedures and hygiene during sewerage work
- The importance of following manufacturers' recommendations when making repairs to sewer pipelines
- The methods available for dealing with sewage flows during sewer maintenance, modifications or repairs
- How to make property connections into manholes and how to bench manholes
- How to fixing manholes and raising frames

Training for selected operatives should also be given in:

- The safe use of high pressure water jetting equipment including the theory and working principles of high pressure water jetting
- Practical aspects of the equipment and on how to select ancillaries for a particular application
- The identification of hazards in the workplace

### 4) Training for Electricians and Mechanics

The training should include details such as:

- Switchgear and starters
- Instrumentation and control
- Motor maintenance & repairs
- Troubleshooting pumps
- Pump maintenance
- Shaft alignment
- Bearings and seals
- Welding

- Pump hydraulics and performance
- Diesel generator maintenance

In addition to the above suggested training areas and realizing the fact that maintenance management operates on certain guiding principles, which have developed after years of experience, there would be need for developing/adapting manuals especially for the operation and maintenance of various sewerage facilities. These manuals would provide guidance to both managers and operators in proper management of various sewerage facilities. Therefore, development/adaptation of manuals should be undertaken as a separate activity.

**CHAPTER 5**  
**FUTURE MANAGEMENT STRUCTURE**

## **CHAPTER 5 FUTURE MANAGEMENT STRUCTURE**

### **5.1 GENERAL**

As described in previous chapter, the present management for the operation and maintenance of the sewerage infrastructure cannot cope with the present situation. Organisations are carrying out breakdown maintenance, severely compromising asset life and system performance. There is limited positive and meaningful co-operation between the agencies involved.

Sewerage systems are rapidly expanding and will continue to do so in the future. Projects sanctioned under GAP and interventions implemented under the proposed priority projects will ensure that most of the sewage flows will be treated by 2015.

There is therefore a significant and urgent need to improve the management and organisation of the operation and maintenance for sewage collection and treatment functions. This will require major institutional re-organisation and the building up of capacity and competence within the sewerage sector.

As discussed in the previous chapter, responsibility for O&M should rest with a single sewerage authority.

It is expected that this new sewerage authority will be integrated with the existing Water Supply Corporation (Jal Sansthan). However, in the context of this Report, the proposals made are, for clarity, for the management of sewerage functions only.

Obviously, several of the technical services, admin and financial functions can be provided by existing water supply departments.

What follows is a list of the tasks together with recommendations as to how they may functionally be grouped together to foster the development of specialized skills.

### **5.2 SUMMARY LIST AND CATEGORISATION OF TASKS**

It is convenient to categorise the sewerage tasks for which the new Authority will be responsible into several headings:-

- (1) Administration and Finance of the Sewerage Division excluding Revenue collection which it is assumed will be carried out by the Water Division but including sector financial control, planning and management of capital investment programmes, advice on legislation, public relations and publicity, new business and office services.
- (2) Personnel including recruitment and appointments, education and training.
- (3) Planning, forward and current.
- (4) Major capital works, including design and preparation of specifications and bills of quantity for new sewers, pumping stations and treatment plants.
- (5) Contracts preparation and supervision of implementation, including approving payments to contractors and suppliers and recording unit construction prices for use in estimating.
- (6) Operation and maintenance of sewage treatment works, in-house and contract operations.

- (7) *Operation and maintenance* of branch and trunk collector sewers, sewage pumping stations, including sewer inspection and condition assessment, and determining rehabilitation needs.
- (8) *Technical Services, field support*, carrying out topographical surveys, specialised GIS computer systems, sewer mapping and sewer inventory database, monitoring flow in sewers and nalas, maintaining a technical library and records such as engineering reports and drawings.
- (9) *Technical Services, environmental*, laboratories, monitoring effluent quality at treatment plant and nalas, inspection and control of industrial discharges into public sewers, removing industrial discharges from nalas.
- (10) *Improvement works*, such as organising and supervising property connections, improving branch sewer coverage, removing storm water from sewers, disconnecting sewers from drains, including design, and preparation of specifications and bills of quantity.
- (11) *Support Services*, purchasing and managing stores for parts, equipment and construction supplies, including management and maintenance of vehicles and maintenance equipment.

### **5.2.1 Grouping of Tasks into Managing Departments and Sections**

#### *Department A: Administration and Finance - Task 1, 2*

- (1) Overall Administration and Office services
- (2) Finance
- (3) Legal aspects and Public Relation
- (4) Personnel
- (5) Training.

#### *Department B: Engineering – Tasks 3, 4 and 5*

*(in the short term this service would be provided by a special unit from UPJN)*

- (1) Planning
- (2) Design
- (3) Contract
- (4) Construction, Quality Management

#### *Department C: Operation and maintenance treatment works - Tasks 6*

- (1) Process Control/Optimisation
- (2) O&M treatment plants

#### *Department D: Operation and maintenance collection - Tasks 7*

- (1) Operation and maintenance Sewers
- (2) Operation and maintenance Pump Stations
- (3) House connections

#### *Department E: Technical Services - Task 8, 9,10*

*(in the short term this service could be provided by a special unit from UPJN)*

- (1) Environment: Protection and Monitoring
- (2) Laboratories

- (3) Topographical surveys and GIS Mapping
- (4) Improvement works
- (5) Records and Library

*Department F: Support Services - Task 11*

- (1) Special Procurement
- (2) Stores for parts, construction materials and equipment
- (3) Vehicle/fleet management, equipment maintenance.
- (4) Environment: Protection and Monitoring
- (5) Laboratories for pollution and chemical analysis
- (6) Topographic surveys and GIS Mapping
- (7) Improvement works
- (8) Office automation, Information Systems, Records and Library (being a technical activity, these have been suggested under Technical Services)

**5.2.2 The Proposed Management Structure and Staffing**

The above recommendations are presented diagrammatically in Figure 5.1. Taking into account the future management organisation, the tasks to be performed, and also the future structure of the sewerage system, the number of staff for operation and maintenance of the sewerage system and the sewage treatment works has been calculated, which is based on recommendations made in Chapter 4. The staff requirements would be as follows:

Level 1	Superintending Engineer	1
Level 2	Executive Engineer /Administrative Officer	6
Level 3	Assistant Engineers, Environmentalist and Assistant Admn. Officer	20
Level 4	Junior Engineers, Administrative Assistant	63
Level 5	Assistants, Operatives, Drivers, Sweepers, Peon, Laboratory Staff,	380
	Total	470

Details on staffing are given in Table 5.1. The proposed staffing is required for the normal functioning of Sewerage Division of the Jal Sansthan (or may be renamed as Allahabad Water Supply and Sewerage Board). The staffing is based on the assumption of completion of works under Phase II of the GAP Project including the sanctioned projects and JICA Feasibility Study projects.

However, some of the tasks of the organisations may be contracted out so that they are carried out by other public agencies and /or by private sector contractors. Even if it is decided to let some tasks out to private sector contractors and other agencies, the Sewerage Division will still require level 1 to level 3 officers to prepare contracts and to supervise (level 4 officers) and control those carrying out the work. That is, the savings to be arising from 'Contracting out' would be mainly in the large number of operatives and their foremen, equipment and vehicles.

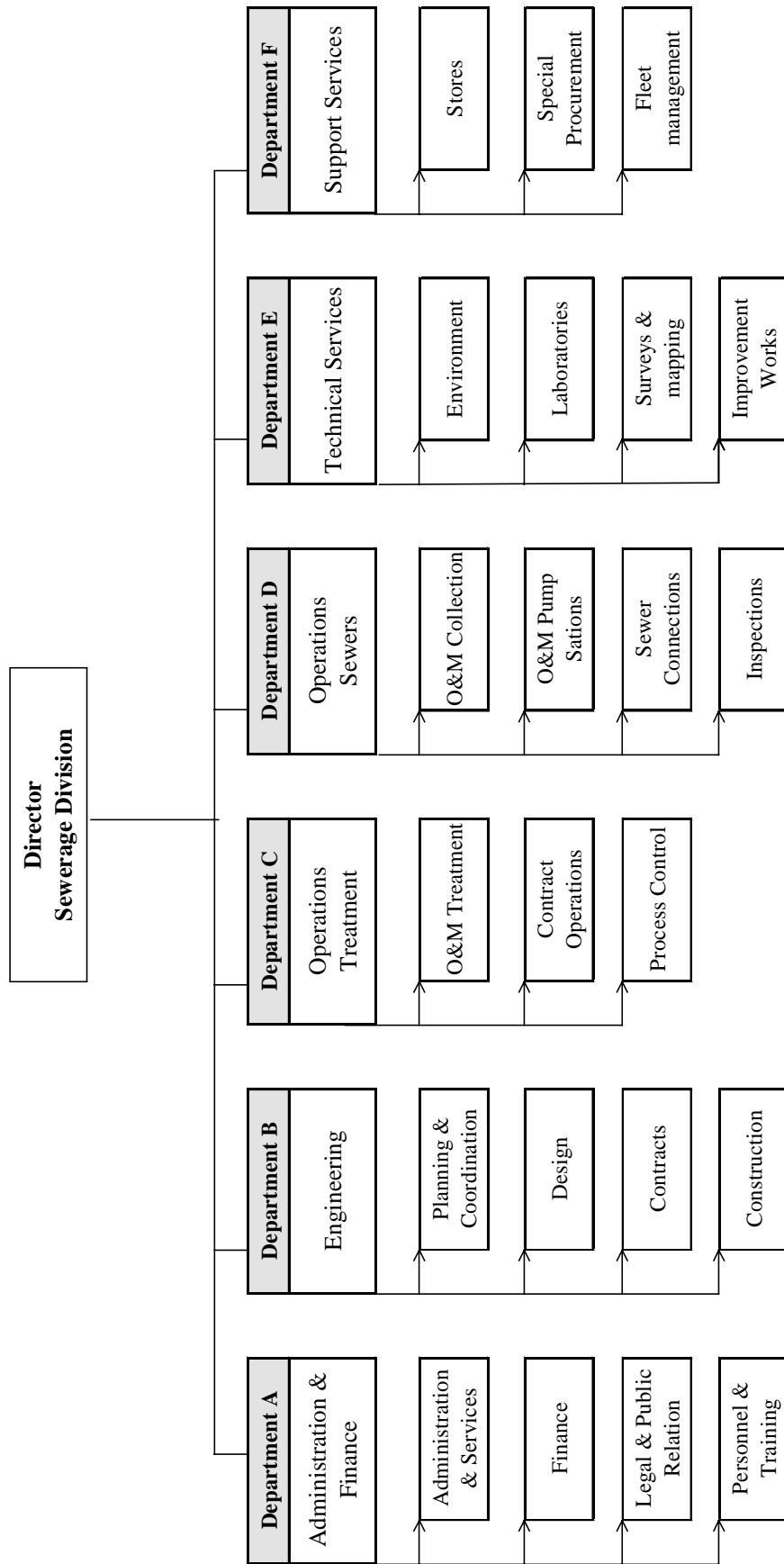


Figure 5.1 Allahabad City Sanitation Management Structure

**Table 5.1 Staffing and Equipment for Sewerage Management Functions (Allahabad)**

Level 1 Division	No.	Level 2		Level 3		Level 4		Level 5 No.	Total Division	
		Department	No.	Section	No.	Sub Section/Unit	No.			
Director (in the rank of Superintending Engineer)	1	A. Administration and Finance	1	Administrative Services	1	General Administration	1	2	33	
				Office services	1	Internal Audit	1	Legal		1
				Legal and Public Relations	1	Personnel and Training	1	Public Relations, Complaints, Unions		1
				Personnel and Training	1	Support Services	1	Stores (spare parts, materials, tools, supplies)		1
				Support Services	1	Stores, Procurement	1	Special procurement		1
				Fleet and Equipment management	1	Planning and Coordination, Contracts	1	Vehicle and equipment maintenance		1
				Planning and Coordination, Contracts	1	Design	1	Planning		1
				Design	1	Construction and Quality	1	Coordination		1
				Construction and Quality	1	Process Control	1	Contract Preparation		1
				Process Control	1	Operation and maintenance	6	Contract Evaluation, legal		1
				Operation and maintenance	6	O&M of Collection System	1	Wastewater Engineering		1
				O&M of Collection System	1	Connections	1	Civil Engineering		1
				Connections	1	Environment and Laboratory Management (Naini- main laboratory)	1	Mechanical Engineering		1
				Environment and Laboratory Management (Naini- main laboratory)	1	Survey and Mapping	1	Construction supervision		1
				Survey and Mapping	1	Sewerage Improvements, Database and Automation	1	Codes and Quality Management		1
Sewerage Improvements, Database and Automation	1		1	Process Engineering	1					
				Laboratory services	4					
				Civil and General	6					
				Electric & Mechanical	12					
				Routine inspection & cleaning	1					
				Emergency blockage clearance and repairs	1					
				Planned maintenance & repairs	1					
				Assessment of structural conditions	1					
				Civil-Connections	2					
				Electrical & Mechanical	6					
				Monitoring quality and quantity of sewage, nala flows and effluents from treatment plants	1					
				Industries and liaison with Industries	1					
				Laboratories	1					
				Field sampling	2					
				Topographic surveys	5					
				GIS base mapping	3					
				Sewer inventory database, drawing and printing services	1					
				Flow monitoring of sewers, nalas etc.	1					
				Other sewerage improvements	2					
				Computer services, MIS and FIMS, Log Records of plants, pump houses etc.	2					
<b>Total</b>	<b>1</b>		<b>6</b>		<b>20</b>		<b>63</b>	<b>380</b>	<b>470</b>	



**CHAPTER 6**  
**METHODOLOGY**  
**OF**  
**SETTING UP THE PROPOSED NEW ORGANISATION**

## **CHAPTER 6    METHODOLOGY OF SETTING UP THE PROPOSED NEW ORGANISATION**

### **6.1        INTRODUCTION**

This section advises how to set up the proposed Management Structure of the Sewage Division at Jal Sansthan, and also the initial steps required so that the Division can start to function.

Whether or not it has been decided to 'Contract out' selected tasks does not affect the procedure described below. It will, however, affect the level of management staffing in the relevant Sections and the numbers of operational personnel required.

### **6.2        SETTING UP THE MANAGEMENT STRUCTURE**

#### **STEP 1: Responsibilities of the Sewerage Division**

At the present time, not all these functions are under the control of Jal Sansthan.

It was suggested earlier in this Report that they should all be controlled in the future by the new Sewage Division at Jal Sansthan. This does not, however, mean for example that the new Authority will design all new sewers. However, it is expected that the new Authority will be closely involved in coordinating with all other agencies engaged in such work.

It does also mean that, once the senior Managers of the Division are functioning in their posts, early firm decisions need to be taken regarding which tasks should be 'Contracted Out' in order that the Division will be appropriately staffed with an adequate labour force. One particular case of 'Contracting out' will be the O&M of the treatment plants and pumping stations to UPJN or the private sector.

The following discussions assume that the new Authority will be responsible for all the tasks listed above.

#### **STEP 2: Personnel – Professional and Supervisory**

- (1)        Agree Management structure.
- (2)        Decide job categories and the status of each job.
- (3)        Decide salaries and other emoluments for each post.
- (4)        Prepare job descriptions for every post.
- (5)        List and review qualifications and experience of every professional and supervisory staff member and record.
- (6)        Fill every post (Job) with appropriate existing staff members so far as is possible.
- (7)        By comparing job descriptions and the qualifications of appointees, determine, plan, design and arrange educational and training courses in order to bring individual qualifications and experiences in line with specific post (Job) requirements.
- (8)        Fill all outstanding vacancies by recruitment of suitable candidates.

- (9) Appoint department and section heads as soon as possible and let them take up their posts, so that they can carry out, with assistance and support as necessary, most of the tasks listed in this section.

### **STEP 3: Offices and other practical details for Management Structure**

- (1) Decide upon required sizes of offices required.
- (2) Examine existing and other offices offered and tailor requirements to what is available.
- (3) Decide upon furniture required.
- (4) Examine existing and offered furniture and prepare order lists of additional furniture required.
- (5) Decide upon equipment required.
- (6) Examine existing and offered equipment and prepare order lists with specifications of additional equipment required.
- (7) Decide upon vehicles required to function properly.
- (8) Examine existing and offered vehicles and prepare order lists with specifications of additional equipment and vehicles required.
- (9) Arrange for the installation of both internal and outside communication apparatus.

### **6.3 SETTING UP THE WORKING STRUCTURE**

This structure will comprise mainly field workers, but it will also include some more junior office staff, such as draughtsmen, print shop workers, laboratory technicians and scientific inspectors.

### **STEP 4: Personnel - foremen, tradesmen and semi-skilled workers**

- (1) Agree team names, structures, composition and personnel requirements.
- (2) Agree job categories and the status of each job.
- (3) Agree salaries and other emoluments for each post.
- (4) Prepare job descriptions for every team position.
- (5) List and review qualifications and experience of every available skilled and semi-skilled staff member and record.
- (6) Fill every post (Job) by appropriate existing staff members so far as is possible.
- (7) By comparing job descriptions and the qualifications of appointees, determine, plan, design and arrange educational and training courses in order to bring individual qualifications and experiences in line with specific post (Job) requirements.
- (8) Fill all outstanding vacancies by recruitment of suitable candidates.

**STEP 5: Accommodation, including mess-rooms, toilets with showers, locker rooms and stores for field-work operations**

- (1) Decide upon required sizes and locations of buildings and/or rooms required.
- (2) Examine existing and other buildings and/or rooms offered and tailor requirements to what is available.
- (3) Decide upon furniture required.
- (4) Examine existing and offered furniture and prepare order lists of additional furniture required.
- (5) Decide upon equipment required.
- (6) Examine existing and offered indoor equipment and prepare order lists with specifications of additional equipment required.
- (7) Examine existing and offered equipment and prepare order lists with specifications of additional equipment required.

**6.4 TASKS ON WHICH TO COMMENCE WORK**

**STEP 6:**

- (1) Plan a publicity campaign, stating the Division's plans for improving the sewerage service, with particular reference to the need to end discharges of sullage into storm water drains and also aimed at persuading property owners to connect to sewers.
- (2) Review, programme and budget for the operation and maintenance of priority projects.
- (3) Plan in-house workshops and seminars, initially to instruct senior management but later for all staff members bearing responsibility.
- (4) Plan in-house training for both staff and operatives.
- (5) Collect and centralise sewerage information including property connection records. Start to establish the Divisional library.

*It is strongly recommended that the new Sewage Division will be absolutely responsible for receiving, assembling, checking, up-dating as found necessary, recording and storing ready for reference all of the City's sewerage and sewage treatment records, preferably in a GIS computer data-base which other authorised agencies and persons can tap.*

- (6) Carry out sewer inspections. Identify critical sewers, assess condition and maintenance needs. Programme and budget for rehabilitation.
- (7) List and review all in progress and planned sewerage schemes.
- (8) Review in the field the methodology and the efficiency of the existing sewer maintenance programmes and decide how they can be improved.

- (9) Improve the operation and maintenance of the existing Sewage Treatment Works, including the capabilities of its laboratory and the efficiency of process control. Prepare manuals for operatives where necessary.
- (10) Plan and implement a programme for measuring flows and taking sewage samples from the drains and sewers.
- (11) Review all work in progress and all Sewerage and Sewage Treatment operation and maintenance from the point of view of safety.
- (12) Select and survey pilot areas for improving branch sewer coverage. Plan, programme and budget for branch sewer improvements.

## **6.5 PILOT PROJECT APPROACH**

Whole scale re-organisation and implementation of new O&M practices may not be feasible given the many institutional constraints that are present in the sector.

As an alternative, O&M improvements could be implemented on a limited (pilot area) only. The pilot area would correspond to a fixed geographical area such as a sewerage district and selection would be based on identified project priorities. It should also take full account of discussion with the relevant operating authority.

The option of a pilot based approach might be preferred for the following reasons:

- Allows concentration of resources to ensure full implementation of all activities and reduces the risk of failure
- A group of “experts” can be developed through all levels of staff and workers in the district. This group can then provide the core of experience to other groups
- Additional operating areas can be added to over time as experience grows and performance reaches required standards.
- Operating procedures can be evolved and refined in a single operating group before expanding to new areas. This helps to ensure commonality of approach and also allows for later comparison of performance across the operating areas.

Key actions that need to be implemented for this approach to be successful:

- Responsibility for all O&M activities to rest with one identifiable officer, of sufficient stature and experience in the relevant authority
- That officer should only be tasked with this responsibility and not be required to carry out other significant duties.
- Officer should be given sufficient delegated authority to actually achieve the required performance and standard of service
- The budget for operating in the pilot area must be properly defined and provided for in the relevant authority’s finances
- This budget will need to be increased as the pilot area is expanded.
- Liaison with drainage and solid waste authorities need to be in place to ensure proper coordination of activities.
- Appropriate technical and financial support to be given by outside bodies during start-up period.

This list of actions is not exhaustive but is intended to highlight those areas that must be addressed before significant progress can be made.

**CHAPTER 7**  
**INSTITUTIONAL DEVELOPMENT**

## **CHAPTER 7 INSTITUTIONAL DEVELOPMENT**

### **7.1 SYSTEM DEFICIENCIES**

Allahabad Nagar Nigam, Allahabad Jal Sansthan and U.P. Jal Nigam, have several deficiencies, lack of sharing of common information, resources amongst each other etc. Nagar Nigam and Jal Sansthan are public service organisations but they work in isolation and do not much interact with public or call for their opinion in operational matters and developmental issues. Some observations are summarized below:

1. There is a clear overlap in several area of operation between Nagar Nigam and Jal Sansthan.
  - (a) While Jal Sansthan is responsible for maintenance of main and trunk sewers, Nagar Nigam maintains the branch and laterals. The Nagar Nigam do not have the requisite expertise and the equipment to carry out the maintenance of sewer lines; hence only manual cleaning is done. This dual responsibility interferes with the smooth functioning of the respective departments and moreover similar types of jobs being done by two different sets of people and organisation.
  - (b) Nagar Nigam, collects property tax and Jal Sansthan collects Water Tax, Water Charge and Sewer Tax from the residents / property owners of Allahabad. Tax Collectors of both the departments visit the same household for their portion of revenue. The Taxpayer has to visit two different offices for payment of his dues and redressal of problems.
2. Nagar Nigam is not properly equipped to handle the cleaning of sewers and normally try to muster help from Jal Sansthan on personal level. However still the responsibility of maintaining the branch sewers lies with the Nagar Nigam.
3. The local Pollution Control Unit of UP Jal Nigam was formed primarily with the execution of the works under Ganga Action Plan and the operations and maintenance thereof was supposed to be transferred to the local body. However, this is not the case in Allahabad. Operations and maintenance of the Sewer Treatment Plant still forms of UP Jal Nigam.
4. While Nagar Nigam and Jal Sansthan face a shortage of manpower, on the other hand UP Jal Nigam has a surplus manpower. A very small percentage of the total manpower is now looking after the assets under Gap Phase I.
5. Lack of networking of the organisations and sharing of common database. Nagar Nigam is responsible for fixing the Annual Rental Value of all properties within the municipal limits and charge Tax there on. The Jal Sansthan is also supposed to use the same Annual Rental Value to impose Water Tax on the consumer but the same is not readily available.
6. All the organisations are primarily conducting breakdown maintenance work. Preventive or routine maintenance seems to be lacking. This is resulting in the systems not functioning to the optimum.

Possible options are prepared considering the most obvious gaps in the organisations. On assessing the institutions, it is felt that there are major items, which require strengthening in the concerned areas. However, apart from the institutional strengthening a reshuffling in the responsibilities between the organisations is necessary. This constitutes a medium and long-term strategy.

## **7.2 MEDIUM AND LONG TERM INSTITUTIONAL DEVELOPMENT**

### **7.2.1 Objectives of Institutional Development**

The Institutional Development Programme (IDP) is expected to implement institution engineering intended to:

- Financially and organisationally strengthen city offices so that they can implement succeeding phases of the sewerage projects proposed in the Master Plan and the Feasibility Study
- Build and strengthen sewerage divisions in city office so that they can provide the public infrastructure services in accordance with the objective, principles and guidelines.
- Prepare an action plan required for the above and their time schedule for implementation and support their implementation

### **7.2.2 Proposed New Roles of Relevant Organisations**

It is utmost important to identify the role of each of the organisations, i.e., UP Jal Nigam, Ganga Pollution Control Unit, Nagar Nigam and Jal Sansthan.

Nagar Nigam and Jal Sansthan are complementary organisations and carry out many common functions. Hence they should be under the same management. It recommended that Jal Sansthan set up sewerage division and all the revenues and costs be centralized with operational autonomy of the departments.

UP Jal Nigam, Ganga Pollution Control Unit, Allahabad can be made responsible for the construction and setting up of sewerage treatment plant under contract of Jal Sansthan and then hand it over to Jal Sansthan for operation and maintenance.

The following new roles and responsibilities are recommended for major players of sewerage system management. These roles and responsibilities should be reviewed in the implementation stage of Institutional Development Programme.

#### **Nagar Nigam (City Office)**

- i) Owner of the assets created
- ii) Member of the board of director of Jal Sansthan (sewerage division in city office)
- iii) Approval of budget for sewerage system
- iv) Coordination body with other organisations such as Development Authority

#### **Jal Sansthan (City Office)**

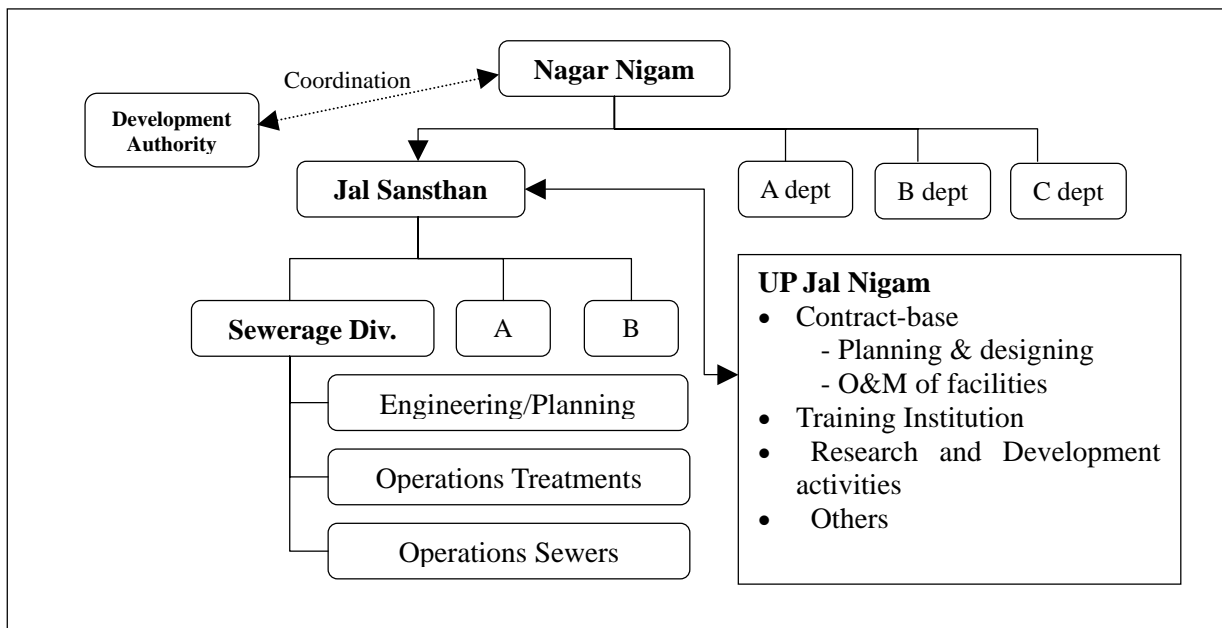
- i) Sewerage system management
  - Planning and designing
  - Implementation of sewerage project
  - Supervision of construction works
  - Operation and maintenance of sewerage facility
  - Revenue collection and generation
  - Financial management of revenue and expenditure



**UP Jal Nigam**

- i) Contract-based work for Jal Sansthan
  - Planning and designing of sewerage system
  - Supervision of construction works of sewerage facility
  - Operation and maintenance of sewerage facility
- ii) Training of sewerage engineer
- iii) Provision of official examination and certification for sewerage engineer
- iv) Research and development of sewerage technology
- v) Preparation of manual and guidelines for planning, designing and operation & maintenance

The following figure explains a concept of the proposed structure of the relevant organisations and roles.

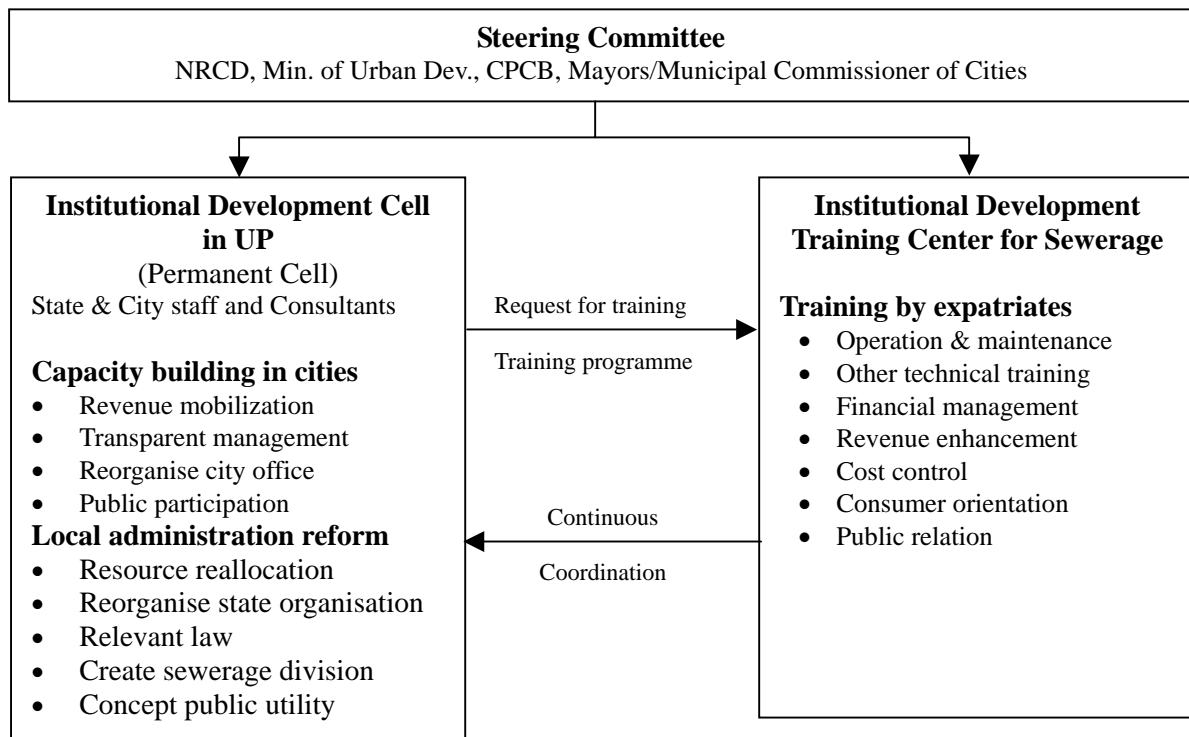


**Figure 7.1 Concept of a New Organisational Structure and Roles**

This structure will be the proposed final goal. In intermediate period, a transitional authority may be required. To transit to the proposed structure, an action plan including a detailed time for implementation shall be prepared in Institutional Development Programme.

**7.2.3 Institutional Setting Up for Institutional Development Programme**

To achieve these objective, a task force named Institutional Development Programme Cell shall be organised in the UP government. This cell shall stay at least 5 years or permanently until the needs cease to exist. Also a team of international and local consultants shall be mobilized to help the IDP Cell for the period of 5 years. Creation of a Institutional Development Training Centre is also proposed to satisfy needs for trainings, which shall develop manpower and expertise required for the new integrated sewerage service. Location and mandates of IDP Cell and its linkages with the Steering Committee and Training Centre are shown below.



Note: Staff shall be selected from the State Govts. (UPJN) and City Office (Nagar Nigam and Jal Sansthan)

**Figure 7.2 Institutional Development Cell**

#### 7.2.4 Institutional Development Cell

It is proposed that an independent programme cell be created in the UP Department of Urban Development. The IDP cell shall report directly to the Principal Secretary and shall be staffed with experts of engineering, law, finance and local administration selected among from the relevant departments of the UP state and 4 cities. The steering committee of the ID Programme shall be convened by NRCD with members from the National Department of Urban Development, Central Pollution Control Board, the UP State Government and the Mayors or Municipal Commissioner of 4 cities. A consultant team shall be employed by NRCD and attached to the IDP cell for assistance and collaboration.

The IDP cell in collaboration with the consultant shall undertake the two-tier municipal reform programme. The first tier, involving coordination among taxpayers, cities' population and personnel of city office, is a painstaking and time-consuming attempt to attain consensus of all levels on the desirable city office and its providing public infrastructure services.

A. Capacity building in 4 cities by replicating lessons learned in the Agra Municipal Reform Project and other municipal reform projects, including, but not limited to:

- Structuring appropriate systems for effective revenue mobilization from city tax (property tax, water/ sewerage tax, etc.)
- Structuring appropriate systems for financial management and complaint redressal, the latter of which shall be enforced to public relations activities

- Structuring appropriate systems for service delivery of the municipal services including particularly sewerage services, taking into account possible private sector participation
- Implementing a large scale public awareness and participation programme in 4 cities

The second tier of the programme, being purely administrative and hence involving only administrators, is comparatively simple attempt. It will include only some amendment of local administrative law and shuffling of some personnel. It may be implemented in the shorter period of time, if consensus among the top level decision makers is attained.

B. Formulation and implementation of the local administrative reform to bring about decentralization, delegation and devolution of the operational, human and financial resources from state to cities, by the following order:

- Identifying the resources needed by cities in providing public infrastructure (municipal) services
- Identifying and selecting the resources of the state government, which are needed by cities and can be transferred from state to cities
- Identifying and selecting the regulatory functions and the engineering & specialist functions of the state organisations including Jal Nigam so that the desired regulation and control as well as the level of technical standards and quality can be enforced and maintained
- Reviewing and drafting the relevant laws and regulations including those for the public servant's cadre so that the transfer of the above resources may be brought about. In any case, duplication or unclear definition of responsibility and jurisdiction shall be eliminated, so that every relevant organisation may clearly perceive its judicial and operational arena, its boundary and linkages to those of the others.
- Structuring in the cities' water and sewerage division appropriate systems to pursue the objective, principles and guidelines of the public infrastructure services

#### **7.2.5 Consultant for Institutional Development Programme**

This consultant team attached to the IDP Cell may be called as IDP consultant, which shall be employed separately from the consultant for the detailed design and supervision of construction for the sewerage project. The IDP consultant in collaboration with the IDP Cell is expected to concentrate on the institution engineering to mobilize and reform the institutional framework, i.e., regulatory framework of the State and Cities. It shall, also, focus on the institution engineering to reshape the operational, human and financial resources of cities, particularly those of the water and sewerage divisions. It will identify and formulate actions and measures to be taken by step-by-step to evolve the present city offices to the full-fledged city offices. These actions and measures include introduction of new management systems, shift of the regulatory frameworks and perceptions or working environments, in which the stakeholders will play their roles. Training of personnel at many levels will become necessary to quickly adjust themselves to the new roles and environments. Such training programmes may be formulated by the IDP Cell with its consultant. Implementation of these trainings, however, shall be made by a separately proposed "Institutional Development Training Centre for Sewerage Management."

## **7.2.6 Institutional Development Training Centre**

Institutional Development Training Centre shall be established separately under NRCD or UP state Government. In cooperation and collaboration with the IDP Cell, it will develop and provide necessary trainings of personnel relevant to the IDP during and after the period of the Programme. As India is required to launch the integrated sewerage service as a new public service, the concept, objective, principles and guidelines of the public infrastructure service shall widely be understood and practiced. The integrated sewerage system also is a young technology in India. Many engineers, technicians and business managers shall be invited for various training including that in the developed countries. The Institutional Development Training Centre shall satisfy needs for such trainings.

## **7.3 SHORT TERM INSTITUTIONAL DEVELOPMENT**

### **7.3.1 Possible Options for Achieving the Desired Expertise and Strengthening of Institutions**

On a careful analysis of the functioning of the three Organisations namely:

- a. Allahabad Nagar Nigam
- b. Allahabad Jal Sansthan
- c. UP Jal Nigam, Ganga Pollution Control Unit, Allahabad

It is noticed that one thing is common to all and that is each of these organisations insures any thing between 35 to 40 percent of its expenditure on manpower of the worker level. Several time the nature of job done by personnel's of two organisations namely Nagar Nigam and Jal Sansthan are similar. However they represent different organisations hence have to carry on their activities independently.

Further the study reveals that in case of Nagar Nigam persons who have been given no formal training do cleaning of branch sewers manually. They do not have access to any mechanised equipment. Further they have very little idea about the safety measures and precautions that should be taken while carrying out the cleaning operation. Often Nagar Nigam requests for help from Jal Sansthan in cases where they are not able to handle with their existing resources.

Moreover under the present structure the different organisations are involved at different places in the management of the same system. Nagar Nigam is responsible of maintaining the branch sewers and the Jal Sansthan is maintaining the trunk and main sewers and finally the Jal Nigam is maintaining the Sewage Treatment Plant. Under the present system the efficiency of each organisation is dependent on the quality of manpower and skills to handle a situation.

### **7.3.2 Recommendation for Strengthening Operations and Maintenance with Existing Manpower:**

There are two options available for Strengthening and Capacity Building and efficient and effective maintenance operation.

#### **Option –1**

The manpower resources of the two organisations may be merged into a single entity and the cross-organisational expertise can be utilised for effective and efficient management of the sewerage and other systems in the city of Allahabad.

#### **Sewer System Management and Operation:**

Thus the job of operation and maintenance of the total sewer system can come under one organisation, which will be able to cater to the needs of the entire city.

#### **Revenue Collection:**

Similarly the revenue collection of the two organisations namely Nagar Nigam and Jal Sansthan can be handled centrally and the existing resource can be optimally used without additional recruitment of manpower.

## **Option –2**

### **Sewer System Management and Operation:**

The operation and maintenance of the sewer system can be out sourced and the existing capacities can be hired out to the contracting organisation. Thereby reducing or sharing the load of manpower cost between the Nagar Nigam and Jal Sansthan on one end and Contracting organisation on the other end.

### **Revenue Collection:**

In order to ensure that maximum revenue is collected this activity can be outsourced and the collecting organisation may be given a percentage out of the revenue collected. It will also ensure that all the connections in case of water and all the properties are properly counted and valued. The contractor will ensure near to 100% tax collection and will also help in enhancing the revenue net.

### **7.3.3 Skill and Capacity Enhancement of Existing Manpower**

Jal Sansthan and Nagar Nigam should conduct suitable training for enhancing the technical capacities of the existing manpower so as to carry out routine jobs efficiently and effectively. Crises Management training should also be imparted. This will also help them in handling complex issues more systematically.

This Skill Enhancement training will reduce the involvement of senior management in day-to-day operations. The time of the senior management can then be spent on strategic planning and developmental issues.

Training should be imparted to use computers and work in a computerised environment.

### **7.3.4 Improvement of Working Environment**

Presently Nagar Nigam, Jal Sansthan and Jal Nigam has plenty of office space, but the same is not properly organised. The furniture is very uncomfortable and needs to be changed. There is a distinct need for a comprehensive training on personal and office hygiene. The present condition of the offices does not motivate the employees to sit in the office for long hours and diligently carry out their duties.

There is a need to redecorate the offices and make the work place more comfortable and attractive. There is a need for a public relations department that can solve problems of the people visiting the offices and efficient public redressal. This will also reduce interaction of the general public interactions with the office staff thereby increasing their output.

### **7.3.5 Interaction of the Public of Allahabad in Developmental and General Issues:**

There is a clear need for a close participation of the public at large of the city of Allahabad on issues concerning development. Effort should be made to invite suggestion from the general public on new projects and developmental issues. Tools like newspaper radio or television should be used to communicate with the public and suggestions invited. Even in case of fixing up the rates of determining the Annual Rental Value if public participation method is adopted the acceptability level will be very high.

It is generally noticed that any activity where there is active public participation a sense of ownership emerges and the level of acceptability is high.

### **7.3.6 Introduction of Computerised System for Accounting and e-Governance**

Out of the three organisation in question only two of the will have public dealing, i.e., Nagar Nigam and Jal Sansthan and these two would need better systems to work more efficiently and address to public issues without loss of time. Hence the accounting, billing and payment system, complaint redressal, etc., should be computerised in the first phase. Database management system software needs to be introduced so that there can be sharing of information between organisations or departments.

All the zones should be networked to the head office. Bill payment, registration of birth and death, complaints and other such facilities should be made available to the public at the Zonal level.

Annual Rental Value calculator should be loaded on to the Internet and the same should be available at the Zonal centres.

Accounts should be audited every year by private firm of Chartered Accountants and Balance Sheet should be made at the end of each financial year and published in the local newspaper and public should be given an opportunity to be heard in case they have any questions.

**Table 7.1 Target Group for Training Programmes**

<b>Organisation</b>	<b>Training Need</b>	<b>Target Group</b>
Nagar Nigam	Routine maintenance of branch and laterals	Labours
	Practices adopted in other countries	Higher rank officials
	Handling of manual equipments/ machines for carrying out routine maintenance	Sanitary inspectors, supervisors and labours
	Appropriate health and safety procedures while carrying out maintenance	Sanitary inspectors, supervisors and labours
	Computer training on keeping a structured database and records.	Health Officer, Sanitary inspector and supervisor
Jal Sansthan	Routine maintenance of main and trunk sewers	Operators
	Best Practices adopted in other countries for sewer cleaning	General Manager/ Executive Engineer
	Operation of suction machines of higher capacities	Operators
	Appropriate health and safety procedures while carrying out maintenance in sewers	Executive Engineer/ Assistant Engineer/ Junior Engineer
	CCTV Operation	Executive Engineer/ Assistant Engineer/ Junior Engineer/ Operators
	Computer training on keeping a structured database and records. Training on networking	Office Superintendent and technical Staff
	Civic duty training	General Manager/ Executive Engineer
UP Jal Nigam	Technological innovations for treatment of sewage	General Manager
	Meaningful and appropriate R&D efforts	General Manager/ Project Managers/ Executive Engineers
	Best practices adopted at international levels for treatment of sewage	General Manager/ Project Managers/ Executive Engineers
	Energy Recovery from sewage	Project Managers/ Executive Engineers
	Detailed operation of the STP	Operators and Field Staff
	Use of latest analytical techniques, equipments in the lab for analysis of sewage	Operators and Field Staff
	Appropriate health and safety procedures while carrying out O&M of STP	Executive Engineers/ Operators
	Computer training on keeping a structured database and records and networking.	Computer Department/ Executive Engineers
	Civic duty training	General Manager/ Project Managers/ Executive Engineers

**CHAPTER 8**

**ACTION PLAN**  
**FOR**  
**INSTITUTIONAL CAPACITY BUILDING**  
**AND DEVELOPMENT FOR OPERATION**  
**AND MAINTENANCE ORGANISATION**



## **CHAPTER 8 ACTION PLAN FOR INSTITUTIONAL CAPACITY BUILDING AND DEVELOPMENT FOR OPERATION AND MAINTENANCE ORGANISATION**

### **8.1 GAPS AND DEFICIENCIES**

All the organisations have some deficiencies while carrying out their designated roles for operation and maintenance of sewerage system. These are summarized below:

#### **8.1.1 Technical**

1. All the organisations in general lack the expertise and the manpower to discharge their day to day duties and functions.
2. The number of non-technical staff is higher in proportion to the number of technical staff.
3. The posts filled up are less than the posts sanctioned by the State Government.
4. There is also an overlap which is seen in the functions related to O&M of the assets that were created previously
5. Most of the maintenance work is done manually. The number of mechanical equipments is inadequate as compared to the amount of work causing delays and incomplete maintenance work. The laboratory equipments also need improvements.

#### **8.1.2 Financial**

1. Lack of funds and resources is the major hindrance in all the organisations
2. All the organisations are doing breakdown maintenance work only due to lack of funds. Preventive or routine maintenance seems to be absent. Hence the system does not function to the optimum.
3. Need for a sustainable and perennial source of fund for operation and maintenance

#### **8.1.3 Communication**

1. Adequate communication facilities are lacking in the offices
2. Networking of organisations and lack of systematic data base results in the records and data not being readily accessible. Data sharing between the organisations also require improvement.

#### **8.1.4 Institutional**

1. Lack of single point responsibility for sewerage system and fragmented responsibility
2. Lack of institutional and management capability of Jal Sansthan and Nagar Nigam on sewerage system
3. Redefining of roles and responsibilities of relevant organisations
4. Reorganising sewerage division in Nagar Nigam/Jal Sansthan
5. Strengthening sewerage management capability of Nagar Nigam and Jal Nigam

### **8.2 INSTITUTIONAL DEVELOPMENT AND CAPACITY BUILDING PLAN**

An Institutional Development Plan (IDP) or Institutional Development and Capacity Building (IDCB) plan has been formulated considering the most obvious gaps in the organisations. The primary objectives of the IDCB is to introduce systems into the organisation/institution to enable it to:

- Create assets without cost and time over-runs and
- Operate and maintain these resources in a self sustaining manner

The IDCB is based on the following basic concepts.

- Capital Works will be executed by the UPJN
- This implementation will be monitored by an independent Project Management Consultant (PMC)
- The ownership of the assets created shall be with NN.
- Operation and Maintenance (O & M) of the assets created shall be
  - Carried out by JS/NN, or
  - Contracted out to a private operator/ UPJN
- Self sustainability would be achieved by strengthening the finances of the JS/NN
- Required manpower with the requisite skills would be deployed
- Improve communication between various organisation
- Improve single point responsibility for sewerage management by NN
- Preparation of legislative amendments if required

The IDCB based on the above concept is presented in the following sections.

#### (1) Ownership

The ownership of the assets so created will be with the NN as this agency is legally required to create these assets and operate and maintain them

#### (2) Capital Works

As mentioned above, UPJN is mandated to prepare, execute, promote and finance schemes for the supply of water and sewerage disposal. Hence, this project would be implemented by UPJN.

As the ownership of the assets created would be with NN and NN/JS may be involved in the O&M of the assets, it is essential that a core group of technical staff/ engineers from both these institutions are seconded to UPJN during the execution of the project. A programme for “on the job” training for this core group is discussed under the subsequent section on manpower.

An independent consultancy firm should be appointed as project management consultants (PMC), under the Divisional Commissioner to monitor the progress of the project implementation. This PMC will be responsible to submit progress reports on a monthly basis, raise timely warnings about possibilities of cost or time over-runs and suggest and monitor the implementation of such recommendations.

PMC would also be responsible for the certification of bills raised by the implementing agency.

#### (3) Operation and Maintenance

The most important objective is to have: “Operate and maintain these resources in a self-sustaining manner”.

The O & M requirement of various components under feasibility Study (F/S) is discussed in the respective section of the report.

The O & M of the assets so created would be contracted out to a private organisation or a GoUP organisation, this will permit efficient and professional service. A concept for sustainable O&M is presented in following sector. However, a detailed plan should be formulated for sustainable operation and maintenance.

### **8.3 METHODOLOGY AND ACTION PLAN FOR SUSTAINABLE OPERATION AND MAINTENANCE**

Sustainability of O&M consists of two components, namely, financial and capacity enhancement of operation and management. This requires that sufficient revenues, capable human resource and requisite infrastructure are available to permit proper operation and maintenance.

The prime responsibility of operation and maintenance of the assets created under this project is to be with the NN/JS. The following sections present and explain the measures to be implemented by the NN/JS to achieve the above objective. All these measures aim at reaching in a short and medium term perspective the self-sustenance objective.

These measures are divided, as stated above, into two categories, namely, Financial and Institutional Capacity Building. The first category of measures are devoted to the objective of reducing the revenue deficit, and the second category aims at enhancing the capacity of the operating agency through human resources development and provision of requisite infrastructure. This methodology is graphically presented in Table 8.1 and described in the following sections.

Financial Sustainability is achieved by converting revenue deficit in to a revenue surplus. The measures to achieve this can be divided into two sub-categories: (i) measures to reduce costs, and (ii) measures to increase revenues.

#### **8.3.1 Financial Sustainability**

##### **(1) Measures to reduce costs**

Any organisation is subjected to two type of cost

- direct cost (operating costs)
- indirect cost (essentially management/administration expenses)

##### **Direct costs**

Jal Sansthan is an organisation, which is (i) a Public Enterprise, (ii) a monopoly, and also (iii) with external constraints (to satisfy the demand with deficient resources).

On one hand, even if the Jal Sansthan had the power to take some actions for instance the reduction of sewerage over flow rates, the impact of this measure will not be immediate because of the time required for repair and replacement. In this way (with short term impact), the possibility of reduction of costs in repair and maintenance expenses (due to old and damaged assets) are limited. However, there are two important categories of costs that could be reduced:

- i) Power charges
- ii) Salaries and wages

As costs are the results of consumption of quantities times the unit tariff, theoretically to reduce the costs it is relevant to reduce both quantities and unit tariff. However very often it is only possible to act on one of these factors because the other is not under control (specially purchase tariffs because they are imposed by suppliers). Despite this, reduction of expenditures should be possible for power charges and salaries and wages.

**Table 8.1 Methodology and Action Plan for Sustainable Operation and Maintenance**

Objective Operate & maintain the assets in a self sustainable manner	Reduce Revenue Deficit	Reduce cost	Reduce direct charges	1	Optimise energy utilisation & operation cost (energy audit)	
				2	Increase productivity	
			Reduce indirect charges	3	Reduce interest/dividend	
				4	Reduce administrative charges	
			Increase revenue	Improved billing & bill collection	5	Increase tax net
					6	Reassessment of properties
		7			Reduce process time per bill	
		8			Increase collection by introducing incentive schemes	
		Utilise by-products		9	Use energy generated for running the treatment plant	
				10	Sell manure and treated water	
		Increase tariff	11	Increase sewerage charge by 7.5 %		
			12	Link tariff with production cost		
	Capacity Enhancement	Human Resource	Training	13	On the job training	
				14	Specialised training	
			Public private partnership	15	Enhance internal capacity	
				16	Contract out the services	
				17	Procurement of necessary maintenance equipment	
			Infrastructure	Engineering	18	Procurement of sophisticated equipment
		Management		19	Record management	
				20	Financial management	
	Institutional Set Up			21	Reorganise sewerage division	
				22	Enhance capability of city office	

***Action 1: Power charges***

It is obvious that the Jal Sansthan uses a huge quantity of energy (kWh) because of (i) the bad conditions of the pumps in operation, and (ii) the losses in the network which cause wastage of power. Great efforts to reduce power consumption have to be implemented.

The proposed assets have to be energy efficient, as the project will be implemented by a core group with Jal Sansthan being a part of it. Strategies such as using Variable Frequency Drive have to be adopted while formulating the schemes for pumping station. Furthermore, a strict equipment selection criteria has to be generated for selection of equipment and the same should be adopted through out the project.

In the Income & Expenditure Account for Jal Sansthan, the cost on account of pay and allowance is 63 % of the total expenditure. This could be significantly reduced, however, it is impossible to reduce individual level of wages (individual wages will increase annually due to inflation rate).

The O&M staff for the project should be sufficiently lean, especially the strength of non-technical staff to reduce the cost of salary and wages. This reduction in non-technical staff can be compensated by introduction of computerization.

***Action 2: Non-Technical Staff***

The non-technical staff should be minimal. Infrastructure in the form of computerization along with specific training programme should be provided for.

In addition to the above, productivity of the existing labour force can be improved thus restricting new recruitment or filling of vacancies created by staff leaving the institution.

***Action 3: Increase Efficiency***

An “on the job” training programme can be devised to increase the productivity of the personnel.

**Indirect Costs**

The indirect cost of agency like AJS can be classified into two, one is the interest paid for the loans and the other is the administrative expense.

As per the Income and Expenditure statement for the year ended on 31<sup>st</sup> March 2004, the Jal Sansthan has paid an interest of around 35 million rupees, 15 % of their total expenditure. In general, such organisation pays two categories of interest:

- (i) The first is the interest for loans borrowed from L.I.C and other financial institutions and this is normal considering that it is a “real” long-term loan.
- (ii) The second is the interest on Government capital for an annual amount and these amounts are not for a loan taken from the Government, but as interest on Government capital. In fact these interests are “dividends”.

The second type of interest is very unusual. Nowhere does a company pay dividends to shareholders when there is a deficit and moreover when the same shareholders provide annual capital contribution to compensate for the losses. It is more relevant not to pay such “interest/dividends” on Government capital, but the approach should be tried to reduce the capital contribution.

It is proposed to undertake detail investigation of the present administrative expense of the AJS to

reduce the second type of indirect cost, administrative expenses.

***Action 4 : Interest charges and Administrative Expense***

The expenditure - “Interest/dividends” on Government capital – should be reduced/eliminated, if possible at the earliest and administrative Expense should be reduced.

**(2) Measures to Increase Revenue**

Three major strategies are proposed for increasing the revenue and make the operating agency, Jal Sansthan, a self-sustainable organisation. They are broadly

- Improved billing and bill collection
- Utilize the by-products
- Increase the tariff

**i) Improved billing and bill collection**

Increase in the volume of billing and increase in the bill collection efficiency results in substantial increase in the revenue income of the organisation. Some of the strategies that can be adopted for increasing the revenue income are:

- Increase the Tax Net
- Reassessment of properties
- Reduce process time per bill
- Increase productivity by introducing incentive schemes

**ii) Increase Tax Net**

In general, in most of the JS and ULBs considerable number of records falls far short of the total number of properties included in the tax net. One such example is Kanpur, where more than 300,000 properties were not included in the tax net. The reasons for this are many but primarily consist of lack of human and financial resources. It is hence, imperative to conduct a comprehensive survey of the entire municipal area to bring all the properties under the tax net. In addition the property permission applications should be integrated with the sewerage tax billing. This can be effectively carried out by creation of a GIS based database.

This system was implemented under the Institutional and Community Development Project (ICDP) Mirzapur. Significant improvement has been achieved in Mirzapur due to the implementation of this system. Description of the system adopted is presented as a case study.

### **Case Study 1: Tax net Extension in Mirzapur**

Mirzapur is a town in Uttar Pradesh with a population of around 200,000 people. When the ICDP started in 1995 (Phase I) the Mirzapur Nagar Palika (MNP) did not have sufficient revenues to pay staff salaries. Urban services were very poor with most of the streets clogged with garbage, streets blocked by solid wastes, most water connections broken and water being pumped from the supply lines with the help of Tulu pumps.

ICDP decided to work on two fronts- immediate visible improvement in Municipal services and restoration of financial health of MNP.

Based on a Pilot Area Programme, Mirzapur solid waste collection system was developed. All repairable equipment such as tractors, tractor trolleys, handcarts, etc. was restored. A specially modified rickshaw with garbage collection trolley was constructed and tested. A ramp platform was designed to facilitate the emptying of rickshaws and handcarts into the tractor trolleys. The programme has been very successful with the residents of the city perceiving a qualitative change and financially participating in the programme.

Simultaneously, steps were taken to improve the financial health of the MNP. These included complete enumeration survey and mapping of all the properties, computerization of registers, computerization of billing and collection and development of rationale for valuation and assessment of properties to provide a basis for property tax. To-day the entire data base including information on infra structure is on a GIS platform.

In 1998, revised demands for tax based on realistic assessment of property values were sent out, which, as expected, met with massive protest from the people. This led to political intervention and suspension of the notifications. The Government of Uttar Pradesh, however, committed to this reform and is expected to implement it in a phased manner.

Although Mirzapur Model is not directly related to water supply it is important for its replicability in Municipal reforms and as an example of people's willingness to pay if there is perceptible improvement in service levels.

### **Action 5: Increase the Tax Net**

Carry out property survey along with the size and type of water connection and broaden the tax net in the short term. As a long term planning strategy, create a GIS database of the existing properties, water and sewerage system and integrate this database with the property permission applications.

#### **iii) Reassessment of properties**

In most cities in UP, the assessment of property values was done many years ago. Property tax is applied based on the annual rental value of the property, which is unrealistic. Water and sewerage charges, which in turn are a percentage of the property tax, thus also become unrealistic. A reassessment of all properties as per their present value would significantly increase the revenue without any increase in the tariff.

Since Water and Sewerage tax are linked with the property tax, revenue on that account will also increase with reassessment of the property values.

There is less coordination between Nagar Nigam and Jal Sansthan on assessment and collection of property tax. The collection and assessment of property tax should be coordinated between Nagar Nigam and Jal Sansthan. This coordination work itself reduces the cost.

**Action 6: Reassessment of Property Values**

Along with the property survey, a re-assessment of the property values should be carried out to have realistic basis for property tax. The collection and assessment of property tax should be coordinated between Nagar Nigam and Jal Sansthan.

In the long term, water and sewerage tax should be linked with the actual consumption of water, to achieve this objective in the medium term the water and sewerage tax could be linked with property tax and size of water connection. In the long term metering of water connection should be implemented. Consideration of this concept will be studied and if feasible it will be planned for future.

**Action 7: Revise Criteria for Water and Sewerage Tax**

Start the process of water and sewerage charges based on dual criteria of property tax and size of water connection. Initiate, a study to evaluate the implementation of metering over the entire city.

**iv) Reduction in the Bill Process Time**

The billing records in Allahabad are at present maintained on paper and the bills and receipts are written by hand. This method is time consuming and results in procedural delays. One way to overcome this limitation is computerization of the whole system. This system was implemented under the Institutional and Community Development Project (ICDP) in Kanpur, one of the Four Master Plan cities, and Mirzapur. Significant improvement has been achieved in these cities due to the implementation of this system. Description of the system adopted in these cities is presented as a case study.

**Case Study 2 – Computerization of Billing System in Kanpur and Mirzapur**

The Institutional and Community Development Project (ICDP) was initiated at Kanpur and Mirzapur cities in March 1995, as a part of the effort to reverse the pollution in river Ganga. ICDP was a joint effort of Government of India (GoI) and the Government of the Netherlands. National River Conservation Directorate of Ministry of Environment and Forests, GoI, was the principal counterpart for these Indo-Dutch Projects. At the State level, ICDP work with the Department of Urban Development, whereas the Nagar Nigam (the urban local body), and the Jal Sansthan (the municipal water supply and sewerage authority) are its partners at the municipal level.

Ganga Action Plan focuses on creating new or improving existing infrastructure, whereas ICDP is concerned with the organisational, financial, administrative and social factors that determine the effectiveness and the sustainability of municipal services. The efforts of ICDP fall under three broad categories:

- Revenue enhancement geared to improving the financial position of municipal institutions (KNN, KJS and MNP).
- Institutional strengthening of these municipal institutions (including decentralization) leading to improved service provision, with special attention to solid waste management, water supply, and community-level infrastructure such as toilets, drains, and pavements.
- Promoting community and private sector participation.

At the beginning of the ICDP all records in Kanpur and Mirzapur were still maintained on paper only, bills were handwritten, and accounts procedures were antiquated. Since 1997, the Mirzapur Nagar Palika, the Kanpur Nagar Nigam, and the Kanpur Jal Sansthan have gradually introduced more efficient ways of doing their work. The use of Information Technology (IT) has been crucial. IT not only helps municipalities to work faster with fewer people, it also significantly improves the accuracy and reliability of information. Both in Kanpur and in Mirzapur part of the taxation and billing database has been computerised. Bills are now printed instead of handwritten, the municipal accounts are being computerised, personnel management is being supported by payroll software, and a Geographical Information System (GIS) provides a robust and reliable way for improving various municipal functions.



One of the systems introduced by ICDP was computerised database and billing system for water and sewerage. The Kanpur case shows that substantial improvements can be made through the introduction of relatively straightforward IT solutions.

It needs to be emphasised that the Kanpur system is not a blueprint that can be followed blindly. Nonetheless, it is meant to provide useful leads and lessons for developing similar applications elsewhere.

The KJS is mandated to provide water and sewerage services to the city of Kanpur, which has some 2.7 million inhabitants (Census result 2001). The KJS has approximately 2300 employees.

The Jal Sansthan relies on two sources of income, first one consists of taxes and charges paid by its consumers (households, institutes and commercial enterprises). The second is made up of grants from the state government.

Grants from the State government traditionally cover the deficits of the municipal agencies. This, however, is expected to change due to the prolonged fiscal crisis of the UP Government, which requires the municipalities to raise more revenue through local taxation and service charges. In future, the municipal bodies are expected to cover at least their salaries and administrative costs. Cost-saving and efficiency-enhancing technologies are therefore more than welcome.

Jal Sansthan water and sewerage bill for property owners consists of the following items:

- Water taxes (a fixed percentage of the Annual Rental Value (ARV) due by all occupants of properties within 100 meter on either side of a water pipe, whether connected or not);
- Water charges (if the property has a water connection and the actual use of water exceeds the water tax. In the absence of water meters the minimum charges are estimated based on the ARV, the diameter of the water pipe, and type of connection, i.e. Domestic or commercial);
- Sewerage tax (a percentage of the ARV due by all occupants of properties within 100 meter on either side of a sewerage line, whether connected or not);
- Sewerage charges (if the property is actually connected to the sewer, taking the number of sewer seats into account);
- Service charges (based on the diameter of the water pipe);
- A surcharge (a 10% penalty on the pending balance of last year's bill);
- A rebate (a 10% deduction in case of timely payment)

On 31 January 2001, there were 167,707 records in the 7 databases covering 6 administrative Zones and a number of colonies. The KJS database is derived from the property tax files of the KNN. When a house is assessed for property tax by the KNN, the basic data (house number, name of owner or occupant, ARV) have to be communicated by the KNN to the KJS. The application of a computer-based billing system was thought to have the following advantages:

- Faster generation of bills;
- Easier addition of new records;
- Automatic generation of management information system (mis) reports for:
  - Ward- and zone-wise achievements,
  - Demand collection–outstanding balance per zone,
  - Lists of defaulters;
- Saving staff time (which can be re-directed to increased effort in collection and ground inspection);
- Avoiding fraud and manipulation of records;

Municipal reform is a continuous effort, similarly introduction of IT is not a one-time event, but it requires continuous refinement of systems, periodic up-gradation of software, and ever further integration of administrative and production systems. Hence many of the instruments developed or introduced by ICDP will need to be up-graded. Furthermore, integration of various subsystems (e.g. taxation and accounts) also has to be enhanced.

#### ***Action 8: Computerization of Billing System***

The whole billing system has to be computerized and the staffs are to be trained to undertake this assignment.

**v) Increase in collection**

Incentive awards are a way of rewarding employees with cash, goods or holidays rather than increases in pay and these incentives are linked with performance.

The Kanpur Jal Sansthan has introduced one such scheme, which has lead to the increase in the revenue by many folds. The present incentive scheme proposed by KJS for the year 2004-05 is presented below:

In order to speed up the recovery amount and encourage the recovery person for the year 2004-2005 different rate of commission given to the recovery person after recovery.

Per Month recovery amount (Lakhs)	Commission amount (in Rs.)
Rs. 1 lakh and above upto Rs.1.25 lakhs	300/-
Rs.1.25 lakh and above upto Rs. 1.5 lakhs	350/-
Rs. 1.5 lakh and above upto Rs. 1.75 lakhs	400/-
Rs. 1.75 lakh and above upto Rs. 2.00 lakhs	450/-
Rs. 2.0 lakh and above upto Rs. 2.5 lakhs	500/-
Rs. 2.5 lakh and above upto Rs. 3.0 lakhs	700/-
Rs. 3.0 lakh and above upto Rs. 3.5 lakhs	900/-
Rs. 3.5 lakh and above upto Rs. 4.0 lakhs	1100/-
Rs. 4.0 lakh and above upto Rs. 4.50 lakhs	1300/-
Rs. 4.5 lakh and above upto Rs. 5.0 lakhs	1500/-
Rs. 5.0 lakh and above upto Rs. 5.5 lakhs	1700/-
Rs. 5.5 lakh and above upto Rs. 6.0 lakhs	2000/-

After every Rs. 6.00 lakhs and above 0.5 % commission will be paid extra. This amount is not included in the government revenue. If the recovery person who is not able to recover the minimum amount given in table, then please note after 3 months the said person is given an official notice.

However, one of the limitations in this model is that the incentive is based on a single parameter, the amount of money collected per month. Implementation of this model may lead to a creation of a limited target circle from where the bill collectors will have a fixed collection. Thus this model may be modified to include the number of bills collected as another parameter. This will lead to the broadening of the tax net as well.

**Action 9 : Incentive scheme**

Formulation of the incentive scheme, based on the amount collected and the number of bills collected

**vi) Utilize the By Products**

The sewage generated form the Allahabad city is to be treated in the proposed STPs located in Rajapur and Kodara. UASB followed by AL is the technology selected for treating the sewage. One of the major advantages of this technology is generation of value added by products. The various by products generated are:

- Biogas
- Treated Water
- Digested sludge (Manure)

These by-products have a commercial value and a market, which can generate some income. One such example is illustrated below as a case study.

**Case Study 3 - Sewage Reclamation Plant in Mumbai Port Trust**

Spread over five hectares of Mumbai Port Trust land near the Sassoon Docks, the beautiful garden was, until the early '80s, a dump. Citizens groups, the World Wide Fund for Nature and moneyed corporate stepped in, and through a high court order, the Port Trust was instructed to lay the botanical garden.

Mumbai Port Trust has developed a botanical garden in early '80s to comply with the high court order. The garden is spread over five hectares of land and has a variety of common and unusual trees, complicated and pretty heap of rock and vegetation. The far side of the garden overlooks the sea.

The water for maintaining this garden is sourced from the sewage water reclamation plant (SWRP) of 200 cum/day capacity. MWH India Pvt Ltd (MWH) designed the plant and it was also constructed under the supervision of MWH. The plant was commissioned and till date being maintained by MWH.

The guard collects Rupees 2 per person to enter the sprawling garden. This money is used for maintenance of the garden.

Thus the by-products can be sold to generate some revenue, however this needs a detailed study to assess the market potential.

***Action 10: Sell the By Products from STP***

Carry out a detail study to assess the market for selling the by products generated from the STP.

**vii) Increase tariff**

Increasing the tariff will have a significant impact on the sustainability of the O&M. At present, AJS collects sewerage tax and charges, which is percentage of the water tax and charges, from the citizens. The sewerage tax cannot be increased, as there is cap on the tax, however, the sewerage charges could be increased. This increment could be by two ways, one is to adopt the resolution passed by the UP Government to increase the charges by 7.5 % annually.

Ideally the cost of service should be equal to the revenue income. Review of the income and expenditure statement of the AJS reveals that considerably high ratio of the total expenditure is spent on the electricity charges. Thus it shall be ideal to relate the increase in the tariff with the electricity charges. One such example occurred in the country in the state of Tamil Nadu is presented as a case study below.

#### **Case Study 4 - Increase in the Water Tariff by TWAD Board**

Tamil Nadu Water Supply and Drainage Board has stated that electrical energy charges have been increased with effect from 1.12.2002 as 25% in High Tension and 112.5% in Low Tension electric supply. The increase in water tariff due to increase in electrical energy works out to Rs. 0.79 per 1000 litres. The Board of Tamil Nadu Water Supply and Drainage Board has approved the increase in the tariff and forwarded their recommendation to the Government for their approval. The Government has examined the resolutions of Tami Nadu Water Supply Drainage Board carefully and approved the revision in water tariff.

The revised water tariffs are given below.

Sr.	Name of Beneficiary	Existing Water tariff per 1000 litres (Rs.)	Revised water tariff proposed per 1000 litres (Rs.)
1.	Corporations/Municipalities/Urban Town Panchayats	3.50	4.50
2.	Rural Town Panchayats/Village Panchayats	2.25	3.00
3.	Industries and other Beneficiaries	10.50	15.00

For the water supplied through public fountains in rural areas, a suitable surcharge on property tax shall be levied as water tax and the amount should be maintained in a separate water supply account at the village panchayat level.

#### ***Action 11: Increase the Tariff***

As a long term strategy, the JS should pursue the UP Government to link the tariff with the cost of production, specifically the cost of electricity charges.

### **8.3.2 Capacity Enhancement**

Capacity enhancement of the organisation shall be carried out by undertaking human resource development programmes. This human resource development programme should be suitably supported, by enhancing the infrastructure of that particular organisation. This section of the report presents the strategy for capacity enhancement through human resource development programme and infrastructure development.

#### **(i) Human Resource Development**

A general assessment of current human resources for operational and maintenance management between the two organisations (UPJN and JS) indicates limitations in the following areas.

- Technical skills to plan and implement projects
- Managerial skill
- Technical operations and maintenance skills

There are also limited budgets available for training and development of human resources. These limitations could be over come through a structured human resource development programme. The programme shall consist of providing training to enhance the skill level and public private partnership to perform the task at hand. The human resource development programme has been developed on the basis of an exercise carried out to understand the needs for this project.

**(ii) Requisite manpower**

The requisite manpower would be deployed from the existing staff or additional staff would be hired or contracted. The detail manpower requirement is discussed in the respective sections of the report.

Based on the above the project specific manpower requirement should be estimated and the deficit, if any, should be made up through recruitment/ contract appointment.

***Action 12: Manpower***

Determine the requirement of technical manpower and recruit/ contract requisite manpower.

**(iii) Training programmes**

In addition to the required number of persons, it is necessary that the manpower have requisite skills. These skills will be developed by providing adequate training to the JS/NN staffs. The detail training strategy, based on the assessment of the needs of these organisations, is described below.

Specially designed “on the job” and in-house training programmes shall be conducted to match the skills required with the available skills in the existing staff.

The requisite training programmes identified are grouped into two different categories, namely, management and technical training.

**Management Training**

The management training shall be provided to the managerial staff and the identified training needs are:

- Project planning
- Project management
- Financial management, life cycle cost analysis, cost accounting
- Human Resource Management
- Data management (GIS, database),
- Management Information System (MIS)
- Operation and maintenance management
- Procurement
- Contract supervision
- Computer and GIS

**Technical training**

It is expected that number of project will increase over the time, thus the work load on the existing staff will increase. Thus the technical skills of the professional, necessarily, has to be increased and improved in the future. The technical training needs identified by the project at professional and technical operations levels are the following:

***Sewerage Engineers***

- Sewer inspection and rehabilitation methods
- Sewer design and sewer hydraulics
- Pump station design and pump hydraulics
- Wastewater treatment process control
- Wastewater sampling and laboratory analysis
- Computer and GIS

***Electricians and Mechanics***

- Switchgear and starters
- Instrumentation and control
- Motor maintenance & repairs
- Troubleshooting pumps
- Pump maintenance
- Shaft alignment
- Bearings and seals
- Welding
- Pump hydraulics and performance
- Diesel generator maintenance

***Sewer Maintenance Field Staff***

- How to recognise different types of sewer and manhole construction materials
- The nature of sewage and common causes of sewer blockages
- The interpretation of sewerage plans and drawings
- The importance of safe working procedures and hygiene during sewerage work
- The importance of following manufacturers' recommendations when carrying out repairs of sewerage pipelines
- The methods available for dealing with sewage flows during sewer maintenance, modifications or repairs,
- How to make property connections into manholes and how to bench manholes
- How to fix manholes and raise frames
- The safe use of high pressure water jetting equipment including the theory and working principles of high pressure water jetting
- Practical aspects of the equipment and how to select ancillaries for a particular application
- The identification of hazards in the workplace

**Financial training**

- Financial analysis, planning and management
- Accounting
- Advanced accounting system
- Billing and collection of sewer charge/tax
- Mechanism of sewer charge/tax
- Computer and GIS

**(iv) Implementation of Training Programme**

Over all responsibility of organising/conducting these training programmes shall be a part of the PMC assignment. However, selection of the personnel to be trained shall be identified by the PMC in consultation with respective agencies.

PMC shall conduct “on the job” training during the construction period on operation and maintenance of similar assets. This strategy would facilitate in having trained personnel for commissioning, operation and maintenance of the assets created under this project.

The other formal training courses mentioned above and additional specialized training, such as sewer design and sewer hydraulics, pump station design and pump hydraulics, wastewater treatment programmes shall be conducted by Government / Private institutions. Some of the training institutions that are well known in the country are:

- Administrative Staff College of India (ASCI), Hyderabad.
- Indian Institute of Technology
- Indian Institute of Management
- National Institute of Urban Affairs, New Delhi.
- Human Settlements Management Institute (HSMI), New Delhi.
- Centre for Development Studies, Uttaranchal Academy of Administration.
- Engineering Staff College of India, Hyderabad.
- All India Institute of Hygiene & Public Health, Kolkatta.
- Research and Training Centre, Maharashtra Jeevan Pradhikaran.
- Civil Training Institute and Research Centre, Municipal Corporation of Greater Mumbai
- Indian Institute of Health Management Research (IIHMR), Jaipur

Identification of the training needs, development of training programmes and selection of the training institute shall be included under the scope of the PMC.

***Action 13: Training (Management, technical and financial)***

Identification of the training needs, development of training programmes and selection of the training institute.

**(v) Public – Private Partnership**

It is understood that there is need for capacity enhancement of the JS/NN for undertaking the O&M of assets. Thus, as a short-term strategy, some of the sewerage operations and maintenance activities shall be contracted out to private sector or public service providers. This will also provide an opportunity to minimize the internal costs with the advantage of competition in the market place. Alternatively it can be used to provide resources to meet short-term peaks in workload or provide services that require specialized skills or equipment.

However, in both the cases, the overall responsibility should be with JS/NN and should closely control and supervise the work carried out by others, and so it will still require competent managers and supervisors.

These contracts should also be used as an opportunity to provide “on the job” training to the personnel of the organisations.

Some of the works that can be undertaken through Public – Private Partnership are:

- Design of sewerage system
- Regular Servicing and maintenance of specialised equipment/ plants
- Seasonal labouring jobs
- sewer inspection surveys to establish the sewer inventory
- Sewerage Construction Supervision
- Sewage Treatment Construction Supervision
- Sewage Treatment Operation and Maintenance

However, a detail study has to be carried out to identify the opportunities for public- private partnership programmes. This study can be a part of the PMC.

***Action 14: Public – Private Partnership***

Conduct a detail study to identify the opportunities for public private partnership programmes.

#### **(vi) Infrastructure Enhancement**

The infrastructure requirements can be categorized into two groups, namely, Management infrastructure and Engineering infrastructure. The management infrastructure primarily consist of computers with accessories and the requisite software, which will be used for data management and financial management. More emphasis shall be given on the data management aspects, as the maintenance will be dependent upon obtaining, verifying and maintaining proper system records. Thus there is need to collect and to store centrally all existing records of the sewerage network by setting up a comprehensive computerised data base, Sewerage System Inventory, at the local level. The following steps will be required to establish sewer inventory and base maps:

- Collect all existing records and as built drawings
- Conduct a geo-referenced alignment survey of all trunk, lateral and branch sewers
- Conduct CCTV inspection of all major sewers
- Develop GIS based sewerage system maps
- Develop GIS based applications for visual interpretation of database on maps.

This can either be a part of the PMC, as a package or it could be contracted out as a separate assignment under the public private partnership programme. As stated earlier this database can be further utilized, while granting permission for construction of new property / expansion of existing property.

#### ***Action 15: Procurement of Hardware and Software tools***

Procurement of hardware and software for creating a sewerage system inventory and develop a GIS based system application for visual interpretation.

Other than the hardware and software, maintenance of sewerage system demands a defined set of engineering equipment. The detail requirement of equipment is discussed in the respective sections.

#### ***Action 16: Procurement of Engineering Equipments***

Procurement of engineering equipment for proper maintenance of the sewerage system.

### **8.3.3 Communications**

As stated above, a number of organisation will be involved in the implementation of this project. The PMC is expected to coordinate the activities of these various organisation. This requires a communication system between and among three organisations and the PMC. An appropriate infrastructure, software, hardware and training should be provided for this communication system.

#### ***Action 17: Communication***

Establishment of a comprehensive and reliable communication system among the organisations, involved and PMC.

### **8.3.4 Institutional Setting Up**

- i) Establishment of sewerage division in Jal Sansthan and Nagar Nigam

Sewerage systems are rapidly expanding and will continue to do so in the future. Projects sanctioned under GAP and interventions implemented under the proposed priority projects will ensure that most of the sewage flows will be treated by 2015.



There is, therefore, a significant and urgent need to improve the management and organisation of the operation and maintenance for sewage collection and treatment functions. This will require major institutional re-organisation and the building up of capacity and competence within the sewerage division. Responsibility for O&M, planning/designing and construction should rest with a single sewerage authority in a city.

It is proposed in the long run that this new sewerage authority will be integrated with the existing Sewerage and Water Supply Corporation (Jal Sansthan), which is administrated under Nagar Nigam. However, in the context of this Report, the proposals made are, for clarity, for the management of sewerage functions only.

The steps to be taken for establishment of a new single organisation have been described in the Previous Chapter, "Methodology of Setting up the Proposed New Organisation."

***Action 19: Establishment of sewerage division in Jal Sansthan and Nagar Nigam***

Reorganise JS and NN as a single point of responsibility for sewerage management.

ii) Capacity building of City Office

To enhance capacity of city office (Nagar Nigam) the followings shall be considered.

- Identifying the resources needed by cities in providing public infrastructure (municipal) services for sewerage
- Identifying and selecting the resources of the state government, which are needed by cities and can be transferred from state to cities
- Identifying and selecting the regulatory functions and the engineering & specialist functions of the state organisations including Jal Nigam so that the desired regulation and control as well as the level of technical standards and quality can be enforced and maintained
- Reviewing and drafting the relevant laws and regulations including those for the public servant's cadre so that the transfer of the above resources may be brought about. In any case, duplication or unclear definition of responsibility and jurisdiction shall be eliminated, so that every relevant organisation may clearly perceive its judicial and operational arena, its boundary and its linkages with those of the others.

The terms of reference for this works are attached hereto. These works shall be done in Institutional Development Cell (IDP Cell) described in the previous section. The required action plan including a time schedule for implementation shall be prepared beforehand and its implementation shall be assisted by the consultants appointed.

***Action 18: Capacity Building of City Office (Nagar Nigam)***

Identification of the resources needed by cities and the resources of state government that can be transferred to cities, and drafting the relevant laws and regulations for these.

### **8.3.5 Summary of IDP**

The strategic action plan is primarily project specific, however, some of the actions proposed apply to the entire organisation, for example, reforms in billing procedures. The entire action plan with its applicability is summarized in Table 8.2.

**Table 8.2 Summary of IDCB Action Plan**

Sr.	Objective	Action	Agency
<b>A. Financial Sustainability</b>			
1	1. Reduce costs	Measures to reduce power consumption have to be implemented.	Organisation
2		Reduce number of non technical staff.	Organisation
3		An “on the job” training should be implemented to increase the productivity of the personnel.	Consultant
4		The expenditure - “Interest/dividends” on Government capital – has to be reduced/eliminated, if possible.	Organisation
5	2. Increase Revenue	<ul style="list-style-type: none"> <li>• Carry out property survey along with the size and type of water connection and broaden the tax net in the short term.</li> <li>• As a long term planning strategy, create a GIS database of the existing properties, water and sewerage system and integrate this database with the property permission applications.</li> </ul>	Consultant Consultant
6		Along with the property survey, a re-assessment of the property values should be carried out to have realistic basis for property tax.	Consultant
7		<ul style="list-style-type: none"> <li>• Start the process of water and sewerage charges based on dual criteria of property tax and size of water connection.</li> <li>• Initiate, a study to evaluate the implementation of metering over the entire city.</li> </ul>	Consultant Consultant
8		The whole billing system has to be computerized and the staffs are to be trained to undertake this assignment.	Consultant
9		Formulation of the incentive scheme, based on the amount collected and the number of bills collected	Organisation
10		Carry out a detail study to assess the market for selling the by products generated from the STP	Consultant
11		As a long term strategy, the JS should pursue the UP Government to link the tariff with the cost of production, specifically the cost of electricity charges.	Organisation/ Consultant
<b>B. Institutional Capacity Building</b>			
12	1. Human Resource Development	Determine the requirement of technical manpower and recruit/ contract requisite manpower	Consultant
13		Identification of the training needs, development of training programmes and selection of the training institute.	Consultant
14		Conduct a detail study to identify the opportunities for public private partnership programmes	Consultant
15	2. Infrastructure Development	Procure Hardware and software for creating a sewerage system inventory and develop a GIS based sewer application for visual interpretation.	Consultant
16		Procure engineering equipment for proper maintenance of the sewerage system.	Consultant
<b>C. Communication</b>			
17	Communication	Establish a comprehensive and reliable communication system between the organisations involved and PMC.	Consultant
<b>D. Institutional Development</b>			
18	Institutional setting up	Establishment of sewerage division in Jal Sansthan and Nagar Nigam	Organisation/ Consultant
19		Capacity Building of City Office (Nagar Nigam)	Organisation/ Consultant

## **8.4 COST ESTIMATE AND IMPLEMENTATION**

IDCB has to be provided with sufficient fund for its implementation. At this stage it is difficult to accurately estimate the financial requirements for this implementation as the cost of various actions proposed depends on the number of unknown variables. Based on past experience, however, a preliminary estimate is presented in this section.

The above summary states that the IDCB programme shall be classified, for the purpose of estimation, into three categories.

- Consultancy services
- Training, and
- Infrastructure

Consultancy Services, primarily, needed for conducting a detail study for data generation and conversion of data into a GIS, property survey and reassessment, identifying the training needs, development of strategy for revision of sewerage charge and establishment of comprehensive communication system.

### ***Training***

The suggested training modules are based more on general assessment of the competencies of human resources available and the competencies required based on consultant's judgement. Similarly, no identification of training institutions has been precisely done. It should be kept in mind that training costs vary substantially with the selection of the institution. Therefore, an attempt can only be made to estimate costs with average data and to arrive at a tentative estimate of costs.

The training costs mainly consists of cost of resource persons, cost of training management (organisational cost) and cost of facilities (training room laboratory, audio-visual facilities, training materials etc.) and personal costs (travel, per diem etc. of trainees). The organisational cost varies with the reputation of the organisation, actual person engaged in assisting the training, duration of training, etc. Similarly, for few specialized management and technical training (wastewater treatment options, automation and process control, safety etc.) training may be organised in India but the resource persons could be invited from outside the country. However, for estimation, an average cost of training has been considered and budgetary estimates have been provided. The component wise estimation for training is presented in Table 8.3.

**Table 8.3 Component wise Training Cost**

Training provided through technical assistance	1	2	3	4	5	6
	Trainees	Course units	Days/unit	Trainer days	trainer cost/days	Total cost in rupees
<b>(1) Management Training</b>	30	8	60	480	35,000	<b>16,800,000</b>
<b>(2) Technical Training</b>						
Basic management/technical skills	30	6	20	120	35,000	4,200,000
Specialized operator training	40	8	30	240	35,000	8,400,000
on-the-job training	50	10	30	300	35,000	10,500,000
Total short-term				660		<b>23,100,000</b>
<b>Operational training</b>						
Basic management/technical skills	30	6	20	120	35,000	4,200,000
Specialized operator training	40	8	30	240	35,000	8,400,000
on-the-job training	50	10	30	300	35,000	10,500,000
Total mid-term						<b>23,100,000</b>
<b>(3) Financial training</b>						
Managerial class	5	10	30	300	35,000	10,500,000
Support staff	20	10	30	300	35,000	10,500,000
Total financial training						<b>21,000,000</b>
<b>Total training</b>						<b>84,000,000</b>

1. Trainees - the number of people that need to take training courses
2. Course units - the number of units in each training course (1 unit = 1 week of training)
3. Days/unit - the number of days required for the trainer to develop and deliver the training unit
4. Trainer days - (2) times (3) - the total number of days needed by the trainer
5. Trainer cost per day - daily rate for trainers to develop and deliver training including site visit
6. Total cost - cost to develop and deliver the training course

### **Infrastructure Enhancement**

Infrastructure enhancement of the IDCB can be grouped into two groups, Hardware- Software and Engineering Equipments for operation and maintenance. A budgetary estimate for Infrastructure enhancement is provided in Table 8.4. Hardware and software include followings:

- Office arrangement and furniture
- Computers and printers/plotters and software
- GIS software
- GIS Development of users and infrastructure
- Accounting software and its development

**Table 8.4 Cost for Infrastructure Enhancement (Draft)**

Sr.	Description	Unit Cost	Quantity	Amount
1	Hardware and Software		LS	5,000,000
2	GIS inventory development		LS	8,000,000
3	Accounting and billing software development		LS	4,000,000
4	Equipments			
a	Sewerage Equipment			15,950,000
b	Lab Equipment		LS	350,000
Total				33,300,000

LS: Lump Sum

Details of the operation and maintenance equipment are shown below. The number of equipment would be required for the maintenance of the sewerage system. These would be as listed below.

**Table 8.5 Capital Costs of Maintenance Equipment**

<b>Sr.</b>	<b>Equipment</b>	<b>Nos.</b>	<b>Unit</b>	<b>Rate /unit</b>	<b>Amount</b>
1	Jetting machines	2	Nos.	4,000,000	8,000,000
2	Tankers with suction machine	2	Nos.	2,500,000	5,000,000
3	Trolley mounted diesel engine and non clog sewage pumps set with all accessories like delivery pipe, suction pipe sluice valve, non return valve etc.	2	Nos.	300,000	600,000
4	Air blower	2	Nos.	300,000	600,000
5	Maintenance van or equivalent	2	Nos.	750,000	1,550,000
6	Other operation equipment as per manual		Nos.	200,000	200,000
<b>Total</b>					<b>15,950,000</b>

### ***IDP Consultants Cost***

IDP consultants costs are estimated based on 2-3 years of the programme duration.

<b>Expertise</b>	<b>Man-Month</b>
<b>Foreign Consultants</b>	
Team leader /institutional development	8
Financial management & control	12
Pubic utility/ law	4
Human resource assessment/training	4
Operation & maintenance engineer	8
<b>Sub-total man-month</b>	<b>36</b>
<b>Local Consultants</b>	
Deputy leader cum financial management & control	20
Pubic utility	10
Cost control manager	20
Operation & maintenance engineer	10
Computer system engineer	20
Sewerage law/Local public utility law	6
Human resource assessment /training	24
<b>Sub-total man-month</b>	<b>110</b>
Cost of International consultants	43,200,000
Cost of Local consultants	27500000
<b>Total</b>	<b>70,700,000</b>

Note:

Unit costs for consultants including remuneration, transportation, logistics etc.

International consultants 1,200,000 Rs / man-month

Local consultants: 250,000 Rs. / man-months

**Summary of Cost Estimate**

A summary of the cost estimate for IDCB component is presented in Table 8.6.

**Table 8.6 Cost Estimates for IDCB (Allahabad)**

Sr.	Description	Cost
1	IDP Consultancy Services	70,700,000
2	Training	84,000,000
3	Infrastructure Enhancement	33,300,000
Total		188,000,000

An implementation schedule is presented in Table 8.7.

**Table 8.7 Preliminary Implementation Schedule for IDCB (Allahabad)**

Million Rs.

	2007	2008	2009	2010	2011	2012
IDCB	37.6	56.4	56.4	18.8	9.4	9.4

**CHAPTER 9**  
**IMPROVEMENTS**  
**IN**  
**SANITATION OUTSIDE THE SCOPE**  
**OF**  
**THIS REPORT**

## **CHAPTER 9 IMPROVEMENTS IN SANITATION OUTSIDE THE SCOPE OF THIS REPORT**

### **9.1 INTRODUCTION**

Improving the sewerage and sewage treatment system alone will not make Allahabad City sanitary. Other improvements are also required. This Section reviews some of these activities required. Most of them are the responsibility of the Municipal Corporation.

### **9.2 ON SITE SANITATION**

The residential zones where there is no sewerage can be either unsewered higher-class low density areas, or congested slum areas. Both of them have on-site sanitation installations.

Even the best on-site sanitary installations will become unsanitary if they are not serviced when necessary:

- ⇒ Septic tanks and other on-site sanitary installations connected to soakage arrangements need de-sludging before they become filled and contain so much sludge that it is carried over in the effluent to block the soakage arrangements.
- ⇒ Single pit latrines and double pit pour flush latrines - which are recommended as on-site sanitary installations for slum areas - need to be de-slugged before they become filled and start to overflow.

Wet sludge from on-site sanitary units is wet, foul, polluting and dangerous. It must be removed, transported and disposed of with care. In the case of double pit latrines the sludge is dry and relatively innocuous at the time it is removed, so that it can be removed by hand.

No provision has been made to accept these wastes into sewerage systems or at the existing and proposed sewage treatment works. This is mainly because:

- they would tend to block sewers unless the wastes are macerated before entering the sewers, which is considered to be an expense which in the circumstances of Allahabad is not warranted (as there are other, more convenient and cheaper, ways of disposing of them);
- the proposed new treatment works is located well outside the City and therefore it would be inconvenient as a disposal area for these sludge.

These sludge are too foul for simple dumping on the surface of land.

They are potentially good for crops, as they contain both fibre to improve the soil condition and plant nutrients, and they can be spread upon agricultural land provided that they are quickly buried.

Or, they can be mixed with garbage at garbage landfill dumping sites, or at garbage composting sites where they will provide nitrogen which the process of composting requires.

The Project suggests that the Environmental Monitoring Group to be set up should monitor on-site sanitary installations after construction so as to ensure that they are properly maintained and serviced and that sludge is correctly disposed of. This regulatory unit could work in conjunction with those who will promote public awareness of good sanitation practices.



### **9.3 CLEANING OF STORM WATER DRAINAGE SYSTEMS**

Many storm water drainage systems do not drain directly into nalas, sometimes because the final connections were apparently never made, but mainly because some storm water drains are discontinuous often because building across them or collapses or other blockages.

Allahabad City needs continuous, efficient storm water drains in order to avoid flooding during heavy rain. Particularly a major problem is that floods tend to drain into sewers, through poor manhole and inspection chamber walls and covers, or through cracks or bad joints in sewers.

Also, if areas and plots are regularly flooded during rain because there is no way for the floodwater to escape, then it is very tempting for those affected to make a deliberate connection into a sewer so that the sewer will act as a storm water drain.

Garbage and other wastes should not be dumped and allowed to remain in any Allahabad storm water drains, because this is a major reason why large parts of Allahabad are currently unsanitary, but for this Project the specific problem is to protect the sewers. The Project is particularly concerned that garbage deposited in storm water drains often finds a way into the sewerage system.

This task is not simply a matter of more frequent cleaning of garbage from storm water drains. The most important aspect in the medium and long term is for the attitudes of some of Allahabad residents to change.

This could hopefully be achieved by vigorous sanitary awareness campaigns, by advertising and by the enforcement of regulations and the application of penalties if necessary, so that offenders no longer dump litter and garbage indiscriminately into storm water drains or indeed on to any public area.

### **9.4 GARBAGE COLLECTION AND DISPOSAL**

Allahabad can never be sanitary until its streets and storm water drains are kept clean and its garbage is regularly collected and disposed of in a sanitary manner.

This task is not simply a matter of more frequent cleaning of garbage from premises, drains, streets and other public places. The most important aspect in the medium and long term is for the attitudes of some of Allahabad residents to change.

Of course, a major incentive to such a change is that there are plenty of convenient alternative acceptable ways - refuse bins and the like - into which litter and garbage can be dumped.

There is a great need to improve the service level of garbage collection and removal from slums. Most slums are full of scattered garbage which it seems is rarely if ever collected.

This situation is very discouraging to those residents and others who are trying to improve the sanitary states of slums and their homes because, whatever they accomplish, their area will never be sanitary if scattered garbage remains.

The disposal of collected garbage currently cause environmental and public nuisance and a danger to public health. Proper landfill sites away from developed areas of Allahabad need to be prepared for garbage disposal, perhaps after some salvaging and/or treatment, and used and kept clean.

### **9.5 STREET CLEANING**

This is a particular aspect of garbage collection and disposal.

Street cleaning is carried out manually in Allahabad by sweepers who pile the litter and debris into heaps at the side of the road pending its collection by the garbage collection service. In the time interval between sweeping and collection the garbage is often dispersed by traffic.

The Project suggests that the methods of street cleaning should be reviewed but more importantly recommends that there should be vigorous sanitary awareness campaigns to minimise litter and garbage dumping.

In order to achieve this sanitary awareness it would be necessary to ensure that the garbage service completely covered Allahabad including the slum areas and that there were adequate means of disposing of litter and garbage.

## **9.6 THE CLEANLINESS OF NALAS**

Nalas are supposed to receive the discharge from the City's storm water drains during periods of rainfall, and they are expected to remain dry at all other times.

The Project Sanitation report has described how industrial wastewaters and sullage are entering storm water drainage systems, and has commented upon the garbage and litter that are also ultimately discharged into the nalas, causing both nuisance and danger to public health.

The recommendations made earlier in this Section to clean the storm water drains, and to improve garbage collection and disposal, will go a long way towards cleaning the nalas. The overall objective should be to eliminate all dry weather discharges into nalas but this is unlikely to happen in the short term.

*Annexure*

**ANNEX Table 1 Requirement of Operating Staff for STPs  
(Guidelines of UP Department of Urban Development)**

Level	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Total		
Post	Ex. Engineer (E&M)	A.E. (E&M) (Civil)	A.E. (E&M)	J.E. (E&M)	J.E. (Civil)	Chemist	Assistant Chemist	Lab Assistant	Lab attendant	Lab attendant	Fitter (Mech.) 1st class	Electrician (Mech.) 1st class	Filter (Mech.) 2nd class	Electrician, 2nd class	Electrician, 2nd class	Driver	Cleaner	Jr. Account.	UDC	LDC/Typist	Peon	Jr. Steno	Sweeper	Welder-cum blacksmith	Operator	Labour (Beldar)	Total	
Activated Sludge Process	10 mld	1		4				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12	28	57
	40mld	1		4				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16	44	78
	80mld	1		6		1	1	1	2	2	2	1	2	2	1	1	1	1	2	2	2	1	2	1	1	19	54	108
	120mld	1		1		2	1	1	2	2	2	1	2	2	1	1	1	1	2	3	3	3	1	2	1	19	73	133
Aerated Lagoons	10 mld	1		4				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	10	30
	40mld	1		4				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	14	35
	80mld	1		4		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	27	56
	120mld	1		4		2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	34	67
Oxidation Pond / Waste stabilisation Pond	10 mld	1						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	11	22
	40mld	1						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	20	31
	80mld	1						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	36	52
	120mld	1						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	50	67
H. Rate Filtration	10 mld	1		4				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12	28	57
	40mld	1		4				1	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	16	44	77
	80mld	1		6		1	1	1	2	2	2	1	2	2	1	1	1	1	2	2	2	1	2	1	1	19	53	106
	120mld	1		1		2	1	1	2	2	2	1	2	2	1	1	1	1	2	3	3	3	1	2	1	19	72	131
Oxidation Ditch	10 mld	1		4				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	21	46
	40mld	1		4				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	28	54
	80mld	1		6		1	1	1	2	2	2	1	2	2	1	1	1	1	1	1	1	1	1	1	1	12	48	95
	120mld	1		1		2	1	1	2	2	2	1	2	2	1	1	1	1	2	3	3	3	1	2	1	12	48	104

**ANNEX Table 2 Requirement of Operating Staff for STPs  
(Recommendations of JICA Study Team)**

Post	No. Level		1	2	3	4	5	6	Sub-t	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Total
	Ex-Engineer	A.E. (E&M)	A.E. (Civil)	A.E. (E&M)	J.E. (Civil)	J.E. (E&M)	Chemist class	5	Assitant Chemist	Lab Assistant	Lab attendant	Fitter (Mech.) 1st class	Electrician, 1st class	Fitter (Mech.) 2nd class	Electrician, 2nd class	Gentlener	Driver	Cleaner	Jr. Account.	U/D Typist	Peon	Jr. Steno	Sweeper	Welder-cum blacksmith	Operator	Labour (Beldar)			
Activated Sludge Process	10 mld		1			4			38		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	12	14	43
	40mld		1			4			51		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	16	22	56
	80mld	1	1	1	6	1	1	1	71	1	1	2	2	1	2	2	2	1	1	1	2	2	1	2	1	1	19	27	81
	120mld	1	1	1	6	2	1	1	85	1	1	2	2	3	1	2	2	2	1	1	2	3	3	1	2	1	19	37	97
Aerated Lagoons	200 mld	1	1	1	6	2	1	1	98	1	1	2	2	3	1	2	2	1	1	1	2	3	3	1	2	1	22	47	110
	10 mld				4				19		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	5	25
	40mld				4				22		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	4	7	28	
	80mld	1	1	4	1	4	1	1	37	1	1	2	1	1	2	2	2	1	1	1	1	1	1	1	1	4	14	43	
Oxidation Pond /Waste stabilisation Pond	120mld	1	1	4	2	1	1	1	42	1	1	1	1	1	2	2	2	1	1	1	2	2	2	2	2	2	4	17	50
	10 mld				1				15		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	17	
	40mld				1				19		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	10	21	
	80mld	1	1	1	4	1	1	1	32	1	1	1	1	1	2	2	2	1	1	1	2	2	2	2	2	1	18	34	
High. Rate Filtration	120mld	1	1	1	6	2	1	1	66	1	1	2	2	3	1	2	2	1	1	1	2	3	3	1	2	1	12	24	71
	10 mld				4				30		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	11	36
	40mld				4				34		1	1	2	1	2	2	2	1	1	1	2	2	2	2	2	1	12	24	71
	80mld	1	1	1	6	1	1	1	61	1	1	2	2	2	2	2	2	2	1	1	2	2	2	2	2	1	12	24	71
Oxidation Ditch	120mld	1	1	1	6	2	1	1	66	1	1	2	2	3	1	2	2	1	1	1	2	3	3	1	2	1	12	26	78
	10 mld				2				31		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	10	35
	40mld				2				35		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	8	14	39	
	80mld	1	1	1	4	1	1	1	63	1	1	1	1	2	2	2	2	1	1	1	2	2	2	2	2	1	12	27	71
UASB + Aerated Lagoons / Fluidised Aerated Bio-Reactor	120mld	1	1	1	4	2	1	1	74	1	1	1	1	2	3	3	2	2	1	1	2	3	3	1	2	1	12	34	84
	200 mld	1	1	1	4	2	1	1	85	1	1	1	1	2	3	3	2	2	1	1	2	3	3	1	2	1	16	41	95
	300 mld above	1	1	1	6	3	1	1	96	1	1	1	1	3	1	2	2	2	1	1	2	3	3	1	2	1	20	48	109

Note:

- 1: UASB+Aerated Lagoons is added to the UP State guidelines.
- 2: Staff requirement of UASB+ Aerated Lagoons is adopted for FAB.
- 3: The major difference between the UP State guidelines and JICA recommendation is the number of labour.

**Table 3 (1/3) Staff Requirement Calculation Sheet and Cost Estimation (Allahabad)**

C. Sewerage Treatment Operations  
Executive Engineer for STP Division  
Assistant Engineer

2  
6

No.	STP	District	Status	Design Capacity (MLD)		Process	Level/Number of required staff					Total	Staff number by level					staff cost Rs.	
				Stage I -2015	Stage II 2016-2030		2 Ex. Engineer	3 A.E (E&M)	3 A.E. (Civil)	4 J.E. (E&M)	4 J.E. (Civil)		4 Chemist Lab service	5 Level 5 total	2	3	4		5
1	Naini STP	A	E/A	80	80	ASP	1	1	0	6	1	1	1	1	1	1	8	71	7,207,000
2	Numaya Dahi STP	B	P	55	50	WSP	0	1	0	0	1	1	1	1	1	2	24	2,350,000	
3	Saloni STP	C	S/A	29	35	FAB	0	1	0	2	1	1	1	1	1	3	33	3,181,000	
4	Rajapur STP	D	P	65	80	UASB++	1	1	0	2	1	1	1	1	1	4	52	5,003,000	
5	Kodara STP	E	P	15	30	UASB++	0	1	0	2	1	1	1	1	1	4	31	3,287,000	
6	Ponghat STP	E	P	10	10	WSP	0	1	0	0	1	1	1	1	1	15	17	1,518,000	
7	Phaphamau STP	F	P	-	10	WSP	-	-	-	-	-	-	-	-	-	-	-	0	
8	Mawaiya STP	G	P	-	45	UASB++	-	-	-	-	-	-	-	-	-	-	-	0	
	<b>Total</b>			<b>254</b>	<b>340</b>		<b>2</b>	<b>6</b>	<b>0</b>	<b>12</b>	<b>6</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>226</b>	<b>256</b>	<b>2,546,000</b>		

**D. Sewer Operations – Collection System**

- 1 Executive Engineer for Collection System Division
- 1 at Head Office
- 1.1 Assistant Engineer for O&M of Collection System
- 1 at Head Office
- 1.2 Assistant Engineer for Connections
- 1 at Head Office

Type of activity	Description	Junior Eng.	Staff / team		No. of Teams	Total	Equipment / team	Staff number by level					staff cost Rs.
			Operative/ inspectors	Drivers				2	3	4	5		
1	Routine inspection & cleaning	1	3	1	1	4	Medium van + mechanical cleaning equipment (roads)	1	1	1	1	4	3,617,000
	Man-entry inspection		3	1	1	4	Pressure jet machine						
	Cleaning		3	1	1	4							
2	Emergency blockage clearance and repairs	1	3	1	1	4	Medium van + mechanical cleaning equipment (roads)						
	Sewer clearance		3	1	1	4	Pressure jet machine + set of nozzles						
	Emergency repair		5	2	1	7	Large van + mechanical cleaning equipment						
							Medium lorry + works material, equipment, tools						
3	Planned maintenance & rehabilitation	1	3	1	1	4	Medium van + equipment for manhole repair, etc.						
4	Assessment of structural condition	1	3	1	1	4							
	<b>Total</b>		<b>-</b>	<b>-</b>	<b>7</b>	<b>31</b>							

**Estimation of required routine inspection teams**

Assumptions:	3 years, entire sewers will be inspected and cleaned. 200 working days/year/team 6 working hour/day 0.5 km/hour	Existing trunk and lateral sewers Sanctioned trunk and lateral sewers Proposed trunk and lateral sewers Branch sewers	Sewerage Covered Area (ha)		Estimated Length (km)		
			Stage I -2015	Stage II 2016-2030	Stage I -2015	Stage II 2016-2030	
			7,048	2,003	7,048	43	43
						0	0
						11	28
						772	2,714
Required routine inspection staff	1 team (rounde dup)	Total				<b>826</b>	<b>2,785</b>



**Table 3 (3/3) Staff Requirement Calculation Sheet and Cost Estimation (Allahabad)**

**Average Salary Used for Manpower Cost Estimation**

<b>Level</b>	<b>Description</b>	<b>Average Salary per month in Rs.</b>	<b>Salary used for costing (Add 10%)</b>	<b>Annual amount in Rs.</b>
Level 1	Superintending Engineer	28,000	30,800	<b>369,600</b>
Level 2	Executive Engineer	25,000	27,500	<b>330,000</b>
Level 3	Asst. Engineer	22,000	24,200	<b>290,400</b>
Level 4	Junior Engineer	18,000	19,800	<b>237,600</b>
Level 5	Labours Average	4,995	5,500	<b>66,000</b>

Source: Operation and maintenance of 60 MLD STP, Naini, Allahabad

Letter No. 488/401/4, Dated 3/3/-4; Enclosure No. 10

Some of monthly wages taken from UP Jal Nigam, Estimate for Operation & Maintenance of Assets created under GAP Phase I, at Allahabad.



## *Appendix A*

## **Appendix A Terms of Reference for Capacity Building of City Office**

The present terms of reference set forth tasks that the IDP Cell shall undertake in collaboration with the team of consultants. As shown in the Task Schedule, major tasks are grouped into three.

### **Tasks and Task Numbers**

- A. Capacity building in 4 cities will be pursued throughout the first phase and the second phase of activities, each one of which will take place approximately for two years and three quarters of a year. This task group consists of four tasks:
1. Revenue enhancement,
  2. Improvement of transparent and accountable management,
  3. Restructuring and reorganisation of city divisions (including Jal Sansthan) and
  4. Public participation into management of city office.
- B. Formulation and implementation of the local administrative reform will take place mostly in the first phase. This task group consists of 6 tasks:
1. Identification of resources that city needs,
  2. Selection and transfer of national and state resources to city,
  3. Reorganisation of state organisations including Jal Nigam,
  4. Amendment or creation of sewerage law, local public utility law and other laws,
  5. Restructuring or creation of the city's water supply and sewerage division, and
  6. Conversion of perception from mere operation and maintenance of sewerage facilities to the public utility service and dissemination thereof.
- C. Task 11 will be programming of various training, which will help relocation of engineers, technicians, administrators, financial controllers and business managers.

### **Description of Tasks in Phase 1**

Task 1 Before its abolition in UP state (late 1990's), Octroi tax was the largest source of city's revenue. Cities did not need to develop taxation system of property tax (house tax, water and sewer tax) that was the second largest source of revenue. Even after the abolition cities did not make consistent effort to increase revenue collection, as the state transfer has been expected to fill up the loss of Octroi tax. In Agra Municipal Reform Project and in the other many cities, attempts to enhance taxation system have been and are being begun by, in most cases, enhancing the tax net and standardizing the property valuation method. IDP shall study carefully feasible and replicable lessons from other cities for application to the target cities.

IDP shall enumerate all the city tax items and review and analyse in detail the city's ongoing taxation procedures including ledger of properties, list of taxpayers, valuation of property, billing and collection, possible evasion, etc. On basis of the analysis and the lessons from other cities, revenue division shall be created or reorganised with proper procedure including, among others, preparation of complete and accurate property ledger (refer to Terms of Reference for Agra Municipal Reform Project), and feasible options to improve tax revenue and their justifications shall be formulated and presented to the city officers and taxpayers for their acknowledgement and consensus. This is the most crucial part of the institution engineering. Coordination of interests of various parts of citizens shall be patiently pursued. Efforts shall be exercised to reach the majority consensus through Task 4: Public participation and other group meetings or individual meetings. If the proposed taxation system requires resolution by the city

assembly, IDP shall assist the city office in preparation of ordinance and briefing materials, and participate in the assembly to testify the expert's view.

During the course of implementation of taxation reform, IDP shall closely monitor its progress and help expedite the process by computerization, inputting the geographic information system (GIS), streamlining work flow of revenue division, training under Task 11, etc.

Task 2 Transparent and accountable management of city office will be pursued initially through strengthening the financial management/control and establishment of public relations unit.

Betterment of financial management and control shall start with introduction of the double entry and accrual basis bookkeeping with accounting system on the internationally accepted standards. Financial management consultants shall undertake a thorough audit of the existing financial reports of Nagar Nigams and Jal Sansthans. The biased financial information due to improper or incorrect bookkeeping shall be rectified. At the same time estimation of asset as well as scale of potential revenue and expenditure will be made. Cities' financial officers shall be invited and participate in the process (in-service training).

"Complaint Redressal" activities shall be strengthened, and the Public Relations Unit shall be created. Complaint redressal is a passive concept, as it will not work, unless and until a complaint reaches the city office. Public relations activities shall be active and bi-directional, as they shall include not only complaint redressal but also addressing the public and the residents through publication, broadcasting, press release, various meetings, etc. on the activities, services and the mandates in general of the city office.

IDP shall create and organise the public relations division in each city office with mandate of information disclosure, residents consultation, opinion survey, complaint redressal, etc., so that management of the city office can be transparently presented to every citizen.

Task 3 Restructuring and reorganisation of city office shall be made in two phases. In the phase 1, concept of the future city service shall be elaborated on the basis of an organised information collection through:

- observation tour to the developed cities
- analysis of the existing constraints and bottlenecks
- hearing and survey from city officers and citizens, etc.

City's mandates, functions and services at target years of 2010, 2015 and 2030 shall be envisioned and defined. Practical step by step procedures to reach targets shall be developed. Primary attention shall be addressed to the regulatory frameworks to ensure the principles of single entity and technical and financial autonomy of the public utility service.

Task 4 Public Participation into task 1, 2 and 3 shall be pursued throughout the Programme activities. Refinement of taxation system (Task 1), creation of the public relations unit (Task 2) and desired roles of city (Task 3) shall be discussed with stakeholders in city (industrial and commercial bodies, voluntary bodies, institutions, individuals, etc.). For this purpose, a public participation programme shall be developed and implemented by utilizing publications, broadcasting, press, schools, various gatherings and individual interviews/ meetings.

Task 5 To operate the sewerage service in accordance with objective, principles and guidelines of the public utility, what the present city lacks and needs shall be identified among from legal mandate or jurisdiction and operational, human and financial resources. Particular attention will be paid to:

- Single management - To mandate the sole responsibility to the water supply and sewerage

division, how shall the present laws/ ordinances be amended?

- Operational resources - Stocktaking of the existing facilities or enumeration of assets shall be made to evaluate technical consistency of the facilities.
- Human resources - Are the present staff qualified sufficiently for operation of sewage treatment plants, etc.? Are trainings needed? Recruit and transfer of technical personnel and business managers needed?
- Financial resources - How much costs will be expended for proper operation of the public utility service including costs for operation and sufficient maintenance of facilities?

Task 6 On basis of the outcomes of Task 5, the national and state's jurisdiction, human and financial resources shall be sought for transfer to cities. Shall technical personnel of the state (particularly Jal Nigam) be transferred? Can the state fund transfer be increased? Shall a new tax be created? Shall laws be amended or created? If so, what will be the practicable procedures to bring them about? As a result, an implementation programme shall be formulated and implemented.

Task 7 If parts of jurisdictional authority and personnel of the state organisation (particularly Jal Nigam) are to be transferred to city, how it shall be evolved? It is suggested that it will stay with the regulatory function and the engineering and specialist function. Technical as well as business standards shall be set and enforced to maintain quality of the public utility services. In the present UP, Jal Nigam has only aggregation of technical personnel for sewerage operation. IDP in collaboration with Jal Nigam shall identify and formulate design criteria and other technical standards and guidelines. Law and ordinances will be drafted in Task 8 for enforcement. A wing of Jal Nigam shall be reorganised for effective enforcement of technical standards to maintain quality of service. Another wing may be reorganised for storage or aggregation of technical experts for advancement of water supply and sewerage technology, training institution of the technology, source of manpower for transfer or on the contract basis and so on. Technology and manpower assessment shall be made. Desirable functions will still be sorted out and elaborated. Applicable procedures to make the organisation evolve to exercise such major functions shall be formulated and implemented.

Task 8 Water Supply and Sewerage Act, UP Municipalities Act, UP Jal Nigam Act and other existing laws shall be reviewed in the light of findings and outcomes of the foregoing tasks 1 through 7. Necessary amendments and new laws will be drafted. If the business activities of public utility service provider need to be governed, such a law shall be created. If transfer of personnel from state to city requires adjustment of cadres, and if a new tax shall be created, such laws shall also be amended or created. Briefing materials and testimonial documents shall be prepared to persuade and convince the public including members of the State Legislative Assembly. Under the guidance of the Steering Committee, IDP shall take every possible measure to get these amendments and laws sanctioned by the state legislature.

Task 10 Conversion of perceptions from a mere operation and maintenance of infrastructure to the full fledged public utility service shall be made clear and evident to everyone and every layer of the society. The citizens should be told that they are owners of the city services. Officers should learn how to serve the citizens. The public utility service shall be provided as and to the extent that are demanded by the citizens. The objective and principles of the utility service shall be widely known. This task shall be linked with Task 4: Public Participation. City officers shall also learn the conversion. Their training or re-training needs shall be assessed and identified as a part of Task 11.

Task 11 All the training needs that are complementary to tasks 1 through 10 shall be sorted out and training programmes shall be formulated for the implementation in institutions within and out of India. In the case that the Institutional Development Training Centre be established, it will implement most of such trainings.

## **Description of Tasks in Phase 2**

Tasks 1 and 2 After completion of these tasks in the 10th quarter of the IDP activities, reviews and evaluations of the progress shall be made at suitable intervals. If progress and achievements are found unsatisfactory, all the necessary measures to improve the programmes shall be planned and implemented. If such may include additional input of resources, assessment of resources required shall be made.

Task 3 and 9 In addition to the programmes developed in the phase 1, detailed programmes shall be formulated in the phase 2. Such programmes should entail creation or reorganisation of departments of the city office. Utmost attention shall be addressed to the organisation of the water supply and sewerage division in the city office in accordance with the objective, principles and guidelines, as IDP's basic objective is to create a sustainable public utility service provider. As city is expected to be fully authorized legally to provide full fledged city services by the end of the phase 1, ownership is already fostered. Technical and financial autonomy of the division shall be ensured to insulate it from undue interventions. To house the water supply and sewerage division, financial control division, revenue division and public relations division in the city office, the latter also needs to articulate its activities into several functional divisions. Residents registration function shall be integrated into one division (with many branch offices area-wise), as it shall prepare and furnish accurate residents ledger, that should be basis of taxation and other city services of other divisions. Policy planning division, urban development division shall be established to coordinate and approve all the development activities by city itself and other state and private developers. The city needs to be consulted and authorized to govern any significant activity in and around the city boundary.

Establishment and reorganisation of most of these divisions shall be implemented in the quarters 11 through 13, and review and evaluation of progress shall be made at the proper interval.

Tasks 4 and 10 Citizens' ownership over every part of the city services, concept of public interest and messages of policymakers of the city office shall be repeatedly discussed among all the parts of residents through gatherings, medias and publications. Public participation programme prepared in the phase 1 may have to be amended or revised from time to time, and be implemented repeatedly even after the IDP.

Task 11 Needs and areas of training evolve as time goes. Training programme developed in the phase 1 shall be reviewed and revised repeatedly.

## *Appendix B*

## **Appendix B Terms of Reference for Agra Municipal Reform Project**

### **Background and context**

Under the Yamuna Action Plan (YAP) project, sewerage facilities have been created in 15 towns (8 towns in UP including Agra, 6 towns Haryana and Delhi). The responsibility for maintenance of these assets is vested with the respective Urban Local Body in each town. However, these agencies lack the financial, institutional and technical capacity to effectively manage these assets. Japan Bank for International Cooperation (JBIC) conducted a study to identify the institutional and capacity building measures for ULBs in these towns.

During presentation of the results of this study to the Government of Uttar Pradesh (GoUP), a suggestion was given to JBIC to conduct a specific study for Agra Nagar Nigam (ANN) by contextualizing the best practices from other ULBs in the country that have successfully implemented and sustained municipal reform measures.

Accordingly, a specific study titled “Collaborative Study on Municipal Reforms in Agra Nagar Nigam” was initiated by JBIC. The objectives of the study were as follows:

1. Facilitate key stakeholders (senior management and municipal councillors to develop a consensus on the nature and direction of reform process within ANN)
2. Develop a detailed action plan for key reform initiatives by contextualizing the best practices in the country
3. Demonstrate the impact of reform through a pilot project that can be potentially replicated to other areas in ANN

The study adopted a highly participative approach in which a reform team headed by the Mayor of Agra was constituted. The team also consisted of the Nagar Ayukta (MNA), heads of departments in ANN, General Manager, Agra Jal Sansthan and key councillors from all political parties. As many as seven workshops were held during the course of the study to obtain consensus from the Reform Team at each stage.

Six areas were shortlisted for preparation of detailed action plan for reform. These include:

1. Implementation of Self-Assessment System (SAS) for Property Tax
2. Implementation of Capital Cost method for non-residential properties
3. Private Sector Participation in operation and maintenance of municipal services
4. Public participation in service delivery
5. Strengthening financial management system
6. Implementing complaint redressal system

A pilot project consisting of primary and secondary collection of garbage from an extension colony in Agra was also configured in close involvement with citizens and ANN. Proposals were invited from three parties from which one party was short-listed and the consultants also prepared draft contractual documents.

### **Objectives of the proposed AMR project**

In order to implement the core recommendations in each of the reform areas, it is necessary to appropriately configure a specific project titled “Agra Municipal Reform”, hereinafter referred to as the AMR Project.

The objectives of the proposed project are as follows:

1. Putting up appropriate systems for effective revenue mobilization from Property Tax (for both residential and non-residential properties)
2. Developing and implementing pilot projects through private sector participation in improving service delivery in municipal services. These pilot projects would be

- implemented in four service areas – water supply, SWM, sewerage and street lighting
3. Implementing a large scale public participation programme in Agra
  4. Putting up appropriate systems for complaint redressal and financial management

Successful implementation of the reform programme in Agra could become a role model for implementation across other towns in Uttar Pradesh. The scope of the AMR Project has been limited to a 15-18 month time frame. While the action plan for reform presented in the report indicates a phasing plan over the next 3-5 years (especially for private sector participation projects), only the first phase projects (specifically the pilot projects identified in street lighting and solid waste management) have been considered as part the AMR project.

### **Project Components and activities**

The specific project components for implementing the AMR project have been identified along the specific areas of reform is listed below:

#### **Component 1 - Property Tax**

- A. Training of ANN revenue staff on Self-Assessment System and Capital Cost method for non-residential properties:

All the employees of the revenue department, including Tax superintendent, Assistant tax superintendent, Revenue inspector and the Tax collector would be trained on the new Self-Assessment System (SAS) and the Capital Cost Method for assessing non- residential properties.

#### **Note:**

- (i) Agra Nagar Nigam has started the Self Assessment System (SAS) for the residential properties. Revenue staff has also been trained on the SAS.
- (ii) Capital Cost method of assessment of non-residential/commercial properties is already in vogue and the Engineering and Revenue Staff has been trained for this system.
- (iii) The consultant's would improve upon this system and provide supervisory and advisory support during the period of the project.

- B. Development of PT handbook:

A user-friendly Property Tax handbook is being prepared by ANN and would be available for sale at a nominal price (or distributed to public free of cost). The PT handbook would be used as a potent tool to communicate about the PT rules to the citizens. About 2,00,000 PT handbooks are proposed to be printed for distribution.

#### **Note:**

- (i) The user friendly property tax handbook had been prepared and launched in July, 2002. The handbook has been made available to the concerned staff for appropriate follow up. The Property Tax handbook is available for sale to the general public at Rs.10/- per copy. The handbook also contains the bank challan, in triplicate, for depositing the assessed tax in their neighbourhood bank/branch at their convenience. So far 110000 Property Tax handbooks have been printed and made available for sale distribution.
- (ii) The consultants may give any suggestions for qualitative improvement of the handbooks. The actual printing etc. will be undertake by Nagar Nigam on their own.

- C. Complete physical survey of the city and general assessment:

At present the quality of information regarding the PT assesses is very poor. Under the SAS a complete and accurate assessment list is necessary. Hence, for the successful implementation of the



SAS information would need to be sourced, reconciled and corrected from multiple sources. The reconciled information obtained from the entire population of Agra would then have to be entered into the computerized database. While the Revenue department would undertake the actual reconciliation of data, the process of converting the manual information into computerized format would require external professional support.

**Note:**

- (i) *Nagar Nigam has engaged a consultant to undertake the property listing and identification based on G.I.S. Land mapping in April 2001. The firm is preparing digitised based maps after detailed physical surveys and preparing GIS. Revenue clerks have also been trained for computerization of the property records.*
- (ii) *The consultant for the AMR project will need to carry on the work by building on the deliverables and output of the earlier consultants and also work hand in hand during the overlapping period of appointment. It will be with scope of work of AMR project to undertake the contact. Survey on basis of the base maps available with Nagar Nigam. The staff of Nagar Nigam Property tax deptt. will be used during the exercise. The contact survey will focus on collection of not more than 10 attributes based on the format to be prepared in consultation with Agra Nagar Nigam. However one of the attributes essentially will be plinth area of the properties, which will be calculated on found by a simple method of Length X Breadth (at least 95% accuracy). The data so collected will be linked to the spatial maps available with Nagar Nigam Agra in GIS format. The consultants shall also devise a scientific numbering system for all dwelling units within the area under the Agra Nagar Nigam jurisdiction.*
- (iii) *GoUP has nominated an Additional Mukhya Nagar Adhikari (AMNA) who will be the TEAM LEADER for the whole exercise including the Property Tax Revenue. This will ensure that central coordination is maintained and ensures that PT improvements are being performed objectively. This will ensure proper disciplinary approach to collection and installation of PT system.*

**D. Development of a software for PT- database design & and application software :**

Prior to the start of the software development process the System Requirement Definition would be designed by a software developer in close co-ordination with ANN in order to minimize the glitches in software design. About 10 personal computers would be procured to be used for the data entry in different zones. The computers, however, would physically be located at the Head Office.

**Note:**

- (i) *Tenders have been invited on 23-08-2002 for the purchase of 10 new PCs and other accessories as plotter printer LAN etc. The computer room furnishing in the ANN head office is also in progress.*
- (ii) *ANN will be procuring the GIS software and have the base maps in GIS format for the Area under ANN jurisdiction. The consultants will need to customize that software and develop property tax specific application. Also any further software to be developed should be totally compatible with the GIS software.*

**E. Finalise bank collection system :**

Systems would be put in place to provide for the PT payable under SAS to be collected through banks. Firstly, the banks have to be identified; the registers/records of remittances and procedures have to be established to reconcile the daily balances of remittances through the bank etc.

**Note:** *Banks/branches have been empanelled through the city to receive the PT payable under SAS, along with the duly filled up forms of SAS. The reconciliation of daily balances of remittances is also in progress through these banks/branches.*

F. Integration of Revenue function with Agra Jal Sansthan As part of the initiative of integrating the revenue collection staff of both ANN and AJS, there would be interaction with the senior offices, state Government. This would be done with an aim of taking stock of the staff inventory of both organisations, revising the organisation structure, revising geographic jurisdictions, negotiating the proposal with the labour unions etc.

*Note: Due instructions are awaited from GOUP for integration of revenue function with AJS.*

G. Planning and implementing the PR campaign :

Planning a massive PR campaign to increase the awareness of the SAS system of determining PT would be done by identifying a suitable PR agency and planning the PR activities. The PR activities planned would then be implemented by using various channels to disseminate information throughout the year. The communication campaign would be interspersed with media events.

*Note: The PR campaign for SAS awareness has been started along with the introduction of SAS system. The detailed planning and implementation of the PR campaign in extension to the efforts started by ANN have to be worked out in consultation with the consultant appointed by J.B.I.C.*

H. Conducting Property Tax camps :

Property tax camps for tax mobilization is expected to be carried out throughout the year. There would be about 25 such camps carried out each quarter. The process of conducting such camps would be institutionalised.

**Note:**

- (i) *The details of property tax camps to be under taken in the various areas of the city have to be worked out by the consultant in consultation with ANN*
- (ii) *Public Participation could be more effective if cooperation with Consumer products based private sector companies is sought for sponsoring events.*

I. ANN to prepare specific proposals for seeking clarifications and guidelines, which should be provided by GoUP :

ANN would be supported in preparation of detailed proposals and submitting to Government of Uttar Pradesh for approval in different areas including 'Discounts to be provided to tax assesses for payment within specified dates', 'Collection of water and sewerage charges along with PT', etc.

*Note: Detailed shall be worked out in consultation with the consultant for preparing specific proposals for seeking clarification and guidelines forwarded by GOUP*

The following would be the outputs and benefits that would be realized by implementing the above activities:

- Trained revenue staff who would have clear idea of deliverables and targets;
- A PT management system which is computerized leading to effective monitoring and control which are essential in plugging the revenue leakages
- An updated database of properties and tax assesses
- Greater public awareness and acceptance of the new system

There would also be considerable financial benefit that would accrue by implementing the above project. Implementation of the above project would ensure that the 100% of the properties are under the tax net. Additionally, changeover to the SAS using Unit Area Method is expected to yield about 50 – 100% (on a conservative basis) additional revenues by assessment values and preventing under assessment.

### ***Component 2 - Private sector Participation in service delivery***

Implementation of the following projects involving private sector participation:

#### **1. Primary and secondary collection of garbage:**

Currently, there is a proposal by an NGO to conduct primary and secondary collection of garbage from the 7500 households of Kamla Nagar that is sustained through user fees. The project would involve a one-time capital investment costs by ANN towards procurement of cycle carts, bins, uniform, tools, etc. Though the user fees will be used to support this programme, there would be an additional cost component towards providing O&M support to the private player for the fifteen month period that will be met by the ANN separately.

The following are the expected benefits by the implementation of this project:

- Efficiency and timeliness of services to the residents
- People's active participation in civic management
- O&M costs would be partly borne by the citizens
- The project could serve as a model project, which could be replicated in the other parts of the city.

**The Consultant is only expected to provide technical guidance to ensure sustainability is maintained after the 15 months of the project is complete.**

**2. Transportation of garbage to landfill site:**

ANN will be work to develop a private sector contract for the collection of garbage from the dhalao point and transportation to the landfill site would be managed in a selected area through private operator. The project would cover about 10% of the total area of Agra i.e. about 20sq.km. The project would involve a one-time capital cost towards upgradation of existing vehicles of ANN before handing over to the private operator. As a cost component, it would also entail the cost of O&M support to the private player for three months towards the manpower and fuel expenses.

**3. The following are the expected benefits by the implementation of this project:**

- Greater cleanliness and improved hygienic conditions on account of efficient garbage disposal,
- Increased efficiency in the operation of garbage transportation,
- The greater efficiency achieved by the Private sector player could be used as a benchmark improving ANN's own performance,
- The project could serve as a model project, which could be replicated in the other parts of the city.

**The Consultant is only expected to provide only technical guidance to ensure sustainability is maintained after the 15 months of the project is complete.**

**4. Primary collection and composting of biodegradable garbage from hotels:**

Such a project would involve collection of biodegradable garbage from hotels on a daily basis, transportation of garbage to composting site, composting of the garbage. The project is currently operating in a limited area by an NGO at Agra. The objective would be to scale up the current project and make it financially self sustainable through user charges. All large sources of biodegradable wastes would be covered under the scheme would be covered under this project. The cost of operations could be partially or fully recovered through user charges from hotels and sale of compost.

**5. The following are the expected benefits by the implementation of this project:**

- Reduction in the load on landfill sites,
- Better hygienic conditions near the municipal bins,
- The ongoing project on composting biodegradable wastes could be made financially

sustainable through the expansion of operations and the imposition of user charges.

**The Consultant is only expected to provide only technical guidance to ensure sustainability is maintained after the 15 months of the project is complete.**

**6. O&M of street lights:**

The operation and maintenance of all streetlights in a particular locality or geographical area could be given to one private agency. The project being envisaged would have a scope of operating & maintaining about 1000 streetlights or about 8-10% of the total area of the city.

**7. The following are the expected benefits by the implementation of this project:**

- Efficient operations which would mean timely replacement of defective bulbs.
- The project could serve as a model project, which could be replicated in the other parts of the city.
- Greater cost savings by involving the private sector participant.

**The Consultant is only expected to provide only technical guidance to ensure sustainability is maintained after the 15 months of the project is complete.**

For all the projects listed out above the following activities need to be carried out:

*Detailed structuring of each of the projects:*

The detailed structuring of the project would involve defining the scope of work clearly, assessing the conditions under which the project would be suitable, arriving at the duration of the project, etc.

**A. Managing the project contracting process:**

As part of managing the project contracting process the bid documents would be prepared, bids would be invited by floating tenders, the bids would then be evaluated based on the criteria of evaluation developed jointly with ANN and finally the private player would be selected. The final contract document would then be prepared after detailed negotiations with the potential private party.

*Monitoring the Operation of Projects:*

Once the contract is in place an institutional mechanism for the continuous monitoring of the projects would be put in place

***Component 3 - Public Participation***

The scope of this activity would include managing a large public participation programme through the platform of "Agra Safai Abhiyan". The specific activities would include:

**A. Facilitating formation of resident associations and citizen committees:**

Partnerships would be entered into on a proactive basis with civil communities, NGOs/CBOs etc.

**B. Structuring formal mechanisms for interaction between ANN and citizen groups:**

The partnerships forged would be formalised through appropriate contracts and institutional mechanisms would be established for continuing and proactive interaction between ANN and the citizen groups.

**C. Planning and coordination of activities for Agra Safai Abhiyan:**

The activities for the Agra Safai Abhiyan would be planned meticulously and implemented.

**D. Coordinating all activities relating to print and electronic media including preparation of short**

audio-visual films

As part of leveraging public relations as a prime strategic tool for encouraging large-scale community participation, several initiatives would be taken to utilise PR for eliciting public participation in municipal services. As part of the PR initiative the public would constantly be kept informed about the activities of ANN through press conferences, media interviews, seminars, etc. Apart from information dissemination the PR exercise would also involve developing short video films on successful initiatives by various community groups to be broadcast on local television channels as well as cinema halls.

The following would be the outputs and benefits that would be realised by implementing the above activities:

- A better civic sense leading to better waste management by citizens
- A platform for involvement of the public in future initiatives
- The formation of at least 5 Resident Welfare Associations in different parts of the city
- The project could serve as a model project, which could be replicated in the other parts of the city
- Reduction in the overall cost of Solid Waste Management due to the successful implementation of the 'Agra Safai Abhiyan' campaign

#### ***Component 4 – Complaint Redressal System***

A. Integrating ward level offices and head office of ANN:

The integration of the ward-level offices of ANN would be done through Radio Transmitters, which would be procured and provided to each of the zonal engineers.

B. Strengthening infrastructure in field offices of ANN:

Investments would be made to improve the basic infrastructure like telephone, seating space, etc., in the field offices of ANN.

C. Development of detailed manual for complaint redressal :

A manual for complaint redressal would be prepared detailing the roles and responsibilities of the personnel involved along with the procedures to be followed under the complaint redressal system.

D. Training of staff on the complaint redressal process:

The staff involved would be trained on the complaint redressal process on improvement of their softer skills required while dealing with the general public.

E. Monitoring the complaint redressal process:

The institutionalised complaint redressal process would then be monitored on an ongoing basis for a period of 6-8 months to refine and better the system.

The following would be the outputs and benefits that would be realised by implementing the above activities:

- Increased willingness to pay due to an efficient grievance redressal mechanisms coupled with greater public participation and private sector initiatives, which would pave the way for imposing conservancy tax for areas served by ANN
- Closer and effective monitoring of the sanitary field workers because of better feedback mechanisms.
- The project could serve as a model project, which could be replicated in other service lines

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
NATIONAL RIVER CONSERVATION DIRECTORATE (NRCD)  
MINISTRY OF ENVIRONMENT AND FORESTS**

**THE STUDY  
ON  
WATER QUALITY MANAGEMENT PLAN  
FOR  
GANGA RIVER  
IN  
THE REPUBLIC OF INDIA**

**FINAL REPORT**

**VOLUME IV FEASIBILITY STUDY FOR PROJECT CITIES**

**VOLUME IV-3 FEASIBILITY STUDY FOR ALLAHABAD CITY  
PART V ECONOMIC AND FINANCIAL EVALUATION**

**JULY 2005**

**TOKYO ENGINEERING CONSULTANTS CO., LTD.  
CTI ENGINEERING INTERNATIONAL CO., LTD.**

**FINAL REPORT**  
**ON**  
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## ABBREVIATIONS

AgO	Agricultural Products
AO	Actual Output by permanent skilled labour,
APSL	Actual Permanent Skilled Labour
ARV	Annual Rental Value
ATP	Affordability to Pay
B/C	Benefit Cost ratio
CA	Cropped Area
CPI	Consumer Price Index
CVM	Contingent Valuation Method
E&M	Electrical and Mechanical
EAP	Entire Economic Active Population
EIRR	Economic Internal Rate of Return
FIRR	Financial Internal Rate of Return
FP	Financial Price
GAP	Ganga Action Plan
GRDP	Gross Regional Domestic Products,
HH	Household
JICA	Japan International Cooperation Agency
NPV	Net Present Value
O&M	Operation and Maintenance
OECD	Organization for Economic Cooperation and Development
PAHO	Pan American Health Organization
Rs.	Indian Rupees
SCF	Standard Conversion Factor
SPRL	Shadow Price Rate for Land
SWCF	Shadow Wage Conversion Factor
WTP	Willingness to Pay

**CHAPTER 1**  
**INTRODUCTION**

## **PART V ECONOMIC AND FINANCIAL EVALUATION**

### **CHAPTER 1 INTRODUCTION**

In general, a project will be evaluated taking engineering, economic/financial, institutional and environmental aspects into consideration. The engineering aspects are studied and form a part of the technical feasibility of the project from the viewpoint of construction, operation and maintenance. The institutional aspect of the project evaluates the existing organisation and management structures and suggests capacity building measures. The environmental aspects are studied on environmental reliability from the viewpoint of water quality, living environment, biodiversity and so forth.

The economic aspect of the project is to determine whether the project can contribute to the improvement in the socio economic condition of people living in cities along the rivers, in this case Ganga and Yamuna, and the financial aspect determines whether a project can add to improvement in the financial condition.

An economic evaluation of the project is based on the economic cost benefit. The benefits should be measurable in terms of direct monetary value addition. The economic benefit to the people can be tangible and/or intangible but it needs to be evaluated as it contributes to the national/regional economy. The economic cost can be derived by eliminating the distortion caused by the taxes, charges, duties that may be levied as per the laws and/or some other rules or regulations applicable at that point of time from financial cost.

With regards to the financial viability, it is to be determined whether the enterprise, in this case it is called as “Water Supply and Sewerage Services Provider” (hereinafter referred as “the Service Provider”), is likely to be financially viable taking financial cost and financial benefit into account.

The financial cost includes initial outlay or investment cost, operation and maintenance cost, and replacement and renewal cost. The financial benefit means direct revenue derived from, in this case, taxes and/or charges from sewerage and indirect revenue in terms of sale of by-products such as treated water for irrigation and dried sludge in the form of compost.

**CHAPTER 2**  
**EXISTING FINANCIAL SITUATION**



## **CHAPTER 2 EXISTING FINANCIAL SITUATION**

### Overall Financial Background

Under this Chapter we will discuss in brief the financial situation of various organisations that affect this Project and National Government (Government of India) and Government of Uttar Pradesh

1. National Government
2. State Government, in this case Uttar Pradesh
3. UP Jal Nigam
4. Allahabad Nagar Nigam
5. Allahabad Jal Sansthan

### Brief Financial Background of the National Government

The financial situation of the National Government (i.e., Government of India) is rather healthy since 1999-2000. It means that the Government finance has been supported by both the tax revenues in revenue account (current account) and receipts in the form of public debt in capital account and there is a sharp rise in them since 1999-2000.

Out of the total tax revenue, around 62 % - 74 % comes from the taxes on commodities and services which are indirect taxes. The receipts in revenue account (current account), i.e., grant-in-aid are less than 1 % consisting of external grant assistance and aid materials & equipment in the nation as discussed in the Master Plan Study Report. The share of the external debt to the capital income ranges between 2.0 % to 3.2 %.

On the expenditure side

1. **General Services** are almost half of the total expenditure.
2. **Economic Development Services** are the second largest head of expenditure.
3. **Grants-In-Aid** are the third largest head of expenditure. In this category, the Grants-In-Aid to State Governments are at the top sharing 95.4 % of the total expenditure.
4. Expenditure on **Social Services** is the fourth group sharing around 5 % only of the total expenditure. The expenditure on **Water Supply and Sanitation** concerning the Project stands at third position under this expenditure group (Social Services) with a share of 4.7 % as per data of 2002-3. (for detailed review refer Appendix A)

### Brief Financial Background of the Uttar Pradesh State Government

The financial figures since 1997-98 for the Uttar Pradesh State show a deficit. However, the financial estimates for 2000-01 and 2001-02 show a positive balance (detailed analysis of the same is given in Appendix B).

The largest head of revenue of the Uttar Pradesh State is the Tax Revenue with a share of around 80 % according to financial statement 1997-98 as discussed in the Master Plan Study Report. Loans and Advances from Centre (the National Government) show a large share of inflow at 30.8 % as indicated in the same statement.

The expenditure on the other hand comprises of 5 categories:

1. Developmental Expenditure
2. Non-Developmental Expenditure
3. Grants-In-Aid and Contributions,
4. Compensation and Assignments to Local Bodies and Panchayati Raj Institutions and
5. Reserve with Finance Department.

Developmental Expenditure and Non-Developmental Expenditure are the major expenditure

categories. Expenditure on **Water Supply and Sanitation** related to the Project ranges only from 3.6 % to 7.0 % as per the financial status of 1994-95.

#### Financial Background of the Uttar Pradesh Jal Nigam

Following table shows a summary of balance sheet of Uttar Pradesh Jal Nigam (UPJN). According to this table, the UPJN has suffered deficits in these 3 years.

**Table 2.1 Summary of Balance Sheet of Uttar Pradesh Jal Nigam**

Credit	Fiscal Year			Debit	Fiscal Year		
	1998-99	1999-2000	2000-01		1998-99	1999-2000	2000-01
	(Unit: million Rs.)						
Current Assets	33,023	37,149	42,859	Liabilities	44,105	48,552	55,046
Fixed Asset	10,701	11,186	12,025	Surplus or Deficit for the Year	-381	-217	-163
<b>Total Assets of UPJN Only</b>	<b>43,724</b>	<b>48,335</b>	<b>54,883</b>	<b>Total Liability of UPJN Only</b>	<b>43,724</b>	<b>48,335</b>	<b>54,883</b>
Assets of Civil and Design Services	6,771	8,489	10,462	Liabilities of Civil and Design Services	6,524	8,199	10,153
				Surplus or Deficit for the Year in Grand Total	247	290	309
<b>Grand Total of Assets</b>	<b>50,495</b>	<b>56,824</b>	<b>65,345</b>	<b>Grand Total of Liability</b>	<b>50,495</b>	<b>56,824</b>	<b>65,345</b>

Source: UPJN.

However, the UPJN Construction and Design Services consisting of Civil Wing and Nalkoop Wing, produce surplus offsetting the deficit of UPJN as shown in the above table. Therefore, financial situation of the UPJN is healthy in total.

Income of the UPJN mainly consists of Centage, Survey and Project Fees, Interest on Loans, Other Interest, and Grant from UP State Government for Maintenance Schemes, Grant from UP State Government for H.R.D., Income from Maintenance Schemes, Other Income, and Grant paid by UP State Government for Loan of Life Insurance Corporation.

And its expenditure mainly consists of Salaries and Wages, Travelling and Daily Allowance, Interest, Expenditure on Maintenance Schemes, Other Expenses and Pension and Gratuity. A summary of its income and loss (expenditure) statement is shown below.

The major work of UPJN is management of water supply, sewerage and sewage treatment facilities. According to the said financial statement of the UPJN, the expenditure on maintenance schemes for such facilities is only around 13 % of the total expenditure. It may be dispersed in the other expenditure items such as salaries and wages, travelling and daily allowance, or other expenses and so forth.

According to a list of fixed assets of the UPJN, the main fixed assets of the UPJN are the waterworks. Other assets are UPJN own scheme's Hand Pumps sharing about 95.4 % of total value of the fixed assets as of 2000-01.

#### Financial Background of Allahabad Municipal Corporation (Allahabad Nagar Nigam)

Following table shows a summary of Balance Sheet of Allahabad Municipal Corporation (Allahabad Nagar Nigam) and details are shown in Table 1 in Appendix H.

**Table 2.2 Summary of Balance Sheet of Allahabad Municipal Corporation**

(Unit: million Rs.)

<b>Receipts in Current Account</b>					
Description	2000-2001	2001-2002	2002-2003	2003-2004 for 9 months	2004- 2005 Budgeted
Revenue receipts	860.27	635.10	629.42	429.95	850.00
<b>Receipts in Capital Account</b>					
Capital Receipts Total	0.00	0.00	9.70	0.00	20.00
<b>Opening Balance</b>	4.53	41.97	33.84	64.40	46.00
Revenue Account Total	860.27	635.10	629.42	429.95	850.00
Capital Account Total	0.00	0.00	9.70	0.00	20.00
<b>Total</b>	864.81	677.08	672.97	494.35	916.00

Source:

Budget Statement of the Nagar Nigam -Allahabad for 1999,2000,2001,2002,2003.

(Unit: million Rs.)

<b>Expenditure in Current Account</b>					
Description	2000-2001	2001-2002	2002-2003	2003-2004 for 9 months	2004- 2005 Budgeted
Revenue Expenditure	436.11	377.01	353.99	284.64	570.10
<b>Expenditure in Capital Account</b>					
Capital Expenditure	0.00	0.00	0.00	0.00	0.00
Revenue Account Total	436.11	377.01	353.99	284.64	570.10
Capital Account Total	0.00	0.00	0.00	0.00	0.00
<b>Closing Balance</b>	41.97	33.84	64.40	32.56	16.40
<b>Total</b>	478.09	410.85	418.39	317.20	586.50

Source:

Budget Statement of the Nagar Nigam -Allahabad for 1999,2000,2001,2002,2003.

As shown in the above table, the financial statement shows a rather sound position in Current Account. However, it is supported by the state transfers as shown in Table 1 in Appendix H. The amounts of the state transfer share to the total revenue are showing at 45 % in 2000/01, 43 % in 2001/02 and 40 % in 2002/03. These state transfers were made to make up for the loss of revenue due to abolition of Octroi Tax since 1990. These state transfers belong to income category of "Non Tax Revenue". According to the information the amount of state transfer depends upon the population of the city.

On the receipt side Property Tax forms a major share of revenue. The share of Property Tax to Total Tax Revenue is 86 % in 2000/01, 67 % in 2001/02 and 57 % in 2002/03.1998. In Allahabad, self-assessment system is being introduced for assessing the annual rental value of properties. This information is given to us by the officers of Allahabad Municipal Corporation.

The other revenue category is called as "Suspense Account" consisting of the Security Deposits from Contractors and Staff Repayment. They are negligible and very small.

Expenditures are itemized as "Salary", "Maintenance/Charges", "Administrative Expenditure", "Other Expenditure including Development" and "Suspense Account".

The expenditure on Staff Salaries is the highest sharing at a rate of 61 % in 2000/01, 68 % in 2001/02 and 66 % in 2002/03 of the total Expenditure.

The share of wages for sweepers is around 58% of the total Expenditure on Salary, which is more than half.

#### Financial Background of Allahabad Jal Sansthan

Following table shows a summary of financial status of the Allahabad Jal Sansthan, and details are

shown in Table 2 in Appendix H.

**Table 2.3 Summary of Financial Statement of Allahabad Jal Sansthan**

(Unit: Million Rupees)

City/items	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04
<b>Allahabad</b>								
<b>Income</b>	131.08	141.16	141.06	190.48	276.38	281.44	338.37	315.00
Water tax	10.81	11.54	12.69	13.80	11.72	10.74	11.17	17.21
Water charge	34.46	40.89	45.21	67.40	80.21	102.48	108.03	116.79
Sewer tax	3.52	4.01	4.86	5.00	5.28	5.50	6.17	5.24
Sewer charge	-	-	-	-	3.48	1.23	2.54	5.89
Other Income	7.50	5.57	7.77	9.04	9.59	9.23	22.07	7.14
Grant	9.25	8.57	-	-	27.91	11.55	19.21	5.24
Total Income	65.54	70.58	70.53	95.24	138.19	140.72	169.19	157.50
<b>Expenditure</b>	201.34	186.02	227.44	224.94	381.80	414.90	448.48	466.13
Establishment	42.12	44.18	50.47	72.06	85.49	82.87	82.66	84.17
Electricity	34.36	34.36	45.00	15.83	61.68	74.16	75.98	77.61
Maintenance	-	-	-	-	2.37	3.00	3.93	4.85
Others	24.19	14.47	18.25	24.58	41.37	47.42	61.66	66.44
Total Expenditures	100.67	93.01	113.72	112.47	190.90	207.45	224.24	233.06
Balance	-70.26	-44.86	-86.38	-34.46	-105.42	-133.46	-110.10	-151.13

(Note) Expenditure for Establishment includes salary and wages.

The major head of income of the Allahabad Jal Sansthan is water tax and water charge, it amounts to nearly 85% of the total revenue. The percentage of share for different years are 82% in 1998/99, 85.0 % in 1999/00, 66.5 % in 2000/01, 80.4 % in 2001/02, 70.4% in 2002/03 and 85.9 % in 2003/04 of the total income as shown in Table 2 in Appendix H. However the income from sewer tax/ charge for the same fiscal years were 6.89%, 5.25%, 6.34%, 4.78%, 5.14 and 7.06%, respectively. This part of revenue concerns the project.

Collection rate for the two main items of revenue, i.e., water tax /water charge and sewer tax/ charge are in the range of 88 % and 56 % respectively.

On the expenditure side there are two major heads of expenditure, i.e., Establishment and Electricity charges. They have the largest share under the expenditure head as shown in Table 2 in Appendix H. Establishment accounts for an average of 40% and electricity accounts for nearly 36% of the total expenditure.

It is clear from the above table that the revenues of Jal Sansthan Allahabad are not sufficient to pay the electricity bill. Hence the same have to be paid directly by the UP State Government. The system of payment of these bills as explained to us is as follows:

1. The bills raised by the UP Power Corporation are sent directly to the Jal Sansthan
2. The bills are verified and approved and signed by the Finance Officer of the Jal Sansthan.
3. The verified bills are then sent to the Nagar Nigam for further processing and payment.
4. Nagar Nigam verifies the bills and sends the same to the State Govt. for payment.
5. The electricity charges are paid to the UP Power Corporation directly by the State Government as per the recommendations of the Eleventh Finance Commission out of the Octroi Compensation due to be received by the Nagar Nigam.

**CHAPTER 3**  
**ECONOMIC EVALUATION**

## **CHAPTER 3 ECONOMIC EVALUATION**

### **3.1 IDENTIFICATION OF ECONOMIC BENEFITS AND COSTS**

#### (1) Economic Benefits

Economic benefits that can be expected in this kind of project are (1) an amount of willingness of people to pay (WTP), (2) a saving amount of medical expenditure of people and saving in the subsidy amount spent by the Government on such medical institutions such as hospitals, clinics health centres etc, (3) saving in the amount of salaries/wages of the people, etc. The latter two benefit categories will be derived as a result of decrease of suffering rate of water borne diseases due to improvement of water environment.

#### i) The Amount of WTP for Improvement of Water Quality of the Rivers Ganga and Yamuna

The WTP factor used for analysis of the Ganga Action Plan<sup>1</sup> (hereinafter referred to as “GAP Report”) for improvement of water quality of the river Ganga has also been applied here at Allahabad. The methodology used is called as “the Contingent Valuation Method (CVM).

#### ii) The Amount of WTP for Improved Sewerage Services

Contingent valuation survey was conducted with the objective of finding out the willingness to pay for the facilities to be constructed in the near future<sup>2</sup>. The amount of WTP is not a basic unit for setting up a tariff system, but the basic unit for the socio-economic benefit.

#### iii) Saving of Medical Expenditure

This kind of project may contribute to improve the people’s living environment. If water quality is improved by a project, water borne diseases may decrease and, people’s burden on medical expenditure and saving of the subsidy allocated by the Government for Hospitals operations and other medical centre services will also decrease. This is an indirect socio economic benefit. In other words, it can be expected that the purchasing power or capability of the people could be increased due to improvement of water quality.

The benefits derived can be measured in the form of (1) reduction in suffering rate of water borne diseases to the total number of diseases (%), (2) effect of this kind of project on the incidence of water borne diseases (%), (3) numbers of outpatients and inpatients suffered by water borne diseases and (4) financial situation of such medical institutions consisting of revenue and expenditure.

#### iv) Saving of Salaries/Wages

People suffering from water borne diseases have to keep off their work for long span of time. This results in loss of salary/wage for the number of days being absent from work. The actual amount of saving after implementation of the project can be estimated with the average income per capita, and the medical data discussed in the paragraph of (iii) above.

#### v) Environmental Benefit due to Improvement of Water Quality

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<sup>1</sup> “A Cost-Benefit Analysis of the Ganga Action Plan” the Ministry of Environment and Forests, the Government of India and the Department for International Development, the Government of the United Kingdom, January 1998.

<sup>2</sup> Miura, 2000 in his HP. The related references are K. Kuriyama “Public Works and the Value of Environment” Tsukiji, 1997, K. Kuriyama “The Value of Environment and Its Evaluation Method by Applying of CVM” the Hokkaido University Press, 1998, Washida, Kuriyama, Takeuchi ed. “Existing Situation of Project Evaluation –A Paper for Workshop for Evaluation of Environmental Project–” and N. Hidano “Economic Evaluation on Environment and Official Administration –A Manual for the Contingent Valuation Method” Keiso, 1999.

The Project aims at improvement in the quality of water of the river Ganga and Yamuna and at the Holy Sangam. Better quality of water, will surely improve the bathing population at the rivers and at the Sangam. The bathing people can be divided into two categories as (1) the regular users, and (2) the occasional users.

The benefit derived by regular users has already been discussed under the points (iii) and (iv) above. Allahabad has a large number of floating population as the city has a very high religious significance. The occasional users consist of such type of people who have real religious or sightseeing purpose. Such tourists or pilgrims spend a lot of money in the cities along the river Ganga, and contribute to the regional and local economy. Improvement in the quality of water will definitely increase the number of occasional users and will directly and indirectly contribute to the improvement in the economic status of the local and regional population.

JICA Study Team in 2003 conducted a survey to find out the number of regular and occasional bathing population. It was found that the number of regular population bathing in the rivers and at Sangam is 1974 per day and occasional bathing population is 2494 per day. This number swells to hundreds of thousands on the Holy Bathing Days and on Bathing Festivals.

vi) Other Socio-Economic Benefits

Furthermore, there may be a lot of other kinds of socio-economic and/or environmental benefits like those, which may be derived from conservation of the bio-diversity, and from increasing of agricultural productivity because of improved water quality.

(2) Economic Costs

As mentioned above, the economic cost is also to be converted from the financial cost. In this case, a Standard Conversion Factor (SCF) for tradable equipment and materials, shadow price for land acquisition cost and/or housing compensation, and for labours for the construction works, cost of transfer items such as personal income tax and corporate income tax should be taken into account.

### **3.2 ECONOMIC EVALUATION INDICES**

Economic costs and benefits throughout the project life are compared in terms of present values. If the total present value of economic costs equals that of economic benefits (when,  $B/C=1$ ), the discount rate used to calculate the present value is called as “economic internal rate of return (EIRR)” and uses as the main index of project evaluation to judge the project feasibility and/or viability. The other two indices are Net Present Value (NPV) and B/C Ratio. (Appendix C gives details on economic evaluation indices used)

### **3.3 ECONOMIC EVALUATION**

(1) Estimation of Economic Benefits

a. WTP for Improvement of Water Quality of the River Ganga and Yamuna and at Sangam

According to the GAP Report, the WTP was at Rs.167.23 per household per annum at 1995/96 price level. This WTP has been used by converting into the present price level of 2003 using the Consumer Price Index (CPI) at 8.69 % inflation rate per annum as shown in Table 2 in Appendix H. The envisaged amount of WTP for this component in 2004 is at Rs.354 per annum per household as shown in the following table:

**Table 3.1 Envisaged Amount of WTP for Improvement of Water Quality of Ganga and Yamuna Rivers**

(Unit: Rs./annum.HH)										
Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Envisaged WTP	167	182	198	215	233	254	276	300	326	354

b. WTP for Sewerage Services

According to the Survey on Public Awareness made by JICA Study Team in 2003, the amount of WTP for sewerage services is estimated at Rs.43/month per HH as shown in the following table. This amount can be annualised at Rs.504 per household.

**Table 3.2 Existing Connection Rate, Existing Capability to Pay, Average Existing Charge and Willingness to Pay in Allahabad**

Income Group	Existing Sewer Connection Rate	Rate of HHs Connected with Existing Sewerage System and Have Capability to Pay	Wastewater Disposal Services			
			Average Expenditure for Wastewater Disposal Including Existing Sewerage Services		WTP for Improved Sewerage Service	
			%	%	Rs./month	Rs./year
Low	11.9%	60.0%	74	888	15	180
Medium	41.7%	88.1%	101	1,212	42	504
High	43.9%	100.0%	169	2,028	71	852
Average	32.5%	82.7%	115	1,380	43	516

Source: Public Awareness Survey, JICA Study Team, 2003.

The amount of the WTP above is the basic units for estimation of economic benefit. Using this basic unit, the annual economic benefit is to be calculated by multiplying the number of served households. The total service population, the number of people to be connected, the entire households served and the number of households connected are estimated in Table 4 (1/2) and (2/2) in Appendix H. In this case, average family size is estimated at 6.32 per HH in Allahabad as of 2001 Census.

Using the above mentioned two factors (1) the basic unit of the economic benefit based on the WTP and (2) the number of served HHs and number of connected HHs, the annual economic benefit based on the WTP can be estimated.

The benefit will accrue year after year from the commencement of the construction works. Since the estimated costs consist of rehabilitation of existing facilities and construction of new facilities, there will be a gradual increase in the number of HHs served and connected.

After the year 2015, it is assumed that the same amount of economic benefit based on the WTP in the year 2015 will continue to accrue till the end of the project life, because the capacity of the waste water treatment plant has been designed to handle the projected population for the year 2015.

c. Saving of Medical Expenditure Due to Decrease of Suffering Rate of Water Borne Diseases

Generally speaking, suffering rate of water borne diseases to the total morbidity rate is 30 %. However, morbidity rate caused by the water borne diseases was 38.0 % of total morbidity rate in Varanasi in 1997 before the implementation of the GAP Project. An average morbidity rate of three



cities of Patna, Kanpur and Haridwar after the implementation of project<sup>3</sup> was 17.7%. Since the above observation pertains to the GAP Project, the same is being used for Allahabad also. Accordingly, difference of 20.3 % (= 38.0 % - 17.7 %) is a basic factor for estimation of economic benefit based on the saving of medical expenditure.

Regarding medical expenditures, following information/data are available from a result of “A Benefit Incidence Analysis for India”<sup>4</sup>. Physical data may be applied to the Project directly. But since monetary data is at 1995/ 96 price level, it should be converted to 2004 price level by using the CPI (= 8.69% per annum).

Converted Information/Data to Present Value:

For Outpatient in the State of Uttar Pradesh:	
Average number of visits to public hospitals:	50.7 visits/1,000 persons per annum
Average amount of charges per outpatient:	94.5 Rs./visit
Average amount of public subsidies per outpatient:	200.7 Rs./visit per outpatient
For Inpatient in the State of Uttar Pradesh:	
Average number of hospitalization:	1,018 times/100,000 persons
Average staying days:	14.6 days/hospitalization
Average amount of charges per inpatient:	139.6 Rs./day
Average amount of public subsidies per inpatient:	1,204.2 Rs./day

(Note) Figures in monetary terms are converted into 2003-price level.

Transportation cost for visit to the hospital has to be added to the said medical expenditures. This is as per the interview survey conducted by the JICA Study Team with some cycle Rickshaw pullers and some patients at Varanasi.

**Table 3.3 Transportation Cost per Patient to Visit Hospitals**

(Unit: Rs./one way per Patient)				
Name of Hospital	Radius from the Place of Origin to Hospitals	Maximum Transportation Cost (Rs)	Minimum Transportation Cost (Rs)	Average Transportation Cost (Rs) per patient
Nagar Mahapalika Hospital	1.5 km	10	5	7.50
Shiv Prasad Gupt Hospital	3.5 km	15	5	10.00
Ramakrishna Mission Hospital	3.5 km	15	5	10.00
Child Welfare & Maternity Hospital	1.5 km	10	5	7.50
Ballabhram Saligram Hospital	2.5 km	10	5	7.50
BHU Hospital	2.5 km	10	5	7.50
Overall Average:				8.33

The sample survey conducted in Varanasi City is a fair representation for applying the results to Allahabad City also.

d. Saving of Salaries/Wages Due to Decrease in Suffering Rate of Water Borne Diseases

Water borne diseases result in a loss of either earnings of an individual or would effect the productive output of an organisation. This kind of losses concerning the salaries/wages could be mitigated if the water borne diseases can be reduced.

At present, the average income level in Allahabad is at Rs. 10,912/month per HH, and is illustrated in Table 5 in Appendix H.

People who may suffer from these kinds of diseases are generally the working members in each household. The average family size in Allahabad is 6.32 as already mentioned above. Among the

<sup>3</sup> M.N. Murty “A Cost Benefit Analysis of the Ganga Action Plan” Oxford University Press, 2000.

<sup>4</sup> National Council of Applied Economic Research, ed. “Who Benefits from Public Health Spending in India” 2002.

family members indicated in the relevant table, number of the working members in a house hold are 1.78 in Allahabad as per the Census 2001. Therefore, the average amount of salaries and/or wages of each working member may be estimated at Rs. 6,130/capita in Allahabad.

e. Contribution to Local Economy Derived from Bathing Population

The local officials were of the opinion that in case the water of the rivers Ganga and Yamuna and at the Holy Sangam was cleaner, there will be an increase of regular users by at least 10%. The incremental daily bathing population is projected as shown in the following table.

**Table 3.4 Projection of Incremental Bathing Population**

	(persons/day)										
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Regular Users	1,974	2,028	2,082	2,137	2,191	2,245	2,299	2,354	2,408	2,462	2,517
Occasional Users	2,494	2,543	2,594	2,645	2,698	2,752	2,806	2,862	2,919	2,977	3,037

i) Regular Users

It is estimated that the clean river water will encourage regular bathing population to visit the rivers and the Sangam more frequently and would encourage economic activities. It is estimated that average per day expenditure of a visitor to the river will be around Rs.45/day including transportation and some snacks.

ii) Occasional Users

The occasional users come from various parts of the country and they spend money on transportation, food, stay and general purchases. It is estimated that these persons would spend around Rs.150 per person per day in addition to the expenses of travelling from their places of residence to Allahabad.

f. Contribution to Increase the Productivity of Agricultural Crops

Under the project at Allahabad, 4 new STPs have been proposed in addition to augmentation of the capacity of the existing STP at Naini. The new STPs will be able to discharge around 140 mld of additional water and in addition, there will be 20 mld of additional treated water at Naini. However, Naini STP is already running at overload and there is no scope of irrigation use of the treated effluent at Kodara and Rajapur STPs. At Ponghat also, because the STP is proposed presently for interception and treatment of Nala water which is already being used for irrigation by the farmers in the nearby agricultural fields and the capacity of the proposed STP also is small, and there are not many such fields also in proximity, the potential of irrigation use at Ponghat also is not very significant.

Hence, for the purpose of irrigation use of the treated effluent, only the treated water quantity at Numaya Dahi STP, i.e. 50 mld is considered of value which means additional 750 ha of irrigated land, as one mld of water can irrigate 15ha of agricultural land. The additional agricultural benefit has been calculated as below:

$$15 \text{ ha} \times 50 \text{ mld} = 750 \text{ ha}$$

According to the statistics, the existing yields of paddy and wheat are;

Paddy: 13.36 quintal/ha (=1.37 tons/ha) in non-irrigated area, and  
19.08 quintal/ha (=1.90 tons/ha) in irrigated area.

Wheat: 16 quintal/ha (=1.60 tons/ha) in non-irrigated area, and  
32 quintal/ha (=3.20 tons/ha) in irrigated area.

Cropping pattern of the crops are not clear, but the period from the transplanting to the reaping stage for paddy is 100 days in addition to the nursery period of around 30 days. The period of transplanting to the reaping stage for wheat is also around 100 days. These crops are cultivated by rotation, and both the crops are cultivated once a year.

Sugar cane, potatoes, mustard and other crops are cultivated between paddy and wheat seasons as secondary crops. But, they are negligible. Therefore, the paddy and the wheat are adopted for estimation of agricultural benefit as an economic benefit of the Project. Their farm grade prices are as follows:

Paddy: 490 Rs./quintal = 4,900Rs./ton  
Wheat: 550 Rs./quintal = 5,500 Rs./ton

In other words the farmers' gross income may be estimated at:

Paddy:  $490 \times 19.08 = 9,349$  Rs./ha in irrigated area, and  
 $490 \times 13.36 = 6,546$  Rs./ha in non-irrigated area.  
Wheat:  $550 \times 32 = 17,600$  Rs./ha in irrigated area, and  
 $550 \times 16 = 8,800$  Rs./ha in non-irrigated area.

While, their production cost is as follows:

Paddy:	Seed	425 Rs./ha
	Fertilizer	1,500 Rs./ha
	Wages for labour	2,800 Rs./ha
	Irrigation water charges	1,150 Rs./ha
	Other expenses	1,200 Rs./ha
	<u>Land revenue</u>	<u>0 Rs./ha</u>
	Total	7,075 Rs./ha

Wheat:	Seed	1,130 Rs./ha
	Fertilizer	1,200 Rs./ha
	Wages for labour	2,100 Rs./ha
	Irrigated water charges	2,000 Rs./ha
	<u>Other expenses</u>	<u>425 Rs./ha</u>
	Total	6,855 Rs./ha

Farmers' income is calculated as:

$9,349$  Rs./ha (Paddy) +  $17,600$  Rs./ha (Wheat) =  $26,949$  in irrigated area, and  
 $6,546$  Rs./ha (Paddy) +  $8,800$  Rs./ha (Wheat) =  $15,346$  in non-irrigated area.

And, the production costs in total are estimated at:

$13,930$  Rs. =  $7,075$  Rs./ha (Paddy) +  $6,855$  Rs./ha (Wheat).

Therefore, their net income per unit area (ha) may be estimated at:

$\frac{26,949 \text{ Rs.} - 13,930 \text{ Rs.}}{1 \text{ ha}}$  (in irrigated area) +  $\frac{15,346 \text{ Rs.} - 13,930 \text{ Rs.}}{1 \text{ ha}}$  (in non-irrigated area) =  
 $14,435$  Rs./ha per year

Based on the above data, the total agricultural benefit can be estimated as follows applying the total area of 750 ha to be newly irrigated:

$14,435$  Rs./ha per year  $\times 750$  ha =  $10,826,250$  Rs./year (rounded at 10.82 million Rs./year in total) as of 2004 price level

This agricultural benefit should be added to the benefits above derived from socio-economic activities.

(2) Summary of Economic Benefits

Following table summarise the unit economic benefits for Allahabad project:

**Table 3.5 Summary of Unit Economic Benefits (Allahabad)**

WTP for Improvement of Water Quality of the River Ganga	WTP for Improved Sewerage Treatment Services	Saving of Medical Expenditure Caused by Decrease of Suffering Rate of Water Borne Diseases		Saving of Salaries/Wages Caused by Decrease of Suffering Rate of Water Borne Diseases		Contribution to Local Economy Caused by Increase of Bathing Population		Agricultural Benefit (Paddy + Wheat)
		Outpatients	Inpatients	Outpatients	Inpatients	Regular Users	Occasional Users	
		Rs./household/annum				Rs./person/annum		Rs./ha/annum
354	553	11.0	139.4	3.6	10.5	17,852	59,507	11,603

The economic benefit shown in the above table consist of (1) the WTP for improvement of water quality of the river Ganga and Yamuna and at Sangam (2) the WTP for sewerage services, (3) the saving of the medical expenditure of the people due to decrease of suffering rate of water borne diseases, (4) the saving of salaries/wages due to decrease of suffering rate of water borne diseases, (5) the incremental contribution to the regional economy derived from bathing population, and (6) agricultural benefit due to discharge of the treated water for irrigation. The future number of households, sewer connected households, etc in Allahabad to estimate economic benefits is projected as shown in Table 4 (1/2) and (2/2) in Appendix H assuming improved sewer coverage and connection rate.

(3) Estimation of Economic Costs

The Project cost is estimated at Rs.3,043 million excluding the price contingencies (price escalation) in Table 3.6 and in Table 6 in Appendix H for detail. Economic cost of the Project is estimated at Rs. 2,475 million excluding price contingencies.

**Table 3.6 Summary of Project Costs**

Item	Total	2007	2008	2009	2010	2011	2012
<b>Sewerage</b>							
Direct Construction Cost	2,059.83	0.00	506.33	523.84	341.25	469.02	219.39
STP & PS	1,652.47	0.00	377.35	394.86	291.45	394.32	194.49
Pipe	407.36	0.00	128.98	128.98	49.80	74.70	24.90
Land Acquisition	208.78	161.35	0.00	1.93	45.50	0.00	0.00
Detailed Design	123.60	105.92	0.00	9.52	8.16	0.00	0.00
Supervision	102.99	0.00	25.32	26.19	17.06	23.45	10.97
Project Administration	102.99	0.00	25.32	26.19	17.06	23.45	10.97
Physical Contingencies	102.99	0.00	25.32	26.19	17.06	23.45	10.97
Total	2,701.18	267.27	582.29	613.86	446.09	539.37	252.30
<b>Non-sewerage</b>							
Direct Construction Cost	86.37	1.77	22.64	21.24	21.24	19.48	0.00
Detailed Design	4.31	0.09	1.13	1.06	1.06	0.97	0.00
Supervision	4.31	0.09	1.13	1.06	1.06	0.97	0.00
Project Administration	8.63	0.18	2.26	2.12	2.12	1.95	0.00
Physical Contingencies	4.31	0.09	1.13	1.06	1.06	0.97	0.00
Total	107.93	2.22	28.29	26.54	26.54	24.34	0.00
<b>Public Participation &amp; Awareness (PP/PA)</b>	46.01	9.5	6.9	7.4	7.6	7.1	7.5
<b>Institutional Development Programme (IDP)</b>	188.00	37.60	56.40	56.40	18.80	9.40	9.40
<b>Total</b>	3,043.12	316.62	673.92	704.19	499.04	580.20	269.15
Price Contingencies (Price Escalation)	1,681.30	84.85	250.41	342.58	311.88	446.14	245.44
Financial Cost (Excl. Price Contingencies)	3,043.12	316.62	673.92	704.19	499.04	580.20	269.15
Financial Cost (Incl. Price Contingencies)	4,724.42	401.47	924.33	1,046.77	810.92	1,026.34	514.59
Economic Cost (Excl. Price & Physical contingencies)	2,391.15	193.19	550.58	578.01	377.79	470.26	221.31
Economic Cost (Excl. Price contingencies)	2,475.48	193.26	571.37	599.43	392.03	489.46	229.93
Foreign Finance (Loan Amount)	4,404	240	897	1,017	746	1,001	504
Local Finance	320	162	28	30	65	25	11

The financial cost of the project including price contingencies is Rs.4,724 million. The local Indian fund required will be Rs.320 million and Foreign Currency Loan component is Rs.4,404 million.

The operation and maintenance (O&M) costs are estimated at Rs.140 million per annum in financial term and Rs.113 million in economic term for 2015. Replacement cost is estimated at Rs.484 million in financial term for mechanical and electrical components of pumping stations and treatment plants and Rs. 484 million in economic term. This replacement cost would be accrued every 15 years after completion of the facilities including proposed, existing and sanctioned facilities. Following table summarise O&M and replacement costs of the Project.

**Table 3.7 Summary of Operation and Maintenance and Replacement Costs**

Item	Estimated current value of facility	2013	2014	2015	2016	2017	2018
<b>Annual O&amp;M</b>							
O&M cost (financial)		115.74	130.20	144.67	144.67	144.67	144.67
O&M cost (economic)		92.12	103.64	115.15	115.15	115.15	115.15
Ratio		0.8	0.9	1	1	1	1
<b>Replacement</b>				Year			
<b>1. Proposed facilities</b>		2027	2042	2057			
Financial cost	1,652	495.74	495.74	495.74			
Economic cost		436.75	436.75	436.75			
<b>2. Sanctioned and existing facilities</b>							
Financial cost	454	136.25	136.25	136.25			
Economic cost		47.69	47.69	47.69			
<b>3. Total</b>							
Financial cost		631.99	631.99	631.99			
Economic cost		484.44	484.44	484.44			

**Standard Conversion Factor (SCF):**

Standard Conversion Factor (the SCF) should be taken into account for tradable equipment and materials when the financial cost is converted into the economic cost. The SCF is calculated as 0.88101 as shown in Table 7 in Appendix H with its calculation process.

**Income Tax:**

Corporate income tax to the contractor: 35 % for the contractors and personal income tax: 10 % for the labour according to the Income Tax Act in India. The corporate income tax is applied for net profit of contractors, and personal income tax is applied for total labour cost. In this case, net profit of contractors is assumed at 10 % of the direct construction cost.

**Shadow Wage Rate of Unskilled Labour:**

In the GAP, the shadow wage rate value of 0.5 was applied. So, the same shadow wage rate is applied in the Project since the Project forms a part of the GAP.

**Shadow Price of Land:**

The shadow price rate for land can be estimated as 0.0906. The economic cost for land can be estimated based on the financial cost for land multiplying this shadow price rate (for details on calculation of Shadow Land Price refer Appendix C).

**Table 3.8 Basic Data and Estimation of Shadow Price Rate for Land in Uttar Pradesh**

Cropped area:	26,609	(1,000 Ha as of 1999/00 in Uttar Pradesh)
GRDP in agricultural	627,320	(Million Rs. as of 1999/00 in Uttar Pradesh)
Financial price of land to be acquired	260	(1,000 Rs./Ha according to the interview survey to the UPJN by the JICA Study Team)

**Calculation:**

$$SPRL = \frac{A_g O / CA}{FP_p} = \frac{627,320 \times 1,000,000 / 26,609 \times 1,000}{260 \times 1,000} = 0.0906$$

In this case, gross regional domestic products (GRDP) in agricultural products are applied instead of the amount of agricultural products ( $A_g O$ ) above.

**Others:**

- Price escalation should not be included in the cost side.
- Discount rate of 10 % and 5 % is applied.
- Project life is set as 50 years after completion of the construction works

(4) Economic Evaluation

Economic evaluation for the project is made by using a cash stream as shown in Table 8 in Appendix H taking the conditions and assumptions above into account. Results are summarised as follows:

**Table 3.9 Results of Economic Evaluation in Base Case**

<b>Index</b>	<b>Discount rate 10 %</b>	<b>Discount rate 5 %</b>
NPV	- 181 million Rs.	1,436 million Rs.
EIRR	8.9 %	8.9 %
B/C)	0.91	1.41

The EIRR is calculated at 8.9 % and the B/C are 0.91 for 10% and 1.41 for 5 % discount rate.

There would be several other indirect socio-economic benefits of this project. These benefits derive from increase in number of tourists, conservation of the bio-diversity, and increase of agricultural productivity etc. If these intangible benefits could be converted into monetary terms, economic feasibility of the project would become higher.

**CHAPTER 4**  
**FINANCIAL EVALUATION**



## **CHAPTER 4 FINANCIAL EVALUATION**

### **4.1 INTRODUCTION**

The financial benefit means amount of direct revenue that is collected by the Service Provider ( project implementation organisation) for the sewerage and sewage treatment facilities in the form of “Sewer Tax and Sewer Charge”. In the State of Uttar Pradesh, the service provider is the local “Jal Sansthan”, in this case, the Allahabad Jal Sansthan belonging legally to the Municipal Corporation (locally called as “Nagar Nigam”) which is also the project implementation organisation. The Jal Sansthan also supplies potable water in addition to providing the sewerage services to the people.

Financial costs include direct construction cost, taxes, land acquisition and housing compensation, physical contingencies, administration, engineering cost for detailed design and supervision and preparatory study for the institutional development, and replacement cost. However, price escalation is excluded from the costs for financial evaluation.

Financial costs and benefits throughout the project life are compared in terms of present values. If the total present value of financial costs equals that of financial benefits (when,  $B/C=1$ ), the discount rate used to calculate the present value is called as “financial internal rate of return (FIRR)” and used as the main index of project evaluation to judge the project viability as well as the Net Present Value (NPV) and B/C Ratio (refer Appendix D for detail).

### **4.2 EXISTING FINANCIAL CONDITION**

Estimation of a financial benefit for this kind of projects should be done using the existing tariff structure and then enhance/ establish a new tariff taking into account the affordability of people to pay (ATP).

#### **(1) Existing Tariff System**

There are three kinds of taxes levied in the State of Uttar Pradesh on property:

- i) Property Tax for houses and land,
- ii) Water Tax, and
- iii) Sewer Tax

The tax rates are:

- a) Property Tax: 15.0% of the annual rental value of properties
- b) Water Tax: 12.5% of the annual rental value of properties, and
- c) Sewer Tax: 4.0% of the annual rental value of properties.

These rates may differ a little bit depending upon cities and areas in the whole India, but in the targeted 4 cities, the same rates are applied.

The assessment of annual rental value (ARV) of the properties within the municipal limits is done by the Municipal Corporation. Presently the system of determining the ARV is called as “Self-Assessment System”. The owner of the property has to pay property tax with a rate of 15% of the ARV so assessed.

Water/sewer tax is paid by all those persons who do not have a water/sewer connection but their house is within 100 m of a pipe line/sewer connection. Water charges are paid by those houses, which have regular water connection. However, houses that have connected water supply, both water tax and water charges are calculated, and the higher of the two is charged. The people who pay water charge should also pay sewer charge at a rate of 25 % of the amount of the water charge, if they have a sewer connection.

(2) Affordability to Pay

Average rate of connection to the existing sewerage facilities is around 32.5 % in whole Allahabad City, but the households (HHs) that are connected with existing sewerage system and have capability to pay are only 82.7 % in 2003 as reflected in the Table 3.2.

According to the same table, the annual average household expenditure for waste water disposal is a sum of Rs.1,380 including disposal made by themselves and the charge for existing sewerage services based on the result of the Public Awareness Survey made by JICA Study Team.

The Pan American Health Organisation (PAHO) recommends that the affordability of people to pay for the services of water supply and sewerage is 5 % of the total income per household as a maximum consisting of 3.5 % for water supply and 1.5 % for waste water disposal.

Following table shows a summary of income level surveyed by JICA Study Team in 2003. Details are shown in Table 5 in Appendix H.

**Table 4.1 Average Income Level by Income Group in Allahabad**

(Rs./month/household)

Income group	Average Monthly Household Income
Low	2,660
Medium	9,174
High	20,902
Average	10,912

Source: Public Awareness Survey, JICA Study Team, 2003

From the figures indicated in the above table, their annual average income level can be estimated as Rs. 130,944 per HH (=Rs. 10,912 × 12 months) and their affordability to pay for sewerage services can also be estimated at Rs.1,964 per annum per HH (=Rs. 130,944 × 1.5 %) from the viewpoint of PAHO's recommendation. In other words, their existing household expenditure for waste water disposal services is calculated at Rs. 1,380 (=Rs.115 × 12 months), which is very close to the logical amount of affordability to pay.

(3) Existing Financial Data of Jal Sansthan

The result of the study conducted by the JICA study team shows that the overall average amount paid per HH for sewerage service is around Rs. 265 per annum. This is as per the information provided by the Allahabad Jal Sansthan and the share of sewerage was derived assuming the approximate sewer connection rate to the existing sewerage system (= 56 %) as indicated in the table below.

**Table 4.2 Average Income per Bill from Sewerage in Allahabad**

Year	Charge raised				Total Bills	Value per bill raised in Rs.		Charge collected in million Rs.				Recovery Rate percent	
	No of Bills- Water	Amount in Rs.million	No of Bills- Sewer	Amount in Rs.million		Water	Sewer	No of Bills- Water	Amount in Rs.million	No of Bills- Sewer	Amount in Rs.million	Water	Sewer
2002-03	128,720	134	64,357	17	193,077	1,044	261	114,190	119	33,360	9	89%	52%
2003-04	139,500	153	69,757	19	209,257	1,099	269	121,880	134	41,370	11	87%	59%
Average						1071.66	264.91					88%	56%

### 4.3 FINANCIAL EVALUATION

(1) Estimation of Financial Cost

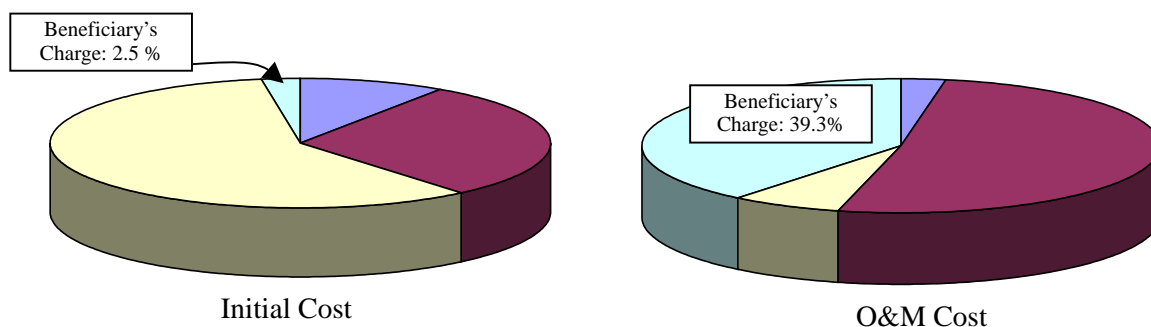
The project cost is estimated at Rs. 3,043 million in financial term excluding the price escalation in total and shown in Table 6 in Appendix H. The annual disbursement of the construction cost is shown

in Table 3.6 in Chapter 3.

The operation and maintenance (O&M) costs are estimated at Rs.145 million per annum in financial term for 2015 in Table 3.7. Replacement cost is estimated at Rs.484 million of pumping stations and treatment plants. This replacement cost would be accrued every 15 years after completion of the facilities including proposed, existing and sanctioned facilities.

(2) Nature of Sewerage Project

In this type of the project for development and improvement of public utility or social infrastructure so called as “public work”, it may not be adequate to analyse cost recovering ability by financial benefit (revenue from collection of user charge). The required cost for sewerage services is much more than that for water supply services. Nevertheless, the charge for sewerage services is usually lower than that for water supply. Thus, generally sewerage projects cannot recover all O&M costs as well as initial capital outlay. Following illustrations depict a Japanese example of cost recovery of sewerage services.



**Figure 4.1 Share Rates of Beneficiaries (Users) in Initial Cost and O&M Cost for Sewerage Services in Japanese Case**

As shown in the figures above, the beneficiary’s initial connection charge (advance payment) can recover only 2.5 % of the total initial cost and user service charge can recover about 40 % of the O&M cost in Japan. A major fraction of the remaining costs are financed by the general account of the central government and/or the local government.

Among the OECD member countries, there is no country that can recover initial cost and O&M cost by the revenue collected from users.

In the sewerage projects, initial capital outlay cannot be recovered by user charge and only some part of the O&M costs can be recovered by the sewerage tax/charge. Therefore, only O&M cost and sewerage user charge but not initial capital cost are considered in financial evaluation of the Project.

(3) Financial Evaluation

The O&M cost of non-sewerage scheme consisting of construction of community toilets and the Dhobighats is excluded in financial evaluation because it should not be recovered by sewerage user charge and it will be recovered by the user charge of each component on self-sustainable basis.

Sewerage projects are public works and their financial viability cannot be worked out using standard financial evaluation techniques as they cannot generate profit or expect cost recovery as their objective. The main objective of such projects is to provide better living conditions to the residents of the city and also make the environment clean and friendly. Hence it cannot be evaluated as a commercial project for cost recoveries and profit objectives.

These projects need a large initial capital outlay, which cannot be recovered from the beneficiaries. At the same time these projects have a very high operation and maintenance and replacement costs. Hence, it is very difficult to evaluate the financial viability of these kinds of projects.

Since the project is public work the capital cost shall be paid out of the general account of the local, state and/or national governments and O&M costs should be recovered from sewerage charge or tax from the users as much as possible and general account of the local government.

The project is financially evaluated preparing a cash stream as shown in Table 9 in Appendix H. The required user charge to recover the entire O&M and replacement cost assuming existing bill collection rate is estimated at Rs. 2,360/per annum per household. The detailed cash flow is shown in Table 9 in Appendix H. The estimated average current sewer charge per bill is Rs.265 per annum. The required user charge is about 8.9 times higher than the current charge level and higher than the estimated maximum affordability to pay of Rs. 1,964 per annum.

In the basic financial evaluation the required sewer tax/ charge levels to recover the entire cost of O&M is worked out. Then, in the following chapter, benefit increase measures are discussed and detailed financial analyses are conducted to make the project financially feasible as much as possible.

#### (4) Repayment Schedule of Foreign Loan in Basic Case

Under the existing value per bill and the existing charge collection rate of Jal Sansthan in Allahabad, the amount to be borne out of the general account of the State Government is estimated as shown in Table 11 and Table 12 in Appendix H together with a repayment schedule of the initial investment cost. Table 11 shows the case in category of the General Project under the terms of 30 years repayment period including 10 years of grace period with 1.3 % of annual interest rate. Table 12 shows the other case in category of the Specified Environmental Project under the terms of 40 years repayment period including 10 years of grace period with 0.75 % of annual interest rate.

In both the cases, the State Government of Uttar Pradesh should bear the amount of Rs. 128 million in 2013, Rs. 142 million in 2014 and Rs. 155 million in 2015. The Project is designed for 2015 population scale, and it is assumed that the same house connection rate may be kept. Therefore, after 2015, the same amount of state transfer will be needed if the capital cost is granted by the National Government.

**CHAPTER 5**  
**REVENUE INCREASE MEASURES**

## **CHAPTER 5 REVENUE INCREASE MEASURES**

### **5.1 INTRODUCTION**

To make the project feasible, revenue increase is required to reduce the burden on the Local and State Government finances to O&M cost of the project. Following measures are proposed here to increase the revenue and thus make the operating agency partially self-sustainable.

- Improvement of billing and bill collection
- Utilise the by-products of sewerage system
- Others such as improvement of accounting system

### **5.2 IMPROVEMENT OF BILLING AND BILL COLLECTION**

Increase in the volume of billing and the bill collection efficiency results in substantial increase in revenue. Following are revenue increase measures.

- Increase the tax net
- Reassessment of properties
- Reduce process time per bill
- Increase productivity by introducing incentive schemes

#### **(1) Increase Tax Net**

In most of the Jal Sansthan considerable number of records falls far short of the total number of properties included in the tax net. One such example is Kanpur, where more than 300,000 properties were not included in the tax net. The reasons for this are many but primarily consist of lack of human and financial resources. It is hence, imperative to conduct a comprehensive survey of the entire municipal area to bring all the properties under the tax net. In addition, the property permission applications should be integrated with the sewerage tax billing. This can be effectively carried out by creation of a GIS based database.

#### **(2) Re-assessment of Properties**

In most cities in UP, the assessment of property values was done many years ago. Property tax is based on the annual rental value of the property, which is unrealistic. Water and sewerage charges, which in turn are a percentage of the property tax, thus also become unrealistic. A re-assessment of all properties as per the present valuation would significantly increase the revenue without any increase in the tariff. Since water and sewerage tax are linked with the property tax, revenue on that account will also increase with re-assessment of the property values.

#### **(3) Reduction in the Bill Process Time**

Integrated computerized system should be introduced. The billing records in Allahabad are at present maintained on paper and the receipts are written by hand. This method is time consuming and results in procedural delays. One way to overcome this limitation is computerization of the whole system. This system was implemented under the Institutional and Community Development Project (ICDP) in Kanpur.

#### **(4) Increase in Collection**

One of the options that can be looked into for increase in collection is to privatise the billing and collection.

Jal Sansthan need to get a survey done of all the houses connected to the sewerage facility. This will give the exact figure of the number of connections and will help in getting an approximate value of the

revenue that can be realized in the form of water and sewerage dues.

The billing and the collection of the sewerage and water dues can be outsourced to a private enterprise. This will ensure that the demand for the charges is raised accurately and in totality. The private enterprise will ensure maximum collection.

The Jal Sansthan can give the billing and collection contract with a condition that the contractor would be required to pay 50% of the anticipated total collection in advance. The contractor should be given a collection based incentive. This will motivate the contractor to ensure proper, timely and full collection.

(5) Revision of the Existing Tariff System

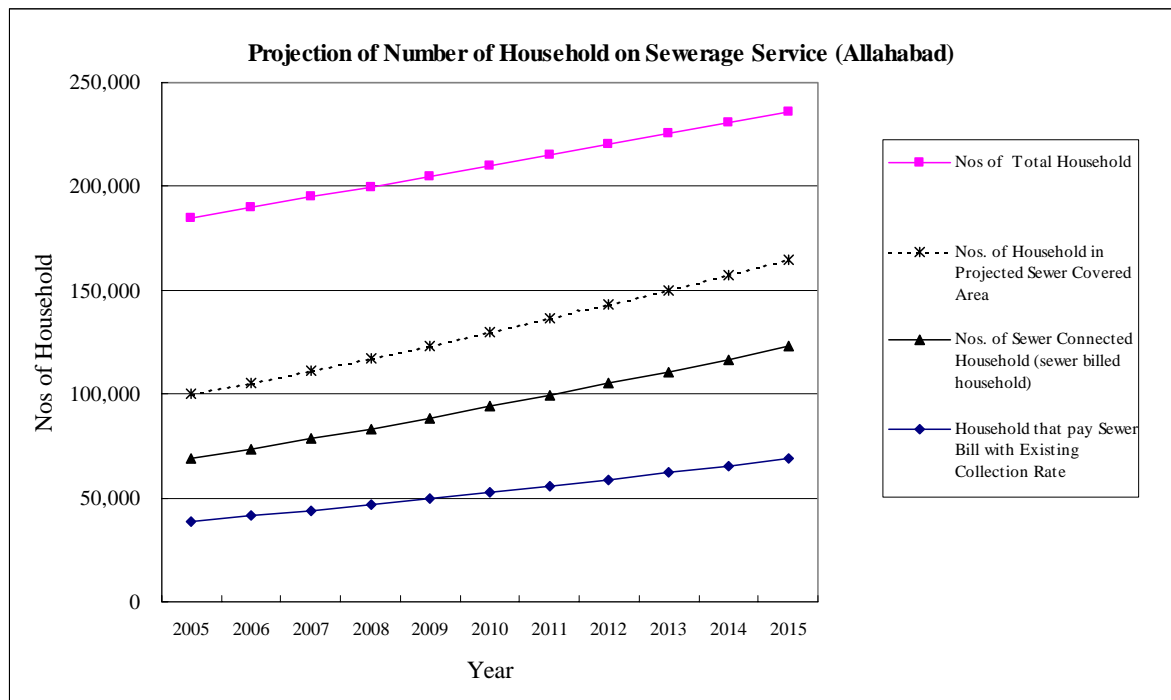
The average ability to pay (ATP) for sanitation is Rs. 1,964 per household per annum and the required charge per bill is estimated at Rs.2,360 per household per annum assuming existing sewer connection rate and bill collection rate, but the actual unit value per bill is only Rs. 265 per bill per annum. In this regards, the sewer tariff could be increased to some extent. Because passing on the entire burden of the differential of the O&M cost and recovery from tax and charges to the State Government will also be not a good idea.

However, it will not be possible to increase the tariff based on the affordability to pay of each household. The tariff system revision should be supported by rules, regulations and/or laws together with restructuring of the Service Provider.

(6) Sewer Connection (Billing) and Bill Collection Rate

Following figure shows the conservative projection of the number of all the households in the city area, the households in the sewer area, the sewer connected households (or sewer charge billing households) and sewer bill collected households until the target year 2015 based on existing collection. The detail projection is shown in Table 4 in Appendix H.

As seen in the figure, there is high potential to increase sewer connection and improve sewer charge collection efficiency.



**Figure 5.1** Number of total households in the city, households in the sewerage service area, sewer connected households and sewer bill collected households

### 5.3 UTILISATION OF BY-PRODUCTS

It will be necessary at this stage to find alternative sources of revenue that could reduce the additional O & M cost burden on the general account of the State Government.

The sewage generated in the city of Allahabad will be treated in sewage treatment plants (STPs), which generate treated water and digested sludge or more commonly known as compost. Both of these resources have commercial value and generate additional revenue to the operating agency. As calculated in Table 10 in Appendix H an amount of Rs.4.4 million per annum could be recovered from these resources, i.e., sale of treated water for irrigation purposes and digested sludge (compost used as manure).

As already mentioned in the Chapter 3, the quantity of the treated effluent for sale for irrigation use has been taken as 50 mld. Sludge for regular sale would be generated in the new STPs proposed at Rajapur and Kodara which will be based on UASB technology and at the existing STP at Naini based on ASP technology.

Naini STP, as already stated in Chapter 3, is being operated at overload. Hence any significant amount of additional sludge may not become available at Naini. Also, although the proposed capacities of Rajapur and Kodara STPs are 65 and 15 mld respectively, considering the dilute nature of the influent sewage at these STPs, because they will be getting much of the influent from the open nalas, particularly at Kodara, the quantity of sewage for the estimation of sludge generation has been taken as 50 mld only.

The rates used for calculation of the revenue from treated water are the prevailing rates charged by the irrigation department. The rate for compost is very conservatively estimated at Rs 0.50 /kg.



## 5.4 FINANCIAL EVALUATION FOR CASE STUDY OF REVENUE INCREASE MEASURES

The amount of revenue generated from taxes and charges by the Service Provider, Allahabad Jal Sansthan, can cover only around 13 % of the total O&M cost in 2015, and the remaining amount would be borne by the U.P. State Government. Therefore, tariff revision or revision in the annual rental value of properties and improvement of charge collection rate are recommended so that the amount of the State transfer could be reduced as discussed hereunder.

Following table shows the result of the case studies taking into account the additional sources of revenue and improvement in the charge collection rate and charge level and sewer connection rate.

**Table 5.1 Summary of Case Studies for Recovering the O&M Cost**

Case in Sewer Charge level	Total O&M Cost required	Base Case		Case - 1			Case - 2				
		Revenue from sewer charge	Amount to be borne by State Transfer	Revenue from sewer charge	Optional Sources		Amount to be borne by State Transfer	Revenue from sewer charge	Optional Sources		Amount to be borne by State Transfer
					Revenue from treated water sales	Revenue from sludge sales			Revenue from treated water sales	Revenue from sludge sales	
Million Rs./year Existing	144.7	18.1	126.6	20.0	1.0	3.4	120.4	31.0	1.0	3.4	109.3
50%	144.7	27.2	117.5					46.6	1.0	3.4	93.7
100%	144.7	36.2	108.5					62.1	1.0	3.4	78.3
350%	144.7	81.5	63.2					139.7	1.0	3.4	0.6
Conditions	Existing sewer collection rate	1) 5% increase of sewer charge 2) 5% increase of collection rate 3) New revenue sources (sales of sludge as fertilizer and treated water for irrigation)			1) Increase in bill collection rate to 90 % 2) Increase in connection rate to 80 % in sewer area 3) New revenue sources (sales of sludge as fertilizer and treated water for irrigation)						

Note:

	Existing Collection Rate of Bills	Existing Charge Level (Rs./Bill/ Year)	Affordability to Pay based on the income level: 1.5 % of average annual income per HH (Rs./Rs. per annum)
Lucknow:	80%	573	2,775
Kanpur:	50%	1,221	1,648
Allahabad:	56%	265	1,964
Varanasi	78%	112	1,889

Case-2

Estimated percentage of house connections in the sewer area	69%	Case-1 charge %	0.05
Estimated percentage of households in the sewer area	54%	Case-1 collection %	0.05
Estimated percentage of bill collected households out of total households in sewer area	42% in 2015		
Proposed collection rate	90% fixed		
Proposed connection rate	80% fixed		

**Reference:**

**Existing average expenditure for sewerage and waste water treatment and drainage per household in other cities in India**

New Barrackpore	1116
Burdwan	603
Rajkot	318
Jaipur	297

As of 1995, 2004-price level

**Recovered ratio of sewer charge to O&M cost in other cities in India**

New Barrackpore	5%
Burdwan	9%
Rajkot	10%
Jaipur	27%
Vijayawada	6%

As in the year 1995

Assuming the connection rate of 80 % in sewer area and the bill collection rate of 90 %, the amount to be borne by the State transfer will be reduced from Rs.127 million to Rs.109 million.

In this case, if the charge level is increased by 100 % (2 times of the existing charge level of Rs.265/HH per annum, in other words, the charge level will be revised to Rs.530/HH per annum), the

amount to be borne by the state transfer will be reduced to Rs.78 million.

Furthermore, if the charge level will be increased by 350 % (4.5 times of the existing charge level, in other words, the charge level will be revised to Rs. 1,192/HH per annum), the revenue and O&M cost will be balanced. Even at this charge level, the charge to be revised is within the affordability to pay for sanitation (Rs. 1,964/HH per annum).

From this viewpoint, a revision of the charge level is required by means of not only the revision of the existing tariff system but also the reassessment of the Annual Rental Value of properties since the charge level is closely linked with the Annual Rental Value of properties.

## **5.5 OTHER RECOMMENDATIONS**

### **(1) Improvement in the Accounting Systems**

Presently the Municipal Corporations do not use professional help in their accounting and continue to maintain accounts on single entry systems. However this is not the case with the Jal Sansthans and they are using services of qualified professional Chartered Accountants. Attempts in isolation are also being made to computerize the billing and improve collection process. However this process is still in a very nascent stage.

Also there seems to be lack of standardization on the accounting system and reporting. There is a lot of ambiguity about heads of expenditure and income both at the Municipal Corporations and Jal Sansthans.

Most of the Jal Sansthans are inadequately equipped with computers and although they have positive and forward looking Finance Officers, there is a lack of professional assistance and guidance. However some of our recommendations are as follows:

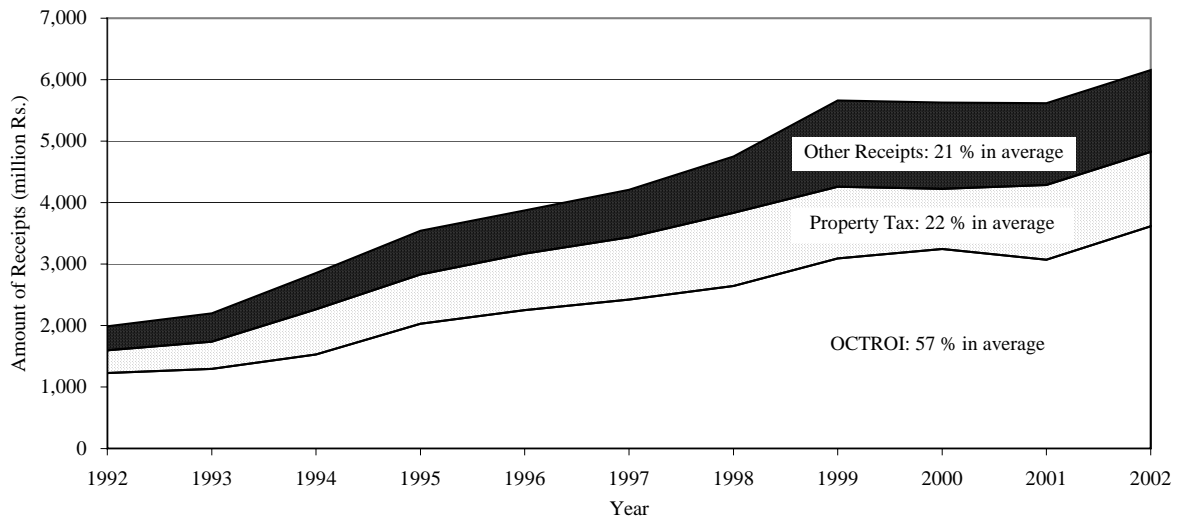
- 1) A good accounting software needs to be implemented which can bring in standardization across the Jal Sansthans and Nagar Nigams in book keeping. This will help in having a better control and timely finalization of accounts.
- 2) All the zones need to be connected with each other and to the main office through a dedicated Wide Area Network connectivity. This will help in better monitoring the activities of each zone.
- 3) Standardised Management Information System formats and extensive use of computers can help in improving the efficiency and effectiveness of the accounting, inventory and other functions.
- 4) The present staff needs to be trained on use of computers.

Detail description of ways to introduce the above mentioned measures has been given in a separate Volume titled "Institutional Development Programme".

### **(2) Lessons From the Other Cities**

The Study Team has made interview surveys and reconnaissance in some of the other cities as well i.e., Ahmedabad and Surat in the State of Gujarat and Indore in the State of Madhya Pradesh for reference. In Gujarat, a specified tax called as "Octroi Tax" is still in force. The Octroi Tax is like an import custom at city level which is applied for the purpose of activation of the regional industries and protect them from the external economic pressure.

The Octroi Tax revenue shares at 57 % in Ahmedabad and 40 % in Surat. Following figure illustrates its transition in Ahmedabad:



**Figure 5.2 Income Statement of Ahmedabad in the State of Gujarat**

Further, the Ahmedabad Municipal Corporation issues a specified bond called as “City Bond” which is tax-free. The City Bond has been issued 3 times in 1998, 2002 and 2004, with assured returns of 14.00 %, 9.00 % and 6.85 % respectively.

In Madhya Pradesh, the Octroi Tax was abolished in 2001, but the Indore Municipal Corporation received a specified “Octroi Compensation Transfer” from the State Government as well as has been receiving general State Transfer thereafter. Therefore, it seems that the Indore Municipal Corporation is keeping the same financial scale with that in the time when the Octroi Tax was still in force.

The above mentioned financial back ground is completely different from the targeted 4 cities belonging to the State of Uttar Pradesh.

Furthermore, these cities, without exception, require special features from the financial and institutional viewpoint which are:

- 1) To adopt a systematic accounting system with “the double entry book keeping” using computers,
- 2) To adopt auditing system with professional chartered accountants,
- 3) To adopt a rational tax collection method using banking system,
- 4) To own accountability for all the information and data including financial status to the public,
- 5) To keep a good relationships between institutions concerned so that information/data can be exchanged with each other any time, and
- 6) To keep link and close coordination with other organisations under the Municipal Corporation, so that it becomes able to work like one single entity as a whole.

Almost all of these lessons should be reflected in the targeted cities as Project Implementing Organisations to execute and promote it for the future. Details of these matters concerning institutional development programmes are discussed in another volume of this report.

Details on the said interview survey and reconnaissance in the other cities are attached hereunder as Appendix E, F and G.

## *Appendix A*

## **APPENDIX A**

### **REVIEW OF THE NATIONAL GOVERNMENT FINANCES**

The financial situation of the National Government (i.e. Government of India) is rather healthy since 1999-2000. It means that the Government finance has been supported by both the tax revenue in revenue account (current account) and receipts in the form of public debt in capital account and there is a sharp rise in them since 1999-2000.

Out of the total tax revenue, around 62 % - 74 % comes from the taxes on commodities and services which are indirect taxes. The receipts in revenue account (current account), i.e. grant-in-aid is less than 1 % consisting of external grant assistance and aid materials & equipment in the nation as discussed in the Master Plan Study Report. The share of the external debt to the capital income ranges between 2.0 % to 3.2 %.

On the expenditure side **General Services** is almost half of the total expenditure. The General Services consists of Organs of State, Fiscal Services, Interest Payment and Servicing Debt, Administrative Services, Pensions and Miscellaneous General Services, and Defence Services. **Economic Development Services** is the second largest head of expenditure. It consists of Agriculture and Allied Activities, Rural Development, Special Areas Programme, Irrigation and Flood Control, Energy, Industry and Minerals, Transport, Communication, Science Technology and Environment, and General Economic Services. The third largest group of expenditure is **Grants-In-Aid** (consists of Grants-In-Aid to State Governments, Grants-In-Aid to Union Territory Governments, Payment of States' Share of Union Excise Duties, Technical and Economic Cooperation with Other Countries, and Aid Materials and Equipment). In this category, the Grants-In-Aid to State Governments are the top sharing 95.4 % of the total expenditure. It means that almost all Grants-In-Aid are for the government transfer to the states. Expenditure on **Social Services** is the fourth group sharing around 5 % only of the total expenditure. It consists of General Education, Technical Education, Sports and Youth Services, Art and Culture, Medical Public Health, Family Welfare, Water Supply and Sanitation, Housing, Urban Development, Information and Publicity, Broadcasting, Welfare of Scheduled Castes, Scheduled Tribes and Other Backward Classes, Labour and Employment, Social Security and Welfare, Nutrition, Relief on Account of Natural Calamities, Other Social Services, and Secretariat-Social Services. The expenditure on **Water Supply and Sanitation** concerning the Project stands at third position under this expenditure group (Social Services) with a share of 4.7 % with General Education at top with 36.2% and Medical Public Health and Housing at the second position sharing 10.8% and 10.9%, respectively as per data of 2002-3.

## *Appendix B*

## **APPENDIX B**

### **REVIEW OF THE FINANCIAL POSITION OF STATE OF UTTAR PRADESH**

The financial figures since 1997-98 for the Uttar Pradesh State shows a deficit. The year financial figures for the years 2000-01 and 2001-02, which is estimates, show a positive balance. An analysis of the same is as under:

The largest amount of revenue of the Uttar Pradesh State is the Tax Revenue with a share of around 80 % since 1997-98 according to its financial statement as discussed in the Master Plan Study Report. In tax revenue, the share of State's own Tax is slightly more than 50 % to the total tax revenue during last 8 years since 1994-95, remaining amount comes as a share from National Government from other taxes consisting of Income Tax, Estate Duty, and Union Excise Duties

The state's own tax income, consists of Agricultural Income Tax and Taxes on Professions, Trades, Callings and Employment which are less than 1 %. The amounts of Taxes on Property and Capital Transactions consisting of Land Revenue, Stamps and Registration Fees, and Urban Immovable Property Tax share ranging from 7 % to 8 % to the total Tax Revenue.

Loans and Advances from Center (the National Government) show a large share of inflow at 30.8 % as indicated in the same statement.

The expenditure on the other hand comprises of 5 categories, Developmental Expenditure, Non-Developmental Expenditure, Grants-In-Aid and Contributions, Compensation and Assignments to Local Bodies and Panchayati Raj Institutions and Reserve with Finance Department.

Developmental Expenditure and Non-Developmental Expenditure are the major expenditures categories, and the former is slightly larger than the latter as per the actual expenditure shown in since 1994-05 till 1999-2000.

The Development Expenditure consists of Education, Sports, Art and Culture, Medical and Public Health, Family Welfare, Water Supply and Sanitation, Housing, Urban Development, Welfare of Scheduled Caste, Scheduled Tribes and Other Backward Classes, Labour and Labour Welfare, Social Security and Welfare, Food and Nutrition, Relief on account of Natural Calamities, and Others as shown in the table below.

Among them, the expenditure for Education, Sports, Art and Culture is largest one sharing at 60 % or more. The second one is the expenditure for Medical and Public Health ranging from 11 % to 19 % of its share rates. The share of **Water Supply and Sanitation** related to the Project ranges only from 3.6 % to 7.0 % since 1994-95 as shown in the above table.

The economic development expenditure consists of Agriculture and Allied Activities, Rural Development, Special Area Programmes, Irrigation and Flood Control, Energy (Power), Industry and Minerals, Transport and Communications, Science, Technology and Environment, and General Economic Services.

According to the data, the expenditures for Agriculture and Allied Activities, and Rural Development are the largest ones ranging from 55 % to 65 % totally during last several years. The share of expenditure on Irrigation and Flood Control partly related to the Project are in the range of 16 % to 36 % since 1994-05.

In the Capital Account, the expenditure for Total Capital Outlay and Loans and Advances by State Government share around 70 % or more since 1994-95. The Total Capital Outlay means the direct

investment for development consisting of Social and Economic Services. The Loans and Advances by State Government mean loans and advances for the development projects for both the Social Services and Economic Services in the State.



## *Appendix C*

## APPENDIX C ECONOMIC EVALUATION INDICES

The EIRR is to be calculated using a cash flow of economic cost and economic benefit during the project life. This EIRR is defined by the following formula:

$$\sum_{t=1}^{t=T} \frac{C_t}{(1+R_e)^t} = \sum_{t=1}^{t=T} \frac{B_t}{(1+R_e)^t}$$

Where,  $T$  = the last year of the project life,  
 $C_t$  = an annual economic cost flow of the project under study in year  $t$ ,  
 $B_t$  = an annual benefit flow derived from the project in year  $t$ , and  
 $R_e$  = the Economic Internal Rate of Return (EIRR) (a discount rate to be used for costs resulted at the same amount of the benefits in terms of the present value).

The NPV is expressed as “B-C” and defined by the following formula:

$$NPV = B - C = \sum_{t=1}^{t=T} \frac{B_t}{(1+R_e)^t} - \sum_{t=1}^{t=T} \frac{C_t}{(1+R_e)^t}$$

It means that, if the present value of the benefit subtracting by the present value of cost would become positive, then the project being under study will have a reliability to execute.

The B/C Ratio is defined by the following formula:

$$B/C = \frac{\sum_{t=1}^{t=T} \frac{B_t}{(1+R_e)^t}}{\sum_{t=1}^{t=T} \frac{C_t}{(1+R_e)^t}}$$

It means that, if the rate of the present value of the benefit dividing by the present value of the cost would become more than “1.00”, then the project being under study will have a reliability to execute.

The project life is assumed at 50 years after completion of the construction works for the Project.

Cash flow of the economic cost and economic benefit should be made for the first year of the construction works to the end of the project life.

In this case, annual operation and maintenance cost (O&M Cost) should be taken into account. And, some amount of replacement cost should also be taken into consideration since some parts of the initial works for the facilities as metal works may not be durable during the project life.

### Shadow Price of Land:

Agricultural productivity is one of index for estimation of shadow price of land. The formula is as follow:

$$SPRL = \frac{A_g O}{FP_p / CA}$$

Here,  $SPRL$ : a shadow price rate for land,  
 $A_g O$ : amount of agricultural products,  
 $CA$ : harvested or cropped area (ha), and

$FP_p$ : financial price of land to be acquired for the Project.

Concerning the data for inserting to the formula above, following data is available from the same Statistics above, and using these data, the shadow price rate for land can be estimated at 0.0906. The economic cost for land can be estimated based on the financial cost for land multiplying this shadow price rate.

## *Appendix D*

## APPENDIX D FINANCIAL EVALUATION INDICES

Financial costs and benefits throughout the project life are compared in terms of present values. If the total present value of financial costs equals that of financial benefits (when, B/C=1), the discount rate used to calculate the present value is called as “financial internal rate of return (FIRR)” and uses as the main index of project evaluation to judge the project viability as well as the Net Present Value (NPV) and B/C Ratio. This FIRR is to be calculated by the same manner with the economic evaluation using a cash flow of financial cost and financial benefit during the project life. This FIRR is defined by the following formula:

$$\sum_{t=1}^{t=T} \frac{C_t}{(1 + R_f)^t} = \sum_{t=1}^{t=T} \frac{B_t}{(1 + R_f)^t}$$

Where,  $T$  = the last year of the project life,  
 $C_t$  = an annual economic cost flow of the project under study in year  $t$ ,  
 $B_t$  = an annual benefit flow derived from the project in year  $t$ , and  
 $R_f$  = the Financial Internal Rate of Return (FIRR) (a discount rate to be used for costs resulted at the same amount of the benefits in terms of the present value).

The NPV is expressed as “B-C” and defined by the following formula:

$$NPV = B - C = \sum_{t=1}^{t=T} \frac{B_t}{(1 + R_f)^t} - \sum_{t=1}^{t=T} \frac{C_t}{(1 + R_f)^t}$$

It means that, if the present value of the benefit subtracting by the present value of cost would become positive, then the project being under study will have a reliability to execute.

The B/C Ratio is defined by the following formula:

$$B / C = \frac{\sum_{t=1}^{t=T} \frac{B_t}{(1 + R_f)^t}}{\sum_{t=1}^{t=T} \frac{C_t}{(1 + R_f)^t}}$$

It means that, if the rate of the present value of the benefit dividing by the present value of the cost would become more than “1.00”, then the project being under study will have a reliability to execute.

The project life is assumed at 50 years after completion of the construction works for the Project in the financial evaluation too. Cash flow of the financial cost and financial benefit should be made for the period from the first year of the construction works to the end of the project life.

In this case, annual operation and maintenance cost (O&M Cost) should be taken into account as the same manner in case of the above economic evaluation. And, some amount of replacement cost should also be taken into consideration since some parts of the initial works for the facilities as metal works may not be durable during the project life.

## *Appendix E*

## **APPENDIX E**

### **A REPORT ON AHMEDABAD MUNICIPAL CORPORATION**

#### **Introduction To Ahmedabad City**

Ahmedabad is the largest city in the state of Gujarat situated on the banks of Sabarmati River. It is fast approaching to be recognized as a mega city, with rapidly growing population Trade, Commerce, Industry, education etc. Ahmedabad has had a significant role in the development of the country. It has the largest textile industry.

Historically this city has played a major role in the Independence movement of the Nation. The Ashram established by Mahatma Gandhi on the banks of river Sabarmati became a centre of all political activities and movements.

Today Ahmedabad has established one of the most prestigious educational Institution of the country in various fields be it management, design, engineering etc.

#### **Ahmedabad Municipal Corporation**

##### **1. General Information**

The Ahmedabad Municipal Corporation was established in 1950 as body corporate under the provisions of “The Bombay Provincial Municipal Corporation Act” of 1949. Ahmedabad Municipal Corporation serves an area of around 190.80 sq. kms. including the city and its peripheral areas and provides a range of civic services to around 35.4 lakh citizens of the city of Ahmedabad.

##### **2. Responsibilities**

The Bombay Provincial Municipal Corporation Act defines the scope and extent of responsibilities of the Corporation. The Act has entrusted on Ahmedabad Municipal Corporation the responsibility for the maintenance, operation and development of certain public utilities in the city. The services currently being provided by the Ahmedabad Municipal Corporation are classified as obligatory and discretionary services.

##### **2.1 Obligatory**

The BPMC Act has identified a list of mandatory functions/services for which the Ahmedabad Municipal Corporation has to make reasonable and adequate provision. These obligatory functions/services are listed as under:

- (1) the watering, scavenging and cleansing of all public streets, collection, removal, treatment and disposal of sewage,
- (2) the construction, maintenance and cleansing of drains and drainage works, and of toilets, water-closets, urinals and similar conveniences;
- (3) the construction or acquisition and maintenance of public hospitals and dispensaries including hospitals, maintaining, aiding and suitably accommodating schools for primary education
- (4) the lighting of public streets, maintenance of municipal office and of all public monuments and open spaces and other property vesting in the Corporation;
- (5) the registration of births and deaths; and,
- (6) the management and maintenance of all municipal water works and the construction or acquisition of new works necessary for a sufficient supply of water for public and private purposes.

## **2.2 Discretionary**

The Corporation may, in its discretion, provide from time to time, certain activities, which may promote public safety, health or convenience. In this regard the Ahmedabad Municipal Corporation has been providing services such as establishments of institutions for the disabled persons, maintenance of secondary schools, running of dispensaries, maternity homes, general hospitals, Post-Graduate Medical College, maintenance of gardens, planting of trees on road sides, holding of exhibitions etc. to the city of Ahmedabad. The State Government, provides grants to Ahmedabad Municipal Corporation to compensate it as far as possible for the expenditure incurred on these boards.

## **3. Organisational Structure**

The Ahmedabad Municipal Corporation has divided its functions into five zones, each covering of nearly Two Hundred Thousand properties. There are enough executive powers given to the operations staff for better implementation. Secondly there is a lot of administrative support from the politicians.

The organisational Structure is given below:

- Municipal Commissioner is the Head of the Ahmedabad Municipal Corporation
- Under him are nine Deputy Municipal Commissioners and they are
  - a. Five Zonal Deputy Municipal Commissioners
  - b. One Deputy Municipal Commissioner- Projects
  - c. One Deputy Municipal Commissioner- Finance
  - d. One Deputy Municipal Commissioner-Octroi
  - e. One Deputy Municipal Commissioner- Administration
- The Zonal Deputy Municipal Commissioners have the following departments under him:
  - a. Engineering
  - b. Administration
  - c. Health
  - d. Town Planning
  - e. Tax
- In case of Tax department
  - Head of the department is the Deputy Assessment Tax Collector
    - Two Assistant Managers
      - o Four Divisional Superintendents
        - Twelve Inspectors
          - Twenty Four Sub Inspectors

In addition to the above Deputy Municipal Commissioner one person from the police department in the rank of Inspector General Of Police is deputed for ensuring proper enforcement of law.

## **4. Reforms**

### **4.1 Civic Centers**

Ahmedabad Municipal Corporation has set up 16 “City Civic Centers” that provides basic facilities to the citizens. Some of the services provided by these centers are:

- a. Assistance in assessment of Annual Rental Value of Property
- b. Payment of various Taxes
- c. Birth and Death registration certificate
- d. Registration of Shops and Establishment
- e. Booking of various municipal corporation facilities
- f. Approval of House Plan
- g. Complaints Redressal



Ahmedabad Municipal Corporation has tied up with various banks and one can pay taxes in the local bank or thru credit card on the net.

#### **4.2 Up gradation and Maintenance Of Existing Systems**

In order to save on Capital Investment the old equipments have been refurbished and their capacities enhanced to cope up with the increase in the load. Measures are being taken to design equipments that could be used to maintain the sewerage system which would not involve huge cost outlay.

Ahmedabad Municipal Corporation has tied up with “Nirma Institute of Technology to help design and develop indigenous scavenging and dredging equipments. Students are being funded to carry out projects for and on behalf of the corporation.

#### **4.3 Privatization and Partnership**

Efforts are towards reducing the manpower and other long-term overhead costs by contracting various activities like solid waste management, water supply and maintenance of sewers to private parties. The Ahmedabad Municipal Corporation normally out sources its functions to the family of the employees. Cleaning of streets and scavenging to the extent of 50% has been outsourced. Production and maintenance of water supply has been outsourced to the extent of 70%.

Maintenance of parks, gardens, and traffic circle is outsourced to private companies.

Public facilities like public toilets and urinals have been contracted out for running and maintaining.

#### **4.4 Improvement in Systems**

##### **4.4.1 Accounting System**

The accounting system has been computerized and double entry system of accounting has been introduced. A system of continuous audit has also been introduced. The Budget and actual financial situation are displayed on the website.

##### **4.4.2 Octroi Recovery System**

Measures have been adopted to improve Octroi recovery and valuation. A three-tier system has been adopted for recovery of Octroi Tax. The first level being the entry point the second point is the check post manned by professionals who check for the valuation of goods. The layer is a team of young personnel who check vehicles carrying goods at random and have the power to charge fine up to 10 times of the value of tax in case of false, short or under valuation. These teams have been equipped with wireless systems for communication.

##### **4.4.3 Simple Annual Rental Value Assessment System**

The process of devising a rational system of Valuation of Property for Taxation purpose, this was devised with active participation of the general public and it took nearly two years to devise and implement the present carpet area based method of Valuation. The method is scientific and simple.

The revision in the rates of property tax is again done with active participation of the public at large.

In order to successfully implement the new system the Ahmedabad Municipal Corporation had employed private parties to carry out exact measurement of each and every property in order to find out the exact carpet area.

##### **4.4.4 Capacity Building**

Extensive training is being imparted to existing employees, for capacity building to work in multi-tasked environment. Training is also being held for Corporations. Corporations and senior officials of the corporation are being sent to various other countries to see, learn and adopt best practices existing in developed countries.

## **5. Project Financing**

Ahmedabad Municipal Corporation in addition to utilizing its own revenue has also borrowed from LIC, HUDCO, NHB, ICICI Bank, Gujarat Housing Board and Gujarat Municipal Finance Board and Tradable Bonds. These loans have been specifically utilized for part financing various water supply and sewage schemes, integrated urban development programmes, etc. that the Corporation has undertaken over the years. These loans have a tenor ranging from 5 to 15 years and are at fixed interest rates, which range from 7.5 % to 12.25 % pa.

Ahmedabad Municipal Corporation is the first in the country to raise funds by issuing tradable Bonds to the public. Since 1995 the Corporation has made 3 issues of Bonds. The first issue was in 1998, second in 2002, and third in 2004. The Bonds are listed on stock exchanges and CRISIL (an organisation involved in rating public issues of companies) has rated Ahmedabad Municipal Corporation Bonds as AA SO+. The Bonds do not have a guarantee of the State they are issued on the strength of the Ahmedabad Municipal Corporation.

## **6. Finances**

Ahmedabad Municipal Corporation derives its revenue from both tax and non-tax sources. Tax revenue, is the primary source of income for over the last few years and has constituted around 80% of the total revenue, comprising of Octroi Tax and Property Tax.

### **6.1 Octroi**

Octroi is a tax levied on goods imported by road, rail or air into the City for either consumption or trade within the City. The Octroi funds (which account for 70% of the total tax revenue) are collected on daily basis from the various collection points and are deposited in the Corporation's Central Treasury account on the subsequent day.

### **6.2 Property Taxes**

The other major source of revenue for the Corporation is the Property-based taxes. This tax is levied on both the residential and non-residential properties. In past The Corporation maintained a record of the Average Ratable Value of all the properties existing within the city limits.

The Property Tax collections made by AMC grew from Rs. 33.58 crores in 1991-92 to Rs. 92.08 crores in 1996-97 registering an annual growth of 22%. A new area-based framework for property tax assessment and billing/payments through e-Governance has improved transparency and collection efficiency considerably.

The Corporation has been generating surplus each year after meeting its regular expense obligations. An analysis of the financial statement of 2002-03 shows:

- Establishment expenses account for around 40% of the revenue or 48% of the total expenditure
- The debt servicing cost is around 15.48% of the revenue

The surplus so generated is being used as corporation's contribution towards building capital assets.

Ahmedabad Municipal Corporation has been given AAA SO+ rating by CRISIL for most secured investment.

## **7. Lessons Learnt**

- 1) Ahmedabad Municipal Corporation does not depend upon the State Government for any financial assistance, as it is able to muster up a large amount of revenue in the form of Octroi Tax. Ahmedabad being an industrial town has a lot of inflow of goods from other parts of the country especially Maharashtra.

The Ahmedabad Municipal Corporation has very easy and user-friendly systems for payment

- of taxes, assessment of Annual Rental Value of Properties, spot delivery of various registrations a licenses (such as birth and death registration, shop license etc.).
- 2) Enough executive powers are vested with the persons carrying out operation in the city.
  - 3) Major development activities and routine activities such as increase in the property tax rate are done in consultation with the residents of the city. The resident are encouraged to participate in any form of dialogue with the Ahmedabad Municipal Corporation
  - 4) There is complete operational and financial transparency. The budget for the year is posted on to the website for the citizens to go through and comment.
  - 5) Actions on complaints are taken within 24 hrs.
  - 6) Ahmedabad Municipal Corporation has launched a drive to reduce its overheads by contracting major maintenance activities to private parties especially its employees.
  - 7) The property tax revenue is 25% of the total revenue of the Ahmedabad Municipal Corporation and the major component is Octroi which is around 55% to 60%
  - 8) The per capita spend on Property Tax is Rs.347.38
  - 9) Capital expenditures are met by external sources i.e. through Bonds and loans from State Financial Instutions. The revenue meets the debt service obligation.

## *Appendix F*

## **APPENDIX F**

### **A REPORT ON SURAT MUNICIPAL CORPORATION**

#### **Introduction To Surat City**

The historical development of Surat dates back to 300 B.C. It situated on the bank of river Tapi, near its confluence with Arabian Sea, in the State of Gujarat. Surat was the most coveted trading cities on the Indian coastline. Over the centuries various communities such as Munhall's, British, and Portuguese etc have traded out of this city. Currently fiber and diamond cutting polishing and exporting are the main business of the city of Surat.

#### **Surat Municipal Corporation**

##### **1. General Information**

Surat Municipality dates back to 1852 A.D., was converted into the Municipal Corporation in 1966, and governed by the "Bombay Municipal Corporation Act". It has an area of 112.27 sq. kms, with a present population of 2.80 million growing at an average rate of 6.2% per annum (highest in the country).

The city has a literacy rate of 83.3% being the highest in the country. Surat proudly claims to be a ZERO unemployment city.

Surat Municipal Corporation is entirely computerized and has e-governance. The corporation uses more than 1,000 computers all interlinked with LAN and WAN it has both intra net and Internet to run and manage the entire activities of the city of Surat. Residents of Surat can transact activities and file complaints thru Internet and conveniently located civic centers.

The Municipal Commissioner on a daily basis is personally looking after the monitoring of Complaint and its Redresses.

The accounts are maintained on a double entry system and are continuously audited by the audit department. The accounting activities and the budget for each year are loaded on to the website of Surat Municipal Corporation.

##### **2. Responsibilities**

The Surat municipal Corporation offers a varied number of civic, public health, education, and registrations and licensing services, some of the services rendered are:

- Construction, maintenance of roads, bridges flyovers, street lighting, providing potable water, sewerage, maintaining of the sewerage treatment plant and solid waste management.
- Constructing, running and maintenance, of hospitals, medical college, schools, community halls, libraries, parks and gardens.
- Registration of birth and death, food inspection and licensing etc.
- Town planning and slum rehabilitation and relocation.
- Disaster Management is any key activity.

##### **3. Organisation its Structure and Activities**

Surat Municipal Corporation for administrative convenience is divided into seven zones. The Municipal Commissioner is the head of the organisation to support him he has three Deputy Commissioners, three Assistant Commissioners, two Executive Engineers, City Engineer and Director Planning.

Deputy Commissioner (Spl.) is the head of the Southwest Zone and is responsible for collection of Octroi in addition to his other regular duties like managing traffic, parks and gardens, Fire services etc.

Deputy Commissioner (Gen) is the head for the East Zone; look after finance and accounts, information systems, finance and tax policies etc.

Deputy Commissioner (Health & Hygiene) looks after the public health issues like family planning, death and birth registration etc.

Director planning carries out the Town Planning activities.

Assistant Commissioner (P &I) is in charge of the North Zone and also looks after the Public relations activities

Another Assistant Commissioner is looking after disaster Management, slum rehabilitation and relocation, monitoring businesses of Surat, etc.

However the Central and West Zone are looked after by Executive Engineers who also look into the sewer, drainage maintenance and water supply and maintenance.

The City Engineer is in charge of framing policy and executing activities relating to town planning street lighting, roads, bridges etc

There is dean for the Surat Medical College who is also an employee of the Surat Municipal Corporation.

The total number of employees at Surat Municipal Corporation is around 15,500 of which class IV employees (sweepers, peons drivers etc) are around 5,700, which include Regular, Part time employees and contracted workers. The total outlay under the salary head is around Rs.400.00 million per annum.

Surat Municipal Corporation has introduced a dress code for its employees.

## **4. Civic Services**

### **4.1 Sanitation and Solid Waste Management**

The corporation has 5,700 persons employed for carrying out the solid waste management activities. Out of this there are around 4,700 regular employees of the corporation, 600 part time workers. The corporation gives Grants to the Resident welfare Associations to carry out the collection of solid waste from their own society. Door-to-Door collection of solid waste is also in force. Fines are imposed for throwing garbage on the street. The disposal of the solid waste is privatised to the extent of 60%.

World's largest sewerage treatment plant has been installed and the current capacity is 562.5 MLD and the sewage generation is only 425 MLD. The main sewerage lines cover 95% of the area. The sewerage, waste and storm water management including running of sewerage treatment plant cost the Surat Municipal Corporation Rs.40.00 cores per annum which is approx 10% of the total outlay.

### **4.2 Basic Services**

Basic services such as water Supply, Sewerage, Solid Waste Management, Roads, Street Lighting have been provided to a level of 97% on an average.

Roads have been broadened and beautified and 100% street lighting. Energy saving traffic signals has been installed.

In addition Surat Municipal Corporation has set up 13 “City Civic Centers” that provides basic facilities to the citizens. Some of the services provided by these centers are:

Assistance in assessment of Annual Rental Value of Property  
Payment of various Taxes  
Birth and Death registration certificate  
Registration of Shops and Establishment  
Booking of various municipal corporation facilities  
Approval and copy of the Plan

#### **4.3 Slum Rehabilitation**

Surat Municipal Corporation has spent more than Rs.75.00 cores for the rehabilitation and relocation of the slum dwellers. The corporation has two main schemes under the slum rehabilitation programme:

- a) **Site and Service:** Under this programme the slum dweller is being given a developed piece of land with all civic services like water, sewerage, lighting for constructing houses, free of charge.
- b) **Belt House programme:** Under this scheme constructed houses at the cost of Rs.68,000/= is given to the slum dwellers on a monthly installment of Rs.481/ payable over a period of 15 years.

This has lead to release of some prime located properties, which were under the control of the slum dwellers. They were sold or commercial complex were constructed and the same became a source of revenue for the Corporation.

#### **4.4 Employment Generation Programmes:**

The corporation under various schemes of the State and Central government has launched several employment generation programmes. Surat Municipal Corporation claims that the city of Surat has zero unemployment.

### **5. Reform and Capacity Building**

Surat Municipal Corporation is proud of its reform and capacity building exercise, which has converted the city from the title of **Dirty City** to the “**2<sup>nd</sup> Best City to Live In India**”.

Some of the reforms are:

Administrative: The Surat Municipal Corporation has a transparent administrative system. Uses modern technology like computers for e- Governance, and Biometric attendance system. Continuous training to its employees is some of the administrative reforms.

Energy Reform: An Energy Audit department has been set up to monitor and make continuous effort to use effective and efficient energy saving devices. Power generation plant running on the Biogas methane has been set up it is expected to save Rs.4.2 million per annum.

Disaster Management: Continuous efforts are being made to strengthen the relief and rescue team for managing disaster with the help of public participation.

Finance and Taxation: The accounts are maintained on a double entry system and are totally computerized. Simple self-assessment scheme is launched and lifetime vehicle tax introduced. Tax rates are being decided with active public participation.

### **6. Information & Technology**

Surat Municipal Corporation has a comprehensive website and an I.T. policy. The website has all the information relating to the activities policies, Laws including budget and final accounts.

There are 13 civic centers which are linked to each other and to the main server at the head office thru LAN and WAN.

The key areas that have been computerized are, Public Health Engineering system, Disease Monitoring System, Grievance Redressal System, Water Quality System, Budget and performance monitoring system, Tax monitoring system, Materials Management, e- library.

## **7. Public Participation**

The Surat Municipal Corporation encourages discussion with the public and invites suggestion on various issues involving developmental, maintenance, finance and other relating to civic facility.

The Surat Municipal Corporation uses various modes mass communication such as Radio, Newspaper, and Websites. Suggestions received are seriously reviewed and pros and cons of each suggestion is looked into and action taken.

Public awareness campaigns are launched encouraging public to come up with suggestions for constant improvement.

Surat City has the world's largest sewerage treatment plant. The Industrialists of the city have contributed money for the setting up of the plant along with the contribution of Surat Municipal Corporation.

## **8. Financial Systems**

### Income

Surat Municipal Corporation is self-sufficient and generates annual revenue to the tune of Rs.780.00 crores (as per the current year budget). The major source of revenue is the Octroi tax, next to this is the property tax as per the statistics the property tax recovery is to the tune of 92%. The Breakup of the revenue sources is as below:

Income	(unit in Rs. Crores (=10 million))	
i)	Octroi Tax	Rs.300.00
ii)	Property Tax	Rs.280.00
iii)	Sale Of Properties	Rs.200.00
iv)	Grant from State	Rs.040.00
v)	Other Income	Rs.060.00
	Total Income	Rs.780.00

The Octroi Tax is around 40% of the Total revenue and Property Tax is around 38% of the total revenue. Surat Municipal Corporation also sells properties, which are at prime location; the revenue from them is around 27%.

### Expenditure

Surat Municipal Corporation is constantly investing in building capital assets from its revenue. In the current financial year it is proposed to spend around Rs.300.00 crores in Capital asset building, which will amount to 50% of the total expenditure. The expense on establishment, repairs and maintenance etc. would be around Rs.300.00 crores. The corporation at no point of time has to fall back on the State Government for resources for operation and maintenance.



## **9. Strengths Of Surat Municipal Corporation**

- 1) Surat Municipal Corporation is a forward looking organisation and has won several awards:
  - Dubai International Award for Best Practice in Solid Waste Management and Urban Governance
  - National Award for Best Employer to provide employment to Physically Handicapped people.
  - Govt. of Gujarat Award to Surat Municipal Corporation for special contribution towards development of Surat city.
  - Best Practice Award for Grievance Redressal System by CMAG.
- 2) The executive powers of the commissioner are delegated to the persons carrying out operations hence better management and tax recovery.
- 3) The Surat Municipal Corporation maintains total transparency by displaying the financial and operation information on the website.
- 4) Energy audits are being carried out to monitor and save energy.
- 5) Active public participation in development activities. One of the pages on the website caters to public opinion on various issues. Public relations department constantly looks into the suggestions received from the public and compiles them for the governing body to take decision.
- 6) The Octroi tax revenue is around 60% of the total revenue of the Corporation.
- 7) Property tax is around 40% of the total revenue.
- 8) The per capital spending on property Tax in Surat (as per 2004-05 projected data) is Rs.871.42
- 9) The Surat Municipal Corporation does not depend on the State Government for any financial assistance. The own revenue is sufficient enough to take care of it operating and developmental activities.
- 10) Civic centers provide assistance to the residents of Surat with respect to payment of Taxes, Assessment of Annual Rental Value of property, Grievance Redressal, registration of Births and Deaths, Shops and Business Establishment License etc.
- 11) Rehabilitation and relocation of slum dwellers to better concrete houses at affordable prices and use of prime location land occupied by slum dwellers, for commercial purpose.

## *Appendix G*

## **APPENDIX G**

### **A REPORT ON INDORE MUNICIPAL CORPORATION**

#### **Introduction To The City**

Holkar Dynasty established Indore City during 17<sup>th</sup> century. Maharani Ahilya Bai ruled the city during the 19<sup>th</sup> century and during her regime the city reached its glory. It is the largest city in the State of Madhya Pradesh and is also known as the commercial capital of the state. The main business is textile, grains, pulses etc. The city is spread over 130.17 sq. kms. and has a density of population of 12579 per sq kms.

#### **Indore Municipal Corporation**

##### **1. About Indore Municipal Corporation**

Indore Municipality was established in 1870, was converted into the Municipal Corporation in 1956 under the provisions of the "Bombay Municipal Corporation Act". Its limits are spread over an area of 130.17 sq. kms, with a population of 1.63 million growing at an average rate of 1.9% per annum.

Indore Municipal Corporation has most of its functions computerized and also has e-governance. The computers of the corporation are networked using LAN and WAN it has both intra net and Internet to run and manage activities of the city. Residents can transact activities and file complaints and conveniently located civic centers.

The Municipal Commissioner on a daily basis is personally looking after the monitoring of Complaint and its Redressal

The accounts are maintained on a double entry system. The main source of revenue is property tax as Octroi tax has been abolished; hence a large amount of fund is transferred from the state as assistance. There is a proposal to reintroduce Octroi Tax in the near future to make the corporation self-sustainable.

##### **2. Functions of Indore Municipal Corporation**

The functions of Indore Municipal Corporation have been clearly divided into two categories, namely Executive Function and Regulatory Function.

Executive Functions include constructing and maintaining basic civic facilities for the residents of Indore city. The same are listed below:

- a Water Supply
- b Sewerage and Drainage
- c Sanitation
- d Roads
- e Street Lighting
- f Garden & Parks
- g Education
- h Social welfare

The Regulatory Functions comprise of legal compliance, which involve registration or issue of licensing and protecting the misuse of the properties that belong to Indore Municipal Corporation. These are as follows:

- a Birth & Death Registration
- b Building plan Approvals
- c Licensing of colonies
- d Disease Control
- e Food and Hygiene
- f Encroachments
- g Shop licensing
- h Assessment of Properties
- i Tax Calculation/ Collection
- j New connections for Water

### **3. Organisational Structure and Responsibilities:**

Indore Municipal Corporation has been divided into eleven zones for administrative convenience and for better service to the residents. Zonal Officer directly reports to the Assistant Municipal Commissioner who heads each Zone. The Municipal Commissioner is the head of the Corporation.

The functions of the Indore Municipal Corporation have been decentralized to zones and each zonal office acts as mini Municipal Corporation. The Zonal Head for efficient and smooth working is vested with some of the administrative powers of the Municipal Commissioner. Each zone has Building Inspector, Asst. Engineer Public works, Asst. Engineer Water Supply, Asst. Revenue Officer, Health Inspector, Asst. Engineer Electrical Department. They all report to the Zonal Officer. The services offered by each zone to the residents are: Birth and Death Registration, Tax collection Counters, Assessment of Taxes, Maintenance of roads, water and sewer systems, new connections, Health and Sanitation service, Licensing, Public grievances and Redressal.

All administrative activities and strategic planning happens at the head office. The accounts and Information & Technology departments are also located at the head office and are being looked after by the Asst. Commissioner and The Municipal Commissioner.

The total strength of the corporation is around 6800 employees.

### **4. Reforms**

The 74<sup>th</sup> Constitutional Amendment has placed the onus of providing Civic Services on to the Urban Local Bodies.

Indore Municipal Corporation adopted several measures and carried out activities, which lead to extending a convenient and friendly environment for the residents of Indore City.

#### **4.1 Reorganizing the Revenue System and Department**

The revenue department has been reorganised and separate cells with sufficient executive powers for smooth functioning have been vested in them.

- (1) Survey Section: a survey section has been created for conducting base line surveys of properties. This section is continuously in a look out for properties that are escaping assessment, or have illegal water connection and trying to increase the tax net. This increased the tax net of properties from 1,55,000 in 1999-2000 to 2,40,000 in 2002-2003, water connections from 98,000 to 1,39,000 for the same period.

- (2) Assessment section: The responsibility of this section is to assist in assign properties and also carry out reassessment of under assessed properties
- (3) Recovery and Vigilance Section: This section has been entrusted with the responsibility of recovering outstanding tax and non-tax dues of the Municipal Corporation. The section has the power to seize and auction properties wherever necessary, also impose interest penalties and fines.
- (4) Marketing Section: Administration and control of the municipal properties and advertisement hording. This section is the caretaker of the municipal properties and the advertisement hording.

Introduction of simple self-assessment procedure and rationalization of the tax structure was a major part of tax reform. Tax bills are delivered in partnership with private organisations. Collection is done at civic centre which are computerized, and linked with WAN.

These reforms led to an increase in the revenue from Rs.160 million to Rs.630 million which is nearly 3 times from 1995-96 to 2002-03.

The website of the Indore Municipal Corporation is comprehensive and exhaustive.

#### **4.2 Comprehensive use of the Information & Technology**

Indore Municipal Corporation along with its technical partners Oswal Data Processors developed a tailor made accounting system to maintain accounts on a double entry. Monitoring of performance of the staff is also done on the computer. All entries related to property tax, water tax, shops rent, birth death certification, cash collection are being maintained through computers which are linked together with LAN and WAN.

The most significant effect of the reform process was sharing of data between Municipal Corporation and other administrative department of the State Government. The Municipal Corporation has installed a computer at the District Registrar's Office who deals with the registration of transfer of properties. In case of any sale or purchase transaction of a property both the seller has to obtain a no dues certificate from the Municipal Corporation.

Information relating to Indore Municipal Corporation is also available on the website.

#### **4.3 Capacity Building**

Training is imparted to the employees of the Indore Municipal Corporation in order to improve their management skills. Officers are encouraged to participate in seminars and workshops for capacity building.

Institute of Management Studies has developed a comprehensive training programme for the elected representatives as well as corporation officials to enhance personal effectiveness and capacity building. Effectiveness of this programme is being monitored under the Indo-USAID Financial Institutions Reform and Expansion project.

Indore city serves as a Resource City with City of Garland Texas, USA specifically in the technical municipal management areas of financial management, citizen participation/communication, and solid waste management and energy efficiency under a programme sponsored by I.C.M.A.

#### **4.4 Communication with Citizens and Public participation**

There is an intensive, active and constant communication with the citizens using various methods such as meetings with the representatives of the resident welfare associations, using cable television,

billboards, and advertisements in the newspapers for educating the public about the importance of tax payment and other issues. As a result of this communication Indore Municipal Corporation was able to generate not only public awareness but also a sense of responsibility towards the city.

The residents of Indore city came forward to contribute towards making of a cemented lane or by lane in their colony. It is observed that one third of the cost of making lanes and by lanes has been borne by the residents. Another landmark is that one single resident of Indore has contributed 50% of the cost of constructing an auditorium which was made at a cost of Rs.3.00 crores.

Grievance Redressal cell is formed which comprises of the Mayor, Municipal Commissioner, and all the Head of Departments. They visit each zone and interacted with the residents on an assigned day and solved their problems on the spot.

The municipal corporation making residents aware of its importance organises rain water-harvesting awareness camps. Presently Indore Municipal Corporation is giving cash incentive of Rs.1000/ and rebate of 6% on Municipal Taxes to residents for implementing Rain Water Harvesting. As a result more than 3000 residential buildings have implemented rainwater harvesting.

#### **4.5 Road Development**

The Indore Municipal Corporation formed a separate cell called as the road Design and Development cell. This cell with the help of retired senior residents of the city designed and developed a strategy for improving the road conditions using modern technology and high standards.

The fund required for the construction of the roads was raised by issuing Development Bonds bearing interest rate of 11.5% secured by State Guarantee and loan @ 10.5% from HUDCO.

#### **4.6 Slum Development and Rehabilitation programme**

Under this programme the Indore Municipal Corporation is actively involved in rehabilitation of the Slum dwellers. It is now constructing RCC houses for them at a cost of Rs.1.00 lacs out of which Rs.25, 000/= is being received as subsidy from the central government under the Slum networking Programme. The balance amount is to be paid by the slum dweller in easy daily installment.

#### **4.7 Financial Management**

It is utmost important to have good financial management systems for any organisation to function properly and successfully. Indore Municipal Corporation appointed a qualified Chartered Accountant to head the Finance Department. Unless all the data generated is not captured properly the analysis of the same cannot be done properly and efficiently. Indore Municipal Corporation has computerized accounting and uses double entry system.

Better budgeting systems have been introduced in order to prune avoidable expenses, also cost control wherever necessary.

The major source of revenue of the Municipal Corporation has been divided into two categories:

Internal Source or Municipal Corporation's source: This source comprises of Property Tax, Water Tax/charges, advertisement tax, show Tax, License free, Shop rent, Other Fees. The income from own sources shows a constant and stable growth. In the year 1997-1998 the income was Rs.194.87 million, which has grown to Rs.635.12 million in the year 2002-2003 an increase of nearly 325.9%.

External Source: The components of this source are in terms of State transfers in the form of: Octroi compensation, Passenger Tax Share, share in Stamp duty, State Finance Commission, Educational

grants, Road repair grants etc. The External source contributed Rs.867.53 million approx 136.59% of the own source.

On an analysis of the financial statements it is noticed that the Indore Municipal Corporation out of its operating revenue contributes towards Capital Expenditure.

Analysis of some of the expense items for 2002-2003:

- In the year 2002-2003 the surplus generated out of revenue was 15%.
- The expense on Tax collection is around 3.6% of the total tax revenue and around 1.5% of the total revenue.
- The expenditure on public health and sanitation is around 7.8% of the total revenue generated
- Water supply expense is around 27% of the total revenue generated however the tax and water charge are not sufficient enough to cover up the costs.

Indore Municipal Corporation has won the **Dubai International award for best Practices.**

## *Appendix H*



*Final Report on Water Quality Management Plan for Ganga River  
Volume IV-1, Feasibility Study for Allahabad City, Part V, Economic and Financial Evaluation*

**Appendix H: Table 1 Annual Financial Statement of Nagar Nigam (Allahabad)**

(Unit: million Rs.)

Current Account Receipts						Current Account Expenditure					
Description	2000- 2001	2001- 2002	2002- 2003	2003- 2004 for 9 months	2004- 2005 Budgeted	Description	2000- 2001	2001- 2002	2002- 2003	2003- 2004 for 9 months	2004- 2005 Budgeted
Revenue receipts	860.27	635.10	629.42	429.95	850.00	Revenue Expenditure	436.11	377.01	353.99	284.64	570.10
1 Taxes Revenue	42.38	60.91	81.44	51.69	129.35	1 Salary & Administration	267.35	255.28	232.25	238.51	369.19
Property Tax	36.53	41.05	46.52	46.14	100.00	Administration	13.66	12.65	10.92	11.21	16.86
Taxes on Vehicles					7.50	Taxes	30.68	27.86	24.70	24.82	46.25
Advertisement & Entertainment Tax	5.64	5.07	6.42	5.43		Sweepers	153.89	148.17	131.21	135.40	207.62
Other Tax	0.21	2.75	0.30	0.11	1.85	Maintenance Staff	9.86	9.37	9.78	8.71	12.33
Stamp & Registration Fee		12.04	28.20		20.00	Medical & Health Services	8.71	7.55	6.17	7.16	10.00
2 Non Tax Revenue	817.72	573.86	547.52	378.20	720.20	Civic Service Staff	24.93	26.09	22.90	26.89	40.31
Rent from Municipal Property	16.56	17.30	20.45	18.34	30.95	Education	0.21	0.54	0.44	0.44	0.84
Sale Of Properties	19.42	2.68	0.83	0.08	2.50	Pension/ Provident Fund	25.41	23.04	26.12	23.87	35.00
Charge for damages/ fines				0.67	0.50	2 Maintenance/ Charges	125.79	82.64	84.90	27.23	148.78
Road Cutting Charge	2.65	4.98	8.66	1.37	5.00	Civic Services					
Other Rental	1.79	1.01	2.24	1.61	2.75	Lighting,Fire,Parks	26.14	22.15	20.59	10.74	38.02
Interest Income	1.08	0.89	1.41		0.50	Road repairs/ Buildings/ Other	88.01	54.72	59.96	12.11	95.86
State Transfer	386.72	272.83	254.58	177.14	329.50	Sewer Lines/ drains	3.29	0.31	0.14	0.72	3.00
Education						Vehicles& Equipment					
Road						General	1.50	0.29			5.10
For Development Activities	264.79	247.17	254.58	177.14	329.50	Educational Instutions	3.73	2.65	2.10	2.24	3.68
Medical & Health Services						Medical & Health Services	3.13	2.52	2.12	1.42	3.13
General	84.88					3 Administrative Expenditure	10.03	9.86	10.78	4.62	19.83
Revolving Fund	37.05	22.10				4 Interest on World Bank Loan		1.86			
Adjustment with Jal sansthan	0.00	3.57				5 Adjustment with Jal Sansthan		9.57	5.64		6.00
Transfers from Urban Development		H				6 Other Expenditure	32.95	17.73	20.07	14.19	25.77
Authorities for Maintenances of New Colonies	2.78	1.33	4.78	1.83	19.00	7 Suspense Account	0.00	0.07	0.35	0.09	0.53
3 Suspense Account	0.17	0.33	0.46	0.07	0.45	Security Deposits				0.09	0.01
Security Deposits from contractors	0.01	0.23	0.36	0.07	0.20	refunds to contractors				0.09	0.01
Staff Repayments	0.16	0.10	0.11		0.25	Staff Loan		0.07	0.26	0.08	0.43
Capital Account Receipts						Capital Account Expenditure					
Description	2000- 2001	2001- 2002	2002- 2003	2003- 2004 for 9 months	2004- 2005 Budgeted	Description	2000- 2001	2001- 2002	2002- 2003	2003- 2004 for 9 months	2004- 2005 Budgeted
Capital Receipts Total	0.00	0.00	9.70	0.00	20.00	Capital Expenditure	0.00	0.00	0.00	0.00	0.00
Loan						Sewers & Public Toilets					
Centre Transfer						Others					
State Transfer						Revolving Fund					
Revolving Fund			9.70		20.00						
Other sources											
<b>Opening Balance</b>	4.53	41.97	33.84	64.40	46.00	Revenue Account Total	436.11	377.01	353.99	284.64	570.10
Revenue Account Total	860.27	635.10	629.42	429.95	850.00	Capital Account Total	0.00	0.00	0.00	0.00	0.00
Capital Account Total	0.00	0.00	9.70	0.00	20.00	<b>Closing Balance</b>	41.97	33.84	64.40	32.56	16.40
<b>Total</b>	864.81	677.08	672.97	494.35	916.00	<b>Total</b>	478.09	410.85	418.39	317.20	586.50

Source: Budget Statement of the Nagar Nigam -Allahabad for 2001,2002,2003,2004,2005

Note:

In Allahabad the Grants from the State Government are not shown in the Capital Account They are treated as revenue as the same is given in lieu of Octroi Tax.

There is a difference in the closing balance of 2000-01 and opening of 2001-02 of Rs.6.45 million

Figures for 2003-04 are for nine months and 2004-05 are budgeted

**Appendix H: Table 2 Annual Financial Statement of Jal Sansthan (Allahabad)**

Description	Current Account Receipts					Current Account Expenditure				
	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000
Revenue receipts	50.58	65.53	70.57	70.53	95.24	90.92	100.67	96.03	116.19	114.95
1 Tax Revenue	13.43	13.89	14.83	16.32	18.30	34.99	42.12	44.88	50.47	72.06
Water Tax	10.44	10.81	11.54	12.69	13.80	34.99	42.12	44.88	50.47	72.06
Sewer Tax	2.98	3.09	3.30	3.63	4.50	3.28	6.26	5.92	8.36	6.94
2 Charges	24.36	34.89	41.60	46.45	67.90	4.84	4.25	3.96	4.92	8.55
Water	24.04	34.46	40.89	45.21	67.40					
Sewer	0.32	0.43	0.71	1.23	0.50	34.36	34.36	34.36	45.00	15.83
3 Government Grants	10.04	9.25	8.57	0.00	0.00	0.25	0.28	0.12	0.28	3.63
Grant for Sewer						0.95	1.29	4.47	4.70	5.46
Grant from river Action Plan						9.83	9.83			
Other Grants	10.04	9.25	8.57			2.43	2.29	2.32	2.47	2.48
4 Others	2.76	7.50	5.57	7.77	9.04					
<b>Capital Account Receipts</b>										
Description	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000
Capital Receipts	708.76	310.69	341.02	388.76	324.76	708.76	310.69	341.02	388.76	324.76
Capital Fund	74.72	74.72	79.82	80.29	82.78	118.38	117.38	118.70	116.35	117.21
Government Grants/loan	125.81	125.81	125.81	125.81	125.81					
Payables	508.23	110.16	135.39	182.67	116.17	590.38	193.31	222.33	272.41	206.39

Source: Final Statement of Accounts of Jal Sansthan for 1996,1997,1998,1999,2000

**Appendix H: Table 3 Group-wise Consumer Price Index for Industrial Workers in India**

**A. Consumer Price Index**

(Base : 1982=100)

Year	Financial year average index for:						
	General	Food	Pan, Supari, Tobacco and Intoxicants	Fuel & Light	Housing	Clothing, Bedding and Footwear	Misc.
1990-91	193	199	243	186	185	154	187
1991-92	219	230	280	204	198	169	210
1992-93	240	254	315	220	212	185	232
1993-94	258	272	340	234	224	201	251
1994-95	284	304	368	243	237	227	273
1995-96	313	337	397	260	255	253	294
1996-97	342	369	432	295	280	271	322
1997-98	366	388	479	328	304	286	354
1998-99	414	445	515	353	389	296	386
1999-00	428	446	565	379	437	306	416
2000-01	444	453	592	454	463	315	442

**B. Variation Against Previous Year**

Price Increasing Ratios against Previous Year for:

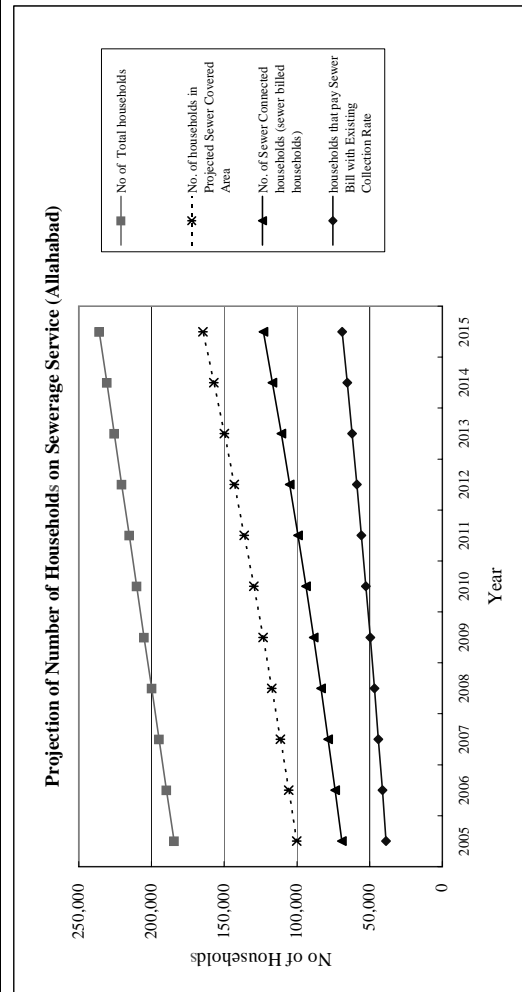
Year	Price Increasing Ratios against Previous Year for:						
	General	Food	Pan, Supari, Tobacco and Intoxicants	Fuel & Light	Housing	Clothing, Bedding and Footwear	Misc.
1990-91	-	-	-	-	-	-	-
1991-92	13.47%	15.58%	15.23%	9.68%	7.03%	9.74%	12.30%
1992-93	9.59%	10.43%	12.50%	7.84%	7.07%	9.47%	10.48%
1993-94	7.50%	7.09%	7.94%	6.36%	5.66%	8.65%	8.19%
1994-95	10.08%	11.76%	8.24%	3.85%	5.80%	12.94%	8.76%
1995-96	10.21%	10.86%	7.88%	7.00%	7.59%	11.45%	7.69%
1996-97	9.27%	9.50%	8.82%	13.46%	9.80%	7.11%	9.52%
1997-98	7.02%	5.15%	10.88%	11.19%	8.57%	5.54%	9.94%
1998-99	13.11%	14.69%	7.52%	7.62%	27.96%	3.50%	9.04%
1999-00	3.38%	0.22%	9.71%	7.37%	12.34%	3.38%	7.77%
2000-01	3.74%	1.57%	4.78%	19.79%	5.95%	2.94%	6.25%
Average Annual Increase Rate Since 1990-91	8.69%	8.57%	9.31%	9.33%	9.61%	7.42%	8.98%

Source : Labour Bureau, Govt. of India.



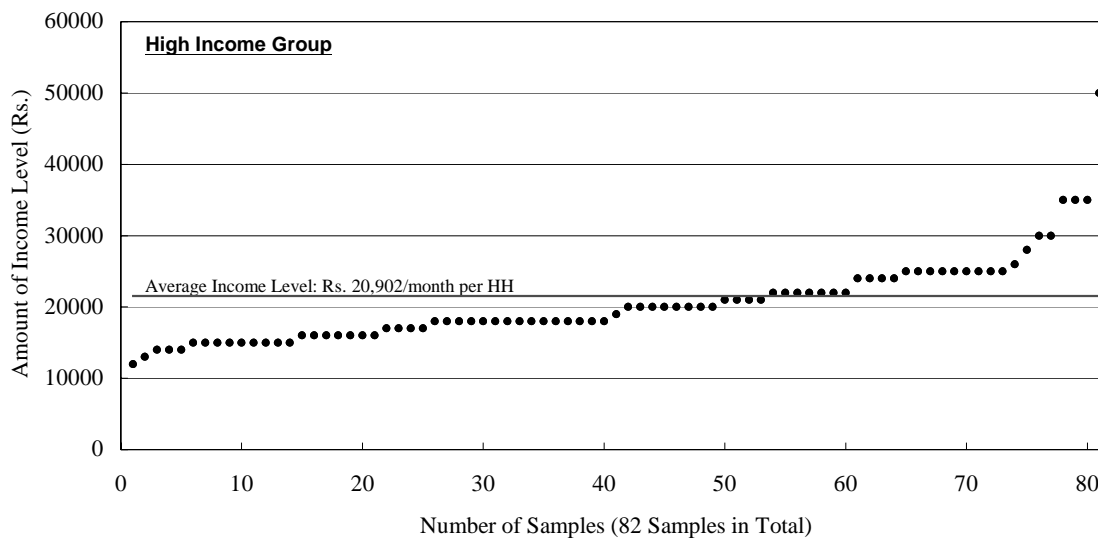
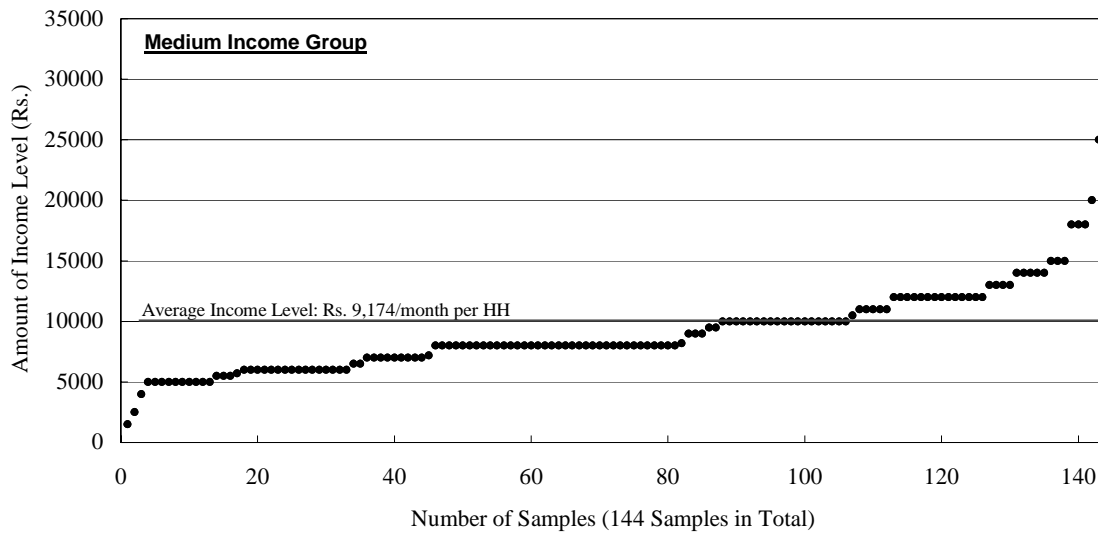
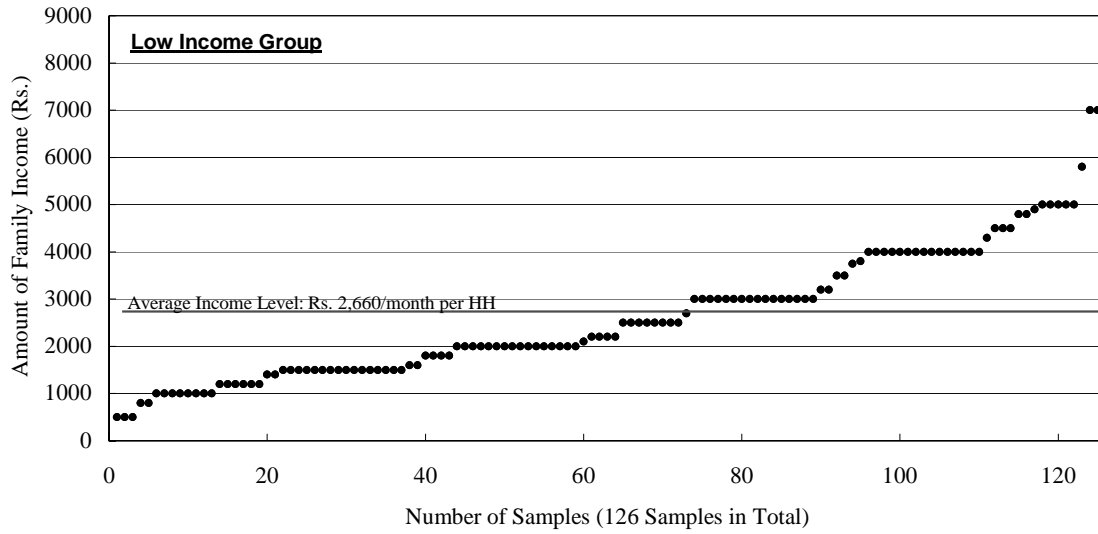
**Appendix H : Table 4 (2/2) Population and Household Projection on Sewerage Services (Allahabad)**

Year	Population Projection	No of Total households	Projected Sewer Covered Area (branch sewer covered area)	No of households in Projected Sewer Covered Area	Projected Rate of Sewer Connection (sewer billed households)	No. of Sewer Connected Population	No. of Sewer Connected (sewer billed households)	Bill collection Rate out of Total Connection (existing collection rate)	households that pay Sewer Bill with Existing Collection Rate	Bill Collection Rate out of Total households in Sewer Area (existing collection rate)
2005	1,165,994	184,493	0.54	100,088	0.374	436,448	69,059	0.56	38,673	0.390
2006	1,198,432	189,625	0.56	105,585	0.389	465,609	73,672	0.56	41,256	0.390
2007	1,230,871	194,759	0.57	111,291	0.403	495,861	78,459	0.56	43,937	0.390
2008	1,263,311	199,891	0.59	117,210	0.417	527,205	83,419	0.56	46,715	0.400
2009	1,295,750	205,024	0.60	123,338	0.432	559,638	88,550	0.56	49,588	0.400
2010	1,328,188	210,157	0.62	129,678	0.447	593,162	93,854	0.56	52,558	0.410
2011	1,360,628	215,287	0.63	136,228	0.461	627,776	99,332	0.56	55,626	0.410
2012	1,393,067	220,422	0.65	142,988	0.476	663,479	104,981	0.56	58,789	0.410
2013	1,425,506	225,554	0.67	149,961	0.491	700,275	110,804	0.56	62,050	0.410
2014	1,457,945	230,687	0.68	157,143	0.506	738,160	116,798	0.56	65,407	0.420
2015	1,490,427	235,827	0.70	164,542	0.521	777,161	122,969	0.56	68,863	0.420
2016	1,522,911	241,976	0.70	172,222	0.538	822,530	130,150	0.56	72,884	0.510
2017	1,568,154	248,126	0.61	150,179	0.555	869,584	137,594	0.56	77,053	0.510
2018	1,607,018	254,275	0.62	157,380	0.572	918,723	145,367	0.56	81,406	0.520
2019	1,645,881	260,425	0.63	164,866	0.589	969,740	153,439	0.56	85,926	0.520
2020	1,684,745	266,574	0.65	172,597	0.607	1,022,396	161,772	0.56	90,592	0.520
2021	1,723,605	272,722	0.66	180,646	0.625	1,077,161	170,438	0.56	95,445	0.530
2022	1,762,468	278,871	0.68	188,976	0.643	1,133,801	179,400	0.56	100,464	0.530
2023	1,801,331	285,021	0.69	197,549	0.662	1,192,080	188,619	0.56	105,627	0.530
2024	1,840,194	291,170	0.71	206,444	0.681	1,252,272	198,176	0.56	110,979	0.540
2025	1,879,057	297,319	0.73	215,620	0.700	1,314,738	208,029	0.56	116,496	0.540
2026	1,917,920	303,468	0.74	225,040	0.719	1,378,640	218,140	0.56	122,158	0.540
2027	1,956,783	309,617	0.76	234,778	0.738	1,444,656	228,585	0.56	128,008	0.550
2028	1,995,646	315,767	0.78	244,799	0.758	1,512,550	239,328	0.56	134,024	0.550
2029	2,034,509	321,916	0.79	255,063	0.778	1,582,071	250,328	0.56	140,184	0.550
2030	2,076,155	328,506	0.92	302,944	0.797	1,655,668	261,973	0.56	146,705	0.480



**Appendix H: Table 5 Income Level (Allahabad)**

Source: A result of the Study on Public Awareness made by JICA Study Team, 2003.



**Appendix H: Table 6 Cost Estimation of the Project (Allahabad)**

(Unit: million Rs.) As of 2004

Cost Items	Total	Disbursement Schedule					
		2007	2008	2009	2010	2011	2012
<b>Sewerage</b>							
Direct Construction Cost	2,059.83	0.00	506.33	523.84	341.25	469.02	219.39
STP & PS	1,652.47	0.00	377.35	394.86	291.45	394.32	194.49
Pipe	407.36	0.00	128.98	128.98	49.80	74.70	24.90
Land Acquisition	208.78	161.35	0.00	1.93	45.50	0.00	0.00
Detailed Design	123.60	105.92	0.00	9.52	8.16	0.00	0.00
Supervision	102.99	0.00	25.32	26.19	17.06	23.45	10.97
Project Administration	102.99	0.00	25.32	26.19	17.06	23.45	10.97
Physical contingencies	102.99	0.00	25.32	26.19	17.06	23.45	10.97
<b>Total</b>	<b>2,701.18</b>	<b>267.27</b>	<b>582.29</b>	<b>613.86</b>	<b>446.09</b>	<b>539.37</b>	<b>252.30</b>
<b>Non-sewerage</b>							
Direct Construction Cost	86.37	1.77	22.64	21.24	21.24	19.48	0.00
Detailed Design	4.31	0.09	1.13	1.06	1.06	0.97	0.00
Supervision	4.31	0.09	1.13	1.06	1.06	0.97	0.00
Project Administration	8.63	0.18	2.26	2.12	2.12	1.95	0.00
Physical contingencies	4.31	0.09	1.13	1.06	1.06	0.97	0.00
<b>Total</b>	<b>107.93</b>	<b>2.22</b>	<b>28.29</b>	<b>26.54</b>	<b>26.54</b>	<b>24.34</b>	<b>0.00</b>
<b>Public Participation &amp; Awareness (PP/PA)</b>	46.01	9.5	6.9	7.4	7.6	7.1	7.5
<b>Institutional Development Programme (IDP)</b>	188.00	37.60	56.40	56.40	18.80	9.40	9.40
<b>Total</b>	<b>3,043.12</b>	<b>316.62</b>	<b>673.92</b>	<b>704.19</b>	<b>499.04</b>	<b>580.20</b>	<b>269.15</b>
Price contingencies (Price Escalation)	1,681.30	84.85	250.41	342.58	311.88	446.14	245.44
Financial Cost (Excl.Price contingencies)	3,043.12	316.62	673.92	704.19	499.04	580.20	269.15
Financial Cost (Incl.Price contingencies)	4,724.42	401.47	924.33	1,046.77	810.92	1,026.34	514.59
Economic Cost (Excl.Price & Physical contingencies)	2,391.15	193.19	550.58	578.01	377.79	470.26	221.31
Economic Cost (Excl.Price contingencies)	2,475.48	193.26	571.37	599.43	392.03	489.46	229.93
Foreign Finance (Loan Amount)	4,404	240	897	1,017	746	1,001	504
Local Finance	320	162	28	30	65	25	11
		Year					
		2013	2014	2015	2016	2017	2018
O&M cost (financial)		115.74	130.20	144.67	144.67	144.67	144.67
O&M cost (economic)		92.12	103.64	115.15	115.15	115.15	115.15
O&M yearly ratio		0.80	0.90	1.00	1.00	1.00	1.00
<b>Replacement</b>		Year					
1. Proposed facilities		2027	2042	2057			
Financial cost	1,652	495.74	495.74	495.74			
Economic cost		436.75	436.75	436.75			
2. Sanctioned and existing facilities							
Financial cost	454	136.25	136.25	136.25			
Economic cost		47.69	47.69	47.69			
<b>Total</b>							
Financial cost		631.99	631.99	631.99			
Economic cost		484.44	484.44	484.44			

(Note)

1. There is no FC Portion in Direct Construction Cost.
2. Engineering Cost for Detailed Design for Sewerage Schemes: 6.00% of Direct Construction Cost.
3. Engineering Cost for Detailed Design for Non-Sewerage Schemes: 10.00% of Direct Construction Cost.
4. Engineering Cost for Supervision: 5.00% of Direct Construction Cost.
5. Cost for Social Awareness: 1.00% of Direct Construction Cost and Engineering Cost for Detailed Design.
6. Administration Cost for Sewerage Schemes: 5.00% of Direct Construction Cost.
7. Administration Cost for Non-Sewerage Schemes: 10.00% of Direct Construction Cost.
8. Physical contingencies: 5.00% of Direct Construction Cost.
9. Share Rate of Equipment/materials to STP and Pumping Stations: 70%
10. Share Rate of Labor Cost to STP and Pumping Stations: 30%
11. Share Rate of Equipment/materials to Trunk/Branch Sewers: 50%
12. Share Rate of Labor Cost to Trunk/Branch Sewers: 50% of Direct Construction Cost.
13. Share Rate of Labor Cost to Non-Sewerage Schemes: 50%
14. SCF: 0.88101 (SCF: Standard Conversion Factor for tradable goods)
15. Contractor's Profit: 10% of Direct Construction Cost and Engineering Cost in LC portion.
16. Corporate Income Tax: 35% of corporate income.
17. Personal Income Tax: 10% of labor cost.
18. Shadow Price Rate: 0.0906 of land acquisition cost.
19. Shadow Wage Rate: 0.5 of labor cost.
20. Price Escalation for LC: 8.69% per annum for LC Portion other than Engineering based on last 10 years in India according to the Statistics.
21. Price Escalation for FC: 0.50% per annum for FC Portion as Engineering based on last 10 years according to the the Bank of Japan.
- 22 Replacement cost 30% STP & PS construction cost

*Final Report on Water Quality Management Plan for Ganga River  
Volume IV-1, Feasibility Study for Allahabad City, Part V, Economic and Financial Evaluation*

**Appendix H: Table 7 Calculation of Economic Internal Rate of Return (EIRR) (Allahabad)**

(Unit: Rs. Million)

Year in Order	Fiscal Year	Economic Cost				Economic Benefit										Total	Cash Balance			
		Construction Cost	O&M cost	Replacement cost	Total	WTP for Improvement for Water Quality		WTP for Sewerage Services		Saving of Medical Expenditures	Saving of Salaries/Wages	Contribution to Local Economy			Agricultural Benefit Due to Treated Water Discharged for Irrigation 14,435 Rs./ha					
						Total Households	Basic unit: 354 Rs./Y per HH	Total households	Basic unit: 553 Rs./Y per HH	Basic unit: 150 Rs./Y per HH	Basic unit: 14 Rs./Y per HH	Regular Users	Occasional Users	Population Projection Rs./Y per person				Basic unit: 17,852 Rs./Y per person	Population Projection Rs./Y per person	Basic unit: 59,507 Rs./Y per person
0	2004																			
1	2005	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0		
2	2006	0			0	0	0	0	0	0	0	0	0	0	0	0	0	0		
3	2007	193			193	0	0	0	0	0	0	0	0	0	0	0	0	-193		
4	2008	551			551	0	0	0	0	0	0	0	0	0	0	0	0	-551		
5	2009	578			578	0	0	0	0	0	0	0	0	0	0	0	0	-578		
6	2010	378			378	0	0	0	0	0	0	0	0	0	0	0	0	-378		
7	2011	470			470	0	0	0	0	0	0	0	0	0	0	0	0	-470		
8	2012	221			221	0	0	0	0	0	0	0	0	0	0	0	0	-221		
9	2013	0	92		92	220,422	78	104,981	58	16	1	2,408	43	2,919	174	11	381	289		
10	2014	0	104		104	225,554	80	110,804	61	17	2	2,462	44	2,977	177	11	391	288		
11	2015	0	115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
12	2016		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
13	2017		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
14	2018		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
15	2019		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
16	2020		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
17	2021		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
18	2022		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
19	2023		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
20	2024		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
21	2025		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
22	2026		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
23	2027		115	484	600	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	-198		
24	2028		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
25	2029		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
26	2030		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
27	2031		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
28	2032		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
29	2033		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
30	2034		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
31	2035		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
32	2036		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
33	2037		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
34	2038		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
35	2039		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
36	2040		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
37	2041		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
38	2042		115	484	600	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	-198		
39	2043		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
40	2044		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
41	2045		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
42	2046		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
43	2047		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
44	2048		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
45	2049		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
46	2050		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
47	2051		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
48	2052		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
49	2053		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
50	2054		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
51	2055		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
52	2056		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
53	2057		115	484	600	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	-198		
54	2058		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
55	2059		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
56	2060		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
57	2061		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
58	2062		115		115	230,687	82	116,798	65	18	2	2,517	45	3,037	181	11	402	287		
<b>Total</b>		<b>2,391</b>	<b>5,723</b>	<b>1,453</b>	<b>9,567</b>	<b>4,077</b>	<b>3,219</b>	<b>876</b>	<b>82</b>	<b>2,244</b>										
Net Present Value (Discount Rate at 10 %)					2,026												1,846	-181		
																		8.9%		
																		0.91		
																		0.1		

(Note) It is assumed that occasional bathing population is one third of that got from the Interview Survey from the conservative viewpoint.



**Appendix H: Table 8 Calculation of Standard Conversion Factor**

(Unit: million Rs.)

Year	Import Amount*	Export Amount*	Import Duties (Custom Duties)**	Export Tax	Export Subsidies
1992-93	633,745	536,883	237,764	0	0
1993-94	731,010	697,514	221,927	0	0
1994-95	899,707	826,741	267,891	0	0
1995-96	1,226,781	1,063,533	357,568	0	0
1996-97	1,389,197	1,188,171	428,510	0	0
1997-98	1,541,763	1,301,006	401,928	0	0
1998-99	1,783,319	1,397,531	406,683	0	0
1999-00	2,152,365	1,595,614	484,196	0	0
2000-01	2,308,728	2,035,710	341,630	0	0
Total	12,666,614	10,642,704	3,148,096	0	0

Source: SCF = 0.88101

\*: Handbook of Statistics on Indian Economy, Reserve Bank of India, 2001.

\*\* : Indian Public Finance Statistics 2002-2003.

$$\text{Note: } SCF = \frac{\sum I + \sum E}{(\sum I + \sum I_{customs}) + (\sum E - \sum E_{tax} + \sum E_{subsidy})}$$

Where,  $SCF$  = standard conversion factor,  
 $I$  = import amount,  
 $E$  = export amount  
 $I_{customs}$  = import duties (custom duties)  
 $E_{tax}$  = export tax, and  
 $E_{subsidy}$  = export subsidies.

**Appendix H: Table 9  
Estimation of Suitable Revenue Level of Jal Sansthan to Recover O&M Cost  
with Existing Collection Rate (56%)(Allahabad)**

Year in Order		Financial Cost				Financial Benefit			Cash Balance
Fiscal Year	Const- ruction Cost	O&M cost	Replacemen t cost	Total	Amount of Revenue to Be Balanced with O/M Cost	Value per Bill to Be Needed (Rs/Bill)	2,360		
0	2004								
1	2005	0	0	0	0	0	0	0	
2	2006	0	0	0	0	0	0	0	
3	2007	0	0	0	0	0	0	0	
4	2008	0	0	0	0	0	0	0	
5	2009	0	0	0	0	0	0	0	
6	2010	0	0	0	0	0	0	0	
7	2011	0	0	0	0	0	0	0	
8	2012	0	0	0	0	0	0	0	
9	2013	0	116	0	116	110,804	146	31	
10	2014	0	130	0	130	116,798	154	24	
11	2015	0	145	0	145	122,969	163	18	
12	2016		145	0	145	122,969	163	18	
13	2017		145	0	145	122,969	163	18	
14	2018		145	0	145	122,969	163	18	
15	2019		145	0	145	122,969	163	18	
16	2020		145	0	145	122,969	163	18	
17	2021		145	0	145	122,969	163	18	
18	2022		145	0	145	122,969	163	18	
19	2023		145	0	145	122,969	163	18	
20	2024		145	0	145	122,969	163	18	
21	2025		145	0	145	122,969	163	18	
22	2026		145	0	145	122,969	163	18	
23	2027		145	632	777	122,969	163	-614	
24	2028		145	0	145	122,969	163	18	
25	2029		145	0	145	122,969	163	18	
26	2030		145	0	145	122,969	163	18	
27	2031		145	0	145	122,969	163	18	
28	2032		145	0	145	122,969	163	18	
29	2033		145	0	145	122,969	163	18	
30	2034		145	0	145	122,969	163	18	
31	2035		145	0	145	122,969	163	18	
32	2036		145	0	145	122,969	163	18	
33	2037		145	0	145	122,969	163	18	
34	2038		145	0	145	122,969	163	18	
35	2039		145	0	145	122,969	163	18	
36	2040		145	0	145	122,969	163	18	
37	2041		145	0	145	122,969	163	18	
38	2042		145	632	777	122,969	163	-614	
39	2043		145	0	145	122,969	163	18	
40	2044		145	0	145	122,969	163	18	
41	2045		145	0	145	122,969	163	18	
42	2046		145	0	145	122,969	163	18	
43	2047		145	0	145	122,969	163	18	
44	2048		145	0	145	122,969	163	18	
45	2049		145	0	145	122,969	163	18	
46	2050		145	0	145	122,969	163	18	
47	2051		145	0	145	122,969	163	18	
48	2052		145	0	145	122,969	163	18	
49	2053		145	0	145	122,969	163	18	
50	2054		145	0	145	122,969	163	18	
51	2055		145	0	145	122,969	163	18	
52	2056		145	0	145	122,969	163	18	
53	2057		145	632	777	122,969	163	-614	
54	2058		145	0	145	122,969	163	18	
55	2059		145	0	145	122,969	163	18	
56	2060		145	0	145	122,969	163	18	
57	2061		145	0	145	122,969	163	18	
58	2062		145	0	145	122,969	163	18	
<b>Total</b>		0	7,190	1,896	9,086		8,102	-985	
NPV (Discount Rate at 10 %)					743		742	-1	
B/C								1.00	

**Appendix H: Table 10 Establishment of New Financing Sources**

<b>Due to Irrigation Water Supply Utilizing the Treated Water</b>		As of 2004
Description	Calculation	
Unit Price of Treated Water to Be Supplied: (According to Agriculture Department)	1,150 Rs. per ha	
Irrigatable Area per Unit Volume of Water: (According to Agriculture Department)	15 ha per mld	
Designed Irrigatable Volume of Treated Water in Allahabad	50 mld	
Period to Be Needed the Irrigation Water:	Paddy -	130 days
	Wheat -	100 days
	Total	230 days
Irrigatable Area by Delivering the Treated Water in Total (= 15 ha × 50 mld):	750 ha	
Expected Total Sold Amount in Total: (= 1,150 Rs. × 750 ha)	862,500 Rs./season	
Adjusted Sold Amount in Total: (Assumed Selling Risk: 25% )	<u>646,875</u> Rs./season	
Irrigation for the Other Season for Greens: (Assumed Proportion of Water to Be Used for Greens: 50 % in Addition to the Main Crops)	<u>323,438</u> Rs./season	
Total Expected Amount due to Selling the Treated Water:	<u>970,313</u> Rs./season	

**Due to Utilization of Generated Sludge as Fertilizer after Treatment**

<b>Sludge generated</b>	<b>Calculation</b>	
Expected Generated Volume of Sludge: (According to Expert of the Study Team)	250 mg/litre	
Expected Volume of Compost Generated from Dry Base Sludge after Treatment: (According to an information from UPJN based on existing example in Allahabad)	250 kg/mld	
Expected Selling Price:	0.5 Rs./kg	
<b><u>Existing Example in Allahabad</u></b>		
Generated Volume of Dry Base Sludge:	15 tons/day	
Total Generated Volume per Month:	450 tons/month	
Selling Price:	60,000 Rs./month	
Unit Price per ton:	133 Rs./ton	
(= Rs.60,000 ÷ 450 tons)	=	0.133 Rs./kg
Generated Volume of Dry Base Sludge in Allahabad: (= 250 kg/mld × 100 mld / 1,000)	13 tons/day	
Generated Volume of Wet Base Sludge in Allahabad: (Water Content: 50 %.) (=25 ton × (1+1))	25 tons/day	
Expected Selling Amount of Dry Base Sludge as Fertilizer (= 0.5 Rs./kg × 31,000 kg × 365 days):	4,562,500 Rs./year	
Adjusted Sold Amount in Total: (Assumed Selling Risk: 25% )	<u>3,421,875</u> Rs./season	

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**Appendix : Tble 11 Repayment Ability for the Project of Improvement of Sewerage Facilities in Allahabad under the General Project**

Reference:

**Conditions**

1) Existing Charge Collection Rate (56 %) and Charge Level (265 Rs. per household per annum)

2) Category of General Projects

30 Years of Repayment Period & 1.3 % interest rate per year

**Expenditure from General Account**

										(Rs.million)			(Rs.million)			
Year in Order	Fiscal Year	Out Flow					In Flow					Cash Balance	Expenditure from the General Account of the Municipal, State & National Governments			
		Improvement of Sewerage Facilities	Interest Payment	Repayment of Principal	Total	O&M and Replace Cost	Foreign Borrow	Revenue in Case of Existing Collection Rate with Existing Value per Bill	Newly Established Financing Sources (Selling of Treated Water for Irrigation and Sludge as Fertilizer)	State Government Transfer for Filling Deficit of O&M Cost	In flow in Total		Annual Expenditure from General Account for O/M Cost	Annual Expenditure from General Account for Initial Cost	Total Amount of State Transfer	
1	2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	2006	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2007	401	3	0	405	0	240	0	0	0	240	-165	0	165	165	
5	2008	924	15	0	939	0	897	0	0	0	897	-42	0	42	42	
6	2009	1,047	28	0	1,075	0	1,017	0	0	0	1,017	-58	0	58	58	
7	2010	811	38	0	849	0	746	0	0	0	746	-102	0	102	102	
8	2011	1,026	51	0	1,077	0	1,001	0	0	0	1,001	-76	0	76	76	
9	2012	515	57	0	572	0	504	0	0	0	504	-68	0	68	68	
10	2013	0	57	0	57	116	0	16	4	95	116	-57	95	57	152	
11	2014	0	57	0	57	130	0	17	4	109	130	-57	109	57	166	
12	2015	0	57	0	57	145	0	18	4	122	145	-57	122	57	179	
13	2016	0	57	0	57	145	0	18	4	122	145	-57	122	57	179	
14	2017	0	57	0	57	145	0	18	4	122	145	-57	122	57	179	
15	2018	0	57	220	277	145	0	18	4	122	145	-277	122	277	400	
16	2019	0	54	220	275	145	0	18	4	122	145	-275	122	275	397	
17	2020	0	52	220	272	145	0	18	4	122	145	-272	122	272	394	
18	2021	0	49	220	269	145	0	18	4	122	145	-269	122	269	391	
19	2022	0	46	220	266	145	0	18	4	122	145	-266	122	266	388	
20	2023	0	43	220	263	145	0	18	4	122	145	-263	122	263	385	
21	2024	0	40	220	260	145	0	18	4	122	145	-260	122	260	382	
22	2025	0	37	220	257	145	0	18	4	122	145	-257	122	257	380	
23	2026		34	220	255	145		18	4	122	145	-255	122	255	377	
24	2027		31	220	252	777		18	4	754	777	-252	754	252	1,006	
25	2028		29	220	249	145		18	4	122	145	-249	122	249	371	
26	2029		26	220	246	145		18	4	122	145	-246	122	246	368	
27	2030		23	220	243	145		18	4	122	145	-243	122	243	365	
28	2031		20	220	240	145		18	4	122	145	-240	122	240	362	
29	2032		17	220	237	145		18	4	122	145	-237	122	237	360	
30	2033		14	220	235	145		18	4	122	145	-235	122	235	357	
31	2034		11	220	232	145		18	4	122	145	-232	122	232	354	
32	2035		9	220	229	145		18	4	122	145	-229	122	229	351	
33	2036		6	220	226	145		18	4	122	145	-226	122	226	348	
34	2037		3	220	223	145		18	4	122	145	-223	122	223	345	
35	2038					145		18	4	122	145	0	122	0	122	
36	2039					145		18	4	122	145	0	122	0	122	
37	2040					145		18	4	122	145	0	122	0	122	
38	2041					145		18	4	122	145	0	122	0	122	
39	2042					777		18	4	754	777	0	754	0	754	
40	2043					145		18	4	122	145	0	122	0	122	
41	2044					145		18	4	122	145	0	122	0	122	
42	2045					145		18	4	122	145	0	122	0	122	
<b>Total</b>		<b>4,724</b>	<b>1,079</b>	<b>4,404</b>	<b>10,207</b>	<b>5,995</b>	<b>4,404</b>	<b>595</b>	<b>145</b>	<b>5,255</b>	<b>10,399</b>	<b>-5,803</b>		<b>5,803</b>		

(Note)

- (1) Interest rate of foreign loan: 1.30%  
 (2) Equal annual repayment amount of capital for foreign loan (Rs.million): 220

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**Appendix H: Table 12 Repayment Ability for the Project of Improvement of Sewerage Facilities in Allahabad under the Specified Environmental Project**

Reference:

**Conditions**

1) Existing Charge Collection Rate (56 %) and Charge Level (265 Rs. per household per annum)

2) Category of Specified Environmental Projects

40 Years of Repayment Period & 0.75 % interest rate per year

**Expenditure from  
General Account**

Year in Order	Fiscal Year	Out Flow					In Flow						Expenditure from the General Account of the Municipal, State & National Governments		
		Improvement of Sewerage Facilities	Interest Payment	Repayment of Principal	Total	O&M and Repalce Cost	Foreign Borrow	Revenue in Case of Existing Collection Rate with Existing Value per Bill	Newly Established Financing Sources (Selling of Treated Water for Irrigation and Sludge as Fertilizer)	Local Government Transfer for Filling Deficit of OM Cost	In flow in Total	Cash Balance	Annual Expenditure from General Account for O&M Cost	Annual Expenditure from General Account for Initial Cost	Total Amount of State Transfer
1	2004	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	2005	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	2006	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	2007	401	2	0	403	0	240	0	0	0	240	-163	0	163	163
5	2008	924	9	0	933	0	897	0	0	0	897	-36	0	36	36
6	2009	1,047	16	0	1,063	0	1,017	0	0	0	1,017	-46	0	46	46
7	2010	811	22	0	833	0	746	0	0	0	746	-86	0	86	86
8	2011	1,026	29	0	1,056	0	1,001	0	0	0	1,001	-55	0	55	55
9	2012	515	33	0	548	0	504	0	0	0	504	-44	0	44	44
10	2013	0	33	0	33	116	0	16	4	95	116	-33	95	33	128
11	2014	0	33	0	33	130	0	17	4	109	130	-33	109	33	142
12	2015	0	33	0	33	145	0	18	4	122	145	-33	122	33	155
13	2016	0	33	0	33	145	0	18	4	122	145	-33	122	33	155
14	2017	0	33	0	33	145	0	18	4	122	145	-33	122	33	155
15	2018	0	33	147	180	145	0	18	4	122	145	-180	122	180	302
16	2019	0	32	147	179	145	0	18	4	122	145	-179	122	179	301
17	2020	0	31	147	178	145	0	18	4	122	145	-178	122	178	300
18	2021	0	30	147	177	145	0	18	4	122	145	-177	122	177	299
19	2022	0	29	147	175	145	0	18	4	122	145	-175	122	175	298
20	2023	0	28	147	174	145	0	18	4	122	145	-174	122	174	296
21	2024	0	26	147	173	145	0	18	4	122	145	-173	122	173	295
22	2025	0	25	147	172	145	0	18	4	122	145	-172	122	172	294
23	2026	0	24	147	171	145	0	18	4	122	145	-171	122	171	293
24	2027	0	23	147	170	777	0	18	4	754	777	-170	754	170	924
25	2028	0	22	147	169	145	0	18	4	122	145	-169	122	169	291
26	2029	0	21	147	168	145	0	18	4	122	145	-168	122	168	290
27	2030	0	20	147	167	145	0	18	4	122	145	-167	122	167	289
28	2031	0	19	147	166	145	0	18	4	122	145	-166	122	166	288
29	2032	0	18	147	164	145	0	18	4	122	145	-164	122	164	287
30	2033	0	17	147	163	145	0	18	4	122	145	-163	122	163	285
31	2034	0	15	147	162	145	0	18	4	122	145	-162	122	162	284
32	2035	0	14	147	161	145	0	18	4	122	145	-161	122	161	283
33	2036	0	13	147	160	145	0	18	4	122	145	-160	122	160	282
34	2037	0	12	147	159	145	0	18	4	122	145	-159	122	159	281
35	2038	0	11	147	158	145	0	18	4	122	145	-158	122	158	280
36	2039	0	10	147	157	145	0	18	4	122	145	-157	122	157	279
37	2040	0	9	147	156	145	0	18	4	122	145	-156	122	156	278
38	2041	0	8	147	155	145	0	18	4	122	145	-155	122	155	277
39	2042	0	7	147	153	777	0	18	4	754	777	-153	754	153	908
40	2043	0	6	147	152	145	0	18	4	122	145	-152	122	152	274
41	2044	0	4	147	151	145	0	18	4	122	145	-151	122	151	273
42	2045	0	3	147	150	145	0	18	4	122	145	-150	122	150	272
43	2046	0	2	147	149	145	0	18	4	122	145	-149	122	149	271
44	2047	0	1	147	148	145	0	18	4	122	145	-148	122	148	270
<b>Total</b>		<b>4,724</b>	<b>784</b>	<b>4,110</b>	<b>9,619</b>	<b>5,995</b>	<b>4,404</b>	<b>595</b>	<b>145</b>	<b>5,255</b>	<b>10,399</b>	<b>-5,215</b>		<b>5,215</b>	

(Note)

(1) Interest rate of foreign loan: 0.75%

(2) Equal annual repayment amount of capital for foreign loan (Rs.million): 147

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
NATIONAL RIVER CONSERVATION DIRECTORATE (NRCD)  
MINISTRY OF ENVIRONMENT AND FORESTS**

**THE STUDY  
ON  
WATER QUALITY MANAGEMENT PLAN  
FOR  
GANGA RIVER  
IN  
THE REPUBLIC OF INDIA**

**FINAL REPORT**

**VOLUME IV FEASIBILITY STUDY FOR PROJECT CITIES**

**VOLUME IV-3 FEASIBILITY STUDY FOR ALLAHABAD CITY  
PART VI STAKEHOLDER MEETING**

**JULY 2005**

**TOKYO ENGINEERING CONSULTANTS CO., LTD.  
CTI ENGINEERING INTERNATIONAL CO., LTD.**

**FINAL REPORT**  
**ON**  
**WATER QUALITY MANAGEMENT PLAN FOR GANGA RIVER**  
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MANIKARNIKA GHAT



**VOLUME IV-3**

**PART VI STAKEHOLDER MEETING**

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# **CHAPTER 1**

## **OBJECTIVE**

## **PART VI STAKEHOLDER MEETING**

### **CHAPTER 1 OBJECTIVE**

In accordance with the new JICA Guidelines of Environmental and Social Considerations, a stakeholder meeting was to be held for the purpose of informing the feasibility study (F/S) project for Allahabad city to the stakeholders and public. The stakeholder meeting was to be organized by the Indian side in collaboration with JICA Study Team.

The objective of the guidelines is to encourage the recipient governments to take appropriate considerations of environmental and social factors. The basic principles regarding environment and social considerations are;

- Cover a wide range of the environmental and social impacts
- Ensure the accountability and transparency of decision-making
- Ensure a wide range of meaningful participation of stakeholders
- Disclose information
- Enhance organizational capacity

Based on the guideline, the stakeholder meeting was held on 7<sup>th</sup> February 2005 in Allahabad.

**CHAPTER 2**  
**PROCEDURE**

## **CHAPTER 2 PROCEDURE**

### **2.1 ORGANIZER**

The organizer of the stakeholder meeting in Allahabad was the Department of Urban Development, Government of U.P., and under this, Allahabad Nagar Nigam (ANN), U.P. Jal Nigam (UPJN) and Allahabad Jal Sansthan (AJS) had the responsibility to hold the stakeholder meeting. The preparations such as selection of stakeholders, programme and venue etc. were decided by the organizers in collaboration with JICA Study Team.

### **2.2 SELECTION OF STAKEHOLDERS**

The organizers in consultation with JICA Study Team decided the range of stakeholders to be invited to the meeting and following stakeholders were selected;

- Elected Public Representatives
- Ministries and Govt. Agencies
- Project Affected People
- Officers of U.P. State Government and State Undertakings
- International Organizations and Donors
- NGOs
- Well-Informed Persons / Experts
- Media

#### **2.2.1 Project Affected People**

As the project will cover the whole area of Allahabad, therefore, representatives of the City were selected as stakeholders, i.e. Mayor, M.L.As, M.Ps, and corporators, who are selected by direct election by the residents.

New STPs are proposed at Numaya Dahi, Rajapur, Sulemsarai, and Ponghat area, new PSs are proposed at Morigate, Mumfordganj and Sasur Khaderi. The village residents are most affected by the proposed facilities. From each village, the heads (representatives) were selected as stakeholders. Taking into consideration the access to the venue, cars were arranged to pick them up and drop.

#### **2.2.2 NGOs**

Active NGOs in environmental field were identified by ANN, UPJN and AJS and selected as stakeholders.

The following is the list of stakeholders and invitees.

#### **List of Stakeholders and Invitees**

<p><b>Target People at the Location</b></p> <p>Representatives of villages expected to be affected by land acquisition</p> <p>Numaya, Karendhi, Dahi, Sayyedapur (Numaya Dahi STP), Mariyadiah (Ponghat STP), Manoharpur (Kodara STP), Mahendori Kacchar (Rajapur STP)</p> <p>Sadiyapur (Ghaggar Nala PS), Bajupur (Sasur Khaderi PS), Beli Upparhar (Mumfordganj PS)</p>
---

<b>Local Associations</b> Dhobi Association Representative of Slum Dwellers (CDS)
<b>Non Government Organizations (NGOs) , Community Based Organizations (CBOs)</b>
<b>Central Govt. Agencies</b> Ministry of Environment & Forests/ NRC, New Delhi Ministry of Urban Development, New Delhi Central Pollution Control Board Central Water Commission
<b>Local Govt.</b> Mayor, Members of Parliament (MPs) and Members of Legislative Assembly (MLAs) from the city, Deputy Mayor, Corporators, Divisional Commissioner (DC), District Magistrate (DM), Development Authority (DA), Central Water Commission (CWC), State Pollution Control Board (SPCB), Irrigation Department, District Urban Development Authority (DUDA), Cantonment Board
<b>International Organizations and Donors</b> Embassy of Japan, JICA India Office, JBIC India Office, World Bank, USAID
<b>Well-Informed Persons / Experts</b>
<b>Media</b>

For the representative of villages expected to be affected by land acquisition, an officer of U.P. Jal Nigam visited each village on 31<sup>st</sup> January 2005 to explain the objective of stakeholder meeting and invite them to the meeting in Allahabad. Taking into consideration the access to the venue, the cars were arranged to pick them up and drop.

### **2.3 PREPARATORY-MEETING FOR 3 CITIES RELEVANT GOVERNMENT OFFICIALS**

Before stakeholder meetings, a joint preparatory meeting was held on 28<sup>th</sup> January 2005 at Lucknow to present and discuss the contents of the project and the procedure of the proposed stakeholder meetings in three towns and resort necessary modifications based on the feed back of this discussion with counterpart agencies of UP Jal Nigam, Nagar Nigams and Jal Sansthan of three cities. Besides, representatives from Govt. of UP also participated in the meeting.

The experts of JICA Study Team, presented the outcome of Feasibility Study for sewerage, non-sewerage including the EIA which followed with discussion and question answer.

All the participants endorsed the procedure and contents of presentation prepared by JICA Study Team, however, the Municipal commissioner, Lucknow and GM, Jal Sansthan, Lucknow pointed out following issues to be considered in the FS respectively.

1. The cost recovery of O&M, which is to be collected through tax as suggested by JICA Study Team , should be done through an enactment by the Government and should be made mandatory to implement. JICA Study Team must envisage this to the Indian government to take measures so as to strictly pass the legislation in this regard.
2. The branch sewers in Lucknow must be considered and JICA Study Team should recommend the measures required from Indian Side to augment the branch sewers with a view to draw the optimum benefits of the proposed project.

## **2.4 PRESS RELEASE**

To inform about the Stakeholder Meetings and brief of the project contents to the general public, following press releases to newspapers were conducted.

- Press release for Allahabad on 6<sup>th</sup> February 2005 in the Kanha Shyam Hotel (their articles appeared on 7<sup>th</sup> February in several newspapers)
- 20 media persons were participated

## **2.5 PREPARATION OF PROGRAMME**

Programme was decided in consultation with ANN, UPJN and AJS as below:

2:30 – 2:40	Welcome Speech
2:40 – 2:50	Introduction of the JICA Study
2:50 – 3:50	Explanation of the Project Components, Operation & Maintenance, Environmental Impact Assessment (EIA) (tea break)
4:00 – 4:35	Questions & Answers
4:35 – 4:55	Speeches
4:55 – 5:00	Closing Remarks (tea & snacks)

## **2.6 PREPARATION OF OTHERS**

### **2.6.1 Venue**

The location of Stakeholder Meeting was decided as SIEMAT Auditorium, 25 P.C. Banerjee Road, Alanganj, with capacity of 200 persons. The banners, seating arrangement and stationeries etc. were prepared by organizers and JICA Study Team.

### **2.6.2 Invitation Cards**

The responsibility of sending invitation cards to stakeholders was with the organizers, and JICA Study Team helped to deliver the invitation cards. The cards were delivered from 29<sup>th</sup> January 2005 and the stakeholder meeting was also informed through JICA Study Team's Homepage. The invitation cards for the villagers who might be affected by land acquisition were delivered by the officers of UPJN on 31<sup>st</sup> January 2005 by hand to each village head.

### **2.6.3 Stationeries / Brochure**

The bags for note pad / pen / brochure / comment sheets were arranged. The brochures were prepared in Hindi and English to give more detail information to the stakeholders (Attached in Appendix B). The comment sheets were prepared to receive the comments from the participants since Question and Answer session was not enough to receive the comments from all the participants.

**CHAPTER 3**  
**STAKEHOLDER MEETING**



## **CHAPTER 3 STAKEHOLDER MEETING**

The stakeholder meeting was held on 7<sup>th</sup> February 2005 at SIEMAT Auditorium. Due to the sudden heavy rain, thunder and hail, people came late to the venue, thus the programme started from 2:50. Total number of participants was around 140. Due to the sudden heavy rain, thunder and hail around 1 o'clock on 7<sup>th</sup> Feb., traffic control due to Magh Mela and the 13<sup>th</sup> days anniversary after assassination of one M.L.A. in Allahabad on 25<sup>th</sup> January 2005, the cars which were sent for the villagers to pick them up were delayed to reach the villages, so that only a few villagers could come and attend the stakeholder meeting.

In the Question & Answer session, many participants spoke out their opinions and active discussion was held. Minute of Meeting is attached in Appendix A.

### Comment from participants

- It is very unfortunate that various important points have been left untouched in this major Project without deliberations on which this project cannot be useful. For example the local geographical features, unplanned residential area and apart from that the increase in the expenditure whether could be paid back by the people and similar many other points are there towards which your attention has not attracted at all.
- Dhobighat be not constructed over polluted nalas because flow of sulphur-di-oxide cannot be prevented.
- Waste water purification could be achieved if pond treatment plant is adopted.
- What provision has been made in your survey and project for prevention of water pollution due to the situation such as unclaimed corpses, some practices due to certain beliefs to dispose the dead bodies into the river water or to bury them on the river bank instead of cremation?
- I would like to say that if you adopt bio-monitoring, it would be very nice which would activate continuous process. Monitoring should be done at the right time, at least ten times in a day. If Allahabad is to be saved, Ganga will have to be saved, this is my hope.
- The work being done by JICA Study Team on the Ganga River Water Quality Management Plan is highly praise worthy. In future pure water would be available in our Ganga River, due to which the situation of cleanliness in our city will improve and there will be reduction in the diseases, public health will improve.

The minutes of meeting, participants' list, comments from participants and answer from the organizer will be opened to the public at the offices of ANN, UPJN and AJS.

Appendix A: Minutes of Meeting on Stakeholder Meeting

Appendix B: Brochure

## *Appendix A*

## **Appendix A Minutes of Meeting on Stakeholder Meeting**

### **Minutes of Meeting Stakeholder Meeting in Allahabad on 7<sup>th</sup> February 2005**

JICA study Team in association with Allahabad Nagar Nigam and Department of urban development, govt. of UP organised a stakeholder meeting on 7<sup>th</sup> February in Allahabad to present and discuss the results of Feasibility Study that was carried out under the Water quality Management Plan of river Ganga undertaken by Japan International Cooperation Agency (JICA). The meeting was attended by a large number of participants comprising of the stakeholders from various categories such as social workers, NGOs, beneficiaries from the slums, dhobi association, corporators, general public and others. Besides this, officials from various concerned departments such as ANN, UP Jal Nigam, Jal Sansthan, ADA and NRCD were also present.

The meeting was chaired by Hon'ble Mayor of Allahabad, Mr. K.P. Srivastawa.

The meeting started with welcome note by the Municipal Commissioner, Mr. Gaya Prasad followed by the broad introduction of the Study by Mr. Kazufumi MOMOSE the Team Leader of JICA Study Team. After this, the technical presentation on the various proposed schemes under the Feasibility Study by the experts of JICA Study Team. The technical session included the comprehensive presentation on following main issues.

1. Sewerage plan
2. Non-sewerage schemes
3. Project benefits and Public Participation & awareness programmes
4. Institutional Development programme
5. Results of Environmental Impact Assessment study

The Technical presentation were done by Mr. R. C. Asthana and Mr. Ajay Singh of JICA Study Team. The overall contents of the technical presentation are summarised as follows.

#### **1. Sewerage**

JICA Study Team informed to the participants that out of the total sewage generation in Allahabad, only 27% is being treated in the existing Naini STP, rest goes untreated to Yamuna and Ganga rivers that contributes heavily to the pollution load of both the rivers. JICA Study Team presented that as per its plan to reduce the pollution load, all the major drains and sewer out falls are to be intercepted and treated through various Sewage Treatment Plants.

The major schemes highlighted by JICA Study Team in its presentation that are proposed under the priority projects are;

- Rehabilitation /Renovation of existing facilities such as Old Trunk Sewers and Pumping Stations in order to make them efficient so that they can be optimally utilised.
- Construction of new facilities that includes Trunk sewers and Interceptors to collect the wastewater, providing new pumping stations and Sewage Treatment Plants. The sites of the proposed STPs are Ponghahat, Kodara, Naumahiya Dahi, Rajapur, besides the augmentation of Naini STP.

#### **2. Non-sewerage**

Presenting the Non-sewerage part, Ajay Singh highlighted that the Non-sewerage programme basically focuses on Low Cost Sanitation (LCS) in slums and Dhobighats. The present population of the slums in Allahabad is approximately 3.3 lakhs and out of this around 69% practice open defecation. There are 111 CTCs and most of them are not utilised properly on account of poor Operation and Maintenance

The JICA Study Team proposed to construct 109 additional CTCs of 10 and 20 seater capacity which has been determined on the basis of sample survey. The other salient features of the proposed scheme are that it has to be demand and need driven, maintained by Community Based Organisation and user pay based cost recovery.

Regarding Dhobighat, JICA Study Team Proposed to rehabilitate the existing facilities making them more user friendly and environment friendly. It was proposed to provide the facilities such as shade, drinking water facility, toilets, submersible pump and adequate water supply etc. at the existing facilities. It was informed that there is no need to construct additional number of Constructed Dhobi ghats as the existing 5 dobighats and 5 proposed by Govt., which is under progress, are sufficient to meet the requirements of dhobis.

Taking the presentation further, Mr. Ajay Singh also enumerated various benefits of the project informed that Public Participation and Awareness programme is also envisaged as an integral component of the project and a large scale PP/PA programme for various target segments has been proposed as an integral component of the project.

### **3. Institutional Development Programme**

Presenting the Institutional Development Programme of the proposed project, Mr. R. C. Asthana of JICA Study Team highlighted the various aspects of the proposed IDP Plan. The salient features of this are summarised as follows;

- The present institutional system has lack of coordination and great degree of duplication. There's lack of clear sense of responsibility.
- Lack of fund, skilled persons, and equipments
- Need an integrated Institutional System under the aegis of Nagar Nigam as a main coordination agency.
- The Proposed IDP envisages for identification and enumerating the state resources to be transferred to cities for sewerage management, structuring of city's water and sewerage division, preparation of manuals and training programmes.

### **4. Environmental and Social Impact Assessments**

Following the IDP, the results of EIA were presented by Mr. Ajay Singh of JICA Study Team. The EIA results were concluded by highlighting the facts that the project has no significance environmental and social impacts. However, some minor impacts such as traffic problem at the time of construction of sewer lines, sludge disposal from the STPs, landscapes etc. may be appropriately mitigated and various migrating measures were suggested to this regard. One of the most important mitigating measures included the effective O&M of the facilities such as STPs, Pumping Stations etc. thus, ensuring its proper functioning without any breakdown by having captive power arrangements. Its also proposed a monitoring plan to check the treated water quality.

#### **Question-Answer session**

After the technical presentation by the experts of JICA Study Team, the Question –Answer session was started in which a panel of Experts comprising the members of JICA Study Team, representatives of Allahabad Nagar Nigam and UP Jal Nigam responded to a wide range of questions raised by various

participants.

Some of the key issues raised during this session are as follows.

- a. Branch Sewers :- Hon'ble Mayor mentioned that as per his information only 25% area of the Allahabad has sewerage connection and in rest of area there is no mechanism for the management of domestic waste water and it flows around the roads unmanaged thus creating to a very unhygienic conditions which further leads to lot of health risks. He asked if the plan proposed by JICA has considered this problem and proposed any solution to this problem.
- b. Responding to this, JICA Study Team informed to honourable Mayor and participants that JICA Study Team's plan primarily focus on the Trunk sewers through which the domestic waste water flowing in various drains, after interception, will be carried to different STPs that have been proposed and where it will be treated and discharged to irrigation canal. JICA expert emphasised that the objective of the proposed project is to improve the water quality of rivers primarily thus entire sewerage plan proposed under the Feasibility Study focuses on the measures to address the domestic waste water that flows to river untreated. He further clarified that it is also because as per the NRCP guideline, the branch sewers can not be funded under the said project and is to be taken care of by the state govt and local bodies. However, Mr. Asthana of JICA Study Team informed that same has been highlighted in our Master Plan. Honourable members requested that since it is a very important issue, JICA study Team must indicate and recommend the appropriate measures in this regard so that this issue can be handled.
- c. Industrial Waste:- Mr. Bhalwar of South Asia Partnership Trust, a Delhi based NGO, raised the issue of industrial waste and said that it is one of the main reason of the river pollution. He said that in Allahabad, the river water gets polluted mainly from the polluted waste water due to industrial wastes that flows to river in the towns like Kanpur. He asked what measure JICA Study Team proposes to address the pollution from Industrial waste? JICA Study Team responded that Industrial wastewater is not the mandate of the under this study and it is to be tackled by Central Pollution Control Board. He also informed that as per CPCB guidelines, all industrial units have to have ETPs and the same has to be monitored by CPCB.
- d. Low Cost sanitation: - One Corporator asked about the land availability for the proposed nos. of CTCs in the slum and also raised the issue of disposal/ treatment measures. Responding to this, Mr. Ajay Singh of JICA Study Team said that at this stage, only the needs of CTCs has been estimated and the location and availability of land will be worked out during the implementation stage in coordination with Nagar Nigam how ever to ensure the access and usage, we have proposed that the location of CTC should not be more that 500 mtrs from the dwelling units. Regarding treatment, Mr. Singh, informed that it has been proposed to prefer the construction of CTCs in the area where the sewerage networks exist or proposed, however, in absence of sewerage connection, septic tank/ soak pit has been proposed.
- e. Others:- Apart from the aforesaid issues, some other concerns like disposal of sludge from the STP area, power breakdown, etc. were raised and discussed in the meeting. Study Team appropriately answered all such queries from a section of the audience.

After the question Answer session, Hon'ble Mayor gave the Chairman's speech. In his speech, he extremely appreciated the proposed project and thanked to JICA for its endeavour to clean the Rivers, Yamuna and Ganga.

The meeting ended by vote of thanks by the Chief Engineer UPJN, Allahabad Mr. BML Agrawal.

Annex I: List of Participants

Annex II: Comments by the Participants and Reply from the Organizer

## LIST OF PARTICIPANTS

Sl. No.	Name	Organization & Designation
<b>[Target People at the Location]</b>		
1	B L Yadav	Gram Pradhan (Village Head), Naini Village
2	Murrari Lal.	Villager, Numayadahi
3	Jeewan Yadav	Villager, Numayadahi
4	Kamlesh Kumar	Villager
5	Asha Yadav	Villager, Rajapur
6	Kakkoo Lal	Villager
7	Suman Yadav	Villager
<b>[Local Association]</b>		
8	Munni Devi	CDS (Community Development Society), Salori
9	Sita Devi,	CDS Rajapur
10	Rajni Singh	CDS Shastri Nagar
11	Usha Kesarwani	CDS Bahadurganj.
12	Sarojini Devi	CDS Allahapur.
<b>[NGO]</b>		
13	K M Tiwari	President, Prayag Manav Kalyan Samiti
14	Alok Kumar Singh	Secretary, Prayag Manav Kalyan Sansthan
15	Shri. Rajesh Tiwari, CEO	Prayag Manav Kalyan Sansthan
16	D K Gupta	Secretary, Vidhya Samiti
17	Manoj Kumar Dubey	Volunteer, Memorial Sewa Sansthan
18	B N Jha	Social Worker, J.S.S Sansthan
19	Santosh Pandey	Social Worker, J.S.S Sansthan
20	Girish Srivastava	N.I.P
21	Shakeel Ahmed	N.I.P
22	Brij Mohan Lal	Dr. Ambedkar Sewa Sansthan
23	Mr. Girish Bhalwar	South Asia Partnership India Trust, New Delhi
24	Shri. Ramesh Tiwari	Manav Kalyan Pratishthan, Fatehpur, U.P
25	Shri Rajesh Kumar	Vindhyavasini Samiti, Sohabia Bagh, Allahabad
26	Mr. Nitin Dixit.	Account Manager, Saakaar International, New Delhi.
27	Pradeep Mahapatra	Executive, Saakaar International.
28	Mr. Nitin Srivastava	Project Manager, Saakaar International
<b>[Central Govt. Agencies]</b>		
29	Mr. Sanjai Singh	Scientific Officer, NRCD
30	Jun Iwasaki	JICA Expert, NRCD, New Delhi.
31	R K Sharma	Engineer, C.W.C
32	A K Mishra, RA	Engineer, C.W.C
33	L R Yadav, JE	Engineer, C.W.C
<b>[Local Govt.]</b>		
34	Dr. K P Srivastava	Mayor, Allahabad Nagar Nigam (ANN)
35	Ved Prakash	Ex. Mayor, ANN
36	Umesh Chandra Jaiswal	Corporator, ANN
37	Dilip Jaiswal	Corporator, ANN
38	Vijay Vaishya	Corporator, ANN
39	Sita Ram	Corporator, ANN
40	Raju Shukla	Corporator, ANN
41	Kamlesh Singh	Corporator, ANN
42	Shiva Sewak Singh	Corporator, ANN

Sl. No.	Name	Organization & Designation
43	Yogesh Ram Singh	Corporator, ANN
44	Mubhar Ahmed Khan	Corporator, ANN
45	Prahlad Archarya	Corporator, ANN
46	Arun Kumar Tiwari	Corporator, ANN
47	Sushma Tiwari	Corporator, ANN
48	Shri Gaya Prasad	Municipal Commissioner, ANN
49	Mr. R C Srivastava	Additional Municipal Commissioner, ANN
50	G N Shukla	Additional Municipal Commissioner, ANN
51	Girish Ojha	Public Relation Orricer, Asst. Municipal Commissioner, ANN
52	Sri Ram	ANN
53	Nem Chandra Yadav	ANN
54	Dr. A K Kapoor	Health Officer, ANN
55	Dr. Arun Kumar	Health Officer, ANN
56	Mr. Nilesh Raman	Officer, Nazul Department, ANN.
57	K K Agarwal	Chief Enginner, UPJN, Lucknow
58	Shri. BML Agrawal	Chief Engineer, UPJN, Allahabad
59	R C Verma	UP JAL Nigam
60	Ram Awasthi	Jal Nigam.
61	Shri. Rashid Ahmed Khan	Jal Nigam
62	Raj Kumar	UPJN
63	Er. Ranjit Singh	UPJN
64	Er. S K Chaubey	UPJN
65	Hari Om Singh	UPJN
66	A.A.R.E	Ganga Action Plan
67	Mukal Srivastava	UPJN
68	Er. M C Srivastava	GPCU, UPJN
69	Er. R C Maurya	GPCU, UPJN
70	Rakesh Kumar	GPCU, UPJN
71	Lalbachhan Praod	GPCU, UPJN
72	P N Srivastava	GPCU, UPJN
73	Mukesh Kumar	GPCU, UPJN.
74	S B Singh	Flood Works Divison, UPJN
75	Shiva Narayan Srivastava	Jal Sansthan.
76	Rashid Khan	GM, Jal Sansthan.
77	S K Pathak	Jal Sansthan
78	S K Jaiswal	Jal Sansthan
79	N N Chauhan	Jal Sansthan
80	Abjal Siddiquie	Jal Sansthan
81	Brijesh	Jal Sansthan.
82	Er. M K Gupta	Engineer, DUDA
83	Er. P K Mishra	Project Officer, DUDA
84	Pradeep Nirmal	Engineer, DUDA
85	Ashok Kumar	Worker, DUDA
86	Indra Bhan Singh	Engineer, Electricity Department
87	Shri. S L Mathur	NHAI ( National Highway Authority of India)
88	Rajnish Srivastava	SHO (Station Health Organization) India Army body
<b>[Well-Informed Persons / Experts]</b>		
89	Anadi Mishra	Advocate, Public Litigation
90	Shri Vinod Kumar Sharma	Advocate, Allahabad High Court.
91	Anuj Pandya	Businessmen.
92	Ashok Mishra	Civil Contractor
93	Shri. B K Dwivedi.	Allahabad University



<b>Sl. No.</b>	<b>Name</b>	<b>Organization &amp; Designation</b>
94	Anupam Ray	Allahabad University.
95	Rajeev Nayan Singh	Allahabad University
96	Dr. Pawan Kumar	Allahabad University
97	Rajeev Ranjan	Allahabad University
98	Mr. Kanhiya Lal.	SIEMAT
99	B K Dwivedi	SIEMAT
100	Shri R C Tiwari	SIEMAT
101	Satyendra Nath	MNNIT, Allahabad
102	Ku. Awami	MLNR
103	Ashok Khushwaha	MLNR
<b>[Media]</b>		
104	Navin Saraswat	Umeed Bharat (Press)
105	Ghan Shyam Maurya	United Bharat (Press)
106	Gyanendra	Dainik Jagaran
107	V K Pandey	NIEEM, Allahabad
108	Kand Kishore	Hindustan Times
109	Jitendra Prakash	The Pioneer
110	Md. Saifuddin	Hindustan (Press)
111	Saras	Swatantra (Press)
112	Amrit Mukherjee	Home Channel
113	Shobby	Home Channel
114	Shri. C P Mishra	Sahara Samay, T V News
115	Praveen Mishra	Indian T V
116	Devendra Jaiswal,	Shikhar (Press), 3 Bali Road, Allahabad.
117	Aashi	GTV
118	Jyoti Cherwani	Aaaj, News Bureau
119	R C Shukla	Amrit Bharat (Press)
120	Sarita Awasthi	Nav Sanjivan (Press)
121	Kumar	Dainik Jagaran.
<b>[JICA Study Team]</b>		
122	Kazufumi Momose	Team Leader, JICA Study Team
123	Shouko Yamada	Social Consideration, JICA Study Team
124	R C Asthana	Adviser, JICA Study Team
125	Ajai Kumar Singh	Sr. Programme Cordinator, JICA Study Team
126	R.P. Sharma	Facilitator, JICA Study Team
127	D Sarkar	JICA Study Team (STUP)
128	Rajeev Mittal	JICA Study Team (STUP)
129	Sanjay Chaudhary	JICA Study Team (STUP)
<b>[Coordinator &amp; Staff of Stakeholder Meeting]</b>		
130	Utparn Dubey	Secretary, Saakaar International
131	Nitin Parihar	Saakaar International
132	Blessy Simon	Saakaar International
133	Pallavi Singh, Volunteer	Saakaar International
134	Susan Thomas	Saakaar International
135	Divya Pandey	Saakaar International.
136	Rosy Sam	Saakaar International
137	Anurag Mishra	Saakaar International
138	Amole Pathak	Saakaar International
139	Anand Singh	Saakaar International
140	Kamal Kumar	Saakaar International
141	Shashank Gautam	Saakaar International

<b>Sl. No.</b>	<b>Name</b>	<b>Organization &amp; Designation</b>
142	Ms. Archana Pathak	Saakaar and CARE.

## **Comments from the Participants and Reply from the Organizer**

### **1. Saroj**

Newspaper Reporter (Hindi Daily), Swatantra Bharat

It is very unfortunate that various important points have been left untouched in this major Project without deliberations on which this project cannot be useful. For example the local geographical features, unplanned residential area and apart from that the increase in the expenditure whether could be paid back by the people and similar many other points are there towards which your attention has not attracted at all.

(Reply)

We have studied the geographical features and based on the result, propose the appropriate plan for Allahabad City. To improve the water quality of River Ganga, it costs and the cost should be funded from somewhere. We propose that first of all, raise the collection rate of tax, and second, consider the tax rate.

### **2. Kamlesh Singh**

Corporator Ward 47, Alopibagh, Allahabad.

Attention is drawn to following for saving the Ganga river from Pollution:

- 1) Dhobighat be not constructed over polluted nalas because flow of sulphur-di-oxide cannot be prevented.  
Treatment
- 2) Whether water purification and oxidation is being done in Ganga river or not.
- 3) How the pharmaceutical raw material will be removed.
- 4) Sludge is rendering the agriculture fields in to waste lands. Research is needed on this.
- 5) Waste water purification could be achieved if pond treatment plant is adopted.
- 6) Ganga water must be released from Narora where it has been collected for electricity generation. This will cause flow of pure water in the Ganga river.

(Reply)

The Dhobi Ghat will be constructed on the appropriate site to connect the sewer lines. Thus, no wastewater from Dhobi Ghat will flow into the Nala. The treatment technology is selected properly considering the land availability, costs etc. Every technology we adopted will satisfy the effluent quality standard.

### **3. Promod Kumar Mishra**

Junior Engineer (Civil), District Urban Development Agency (DUDA), Allahabad

Kindly inform that another factor which contributes towards pollution of Ganga, that is, unclaimed corpses, some practices due to certain beliefs to dispose the dead bodies into the river water or to bury them on the river bank instead of cremation. What provision has been made in your survey and project for prevention of water pollution due to this situation?

Apart from that according to your statement, in the proposed project, the arrangement of branch sewers is to be done by the local body and while the implementation of your project has been proposed to be done upto the year 2013, till then how the construction of water flush latrines in the narrow lanes of the slums of Allahabad will be done?

(Reply)

The proposed CTC in slum area will be connected to the existing sewer or treated by off site.

**4. Dr. Brajesh Kumar Dwivedi**

Lecturer, Environmental Science, Department of Environmental Science, Botany Department, Allahabad University, Allahabad.

First of all I wish to congratulate the former Prime Minister of India, Honb'le Vajpayee ji and this multi dimensional Agency of Japan. Indeed this would be of help in the re-juvenation of the faith of Allahabad.

It will be helpful if your projections are implemented in the right earnest.

In-deed if the good work done by you is seen, the true situation has been identified, for example, social, economical, technical and participatory, which is praise worthy.

I would like to say that if you adopt bio-monitoring, it will be very nice which would activate continuous process. Monitoring should be done at the right time, at least ten times in a day. If Allahabad is to be saved, Ganga will have to be saved, this is my hope.

(Reply)

Thank you for your comments. We propose the environmental management plan for monitoring / environmental management.

**5. Rajneesh Srivastava**

Secretary, Sahyog Helpers Organization of Welfare (SHOW)

It has been told by you that the pollution of Ganga increases because of the city wastes also.

I want to know if any project has been prepared for cleanliness of the city also. If has been prepared, then what is the scheme.

(Reply)

Unfortunately, the solid waste is not included in this study, as our scope of the study is limited to liquid waste management. But we have recommendations regarding solid waste management in the Master Plan.

**6. Sanjay Singh**

Area Assistant, Jan Shikshan Sansthan, Haas, Allahabad.

The work being done by JICA Study Team on the Ganga River Water Quality Management Plan is highly praise worthy. In future pure water would be available in our Ganga River, due to which the situation of cleanliness in our city will improve and there will be reduction in the diseases, public health will improve.

(Reply)

Thanks for your comments.

**7. K.M. Tiwari**

President, Prayag Manav Kalyan Evam Vikas Samiti, Allahabad,

- 1) There will be flush toilets for the human excreta but there is no provision for the disposal

- of animal excreta – should be done.
- 2) Toilets are constructed on the banks of Ganga during Mela which cause Ganga water pollution. How the purity of water would be achieved from this?
  - 3) It will be better if mobile arrangement is made for solid waste disposal in the city.
  - 4) It will be of special benefit if the treated water is used for agriculture instead of discharging in the Ganga.

(Reply)

Refer the answer to No. 5.

We propose the effluent from some treatment plant can be used for the irrigation.

## *Appendix B*

## Appendix B Brochure

### BRIEF OUTLINE OF WATER QUALITY MANAGEMENT PLAN FOR GANGA RIVER IN THE REPUBLIC OF INDIA

#### Stakeholder Meeting on Pollution Abatement Project for Allahabad

Organized Jointly by Department of Urban Development, Govt. of U.P., Allahabad Nagar Nigam, U.P. Jal Nigam and Allahabad Jal Sansthan in Collaboration with JICA Study Team

February 7<sup>th</sup> 2005

### INTRODUCTION OF THE ENTIRE PROJECT

Ganga Basin, the largest river basin of Republic of India, is supporting nearly 40 percent of the country's population. River Ganga and its tributaries, besides being a source of water supply and irrigation, are also regarded as sacred rivers and extensively used for bathing by millions of people. The mounting pollution of river Ganga and its tributaries due to increased human and industrial activities has adversely affected the human health and biodiversity of the eco-system. To control further pollution and improve the river water quality, the Government of India is implementing the Ganga Action Plan (GAP). The first phase of GAP, which was launched in 1985 has been completed, while the second phase is presently under implementation.

The Government of Japan is collaborating with Government of India on this important programme by providing assistance through the Japan International Cooperation Agency (JICA) for taking up a Development Study relating to 'Water Quality Management Plan for Ganga River Basin'. The Study focuses on formulation of the water quality Master Plan (M/P) for the four large and important towns of Kanpur, Allahabad, Varanasi and Lucknow. The target year of Master Plan is 2030.



### ALLAHABAD PROJECT

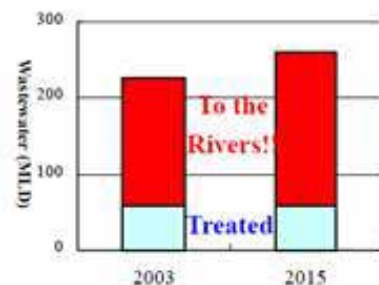
#### OBJECTIVES OF ALLAHABAD PROJECT

To improve water quality of Ganga and Yamuna Rivers,

- Through reducing major pollution sources, domestic wastewater (Sewerage Measures)
- Through reducing open defecation and washing cloth activities on the river bank (Non-Sewerage Measures)

#### PROBLEMS IN WATER POLLUTION IN ALLAHABAD

- Major pollution source of Ganga and Yamuna Rivers is domestic wastewater
- At present, only limited wastewater (27%) is treated, the remaining (73%) is discharged into Ganga and Yamuna Rivers without treatment
- The total current estimated wastewater is 226 mld, out of which 60 mld is conveyed to one existing STP, whereas 166 mld is discharged into the river.
- Sewerage facilities are not properly operated and maintained
- Open defecation and laundry activities are also one of the pollution sources
- Without this project, more wastewater will find its way to Ganga and Yamuna Rivers in future, and pollute them more







## MAJOR PROJECT COMPONENTS

### ■ Sewerage Measures

- ◇ Rehabilitation/renovation of existing facilities
  - Trunk sewer and pumping stations– Recover adequate flow capacity
  - Sewage Treatment Plant – Treat collected wastewater to desirable level.
- ◇ Construction of trunk sewers and interceptors to collect and convey wastewater
  - Divert wastewater from the city core
- ◇ Construction of pumping station
  - Intercept the wastewater and pump up to STP
- ◇ Construction of sewage treatment plant
  - Treat collected wastewater to desirable level



### ■ Non-Sewerage Measures

- ◇ Community Toilet Programme
- ◇ Constructed Dhobi Ghat Programme (Rehabilitation)

### ■ Non-Facility Measures

- ◇ Strengthening of operation and maintenance and management (Institutional strengthening)
- ◇ Public awareness and participation (PP/PA) programme

## PROJECT BENEFITS

- Check almost all the untreated wastewater before entering the Rivers
- Improve water quality of Ganga and Yamuna
- Improve bathing and river front environment
- Improve Municipal water quality (the quality of the water source will be improved)
- Improve sanitary conditions in the City
- Reduce risk of disease and enhance human health
- Nutrient rich treated water used for irrigation and sludge from STP as manure
- Improve the image of the City and enhance the value of the City
- Increase in employment opportunities during construction and O&M stage

## IMPACTS AND MITIGATION MEASURES

Impact	Mitigation Measures
<b>Sewage Treatment Plant</b>	
<ul style="list-style-type: none"> <li>• Resettlement</li> <li>• Income loss due to land acquisition</li> <li>• Water contamination in receiving body</li> </ul>	<ul style="list-style-type: none"> <li>• STP site is selected properly, so that resettlement is avoided</li> <li>• To be compensated by money or alternative land</li> <li>• Disinfection through chlorination</li> <li>• Ensuring appropriate O&amp;M of sewerage facilities</li> <li>• Setting up of monitoring mechanism</li> </ul>
<b>No major impact of installation of pumping station and trunk sewer</b>	
<b>Risk (Power failure) in sewerage facilities</b>	
<ul style="list-style-type: none"> <li>• Untreated wastewater discharge into the Rivers while power cut</li> </ul>	<ul style="list-style-type: none"> <li>• Provision of generator and fuel</li> <li>• Budget provision for fuel</li> <li>• Appropriate O&amp;M</li> <li>• Setting up of monitoring mechanism</li> </ul>

## भारतीय गणतंत्र में गंगा नदी के जल की गुणवत्ता प्रबन्धन योजना की संक्षिप्त रूपरेखा

इलाहाबाद नगर में प्रदूषण नियंत्रण योजना पर स्टेकहोल्डर्स की बैठक

- आयोजनकर्ता -

नगर विकास विभाग, 30प्र0 सरकार, इलाहाबाद नगर निगम, 30प्र0 जल निगम, इलाहाबाद जल संस्थान

- सहयोग -

जायका अध्ययन दल

07 फरवरी 2005

### परियोजना - एक परिचय

गंगा नदी भारतवर्ष की नदियों में सबसे बड़ी नदी है एवं गंगा नदी व इसकी सहायक नदियों से देश की करीब 40 प्रतिशत जनसंख्या लाभान्वित होती है। गंगा नदी एवं इसकी सहायक नदियां, जल आपूर्ति एवं सिंचाई के श्रोत के अतिरिक्त पवित्र नदियां मानी जाती हैं और बड़े पैमाने पर लाखों लोग इसमें स्नान करते हैं। मानव एवं प्रौद्योगिक क्रियाकलापों के बढ़ने के फलस्वरूप गंगा एवं इसकी सहायक नदियों में बढ़ते प्रदूषण ने मानव स्वास्थ्य एवं पर्यावरण की विविधता पर बुरा प्रभाव डाला है। बढ़ते प्रदूषण को रोकने व नदी जल गुणवत्ता को सुधारने के लिये भारत सरकार द्वारा गंगा कार्य योजना (जी0ए0पी0) का कार्यान्वयन किया जा रहा है। वर्ष 1985 में शुरू किया गया गंगा कार्य योजना का प्रथम चरण पूर्ण हो चुका है, जबकि इसके द्वितीय चरण का कार्यान्वयन प्रगति पर है। वर्तमान में इस महत्वपूर्ण कार्यक्रम पर जापान सरकार द्वारा भारत सरकार के साथ सहयोग किया जा रहा है, जिसके अन्तर्गत जापान इन्टरनेशनल कोओपेरेशन एजेन्सी (जाइका) द्वारा 'गंगा नदी के जल की गुणवत्ता प्रबन्धन योजना' के रूप में एक विस्तृत अध्ययन करवाया जा रहा है। यह अध्ययन चार बड़े व महत्वपूर्ण नगरों - कानपुर, इलाहाबाद, वाराणसी व लखनऊ के लिये, जल गुणवत्ता मास्टर प्लान बनाने पर केन्द्रित है। मास्टर प्लान का अभिकल्पित वर्ष 2030 है।



### इलाहाबाद परियोजना

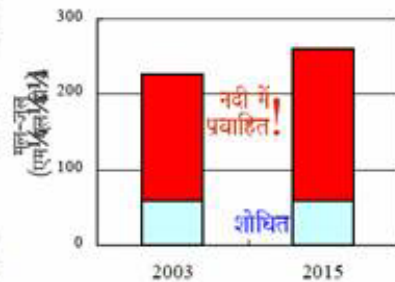
#### इलाहाबाद परियोजना के उद्देश्य

#### गंगा एवं यमुना नदी की जल गुणवत्ता सुधारना,

- जलोत्सारण सुविधा ( सीवरेज मेजर्स) उपलब्ध कराते हुए प्रदूषण श्रोतों एवं घरेलू गंदे जल से होने वाले प्रदूषण भार को कम करना।
- खुले स्थान में शौच एवं नदी के किनारे कपड़े धोने के कारण होने वाले प्रदूषण को रोकथाम (गैर जलोत्सारण-नॉन सीवरेज मेजर्स)

#### इलाहाबाद में जल प्रदूषण की समस्याएं

- गंगा एवं यमुना नदी के प्रदूषण का मुख्य श्रोत घरेलू मल-जल है।
- वर्तमान में, केवल सीमित (27 प्रतिशत) मल-जल का शोधन होता है बाकी बचा हुआ (73 प्रतिशत) बिना शोधित हुए गंगा एवं यमुना नदी में मिल जाता है।
- वर्तमान में मल-जल की कुल आंकलित मात्रा 226 एम0एल0डी0 है जिसमें से 60 एम0एल0डी0 मल-जल वर्तमान में कार्यरत एक शोधन संयंत्र पर ले जाया जाता है, जबकि 166 एम0एल0डी0 नदी में गिरता है।
- जलोत्सारण सुविधाओं का उचित संचालन एवं रख-रखाव नही है।
- खुले स्थान में शौच एवं धुलाई कार्य भी प्रदूषण के श्रोतों में से एक है।
- इस परियोजना के लागू न होने पर, भविष्य में इससे अधिक मल-जल गंगा एवं यमुना नदी में जायेगा और जल प्रदूषण बढ़ेगा।





## परियोजना के मुख्य अवयव

### ■ जलोत्सारण सुविधायें

#### ◇ वर्तमान सुविधाओं का पुनरोद्धार/जीर्णोद्धार

- ट्रंक सीवर एवं पम्पिंग स्टेशन - पर्याप्त बहाव क्षमता की प्राप्ति
- सीवेज शोधन संयंत्र - एकत्रित मल-जल का मानक स्तर तक शोधन

#### ◇ मल-जल को एकत्र करने व भेजने के लिये ट्रंक सीवर व इन्टरसेप्टर का निर्माण

- नगर क्षेत्र से मल-जल को एकत्र करना

#### ◇ पम्पिंग स्टेशन का निर्माण

मल-जल को एकत्र करके शोधन संयंत्र तक पम्प करना

#### ◇ मल-जल शोधन संयंत्र का निर्माण

- एकत्रित मल-जल का मानक स्तर तक शोधन

### ■ गैर जलोत्सारण सुविधायें

- ◇ सामुदायिक शौचालय कार्यक्रम
- ◇ धाबी घाट निर्माण कार्यक्रम (पुनरोद्धार)

### ■ परोक्ष (नान फैसिलिटी) सुविधायें

- ◇ संचालन एवं अनुरक्षण तथा प्रबन्धन का सुदृढीकरण (संस्थागत सुदृढीकरण)
- ◇ जन जागरूकता एवं सहभागिता कार्यक्रम



## परियोजना से लाभ

- नदियों में प्रवाह से पूर्व लगभग सम्पूर्ण गैर शोधित जल की रोकथाम
- गंगा एवं यमुना नदी के जल की गुणवत्ता में सुधार
- नदी तट के पर्यावरण तथा स्नानार्थ वातावरण में सुधार
- नगर क्षेत्र के पेयजल की गुणवत्ता में सुधार (पेयजल स्रोत की गुणवत्ता में सुधार होगा)
- नगर क्षेत्र की स्वच्छता की स्थिति में सुधार
- बीमारियों के खतरे में कमी एवं जन स्वास्थ्य में वृद्धि
- पोषक तत्वों युक्त शोधित जल का सिंचाई हेतु एवं शोधन संयंत्र से प्राप्त स्लज का खाद के रूप में उपयोग
- नगर की छवि एवं समृद्धि में वृद्धि
- योजनाओं के निर्माण एवं रख-रखाव के दौरान रोजगार के अधिक अवसर

## प्रभाव एवं उचित निस्तारण

प्रभाव	उचित निस्तारण
<b>मल-जल शोधक संयंत्र</b> <ul style="list-style-type: none"> <li>• विस्थापन</li> <li>• कृषि भूमि अधिग्रहण से आय में कमी</li> <li>• शोधित जल ग्रहण के कारण नदी जल का प्रदूषण</li> </ul>	<ul style="list-style-type: none"> <li>• विस्थापन न हो इसके लिये उचित एस0टी0पी0 स्थल का चुनाव किया जा चुका है</li> <li>• धन अथवा वैकल्पिक भूमि द्वारा क्षतिपूर्ति</li> <li>• क्लोरिनेशन द्वारा विषाणु संक्रमण दोष दूर करके</li> <li>• जलोत्सारण सुविधाओं का उचित संचालन एवं रखरखाव</li> <li>• अनुश्रवण व्यवस्था बना कर</li> </ul>
<b>ट्रंक सीवर व पम्पिंग स्टेशन के निर्माण से कोई विशेष प्रभाव नहीं जोखिम (विद्युत आपूर्ति बाधित होने पर)</b> <ul style="list-style-type: none"> <li>• विद्युत आपूर्ति बाधित होने पर बिना शोधन के गंदे जल का नदी में प्रवाह</li> </ul>	<ul style="list-style-type: none"> <li>• जनरेटर व ईंधन सुविधा का उचित प्राविधान</li> <li>• ईंधन हेतु पर्याप्त बजट</li> <li>• उपयुक्त संचालन एवं रख-रखाव</li> <li>• अनुश्रवण व्यवस्था बना कर</li> </ul>