MATRIX

Consultants in
Development Management

INDO-DUTCH
ENVIRONMENTAL AND SANITARY ENGINEERING PROJECT
KANPUR - MIRZAPUR

UNDER GANGA ACTION PLAN

BRIEFING DOCUMENT

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LIST OF ABBREVIATIONS

AMU	Aligarh Muslim University
BHU	Benares Hindu University
BOD	Biological Oxygen Demand
CLRI	Central Leather Research Institute
COD	Chemical Oxygen Demand
DM	District Magistrate
DPR	Detailed Project Report
ESI	Employees State Insurance
GOI	Government of India
GON	Government of The Netherlands
GPD	Ganga Project Directorate
GUA	University of Amsterdam
HRT	Hydraulic Retention Time
HSMI	Human Settlements Management Institute
IHS	Institute of Housing Studies, Rotterdam
JEM	Joint Evaluation Mission
JPS	Associates consultancy bureau on training and institutional development
KIT	Royal Tropical Institute, Amsterdam
KIWA	Testing and Research Institute of The Netherlands Waterworks Association
KNM	Kanpur Nagar Mahapalika
KJS	Kanpur Jal Sansthan
LCS	Low Cost Sanitation
LUW	Agriculture University of Wageningen
MIS	Management Information Reports
MLD	Million Litres per Day
MNP	Mirzapur Nagar Palika
ORS	Oral Rehydratation Solution
PHC	Primary Health Care
POO	Plan of Operations
RIVM	Netherlands Institute of Public Health and Environmental Hygiene
RIZA	Institute for Inland Water Management and Wastewater Treatment
RNE	Royal Netherlands Embassy
SEU	Socio-economic Unit
SS	Suspended Solids
TBA	Traditional Birth Attendants
TNO	Council for Scientific and Industrial Research in The Netherlands
TSS	Total Suspended solids
UASB	Upflow Anaerobic Sludge Blanket
UP	Uttar Pradesh
UPJN	Uttar Pradesh Jal Nigam

INTRODUCTION

This briefing document is based on the literature available in the Netherlands on the Indo-Dutch Environmental and Sanitary Engineering project in Kanpur and Mirzapur as well as on some interviews with resource persons.

Its aim is to make a description and analysis of the project and its performance and to serve as a tool for the mid term evaluation that will be carried out in June 1991. In the opinion of the authors, the relevance of the issues as identified in this document are subject of discussion.

The Kanpur/Mirzapur project is a comprehensive project. It includes a large number of executing agencies, it has a complex setting and a great variety of project activities. In order to make the mid term evaluation as efficient and effective as possible, a phased approach will be followed:

I. **Pre-study** with the following objectives:
- to acquire relevant insight in the development, achievements and main constraints of the project as a whole as well as of the different project components;
- to make an analysis of the main bottlenecks and issues;
- to indicate gaps in project information and to find out whether lacking information could be obtained from the consultants;
- to indicate how the evaluation process should proceed and whether a field survey might be required for obtaining information on and insight in some specific issues and make an inventory of relevant issues to be addressed in the field survey and final mission.

The Pre-study has resulted in this briefing document.

II. **Interim mission** with the following objectives:
- to discuss the draft TOR for the evaluation with the municipalities of Mirzapur and Kanpur, UP Jal Nigam, UP Government and GPD and the Indian members of the evaluation mission;
- to discuss the briefing document with the parties involved in the project;
- to discuss the contents of the field survey;
- to discuss the need for a field survey and if necessary to prepare and organise (partly) the field survey.

III. **Field survey** with the following objective:
- to obtain information on and insight in some specific issues, as far as this information/insight cannot be obtained from the consultants. The field survey (if required) will facilitate the evaluation mission to formulate their final conclusions and recommendations.

IV. **Mid term evaluation** with the following objectives as formulated in the TOR:
- to evaluate the project on its performance regarding the technical, institutional financial and socio-cultural aspects in relation to its objectives;
- to recommend changes or improvements for the continuation of the project.

1. SUMMARY OF MAIN ISSUES

1.1 Introduction

The main aims of the environmental and sanitary engineering project Kanpur/Mirzapur are twofold:

1. Reduction and prevention of pollution of the river Ganga (indicated as the 'overall aim' in the Workplan)
2. Improvement of environmental living conditions of the population in Mirzapur and Jajmau, Kanpur.

These two main aims are specified in the following objectives:

- "to develop integrated delivery systems for sewerage, stormwater, drainage, water supply, sanitation treatment of domestic and industrial wastewater collection, disposal and possibly treatment of solid waste, and public health education utilizing effective community participation, with the aim not only to control pollution on the river Ganga, but also to improve the general living conditions of the target population in Kanpur and Mirzapur".

- "to demonstrate the application of an integrated approach in Jajmau, an area which is characterized by a mixed industrial and residential use within the city of Kanpur, and the medium sized city of Mirzapur and to develop basic criteria for the technical designs in sanitary engineering projects for combined treatment of domestic and industrial waste water".

- "to demonstrate that by using an anaerobic waste water treatment process, a substantial part of the energy requirements for waste water collection and treatment can be covered by its production of biogas".
  (Mid Term Status Report, 1989)

The sources of pollution in Mirzapur are mainly of domestic nature, whereas in Kanpur also the industries (especially tanneries) form an important source of pollution.

The living conditions in terms of sanitary facilities, sewerage and drainage systems, water supply, solid waste disposal and urban health care are poor in both project areas.

In this summary chapter an overview is given related to the main issues on performance with regard to approach and methodology, expected sustainability, progress, impact and replicability.

First of all the project is placed in the context of the objectives as they are mentioned above and discussed from the perspective of the concept of integration. Secondly, a short overview is given on various aspects of sustainability. Thirdly, discussion points will be formulated on the impact and replicability of the project.

Finally some points of attention to the evaluation mission are formulated. The points of action for different stages of the mid term evaluation are listed in the final chapter.

1.2 The concept of integration

1. The basic concept of the project is an integrated approach. Such an integrated approach is logic since most project components are to a certain extent related.

   The 'Project Workplan' (chapter 2, page 4) describes integration as follows: "different components covered by the project are interrelated. It is this interrelationship that subsequently leads to the need to recognize and reflect mutual influences in the different design and planning sequence for implementation of the project components. It should however be clear that the prime aim of the project is to address the problem of "pollution abatement and control". Towards this end interventions in related sectors have to be derived accepting that this "back bone" or major thrust provides the binding and integrating component of the project'.

2. The concept of integration of a project implies that there is a clear leading objective that forms the basic philosophy for the entire project and all its sub-projects. Pollution abatement is mentioned as the prime aim of the Ganga Action Plan, whereas improvement of the environmental living conditions of the population in Jajmau and Mirzapur serves as the second aim.

   A critical analysis of the available project documentation however makes clear that these two objectives, although in principle not contradictory, appear in practice to function laterally instead of as one integrated main objective.

   This statement can be illustrated by discussing briefly some aspects of the project from the perspective of integration, viz. the institutional set up (institutional integration), the technology, the set up of the implementation and the time-planning.

3. Institutional integration implies that one institution or project-structure has the ultimate responsibility for the interpretation of the concept and its implementation.

   The institutional set up of the project as it is described in chapter 3 seems transparent on paper. The ultimate responsibility is with the Ganga Project Directorate and all important decisions related to the project are taken by the Project Review Panel.

   The study of the documentation has shown that in practice the responsibility for the implementation and for the Operation & Maintenance of the different sub-projects is divided over a large number of institutions which have various other tasks besides the activities related to the Ganga Action Plan.

   These circumstances have led to a cutting up of the project in a number of sub-projects. A sound implementation structure which synchronises institutional/organizational, technical and socio-economic interventions and integrates them smoothly into the existing municipal and state agencies, seems to be lacking. This has sometimes resulted in an ad hoc performance.

4. The technology choices that have been made give the project essentially a 'hardware' character. Activities in the field of community participation and health education are more of a supportive than of a basic character. The integration of technical interventions and some of the community participation and health education activities is not very sound.

5. The analysis of the available documentation gives the impression that the set up of the implementation is characterized by a centralised approach. The implementing agencies on municipal and state level appear only to have been marginally consulted during the inception and design phase of the project. Consequently the activities are in a number of cases not considered as 'their own', but they put at the same time a heavy weight on the capacities of the state and municipal institutions.

6. The envisaged demonstration refers on the one hand to the introduction of a new technology and on the other hand to the demonstration of the integrated approach. Integration of the demonstration aspect should imply that demonstration of the different project components is clearly defined and transparent for all parties involved: i.e. implementing agencies and local population, which appears not to be the case.

7. The project appears to lack an integrated time-planning, including a 'critical path' for a coherent implementation of the different sub-projects. The schedule of operation of nearly all sub-projects is strongly delayed and hence an extension of the project after April 1992 is planned. Delay in one sub-project directly affects the progress in other sub-projects and consequently their expected effects. For example the retardation in the water supply sub-projects affects performance and effectiveness of other schemes such as sewer cleaning and the activities of the SEU, i.e. community participation and health education.

1.3 Expected sustainability

1.3.1 Institutional sustainability

Implementing agencies

8. The project activities have not been based on potential capacities of the municipal agencies. The study of JPS has stressed that decision making on policy matters is dependent on individuals without appropriate coordination forums and institutionalised problem solving apparatus. Unless the institutional and financial capacities of the municipalities are seriously considered and strengthened, the sustainability of most of the sub-projects is at stake.

9. The project has so far not developed an overall structure for institutional strengthening of the implementing agencies. The training needs assessment study carried out by JPS revealed that important measures need to be taken within the different agencies (UPJN, KNM, KJS and MNP) in order to establish sound O&M systems for the established facilities. However current plans for institutional strengthening only envisage training activities. It remains unclear whether a strategy for an adequate project management system will be developed.

It is suggested by RIVM to have a high level policy discussion in April/May 1991 between RNE, the Ministry of Environment and the UP State Government representatives on the issue of O&M in view of the sustainability of project facilities.

10. It appears from the institutional structure within both municipalities (but especially in Mirzapur) that the links between the socio-economic activities of the municipalities and the community structures do not have a very sound basis. It is for example unknown whether a clear division of tasks and responsibilities of maintenance of water facilities and latrines between municipal institutions and the population have been developed.

Training

11. The JPS study has underlined the lack of an overall understanding of the role and importance of training for organisational and individual performance. Most training activities so far are of an ad hoc nature. No provisions have been made yet for a structural imbedding of training within institutions.

12. Attempts to establish an Indian UASB knowledge centre do not appear to have been made.

1.3.2 Expected Economic Sustainability

13. The available information and documentation is not sufficient to assess the cost-effectiveness for the investment in the different sub-projects from the viewpoint of the choice of the technology-mix, the expected output or the economic sustainability.

14. A transparent system of financial analysis which makes it possible to compare the investment schedules of the different sub-projects in an adequate way has not yet been developed. Furthermore detailed financial O&M schemes for all sub-projects seem to be lacking.

15. There is a need for all parties involved in the project (GOI, GON, Ganga Project Directorate, U.P. State Government, etc) to get an adequate insight in the financial consequences of the delay of the project implication, both for the investment levels and O&M.

16. On the basis of the available documentation it has to be concluded that under optimum circumstances there seems to be a fair base for economic sustainability for most of the sub-projects in Kanpur.

17. The financial position of the MNP in Mirzapur seems to be very weak. Budget allocation for the O&M of the provided facilities (sub-projects) can not be guaranteed within the existing organizational and financial situation.

18. Not all installed private latrines are being used, because funds for the construction for a superstructure are lacking. It is not clear whether adequate measures to solve this problem have been taken in the meantime.

19. Although the UASB treatment plants have been proven economically feasible in comparison to other treatment plants their cost-effectiveness related to the necessary investment and O&M cost and consequently their long run economic sustainability has still to be proved.

20. So far any insight in the budget structure and the cost-effectiveness of the public health and community participation activities is lacking.

21. Public health and community activities so far fully depend on financing by the project. Financial sustainability of these activities seems difficult to reach.

1.3.3 Expected political sustainability

22. The prime aim of the project, i.e. reduction of pollution load of the river Ganga is strongly supported by the Indian national politics. All other interventions are in principle subordinate to this prime aim. As a consequence of the political character of this project the time pressure is very heavy, which may negatively affect the project's long term sustainability.

23. The relation between the targets set by national politics and those set at local government level seem to be weak. The role of the local government is subordinate in the project which endangers the project's sustainability.

1.3.4 Expected socio-cultural sustainability

24. The prime project's aim viz. pollution abatement has limited popular and administrative support. The objective of improving the living conditions is generally more appealing. The strategy of the project followed so far to let project targets and time pressure prevail over community participation may in some cases be counterproductive resulting in a lack of tuning of the technical interventions and the different complementary SEU activities.

25. Crash programmes (or priority programmes) were identified to create good will of the population regarding the project interventions. These programmes were delayed due to various circumstances. It is unknown whether the crash programmes have indeed positively affected the populations attitude towards the project.

26. The framework of the SEU activities is very broad. Too many different activities seem to be undertaken. Some of these are only weakly related to the prime objectives of the project.

27. The impact of the SEU activities can not be assessed yet. Additional information is needed. The information should be gender specific and be focused on issues like effective utilization of facilities, access to facilities (including health related aspects) of the weaker sections of the population, chosen methodology, improved sanitary facilities as perceived by the population, functioning of community management etc.

28. A reliable epidemiological baseline study has so far not been made. This will hamper the impact measurement of the health education activities.

Legal issues

29. The juridical issues between the tanneries and the municipal corporations regarding disposal of waste and connection and contribution to the construction and the O&M of the sewer system need to be settled. Adequate control mechanisms appear so far to be lacking.

30. It remains unclear whether the following subjects are clearly defined and streamlined: Legislation issues regarding ownership of individual connections to the water supply system, responsibility for the installation of facilities on private properties, O&M of facilities including meter reading and the arrangement for tariffs and mechanisms for penalizing householders with illegal connections and for defaulters.

1.3.5 Expected environmental sustainability

31. The effluent of the UASB treatment plants does not meet the discharge standards as set by the GAP. Therefore post treatment via an aerobic treatment plant is required.

32. The hazardous wastes originating from the pre-treatment of the tannery waste water, the UASB plants, the chrome recovery plants and the aerobic treatment plant (still to be constructed) causes environmental health hazards. A satisfying long term solution for this problem does not seem to be found yet. It should be stated that development of a safe disposal system for hazardous waste is a prerequisite for the prime aim of the project and hence for the environmental sustainability.

33. It should be taken into account that the Ganges is a monsoon river with per season strongly differing water levels and great self cleansing capacities. Consequently, it can be deducted that the water quality of the river is mainly posing real environmental dangers during the dry season and much less during the rest of the year. Without denying the very importance of pollution abatement of the Ganga, the question rises how and on what term this objective can adequately be achieved. Treatment plants can only be effective when sewer and water supply systems are properly functioning. Therefore, priority ranking is needed and the optimum financial and economic alternatives both from investment and O&M perspective need to be carefully considered.

1.3.6 Expected technical sustainability of different sub-projects

UASB

34. The UASB process is found to be technically feasible in Indian circumstances.

35. The delay in the sewer laying scheme in Mirzapur affects the progress in the LCS scheme; the construction of the latrines to be connected to the sewer system can only be taken up after the sewer laying programme. The UASB treatment plant will be connected to the sewerage system. Therefore problems encountered in the sewer scheme may endanger the effective utilization of the UASB plant are continued.

LCS schemes

36. The location of an unspecified number of the private latrines has been haphazard, as a result of which some of the on-site latrines were constructed on places which leave too little room for soak pits or to make adequate arrangements for cleaning the soak pits. The latrines are in the majority of cases situated in such a way that later connection to the sewerage system will be impossible or difficult.

Sewerage

37. The technical feasibility of the approach chosen for the construction and rehabilitation of the sewerage and drainage system in Mirzapur can be questioned.

1.4 Impact

An assessment of the results and the impact of the project related to its objectives, can not be made at this stage. This should be done by the mid term evaluation. However some first remarks can be made with regard to the impact of the project.

Pollution abatement

With regard to the project's prime objective, the reduction of the pollution load of the Ganga, it has been shown that the UASB treatment plants are technically feasible. Based on that, it can be assumed that the water quality will improve, especially when post treatment will be realized. However it remains doubtful whether this leads to an improvement of the environment as a whole as long as the development of a safe disposal system for industrial solid waste and sludge from treatment plants remains in abeyance. Another problem is the sustainability of the project; the paragraph above showed that the economic and institutional sustainability of the established facilities can be questioned.

Improvement of the environmental living conditions

No conclusion can be drawn yet about the improvement of the environmental living conditions of the population for the impact of the project interventions can not be demonstrated at this stage of the evaluation. But also here it should be stated that doubts about the sustainability of the project exist.

Demonstration

One of the objectives of the project are to demonstrate the feasibility of the anaerobic waste water treatment process for the treatment of domestic waste water and the combined treatment of domestic and industrial waste water and the impact of the integrated approach in both project areas.

The starting point of the project is in fact the demonstration of the UASB technology. As mentioned above, the technical feasibility of the anaerobic treatment process has been demonstrated. However, one of the essential questions is whether the choice of the introduction of water treatment as starting point for the project has been the right one. This question should be related to the impact of the integrated approach in both project areas, which has not been demonstrated yet. In this respect it should also be noticed that no indicators seem to have been developed for impact measurements.

Bottlenecks

The main problems so far of the project seem to be:
- a lack of conceptual and institutional integration;
- a technology driven approach as a result of which administrative, financial and organizational capacities of the municipalities have been insufficiently taken into account;
- a lack of insight in the possible demonstration character of the different sub-projects;
- a lack of insight in the impact and replicability of the project.

All this leads to the identification of some crucial questions that need attention with respect to the replicability of the project.

1.5 Replicability

One of the crucial questions with regard to the project's replicability is related to the basic concept of integration.

So far no clear leading concept that can be translated into concrete action of institutional integration has been developed and adapted by all parties involved. The development of such a clearly defined leading concept is essential for the envisaged replicability of the project. More concrete the following questions need to be addressed in order to develop a sound integrated and replicable project concept:

- How can municipalities (or in general implementing agencies) be seriously involved in the project during all project stages?
  This question encompasses issues such as:
  * the absorbtion capacities of municipalities and related to this, the linking-up of project activities with the technical, organizational and financial capacities of implementing agencies;
  * workable and clearly defined agreements on division of tasks and responsibilities.

- How to distinguish between main stream activities and crucial supportive activities versus non-crucial supportive activities?
  This question refers to the limits of the integrated approach. It can be assumed that some activities in the field of community participation and health education are essential with regard to the main stream activities, whereas others are only marginal with respect to the achievements of the project objectives. A clear choice needs to be made by the SEU project team for the implementation of SEU activities that are directly related to the mainstream activities.

- How to develop an integrated demonstration approach that takes into account all involved parties and all different aspects of the project?

- How to develop performance indicators? In this respect the following will be crucial: indicators should refer to a clear priority setting based on a critical path schedule. This implies that those activities which directly affect the progress and effects of other project activities interventions need to be given priority.

- How to develop mutually agreed impact indicators? In this respect the following issues need to be taken into account:
  * impact indicators need to be defined in terms of relation between input/output and should provide a clear perspective on institutional, technical financial-economic, environmental, socio-cultural political sustainability;
  * impact indicators need to be related to comparative estimates that facilitate a comparison of the effectivity of the interventions chosen and alternative solutions.

1.6 The evaluation process

Chapters 2 to 5 of this document have revealed that a clear insight in the perception of the municipalities on the project interventions is lacking and that more crucial information is required to make an underpinned assessment. It will not be possible to seriously consult municipalities on their perception or to collect all lacking information during an evaluation mission of 2 or 3 weeks. Therefore it is recommended to divide the mid term evaluation in different phases:

I. To carry out an interim mission in March 1991, during which the implementing agencies (on municipal and state as well as national level) are asked to comment upon the draft TOR for the mid term evaluation and this briefing document. Thereafter the final TOR can be formulated and the value of the issues as identified in this briefing document can be assessed.

II. The lead consultant can be asked during the interim mission to provide additional information on the gaps in information revealed in this document. Depending on the results of this, a decision can be made about what information is still to be collected and whether a field survey is required for the collection of additional information.

III. The mid term evaluation is planned in June 1991. This mission should be composed of people that have expertise on:
- institutional development;
- technology in the fields of water supply, water quality control and sewerage, waste water treatment, sanitation, and solid waste management;
- financial and economic issues;
- community participation and gender issues;
- environmental health.

The main objectives of the evaluation mission are:
- to evaluate the project units performance regarding the technical institutional, financial and socio-cultural aspects in relation to its objectives;
- to recommend changes or improvements for the continuation of the project.

The main issues to be addressed by the evaluation mission are:
- the concept of integration;
- performance and replicability of the project;
- the assessment of the impact of the project activities.

The actions to be taken by different actors during the various phases of the evaluation are listed in chapter 7.

2. SUMMARY OF PROJECT DESCRIPTION

2.1 Background

Negative side effects of economic development and population growth were clearly recognized by the Indian Government in an early stage. This resulted in the seventies in the development of a framework of rules and regulations with emphasis on industrial and domestic pollution abatement in India. Since the seventies, the attention for environmental issues has increased. One of the current big Indian environmental programmes is the Ganga Action Plan, that started in 1984 under the final responsibility of the then prime minister Indira Gandhi. The Ganga Action Plan aims at reduction and prevention of pollution of the river Ganga.

The growing attention for environmental issues in India and the increasing importance the Dutch cooperation policy attaches to this subject, resulted in 1985 in the expansion of the existing framework of the bilateral development cooperation between India and The Netherlands with the sector of environmental protection and management. One of the main pillars of the Indo-Dutch environmental cooperation programme is the promotion of so-called "clean technology" by means of industrial counselling projects.

The first major Indo-Dutch collaboration in the field of environment was identified within the Ganga Action Plan and has a clear industrial counselling component: Two fact finding missions (1986 and 1987) resulted in the identification of the environmental and sanitary engineering project Kanpur/Mirzapur.

Mirzapur, a town of approximately 200.000 inhabitants is located mid way between Allahabad and Varanasi (about 700 km from New Delhi) in the state Uttar Pradesh and is famous for its carpets and brassware manufacturing.

In Kanpur, a city of approximately 2,5 million inhabitants about 450 km from New Delhi in Uttar Pradesh, the industrial area Jajmau (mainly tanneries) was amongst others identified for reasons of demonstrating Dutch developed technologies in reducing the industrial pollution load in the river Ganga.

2.2 Objectives

The overall aim of the Ganga Action Plan serves as the main development objective for the project. In addition the project aims at improvement of the environmental and living conditions of the people in Kanpur (Jajmau) and Mirzapur.

The following objectives are formulated:

- "to develop integrated delivery systems for sewerage, stormwater, drainage, water supply, sanitation, treatment of domestic and industrial wastewater collection, disposal and possibly treatment of solid waste, and public health education utilizing effective community participation, with the aim not only to control pollution on the river Ganga, but also to improve the general living conditions of the target population in Kanpur and Mirzapur".

- "to demonstrate the application of an integrated approach in Jajmau, an area which is characterized by a mixed industrial and residential use within the city of Kanpur, and the medium sized city of Mirzapur and to develop basic criteria for the technical designs in sanitary engineering projects for combined treatment of domestic and industrial waste water".

- "to demonstrate that by using an anaerobic waste water treatment process, a substantial part of the energy requirements for waste water collection and treatment can be covered by its production of biogas".
  (Mid Term Status Report, 1989)

Prime aim of the project is to address the problem of "pollution abatement and control". As such, it is the backbone of the project. Interventions in related sectors have to be geared towards this end. Integrated planning and implementation is the key concept in the approach. In the original technical proposal for the project, it was stated that an improvement of the overall environmental and sanitary condition in the area can only be realized effectively if measures concerning the disposal and treatment of waste are integrated within a programme for the improvement of the sanitary condition of the population and a programme of health education. This implies that the different components covered by the project are interrelated.

Furthermore, the project is meant to be replicated in similar development projects and therefore has to demonstrate whether and under which conditions the approach and the technologies can work. Based on the experiences with design and implementation activities, a replicability report will be written which encompasses a set of guidelines for policy makers and implementing agencies.

2.3 Measures to accomplish the objectives

In order to achieve the objectives a number of curative and preventive measures are being implemented. These are summarized below:

- construction of interceptions (interception of nalahs);
- introduction of the Upflow Anaerobic Sludge Blanket Process (UASB) for treatment of waste water;
- introduction of chrome recovery technology in the tanneries of Jajmau, Kanpur;
- provision of low cost sanitation;
- rehabilitation and augmentation of the water supply system;
- improvement of stormwater drainage;
- solid waste collection and disposal;
- enhancement of the knowledge, attitudes and practices of the target population;
- motion of public and occupational health;
- transfer of know-how through training.

In conjunction with the main activities in the initial stage of the project, crash programmes were identified and initiated in the field of water supply and sanitation. These crash programmes are meant to tackle some evident bottlenecks in the existing sanitary conditions during the first phase of the project and to create good will and a cooperative attitude with the people in the project areas.

2.4 Historical overview of the project

The project started in June 1987. Phase I was mainly meant for design which would take 1,5 years. Phase II would be a 2,5 year period during which the detailed designs and tender documents would be prepared and also various schemes would be executed.

The start of Phase II was to depend on the approval of the investment programme by the Governments of India and the Netherlands.

During phase I various socio-economic baseline surveys were carried out: income, water supply, sanitary facilities, community health services, sewerage system and connections to the system, inventory and quality of the drainage system, solid waste collection system, pollution load and characteristics of waste water. Furthermore, three types of in-depth studies were conducted.

These included:
- cost recovery;
- public health promotion and communication;
- community participation and involvement.

Based on the studies, design reports on the various components of the project, e.g. sewerage schemes, stormwater drainage schemes, and water supply schemes in both cities were completed. These reports contain proposals on the investment costs over the period 1988-1991.

Apart from the identification and implementation of some crash programmes also the construction, testing and monitoring of the first two small scale UASB modules were started, (one for domestic waste and one for a mix with industrial waste) during Phase I and a pilot chrome recovery plant was built at one of the tanneries. These three plants were monitored and the results were used for the design of the real scale treatment systems.

In 1988 it became clear that the first phase of 18 months was too short. The construction of the first 5 MLD UASB module, and the crash programmes for water supply and sanitation, were delayed due to prolonged land acquisition procedures, poorly performing contractors (Kanpur), strikes in Mirzapur and lack of supervision capacity. Furthermore, more time was needed for policy and action oriented research and for the development of a setting of the socio-economic activities.

In June 1989, two years after the start, a Mid Term Status Report was written by the project, which provided comprehensive background information for, amongst others, the Indo-Dutch joint evaluation mission June/July 1989.

This mission identified three main bottlenecks:
1. the lack of a clear definition of the integration concept;
2. the combination of experiment and demonstration;
3. a lack of clear division of responsibilities between the parties concerned.

The mission made about 50 recommendations. The main ones are listed here:
- to make a description of the concept of integration;
- to make a clear distinction of demonstration activities and testing activities;
- to define responsibilities more clearly;
- to move consultants from Delhi to Kanpur and Mirzapur in order to stimulate interaction with the Indian authorities;
- to introduce more progress meetings;

- to solve the post-treatment problems;
- to enhance the involvement of the local population in the decision process regarding the envisaged services;
- to continue the occupational health programme especially in Jajmau and consider if both in Mirzapur and Kanpur the occupational health care programme can be incorporated in the Primary Health Care programmes;
- to enhance the attention for women's needs in the training programmes;
- to give financial overviews of the project activities
- to make a planning of the cost of the investment programme;
- to pay more attention to the O&M aspects of the project.

The Evaluation Report was grosso modo accepted by the Indian authorities.

An official final comment on the Evaluation Report from the side of the GON was not found. Some comments on the Evaluation Report were given by RIVM/BIS and DGIS/DST/TA. These comments included that the recommendations were little specific and it was noticed that the chapter on technical aspects was weak.

The project team did not agree with some of the conclusions of the JEM and provided extensive comment. Consequently, the recommendations of the JEM were only partly given follow-up. One of the main bottlenecks as identified by the JEM, i.e. the lack of a clear definition of the integration concept, has not been addressed separately and it is not clear whether a proper follow-up was given. Chapters 3 to 5 will refer to the conclusions and recommendations of the joint evaluation mission, if relevant.

Special missions on UASB

Two missions to evaluate the UASB reactor were carried out (1989 and 1990). The missions were positive about the use of the UASB technology in Indian context, although it was stressed that the effluent of the UASB plant needed further treatment.

2.5 Revised workplan

The delays during Phase I (the design period) made it necessary to revise the workplan. The revised workplan envisaged the end of the first phase in December 1989 and the second project phase to last from January 1990 onwards till March/April 1992.

Since the implementation of works of Phase II is behind schedule already, an extension of the project after April 1992 is required. The completion date of the project is now set on November 1992 (RIVM Mission Report, January 1991). The physical and institutional working conditions are definitely more difficult in Mirzapur than in Kanpur and hence the delays are longer in Mirzapur. With regard to the delays it should be borne in mind that the GPD has, during V Joint Panel Meeting (for political reasons) revised the planning proposed by the consultants and instead set (too) tight construction and financial disbursements targets (RIVM, July 1990).

2.6 Commitments

The commitments of the GON (Sideletter 1987) is Dfl 30,5 million (Rs 2135) for Kanpur and Dfl. 19,5 million (Rs 1365 lakhs) for Mirzapur. From the start of the project until 1/1/1990, this commitment included Dfl 13,87 million for technical assistance. The contract for technical assistance beyond 1 January 1990 is still under negotiation.
The commitment of the GOI is to supply personnel and means for the maintenance and operations. Uttar Pradesh (UP) State Government has made a commitment to spend Rs. 1 crore on rehabilitation and expansion of water supply in Mirzapur.

2.7 Mid term status evaluation

In the Sideletter it is stated that a joint mid term review of the project is foreseen after one and a half years and that a joint evaluation of the project will be carried out three years after the formal start of the project. This latter joint evaluation mission is the current mid term (status) evaluation 1991.

According to the TOR the general objectives of the mid term evaluation are the assessment of:

- the progress and performance and impact (if already measurable) of the different project components related to the objectives, with an emphasis on the period after June 1989;
- the effectivity of the means being used;
- the factors which have imposed constraints or beneficial effects on the achievements of the project;
- the feasibility of the time schedule and workplan;
- the adequacy of the operation and maintenance;
- the follow-up of the recommendations of the joint evaluation mission 1989
- the expected sustainability of the project activities;
- the adequacy of the MIS Report as a tool to monitor the project;
- the framework of the replicability report.
- the recommendation on changes or improvements for the continuation of the project.

The mid term evaluation is carried out in phases as described in the introduction.

3. ORGANISATIONAL AND INSTITUTIONAL ISSUES

3.1 Sideletter

The agreements between GOI and GON are formulated in the Sideletter (1987). A summary of the main agreements in this Sideletter is given below:

> "The Government of India, the Central Ganga Authority and the Uttar Pradesh State government will implement the project with the necessary staff and provide adequate facilities necessary and provide adequate facilities necessary for timely and satisfactory implementation of the project".
>
> "For the operation and maintenance (O&M) of all engineering works under the project, the concerned Indian Authorities will provide the necessary funds and will timely select and place the necessary permanent staff to be trained. The consultant will timely inform the Ganga Project Directorate on the required number and qualifications of such staff, in order to facilitate their recruitment by the local authorities concerned. The on-the-job training of such staff will run parallel to the consultants activities and should not be postponed to a later date".
>
> "On behalf of the GON, the Ministry of Foreign Affairs will select and contract the Netherlands Lead Consultant after consultation with the Indian Authorities".
>
> "The lead consultant will have the overall responsibility for the preliminary studies and the final technical designs including the training of O&M staff, the community participation and the public health education. During the execution phase of the project the primary responsibility for the supervision of contracted work rests with the executing agency".
>
> "The project costs funded by the central Ganga Authority through its project manager and related to construction and procurement will be reimbursed by the GON".
>
> "Decisions on major issues and the review of the progress with regard to the project will be undertaken by the Project Review Panel on a regular basis".

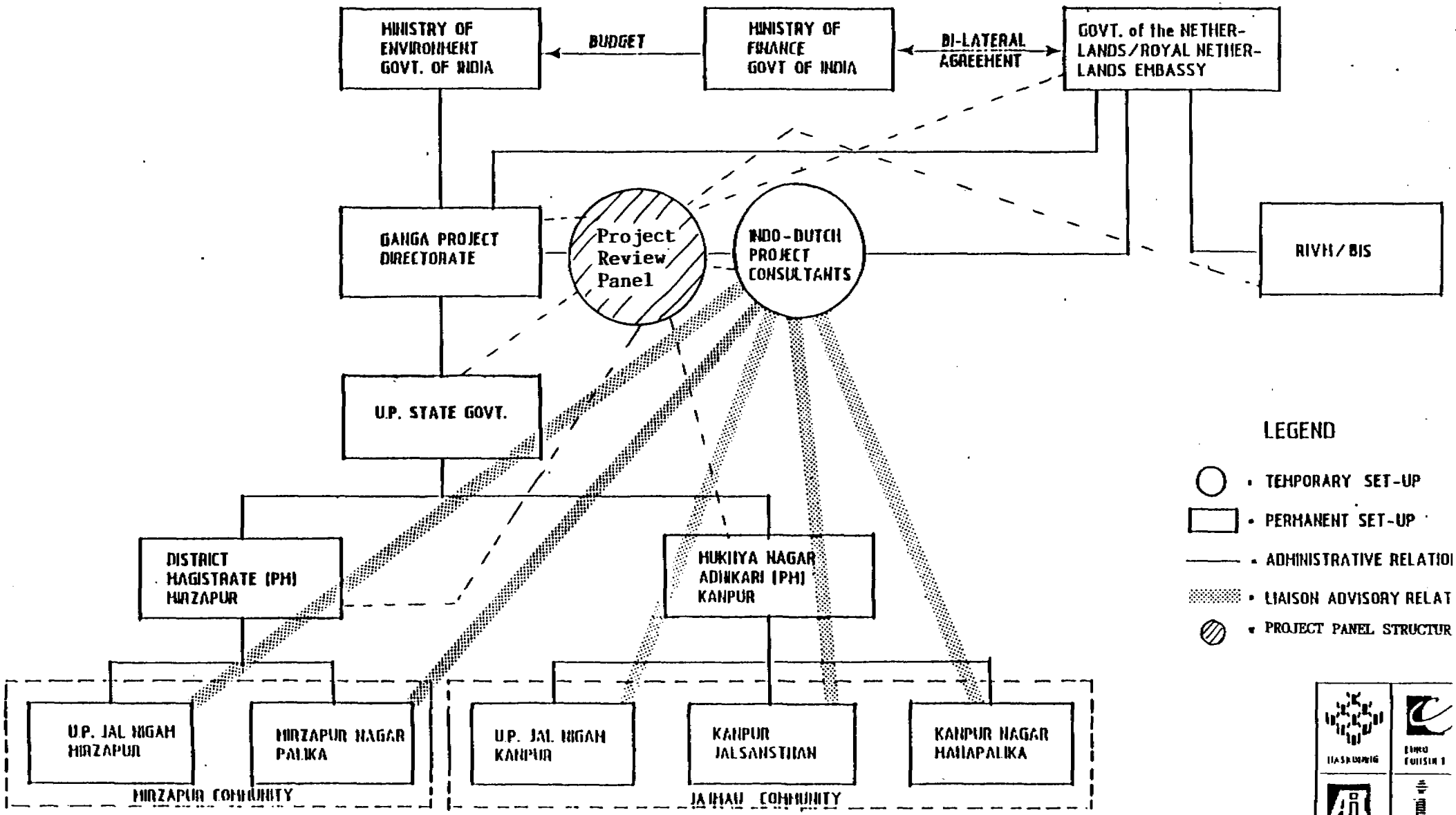
The institutional set-up of the project is visualized in figure 1. In addition to this figure the main liaisons between the institutions involved in the project are described below. Most of the descriptions are taken from the Mid Term Status Report. The descriptions of the municipal and state agencies are taken from the JPS Fact Finding Report. The project consultancy set up is visualised in figure 2.

3.2 Government of India

The **Ganga Project Directorate (GPD)**, a body resorting under the Ministry of Environment and Forests, is responsible for the activities under the Ganga Action Plan. GPD is the main counterpart organization for the project. A description of its mandate, budget and organizational structure has not been found in the documents. The GPD which is a temporary organisation, has entrusted the UP State Government, Department of Housing and Urban development to implement the Ganga Action Plan in Uttar Pradesh. This department coordinates the implementation activities of the various executing agencies at state and local level.

Figure .1

PROJECT INSTITUTIONAL SET-UP



PROJECT CONSULTANCY SET-UP

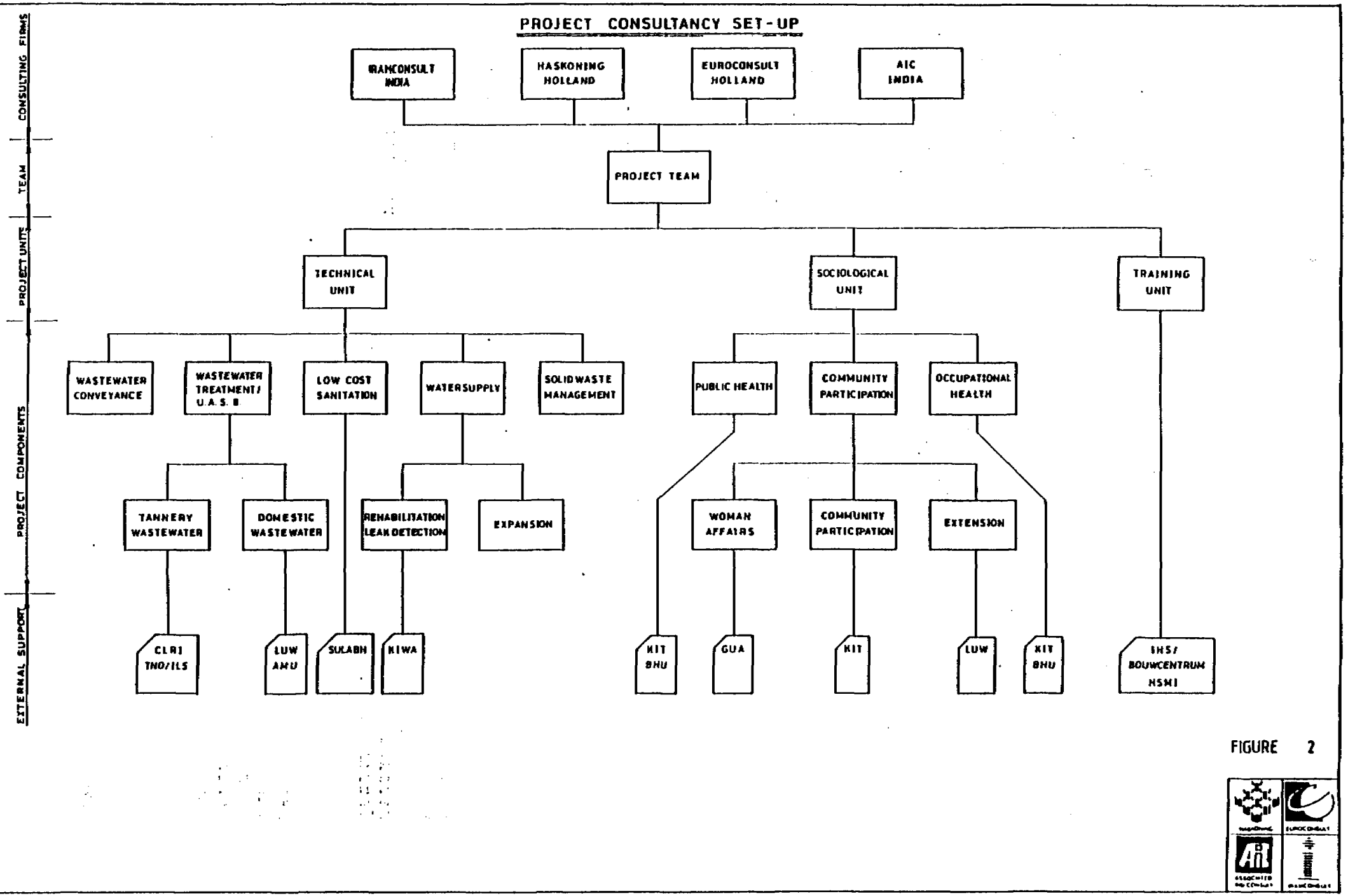


FIGURE 2

FIGURE 3

Kanpur

Project Component	Executing Agency	Operation and Maintenance Agency
Sewage treatment	U.P. Jal Nigam	U.P. Jal Nigam
Sewerage		
- sewer lines	U.P. Jal Nigam	K.J.S.
- sewer cleaning	K.J.S.	K.J.S.
- pumping stations	U.P. Jal Nigam	U.P. Jal Nigam
Stormwater Drainage	U.P. Jal Nigam	K.N.M.
Sanitation	K.N.M.	K.N.M.
Water Supply		
- distribution network	U.P. Jal Nigam	K.J.S.
- handpumps	K.J.S.	K.J.S.
Solid Waste Management	K.N.M.	K.N.M.

Mirzapur

Project Component	Executing Agency	Operation and Maintenance Agency
Sewage treatment	U.P. Jal Nigam	U.P. Jal Nigam
Sewerage		
- sewer lines	U.P. Jal Nigam	M.N.P.
- pumping stations	U.P. Jal Nigam	U.P. Jal Nigam
Stormwater Drainage	U.P. Jal Nigam	M.N.P.
Sanitation	U.P. Jal Nigam	M.N.P.
Water Supply		
- distribution network	U.P. Jal Nigam	M.N.P.
- handpumps	U.P. Jal Nigam	M.N.P.
Solid Waste Management	M.N.P.	M.N.P.

3.2.1 Uttar Pradesh Jal Nigam

In Kanpur the U.P. Jal Nigam (UPJN), a state-wise agency under the U.P. State Government has been appointed to implement the water supply, sewerage and stormwater drainage and sewage treatment schemes under the project in Kanpur. In both municipalities the Ganga Action Plans works, i.e. sewage pumping stations and sewage treatment plants are operated and maintained by UP Jal Nigam. it is foreseen that also in the next five year plan these schemes will be maintained by UP Jal Nigam, but the costs of O&M are planned to be equally shared by the GPD and UP Government.

In order to execute the schemes more effectively the U.P. Jal Nigam has established a Ganga Pollution Control Unit at Kanpur headed by a General Manager.

UP Jal Nigam is a government of Uttar Pradesh agency having its headquarters at Lucknow and unit offices in several cities/towns/blocks of UP. Its main function is to create facilities (capital projects) with regard to water supply and sewerage. UPJN has a staff of over 4000 qualified engineers. With the formation of Ganga project Directorate (GPD) at the Government of India level, UPJN was chosen for the implementation of water supply and sewerage projects under the Ganga Action Plan (GAP) in the State of UP. The involvement of UPJN in the project is put in scheme in figure 3. No information has been found on the yearly budget of UPJN.

3.2.2 Kanpur Nagar Mahapalika (KNM)

The Kanpur Nagar Mahapalika (KNM) is entrusted with the execution of the low cost sanitation, solid waste management as well as the community participation and health programme and the O&M of the stormwater drainage, sanitation and solid waste management facilities in Kanpur.

The jurisdiction of KNM extends to the whole of Kanpur. In addition to the environmental and sanitary engineering responsibilities KNM also administers several other public utility services, such as medical and family welfare services, educational services, maintenance of roads and parks and city lighting.

KNM is governed by a Board and its Mayor. The Board consists of 100 elected members, 11 nominated members and 14 ex-officio members. The structure and functioning of the KNM are governed by the UP Municipal Act. Sanctioning of manpower budgets and the terms (such as appointments, promotions etc) of the higher class staff are administered directly by the State Government.

The total budgeted income of KNM is about Rs 43 crores for the year 1990-91 This is contributed mainly by compensation towards abolition of Octroi (42%), House tax (13%), Government Grants and Subsidies (18%) and miscellaneous receipts and other income (27%). The total budgeted expenditure for 1990-91 is Rs. 42.55 crores. The KNM is considered to have the best financial health when compared to all local bodies in the State of UP according to KNM's Mukhya Nagar Adhikari.

KNM employs 8000 personnel, of which half are deployed in the health department.

3.2.3 Kanpur Jal Sansthan

Kanpur Jal Sansthan (KJS) has the responsibility for the installation of the handpumps under the water supply programme and the execution of sewer cleaning works as well as for the O&M of sewer lines, and water supply. The Mukhya Nagar Adhikari of the KNM has been assigned the task of local project manager for the coordination of all Ganga schemes on behalf of U.P. Government and GPD.

The JPS Fact Finding Report gives the following information about KJS:

KJS has been constituted under the UP Jal Nigam Act. Under this Act, it has been provided that the State Government may decide to take over the water supply functions of any local agency and incorporate the same as an independent body to be called as "Jal Sansthan".

KJS is governed by a Board consisting of the Mayor of the town, i.e. Chairman of KNM, District Magistrate, Finance Specialist of UPJN Lucknow, Superintending Engineer (UPJN Kanpur), Mukhya Adhikari, KNM and General Manager of KJS. The Board of KJS examines proposals and gives approval. The proposal need also to receive administrative sanction from the Board of UPJN. In the area of manpower, the budget proposed by the Board of KJS need to be sanctioned by the UP State Government.

The total budgeted income of KJS for the year 1990-91 is about Rs.618 lakhs, whereas the total budgeted expenditure is Rs 805 lakhs. The main sources of income are water tax (60%) and additional water tax (17%). There is no system of the State Government giving any subsidy proportionate to the salary bill of KJS as is the practice with KNM and MNP. According to the JPS Fact Finding Report, the fund position of KJS is bad, which is mainly due to poor performance of recovery (9%).

The KJS employs a total of about 1700 employees.

3.2.4 Mirzapur Nagar Palika

In Mirzapur UP Jal Nigam is the implementing agency for all technical schemes, while the Mirzapur Nagar Palika is carrying out the implementation of solid waste management and public health and community participation sub-projects. In Mirzapur the District Magistrate (DM) has been assigned the task of project manager for coordination of all project schemes. In Mirzapur the Ganga Action Plan works are headed by the General Manager Ganga Pollution Control Unit located in Allahabad. This General Manager, in addition to GAP schemes in Mirzapur, looks after GAP projects in Allahabad as well.

The JPS Fact Finding Report provides the following information on MNP:

> "MNP is the local body for Mirzapur town. It is responsible for providing and administering public utilities and services for Mirzapur. MNP is governed by a Board, which consist of: 25 elected members by the voters of Mirzapur, 3 nominated members and 5 ex-officio members (i.e. the local MLA, 3 MLCs and the MP) and the Chairman of the Board".

The structure and mandates of MNP are defined under the UP Municipalities Act. In this Act the duties of the Board and its powers have been specified. In the project documents no specification has been found. According to the JPS Report, the total budgeted income of the MNP is about Rs. 208 lakhs for the year 1990-91, contributed by the compensation towards octroi abolition (40%) house and water tax (5%), State Government grants and subsidies (40%) and miscellaneous income (15%). The total budgeted expenses of the MNP is about Rs. 238 lakhs. The gap of Rs 30 lakhs between budgeted income and expenses is to be financed by carrying the balance forward to the following year. The major budget headings are Public Health and Conveniences (55%) and the maintenance of roads and other properties (25%).

The fund position of MNP is weak according to the project documents:

> "Since UP State Government's responsibility covers approximately 400 municipalities and seems to be short of funds, it is therefore required to put Mirzapur on the priority list of UP State Government." (RIVM Mission Report, January 1991)

The MNP employs about 800 personnel.

3.3 Government of the Netherlands

The project implementation is guided and monitored by the Royal Netherlands Embassy (RNE) in New Delhi. RIVM/BIS has been assigned as project advisor and monitoring agency to assist the RNE.

For the monitoring and subsequent regular reporting on progress of the project a Management Information System (MIS) is established. The MIS is a quarterly review of the status of the various project schemes at Kanpur and Mirzapur based on a quantitative review in terms of physical as well as financial progress. Furthermore the MIS is meant to give information on the quality aspects of the executed works and on the physical progress against time schedules. The monitoring data are provided in the quarterly project's MIS reports. The MIS has been introduced in 1990. A first set-up of the MIS has been submitted to the RNE in March 1990. Thereafter three more MIS Reports have been formulated.

3.4 Project organisation

3.4.1 Project Review Panel

The project is "governed" by the Project Review Panel, consisting of representatives of the GPD headquarters chairmen, UP Government, RNE and its advisor RIVM and the Netherlands lead consultant. The Project Review Panel takes decisions on major issues like land acquisition, financial schemes of different project components, disbursement schedules and has the responsibility of the review of the progress of the project activities. The panel meets at specified decision moments in the project (normally twice a year).

3.4.2 Project working group

To coordinate and discuss all project related subjects an on-site Project Working Group has been created. This group consists of representatives of the following organisations:

For Kanpur: Kanpur Development Authority;
Municipality of Kanpur;
KJS;
UPJN;
UP Pollution Control Board;
Netherlands lead consultant.

For Mirzapur: Municipality of Mirzapur;
UPJN;
UP Pollution Control Board;
Netherlands lead consultant.

3.4.3 Project team

The project team comprises four consultancy firms, namely Haskoning (lead consultant), Euroconsult from the Netherlands and from the Indian side AIC (Bombay) and IRAM consult (New Delhi). In addition to the services of the main consultants, 12 Dutch and Indian institutions are providing complementary short term services: CLRI and TNO/ILS (tannery wastewater), LUW and AMU (domestic wastewater), Sulabh (low cost sanitation), KIWA (rehabilitation of water supply system and leak detection), KIT (occupational health), BHU, GUA, IHS/Bouwcentrum and HSMI (training).

The lead consultant is the binding factor amongst the consultants and the intermediary agents for the contracts of the other consultants. The job description of the consultants are given in the TOR. Separate job descriptions for the different consultancy firms have not been found in the documents.

According to the Sideletter, the lead consultant has the overall responsibility for the preliminary studies, final technical designs, supervision of the implementation of technical works, training of O&M staff, arranging community participation and public health education.

The consultants deal directly with the executing agencies like UPJN, KNM, KJS, MNP as counterparts. The primary responsibility of supervision of the contracted work rests with the executing agencies with powers to disburse funds to contractors and also to pay for additional items or changes up to 20 percent of the contract price. The consultants provide advisory services with respect to problems which may arise during execution of the work and on the necessary quality control aspects in order to be insured that the completed works meet the designed goals and objectives of the project (Sideletter 1987).

In Kanpur as well as in Mirzapur the project team, consisting of an expatriate resident engineer, an assistant project manager and 4 construction engineers, is responsible for all implementation tasks. The team is supported by 2 draftsmen and 1 assistant engineer. For community participation and public health aspects 1 community development expert and 1 expert women's affairs are contracted. In addition the coordinator of the socio-economic unit and the health specialist provide support to the two teams in both cities. These people are all part of the project team.

Detailed Project Reports (DPR) are made for different project components. They contain designs, schedules of rates, unit rates, unit estimates, bill of quantities and summary of cost estimates as well as working drawings. These documents have to be internally approved by the implementing agencies, before they are sent through UP Government to GPD.

3.4.4 Communication lines

During the inception period, the division of tasks between the various local municipal agencies and UP Jal Nigam, as described in the TOR were made clear to all involved parties. Initially some difficulties occurred in the coordination of works as well as in communication between the consultants and the implementing agencies. This resulted in problems in the field work and some delays in the implementation of the project (JEM 1989).

In September 1990 it has been observed by RIVM/BIS that:

> "The exchange of information takes place on a regular basis and is well organized. The Ganga Project Directorate, Uttar Pradesh Jal Nigam the municipal organizations, consultants and contractors do cooperate in a positive way. Notably GPD is very keen to keep the project on track and complete the activities within the time schedules of the approved workplan. GPD therefore closely liaises with the general managers of UPJN in Kanpur and Mirzapur to stress the importance of this project and point out their responsibilities in this respect. Also GPD proves to be instrumental in convincing municipalities about their share in the responsibility for project implementation".

3.5 Programme related to issues of institutional strengthening

In the Plan of Operations (POO) about training and institutional development, the project defines institutional development as:

> "The process to enhance the capacity and capabilities of the responsible agencies concerned with the effective operation and maintenance of the environmental and sanitary facilities being provided under the project".

It consists of the following elements:

1. "institutional strengthening; a process which aims at the establishment of the necessary infrastructure (staffing, budgets, equipment, materials etc) to carry out the tasks with responsible agencies".

2. "training, which is a method for human resource development and improvement of the capabilities of the different layers of staff responsible for the O&M of the scheme".
   (POO Training and institutional development, July 1990: page 8).

The development of human resources through training and transfer of knowledge is the major thrust in the area of institution building of the project during the period from the second half of 1990 onwards. The project involves institutions at different levels:

a. state and central level;
b. urban administrative level (or municipal Administration level);
c. community level;
d. industrial sector.

For institutional and human resources development, the community and urban administrative levels will be given priority.

The project considers the institutional strengthening of the local agencies, especially with regard to organization aspects of O&M to be an essential prerequisite for the sustainability of the newly provided facilities. Hence the training/institutional development plan is directed towards the organisations responsible for the O&M of the hardware components. As such it is complementary to the training activities towards the "beneficiary level" which are undertaken within the Socio-economic Unit (SEU).

Following the Sideletter the O&M of all engineering works under the project comes under the responsibility of the Indian Authorities, who will provide the necessary funds and who will timely select and appoint the necessary permanent staff to be trained. In establishing an effective O&M system, the project acts as facilitator and provides support.

In the second half of 1990 JPS Associates, a local organization experts firm, has started a study which aims at a process of institutional development within the agencies responsible for O&M of completed facilities.

JPS is to act as a catalytic agent in order to support the concerned agencies in achieving the following:

1. Development of linkages (coordination) at policy making and operation management levels.
2. System and management development in each implementing agency.
3. Promote work discipline and culture.
4. Performance appraisal and training the trainers.

The methodology envisaged for covering the scope of work include the preparation of O&M manuals, working sessions on strategy development, workshops, seminars etc.

The training needs assessment of the different implementing agencies will form the basis of the training programme. Thereafter plans will be developed in consultation with the local organisations like KJS, KNM, and MNP in order to help them to function better. These plans will take into account the financial and personnel situation of the organisations involved.

In addition to the activities of JPS Associates, the Institute of Housing Studies will develop training materials and will also be responsible for setting up the monitoring and evaluation system to ensure that the training process can be properly managed. This involves monitoring the actual training and post training follow-up with participants.

3.6 Activities on Institution building and training

During the first phase of the project the scope of institutional strengthening was mainly limited to training activities related to the UASB plant, health education or sociological activities. Nothing had been done in the field of formal set-up within the various implementing agencies for the training programme and the institutional strengthening.

The Plan of Operations on Training and Institutional Development, provides in fact a starting point towards human resource development in a broader sense. However this document is only put in rather global terms and does not foresee the set-up of an overall structure for institutional strengthening of the municipal agencies.

The Detailed Fact Finding Report of JPS (December 1990) is the starting point for the formulation of an overall training plan, that is planned to start in March 1991. The training activities are related towards the O&M of the technical facilities. A summary of the main findings per agency is given in Appendix IX.

The project documents reveal that the financial and institutional capacities of the municipalities of Kanpur and Mirzapur are limited. Especially in Mirzapur the project is facing serious problems of an institutional and financial nature. The RIVM mission of July 1990 also noted that:

> "In Mirzapur the District Magistrate of Mirzapur is to act on behalf of UP Government as the project manager\coordinator. His capacities do seem very limited, amongst others due to the fact that all funds are channelled through UPJN Mirzapur and Mirzapur Nagar Palika as the implementing agencies. This results in a situation where UPJN and MNP act more or less autonomously without properly liaising with the DM".

According to JPS:

> " All the implementing agencies regard O&M as an activity, which does not enjoy the status of either a function or a priority with accountability. O&M activities at present not on a level which demand attention and interest of the senior management of the implementation agencies.... Neither learning/experiential learning nor training are institutionalized..... Management tasks have, at best, taken the form of supervision, but not of developing and managing resources.... In the absence of a clear perception of roles in levels of management, individual manager's strengths and/or weaknesses predominate systems and organizational framework.....Recruitment processes lack norms of staffing".

According to the JPS Report there are three distinct levels of institutional development on which training inputs are required:

a. corporate strengthening;
b. work culture and individual development;
c. management strengths such as:
   * financial management;
   * professional skills development;
   * strengthening of functional management skills and interfunctional work environment.

The JPS globally identifies the training needs of the different agencies and emphasizes the need for establishment of permanent training cells within the different implementing agencies. A summary of the fact finding of JPS is given in Appendix IX. The findings of JPS will be worked out more clearly in separate working plans per agency, including budget and personnel allocations.

According to the RIVM Mission Report of January 1991, MNP showed interest in the possibility of establishing a twinning relation with a water enterprise in The Netherlands.

3.7 Main issues and points of action

1. The organizational structure of the project is complicated, which is mainly due to the great variety of activities and the integrated approach.

   Point of action: Prior to the mid term evaluation, an analysis should be made of the institutional interests of the different implementing agencies and of the interactions between the parties involved in the project. Such an analysis will facilitate the mid term evaluation mission in the assessment of the efficiency and effectiveness of the organisational structure of the project.

2. The project set-up appears to have a technology driven character. The project documents give the impression that the implementing agencies on municipal level (KJS, KNM, MNP) and state level (UPJN) have not been sufficiently consulted during the inception and design phases as a result of which the project activities put too heavy a weight on the municipal capacities. This is especially the case in Mirzapur. This situation endangers the institutional sustainability of the project.

   Point of action: In order to involve the implementing agencies more actively in the project, their perception of the project need to be clarified. Therefore it is recommended to consult the above mentioned agencies during an interim mission, during which they can comment on the draft TOR for the current evaluation and on this briefing document.

3. The assessment of the organizational weaknesses and strengths of the municipal bodies has only been carried out during the implementation phase, which in itself is not surprising, since such an activity was not included in the TOR of the project. However, the fact that the organisational study was only recently carried out, strengthens the impression that the municipalities have not been sufficiently consulted. It should be noted that detailed studies like the training needs assessment made by JPS are essential.

   Point of action: The progress of the JPS activities and the feasibility of their recommendations need to be assessed by the evaluation mission. Special attention needs to be paid to the question whether the proposed training activities are sufficiently linked up with the needs as identified by the implementing agencies themselves.

4. Institutional strengthening has primarily been interpreted as training. Consequently a clear strategy towards institution building seems to be lacking. Such a strategy should encompass an institutional infrastructure with adequate communication lines between the involved parties, clearly defined responsibilities and tasks and adequate permanent budget and personnel allocations per agency leading to an urban management system.

   Point of action: the evaluation mission should comment on the project's strategy concerning institutional strengthening and assess whether it is sufficiently meeting the project's aims.

5. In view of the institutional sustainability of the project, GON has demanded the lead consultant to reduce the technical assistance during the rest of the course of the project. The impression exists that the lead consultant is too much involved in supervision activities, which are the task of the implementing agencies according to the Sideletter. Moreover, in the opinion of the GON, sufficient supervision capacity exists within the Indian agencies. This all is in line with the conclusion of the joint evaluation mission of June/July 1989. A phasing out plan is to be drawn by the lead consultant, which will be ready by the end of May 1991.

Point of action: The evaluation mission should comment upon this plan.

4. TECHNICAL ISSUES

In this chapter the most essential technical issues will be highlighted. The description of the different technical components can be found in the appendices (see separate part with appendices). Every component will be summarized, after which issues are formulated followed by specific points of action. Remarks made in this chapter are taken from different sources; some of them are directly taken from the Management Information Reports (MIS).

4.1 Wastewater treatment

4.1.1 UASB treatment plants

A key element in the Kanpur/Mirzapur engineering and sanitary project is the application of the Upflow Anaerobic Sludge Blanket (UASB) technology for treatment of domestic and tannery wastewater. The choice for the UASB technology instead of more conventional aerobic treatment systems was made because of the following reasons:

- the UASB is relatively simple and also has a relatively limited number of mechanical parts;
- the investment costs are (supposed to be) lower;
- the O&M costs are lower due to the low energy requirement since the biogas produced can be used to generate electricity for wastewater dumping;
- the construction area is relatively small;
- the UASB technology is a relatively flexible system, it can deal with future changes in water composition (with regard to water quality).

5 MLD plant

The 5 Million Litres per Day (MLD) pilot plant for the treatment of domestic wastewater, became operational in February 1988. A joint Indo-Dutch evaluation mission concluded in December 1989 that the results of the 5 MLD UASB plant for the treatment of domestic waste were positive; the technique had proven its technical feasibility and the UASB system (including post-treatment to achieve GAP standards) appeared to be cheaper than other systems. Nevertheless, the performance of the plant fell short of the GAP discharge standards and the DPR expectations for the parameters described for the effluent quality and biogas recovery was BOD 50 (against desired 30/20 mg/l), COD 162 (against desired 100 mg/l), SS 145 (against desired 50/125 mg/l). Therefore, it was concluded that post-treatment was needed to meet GPD standards.

The 10 m3 pilot plant

The 10 m3 pilot plant for the treatment of tannery wastewater mixed with domestic wastewater, became operational in April 1989. A joint mission for the evaluation of the 10 m3 UASB reactor was carried out in May 1990. The mission came to the following conclusions:

- The anaerobic treatment of tannery wastewater mixed with municipal sewage using a UASB process proved to be technically feasible. The process is stable and resilient to shocks.

- To achieve GAP discharge standards aerobic post-treatment is necessary.

- Critical design parameters for the UASB reactor include a dilution ratio of 1:3 (tannery wastewater: municipal sewage).

- The UASB based treatment process, including post-treatment, has the clear potential to be economically more advantageous than the fully aerobic and conventional anaerobic alternatives. Other high rate anaerobic technologies have not been proved to be economically feasible with regard to treatment of tannery wastewater.

- The full scale plant needs to have a capacity of 35.3 MLD (8.8 MLD tannery wastewater) and must be provided with an equalisation tank of 8.8 MLD (retention time one day. The daily average Hydraulic Retention Time (HRT) in the UASB reactor should be minimally 8 hours as compared to 6 hours for municipal sewerage.

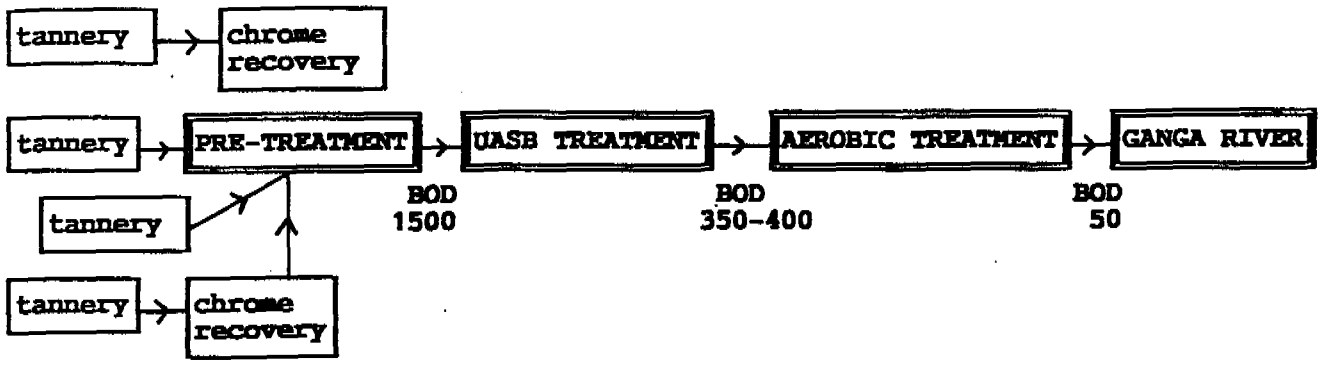
- The UASB technology functions satisfactory, though process performance of the pilot plant was somewhat limited by the difficult nature of tannery wastewater characterized by: relatively high ash content and high chromium content (at least in the pilot plant influent, though the mission is of the conviction that in full scale situation most chromium will be automatically removed by precipitation in the primary treatment that must be provided on the site of each factory as stipulated by the regulatory agencies).

- The volume of the produced biogas, is at least enough to be self-sustaining for the UASB treatment process. So the energy requirements are limited in comparison with other systems.

Pre-treatment

Figure 4 shows the treatment processes that are needed to meet the GAP standards of tannery wastewater in the Ganga.

Figure 4



The tannery wastewater is polluted to such a degree that pre-treatment by the tanners is required, which was made obligatory by law. The sludge coming out of this pre-treatment pit causes environmental problems. No system has been developed yet for the disposal of sludge.

Post-treatment

The tannery wastewater has a BOD rate of about 1500 before the anaerobic treatment. In the treatment process it is mixed with domestic waste (1:3) after which it leaves the plant with a TSS of 600-700 and a BOD rate of 350-400, which is still much too high for discharge into the Ganga (Note also that these data differ from those given in the Projects Working Plan: BOD 200-400 ppm). All data point at the necessity for post-treatment. Post-treatment is also considered necessary in order to reduce the sulphide content in the effluent.

The post-treatment will be realized by means of a relatively expensive aerobic treatment plant, which was not envisaged at the start of the project and hence demands extra investments. A plan is being developed for the construction of such an aerobic treatment plant.

Transfer of technology

The mission Enklaar/Jansen/Allaerts, noticed in their report of March 1989 that UPJN, the responsible agency for O&M of the treatment plants needed careful assistance by the introduction of a new technology, training in O&M and preparation of manuals. During the JEM of 1990 it was noted that the plant operators were well trained. Whether the management level understood and supported the technology was not clear.

From the viewpoint of technical sustainability, it will be essential to ensure that enough experience with the UASB is available within the higher cadre and management level. The JEM of May 1990 recommended to create a UASB knowledge centre in India. The Aligargh Muslim University has been involved in the UASB treatment activities, but no efforts have been made to link this experience with the establishment of a UASB knowledge centre.

4.1.2 Chrome recovery

The tanneries, the smaller ones excluded, use chrome for the tanning process. This chrome is polluting the wastewater which is discharged into sewers and drains. Therefore a pilot plant study for chrome recovery and reuse was carried out. The chrome recovery system was designed by the project in association with ILS/TNO and the Central Leather Research Institute in Madras. The study revealed that chrome recovery and reuse proved to be technically feasible and can profitably be adopted by Indian tanneries (tannery waste management volume IV, June 1990).

The chrome content of the composite Jajmau tannery wastewater is 160-275 mg/l, which means an average of 217.5 mg/l or 1260 kg chromium per day. This is caused by two types of tanning; main tanning and re-tanning. The pilot plant experiment dealt with main tanning only. According to the project, it is also possible to recover chrome from re-tanning liquors, provided no other chemicals are mixed with it. Five tanneries are actually planning to realize re-tanning. If a tannery does both, i.e. recover chrome from main tanning and re-tanning, about 90% of discharged chromium may be recovered. If tanners do only main tanning, about 70% can be recovered.

It is to be expected that especially the bigger tanneries, will adopt the system in the first stage because of the economic feasibility of the recovery plant. According to the project calculations about 26 large tanneries have to recover chromium from main tanning as well as from re-tanning to reduce the chromium discharge by about 50% (tannery waste management volume V, June 1990). How many tanners are planning to introduce a chrome recovery plant in the short or even long run, is not clear at this moment. The project has not set a well defined target in this respect.

A recent study revealed that the bigger tanneries have the financial strength to install chrome recovery plants based on commercial loans. The middle size tanneries can only install chrome recovery plants with the help of revolving funds. Installation of such funds is under discussion.

4.1.3 Sulphide removal and sulphur recovery from UASB effluent

Based on the recommendations of the JEM for the UASB treatment plants, a proposal was made for a pilot study (desk study) with respect to sulphide removal and recovery of sulphur. The study revealed that removal of sulphide and recovery of sulphur is very complicated and recovery will be neither technically nor economically feasible. Moreover, it became clear that the sulphide rate is only partly measurable in the BOD rate. The means that the BOD rate of tannery waste water is de facto about 30% higher than can be officially measured. It can hence be estimated that the BOD rate after the UASB treatment is about 400 to 450. It has been decided by advisors and project team that the construction of a conventional aerobic treatment plant for the post-treatment of the wastewater is the best way to deal with the sulphide problem.

4.1.4 Main issues and points of action

- The treatment of a mix of tannery and domestic wastewater in Indian circumstances was a new concept introduced by the project. The evaluation missions on the performance of the UASB treatment plant concluded that the UASB treatment process showed its technical and economic advantages over other anaerobic treatment processes or over conventional aerobic treatment processes.

  Hence the initial doubts about the usefulness of UASB treatment plants in India, which existed within some of the involved Indian as well as Dutch agencies, have been taken away. Therefore there is no reason for the current evaluation mission to look extensively into this subject. Yet one important technical problem remains to be solved: the effluent of the mixed plant still has a BOD of 350 or 450 p/mm, which is much too high for the GPD discharge standards. Experts on wastewater treatment (amongst others from DWB/RIZA and IHE) have concluded that a supplementary aerobic treatment plant is needed to tackle this problem. This had not been foreseen during the inception period and hence requires extra finances.

  Point of action: the evaluation mission will have to assess the progress and financial consequence of the project activities regarding the post-treatment issue. The lead consultant will have to provide adequate information on this issue.

- By law the tanneries are obliged to carry out pre-treatment of the tannery waste. This is being done by means of sinking pits. However, it is not clear whether all tanneries are indeed treating their effluent.

  Point of action: the interim mission should check whether an overview exists of the number of tanners, that are practising pre-treatment. If such an overview does not exist, the project will be requested to collect the relevant information.

- It is not clear where the sludge, which is coming from the pre-treatment pits is disposed. Since no overall system has been developed to collect the polluted material and dispose it safely, it is not unthinkable that the sludge is ending up into the Jajmau sewers or drains, which may counter-effect the treatment process.

  Point of action: the evaluation mission shall have to find out whether the sludge poses environmental problems and if so how this problem should be solved. The problems may be of a financial and operational nature:
  * small and middle sized tanneries may have difficulties to finance the required investments;
  * the Kanpur municipality may have problems with the disposal of this hazardous waste.

- The results of the financial-economic study about the tanneries, which is presently conducted, will be helpful to get insight into the economic viability of the tanneries and the required investments with regard to sludge disposal, pre-treatment, chrome recovery and contribution to the construction and O&M of the industrial conveyance system.

  Point of action: the interim mission should collect information on the progress of the financial-economic study on the tanneries in order to check whether the results are useful for the evaluation mission. A distinction in this study between small, middle size and large tanneries seems useful.

- The activities related to the chrome recovery lack a thorough strategy, which envisages the installation of chrome recovery plants and dissemination of knowledge. A distinction in this study between small, middle size and large tanneries seems useful.

  Point of action: the evaluation mission should look into the need for the development of a strategy for dissemination of chrome recovery technology.

- The disposal of sludge originating from the pre-treatment of the tannery waste, the chrome recovery, the UASB treatment plants as well as that of the (future) aerobic treatment plants may cause environmental problems.

  Point of action: information should be made available or collected on the present disposal systems of the aforementioned types of sludge. It should be checked whether it creates dangers for the living conditions in the area involved. Furthermore, an assessment should be made of the control mechanisms.

- The use of UASB technology is a relatively new phenomenon in India. According to the information in the project documents, the plant operators appear to be well trained, whereas it remains unclarified whether the transfer of knowledge on the management level within UPJN (the implementing agency) has taken place sufficiently. It needs to be stated that one of the conditions for sustainability of the UASB plants, is continuous transfer of knowledge which needs to be institutionalized (by establishing training cells) within the agencies involved. This condition has not been met.

  Point of action: the evaluation mission should assess the progress regarding the institutionalization of training of UASB knowledge within UP Jal Nigam at the management as well as operational level.

- The JEM on the UASB treatment plant (May 1990) has recommended to establish a UASB knowledge centre in India.

  Point of Action: the evaluation mission should check whether an agency to set up an UASB knowledge centre has been identified.

- In the project documents it is stated that the costs of O&M will be shared by the GPD and the UP Government for the next five years.
  Point of action: the interim mission should discuss the agreements between the GPD and the UP State government concerning the costs of O&M, for the next five years as well as for the period after that.

4.2 Sewer and drainage programme in Kanpur

4.2.1 Proposed activities

The following main activities are undertaken under the sewer and drainage scheme:

- Construction of an industrial sewerage system to which all tanneries will be connected in order to stop the direct discharge of wastewater in the Ganga.

- Construction of about 21 km of new sewers, the replacements of 13 km of existing sewers and the cleaning of about 78 km of sewers.

- Construction of stormwater drains and the cleaning and repair of existing ones. The overall plan for stormwater drainage in Jajmau takes into account the separation of the stormwater drainage from the sewerage system.

4.2.2 Industrial conveyance system

In September 1990 a start was made with excavations for the main pumping system, construction of a collection drain and the construction of the industrial conveyance system. The expenditure sanction by GPD was 5 months behind schedule and therefore the completion date is now estimated to be March 92 (MIS Report September 1990).

The extent to which the tanneries will pay for the O&M of the conveyance system is still under discussion. Approximately 25% of the tanneries appear to have paid their share in the investment cost for the conveyance system and the UASB treatment plant (investment ratio GPD/UPJN/tanneries = 65/17.5/17.5) (RIVM Mission Report, September 1990).

This ratio was worked out by the project, taking into consideration that 30% of the volume of water to be carried by the common conveyance system and 30% of the pollution load of the effluent treatment plant would be from domestic sewage. GPD would bear all costs for the common conveyance and 50% for the remaining part, which amounts to 65% of the total.

4.2.3 Domestic sewer scheme

The entire sewer cleaning programme is strongly delayed. In June 1990 only 50% of the programme was completed. Hence it is noted by the project that the (already revised) completion date of February 1991 is not feasible.

It has been noted by the project that:

> "this delay will adversely affect the time schedule established for latrines being constructed under the low cost sanitation programme which are to be connected to sewers. Another significant aspect of the sewer cleaning programme is that even if the sewers are cleaned once, in the absence of proper water supply in most areas the cleaned sewers will get silted up in no time. Thus the effectiveness of the programme will get lost".
> (MIS Report, June 1990).

4.2.4 Stormwater drainage

In view of the financial ceiling for Jajmau the scope of the original plan for stormwater drainage had to be reduced. In 1989 administrative approval was given for a scheme of Rs. 92 lakhs. In September 1990 the stormwater programme is according to schedule, hence it is envisaged that the targeted date of January 1992 will be achieved.

4.2.5 Main issues and points of action

- The project team is fully aware of the practical and legal difficulties with regard to connecting the tanneries to the new system conveyance system. Therefore they opt for:
  > "a detailed time schedule as well as for the creation of a certain procedural format to such an extent that an official dialogue is started immediately between tanners, UP Jal Nigam and UP Pollution Control Board. Unless systematic efforts are made in this regard a dry system is foreseen which will be an anti-climax after the major components are installed".
  > (MIS Report July 1990).

  The RIVM supports this initiative.

  Point of action: The evaluation mission should assess the progress of the development of a procedural format and the dialogue.

- The issue of the financial contribution of the tanners to the construction and O&M of the industrial conveyance systems has only partly been solved.

  Point of action: The lead consultant is requested to clarify whether a clear agreement exists between the tanners, UP Jal Nigam and KJS including guaranteed personnel and budget allocations and control mechanisms.

- According to the information of the project team in July 1990, the effectiveness of the sewer cleaning programme is very low, partly due to the lack of sufficient flowing water.

  Point of action: the lead consultant is requested to clarify whether adequate measures have been taken to solve this problem (e.g. to give priority to the water supply scheme).

- The JEM of July 1990 and the additional comment on the project given by one of its members, made the following recommendations:
  * "an improved separate sewerage system has to be designed and constructed for Kanpur. The wastewater that is flowing into the nalahs needs to be intercepted".

  * "check the capacity of the drains to 2 to 5 times year frequency storms of appropriate concentration time as per IMD recommendations. Provision of lined cunnettes for sewerage flow and non foreclosing of future options for drainage are to be kept in consideration".

  The first recommendation was given a follow-up, since the interception of the wastewater to prevent discharge into the nalahs was taken into account in the revised workplan. It is not clear whether the second recommendation got a follow-up.

  Point of action: It should be checked with the lead consultant whether the second recommendation got a follow-up. Furthermore it needs to be checked whether both recommendations have consequences for the investment and O&M schedule.

- According to the JPS Fact Finding Report on institutional development & training of December 1990, the sewerage cleaning department of KJS needs:
  - additional manpower;
  - training in basic skills for sewer cleaning;
  - a monitoring system for the entire sewerage system;
  - a working programme for periodic inspection of sewers and monitoring the flow conditions.

  Point of action: The recommendations of JPS and the follow-up given, need to be assessed by the evaluation mission.

4.3 Performance of Sewer and drainage schemes in Mirzapur

4.3.1 Crash programme sewerage and stormwater drainage

The implementation of a crash programme was taken up by UP Jal Nigam in December 1988 and was financially completed in March 1990. The completion cost of the scheme is Rs 33.24 lakhs against the sanctioned amount of Rs 30.24 lakhs, which means a financial gap of 3 lakhs. Some physical works are still to be taken up in September 1990:

1. backfilling of a stretch at the tail end by the side of Khandwa nalah;
2. construction of chamber upstream of existing inlet side opening to Khandwa nalah at its tail end;
3. road reinstatement at one of the demonstration areas.

UPJN has agreed to take up the first two activities. The responsibility for the third one has been transferred to MNP, that utilized the transferred amount for their own works elsewhere. This matter has not been solved yet.

The project fears that the Khandwa nalah will experience collapses during the raining season. Because the nalah is an important part of the system it is decided by the project and UPJN to formulate a proposal for allocation of funds for repair of this nalah (MIS September 1990).

4.3.2 Interceptor sewer and pumping stations

The actual construction of an interceptor sewer and pumping stations started in April 1990, which meant a delayed start of 6 weeks. Moreover, present progress is extremely slow. Therefore a revised construction schedule has been prepared in consultation with UPJN and the City Administration (MIS September 1990). According to the project information the surmounting backlog is caused by:

1. "the non-existence of alternative routes for traffic diversion resulting in a phased construction";
2. "deployment of insufficient numbers of skilled and unskilled workers";
3. "inadequate resources with contractors";
4. "loss of working time due to monsoon, various festivals and holidays";
5. "lack of safety arrangements at working spots resulting in safety hazards which in turn affect the progress of work".

4.3.3 Combined wide meshed system

In Mirzapur a combined wide meshed system was chosen, for technical as well as budgetary reasons. The construction of the wide meshed system scheme in the core area was to start in February 1990. For various reasons such as lack of experience and competent contractors and reluctance to take up the work under the State Government and non-availability of pipes the work had not started in September 1990. In the meantime a revised schedule, in which the aforementioned bottlenecks have been taken into account has been made. In September the city administration still had not given permission to UPJN to start construction.

4.3.4 Drainage system in the non-core area

The Detailed Project Report for the expansion of drainage system in the non-core area was revised in September 1990. This was caused by the costs for construction of stormwater drains including culverts and land acquisition which turned out to be bigger than originally foreseen. According to the MIS Report the scheme will need more time, which in itself is not a crucial bottleneck since the scheme does not affect the progress of other project schemes.

4.3.5 Main issues and points of action

- Because of the physical infrastructure of the city with its narrow streets the construction of the sewer and drainage system has been seriously delayed. The prolonged construction works are posing problems for the inhabitants and causes traffic congestions. This may negatively affect the good will of the population. Consequently the question arises whether the design of the sewer laying programme is sufficiently adapted to the physical infrastructure of the city of Mirzapur and whether the execution of the sewer laying scheme is technically feasible within the limits of the existing budget.

  Point of action: The lead consultant is requested to provide up-date information on the aforementioned questions. This information will help the evaluation mission to analyze the causes for delay and to provide advice on possible options.

- The municipality encounters difficulties in finding experienced and competent contractors to carry out the construction works. Whether this is "only" due to financial matters is not clear. In other words are competent contractors not interested to take up the work because of the low payment or is it anyhow difficult to attract competent contractors in Mirzapur?

  Point of action: The reasons why contractors are difficult to find in Mirzapur need to be answered by the lead consultant.

- The municipality of Mirzapur lacks management and financial capacity to take up the work adequately and to guarantee a proper maintenance of the projected facilities. This could be one of the reasons why the city is reluctant to give permission to UPJN to start with the construction works. According to the Fact Finding Report of JPS, Mirzapur Nagar Palika, the responsible agency for the O&M of the sewerage and drainage system did not allocate staff for O&M, has no work programme and lacks equipment.

  Point of action: The recommendations of the JPS need to be assessed by the evaluation mission.

- Preparations for the construction of a UASB plant were made in 1990. Since the treatment plant can only be operational when it is connected to the sewerage system, the construction and maintenance of the sewer pipes and pumping station should be guaranteed before the construction of the UASB plant is started. Otherwise an "unemployed" UASB plant will be the result.

  Point of action: The evaluation mission should give attention to the consequences of the delays in the sewer laying programme and envisaged O & M problems in relation to the progress of the construction of the UASB treatment plant. The evaluation mission should notably check whether it makes sense to continue the construction of the plant as long as no solution has been found for the problems related to the sewer laying scheme.

4.4 LCS scheme in Kanpur and Mirzapur

The objective of the Low Cost Sanitation (LCS) scheme is to serve 90 to 100% of the project area with the provision of low cost private pour flush latrines, either by construction of new latrines, or by the conversion of unhygienic dry bucket latrines into pour flush latrines. Depending on the presence of sewers, these latrines will either be connected to leaching pits or to a sewer. For people who can not afford a private latrine, community complexes are to be provided. According to the project documents the private latrines will be mainly of the on-site type, i.e. connected to a leach pit. Only when hygienic conditions allow so and sufficient sewers have been laid in the concerned areas, private latrines with off-site sanitation will be taken up.

4.4.1 LCS scheme in Kanpur

Based on a survey of Sulabh, the contractor for the LCS scheme, it was originally planned to construct 11235 private latrines. However, new figures from a different source (KJS) indicate that it is only feasible to construct 3887 latrines of which 2611 off-site and 1264 on-site.

According to the RIVM mission of September 1990 out of 12 approved public toilets, 4 had been completed while 5 were under construction. The RIVM mission visited 2 public latrine complexes of which one was functioning well, while the other one was dirty, not being used and without caretaker.

In July 1990, 600 latrines had been completed (MIS Report, September 1990). Consultants and counterparts are of the opinion that Sulabh is performing below standards. Other contractors amongst whom a female mason society, have been contracted for the remaining construction works.

4.4.2 LCS scheme in Mirzapur

The original list of potential beneficiaries, submitted by Sulabh (10.400 households) has been replaced by a UPJN list (7350 facilities, 4200 on-site and 3150 off-site facilities) because of bad performance of Sulabh. Hence the construction work will be carried out by the State Government. Furthermore, negotiations have been started between UPJN and MNP. The latter has agreed to maintain the latrines for 30 years.

The progress of the programme is slow. In September 1990 none of the public latrines and 1775 on-site private latrines were completed. The construction of off-site latrines can only take place after completion of the sewers.

It was observed in September 1990 that 75% of the potential users had not started using the latrines since no superstructure had been constructed. The results of a door to door field survey revealed that only 8% was ready to take a loan from the government for construction of the superstructure. Hence a solution need to be found for these financial problems, otherwise the LCS scheme may have little results.

The survey carried out by the project revealed that 2373 households do not have adequate space (as per standard design) for private latrines and soak pits. This means that the latrines of these households need to be connected to the sewer system. The impression is that this was not foreseen during the design phase. The joint evaluation mission of June/July 1989 pointed out:

> "The facilities are in the majority of the cases not situated in such a way that later connection to a high cost sanitation system will be possible. The interaction between low and high cost sanitation therefore is weak".

The mission was also of the opinion that the planning of the low cost facilities was haphazard, as a result of which an (unspecified) percentage of the on-site latrines was constructed on places where there was no or too little space for the municipality workers to empty the soak pits. Moreover it was noticed that the introduction of a large number of soak pits in an urban area may lead to environmental pollution and hazard, unless proper precaution is taking regarding construction, maintenance of surroundings, effect of rodent holes on diffusion of pollutants and obnoxious gases".

The mission recommended to study seriously necessary changes in the present low cost sanitation programme.

4.4.3 Main issues and points of attention

- The LCS programme has been seriously delayed. Whether reliable contractors with sufficient capacity have been recruited in the meantime is not clear.

  Point of action: the lead consultant is requested to inform the mission regarding the aforementioned issue in order to make a reliable assessment.

- It is not clear whether the project has given follow-up to the recommendation of the joint evaluation mission of June/July 1989, i.e. to study seriously the necessary changes in the project's low cost sanitation programme.

  Point of action: The following questions need to be answered by the lead consultant before the evaluation mission takes place:
  * is the location of the latrines and leach pits still to be constructed, such that environmental pollution will be prevented and that removal of content of the leach pits can be guaranteed?
  * is the interlinkage between the availability of water supply and the LCS system sufficiently realized?
  * what are the financial and economic consequences of the recommendations of the joint evaluation mission?

- The original list of potential beneficiaries in Kanpur and Mirzapur proved unreliable. In the revised lists the number of potential beneficiaries was reduced from 11235 to 3887 in Kanpur and from 10400 to 7350 in Mirzapur. These big differences have not been explained in the document. It remains unclear why the number of latrines to be constructed is seriously reduced and if (and how) the rest of the population will be served.

  Point of action: It should be revealed by the lead consultant why the number of latrines has been reduced and how the rest of the population will be served with low cost sanitary facilities.

- A survey revealed that many of the households do not have adequate spacing for private latrines. An alternative solution is being prepared by the project.

  Point of action: the lead consultant is requested to provide information on the progress on finding and implementing an alternative solution.

- The lack of funds for superstructures is a serious constraint in the LCS programme. Why this problem was not anticipated is unclear. Either the extension programme did not sufficiently inform the potential users about this matter, or the need and hence the financial consequences of the construction of a superstructure were simply neglected. In the meantime the GPD has been approached to come forward with an additional loan. The results of the negotiations are not yet known. It should be taken into account that only a small percentage of the users is prepared to take an additional loan. An adequate solution need to be found for this problem, otherwise all efforts of the low cost sanitation programme will be ineffective.

  Point of action: the lead consultant is requested to provide information on efforts and to overcome the problem of the required superstructures.

- About half of the completed public latrine complexes in Kanpur are not in use.

  Point of action: an analysis needs to be made of the reasons why some of the public latrine complexes are not being used and of the users groups of the public latrines that are functioning. The lead consultant is requested to provide the information.

- After various initial troubles the female masons are now employed under the LCS scheme. Their part of the work under the LCS scheme is only a very small percentage of the work still to be undertaken.

  Point of action: it needs to be checked by the lead consultant whether the female masons participate as skilled workers, whether they need a follow-up training in order to improve their skills and whether this project component is replicable.

- The JPS Fact Finding Report revealed that no staff for O&M and supervision of the public latrines within MNP (Mirzapur) and KNM (Kanpur) has been allocated.

  Point of action: It needs to be checked whether adequate follow-up has been given to the analysis made by JPS in terms of adequate arrangements within MNP and KNM in collaboration with the community for O&M of the public toilet complexes.

4.5 Solid waste management programme in Kanpur and Mirzapur

4.5.1 Programme activities

The solid waste management scheme is meant to contribute to procurement of equipment and to improvement of management. It is proposed that the execution of the programme is carried out in 3 (demonstration) areas in Kanpur. The proposed system contains five basic elements:

- storage at source;
- primary collection;
- transfer;
- secondary collection;
- disposal.

The population should bring waste to roadside bins. Sweepers will collect the domestic waste from these bins and dispose it in containers. The solid waste from the containers will be transferred to the disposal sites, where a sanitary landfill operation is carried out with equipment like tractors with dozer blades. Roadside drains are cleaned by a separate group of sweepers. Commercial waste is placed by the producers in the containers directly. For waste of hospitals and tanneries special measures will be taken. The same system is proposed for Kanpur and Mirzapur, starting with demonstration areas.

The expenditure involved is basically geared towards procurement of equipment and construction of facilities like garages etc. According to the MIS Report 1990, the procurement of materials is delayed in Kanpur and on schedule in Mirzapur.

The management support, i.e. Kanpur Nagar Mahapalika in Kanpur and Mirzapur Nagar Palika, is envisaged to start in October (Kanpur) and September (Mirzapur) 1990. Recent information on other activities like consultations with population in the project areas, is not available.

4.5.2 Main issues and points of action

- The Mid Term Status Report gives the following information on the solid waste management programme:

  "taking into account the limited availability of the majority of the population to pay for various facilities only limited improvement of the solid waste collection and disposal can be proposed. A minimum service level should be established based on a least cost analysis with a high efficiency."

  Point of action: The lead consultant has not yet made clear what a minimum service level based on a least costs analysis with a high efficiency looks like. Therefore he project is requested to answer the following questions: what part of the costs should be born by the population, what method is being followed to stimulate the support of the population in terms of the proposed disposal method and how will the related taxes be collected?

- Strikes of sweepers seem to be a regular phenomenon, both in Kanpur and in Mirzapur, and are mostly related to backlogs in salary payment. Moreover, the introduction of the new system in the demonstration areas resulted in more working hours, for which no financial compensation was made available. Therefore the sweepers and their supervisors did not want to use the new equipment (Mirzapur).
  Collaboration of the sweepers is one of the crucial factors for the success of the solid waste management component and should receive due attention.

  Point of action: The lead consultant needs to provide more information on the involvement of sweepers in the solid waste management scheme.

- The solid waste management programme is basically catering for the non-hazardous solid wastes. In Kanpur only parts of the solid wastes generated by tanneries are included in the solid waste programme.

  According to the joint evaluation mission of 1989, it seemed possible to improve the level of service by incineration of solid waste in Mirzapur and composting at Kanpur and secured land filling of hazardous industrial wastes. The reaction of the project was that incineration would not be feasible financially and that composting had been tried in Kanpur but had shown very poor results. Therefore the lead consultant is in favour of disposing off all solid wastes by sanitary landfilling. In Mirzapur new dumping sites are needed, because of the limited capacities of the existing ones. However landowners are not willing to rent out land for that purpose (MIS Report September 1990). In January 1991 new dumping sites were not yet available. No approval was given by UP State Government for the installation of disposal sites (information RIVM advisor).

  Point of action: the evaluation mission should check what measures have been taken regarding the disposal of hazardous industrial waste, after which an assessment is to be made of the technical and financial feasibility of the proposed actions.

- In Mirzapur the practice of washing metal bearing slags (waste generated by the brassware industries) directly into the river Ganga causes environmental pollution.

  Point of action: The lead consultant has to provide information to what extent the metal bearing slags might pose environmental pollution.

- In the MIS Report of July 1990 it is noted that:

  "some method to evaluate the actual effect in terms of cleanliness is to be formulated. If the progress is related to cleanliness we may get a more realistic picture than providing data on procurement and construction facilities."

  Point of action: The lead consultant should provide information whether criteria have already been developed to evaluate (or to monitor) the effect of the solid waste management scheme in terms of a cleaner environment. This information can serve as a basis for the assessment of the output of the solid waste management scheme to executed by the evaluation mission.

4.6 Water supply scheme in Kanpur and Mirzapur

The proposed improvements in the water supply system in both cities are:
- expansion and rehabilitation of the existing distribution network;
- expansion and rehabilitation of the existing production and storage facilities.

4.6.1 Proposed activities in Jajmau/Kanpur

In Jajmau/Kanpur the following infrastructural works are required:
- construction/regeneration of tubewells;
- construction of pumping stations;
- construction of overhead tank and laying of rising mains;
- laying of distribution mains.

The first phase of the overall water supply programme was identified in 1988 which envisaged the construction/regeneration of tubewells, the construction of the overhead tank and of the rising mains.

Besides a 'crash programme' was identified comprising the installation of handpumps and public standposts (number not specified).

For operational reasons Kanpur is divided in a number of zones which are due to get water supply systems that are interconnected but could -if necessary- function autonomously.

The targets to be reached in 1991 for three zones are a coverage of 56% of the population by house connections and 44% by 120 public taps.

In order to improve the existing situation rehabilitation of the system has top priority.

"Wherever necessary augmentation of the systems will be taken up simultaneously. Based on the urban characteristics like type of houses, and income patterns, piped water supply through house connections is not considered a feasible option for everyone. There will remain certain pockets where drinking water will be supplied through communal standposts. (Workplan 1990:7).

4.6.2 Performance in Kanpur

From January 1990 onwards the following activities were scheduled:

- In zone III a total of 10785 m of pipes (big small diameter) was to be laid and 124 valves of varying sizes were to be installed. Furthermore with regard to the leak detection/rehabilitation and mapping a total number of 3384 house connections were to be taken up.

- In Zone II a total number of 168 valves were planned to be installed and with regard to the leak detection and rehabilitation programme 4582 house connections were to be taken up.

The factual situation (according to the MIS Report September 1990) is as follows:

- In September 1990 the construction of the overhead tank is not completed yet, and is about 1 year behind schedule.

- The planned water supply works are approximately 5 months behind schedule according to the information made available in September 1990 and approximately 50% of the valves and specials to make the connections in the distribution network had been purchased (delay in deliveries).

- The chlorination programme of tubewells and pumping stations has by far not yet reached the set target.

- The rehabilitation programme is delayed. According to the leading consultant the leakage reduction programme should only be implemented after completion of the overhead tank and installation of network valves. The MIS Report of July 1990 gives in this respect the following information:

  "The logical sequence that has been thought of, is to isolate a small pocket to test the same for leakages, rehabilitate the system, install necessary water meters, create a complete record of house connections and thereafter it can be said that such a rehabilitation programme should be undertaken only after the water quantity is made available and the control of the supply through overhead tank, pipe, network and control valves is installed. If the sequence is to be followed this programme should be taken up in at least zone I but only after June 1992. It can be anybody's guess to predict the completion date in this behalf. Coupled with this constraint other administrative and procedural difficulties must be looked into. By working in a given pocket the maintenance authority, i.e. KJS must initially identify the existing house connections metered or un-metered as well as regular or unauthorized. While detecting unauthorized connections they may possibly have to launch massive legal and administration action in order to either regularise such connections or to completely disconnect the same. Looking at these constraints it is extremely difficult at this stage to really predict anything on the completion date which has been indicated as February 1992 in the Workplan".

This quotation gives a good insight in the problems encountered in the implementation-/rehabilitation of the water supply system. The lead consultant is preparing a more realistic work schedule for the rehabilitation works including a procedure for implementation and division of responsibilities of various agencies involved.

4.6.3 Proposed activities in Mirzapur

In Mirzapur the following works are proposed:
- a crash programme (see below);
- rehabilitation of the existing water supply network, including replacement of 30% of the service connections, repair of existing and installation of new water meters for all existing connections and installation of over 400 sluice valves;
- source development.

The crash programme consists of the following elements:
- rehabilitation of 170 public standposts;
- establishment of water supply zones (zones I - IV);
- regeneration of 12 tubewells;
- provision of chlorinator units for 12 tubewells;
- construction of four rising mains to connect tubewells with overhead tanks;
- construction of an overhead tank (in zone III) with a capacity of 2250 cu.m and a staging of 19 meters above ground level;
- a leak detection survey, which resulted in the rehabilitation programme;
- installation of 200 India mark II handpumps all over the municipality.

The targets for the water supply programme to be reached in 1991 approximately 60% of the population by house connections and 40% by public standposts.

4.6.4 Performance in Mirzapur

The regeneration of 12 tubewells which was realized between January 1988 and December 1988 resulted into an increase of the production of water of 40%.

- In January 1991, 278 handpumps had been installed under the crash programme.

- Delays: implementation of the planned activities was in September 1990 at least 5 months behind schedule. One of the main reasons for the delays is that no money was received from UP State Government for the rehabilitation activities. This situation is frustrating the implementation of phase IB (GON funding). (RIVM, Mission Report, January 1991).

- The MIS Report of July 1990 states that the O&M of the pumps are said to be neglected.

  "Personnel with the required technical skills should be trained properly for maintenance of pumps. The breakdown of pumps will become inevitable if preventive maintenance is ignored. Already the V.T. pumps installed in Ghantaghar and Oliarghat have broken down twice".

- In September 1990 out of the 12 chlorinators only 4 were in operation.

4.6.5 Main issues and points of action

- According to the project workplan the rehabilitation of the water supply system in Kanpur was given top priority. The MIS Report of July 1990 mentions that the leakage reduction programme can only be implemented after completion of the overhead tank and installation of network valves.

Point of action: The combination of delays and changes in the planning of the water supply system in Kanpur suggest the need for a in depth (re)assessment of the plans, both from technical as from financial perspective. This issue deserves discussion during the interim mission; in which way an assessment can best be organised. The report of this assessment should be available before the evaluation mission starts its activities.

- The available budget for the improvement of the water supply system in Mirzapur may limit the execution to mainly the core area of Mirzapur. The formulated target of an overall expansion and rehabilitation programme for Mirzapur by far exceeds the agreed amount.

Point of action: a detailed (re-)assessment of the water supply plans both from technical as from financial perspective seems evident.The interim mission can advise in which way a further assessment can be effectuated (see previous point of action).

- In 1989 it was agreed with GPD and implementing agencies that the (national) norm of 270 lpcd should be reduced to 150 lpcd and 35 lpcd for respectively house connection supply and standpost supply in calculation of production capacities. For distribution calculations a maximum day demand of 200 lpcd for house connections has been taken into account. For standpost supply a maximum day demand of 1.3 times the average day demand has been applied.

Point of action: The adapted water norms should be taken into account during the (re-) assessment of the water supply programmes in Kanpur and Mirzapur.

- The implementation of the programme is behind schedule. The delay due to the fact that UP State Government has not yet provided funding for phase IA, causes serious problems, since a reliable water supply is crucial for other project components such as the sewer cleaning and sewer laying and community participation and public health education and the UASB treatment plants.

Point of action: The evaluation mission should consider the effect of the delays in the implementation of the workplan, taking into consideration the outcome of the (re-)assessment of the water supply programme.

- **Important legal issues are the following:**
  - definition of ownership of the house connections to ensure that the KJS and the MNP retain responsibility for the installation, repair and maintenance of the connection up to and including the water meter which is located adjacent to the consumers property boundary;
  - acquisition of land for construction works;
  - procedures with reference to legislation and tariff structures that will lead to a self financing of the system;
  - legal actions against illegal connections.

Point of action: The lead consultant should take action with respect to the aforementioned issues. The interim mission is to check on which of the mentioned issues adequate action is being taken and to assess the effect of this action. Issues on which no action can be taken for whatever reason, should be subject of discussion during the evaluation.

- **Important Operation & Maintenance issues are:**
  * Development of effective water supply units that will be capable of operating, maintaining the systems (including leak detection) as well as meter reading, revenue collection, planning and construction of any necessary extensions and improvements to the systems and the achievement of financial self-sufficiency of the system.

  * Provision of adequate quantities of water to consumers 24 hours a day.

  * Provision of Kanpur Jal Sansthan and Mirzapur Nagar Palika with sufficient trained staff, tools, infrastructure and spare parts to enable them to operate adequately including issues such as the maintenance of records, the collection of revenues due, and the possibility to take disciplinary action, such as disconnection of services where necessary.

  * Until now no detailed training plan has been made available. The training needs assessment study as carried out by JPS gives a clear indication. Based on this report an overall plan including training aspects and the set-up of training cells, budget allocations, training cells, etc needs to be developed.

Point of action: These issues should be point of attention of the (re-)assessment of the water supply programmes.

- Issues related to community participation:

Since no adequate information is so far available the following questions seem relevant:

  * In which way were men and women of the community involved in decisions such as the place of a handpump or a public standpost?
  * How many waterpumps are effectively functioning?
  * How many people and of which class of the populations are being served with good water ?
  * What are the clients opinions on the water supply system?
  * Are waterpumps being maintained (in other words does community participation works and in which parts of the cities)?
  * Are men and women of the community involved in surveillance and/or maintenance of handpumps or public standposts?
  * How is cooperation between municipality and population being shaped ?

Point of action: Answers to these questions on community participation should be made available before the evaluation mission effectuates its activities.

5. SOCIO-ECONOMIC ISSUES

Improvements of the living conditions of the people is the second main objective of the project. This objective is to be achieved by the establishment of drinking water, sanitary facilities and wastewater treatment on the one hand and support of the local population towards technical interventions and health education on the other hand. The social aspects, including gender related issues and health activities, are the responsibility of the SEU (see also figure 2).

5.1 Objectives

The primary objective of the SEU is to stimulate participation, active involvement in decision making processes, maintenance of facilities and support to the project's technical interventions from the local community to achieve sustainable improvement of the living conditions. This primary objective can be divided into the following sub-objectives as formulated by the project:

1. To strengthen and/or even build up institutions which organise the effective participation of the communities.
2. To enhance the awareness and ability of the community to meet its own needs with or without outside help, to articulate their own aspirations and to deal effectively with the problems of the community and especially the women.
3. To ensure that all segments of the population are involved in the planning and implementation and that weaker sections in the community will get priority in development input.

After an initial phase of about one year, the SEU programme was formulated in Detailed Project Reports (1988). Funds were made available through the (external) Financial Assistance component of the project. The actual activities in the field of health promotion and community participation aspects started in October 1988. To achieve this the project identified several potential change agents: Traditional Birth Attendants (TBA), Private Medical Practitioners, Primary School teachers, Anganwadi Workers, Community volunteers, Handpump caretakers and health and safety worker volunteers.

5.2 Programme

The workplan of the SEU covers four components;
1. support to technical interventions;
2. health related aspects;
3. occupational health programme;
4. skill training programme for women.

5.2.1 Support to technical interventions

The project has categorized the support of technical interventions as follows:
(A) implementation support, (B) institutional development, (C) establishment of community level organizations (mandals) and (D) programme support communication.

A. Implementation support

Implementation support covers community participation and health promotion related to sanitary interventions (water supply, sanitation and solid waste management).

Water supply
Implementation support is mainly directed towards water supply with the aim to establish a cost-effective O&M system based on community involvement, improved water allocation and storage practices, training of handpump caretakers, establishment of a complaint system, on-the-job training of handpump mechanics and promotion activities. To establish a cost-effective O&M system will not be possible.

In January 1991, 278 handpumps had been installed, thus serving roughly 45.000 people (150 people/handpump. Apart from this group which also makes use of traditional wells, the remainder part of the population (80.000 people) is served through (intermittent and low pressure) piped water supply and traditional wells. In January 1991, 317 caretakers were reported to be available (against a total of 556). It seemed that the interest to participate in the meetings held between community representatives and MNP maintenance crew is gradually lost. The main reason for this is the lack of funds for O&M.

Low cost sanitation activities
The SEU activities concern extension via intermediaries on how households can get a private latrine constructed and to promote usage of private as well as public latrines.

Solid waste management
The community support scheme aims at the active involvement of the population in the disposal of solid waste. This requires an adequate interaction between the municipalities and the population for which preparatory meetings were held in the project areas.

B. Institutional development

The institutional building component within the Socio-Economic Unit aims at strengthening of the role of the municipalities in promoting hygiene practices during and after implementation.

C. Community level organizations

To sustain the projects efforts community organisation plays an important role. During the project, a number of mandals (officially registered community organizations), have been established to extend support towards promotion of improved environmental sanitation. The project will direct its efforts towards expanding and strengthening of their operational capacity.

D. Project support communication

In cooperation with UNICEF the project has developed promotion materials on solid waste disposal, sanitation, handpumps and piped water. Also promotion methodologies for sanitary interventions have been developed.

5.2.2 Health related aspects

The Public Health education consists of a number of key messages, that are supposed to lead to an improvement of the health status of the population. The messages deal with subjects such as the need for latrine use, prevention of water spillage, improved methods of water storage, proper methods for disposal of solid waste, hand washing with soap, oral rehydration for children with diarrhoea, encouragement of breastfeeding and the need for promotion of immunizations. These messages are conveyed mainly to women groups via intermediary health agents like Anganwadi workers, Traditional Birth Attendants and Private Medical Practitioners and school teachers).

Health agents are given short training related to their specific tasks. In addition to this social marketing, activities are undertaken consisting of the disposal of basic Public Health Care packets and special health kits for Traditional Birth Attendants. Health Agents and/or population can buy these packets for reduced tariffs.

Longitudinal diarrhoeal incidence study

A longitudinal diarrhoeal incidence study is carried out, which aims at the assessment of the effectiveness of the total package of sanitary improvements including promotion activities. Under the scheme of this study 200 households are visited every two months and interviewed on the cases of diarrhoea of the children under 5. In these households samples of water quality are taken. The findings of the study will provide feed back on approaches and education messages used and how to adapt these.

5.2.3 Occupational health programme

The long term objective of the occupational health programme is to improve the working and health conditions of the tannery workers in Jajmau, Kanpur and of the carpet weavers (especially of the children, who are engaged in the carpet weaving industry) in Mirzapur. A situational analysis of the occupational health problems of the respective groups would form the basis to formulate interventions in order to diminish the occupational health hazards (see appendix VII).

5.2.4 Skill training for women

The project identified the need for increasing the skill levels and the income of women. In view of this an effort has been made to train female construction workers as masons. Training for the first batch of women in Kanpur and Mirzapur (each 15 trainees) was completed in 1989. After some difficulties to find employment for the trained women masons they are now employed under the Low Cost Sanitation Scheme. The training of the second batch of 15 trainees in both Kanpur and Mirzapur started in the second half of 1990. For a more extensive overview of the SEU see appendix VII.

5.3 Performance

At this stage it is not possible to make an assessment of the impact of the SEU activities because the outcome of the impact assessment studies as carried out by the project are not yet available and most project activities have just been started.

The operationalisation of the objectives is put in broadly defined terms and encompasses a very wide range of activities. In order to discuss the socio-economic activities, a set of indicators will be used that have been developed in the course of the project, based on the outline of UNDP/PROWESS. In this chapter these indicators will be used as instruments to identify the main issues related to the performance of the SEU.

They are:
1. Effective utilization of facilities provided.
2. Sustainability of the sanitary interventions.
3. Replicability of approach and methodology.

5.4 Effective utilization

The following information on effective utilization of facilities is available:

Low cost sanitation scheme

The utilization of the private latrines provided under the Low Cost Sanitation scheme has been limited because the potential users did not construct superstructures. Although the possibilities exist for obtaining a loan to build the superstructure, very few (8%) are willing to take such a loan. Furthermore, about 40% of the latrines constructed show technical defects, mainly due to lack of space resulting into undersized leach pits.

The public toilets in Mirzapur are not yet completed and only half of the public toilets in Kanpur are being used. The RIVM mission of March 1990 noticed that monthly expenditures (caretakers salaries, cleansing materials) were being covered by tariff revenues (approximately Rs 700/month). The reasons why some of these are used and others not are not known.

Water supply

No data are available on the effective use of water pumps. But it is indicated by the project team that the quality of the installation of handpumps is low and that proper supervision lacks.

5.5 Sustainability of the SEU activities

The sustainability of the SEU activities is related to economic, socio-cultural and institutional sustainability. These points will be discussed below:

5.5.1 Economic sustainability

The project aims especially at reaching the weaker sections of the population. The baseline studies revealed that the income position of many households in Kanpur and even more in Mirzapur is such that only limited financial contribution towards the established facilities can be expected. It can be concluded that the facilities may have to be permanently subsidized.

5.5.2 Socio-cultural sustainability

Socio-cultural sustainability can only be obtained when the SEU activities are linked-up with the socio-cultural context. This means that the activities need to be grafted upon the existing values, needs and behaviourial patterns and cadres of the community.

In view of this the project has undertaken the following:

- they have conducted several baseline surveys to get insight in the socio-cultural context and basic needs;
- they have contacted the existing health cadres such as Traditional Birth Attendants and Private Medical Practitioners;
- they have trained all sorts of change agents: in total 80 community workers, 120 TBA's, 70 PMP's, 80 school teachers, 600 handpump user representatives.
- they have tried to identify NGOs to give additional input;
- they have tried to form community level organizations such as mandals;
- they have implemented crash programmes in order to create goodwill with the population.

Based on the available literature the following points can be listed:

- The baseline surveys provided a basis for further project formulation and implementation. Still it is unsure whether the project really responds to the basic needs of the population. One result of the baselines studies is the identification of a (separate) income generating project for women. It was found that poverty and the lack, especially of women, of income made it premature to talk about participation, awareness raising and voluntary work without actually improving the employment situation of women (Inception Report, 1987). This project, which will receive special funds, had not yet started in December 1990.

- The project has sought connection with the existing health cadres. This resulted in a situation where all sorts of health agents are involved in the project. A clear choice to involve only those, who by profession have a clear link with the main stream activities of the project, may have to be made.

- The project has not succeeded in identifying suitable NGOs, which can be involved in the project.

- Several mandals have been established, but information on their number, their performance, composition (men-women relations) etc. is not available.

what kind

- Implementation of crash programmes was delayed but most of the programmes were completed by the end of 1990. It is not known whether the crash programmes have provided an incentive and stimulated the interest of the population.

- Benefits of the project can be seen as incentives. Community participation and health education can therefore be mutually reenforcing. However, integration of different project activities may form a bottleneck towards health education. The impression exists that the timing of the technical activities and the SEU activities is insufficiently tuned. An example is health education at schools; particularly the municipality schools have no latrines, handwashing facilities and rubbish bins for use by children. Thus the most effective way of teaching, through the training of good practices, is denied to them. An other example is provided by occupational health programme in Kanpur; workers are stimulated to use services of the Employees State Insurance (ESI), whereas the health service of the ESI is considered insufficient. The fact that primary drains under construction, were already filled up with solid waste as was noticed by the RIVM mission of March 1990 may be an other illustration of either a wrong tuning of health education and technical improvements, or of a lack of incentives to change behaviour of the community for a clean environment, or a combination of the two.

- Financial incentives may be essential for the success of community participation. Interviews with caretakers revealed that they expect money for the job they are doing (Schenk-Sandbergen, 1988). In how far the set-up of the community management system has included financial compensation for community members who are providing social services, is not clear.

As a conclusion, it can be stated that efforts have been made to relate the SEU activities with the socio-cultural context. In how far this has been successful remains unclear. The SEU are supportive to the technical interventions, which do not all directly reflect the basic needs of the population. It may well be that the lack of a sound overall integration of the SEU activities with the technical interventions has in some cases been counterproductive for the activities of the SEU.

5.5.3 Institutional sustainability

In order to ensure O&M of facilities, an agreement is required between project and concerned authorities on operation and maintenance set-up. It should include the involvement of volunteer caretakers in regular maintenance activities, their legal status, selection, payment etc.

Community cells have been established or are under construction. These cells serve as focal points for change agents to meet the social workers of the municipality and meet each other. More specific information on the collaboration between the municipalities and the community is not available. However, the following comments can be made:

- A problem in Mirzapur and Kanpur is the lack of spare parts. Budget allocations have to be made available for these spare parts and for chlorination and bleaching powder. The weak financial position of MNP is a major constraint and results into insufficient supply of spare parts, non payment of the salaries of its maintenance staff and other requirements to maintain the system. In Mirzapur this may have contributed to a serious outbreak of cholera/gastroenteritis during the summer.

- The SEU has incorporated staff of the implementing agencies, who are temporarily attached to the project and hence have become implementors, working outside their institutional setting. Note also that Mirzapur Nagar Palika, responsible implementing agency for the SEU activities does not have a department nor a budget for community activities. This will hinder the continuation of activities after termination of the project. The situation in Kanpur is supposed to be better, but exact information is lacking.

- The health care systems in Kanpur and Mirzapur do not have staff working in the "field". However, this problem may be "solved" under the Urban Health Care project, that has recently been started.

- The SEU project team consists of about 5 or 6 members (1 or 2 expatriates), who are assisted by external advisors from different Indian institutions and one external expatriate advisor from the KIT for occupational health (see also appendix VII). The exact division of tasks and responsibilities between the project staff and the implementing agencies (i.e. KNM and MNP) has not been made clear in the documents.

- The division of tasks and responsibilities between the community and the municipalities with regard to O&M has not been made clear in the documents.

It can be concluded that the weak financial position of MNP may prove a serious bottleneck for the institutional sustainability of the SEU scheme. It is unclear whether clear cut agreements have been made between the project staff and KNM and MNP as well as between the latter two and the community with regard to division of tasks and responsibilities.

5.5.4 Replicability of approach and methodology

The replicability of approach and methodology will be discussed in this paragraph.

General methodology

- One basic methodological problem is that the operational definition of community participation and health education components is very broad and rather vague. Consequently too many activities may have been undertaken with a limited budget and a small project staff.

- The approach of the SEU appears to have been based on the attempt to involve as many intermediaries as possible and to reach as many families as possible. Consequently the contents of some of the activities may be rather general and not always directly translatable in practice. The latter was for instance the case with the training courses for Anganwadi workers, who complained that they could do little with skills they had learned during the training courses.

- Some of the SEU activities are only weakly related to the main stream activities (although objectively seen, they may be useful). Examples are the activities in the field of antenatal and post natal care (via Traditional Birth Attendants) and the occupational health programme in Mirzapur.

Gender issues

- It appears from the documents that the project is fully aware of the role of women in water and sanitation issues. In both project areas Indian Women in Development specialist have been attached to the project and female staff is working in every project level. However, the operationalisation of a strategy remains unclear. In other words what methodology is followed to involve women in the project?

- The skill training programme for women masons is one of the more specific gender related project component. This activity can in itself be considered as a very good initiative, but the number of women involved is small and their contribution to the LCS programme, in which they are involved is very limited. The efforts to make it a success may have been so time consuming that the question rises whether the skill training component may better be related to the newly identified income generating activities project instead of to this sanitary and engineering project.

Health and hygiene education

- The epidemiological baseline information is very limited. The project has not made a pre-assessment of the nature and magnitude of the pollution and of the biological consequences for the workers and population. The occurrence of the cholera outbreak in Mirzapur in the summer of 1990 has apparently not been confirmed bacteriologically. Hardly any information on disease patterns is provided and whether sufficient information on hygiene related behaviour is available is not clear. In view of this it will be very difficult to demonstrate the impact of health education activities.

- An effect on health education can only be demonstrated if health education activities are regularly evaluated and adjusted according to the findings of evaluation research. The longitudinal diarrhoeal incidence study is the main (perhaps the only) activity in this regard. Its results are not available in The Netherlands, so no thorough assessment can be made of its merits. However, it is generally known, that such studies are methodologically very difficult. It will be practically impossible to obtain reliable data on diarrhoea incidence during home visits every 2 months.

It can be concluded that the operational definition of community participation and health education is very broad. Consequently too many activities may have been undertaken without a clear priority setting. Some of these activities are only weakly related to the main stream activities. The integration of the SEU activities with the technical and institutional interventions appears in some cases to be weak.

5.6 Main issues and points of action

1. In general it can be stated that the Kanpur/Mirzapur project is basically a hardware project; the SEU main function is to give support to technical interventions, which only to some extent represent the felt needs of the population. The budget for the SEU is less than 2% of the total project budget, which limits the activities that can be undertaken.

   Point of action: to find out whether the SEU activities are cost effective.

2. The integration of the technical interventions and institutional issues with the community participation and health education activities appears in some cases to be weak. This may even be counterproductive for the SEU activities

   Point of action: the issue as formulated above is based on information that may prove outdated. The lead consultant is therefore requested to provide additional and more recent information on the tuning of the different technical, institutional and social interventions.

3. Community participation and health education are broadly defined as a result of which the project staff has too many activities to oversee. A clear priority setting appears to be lacking.

   Point of action: the lead consultant is requested to provide information on the fact whether a priority ranking has been made.

4. The conceptual framework of the SEU activities is very broad and some activities (e.g. post natal care, occupational health in Mirzapur) are only weakly related to the main stream activities.

Point of action: It should be checked, preferably prior to the evaluation mission, whether the broadly defined conceptual framework has imposed constraints on the impact of the SEU activities.

5. The information on utilization of the facilities is not available.

Point of action: updated information need to be collected on the utilization of:
- private latrines;
- public toilets;
- waterpumps;
- and involvement in solid waste management programme;
- Public Health Care packets and delivery kits;
- health education;
- all aforementioned facilities by the poorer sections of the community (or in other words do the poor have access to the established facilities).

If the lead consultant can not provide sufficient information on the questions as formulated above, additional information may have to be collected during a field survey.

6. Information on the relation of the SEU activities and the local cultural context is limited.

Point of action: Additional information need to be collected on the following:
- does the project respond to the real needs of the community?
- why is it difficult to identify suitable NGOs in the project areas, do they not exist, are they not interested, and if so for what reasons?
- is the connection with the existing health cadres effective?
- has the project been sufficiently connected with the existing organisational structure of the local community organisation?
- how many mandals have been established,how do they function, are they representative for the community, have women been involved in crucial positions within the mandals?
- how is the community participation arranged in terms of payment of volunteers etc.?

In case the lead consultant has only part of the information, the lacking information is to be collected during a field survey.

7. The approach to link up with the existing health cadres is effective in case existing health structures are strong. Since this is not the case in Kanpur and Mirzapur, the long term urban health care project that started in the second half of 1990, may overcome this bottleneck.

Point of action: To collect information on the contents and the organisational details of the urban health care projects.

8. Effect of health education activities can only be shown if health education activities are regularly evaluated and adjusted according to the findings of regular evaluation. This appears to have been realized only marginally.

Point of action: The lead consultant is requested to provide the results of the longitudinal diarrhoeal study and on eventual other forms of impact measurements they may have carried out (e.g. case control studies and impression of improvements as perceived by the target groups).

9. The strategy for activities related to gender issues remains unclear.

Point of action: the lead consultant is requested to give more insight in the strategy of how to develop activities to address gender related issues.

10. A main constraint with regard to the institutional sustainability of the community participation is the weak position of the KNM and especially of the MNP. No budget exists for SEU activities within MNP. The situation in KNM remains unclear.

Point of action: the lead consultant is requested to provide additional information on the following:

- division of tasks and responsibilities between the three parties involved: project team, KNM and MNP and the community;
- has arrangements been made for the institutional imbedding of the SEU interventions within the implementing agencies?
- are finances foreseen for implementing SEU activities on a long term basis.

11. No information is available on the results of occupational health programmes in Kanpur and Mirzapur.

Point of action: The lead consultant is requested to provide update information on the progress and performance of the occupational health programmes.

12. As a result of the project interventions the income position of scavengers and ragpickers can be endangered.

Point of action: the lead consultant is requested to provide information on the extent in which the employment situation of ragpickers and scavengers is being affected by the project. And if so, whether adequate measures have been provided to safeguard their income and employment situation.

13. It is expected that about 30% of the target group households can not have a private latrine for various financial and practical reasons. Public toilets alone can not answer the needs of these households.

Point of action: find out whether an alternative solution is to be provided in order to serve the whole target group with low cost sanitation facilities.

6. FINANCIAL ANALYSIS AND ISSUES

6.1 Introduction

The following financial analysis of the Kanpur, Mirzapur Project is mainly based on the following documents.

- Project Workplan 1990 onwards, January 1990 (quoted as Workplan).
- Financial analysis, part 1 and part 2, February 1990 (quoted as Analysis I and Analysis II) + comments on this analysis by Ir. B. Jansen, RIVM.
- Progress summary sheets in the 'Management Information System' of March, June and September 1990 (quoted as MIS, April, June or September).

Apart from these reports the 'Mid Term Evaluation Report' of July 1989 (quoted as Mid Term Evaluation) and some project descriptions were consulted.

In this financial chapter first of all a short general financial overview of the Kanpur/Mirzapur project as a whole will be given. Afterwards the different sub-projects as they are found in Analysis I and Analysis II and in the different MIS will be dealt with. Finally the relevant issues will be listed and points of action for the evaluation mission will be summarised.

6.2 General overview

6.2.1 Proposed investment; investment ceilings

According to the Workplan: "the Ganga Project Directorate is the nodal agency through which GOI funds are channelised for investments in the Ganga Action Plan Projects in Uttar Pradesh' (page 18).

The investment ceilings for Jajmau, Kanpur and Mirzapur were guided by the allocations for Ganga Action Plan schemes in UP and originally set at resp. Rs. 12 crores and 5 crores. After establishing the needs during the inception period and further detailing of the schemes, these ceilings were increased by GPD. Due to escalation in costs the ceilings again needed revision (Workplan, page 18).

In 1989 the lead consultant had already indicated that the proposed budgets would be too low and if budgets would not increase priorities would have to be set (Mid Term Review, page 26).

Summarising, the following successive **investment ceilings** can be mentioned:

	Jajmau, Kanpur	**Mirzapur**
Mid 1987; (start project)	Rs 12 crores	Rs 5 crores
July 1988	Rs 15 crores	Rs 9 crores
January 1990 (workplan)	Rs 22 crores	Rs 15 crores

These figures imply that the investment ceilings in Indian rupees have doubled in less than 3 years. The available documentation is not specific on whether this high increase in ceilings is primarily due to a more realistic cost calculations or rather to inflation.

Points of action:

- A more detailed objective investigation in the causes of the delays, the cost of the delays (interest, overhead cost, price increases, etc.) their possible consequences for the final investment level and its influence on the targets of the different sub-projects seems of utmost importance. When such an investigation has taken place it may be possible to formulate alternative calculation models for the economic sustainability of the different sub-projects. The interim mission should take steps that could lead to such an investigation.

- The lead consultant could make a new, realistic time planning of the project implementation including the consequences of the delays for the investment levels and the total investment planning. Consequently the financial analysis both for investment and a more specified analysis for O&M for the different sub-projects could be adapted or prepared. This issue is also reiterated in the RIVM Mission Report, January 1991 (page 14).

- The lead consultant together with the organisation or agency responsible for the O&M of the concerned sub-project could provide updated financial O&M-schemes for the sub-projects. Elements of such a detailed O&M scheme are as follows.
  For schemes for which the users pay a fee or holding tax:
  * the number of paying users (households, industries, etc.);
  * the applied unit price;
  * the effectiveness of the collection of fees or holding taxes;

  For all schemes:
  * the level of investment and the related annual depreciation;
  * the complete O&M scheme based on the components mentioned;
  * the agreement (or the state of negotiations) with the responsible authorities (State, GPD) to supplement the possible deficits of the scheme according to the guidelines formulated by the Review Panel Meeting of September 1990.

- The evaluation mission will have to pay special attention to the financial aspects of O&M of the sub-projects. O&M should be placed in the context of long term sustainability. Concrete proposals on this issue to the Review Panel could be considered.

6.3 Expansion and improvement of the water supply distribution system in Mirzapur

General observation: although the water-supply sub-projects represent less than 10% of the total investment volume for the whole Kanpur-Mirzapur project they get a disproportional attention in the Financial analysis. Volume I of the Analysis is completely devoted to the Water supply sub-projects.

Point of action: The question may be raised why the water supply sub-projects in Kanpur and Mirzapur have got a more intensive attention in the Financial Analysis than the other sub-projects, taking into consideration the restricted financial importance of these sub-projects. It is likely that the leading consultant could answer this question.

6.3.1 Investment

According to the project description (december 1988 volume I) the total amount of planned investment in the water-supply distribution system during the project period amounts to :

Phase I:	- Crash programme	: Lakhs Rs. 47.78
Phase II:	- Rehabilitation +	
	overhead tanks zones I-III	: - - 166.20
	contingencies, etc.	: - - 17.12
	Total phases I + II (1989 -91)	: Lakh Rs.231.10
Phase III (1995): (Phase III is not part of the present investment budget)		: Lakhs.Rs. 12.15

The figures, the items and the phasing of the different components are very different in the project description (page 41) and Analysis I (page 18) To give an example: an important budget item such as the overhead tanks is not found as a separate item in Analysis I. Further in the Workplan the most important item is rehabilitation which is not found and cannot be traced back in Analysis I.

These different basis for calculation partly explains the difference in amounts but not in all the cases. Analysis I calculates a total amount of investment of Lakhs Rs. 168. The Workplan mentions an amount of Lakhs Rs.75 Lakhs rs for the same period.

To conclude: three different investment amounts for Mirzapur are mentioned in three different documents:

- Project description December 1988: Lakhs Rs. 231
- Reviewed project description: unknown
- Workplan January 1990: Lakhs Rs. 75 (+ crash programmes) (Lakhs Rs. 50 ?)
- Financial analysis February 1990: Lakhs Rs. 168

The difference between these amounts is too big to be explained by a possible typing error but cannot be explained on the basis of the available information. In Analysis I (page 16) it is indicated that there are some changes in the phasing which may have been worked out in further detail in the version of January 1990 of the project description which has so far not been made available.

Point of action: The lead consultant could make available the most up-to date investment figures for the sub-project water supply in Mirzapur. Possible changes in priorities which could be one of the causes of the changes in budget figures should be explained.
N.B. The same observation can be made for other sub-projects.

According to the project description of December 1988 the **investment budget** for water supply in Mirzapur is (apart from the crash programme) globally divided in the following way:

- rehabilitation 60%
- new pipes 20%
- overhead tanks 12.5%
- road reinstatement 7.5%

This indicates that investment activities are primarily oriented to rehabilitation of the existing system and not so much to expansion.

Comparing the **budget items** in the project description of December 1988 with the financial analysis of February 1990 one can conclude that some budget items have been changed or lowered. No further information for the **reasons** of these changes are mentioned. They may have to do with the priority setting that was already mentioned in the midterm-review.

Conclusion: The information and documentation (so far available) is not sufficient to assess the cost-effectiveness of the proposed investment from the viewpoint of the choice of the technology mix or the expected output. The effect of changes in the budget (January 1990) on the cost-effectiveness cannot be determined.

Point of action: Alternative calculations of the cost of investment per potential household/user for different options (handpumps/public taps/ house connections could together with the expected O&M cost (see below) give more insight in the cost-effectiveness of the investment in the water supply system.The lead consultant is requested to make such calculations.

6.3.2 Economic Sustainability of water supply in Mirzapur

According to present policies in India water supply facilities are assumed to recover their O&M cost.

In order to assess the financial and economic sustainability of the Mirzapur water supply system four indicators seem useful:

a. the level of investment and the related annual depreciation;
b. the quantity of the water used and the related number of paying users (households, industries, etc.);
c. the related O&M cost;
d. the applied unit price of the water and the related revenue.

a. The **level of investment** has been discussed in the previous section. The related depreciation is included in the calculation of average incremental cost (see below).

b. The **quantity of water used** is based on estimates of the number of users and the average consumption/user for domestic use, public standposts and commercial use. Table 2 in Analysis I (page 21) indicates the cost of the water supply based on the cost of personnel, energy, etc.

The ultimate **number of paying users** in not so easy to estimate at this moment. In the December 1988 Design Report the following figures for (paying) house connections are given:

	1991	2001
zone I	2060	2501
zone II	3998	4479
zone III	2929	3440
zone IV	1475	2153
zone I-IV	10462	12573

Since **revenue** is supposed to be collected for the house connections they will have to form the financial basis for the O&M of the system.

Table 3 in Analysis I (page 23) elaborates the number of house connections and the related revenue more in detail. Starting from a number of household connections of about 7.000 in 1991 to 7800 in 2001 (which is 30% lower than the 1988 report supposed) a detailed computer-analysis is given of the different possible tariff-settings.(Analysis I pages 23 -30).

c. The **annual minimum O&M cost is calculated at 39 Lakhs Rs.**over a period of 30 years irrespective the level of water consumption.

d. Under the hypothesis of 7800 paying users in 2000 the **annual maximum revenue increases from 1991 to 2000 from approximately 20 to 22,5 Lakhs Rs.**

The **conclusion** is that -based on an average incremental cost calculation on investment/ reinvestment and O&M cost with a 10% discount rate and a water loss of 20% -the water tariff should be **Rs. 1.88/ cubic meter** (cum).

However, Mirzapur Nagar Palika is planning to fix tariffs at 1 Rs /cum for households and 3 Rs/cum for commerce, whereas the present household water tariff is Rs 0,22. Even if a discount rate of 0% would be applied the water tariff can be calculated at 1.34 Rs/cum.
Analysis I concludes in page 30 that financing of deficits will have to be arranged.

Reliability of assumptions on financial sustainability

The above presented financial analysis of the Mirzapur Water supply system is based on the following **assumptions:**

1. an increasing number of paying house connections (from 7.000 in 1991 to 7800 in 2001);
2. a fixed investment level;
3. no delays in implementation of the programme (delays may have a cost increasing effect);
4. a water loss of 20%;
5. efficient Operation & Maintenance.

Some questions can be raised:

ad.1 It seems questionable whether the originally planned number of house connections can be attained within the financial limits of the programme (see 5.3.1). Besides the number of paying users strongly depends on the quality of the services and therefore on the organisation and management of MNP; according to the JPS Report on Institutional Development and Training (December 1990) MNP is a weak organisation.

ad.2 A related question is whether the targets (even the reduced targets) can be achieved under the investment ceilings.

ad.3 The graph in the MIS Report of September 1990 indicates a serious delay in implementation which may have financial consequences.

ad.4 An estimated water loss of 20% appears optimistic.

ad.5 The MIS-report of September 1990 indicates that various aspects of the O&M activities of MNP is inefficient; (new pumps; chlorination); it appears that job- descriptions for various functions are not clear. The question may be raised whether -taking into consideration the administrative and managerial problems of MNP which are also highlighted in the JPS Report of December 1990 (pages 123 - 125) - the O&M-level is not estimated too low.

All these points lead to the conclusion that the assumptions for the financial analysis of the water supply system in Mirzapur are not or only partly reliable. This means that the economic sustainability which was already questionable in the proposals as they have been presented and in the financial analysis of the system is not guaranteed.

Points of action:

- The lead consultant is requested to review (together with MNP) the calculations of the economic sustainability of the Mirzapur Water Supply sub-project on the basis of the most realistic and up-to-date available assumptions.

- O&M of MNP should be a point of serious concern for the evaluation mission.

6.4 Expansion and improvement of water supply distribution system in Jajmau Kanpur

6.4.1 Investment

According to the project description (December 1988) the budget can be recapitulated as follows:

Phase I	: Lakhs Rs. 100.61
Phase II	: Lakhs Rs. 86.32
Phase III	: Lakhs Rs. 57.17
Contingencies, etc. (estimated)	: Lakhs Rs. 20.00
Total	**Lakhs Rs. 264.10**

According to Analysis I the total amount of planned investment in the water-supply distribution system during the project period amounts to Lakhs Rs. 190 which is less than the original estimate.

Distribution of the proposed investment in the project description of December '88, compared to Analysis I gives the following picture:

Budget item	Project Description December 1988	Analysis I February 1990
- Rehabilitation	20%	19%
- Tubewells	18%	15%
- Overhead tank	18%	22%
- Expansion network	21%	18%
- Handpumps/standposts	10%	12%
- Reinstatement roads	6%	5%
- Miscellaneous	7%	9%

This implies that a substantial part of the investment is for rehabilitation and improvement of the existing system. Roughly 40% of the investment was planned for expansion of the system. The cuts in the budget did not lead to a significant change in the investment priorities.

The available information and documentation is not sufficient to assess the cost-effectiveness of the proposed investment from the viewpoint of the choice of the technology mix or the expected output. The effect of changes in the budget (january 1990) on the cost-effectiveness cannot be determined.

Point of action: Alternative calculations of the cost of investment per potential household/user for different options (handpumps/public taps/ house connections could together with the expected O&M cost (see below) give more insight in the cost-effectiveness of the investment in the water supply system.The lead consultant is requested to make such calculations.

6.4.2 Economic sustainability of the water supply in Kanpur/Jajmau

N.B. In this calculation Jajmau is considered as an isolated project. However, Jajmau is part of the large city of Kanpur. O&M calculations for Jajmau should be considered from that perspective.

In order to assess the financial and economic sustainability of the Kanpur/Jajmau water supply system the same indicators as mentioned under Mirzapur have been used.

ad a. The **level of investment** is discussed in the previous section.

ad b. The **quantity of water used** is based on estimates of the number of users and the average consumption/user for domestic use, public standposts and commercial use. Table 2 in Analysis I (page 6) indicates the cost of the water supply based on the cost of personnel, energy, etc.

The **number of paying users** is estimated as follows:

	1991	2001
Zone I	2.993	5.857
Zone IA	196	405
Zone II	5.073	9.224
Zone III	1.744	3.270
Total	**10.006**	**18.706**

These figures imply that the number of house connections is expected nearly to double in the coming 10 years.

ad c. O&M cost is calculated at Lakhs Rs. 45 in 1991 and will increase to Lakhs Rs.60 in 2001.

d. In table 3 of Finan. I (page 8) the **water revenues** are calculated. The number of paying house connections are expected to be 8643 in 1991 and 16.540 in 2001. This implies that an average of 90% of the planned number of house connections is expected to pay regularly. The calculations are based on a water tariff of Rs. 1/cum for households and Rs. 3 for commercial establishment and a water loss in the system of 20%.

Consequently the water revenue is calculated to increase from about Lakhs Rs. 25 in 1991 to about Lakhs Rs. 100 in 2001.

Detailed calculations - similar to the calculations which were discussed in the previous paragraph for Mirzapur - indicate that an economic reliable water tariff of Rs 1,06/cum would lead to an economic break even for the water supply system in 1996 or 1997.

Reliability of assumptions on financial sustainability
The **five assumptions on sustainability** which were discussed for the Mirzapur Water Supply system are also valid for Jajmau (see paragraph 6.3.2).

According to Analysis II the prospects for financial sustainability in Kanpur look fair.

On the other hand the MIS Report of September 1990 talks about serious delays in the implementation of the Kanpur water supply programme. There is a delay of one year in the construction of the overhead tank. Expenditure (in investment) was in September 1990 lagging behind more than 55 Lakhs Rs.

The JPS Report of December 1990 observed some serious problems in relation to administration and financial management of KJS (JPS Report pages 166-168).

Conclusion: the economic sustainability for the water supply system in Kanpur seems to have better chances than in Mirzapur. However the possible consequences of the delays for the financial and economic sustainability of the water supply project in Kanpur will have to be a point of concern for the evaluation mission.

Point of action: The lead consultant is requested to review (together with KJS) the calculations of the economic sustainability of the Kanpur Water Supply sub-project on the basis of the most realistic and up-to-date available assumptions.

6.5 Sanitation and other schemes in Kanpur

Preliminary observation

Analysis II - entitled 'Sanitation schemes in Jajmau-Kanpur and Mirzapur' -covers broader fields than only 'sanitation schemes'. There is an important difference between Analysis I and Analysis II in the sense that Analysis I makes a financial analysis of the water supply distribution system especially related to **cost recovery at intermediate term.**
In Analysis II some cost recovery aspects are discussed for the sewerage systems.But cost recovery of the other investment items is not discussed at all.

6.5.1 Investment schemes in Kanpur/Jajmau

According to Analysis II the following investment items can be distinguished:

Investment item	1988/89	1990	1991	1992	Total amount (in Lakhs Rs)
- domestic sewer system	59	123	89	--	271
- sewer cleaning	17	11	--	--	28
- low cost sanitation	8	162	80	-	250
- solid waste management	10	50	4	--	64
- stormwater drainage	4	193	98	--	295
- industrial waste water	3	215	132	--	350
- 5 UASB-modules	69	25	225	--	319
- UASB plant	12	--	--	--	12
- chrome recovery	5	--	--	--	5
- health promotion	16	12	2		30
Summary investment items	203	791	630	--	1624
- water supply (discussed in Analysis I)					190
Total investment					**1814**

This total amount of planned investment is about 10% lower than the investment amount as it is presented in the Workplan. The differences between the planned investment level in the workplan on one hand and in the Financial Analysis on the other hand are not explained.

This general investment overview is not an adequate tool to assess the quality of the investment from the perspective of technology choices or from the viewpoint of cost-effectiveness. Even when comparing the levels of investment as they are presented here with the different project descriptions do not yet give the adequate input for such an assessment.

Point of action: Alternative calculations of the cost of investment per potential household/user for different options of sub-projects could together with the expected O&M cost (see below) give more insight in the cost-effectiveness of the investment in the different sub-projects. The lead consultant is requested to make such calculations.

6.5.2 Economic Sustainability (general)

Analysis II presents an overview of the calculated O&M cost for the different project activities in Kanpur-Jajmau (based on 1989-prices).

Summary of O&M Costs Jajmau Rs. 1989

Project year	1	2	3	4	Total
Calender year	1989	1990	1991	1992	
Expansion and improvement domestic sewerage system	552,000	604,000	813,000	902,000	2,889,000
Low cost sanitation		411,000	820,000	820,000	2,051,000
Solid waste management		3,450,000	6,900,000	6,900,000	17,250,000
Stormwater drainage improvement		10,000	225,000	346,000	581,000
Industrial waste water conveyance system		10,000	807,000	1,295,000	2,112,000
UASB treatment plant	p.m.	421,000	421,000	2,104,000	2,946,000
UASB tannery waste water pilot plant	p.m.	474,000	474,000	474,000	1,422,000
Chrome recovery plant	p.m.	245,000	245,000	245,000	735,000
Total	552,000	5,625,000	10,705,000	13,104,000	29,986,000

It is estimated that an additional 15% of O&M costs will be required for supervision, coordination and administration of projects.

According to Analysis II these amounts should be increased by 15% for supervision, coordination and adminstration.

Cost-recovery which should be the basis for a sound economic sustainability of the new or extended systems is not dealt with in much detail in Analysis II.

The current system of cost recovery for O&M in Kanpur for sewerage and other sanitation services is based on :

- **general taxes** directly related to services for sanitation and health based on the annual rental value (ARV) of premises and are revised every 5 years. No percentage is mentioned.

- **sewer taxes** levied at 4% of the ARV of the premises connected to the public sewer system.

- **water tax** levied at 14% of the ARV.

6.5.3 Sustainability of the domestic sewerage system in Kanpur/Jajmau

Kanpur Water and Sewerage Board (KJS) and the Kanpur Municipality (KNM) are the organisations responsible for the Operation & Maintenance of the sanitary facilities including domestic sewerage. Analysis II argues that the financial position of KJS is problematic.

Income of KJS is mainly depending on the **general taxes** levied on the basis of the annual rental values (ARV) of premises. Further there is **water tax** of 14% of the ARV. But if water consumption is metered a rebate is allowed on the water tax.

On the basis of the figures (table 2 of Analysis II) it is made clear that KJS has worked with deficits in the past. In paragraph 5.4.2 of the present document it has been mentioned that the water supply system as such may have (if a number of positive assumptions are fulfilled) a fair chance to function at break even.

However, KJS works financially as an **integrated institution** and the positive results of the water supply system are counterbalanced by the negative results of the sewage system.

Based on the incremental cost calculation the absolute minimum basic cost of collection and conveyance of 1 cum waste water (treatment not included) is calculated at Rs.0.81.(for calculation see page 46 of Analysis II). **Analysis II concludes** (page 48) **that on the basis of the surveys effectuated most of the households in Kanpur can afford the collection and sewage charges.**

This implies that under the **reliability assumptions** earlier mentioned (paragraph 5.3.2), except the in this case not relevant assumption on water loss) the integrated water supply and sewage system in Kanpur could function in a break even situation. However if one or some of these assumptions are not fulfilled the economic sustainability of the project needs to be reconsidered.

Points of action:

- The lead consultant could (together with KJS) prepare an integrated financial O&M scheme for the water supply and sewage system in Kanpur.

- In the Financial analysis no direct financial link is laid between the water tax discussed in this section and the system of metered water which was discussed in the preceding paragraphs. These systems cannot be dealt with in isolation; an increase of income of metered water will no doubt decrease the water tax revenue; this has as a consequence that a water charge surplus may be lower which may influence the possible coverage of deficits of the sewage system. This point should be borne in mind by the recalculation of the O&M schemes.

6.5.4 Industrial wastewater and UASB-treatment plants (inc. chrome recovery plant)

Sewage pumping stations and wastewater treatment plants - which are under construction -are not included in the preceding analysis. U.P. Jal Nigam will be directly responsible for the O&M of these project components.There O&M cost will be equally shared by the GPD and the UP Government. These cost components are not specified in Analysis II.

About 24% of the tanneries have contributed a share in the **investment cost** for the conveyance system and the UASB treatment plant (Report RIVM Mission, September 1990). U.P. Jal Nigam carries the responsibility.

Point of action: Detailed O&M scheme for industrial waste water and UASB-treatment plants could be worked out by the lead consultant together with UP Jal Nigam. The 'polluter payment principle' should be part if this scheme (see elements of this scheme in paragraph 5.2.4) since no concrete plans to implement the 'polluter payment principle' have been developed so far.

6.5.5 Stormwater drainage, low cost sanitation and solid waste management

KNM (public works) is the O&M agency for these three projects. The system of financing of O&M cost for these projects is not clearly explicated in Analysis II.

Point of action: Detailed O&M scheme for stormwater drainage, low cost sanitation and solid waste management could be worked out by the leading consultant together with KNM (see elements of this scheme in paragraph 5.2.4).

General conclusion on sustainability of projects in Kanpur

If the reliability assumptions earlier mentioned are fulfilled, that means if the investment cost will not increase too much due to delays and other circumstances, if the systems are well managed, if taxes and other fees are adequately collected and if the 'polluter pays', there seems to be a fair base for sustainability for most of the projects in Kanpur. However the sustainability base should be worked out more in detail.

Point of action: The O&M scheme in page 22/23 of the Workplan could further be worked out by the lead consultant together with the respective authorities responsible for O&M of the concerned sub-project.

6.6 Sanitation and other schemes Mirzapur

6.6.1 Investment

Analysis II gives the following investment scheme.

Summary Investment Costs, Mirzapur, Rs. 1989

Project year	1	2	3	4	5	Total
Calendar year	1988	1989	1990	1991	1992	
Wide meshed system core area			13,300,000	11,000,000	1,700,000	26,000,000
Interceptor sewer and pumping stations		1,200,000	20,000,000	5,400,000	400,000	27,000,000
Expansion & rehabilitation drainage system non-core area			9,100,000	5,000,000		14,100,000
Crash programme sewerage, stormwater drainage		2,000,000	1,000,000			3,000,000
Total sewerage system		**3,200,000**	**43,400,000**	**21,400,000**	**2,100,000**	**70,100,000**
UASB treatment plant			8,800,000	12,600,000	2,200,000	23,600,000
Low cost sanitation		1,000,000	13,800,000	10,700,000		25,500,000
Health promotion community participation aspects		800,000	1,000,000	1,200,000	200,000	3,200,000
Solid waste management		900,000	2,100,000	4,000,000		7,000,000
Grand Total		**4,300,000**	**69,700,000**	**50,900,000**	**4,500,000**	**129,400,000**

+ Water supply system as analyzed in Analysis I	? estimated	15,600,000
Estimated total investment (in Lakhs Rs.)		145,000,000

This total amount of investment is somewhat higher than the investment amount as it is presented in Workplan. The main difference is caused by the uncertain investment amount for the water supply system (see 3.1). The differences between the planned investment level in the workplan on one hand and in the Financial Analysis on the other hand are not explained. Differences for the specific items are too small to be significant.

This general investment overview is not an adequate tool to assess the quality of the investment from the perspective of technology choices or from the viewpoint of cost-effectiveness. Even when comparing the levels of investment as they are presented here with the different project descriptions do not yet give the adequate input for such an assessment.

Point of action: Alternative calculations of the cost of investment per potential household/user for different options of sub-projects could together with the expected O&M cost (see below) give more insight in the cost-effectiveness of the investment in the different sub-projects. The lead consultant is requested to make such calculations.

6.6.2 Economic Sustainability of Mirzapur schemes (general)

Analysis II presents an overview of O&M cost for the different project activities in Mirzapur.

Summary O&M Costs, Mirzapur, Rs. 1989

Project year	1	2	3	4	5
Calendar year	1988	1989	1990	1991	1992
Sewerage system			295,000	590,000	2,000,000
UASB treatment plant				400,000	1,679,000
Low cost sanitation public latrines		92,500	185,000	544,000	713,000
Solid waste management			1,200,000	4,000,000	9,500,000
Total		**92,500**	**1,680,000**	**5,534,000**	**13,892,000**

Cost-recovery which should be the basis for a sound economic sustainability of the new or extended systems is not dealt with in much detail. However in Analysis II it is observed that the municipality of Mirzapur depends heavily on government grants. Further it is observed that due to shortage of funds public services are inadequate.

In Mirzapur taxes on land and buildings are levied to meet the O&M cost of the domestic sewerage and sanitation system. In general a tax is levied at 10% of the ARV of premises with an ARV higher than Rs 90. The present ARV values are still based on 1967. (According to the JPS Report, 1962.) The reasons why they have not been re-assessed since are not very clear.

Point of action: The lead consultant could together with MNP Mirzapur investigate why the ARV-values have never been reassessed since 1967. A reassessment has to be considered before a review of the O&M calculations can take place.

6.6.3 Sustainability of the domestic sewerage system in Mirzapur

Chapter 2 of Analysis II dealing with financial aspects of sanitation in Mirzapur makes clear that the financial position of MNP is very weak. and heavily depends on government funds. The JPS Report of December 1990 affirms this analysis. Partly due to this shortage of funds sanitation services are inadequate and maintenance of the sewerage system is not executed properly (page 7).

Analysis II limits itself to a somewhat more detailed discussion on the sustainability of the domestic sewerage system.

As for the other sub-projects the method of the average incremental cost is used to calculate the cost of collection and conveyance of sewage in Mirzapur for the improved system. The calculation for Mirzapur shows a **base cost of Rs. 2.22 per cum!** (To compare in Kanpur this base cost is 0.81; in Mirzapur it is calculated to be **three times higher!**)

On the basis of the baseline household survey for Mirzapur of April 1988 Analysis II calculates (page 48) that **70% of the households in Mirzapur cannot afford full cost recovery charges for collection and conveyance of sewage.**

This means that for Mirzapur the conclusion has to be drawn that **the cost of O&M of the sewerage system can by no means be covered. Integration of O&M the Water Supply and Sewerage systems does not solve this problem (see 5.3.2)**

Points of action:

- The O&M and financial situation of the sewerage sub-project in Mirzapur should be a point of serious concern for the evaluation mission.

- The agreement with the responsible authority to supplement the possible deficits of the scheme according to the guidelines formulated by the Review Panel Meeting of September 1990 should be a point of discussion between MNP and the evaluation mission.

6.6.4 Other project-components

Observations for the other systems are generally similar to the observations made in paragraph 5.5.4 and 5.5.5. As in general the financial position of the Municipality and the public services in Mirzapur is worse than in Kanpur the sustainability and O&M of these systems and related problems need to get full attention.

Point of action: The O&M scheme in page 24 of the Workplan (related to UASB, low cost sanitation and solid waste management) could be further worked out by the leading consultant together with the respective authorities responsible for O&M of the concerned sub-project. The relevant observations in paragraph 5.5.4 and 5.5.5 have to be taken into consideration.

General conclusion for Mirzapur

The financial situation in Mirzapur appears to be very bad and none of the sub-projects may become economically self sustainable.

Point of action: The evaluation mission has to discuss the situation of the economic sustainability of the different sub-projects in Mirzapur according to the lines indicated above. The agreements (or negotiations) with the relevant authorities (State, GPA) should be included in these discussions.

6.7 Public Health and Community Participation

The Workplan mentions in both investment schedules for Kanpur and Mirzapur an amount of Lakhs Rs.30 for Public Health and Community Participation which is about 1.5% of the total budget for Kanpur and 2% for Mirzapur. The Financial Analysis does not pay any attention to the Public Health and Community activities.

The only source of financial information on these sub-projects seems to be the MIS Reports. The financial progress charts in the MIS Report of September 1990 make clear, that the expenditure in these sub-projects is developing quite well.

Mirzapur was till August 1990 on schedule but had some delay in expenditure in September.

Kanpur has a delay in expenditure of nearly 30%, but till September 1990 the expenditure seems progressing slowly.

So far the public health and community activities fully depend on financing by the project. This is a point of serious concern (information RIVM Mission Report, January 1991).

Point of action: The evaluation mission should discuss with all parties involved the financial sustainability of the public health and community activities after the project termination in 1992.

As no further financial information is available on indications for cost-effectiveness of the expenditure for these sub-projects can be developed.

Point of action: It is up to the evaluation mission to check whether the comparatively small budgets for public health and community participation are sufficient in relation to the set targets and whether it is likely that the expenditure pattern of the last few months can be maintained or will have to change. Further the evaluation mission could formulate criteria for cost-effectiveness for these sub-projects.

7. LIST OF ACTION POINTS

7.1 Questions for the lead consultant

The project is requested to provide additional information on the following subjects:

Industrial waste water conveyance system

1. Has a clear agreement been made between the tanners, UP Jal Nigam and KJS (including guaranteed personnel and budget allocations and control mechanisms) concerning the costs for construction and O&M of the industrial conveyance system.

Sewer scheme

2. Which measures have been taken to prevent the choking/silting of the recently cleaned sewers in Kanpur.

3. What are the causes for delay of the sewer laying programme in Mirzapur and have reliable contractors been found in this city.

Low cost sanitation

4. Has the project given follow-up to the recommendations of the joint evaluation mission of 1989 regarding the low cost sanitation scheme. In other words:
   * is the location of the latrines and leach pits still to be constructed, such that environmental pollution will be prevented and that removal of content of the leach pits can be guaranteed?
   * is the interlinkage between the availability of water supply and the LCS system sufficiently realized?
   * what are the financial and economic consequences of the recommendations of the joint evaluation mission?
   * which solution has been found to overcome the problem of the lacking superstructures.

5. Has an analysis been made of the reasons why some of the public toilets are not being used.

6. How will the part of the population (about 30%) without possibilities to install private latrines, be served with LCS facilities?

Solid waste management

7. What part of the costs of the solid waste management activities is to be borne by the population; what method is being followed to stimulate the active involvement of the population in the proposed disposal system and how will the taxes be collected.

8. What measures are to be taken to collect and dispose sludge originating from the various treatment plants.

9. Is information available on the extent to which the process of washing metal bearing slags in the Ganga causes pollution?

10. Is information available on the involvement of sweepers in the solid waste management scheme?

11. Have criteria been developed to evaluate (or to monitor) the effect of the solid waste management scheme?

Water supply

12. What measures have been taken with regard to:
    * definition of ownership of the house connections to ensure that KJS and MNP retain responsibility for the installation, repair and maintenance of the connection up to and including the water meter which is located adjacent to the consumers property boundary;
    * acquisition of land for construction works;
    * procedures with reference to legislation and tariff structures that will lead to a self financing system;
    * legal actions against illegal connections.

Financial economic issues

13. Can a financial analysis be presented which will show the interrelation between the budget items of the different sub-projects in an adequate and systematic way.

14. To what extent are the cost (investment) levels as presented in the Workplan and in Analysis I and II still valid at present (February 1991) with regard to the expectations for further cost-development and cost-effectiveness.

15. Has a new, realistic time planning of the project implementation been made, including the consequences of the delays for the total investment planning. And has a more specified and updated analysis for O&M for the different sub-projects been made. Elements of such a detailed O&M scheme are:
    - schemes for which the users pay a fee or holding tax:
        * the number of paying users (households, industries, etc.);
        * the applied unit price;
        * the effectiveness of the collection of fees or holding taxes;
    - for all schemes:
        * the level of investment and the related annual depreciation;
        * the complete O&M scheme;
    - the agreement (or the state of negotiations) with the responsible authorities (State, GPD) to supplement the possible deficits of the scheme according to the guidelines formulated by the Review Panel Meeting of September 1990.

Community participation and health related aspects

16. Is updated information available on the effective utilization of:
    - private latrines;
    - public toilets;
    - water pumps;
    - or involvement in solid waste management programme;
    - Public Health Care packets and delivery kits;
    - health education.

17. Is information available on the degree to which the aforementioned facilities are being used by the poorer sections of the community (or in other words do the poor have access to the facilities).

18. What is the project's strategy to develop activities to address gender related issues.

19. Why is it difficult to identify suitable NGOs in the project areas, do they not exist, are they not interested, and if so for what reasons?

20. How many mandals have been established, how do they function, how many men and women are represented in the mandals, have women been involved in crucial positions within the mandals?

21. Have arrangements been made for payment of community volunteers.

22. What are the results of the longitudinal diarrhoeal study.

23. Which indicators have been developed for impact measurements with regard to the effect of health education.

24. Have indicators been developed for the assessment of promotion activities and design of additional promotion materials.

25. How many trainees have been trained under the SEU activities. What arrangements have been made for the follow-up of training courses.

26. Is updated information available on the results of the skill training for women masons and have measures been developed to guarantee (if possible) the sustainability of this project component.

27. Is additional information available on the results of the occupational health programmes in Kanpur and Mirzapur? And more specifically, is information available on the results of the occupational health programmes in Kanpur and Mirzapur in terms of:
    * number of workers that are being reached (in both cities);
    * number of tanneries with improved working conditions;
    * effect of the occupational health programme on tanneries that were not reached by the project;
    * number of workers who are using the Employment State Insurance facilities;
    * functioning of the health councils;
    * perception of the workers with regard to the effect of project activities;
    * perception of the employers with regard to the effect of the project activities.

28. Has a priority ranking been made with regard to SEU activities.

29. Can information be provided on the cost-effectiveness of SEU activities.

30. Is information available on the effect of the project on the income position of ragpickers and scavengers?

31. Can recent information be provided on the tuning of different technical, institutional and social interventions and eventual priority ranking (i.e. information that is not available in the documents in The Netherlands).

23. Has a clear arrangement been made between the project team, KNM and MNP with regard to division of tasks and responsibilities. And have arrangements been made for the institutional imbedding of the SEU interventions within the implementing agencies.

7.2 Tasks for the interim mission

General

1. Discuss the draft TOR of the mid term evaluation with the Indian implementing agencies (GPD, UP State, UP Jal Nigam, KNM, KJS, MNP and the project team) and finalise the TOR.

2. Discuss the briefing documents with the agencies involved in the project (GPD, UP State, UP Jal Nigam, KNM, KJS, MNP and the project team).

3. Check the perception of the implementing Indian agencies concerning the project and make an analysis of the institutional interests of the agencies concerned.

Tanneries

4. Collect information on the progress of the financial economic study of the tanneries in order to check whether its results can be used by the evaluation mission.

5. Check whether an overview exist of the number of tanners who are practising pre-treatment. If such an overview does not exist the interim mission should decide how to collect the required information (e.g. during a field survey).

Operation and Maintenance

6. Check what agreements have been made between the GPD and the UP State Government concerning the costs of O&M for the next five years as well as for the period after that.

Water supply scheme

7. Check the need for a (re)assessment of water supply scheme in Mirzapur and in Kanpur from the technical as well as from the financial point of view.

Field survey

8. Discuss the need for a field survey. If necessary prepare and organise (as far as possible) a field survey.

7.3 Tasks for the evaluation mission [1]

Institutional

1. Make an assessment of the efficiency and effectiveness of the organizational structure of the project based on the analysis of the institutional interests and interactions between the parties involved in the project.

2. Make an assessment of the overall strategy of the project with regard to institutional strengthening.

3. Check whether the proposed institutional strengthening activities are linked up with the training needs as identified by the implementing agencies.

4. Make an assessment of the progress and the feasibility of the work plans (which are being developed by JPS) for training programmes for the different implementing agencies.

5. Make an assessment of the phasing out plan of the lead consultant about reduction of the (expatriate) technical assistance.

Waste water treatment

6. Assess the progress and financial consequences of the project activities regarding the post-treatment issue.

7. Check whether an agency to set up a UASB knowledge centre has been identified.

8. Look into the need for the development of a strategy for dissemination of technology on chrome recovery.

9. Assess the progress of the development of a procedural format and dialogue between tanners, UP Jal Nigam and UP Pollution Control Board with regard to the contribution of tanners to the construction and O&M of the industrial conveyance system.

Sewer programme

10. Make an assessment of the consequences of the delays in the sewer laying programme and the envisaged O&M problems in relation to the progress of the construction of the UASB treatment plant in Mirzapur.

Solid waste management

11. Make an assessment of the extent to which the current disposal systems for sludge (originating from the pre-treatment of the tannery waste, the UASB treatment plants, the chrome recovery plants and the aerobic treatment plant, which is to be constructed) will cause environmental problems.

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[1] The tasks for the evaluation mission as formulated in this list are to be considered as a further specification of the objectives as formulated in the draft TOR

12. Make an assessment of the technical and financial feasibility of eventual actions proposed by the project on systems for disposal of hazardous industrial waste (sludge).

13. Check whether the metal bearing slags (originating from the brassware industries in Mirzapur) are causing environmental problems.

Water supply

14. Check the effect of the delays in the implementation of the water supply schemes in Kanpur and Mirzapur for other project schemes.

Financial economic

15. Find out whether the investment costs as calculated in the Workplan and in the Financial Analysis for the different sub-projects is realistic.

16. Pay special attention to the financial aspects of O&M of the sub-projects. O&M should be placed in the context of long term financial sustainability. Concrete proposals on this issue to the Review Panel could be considered.

17. Discuss the agreements (or ongoing negotiations) about supplementing the deficits of the different schemes according to the guidelines formulated by the Review Panel Meeting of September 1990 with the responsible authorities.

18. Check whether the comparatively small budgets for public health and community participation are sufficient in relation to the set targets and whether it is likely that the expenditure patterns of the last few months can be maintained or will have to change.

Socio-economic

19. Formulate criteria for cost-effectiveness of public health and community participation sub-projects.

20. Make an assessment (as far as possible) of the impact of the SEU activities.

MATRIX
Consultants in
Development Management

INDO-DUTCH ENVIRONMENTAL AND SANITARY ENGINEERING PROJECT KANPUR/MIRZAPUR UNDER GANGA ACTION PLAN

BRIEFING DOCUMENT

PART II

LIST OF APPENDICES

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February 1991

UASB TREATMENT PLANT **APPENDIX I**

1. Investment schedules

Jajmau Kanpur:

-	UASB (5 mld)	65 lakhs Rs
-	UASB (pilot plant tannery)	12
-	Chrome recovery	5
-	UASB laboratory	4
-	Full scale plant	250
-	Post treatment	(investment amount to be quantified when type of post treatment has been selected)

Mirzapur:

-	UASB treatment plant (incl. post treatment)	220 lakhs Rs

(Source: Project Workplan, April 1990)

2. Programme

The UASB treatment technology as developed in the seventies, was originally used for the treatment of industrial waste water. More recently the technology has been used for treatment of domestic water. The project aims at demonstration and dissemination of the UASB technology in India. During the first phase of the project two pilot plants were constructed: a 5 mld pilot plant of the UASB treatment plant for domestic waste with a volume of approximately 1200 m3 and a 10 m3 UASB pilot plant for treatment of industrial waste mixed with domestic waste.

The 10 m3 UASB, located at the premises of Pioneer Tannery in Jajmau has the following aims:

- to assess the required dilution ratio of tannery waste water with domestic wastewater;
- to ensure sufficient treatment efficiency as well as a stable process operation;
- to assess the stability of the process towards fluctuations in waste water quality and quantity;
- to establish specific design criteria and operational guidelines.

The Ganga Action Plan envisaged the following standards for treated municipal sewage:

* Application on land for irrigation:
  BOD less than 50 mg/l;
  TSS less than 50 mg/l.

* Discharge into the river:
  BOD less than 30 mg/l;
  TSS less than 50 mg/l.

For industrial effluent the standards are prescribed in the Indian Standard Code 2940.

The 5 MLD volume, which is designed for treatment of domestic sewage has the following aims:

- to demonstrate the UASB process under Indian conditions;
- to optimize the design criteria for further extension of the UASB treatment system in Jajmau as well as in Mirzapur;
- to assess the treatment efficiencies;
- to set up O&M guidelines;
- to train plant personnel.

SEWER AND DRAINAGE PROGRAMME IN KANPUR APPENDIX II

1. Investment schedules

Kanpur: investment costs in lakhs of Rs

1.	Industrial waste water conveyance system for the northern belt, Jajmau	380
2.	Expansion of domestic sewerage system, Jajmau	335
3.	Stormwater drainage system improvement	295
4.	Sewer cleaning, Jajmau	25

2. Pre-project situation

At the start of the project hardly any information on the existing system such as location and status of the sewers was available. An extensive field survey during the inception period revealed the following:

The existing trunk sewerage system consist of 3 trunk sewers:
- one 90-inch trunk sewer, crossing the Jajmau area from west to east. This sewer transports sewage from the city drainage area of Kanpur to the Jajmau pumping station;
- one 24-inch trunk sewer, running from the south to north along the Bypass Road to Lucknow;
- one 18-inch trunk sewer, also running from the south to the north and laid west of the 24 inch trunk sewer.

About 70% of the systems is not operational. Maintenance has been neglected completely. People are reluctant to take house connections.

Approximately 13 km of sewers could not generate the required self cleansing velocities because they were laid under incorrect slopes. These stretches are liable to very frequent and rapid choking even after cleaning. Replacement of these sewers was therefore felt to be the only remedy and essential requirement for the good functioning of the entire system.

In the Northern belt of Jajmau, 151 tanneries are concentrated adjacent to the southern bank of the river Ganga. Untreated waste water is either discharged into the Ganga or without permission discharged into the 90" inch trunk sewer.

About 60% of the tanneries have made connections to the 90" trunk sewer directly. Other tanneries discharge their waste water randomly from their premises to the surrounding areas. This waste water flows through the residential areas on the streets, in stormwater drains, and eventually reaches the Ganges via the existing nalahs.

The UP State Pollution Control Board standard does not allow the discharge of waste water into a municipal sewer for waste water with BOD values of over 500 mg/l. The tannery waste water is of such a composition that this requirement can only be met by treating the effluent to sewer standards (i.e. BOD 350 mg/l, SS 600 mg/l). Through a judgement of the Supreme Court it has become obligatory for all tanners to construct pretreatment facilities. This implies that the tanneries have to construct a pretreatment collection pits for the various liquors.

The present quantity of tannery waste water is about 5.8 MLD which will increase in future to about 8.8 MLD. The domestic waste water generated in the northern belt from the clusters of houses interspersed between the tanneries is estimated to be low and mainly consists of sullage water. Laying a separate system for domestic waste water is therefore not feasible according to the project. The estimated domestic waste water quantity is 2.7 mld (Mid term Status report:53, 1989).

3. Programme

3.1 Industrial wastewater conveyance system

An industrial sewerage system is designed to which all tanneries should be connected. The proposed system is designed to stop the direct discharge of waste water in the Ganga, to improve the general sanitation situation in the area, and to relieve the 90" trunk sewer of the tannery waste water load.

It is emphasized by the project that each tannery should have a collection sump, with a pump in order to pump the effluent to the industrial sewer. The effluent needs to be passed through a semi-circular type stainless steel screen 2 to 3 mm dia. perforations and rotary brushes to remove hair fleshings and heavy suspended particles to avoid frequent clogging of the fixed screen and overflowing of effluent. The fixed screen should be part of the industrial sewerage scheme and should be sealed.

A separate industrial sewerage system has been designed which transports the tannery waste water to the full scale UASB treatment plant, where it is to be mixed with domestic waste.

As far as possible it has been avoided to intercept stormwater by the industrial sewerage system. A separate stormwater system has been designed and planned for that purpose. However stormwater from the tannery premises will inevitably come into the industrial sewer system (MTS report, 1989).

The waste water system conveyance system for the northern belt in Kanpur has four major components, which are undertaken simultaneously (except for the installation of pumping equipment):

A. Tannery connections and channels to convey the waste water up to the pumping stations. The total length of the channels to be constructed is 10.499 km.
B. Construction of the (4) pumping stations.
C. Installation of pumping equipment.
D. Rising mains carrying the waste water to the UASB treatment plant. Total length is 1577 m (or 4200 m workplan not clear).

The system consists of shallow channels under gravity bringing tannery waste water to the 4 pumping stations and conveying the same to a common effluent treatment plant. The choice of channels with removable top covers (for cleaning purposes) as against pipe sewers, was based on the practical approach of maintainability.

The cost sharing pattern for the common conveyance system and effluent treatment plant as agreed in the 18th Meeting of the Steering Committee is that, 65% of the capital cost of the total scheme will be funded by the Central Government while the remaining 35% will be borne by UP Government and tanners.

3.2 Stormwater drainage system

The stormwater drainage system consists of 4 outfall nalahs, which have sufficient capacity to drain their catchment areas. It was observed during the inventory that most of the stormwater drainage enters the sewerage system through gully pits of which there are about 5000 constructed in Jajmau.

The overall plan for stormwater drainage in Jajmau takes into account the segregation of the stormwater drainage in jajmau system from the sewerage system. The components of the proposed of stormwater drainage comprise the following:

- Lining of downstream part of Bengali Ghat nalah where it crosses a densely populated area.
- Extension of bengali Ghat nalah to the south.
- Lining of the nalah through the densely populated area of Chabila Purwa.
- Construction of new stormwater drains in Ompurwa and Tiwaripur where frequent flooding occurs.
- Construction of a new drain along the Bye Pass Road to prevent flooding in a number of undrained areas along this road.
- Cleaning and repair of all existing main drains.
  (MTS report 1989)

The rate of construction of stormwater drains is envisaged to be 5m/day for the bigger sections and 10/day for the smaller sections. The total length of new drains to be constructed is about 5 km.

3.3 Domestic sewer programme

The following activities are to be undertaken:

- Replacement of approximately 13 km of existing mainly smaller diameter sewer lines which have incorrect slopes.

- Total length of sewers to be laid is about 21 km. out of this 3-5 km is main sewer line of diameter equal to 350 mm or more and the remaining 17.5 km is branch sewer of less than 350 mm dia.

- About 1650 m length of sewer will be laid departmentally.

- Rate of sewer laying per day for the branch sewer is assumed as 23m. Rate of sewer laying per day for the main lines (350 to 600mm dia.) is assumed as 8m. In the congested areas the rate of sewer laying has been lowered due to traffic and other congestions. The work will be divided into two contracts. The first contract is for about 14592m of sewer lines and the second contract is for about 6500m. Those sewer lines which can only be laid after the completion of the sewer cleaning programme are included in the second contract.

- The work is planned to be executed at three places simultaneously.

- cleaning of approximately 69 km sewers from which about 1350 cu. m. of silt is to be removed

- Cleaning of 9 km of trunk sewers with a silt quantity to be removed of 2900 cu. m.
- Purchase of 4 bucket cleaning machines.
- Repair of manholes.

1. Investment schedule

1.	crash programme sewerage and stormwater drainage	30
2.	interceptor sewer and pumping stations	270
3.	wide meshed system in core areas	260
4.	Expansion of drainage system in non-core area	150

2. Pre-project situation

The project area of Mirzapur can be divided into four main drainage zones, the core area, the civil lines zone, east zone and west zone. The core area has a combined sewerage and stormwater drainage system which has five main outfalls to the river. The civil lines zones has two outfalls to the river Ganga. The east zone of Mirzapur does not have a drainage network and the west zone has some rudiments of a drainage system. The existing system has been in use as a combined system for quite some time. It was originally designed for storm and sullage water only. Most of the roads have open drains on the sides. People even dispose the night soil directly into these drains which causes nuisance and unhygienic conditions. Although the present system is quite adequate as far as stormwater is concerned, its efficiency could be enhanced by a better maintenance. Drains gradually silt up, as solid waste slips into them. Furthermore, both flow and maintenance are regularly obstructed by encroachments, platforms etc., which are often illegally built.

In general the construction of the trunk is such that they can be used in the future sewerage system. Sufficient flow capacity will be available after cleaning. The condition of the covered main nalahs is worse. Siltation levels up to 100% have been observed. The sandstone cover slabs have large irregular joints causing erosion of the upper layers which result in silting of the nalahs. The cross-section of these nalahs varies from 0.2 to 1.0 sq. m. whereas the total length is about 6500 m.

Water logging was found to occur in about 20 to 30 % of the road drains under dry weather conditions. On the other hand the capacity of the road drains is sufficient to cope with the stormwater flow.

3. Programme

For Mirzapur the design of a combined wide meshed system was chosen for technical as well as budgetary reasons. The wide meshed system will be easier to maintain and the distance over which the waste water will flow through the open road drains will be reduced, resulting in improvement of the hygienic conditions. Furthermore only sullage water will be discharged in the road drains.

A masterplan has been designed which gives the long term overall view for the sewerage and stormwater drainage system in Mirzapur. The plan has been divided into three parts, viz. the interceptor sewer and pumping stations, the wide-meshed system in the core area and the expansion of the drainage system in the non-core area. It is envisaged to intercept the nalah system and convey the sewage to a site for treatment outside the built-up area. This conveyance can only be achieved by the use of pumping stations which will be kept to a minimum in view of the need to minimize requirements for O&M.

The total length of various pipes to be laid is 3316 m and the length of the rising mains to be laid is 2383 m.

Furthermore other connected works like construction of manholes etc, are to be undertaken. A crash programme was identified in an early stage of the project, which was sanctioned in March 1988. This crash programme contained the following components.

1. construction of manholes at regular distances;
2. local repairs and/or upgrading of existing structures in the nalahs;
3. procurement of cleaning and safety equipment for mechanical and manual sewer cleaning, also including facilities for transportation and disposal of extracting silt;
4. cleaning of those nalahs which will continue to operate as trunk sewers;
5. cleaning of parts of the system of covered nalahs;
6. procurement of equipment for solid waste collection and disposal;
7. implementation of a comprehensive integrated program of activities including low cost sanitation, sewerage, upgrading of road drains and solid waste for two pilot areas. the proposed areas have been identified in the in-depth studies by the socio-economic surveys.

1. Investment schedule

Kanpur: 310 lakhs
Mirzapur: 255 Rs Lakhs

2. Pre-project situation

Kanpur
The estimated status of sanitation in Jajmau based on a survey in 16 Sample areas carried out by the project during the inception phase is as follows:

Total number of households:	20445 =	100%
No of households with latr. conn. to pits/tanks		6.1%
No. households with latr. conn. to sewerS		35.6%
No. households with dry/bucket latrines		13.3%
No. households without latrines		45%

Mirzapur
The estimated status of sanitation in Mirzapur based on a survey in 14 sample areas covering 1745 households is as follows:

Total number of households:18079=	100%
No. of households with latrine connection to pits/drains[1]=	19%
No. of households with dry bucket latrines=	34%
No. of households without latrines=	47%

(Source: Mid Term Status Report)

3. Programme

3.1 Kanpur

The objective of the Low Cost Sanitation (LCS) programme is to serve 90 to 100% of the project area with the provision of low cost private pour flush latrines, either by the construction of new latrines, either by the conversion of unhygienic dry bucket latrines into pour flush latrines. Depending on the presence of sewers, these latrines will either be connected to leaching pits or to a sewer. For people who can not afford a private latrine community toilet complexes will be provided.

The private latrines will be mainly of the on-site type, i.e. connected to a leach pit. Only when hygienically possible the private latrines will be connected directly to a covered nalah or a sewer (off-site disposal). The private latrines with off-site sanitation will be taken up after sufficient sewers have been laid in those areas.

[1]of these 95% discharge effluent directly to open road side drains

In Kanpur the number of public latrine complexes to be constructed is 12, whereas the number of latrines with on-site sanitation to be converted or to be newly constructed is 3500 (with an expected rate of 8 per day in 435 days = 17 months). The number of private latrines with connection to sewer to be converted/constructed is 7000 (estimated progress 12/day = 5823 say 23 months) (workplan april 1990).

The responsible agency for the execution of the programme as well as for the O&M of the sanitation programme is Kanpur Nagar Mahapalika.

3.2 Mirzapur

In Mirzapur the number of public latrines to be constructed is 5 and the number of latrines with on-site sanitation to be converted or to be newly constructed : 3750 (based on a rate of 15 per day in 270 days = 12 months).

Number of private latrines with connection to sewer to be converted/constructed is 2500 (15/day = 167 say 7 months)

A certain number of latrines were taken up under the crash programme.

The responsible agency for the execution of the sanitation programme is UP Jal Nigam, whereas Mirzapur Nagar Palika is responsible for the O&M.

4. Performance

4.1 Kanpur

In September out of 12 sanctioned public toilets, 4 had been completed while 5 are under construction. Out of the 2 observed public latrines one is functioning well, while the other one is dirty, not being used and without caretaker (RIVM).

In July 1990, 600 latrines had been completed. Updated data on the number of completed private latrines are not available. Consultants and counterparts are convinced that Sulabh, the contractor for the construction of latrines is performing below standards, as a result of which the progress of the work is delayed. Other contractors are attracted for the remaining construction works, amongst whom the female mason society.

Based on a survey of Sulabh, the contractor for the LCS programme, it was originally planned to construct 11235 private latrines. However, new figures from a different source (KJS) indicate that it is only feasible to construct 3887 latrines of which 2611 off-site and 1264 on-site). At a unit-rate of Rs 1900/latrine this would require an investment of Lakh 74.5 thus leaving a balance of approximately 1.5 compared to the present sanctioned amount. The figures are to be checked again by KJS and UPJN (RIVM/September 1990).

4.2 Mirzapur

The progress of the programme is slow. In September 1990 none of the public latrines had been completed, and 1775 on-site private latrines were completed against the 3660 envisaged. The construction of off-site latrines can only be taken up after completion of the sewer laying. The original list of potential beneficiaries, submitted by Sulabh (10.400 facilities) has been replaced, due to insufficient quality by a UPJN list (7350 facilities, 4200 on site and 3150 off site facilities).

SOLID WASTE MANAGEMENT APPENDIX V

1. Investment schedule

Kanpur: Rs lakhs 65
Mirzapur: Rs lakhs 70
(workplan 1989)

2. Pre-project situation

Kanpur

Jajmau can be seen as the forgotten part of Kanpur city with regard to solid waste collection and disposal. In most areas domestic waste litters all over for a long time before efforts are made to collect or dispose it. Domestic solid waste is usually thrown on the street, from where it is collected by road sweepers. The collected solid waste is mainly disposed of at two controlled dump sites. Furthermore many other places are being used for this purpose. Sweepers deployed by the municipality do not attend to their duties regularly (often because of salary problems), as a result of which private sweepers are deployed in more developed areas in Kanpur.

In the industrial area the whole belt is strewn by wood bark for drying skins. Although most of the solid wastes generated in the tanneries are utilized in some form of the other, they still cause serious environmental pollution. The fleshings cause foul smell and attract all sorts of insects and vultures or other birds. Especially during the rainy season the problem becomes severe, as the drying rate is very slow. Other problems observed are the leaching of tanning, rodent problems and pollution of the soil.

In order to give an indication of the scale of operating the following data can be mentioned: In Jajmau 50 (of the 150) tanneries process about 100 tonnes of cow and buffalo hides per day, adopting vegetable tanning using barks and nuts. For this process 100-150 tonnes of barks and 40 to 60 tonnes of myrobalan nuts are used. The major part of the dusted/waste salt, which is about 6 to 10 tonnes per day goes into the drain (for more characteristics of the tanneries waste see Mid Term Status Report, chapter 8) .

The legislation has obliged the tanneries to construct pre-treatment systems before discharging their waste into the sewer system. Since the pre-treatment units, consisting of tanks and sludge beds, have been constructed recently, their ultimate efficiency has yet to be assessed. However, when properly operated and maintained they will generate large amounts of sludge. A suitable solution for the transportation and the development of a disposal system for this sludge has yet to be found.

Mirzapur

Out of about 134.000 inhabitants about 82.000 are served with daily solid waste collection (61%). The area in which solid waste collection is daily collected covers about 300 ha, while the total populated area covers about 1200 ha. In the area 225 sweepers are deployed equipped with 1200 handcarts. 105 sweepers are working in actual sweeping, while the other 120 sweepers are collecting waste in handcarts. Waste is usually disposed indiscriminately by the inhabitants, thus leaving the responsibility of removal to the municipality and the stray animals.

People showed some awareness about certain health risks involved in the improper handling of solid waste, according to the baseline surveys. Five places are used as disposal sites for solid waste. At the three sites on the bank of the river the waste is simply tipped over the bank into the river.

The main part of the solid waste is domestic; about 67 tonnes/day. Furthermore approximately 6 tonnes of industrial waste are being produced and 6,5 tonnes consisting of animal corpses or slaughterhouse waste (MTS report:100, 1989 based on data of 1987).

3. Programme

The solid waste management programme is described in Chapter 4.

REHABILITATION AND AUGMENTATION OF WATER SUPPLY SYSTEM

APPENDIX VI

1. Investment schedule

Workplan:	Jajmau Kanpur:	210 lakhs
	Mirzapur:	75 lakhs

2. Pre-project situation

2.1 General

The water supply systems in both cities are far from satisfactory. Drinking water is being supplied intermittently, under low pressures, and is bacteriologically contaminated. Some parts of the distribution network are relatively new but the records of existing pipelines and the registration of connections were totally inadequate.

2.2 Kanpur

Baseline surveys carried out by the project revealed the following: In Jajmau, Kanpur the amount of leakage and waste i.e. the amount that is pumped into the system but not used by the consumers is around 40%. Naturally this results in very unhygienic and insanitary conditions.

The existing water supply of Jajmau is primarily based upon a number of deep tubewells which deliver water to two overhead tanks from which water is distributed to consumers via pipe network systems.

A total of 47% of the population has private house connections from the piped water system, 10% depends on public taps, the rest of the population uses private handpumps, whereas the public handpumps are few in number.
The piped water supply is intermittent, for about 4 hours in the morning and 4 hours in the evening.

Field surveys and other water analysis indicate that dug wells and shallow wells are highly polluted through domestic sewage and industrial waste water but the deeper aquifer at 40/50 m depth, tapped by handpumps and still deeper aquifer at 300/400 m depth tapped by deep tubewells are still safe and yield potable water.

Wastage and unhygienic conditions have been noticed at existing public standposts, and complaints were heard about bad taste, smell, shortage of water as well as irregularity and low pressures. In general people were satisfied about the handpump supply. Chlorination is carried out in a poor manner (not properly mixed and it is doubtful if sufficient chlorine is added). The overall per capita piped water production in the total 6E zone is 60-79 lpcd which is too low according to Indian standards. The practice of allowing householders to construct their own private connections has lead to excessive losses due to poor workmanship and the wide spread use of "tullu" pumps depressurizes the system.

In general the north 5E zone has a higher developed standard of living in comparison with the 6E zone population. Therefore the latter will get priority. Tanneries rely on their own water supply systems.

2.3 Mirzapur

A baseline survey, carried out in 1987 revealed the following. The amount of leakage and waste i.e. the amount that is pumped into the system but does not reach the consumers is for Mirzapur around 70%. The water supply is below acceptable standards. 57% of the people depend on private water supply e.g. hand dug wells and handpumps as against 43% depending on public water supply. The pressure is very low at the taps and the leakages in the network are so extensive that installation of "tullu" pumps has become a common feature in Mirzapur. Power cuts hamper piped supply and shortage of water as well as irregular supply are common features.

Complaints have been heard about the taste of water from public taps, but in general people are satisfied about the water of the public taps. Unhygienic conditions have been observed in the distribution area and many standposts lack standpipes. Levels of nitrate suggest pollution of the groundwater.

Nagar Palika, the responsible agency for O&M has lost control over the system and lacks the resources, and legal and political backing required to rectify the situation.

3. Programme

3.1 Water supply system of Kanpur

The proposed improvement/extension of the water supply system of Kanpur consists of the following components:

- rehabilitation of the existing distribution network and house connections and extension of the network;
- expansion of the existing production facilities;
- expansion of the water supply system; distribution, production and storage.

To realise this proposed system the following infrastructural works are required:

1. Laying of Tubewell/construction of pumping stations.
2. Construction of overhead tank.
3. Laying of rising mains.
4. Distribution mains.

Apart from the overall water supply programme a crash programme was identified in 1988 which envisaged the construction of an overhead tank and the construction of tubewells to be connected to the overhead tank (rising mains). For operational reasons Kanpur is divided in a number of zones which are due to get water supply systems that are interconnected but could -if necessary- function autonomously.

The targets to be reached are the following:

	1991				2001			
	population	number house con.	% people house con.	% people publ. taps	population	number house con.	% people house con.	% people pub. tap
Zone I	54.352	2.993	37%	63%	66.110	5.857	59%	41%
Zone IA	5.244	196	25%	75%	5.385	405	50%	50%
Zone II	45.090	5.073	75%	25%	76.867	9.224	80%	20%
Zone III	15.000	1.744	75%	25%	27.250	3.270	80%	20%
Total	120.186	10.006	56%	44%	175.612	18.706	70%	30%

The number of planned publics taps is 120.

From January 1990 onwards the following activities were scheduled:
In zone III a total of 10785 m of pipes (big small diameter) was to be laid and 124 valves of varying sizes were to be installed. Furthermore with regard to the leak detection/rehabilitation and mapping a total number of 3384 house connections were to be taken up. In Zone II a total number of 168 valves were planned to be installed and with regard to the leak detection and rehabilitation programme 4582 house connections were to be taken up.

In order to improve the existing situation rehabilitation of the system has top priority. "Wherever necessary augmentation of the systems will be taken up simultaneously. Based on the urban characteristics like type of houses, and income patterns, piped water supply through house connections is not considered a feasible option for everyone. There will remain certain pockets where drinking water will be supplied through communal standposts. In those areas a sewerage system is not considered for reasons of lack of sufficient water for flushing of the sewers. However, to improve the sanitary conditions in these areas too, pour flush latrines connected to leach pits are planned" (workplan 1990:7).

3.2 Water supply system Mirzapur

The proposed improvements in the water supply system can be divided in the following components:
- rehabilitation of the existing distribution network;
- rehabilitation of the existing production facilities (under the crash programme);
- expansion of the water supply system, distribution and storage.

To realise the proposed system first of all a crash programme, which forms an integral part of the water supply system needs to be implemented. This crash programme consists of the following elements:
- rehabilitation of 170 public standposts;
- establishment of water supply zones (zones I - IV);
- regeneration of 12 tubewells;
- provision of chlorinator units for 12 tubewells;
- construction of four rising mains to connect tubewells with overhead tanks;
- construction of an overhead tank (in zone III) with a capacity of 2250 cu.m and a staging of 19 meters above ground level;
- a leak detection survey, which resulted in the rehabilitation programme.

In order to meet immediate needs and to increase the confidence of the people in the project the crash programme was proposed in 1987 to start with the installation of approximately 200 India mark II handpumps in the whole municipal area of Mirzapur.

Apart from the crash-programme the following elements of the Mirzapur water supply programme can be mentioned.

- Rehabilitation of the existing water supply network including:
  * replacement of about 30% of the service connections;
  * improvement of all connections of service mains with the distribution pipes;
  * installation of water meters for all unmetered house connections and repair of existing water meters;
  * installation of 434 sluice valves of various diameters.

- Source development including the choice between river water, ground water and the Tanda reservoir.

- Further expansion of the distribution system, including service connections, house connections and public standposts.

The following targets for the water supply programme were set:

	1991				2001			
	population	number house con.	% people house con.	% people publ. taps	population	number house con.	% people house con.	% people pub. tap
Zone I	28.000	2.060	49%	35%	37.000	2.501	49%	35%
Zone II	36.000	3.998	74%	18%	38.500	4.479	78%	17%
Zone III	32.000	2.929	61%	19%	36.500	3.440	63%	16%
Zone IV	26.000	1.475	38%	25%	34.000	3.153	42%	19%
Total	122.000	10.006			141.000	12.573		

The activities realised so far related to the crash programme include the regeneration of 12 tubewells which was realized in 1988 till December 1988. Further twelve are installed, of which 3 are V.T. pumps and 6 submersible pumps.

Furthermore the renovation of the pumphouse and chlorinator rooms and the construction of chlorinator rooms were completed and the installation of differential pressure type chlorinators was also done at each tubewell.

Works related to the construction of the overhead tank are progressing. Most of the concrete columns have been completed.

ACTIVITIES OF THE SOCIO-ECONOMIC UNIT APPENDIX VII

In this appendix some background information is provided about the socio-economic situation in both project area. Thereafter the set-up of the Socio-Economic Unit (SEU) is described and finally an overview is given of the main project activities of the SEU.

1. Some socio-economic data

During the inception phase several community and baseline surveys were carried out to collect data on the existing sanitary facilities and behaviour, gender specific information and the financial situation of households etc. These data were used for the design of the implementation of the project. The main findings of the aforementioned studies are presented below.

1.1 Kanpur

In Jajmau, Kanpur the monthly average income is Rs. 1143. The Government of India has defined the poverty line in terms of the annual income of a family. A family having an annual income of Rs. 6400,- or less is considered to be a family below the poverty line, whereas families with an annual income level up to Rs 3500,- are categorised as the poorest of the poor. Of the households in Jajmau about 27% lives under the poverty line, while about 4% belongs to the poorest of the poor. The lowest average income is found in the slums in the industrial belt. The average households size is 5. This number is influenced by single headed households.

The health infrastructure is poor; there is only one government run Ayurvedic health centre, which is not equipped with proper medicines and one mother and child care health centre. The Employees State Insurance (ESI) hospital in Jajmau, where regular employees of tanneries receive health care, is out of operation: it lacks staff, equipment and medicines. The majority of the population seeks medical aid from private practitioners, who are often under-qualified.

The baseline survey as carried by the project revealed the priority setting of the population of the three major problems: drinking water, choked drains and sewerage and roads.

1.2 Mirzapur

In Mirzapur about 48% of the population lives below the poverty line or just above it, whereas 18% of the population can be considered as the poorest of the poor. The average household size is 6,6.

The health infrastructure is poor, Mirzapur district has an extensive set up of community health services, but it is confined to rural areas only. Mirzapur is equipped with a district hospital, a separate female hospital with maternity centre, a district Ayurvedic hospital and one T.B. clinic. These facilities exist in the core part of the town.

During the baseline survey in Mirzapur of April 1988 improvement of the water supply was mentioned by 77% of the households as one of the priorities, followed by cleaning of drains (51%), solid waste disposal (41%) and sanitation.

2. Set-up of the socio-economic unit

The sociological unit contains three components: community participation (including women affairs and extension), occupational health and public health.

2.1 Executing agencies

The executing agencies for the Detailed Project Reports (DPR's) are the municipalities of Kanpur (Kanpur Nagar Palika) and Mirzapur (Mirzapur Nagar Palika).

The executing agency in Kanpur (KNM) had a separate cell for community activities; the Urban Community Development Project, whereas in Mirzapur such a cell does not exist.

2.2 Programme management group

In Kanpur a Programme Management Group (PMG) was established to monitor the programme. The PMG is chaired by a senior representative of KNM and comprises the Chief Medical Officer (CMO) of KNM, the project officer of the Urban Community Development Project (UCD) at KNM, the officer in charge of the sanitation department of Social and Preventive Medicine of Kanpur Medical College and the Coordinator the SEU of the project. The occupational health expert of the project represents the project on occupational health aspects. The CMO of KNM is directly responsible for the health related aspects, including the occupational health programme. The sanitation department has responsibility for the skill training programme while community participation aspects is under the UCD project officer.

The UCD Project of KNM has attached two community workers to the occupational health programme and three workers for the community participation and health related programme as spelled out under the DPR's.

In Mirzapur a similar set-up is followed. The PMG is chaired by the executive officer of Mirzapur Nagar Palika and comprises the health officer of MNP, a representative from the Department of Preventive and Social Medicine, Benares Hindu University and the coordinator of the SEU of the project. Under the Detailed Project Report, MNP has attached one community worker to the occupational health programme and three community workers to the other programme aspects (Mid Term Status Report).

The authority of the Product Management Groups seems to be related to an advisory and coordinating role. No clear descriptions have been found in the documents about division of responsibilities and tasks of the different agents involved such as the PMG, municipal community workers, project staff and the so-called change agents.

2.3 Project team

A small project team provides support to the concerned municipalities that execute community participation and public health programmes. It consists of one coordinator, who functions as a binding and guiding force between the SEU set-ups at Kanpur and Mirzapur, one community development expert and specialist women's affairs for Kanpur and Mirzapur each and an occupational health expert. The latter provides support to the health related aspects as well. The project team concentrates its activities on development and design of the different programmes aspects and monitoring of its accomplishment.

2.4 External advisors

Support from different institutes from the Netherlands is provided by the Royal Tropical Institute (occupational health aspects) and the University of Amsterdam (advises on women's aspects). Other resource organizations are the medical institutes, Kanpur Medical College, SPM dept for Kanpur and Benares Hindu university and the Auxiliary Nurse midwife Training centre (ANMTC). At community level they collaborate with local NGOs. Together with Unicef an extensive collaboration is established on development of urban and slum specific promotion materials.

3. Objectives

The primary objective of the SEU activities is to stimulate participation, active involvement in decisons making processes, maintenance of facilities and support to the project's technical interventions from the local community to achieve sustainable improvement of the living conditions.

The workplan of the SEU covers four components, which will be described below:
1. support to technical interventions;
2. health related aspects;
3. occupational health programme;
4. skill training programme for women.

4. Programme

4.1 Support to technical interventions

The project has categorized the support of technical interventions as follows: implementation support, institutional development, establishment of community level organizations (mandals) and programme support communication.

4.1.1 Implementation support

Implementation support covers community participation and health promotion related to sanitary interventions (water supply, sanitation and solid waste). Implementation support has mainly been directed towards the water supply so far.

Water supply
The aim is to establish a cost-effective O&M system based on community involvement, improved water allocation and storage practices, training of handpump caretakers, establishment of a complaint system, on-the-job training of handpump mechanics and promotion activities.

Handpump caretakers (one male and one female for each handpump) have been enroled from the local communities where the pumps have been installed. The number of handpumps installed are 257 in Mirzapur and 200 in Jajmau (Institutional development and training phase 1, JPS Associates december 1990). In addition to the CP activities the local agencies have the responsibility for the institutional support and the provision of spare parts and other consumables, responding to calls for help from hand pump caretakers and the O&M of water quality testing laboratories.

Comment: In the project documents it is stated that during the project cycle the community involvement in the water supply system has undergone an evolution in the sense that community representatives are increasingly involved in quality control aspects during installation, choice for the location of pumps and that the training programmes have been adopted based on the experiences and complaints systems. However, in the RIVM Mission Report of January 1991, it is stated that the enthusiasm of the local population to attend meetings in Mirzapur is diminishing.

4.1.2 Institutional Development

The Institutional building component within the Socio-Economic Unit aims at strengthening of the role of the municipalities in promoting hygiene and water and sanitation practices during and after implementation.

A workshop on community development and environmental health, organized in june 1989 concluded that more emphasis had to be given to institutional strengthening of the programme at municipal level. This resulted into the decision to establish a community development cells in each municipality, which is to serve as the operational base for the municipal community workers. The community development cells, which are presently housed on a temporary basis, have become the focal points for all community oriented activities and for the various categories of volunteers. Apart from being a meeting place, training is one of the major activities being conducted at the community centres.

4.1.3 Community Level organizations

To sustain the projects efforts community organisations play an important role. The Joint Evaluation Mission of June 1989 has stressed the need to strengthen the claims of the community over official agencies by means of involvement of mandals at the different levels of project operation, including also policy making bodies as the Project Management Group. The mission emphasized that the representation of mandals would include equal numbers of males and females and that the representation should rotate periodically.

Comment: The project documents so far do not clarify the numbers of mandals formed, the number and position of women and men in mandals, not their role in the community management.

4.1.4 Project support communication

See Chapter 5.

4.2 Health related aspects

For a description of the activities see Chapter 5.

Longitudinal diarrhoeal incidence study
One of the more ambitious parts of the Public Health Education activities, as the Joint Evaluation Mission of 1989 put it, is the longitudinal study on diarrhoea incidence. Under the scheme of this study 200 households are visited every two months and interviewed on the cases of diarrhoea of the children under 5. In these households samples of water quality are taken.

In the Mid term Status Report it is stated:

> "the study does not pretend to give final evidence researchers have been trying to give before. "Diarrhoeal diseases are multifactorial in origin and therefore fluctuations in their magnitude in any area cannot be attributed exclusively to water and sanitation facilities existing in that area. Rather than measuring the impact of specific sanitary improvements the study is aimed at the assessment of the effectiveness of the total package of sanitary improvements including promotion activities. The findings of the study should provide directions in terms of approaches and focal messages to be adopted for carrying out promotional activities in the area".

Comment: The results of the diarrhoea study so far are not available in the Netherlands, so it is not possible to make an assessment of this component.

4.3 Occupational health programme

The long term objective of the occupational health programme is the improvement of working and health conditions of the tannery workers in Jajmau, Kanpur and of the carpet weavers (especially of the children, who are engaged in the carpet weaving industry) in Mirzapur.

During the project cycle the scope of the occupational health programme has been enlarged. Additional activities are identified which will be directed towards the brassware industry workers in Mirzapur. Furthermore, assessments will be made of occupational health hazards of other target groups involved in project related works like sweepers and workers involved in manual cleaning of sewers. Information about the progress of these activities is not available. The scope of this document will therefore mainly be limited to the occupational health activities directed towards the tannery and carpet industry.

Tanner industry

The tanner industry, which can be considered as the economic heart of Jajmau, is an important polluting element in Jajmau because of the hazardous industrial waste that is "produced" during the production cycle. The issue of industrial wastewater is dealt with under other project components. A situational health study revealed the serious health hazards to which the workers are exposed. The occupational health programme is directed towards the tannery workers and the tannery owners. The tannery workers are made aware of the necessity of a good "house"keeping of the industry as well as of the health hazards to which they are exposed during their work as well as their rights with regard to improvement of working conditions and access to health facilities etc.

The activities directed towards the tannery owners concern messages on improvement of the working conditions by taking safety measures in their industries and access to health services etc. In collaboration with the ILO a workshop was held towards this goal.

Comment: Some tannery owners, who were not yet reached by the project got interested in improving working conditions. Furthermore, the ILO and the National Productivity Council have shown their interest in the project. However, no information is available on the results. Information is still required about subjects such as: the number of tanneries with improved facilities (target was 21), number of workers using the Employment State Insurance (target is 40%), functioning of the 17 Health Councils, that were established, impact on the tanneries that were not covered so far.

An indicator of the impact on the improvement of the working conditions could be the perception of the tannery workers in this regard.

Weavers
The occupational health programme in Mirzapur has so far mainly been directed towards the carpet industry. The reason to choose this sector seems no other than that the carpet industry is an important economic activity in Mirzapur. After a first situational health hazards analysis, measures were taken like provision of spectacles and improvement roofs with transparent fibre glass roof tiles to improve visibility inside. The main part of the activities has been directed towards improved working conditions of children, who make up a major part of the carpet weavers. These activities concern issues like yoga and alphabetization programmes (also for adults).

Comment: Systematic information on the results of these programme are not available. The activities are not directly related to the project's mainstream activities.

4.1.2 Skill training for women

One of the efforts to enhance the role of women in the project is directed towards the training of female construction workers as masons. The first batch training for women in Kanpur and Mirzapur (each 15 trainees) was completed in 1989. Soon after, it was found that full employment of these trained women gave cause to concern, one of the reasons being the slow progress of the LCS programme. It was foreseen to involve the trained women in this scheme. In order to break the deadlock it was decided by the project and the municipalities to initiate the formation of work cooperatives or organisations of the masons. This would make it possible to issue direct orders from the municipalities to the cooperatives for construction and O&M of private latrines to the mason organisation (instead of Sulabh). The municipalities of Kanpur and Mirzapur were reluctant to employ the female masons, for reasons which are not clarified in the documents. As a result of all this the female masons not only got demotivated because of the time gap between the training and the actual work, but they also forgot some of the new skills acquired (MIS report).

In Mirzapur the women masons could only get contracted by UPJN/MNP in May 1990 on the intervention of the Director of the GPD. In Kanpur the newly established female mason society (BASERA) has been officially involved in the construction of 25 latrines since May 1990. Since the women masons were getting regular assignments and the progress made by them was found to be encouraging, the training of the second batch of 15 trainees in both Kanpur and Mirzapur was started in the second half of 1990.

In addition to the female masons skill training programme some new activities were undertaken by the project: in Kanpur male masons were trained and organised into cooperatives. In September they were reported to have not yet started their work because of the time consuming official registration and approval procedure. In Kanpur women have been selected to follow a training for plumbers/fitters. Their number has not been clarified in the project documents. The KJS/UPJN have shown interest in employing these women (MIS report Sept. 1990:14).

Comment: More information is required on the employment situation of the female masons, the quality of their work and their position in the construction industry.

SUMMARY OF THE MAIN DETAILED FACT FINDING ON THE ORGANIZATIONAL WEAKNESSES AND STRENGTHS OF UPJN, NP, KJS AND KNM CARRIED OUT BY JPS

APPENDIX VIII

1. **Uttar Pradesh Jal Nigam**

Organizational strengths and weaknesses

- The Ganga Project Directorate has laid down certain staffing norms with respect to O&M functions of the sewage pumping stations. Both Mirzapur and Kanpur units of UPJN consider these norms as not practical.

- Currently, out of 21 personnel assigned by UPJN for the O&M of the 5 MLD UASB sewage treatment plant at Kanpur, 18 have been recruited as temporary staff. The staff strength is just the bare minimum and does not take into account sick leaves and holidays etc. Moreover the present transfer policy of UPJN does not take into account the continuity that is needed with respect to the O&M of facilities where relatively new technology is involved.

- Only one of 3.5 currently appointed executing Engineers for the O&M of the UASB treatment plants has received in-depth training on the O&M of UASB technology.

- At the operating level, both in terms of quality and skills and motivation JPS has observed a considerable degree of positive intervention and a pro-active work culture. However the existing strength is not effectively utilised through an institutional strengthening process.

- The staff on the management level appears to lack motivation.

- Formalised O&M budgets exist with respect to O&M activities currently carried out by UPJN. They have been prepared by the GPD. But no formalised system of periodic reports with regard to actual expenditure budgets has been developed.

- UPJN has undertaken the O&M activities of the tube well pumping stations in Jajmau and Mirzapur, part of the sewer system in Mirzapur as well as the handpumps in Mirzapur. The responsibility for O&M of such facilities does not rest with UPJN on a permanent basis; but is to be carried out by KJS in Kanpur and MNP in Mirzapur.

  Regardless of the allocation of responsibility to the local bodies for the maintenance of such facilities, the mandate, it appears, has remained only on paper due to reluctance on the part of the local bodies. The reluctance is due to various factors such as lack of funds, lack of qualified and experienced personnel, lack of initiative and lack of positive intervention by the UP Urban Development Department. A programme for the gradual elimination of the temporarily system of subsidies/grants and the transfer of the mandate specifying the amount that local bodies should pay to UPJN has not been made yet.

JPS Associates identified training needs within UPJN, which are summarily listed below:

- UPJN training centre, which is based in Lucknow, need to widen its area of support to UPJN and facilitate in strengthening management development efforts for instance in coordinating performance appraisal administration and development of manpower plans for UPJN. (At present the training centre is restricted to mainly being a facility rather than a major training activity).

- UPJN needs to allocate an appropriate training budget

- Specific training needs in UPJN in Kanpur and Mirzapur are related to management development.

- There is an absolute need for consolidation of the knowledge on the operational level

2. <u>Mirzapur Nagar Palika</u>

Organizational strengths and weaknesses of MNP:

- The MNP and its Board have not addressed themselves to important and pressing issues such as:
  * improving the quality of its existing services;
  * finances- enhancing through newer heads of revenues, or revision of tariffs or through effective collections;
  * effective inter-face between public and the administration of the MNP.

- Appropriate norms have not been used to determine the number of manpower. As a result, for several essential services, the sanctioned manpower is less than required. On the other hand no plan has yet been made for productive utilisation of the staff rendered surplus as a result of abolition of octroi.

- There is no system to ensure performance of personnel or of accountability for performance.

- There is no history of training imparted to any of the staff of MNP.

- In general the practice of documentation (utility maps, list of properties, allocation of areas of work reports etc.) in MNP is grossly inadequate.

- The present fund position of MNP is so bad, that as of October 1990, it has not paid salaries of all staff for three months. This situation is mainly due to the poor recovery of House and water Tax, abolition of octroi and delays in receipt of compensation towards the same and non-receipt of State Government Grant towards pay and daily allowance of sanctioned staff.

The training needs of MNP as identified by JPS are summarily listed below:

- Board members need training in order to get acquainted with administration of municipalities.

- The top management of MNP needs (management) training to help them fulfil their responsibilities effectively given the complexities of the tasks as well as of the environment.

- Basic and instructional training is needed for the personnel of the water supply department.

- the Department of health needs training in:
  * supervision;
  * effectiveness in communication with members of the community especially on improved habits of solid waste collection and disposal;
  * maintenance of the equipment and vehicles provided for the department.

- The Assessment and Recovery Section and Accounts Department staff has not undergone any formal training in field of their functions. Also their background and past experience do not fit their present work role and responsibilities. Vocational training related to their function is needed.

3. **Kanpur Jal Sansthan**

Organizational strengths and weaknesses:

- Out of the total arrears of about Rs. 15 crores, about 10 crores are outstanding from certain large consumers. The operational personnel normally responsible for collections are unable to actually effect the recovery from these institutions. Therefore the Board needs to give special attention to this problem.

- The senior management group of the KJS experiences a great deal of work pressure related to issues as staff problems/union activities, cash flow problems, public grievances etc.

- Staffing norms and systems for tube well maintenance as well as O&M of the overhead tanks and chlorinators are not well developed.

- There is a shortage of manpower for sewer cleaning.

- Present recovery performance is quite unsatisfactory.

Summary of the training needs as identified by JPS:

- A workshop for senior management.

- Basic training in O&M on operational level.

- Training on leakage detection on operational level.

- Orientation programmes for engineers in the water department who are transferred-in from time to time.

- Training of a basic nature on tasks as sewer cleaning and maintenance at every level

- Training in basic tasks for personnel in Billing, Recovery and Accounts Departments.

4. **Kanpur Nagar Palika**

Main organizational strengths and weaknesses:

- the KNM is considered to have the best financial health when compared to other local bodies in UP State. The overall recovery performance is 46%, which is considered good in the state of UP.

- There is no human resource department in the organisation structure (8000 employees).

- There is no separate department or officer responsible for O&M of the stormwater drainage system, neither is there a control system.

- There are no manning norms for staff to be positioned at toilet blocks of public toilets (for supervision and maintenance).

- Manpower budgets for solid waste collection and disposal have bot beeb updated since 1960.

The main training needs as identified by JPS are:

- A training programme for top management of KNM is needed (but it remains unspecified at this stage).

- Training needs for personnel of the departments of Health and City cleansing are related to subjects as new trends in solid waste management techniques, effectiveness of supervision, and effective communication with members of the community and householders and maintenance of equipment.

- Personnel in Assessment, Recovery and accountants functions need to be trained according to their functions on systems and procedures for effective performance.

RESULTANT ISSUES - A SUMMARY

The 'Resultant Issues' provide a macro-view of basic issues that could be termed as primary causes for the lack of effectiveness in the functioning of implementation agencies. These are applicable to all the implementation agencies both at Kanpur and Mirzapur.

The issues raised are both intrinsic and extrinsic. As such, JPS experience in the sectoral knowledge i.e., in the sector of urban infrastructure management in India in other states outside U.P.is also reflected in evaluating the deficiencies being highlighted.

The diagnostic observations are reflected as deficiencies to be directly responded through strategic interventions including policy directions, institutional strengthening, training and individual development programmes.

PART - A :

1. Organisational Issues:

The fact finding study team aimed at addressing each implementation agency to a series of emerging requirements that may necessitate the present organisation to change and adjust itself through designed institutional development strategies.

i) All the implementing agencies regarded operations and maintenance to be a natural and a routine responsibility. Operations and Maintenance at present is a mere activity and does not enjoy the status of either a function or a priority with accountability. O & M as a result does not enjoy a focused priority but is relegated to an 'as and when' function.

ii) Operations and Maintenance activities are at present not at a level which demand attention and interest of the senior management of the implementation agencies, even though the Operations and Maintenance in the public utility services is under constant public review and is sensitive enough to rouse public response.

iii) Generally O & M responsibilities comprise of operational and administrative aspects on one side and developmental aspects on the other. In the operational O & M responsibilities the emphasis would be on functioning and monitoring of action plans, whereas, on the developmental responsibilities of O & M, the emphasis would be on management interventions as a consequence of experiences in functioning and monitoring of operational responsibilities.

The study team during the fact finding mission found that the implementation agencies did not distinguish their responsibilities between their respective Developmental and Operational/ Administrative roles. As a result, the learning/ experiential learning is not institutionalised but more individualised.

iv) In quality terms, the role of Management is to develop and manage the resources. At present, at best, the Management is performing the limited role of supervision.

In O & M, it is imperative for the organisation to allocate the following responsibilities against each level of management.

Senior Management	-	a) Development Activity b) Evaluation of the Organisational Performance
Middle Management	-	a) Design Operational strategies as per Organisational goals b) Ensure implementation strategies c) Train and develop skills
Junior Management	-	a) Supervision of task performance b) Quality of deliveries of O & M activities

In the absence of clear perception of roles, in levels of management, individual manager's strengths and/or weaknesses predominate systems and organisational framework.

v) In most of the implementing agencies, in the present structure, the levels of skills are diffused. There appears to be no correlation between various levels of the organisation. The span of control for each operating manager/supervisor in terms of tasks/personnel is not defined.

vi) There is a gross surplus of labour in unskilled categories in various stages of temporary and permanent employment.

Even with a clear perception of the surplus labour - the recruitment process continues with no norms of staffing.

It is indeed an alarming situation demanding stringent management intervention to trim the organisations, redefine organisational structures and functions and put in place a semblance of a working organisation let alone an effective one. The State Government has a critical role in this respect to initiate steps as well as support local bodies to seek managerial and not political solutions to surplus labour.

vii) The implementation agencies need to re-orient their working practices with the use of mechanised and automation strategies rather than high manpower oriented work practices.

viii) It is imperative for the implementing agencies involved in O & M activities to focus on manpower planning and a well designed Human Resource Management policies.

It is noted that the administrative establishment departments role of implementing agencies is far from a well designed personnel department's role. Most of the heads of Administration and Establishment sections are not even qualified to man and administer such a sensitive function in high manpower oriented work organisations.

ix) The vendor development strategies for numerous contractors/suppliers and job works personnel do not exist. As a result, there is no quality assurance.

2. Policy Issues

In urban infrastructural development projects, it is imperative to broaden the scope of decision making/policy formulation needs to go beyond the facility creation phase and also include operations and maintenance imperatives. Illustratively, the policy makers could aim at O & M staffing in the project formulation stage itself through creation of a cadre of O & M engineers.

i. Even at the outset, O & M is to be recognised as an important part of capital investments by the State level policy makers. At present the State level policy making is restricted to capital works in terms of providing infrastructural facilities and then at best in handing over the same facilities provided to O & M agencies based on convenience rather than on competence and capabilities.

ii. In each urban centre/city, it is observed that more than 2 or 3 O & M agencies operate which is contributing to a situation where there is lack of focus on O & M and also lack of coordination between these agencies even with regard to the components of O & M each agency is responsible for. There is lack of clarity both on the role/responsibility of each O & M agency with required to O & M as well as a lack of clear guidelines on the funding and recovery aspects for the responsibilities taken up by each O & M agency.

iii. Currently the decision making process on policy matters is dependent on individuals in various agencies without appropriate coordination forums and institutionalised problem solving apparatus. There is also no clear understanding between State Government and the local bodies on O & M recoveries and clear guidelines from the State Government as to how O & M costs are to be met by local bodies.

The study team clearly observed gaps in clear decision making by different policy making organisations. In turn, there is a sense of detachment and lack of initiatives in O & M agencies.

3. Performance Issues :

In none of the implementation agencies, 'Performance' is defined in terms of organisational performance for senior management, system performance for middle management and task performance for junior management.

At present, 'Performance' is a mere completion of routine tasks, file completion or progress report based on statistics.

In a sense, 'performance' has a limited scope and conduct in the present organisational context.

The process of setting objectives with an appropriate appraisal system to measure results does not exist in most of the implementation agencies.

Appropriate monitoring and evaluation support systems such as a well designed reporting system, communication system do not exist.

The concern is not that a mere system does not exist but even more important is the concern that the need for such a system is not felt by the operating managers,

4. Financial Issues

A. Financing of Capital Projects

1. Need for State Urban Infrastructure Development Finance Corporation.

In the State of Uttar Pradesh the Financing of Capital Projects and the related fund management is handled by the Ministry of Urban Development, State Government and UP Jal Nigam (for certain capital works jointly. There is a need for an independent department or corporation to handle the following functions and meet the desired objectives.

- Keeping up-to-date data on State needs and achievements in Urban Infrastructure Development.
- Development of perspective plans, both, short term and long - term for implementation of UID Programmes in the State.
- State Level resource mobilisation in co-ordination with Financial institutions, State Government, beneficiary agencies etc.
- Project Finance to implementation agencies including fund management and recovery from beneficiary agencies.
- Approval to tariffing structure of the beneficiary agencies.
- Evaluation and monitoring of various funded projects in the State.

2. Funding Mix of the Project

Presently most of the projects are financed by Grants/Subsidies from the State Government. Only in few projects there is mix of Grant and Loans from State Government/Financial Institutions (LIC, World Bank etc.). In none of the projects, the beneficiary agencies have contributed financially. Also it is learnt that the loans obtained for the project are not repaid by the beneficiary agencies but are adjusted by the Government from the grants etc. payable to that agency.

To reduce the burden on the State Government for financing of the projects through grants/subsidies and to increase the commitment of the beneficiary agencies in participating and repaying of loans, we suggest a mix of financing pattern graded city-wise.

B. Financial Discipline

1. At present in all the implementing agencies studied by the fact finding mission, the departments in Finance function, such as, Accounting, Billing and Recoveries, Budget, Cash are not manned by appropriately qualified persons. Even the existing personnel have not updated their professional skills and knowledge through training or through self development plans.

2. Budgets made are generally based on approximations. There is a total lack of appreciation for accuracy and detailed budget preparation exercises. Due to a casual approach to budget formulation exercises, the factual situation is not necessarily reflected, thereby, making the budgets highly un-realistic. There is no continuous monitoring of budgets in terms of cost benefit exercises, instead at present, a budget is a means of seeking approvals for expenditures.

3. In all the implementing agencies, the system adopted for accounting is an obsolete and inadequate control mechanism in Accounts Management.

4. Though the practice of Internal Audit exists to meet Governmental Statutory needs, it is required that internal audit function also facilitates financial discipline.

5. A Computer based MIS would take the organisation a long way in its drive towards efficiency and effectiveness.

C. Other Related Areas :

1. The aid of computers is a felt need for the purposes of consumer benefit in area such as billing and recoveries, accounting, project management, MIS.

2. Training to Officers and staff for better co-ordination and for the need to introduce an integrated system is an absolute necessity. The efforts for training and development of systems and personnel are non-existent in the implementation.

3. At present though the skills permit inter-changeability between two departments, in practice, the skilled staff are not transferred from department to department or section to section. As a result the experience base of individuals is being limited and flexibility in working norms is being restricted.

4. There is a need for co-ordination at operating levels of each implementing agency through structured forums. There is a distinct gap in the initiative of senior management personnel of the implementing agencies to take individual lead and improve the financial health of the implementation agencies.

5. Leadership and Organisational Behaviour Issues :

Leadership is a felt need in all implementation agencies. The leadership is to be at 2 levels; within the organisation and the leadership of the organisation in the community.

i. The need is to develop individual leadership in the form of fresh and new initiatives to seek ground level solutions. Work teams with experience performing at the operational level is a felt need.

ii. Operations and Maintenance positions are to be filled by a carefully designed selection process. Positive attitude towards operations and maintenance activity is to be developed through conscious training and development efforts.

iii. With the introduction of technology and investments being made, training could be better sustained with providing a new work culture in operations and maintenance organisation. Measures to optimise use of resources and time with focus on qualitative output through revised work culture/norms would in turn provide the organisation greater acceptability in public.

iv. The sustainability of new thrust on operations and maintenance could best be supported by seeking and promoting local communities to participate in the same. However, all implementation agencies visited by the fact finding mission do not seem to appreciate the need for an articulated approach to such community participation. It is therefore necessary to provide for communication channels between the implementation agencies and the community at the operation levels.

6. Planning and Development Issues :

In any planning and development process, there shall be three basic elements. First, planning sets the standards and objectives which serve as a guide for performance. Second, control measures and evaluating inputs and performance according to standards and objectives. Third, corrective actions in the form of review decisions. Planning and control is mistakenly equated with only the third element of the process. The growth of each agency is many times a product of executive decisions rather than a process with planning and development as a guiding tool.

PART - B : TRAINING NEEDS ARISING OUT OF RESULTANT ISSUES :

The issues raised earlier in this report clearly highlight three distinct levels of institutional development inputs.

The three levels could be :

a) Corporate strengthening (Corporate Planning)
b) Work Culture and Individual Development
c) Management strengths such as :
   - Financial Management
   - Professional skills development
   - Strengthening of Functional Management skills and inter-functional work environment.

The fact finding mission has focused on Training aspects in all the implementation agencies and arrived at the following observations :

1. Even at the top levels of the implementing agencies, there need be a total understanding of the role and importance of training to upgrade organisational performance and individual performance.

2. In meetings with top officials of all implementation agencies, the study team did not feel a pro-active initiative to awarding 'training' a priority status in their respective organisations.

3. The perceptions on 'training' is restricted to as a break from routine, as a support to experience or as an opportunity to travel.

4. There is a need to articulate

   a) Organisation's expectations from 'training'
   b) Participants expectations from 'training'
   c) Positioning of 'training' as a tool for Organisation and individual development plans.

   This exercise to articulate organisation response to the above (a), (b) and (c) is extremely vital.

5. Based on the organisational responses to 'training' as an essential tool for development, it is imperative to design an appropriate training and a HRD policy for the implementation agency. In the fact finding mission, none of the implementation agencies have even well-defined organisational responses towards 'training' in particular. Consequently, there is no visible effort in taking various steps indicated above.

6. There are no past efforts in identification of 'training' needs.

7. At present, in some implementation agencies, the performance appraisal forms do not even provide for the reflection of 'training needs' or the appraisers evaluation of training needs of the appraisee.

   Also, linkages between 'training' and personnel systems such as performance appraisal, target/goal setting, performance monitoring, incentive and wage/salary structure, promotions and transfers/deputations need to be established.

8. In none of the implementation agencies other than UPJN, (where at least weak efforts are being made), is there a structured in-house co-ordination of training activities and monitoring of follow-on exercises.

9. As mentioned earlier, in KNM, MNP and in KJS the experience of past training activity is not institutionalised through reports of trainees/organisational evaluation of training benefits.

10. Even the method of selection of trainees and the choice of training performances are more based on personal and individual perceptions of departmental heads rather than a well designed organisational exercise.

11. The training resources, including the external and internal training skills are not assessed as a structured and planned exercise. The choice of training and institutes imparting training is not made as a part of planned exercise.

12. At best, training is seen as a refresher to their experiential learning. Training is perceived as a welcome deviation from routine for a brief spell of time.

13. To derive greater mileage of the existing efforts, emphasis is to be made on :

Managerial Training	:	Conceptual and systems related training inputs
Supervisory Training	:	Co-ordination, monitoring and skills development input
Skills Training	:	Operating elements and self learning techniques

It is observed that, at present, training is not a serious subject in the existing priorities of implementation agencies. As such, distinct result oriented efforts are necessary to develop interest, commitments towards training efforts.

In the implementation agencies, there exist potential trainees at 3 distinct levels:

1. Level of familiarity with skills
2. Level of knowledge of skills
3. Level of achievement of skills

It is therefore necessary for training efforts to evaluate a need based, practical and more so an acceptable strategy to strike the attention and motivation of personnel in the implementation agencies.