

## IX-SCIENCE, TECHNOLOGY AND ENVIRONMEMNT

Science and Technology has made a phenomenal impact world over in shaping the life style of the common man. In order to give greater impetus to Science & Technology and environment programmes, a separate Department of Environment, Forest and Wildlife was created in the Government of Delhi in 1985. State Council for Science and Technology was set up to advise and promote Science and Technology activities and oversee the implementation of various schemes/programmes under Science & Technology sector.

Delhi Pollution Control Committee had been set up in June 1991 so that environment problems of Delhi can be tackled effectively and efficiently.

Approved outlay for 10<sup>th</sup> Five year Plan and Annual Plan 2002-03. Revised estimate 2002-04 and proposed outlay 2003-04 under the sector are given below:

(Rs. in Lakh)

Sr. No.	Agency	10 <sup>th</sup> Five Year Plan approved outlay	Annual Plan 2002-03		Proposed outlay 2003-04
			Approved Outlay	Revised Estimate	
1	2	3	4	5	6
1.	Environment Department	4760.00	600.00	350.00	600.00
2.	DPCC	500. 00	100.00	100.00	-----
3.	Industries Deptt.	240.00	50.00	50.00	150.00
	Total	5500.00	750.00	500.00	750.00

Scheme wise write up of Annual Plan 2002-03 is as under :

### A. SCIENCE AND TECHNOLOGY PROGRAMME

## **I INDUSTRIES DEPARTMENT**

### **1. SETTING UP OF BIO-TECH RESEARCH AND DEVELOPMENT CENTRE ( Rs.150.00 lakh)**

Over the last two decades, in many developed Countries, the concept of Technology parks was introduced for seminal discoveries in Electronics and Biology. In India also, considerable efforts have gone into supporting research in Bio-technology that have been rapidly used for genetic engineering of microbes, plants and live stock. A special department of Bio-Technology was created by the Govt. Of India to support research on genetic engineering of organisms for industrial and agricultural use. At a number of Universities, post-graduate teaching for master's degree in bio-technology has been initiated for developing manpower for research in this area. All these efforts have led to adequate research. Potential and activity in the area of bio-technology, which can now be exploited for industrial and agricultural applications.

#### **OBJECTIVES :-**

The proposed Bio-tech Centre would be promoting the following three facilities :-

- (i) Pilot scale production of industrial important microbial enzymes.
- (ii) Development of a repository of DNA probes for the diagnosis of genetic disease/disorders and counselling.
- (iii) Genetic Engineering of crop plants for hybrid seed production.

#### **LOCATION :-**

The Bio-tech Centre is proposed to be built in close proximity to the new life Science Building at the University of Delhi, South Campus. The land about 2 acre for the Centre will be provided by the University. A covered Area of 2250 Sq. mtr. will be required for facilitating this Centre. The total power requirement is worked out as 200 KVA for air Conditioning of the building and laboratories, individual air

conditioners for tissue culture rooms and green house for growth of transgenic plants, Auto Claves, pilot Scale fermentor and Servo stabilizers. The external design of the building has to conform to the building plan of the Campus.

MEANS OF FINANCING:-

This project will be joint venture of Govt. of NCT of Delhi and Delhi University, South Campus. The estimated Cost of the project is Rs. 8.0 crore. Out of the total cost, it is estimated that expenditure of Rs.4.0 Crore will be incurred on the construction the building and its furnishing with air conditioning system including cost of Electric Sub Station of 220 KVA. This component of the cost is to be borne out by Govt. of NCT of Delhi from plan Funds. Thereafter Rs.3.0 Crore is likely to be spent on purchasing of equipment for microbial Enzyme production, Transgenic and development of molecular Diagnostics Facilities/ Laboratories. This Component will be provided partly by the Department of bio-technology, Govt. of India and partly by Industries/ Clinicians/ Hospital. The land and core research staff will be provided by the University. The operational cost/functional cost will be met from sponsored projects from industries, training programmes conducted by the Centre and Patent/Royalties realised from the Research/Development work. In this direction, a number of organisations and companies like N.D.D.B., and MAHYCO have sponsored projects on hybrid seed production. The microbial enzyme group/research staff has interaction with many industries like Dabur and East India Pharmaceuticals Ltd. Numerous clinicians at Delhi State and Central hospital are already interacting with the university on characterization of genetic diseases. Extensive funding for interaction between clinicians/ Hospitals and the University has already been provided by Department of Bio-technology. The proposed facility will help both the private and public Hospitals in genetic counselling based on the latest developments in the area of human genetics.

An MOU has been signed among Delhi University Industries Department, Govt. of Delhi and the DSIDC. It has been mentioned in the MOU that GNCTD is total commitment will be limited to Rs.5.39 crore and no additional funds will be provided in any circumstances. GNCTD will provide 50% as grant and 50% as loan. The project will be executed by DSIDC in collaboration with Delhi University.

**Brief description :-**

a. Microbial Enzymes for Indl. Applications :-

The Indian industry mainly relies on imported enzymes. As till date, no industry in India except "Biocon Industries" in Bangalore (Producer of Papcoin) produces enzymes at commercial Level.

Amongst living Organisms, microbes are the most useful for production of useful enzymes and metabolites as these can be grown in sufficient volumes in fermentors. Looking at the immense demand of various enzymes in Food, Pharmaceutical, detergent, beverage and chemical industries, the indigenous production of Enzymes have good market prospects. One of the major projects to be undertaken in the microbial unit will be scaling up of production of Lipase for industries applications. This will be followed by the production of useful analyses and xy-lanases.

b. DNA diagnostics for Genetic Diseases: -

Of all the biomedical revolutions that have so far been witnessed, the human genome project is going to have the most far reaching applications. There are three aspects of the humangenome project i.e. Gene Mapping, Genetic Screening and Gene Therapy. The most relevant aspect for India is genetic screening for prevention of Genetic disorders/ Genetic diseases. The Techniques of gene mapping are too expensive and the technology for gene therapy are still in its infancy, but a large number of probes are available for discerning genetic disorders. Therefore this must be tapped and deployed for genetic screening and genetic counselling to save the society from emotional despair and enormous costs of looking after genetically impaired individuals. The Centre, will undertake awareness programmes, towards genetic diseases, counselling and prevention.

c. Genetic Engineering of Crop Plants :-

Most of the technologies in the field of genetic engineering have been developed in US and Europe by very close interaction of the Universities and the MNCs

specializing in the production of agro chemicals and hybrid seeds. But agriculture research has to be location specific depending on soil nature and climate variations. Therefore, while the industrial technologies can be imported or set up on turn key basis, but no profound changes can be brought in Indian Agriculture by import of transgenic cultivars developed abroad. The world trade Agreement allows non-patenting of genetically engineered plants providing an opportunity to combine frontier technologies of genetic Engg. with well established methods of Crop. plant breeding in order to provide a major boost to Indian Agriculture. Hybrids tend to out perform pure lines in Yield. A large number of Seed Companies and Fertilizer companies have shown interest in hybrid seed technologies.

The Project Report has been prepared by DSIDC which has been concurred by Planning Commission. Architect has been approved for the design building and tenders have also been invited for the construction of the building. The construction of project building is likely to start soon. The expenditure for the infrastructure facilities including construction of project building, servo stablizer and working capital for first three years of operation works out to Rs.5.39 crore, The land is to be provided by Delhi University in the South Campus compound. An amount of Rs.300.00 lacs was provided during 2001-02. An outlay of Rs.240.00 lacs is approved for the Tenth Five Year Plan(2002-2007). including Rs.50.00 lacs for the Annual Plan 2002-03. For the Annual Plan 2003-04, an outlay of Rs.150.00 lacs is approved including Rs.75.00 lacs as loan for the scheme.

## **B. ENVIRONMENT PROGRAMME:**

### **II. ENVIRONMENT DEPARTMENT**

#### **1. PUBLIC ENVIRONMENTAL AWARENESS AND OTHER RELATED ACTIVITIES' (Rs.160.00 lac)**

##### **Objectives of the Scheme :**

To create public environmental awareness by educating public in general and different segments of the city such as school students, residential associations, traders associations etc. through various means.

**Need and Justification of the Scheme :**

Ever increasing population in Delhi has resulted in significant increase in environmental pollution thereby affecting the health of public resulting in loss of avoidable man-days. To meet need of increasing population, more resources are required resulting in increased industrialization, urbanization, besides becoming commercial center. These activities require huge infrastructure and other civic amenities to cope with solid waste generation, treatment of sewerage etc. Such unattended problems lead to various diseases due to unhygienic conditions. It is realized that such problems can be tackled more effectively with co-operation of the public for which emphasis to be given to public environmental awareness activities. For this purpose, various publicity media such as newspapers, T.V., theatre shows, distributing publicity materials to the public are used. In order to inculcate and motivate the children to take part in the environmental related activities like tree plantation, campaigns such as 'Children Against Crackers' and 'Say No to Plastic bags' etc. are also conducted.

**Programme Contents:**

- Preparation of Environmental related video films and its telecasting in T.V. Channels,
- Issuing of advertisement in newspapers, magazines and other electronic media/display systems.
- Participation in Exhibitions, Fairs/Melas.
- Preparation and distribution of brochures, booklets, posters and other publicity materials.
- Purchasing of awareness materials, books and mobile van.
- Displaying Models, charts etc. on environmental issues.
- Organizing street plays, theatre shows, seminars/conferences/workshops, Human chain, Human rallies, and other related awareness functions etc.
- Training programmes will be arranged to sensitize the general public especially women's organizations, Industrial workers on waste minimization.

- For creating more awareness on environmental issues, Campaigns will be launched. Print and Electronic media will be used without any financial hindrance.

**Starting Date of the Scheme :**

The scheme is being implemented from the 8<sup>th</sup> Five Year Plan and will be continued throughout the 10<sup>th</sup> Five Year Plan.

**Evaluation Study**

No evaluation study has been made since the nature of the scheme is educative and publicity oriented.

An outlay of Rs. 8.00 lacs is approved in the 10<sup>th</sup> Five Year Plan. The approved outlay of Rs. 150.00 lacs is anticipated to be utilized during 2002-03. An outlay of Rs. 160.00 lacs is approved in the Annual Plan 2003-04.

**2. POLLUTION DISASTER AND HAZARDOUS WASTE MANAGEMENT**  
**(Rs.100.00 lac)**

**Objective of the scheme :**

To manage proper disposal of Hazardous Waste.

**Need & Justification of the Scheme:**

The wastes generated from the industrial units, which are hazardous in nature, pose a serious threat to the environment in Delhi. There are many kinds of waste generating units such as Cyanide waste, metal finishing waste, hydro-carbon waste, waste from dyeing industries etc. The Total quantum of hazardous wastes generated in Delhi is approximately around 60,000 tones per annum, which needs to be disposed off properly as per the Hazardous Waste (Management & Handling) Rules, 1989. The Hon'ble

Supreme Court has also insisted that all the State Governments and Pollution Control Boards to ensure safe disposal of hazardous wastes generated by different units.

In Delhi, the waste generating units are distributed in the industrial areas whereby the construction of 15 CETPs is in progress. However, the Delhi Pollution Control Committee to inventories hazardous waste generating units is carrying out field inspections, which is a continuous process. The Ministry of Environment & Forests, Govt. of India has also clearly mentioned that the sludge generated from the CETPs (Common Effluent Treatment Plants) has to be treated as hazardous waste and needs to be properly disposed off. This scheme is facilitating the work related to Hazardous waste disposal.

**Programme content::**

- Acquisition of Hazardous Waste disposal site as per Hazardous Waste (Management & Handling) Rules, 1989.
- Making available technical expertise for maintenance of Hazardous Waste.
- Creating necessary awareness among the industries and also to educate them for proper handling, transportation and disposal of hazardous chemicals and hazardous wastes.
- Hazardous waste industries will be surveyed in every two years.
- Apart from the E.I.A. study, a Technical feasibility study will be conducted on Hazardous waste disposal through a reputed organizations and this study will appraise the fact of Hazardous waste collection, Transportations, disposal and related aspects.

**Position of Approval of SFC:**

SFC approval will be obtained after finalisation of site.

**Starting Date of the Scheme :**

The Scheme is being implementation from 1998-1999.

**Target Date of the Completion of the Scheme :**

Completion of the scheme depends on policy decisions of Govt., no specific date of completion can be given.

**No. of posts:**

No post has been proposed in this Scheme.

An outlay of Rs. 400.00 lacs is approved in the 10<sup>th</sup> Five Year Plan 2002-07 including Rs.100.00 lac for the Annual Plan 2002-03. The same amount of Rs.100.00 lac is approved for the Annual Plan 2003-04.

**(3) STRENGTHENING OF TECHNICAL SET UP IN THE ENVIRONMENT DEPARTMENT (Rs.50.00 lac)**

**Objective of the Scheme :**

- To provide infrastructure facility in the Department of Environment, Govt. of NCT of Delhi to handle the increasing workload on pollution issues.
- To coordinate pollution control measures undertaken by various Departments in NCT of Delhi to control pollution.
- To implement the Govt. policies and various schemes for conservation of Environment and control of pollution in Delhi

**Need and Justification of the Scheme :**

The rapid growth of Delhi has resulted in significant increase in environmental pollution. The situation is causing serious concern as has been expressed in parliament, in Delhi assembly and by citizens of Delhi. Highly urbanized set up of Delhi with rapid pace of development need priority treatment of Delhi in terms of Environment management. Govt. of Delhi has stressed for steps taken for checking pollution and improving the environment. Department of Environment, Govt. of Delhi is taking

effective and coordinated measures for controlling pollution with limited facilities. The overall workload of this department has increased manifold during last few years particularly for implementation of various Environmental Acts and Rules, implementation of policies on behalf of Govt. of Delhi for improvement of environment and control of pollution on the basis of National environmental policies of Govt. of India. In addition, to function as a nodal Department for interaction and co-ordination with other Departments on Environmental issues.

In view of the increased level of work, separate Secretary (Environment, Forests & Wild life) has been posted. At present, this Department does not have required technical resources/staff and lacking personnel branches like Administrative, Planning, Accounts without which Environment Department cannot perform its functions as per allocation of Business rules. In addition, infrastructure, communication and mobility, facilities like vehicles, computers, photocopier and other related materials would be required for staff. Hence, this scheme is of great relevance for strengthening the Department to perform its functions in a better way.

### **Programme contents**

Under this scheme, the important contents are development of infrastructure, mobility with six new vehicles, computers, library, salary for proposed staff.

Presently, the existing staff of this Department are getting salary under the Central sponsored scheme "Assistance for Abatement of Pollution in Delhi" funded by Ministry of Environment & Forest, Govt. of India since 1987. Provision has been made for timely payment of salary to existing staff of the Environment Department and to be created under the scheme. 'Flexible Complementary Scheme will be adopted on the Technical posts of Environment Department as implemented in Ministry of Environment & Forests, Govt. of India'.

Further, Environment Department after its separation from Development Department, is functioning as a new Department since June 1997. The allotment of quarters to the existing staff as per seniority and on turn basis seems to be almost impossible at least for 20 years based on present circumstances. So, the required

accommodations for the staffs of Environment Department shall be purchased by utilizing the allotted budget of the Plan scheme “Strengthening of Environment Department”

**Starting date of the Scheme**

This scheme is being implemented from the commencement of the 8<sup>th</sup> Five Year Plan and it will be continued throughout the 10<sup>th</sup> Five Year Plan.

**No. of posts proposed**

<b>Sl.No.</b>	<b>Name of the post</b>	<b>Pay Scale in Rs.</b>	<b>No. Posts</b>
1	Secretary (Environment)	18400- 22400	01
2	Principle Scientific Officer	12000- 18000	03
3	Deputy Secretary	10000-15200	01
4	Senior Scientific Officer	10000-15200	04
5	Scientist	6500-10500	04
6	Jr. Accounts Officer	5500-9000	01
7	Head Clerk	5000-8000	01
8	Stenographer, Gr. III	4000-6000	03
9	L.D.C	3050-4590	03
10	Driver	3050-4590	03
11	Peon	2550-3200	03
12	Other required staff like Data Entry operators will be arranged on contract basis.		

**Justification**

For implementing the Environmental Policies, Schemes, Acts & Rules, in N.C.T, of Delhi in efficient and effective manner, the environmental issues will be looked after in area wise by three Principal Scientific Officers under the supervision of Secretary (Environment). These Principal Scientific Officers will be assisted by Sr. Scientific Officers in the areas of Public Environmental Awareness, Eco-Club activities in schools

& Colleges, Development of Environmental Data for GIS/MIS system, Computerization of Data & Records, Air & Noise Pollution from industrial, vehicular, Thermal Power Stations, Domestic sources, Surface & Ground Water management, Global warming & Ozone depletion and overall plan scheme implementation etc. The other Staff will be required for assisting senior staffs and for setting of various personnel branches in the Department.

An outlay of Rs. 6.00 lacs is approved in the 10<sup>th</sup> Five Year Plan 2002-07 including Rs.80.00 lac for the Annual Plan 2002-03. Against which an expenditure of Rs. 20.00 lacs is anticipated in the Annual Plan 2002-03. An outlay of Rs. 50.00 lacs is approved for the Annual Plan 2003-04.

**(4) ENVIRONMENT DATA GENERATION, SURVEY, RESEARCH PROJECT AND OTHER ACTIVITIES. (Rs. 70.00 lakh)**

**Objective of the Scheme**

To conduct need based environmental surveys and data generation on continuous basis on Quantum of pollutants generated from sources such as industries, vehicles, thermal power stations and effect of hazardous, toxic waste on ground water and other water bodies.

**Need & Justification of the Scheme**

Rise in population and growth in economic activity has led to overall increase in pollution in Delhi though rate of pollution has shown decline. To assess impact of pollution on human health and for the overall environmental up-gradation in Delhi, it is essential to update the environmental status through need-based survey on various aspect of pollution. This scheme will support such type of activities to generate environmental data from time to time, so as to formulate plans for control of pollution in Delhi.

**Programme Contents**

Need based projects on Environment will be identified and implemented.

Environment related studies on Delhi's Environmental issues would be carried out through NGOs, reputed consultancy organizations, Research & Academic institutions. etc. by providing them necessary financial assistance.

**Starting Date of the Scheme**

The scheme is in implementation from 1998-1999,

**Target Date of the completion of the Scheme**

The scheme is being implemented from the financial year 1998-99 and it will be continued throughout the 10<sup>th</sup> Five Year Plan. Since, this activity is of informative and educative in nature, no specific date of completion can be given.

**Any Evaluation Study Made**

Mid term evaluation study shall be conducted during 2003-2004.

An outlay of Rs. 160.00 lacs is approved in the 10<sup>th</sup> Five Year Plan 2002-07. The entire approved outlay of Rs. 30.00 lacs is anticipated to be utilized during 2002-03. An outlay of Rs. 70.00 lac is approved for the Annual Plan 2003-04.

**(5) SETTING UP OF ECO-CLUBS IN SCHOOLS/ COLLEGES (Rs.100.00 lac)**

**Objective of the scheme**

To create environmental awareness among the school students for environmental improvement and to inculcate the culture of Eco-friendliness among them.

**Need and Justification of the Scheme**

Protection of environment and control of pollution are so important and they cannot be left to Governmental action alone. Students are important vehicles for which they must be educated to make them Eco-friendly. Any plan to control pollution can

succeed only if the people feel initiated and involved in its working and are able to participate in its implementation. School children are an important target group and they can act as the carriers of the messages i.e., 'PARYAVARAN VAHINIS' in the up gradation of environmental quality. For this purpose, an action oriented environmental awareness programme among school & college students is proposed in way of setting up of Eco-clubs in schools & colleges with emphasis on following activities.

- To motivate the students to keep their surrounding green and clean by undertaking plantation of trees by students.
- To promote ethos of conservation of water by minimizing the use of water.
- To motivate the students to imbibe habits and life style for minimum waste generation, source separation of waste, disposing off the waste to the nearest storage point.
- To compost horticulture waste to use it as a manure for school gardens.
- To induce the students to create awareness among public and sanitary workers to stop the indiscriminate burning of waste which causes respiratory diseases.
- To sensitize the students to minimize the use of plastics/polythene bags. Not to throw them in public places as they choke drains and sewers. Being non-biodegradable they cause water logging and provide breeding ground for mosquitoes.
- To organize Tree plantation programmes in schools for which Delhi forest Department provides saplings free.
- To create awareness on harmful effect of noise and air pollution caused by bursting of crackers on Diwali, which are manufactured basically by engaging child labour, exploiting young children.
- To arrange other awareness programmes such as Quiz, Essays, Painting competitions etc. aiming at various environmental aspects.
- To educate the children about re-use of waste material & preparation of products out of waste.

**Programme Contents**

More number of Eco-clubs will be set up in addition to the existing Eco-Clubs during Tenth Five Year Plan. Financial assistance would be increased with the approval of finance department. It depends upon the performance of the schools. Apart from Schools, Colleges will also be included in the Eco-Club activities. The implementation and monitoring of Eco-club activities in schools will be done in 11 educational districts as per the analogy of Education Department, Govt. of Delhi. Besides, the financial assistance to schools and colleges, this scheme will cover prize money, organizing related functions for Eco-Clubs.

**Starting date of the Scheme**

The scheme is in implementation from Ninth Five Year plan

**Target Date of the Completion of the Scheme**

Since the activity is of informative and educative in nature, no specific date of completion can be given.

**Any Evaluation Study Made**

Evaluation study has been conducted by the Planning Department, Govt. of N.C.T. of Delhi during 2002-03.

An outlay of Rs. 500.00 lacs is approved in the 10<sup>th</sup> Five Year Plan 2002-07. The approved outlay of Rs. 100.00 lac is anticipated to be utilized during 2002-03. An outlay of Rs. 100.00 lac is approved for the Annual Plan 2003-04.

- (6) **ASSISTANCE TO NGOs IN THE PROMOTION, CONSERVATION AND PRESERVATION OF ENVIRONMENT(Rs.50.00 lac)**

**Objective of the Scheme**

To promote and assist various Non-Governmental Organisation in the conservation, preservation of environment and pollution control activities. To implement various programmes of Environment Department through NGOs.

### **Need and Justification of the Scheme**

The Capital City of Delhi has been earmarked as the fourth most polluted city in the world in terms of the Suspended Particulate Matter (SPM) level by the WHO Report, 1989. The growing influx of population into the urban city from the neighboring states and also from other parts has resulted in growing air pollution, water pollution and also pollution due to solid waste. In recent years, many public interest litigation cases have also been filed before various courts for want of specific measures for preservation of environment from pollution angle.

The Non-Governmental Organizations play a vital role in the popularization of Government policies and various measures being taken by the Government Departments for controlling the degradation of environment. The NGOs also play an important role in the identification of local problems such as pollution caused due to industries in any particular area, illegal functioning of industries in specific areas etc. The NGOs will also play a key role in educating the industrialist, the workers involved in the various industrial activities about the nature of the job in which they are involved and also to advise the necessary protective measures which have to be taken.

For this purpose, the NGOs will prepare informative, educative handbills and distribute to the various industrial areas and will organize 1-2 days pollution control camps in the various industrial area. Hence, the scheme of providing financial assistance to the NGOs will be of great importance and the need of the hour in controlling environmental degradation.

### **Programme contents**

- Preparation of publicity materials and other necessary informative and educative material for distribution including video films, models exhibits etc.

- Preparation of various guidelines and other safety measures to be taken by the industrialist for the protection of the workers.
- Organizing dramas/street plays etc., for educating general public, school children and industrial workers including pollution camp.
- Need based activities especially in the field of waste minimization; Rainwater harvesting will be supported. The existing gaps on Delhi's Environmental issues will be identified through this scheme.

**Starting Date of the Scheme**

This scheme is being implemented from the financial year 1998-99

**Target Date of completion of the Scheme**

The Scheme is being implemented from the financial year 1998-99 and will be continued throughout the 10<sup>th</sup> Five Year Plan. Since this activity is of informative and educative nature, no specific date of completion can be given.

**Any Evaluation Study Made**

Mid term evaluation study shall be conducted after 2003-2004.

An outlay of Rs. 100.00 is proposed for the 10<sup>th</sup> Five Year Plan. An Expenditure of Rs. 20.00 lacs is anticipated in the Annual Plan 2002-03. An outlay of Rs. 50.00 lac is approved for the Annual Plan 2003-04.

(7) **PREPARATION OF ENVIRONMENT MANAGEMENT PLAN (Rs.50.00 lac)**

**Nomenclature of the scheme**

Grant-in-aid to School of Environment Management, Guru Gobind Singh Indraprastha University for Environment Management Plan.

### **Objective of the scheme**

Remote Sensing Technology has recently emerged as a powerful tool for providing a highly reliable, cost effective, comprehensive and timely information on environmental status which together with the GIS can be utilized well for the overall sustainable development, planning and management of a region.

### **Problems of Delhi**

- Air Pollution
- Water Pollution
- Land Pollution
- Noise Pollution
- High Rate of Groundwater Depletion
- Very High Man/Land Ratio
- Intensive Urban Land Use
- Low Greenery
- Inadequate Waste Disposal System
- Semi-Controlled Growth & encroachments
- Low Quality of Life
- Fourth Most Polluted City in the World

Delhi, the heart of the country is today very much plagued by all sorts of environmental degradation. Even since declaration of Delhi as the National Capital City in 1911, there has been steady inflow of people from all parts of the country. The population of Delhi recorded a phenomenal increase after independence with large scale influx of people from across the border. The Population of Delhi has increased to 13.78 million in the year 2001. Continuous migration of people into Delhi has stressed the existing infrastructure facilities within the city to the point of no return. Growing population pressure and human activities are constantly increasing the demand on the limited land resource. To meet the unprecedented demand of land for agriculture, forest, pasture, urban and industrial pursuits, reliable and comprehensive information on the

spatial distribution pattern of land related activities and its periodic change for formulating a sound national land use policy and strategies for optimum land use planning is required.

### **Needs of Delhi state**

- Holistic approach to Environmental Issues
- Long Term Environmental Planning
- Accurate Geo-spatial Data base
- Effective Environmental Management
- Continuous Monitoring using Remote Sensing & other Methods

### **Remote Sensing and GIS for EMP**

Remote Sensing technology is the only tool to provide timely information on spatial and temporal scale. The Remote Sensing technique, by using ITS-1C/1D imageries and PAN Data in conjunction with ground truth surveys will enable to identify, locate and map various types of lands associated with different landform units (Dhinwa, 1992; Palaniyandi and Nagarathinam, 1997; Murthy and Venkatesware, 1997; Khan, etc. al. 1999). The raw data produced by the remote sensing is integrated and analysed by the Geographical Information System (GIS), which is an organized collection of computer hardware, software and geographic data (ESRI, 1995). GIS is a powerful spatial planning tool finding applications in the areas as diverse as environmental monitoring and evaluation, land use and resource management, forestry management, marketing, wasteland planning and change detection. To outline a scientific approach to wasteland management, mapping of wastelands and formulation of suitable reclamation strategies are essential prerequisites. The first part of the problem, namely mapping can be reasonably attempted by making use of Remote Sensing satellite data. From the Eco-fragile areas so mapped, it is necessary to identify homogeneous regions for suggesting a suitable reclamation strategy.

To establish multipurpose Database Centre related to Natural Resources and Environment Pollution. The following maps will be generated:

- Ecological Landuse Map.
- Air Quality Map.
- Hydrogeomorphology Map.
- Water Quality Map.
- Noise Pollution Map.
- Soil Quality Map.
- Land Capability Map.

**Departments to be benefited from the maps prepared by this project**

1. Environment and Forest Department, Govt. of Delhi.
2. Delhi Pollution Control Committee.
3. Ground Water Cell, Govt. of India.
4. D.D.A.
5. Irrigation and Flood Control Department
6. Land and Building Department
7. Industry Department.
8. NCR Planning Board.
9. Ministry of Environment and Forest, Govt. of India.
10. Central Pollution Control Board.
11. Municipal Corporation of Delhi (M.C.D).

**Total cost of the Project**

This is a new scheme of School of Environment Management, Guru Gobind Singh Indraprastha University for Environment Management Plan. The total cost of the project is estimated at Rs. 114.00 lac.

### **Programme contents**

For preparing Environment Management Plan (EMP) of Delhi State, latest techniques like Remote Sensing and Geographic Information System (GIS) will be used. Remote Sensing can provide some of the useful land information, particularly natural resources and land use change etc. GIS on the other hand, is an effective tool not only for input, storage and retrieval of a voluminous spatial as well as non-spatial data, but also for analysis and integration of these data to derive useful outputs in a desired way.

#### **1<sup>ST</sup> Phase: Situation Analysis**

- Collection of Existing Data
- Bridging the Gaps in existing Data and improving availability of Information.

#### **2<sup>nd</sup> Phase : Strategies for Sustainable Development**

Presently 1<sup>st</sup> Phase will be undertaken and it will be completed within a period of 3 years and the 2<sup>nd</sup> phase will be started only after submitting the report of 1<sup>st</sup> phase and after receiving the comments of various user department.

#### **Studies to be undertaken in 1<sup>st</sup> phase will be as follows;**

##### **ECOLOGICAL LANDUSE**

The main work to be undertaken relating to Ecological Landuse are as follows:

- Mapping of Ecological Landuse at the scale of 1 : 12,500.
- Identification of the Eco-Fragile Area.
- Identification and mapping of the existing status of vegetation in Ridge Forest and in general.
- Identification of the degraded area within the Ridge which can act as potential land for further afforestation.
- To study the possible watershed management practices in the Ridge.

- Collection of Soil data for thematic soil quality maps.
- Creation of land capability and land suitability map.

### WATER ENVIRONMENT

The main objectives of the proposed study are the following:

- To assess the groundwater and surface water resources.
- To identify natural and artificial drainage patterns.
- Collection of field data for analysis of aquifer data.
- Delineation of the areas of over exploitation of water resources and preparation of water table depth and fluctuation maps.
- Sampling, analysis and preparation of surface and ground water quality maps (Physical, chemical and biological)
- Identification of areas and sources of surface and ground water pollution.
- Identification of the location for water harvesting and recharging sites.
- Delineation of micro and macro watershed based on the surface topography.
- Action plans for management of identified hot spots.

### AIR ENVIRONMENT

Industrialization and burgeoning urban population beyond the carrying capacity of the different components of urban ecosystems, coupled with indifferent urban governance, is the root cause for urban environmental problems.

The proposed integrated air quality management system would comprise the following modules.

- Air Quality Monitoring –Air Quality and Meteorological Parameters
- Air Pollution Analysis
- Air Quality Identification of Hot Spots

This system will provide an integrated tool to address the issues of air quality emissions, monitoring and management in Delhi for taking decision about reductions achievable for various proposed mitigation strategies.

- (1) Meteorological Data:- Six Meteorological parameters, namely ambient temperature, wind speed, wind direction, precipitation, stability class and mixing height will be used for air quality monitoring.
- (2) Air Quality Monitoring :- Under Ambient Air Quality Monitoring, the pollutants monitored will be SO<sub>2</sub>, NO<sub>2</sub>, CO, O<sub>3</sub>, Benzene and SPM. In addition to these no. of specific parameters take RSPM, lead, trace metals and PAHs will also be monitored following the standard procedures.
- (3) Analysis :- It might range from simple averaging of meteorological data, through linking air quality and meteorological data together for using the data to forecast a future improved state of the environment.

Mapping will be done at 1: 12,500 scale using satellite data for the entire state. The proposed studies and the formulation of the plan will be completed in 3 years.

### CREATION OF DATA BASE

#### **(a) Remote Sensing Data**

##### Acquisition of Data

- (i) Photographic products
  - IRS-LISS III FCC (2000-01)
  - IRS-PAN Geocoded Data (2000-01)
- (ii) Digital Products
  - IRS-LISS III Scenes (2000-01)
  - IRS-PAN Scenes (2000-01)
  - IKONOS Scenes (2000-01)

##### Satellite Based General Survey

- (i) Preparation of base maps: - Base maps will be prepared at different scales for Delhi with the help of SOI's toposheets.
- (ii) Interpretation of Satellite Data: - IRS-LISS-III and PAN data will be analyzed in order to get land use/land cover maps, Hydro geological maps and change detection for the entire state.
- (iii) Ground Truth and Finalization of Maps: - Ground truth will be carried out for ambiguous feature and necessary correction will be made in the visually interpreted maps in order to get the final maps.

**(b) *Ancillary Data***

Secondary data related to soil, water, air, noise from various agencies will be collected.

**(c) *Laboratory Data***

Data collected from field relating to air, water, soil, and noise will be analyzed in the laboratory.

***Position of approval of SFC***

After approval of the Planning Commission, the scheme will be placed before SFC for its approval.

***Starting date of the scheme***

The scheme is yet to be approved by Planning Commission, Government of India.

***Target date of the completion of the scheme***

Project duration is 5 year. Phase I will be completed in a period of 3 years and phase-II in 2 years.

***Pattern of assistance***

Pattern of assistance will be finalized once the project got approved.

An outlay of Rs. 100.00 lacs is approved for the 10<sup>th</sup> Five Year Plan. No expenditure has been incurred during 2002-03. An outlay of Rs. 50.00 lacs is approved for the Annual Plan 2003-04

**(8) INSTALLING EFFLUENT TREATMENT PLANTS IN SEVENTEEN DRAINS WHICH DISCHARGING IN TO RIVER YAMUNA(Rs.20.00 Lac)**

**Objective of the Scheme:**

1. To install ETPs or other pollution control devices as found suitable after a techno feasibility study in the 17 drains which discharge into the river Yamuna.
2. Building up of database on water quality parameter of the 18 drains.
3. Locating pollution sources of the drains.
4. Drawn up suitable Action Plan based on the results of water quality of the drains.
5. Coordinating with related organizations like CPCB, DJB, Flood and Irrigation department for implementing action plan so as to improve the water quality of the drains.

**Need and justification of the scheme:**

The Delhi stretch of river Yamuna is highly polluted. The main reasons for pollution of the river are as under: -

1. There is no perennial fresh water flow in the river below Wazirabad barrage and downstream along its 22 kms stretch upto Okhla barrage. This is because the entire river flow is ponded upstream of Wazirabad for meeting the drinking water requirement of Delhi. Thus, there is no dilution capacity in the river along its Delhi stretch.
2. On the other hand, nearly 3000 million litres per day (mld) of effluents containing sewage and industrial wastes are discharged into the river in partly treated and partly untreated condition.

3. About 62,000 odd jhuggies are located on the embankment of river or major storm water drains numbering 17 and discharging wastewater into Yamuna. The Najafgarh drain is the largest of the 17 drains and is responsible for nearly 70% pollution of river Yamuna in Delhi. Due to lack of proper sanitation facilities, the people living in these clusters use open areas for defecation. Waste generated from these areas ultimately finds its way through the open surface drains into river Yamuna. The drains that fall into the river are storm water drains originally meant for conveying excess rainwater. However, they now carry sewage and garbage.

All the wastewaters flowing through these drains are to be necessarily treated by the STPs before discharging into river Yamuna. Presently there is no system for ascertaining whether the quality of drain water is meeting the desirable standards before discharging into river Yamuna. This project will facilitate to Install ETPs or other pollution control devices and to monitor the water quality in the drains in a continuous manner. The monitoring observations will be useful for knowing the pollution status of the drains and to drawn up suitable action plans for improving the quality of water in the drains as well as in river Yamuna.

**Total costs of the scheme:**

Feasibility study is yet to carried out. It may cost more then 1000 crore.

**Programme content**

ETPs will be installed in the outlets of the seventeen major discharges in to river Yamuna. Now this scheme would be taken care of by the STPs proposed to be constructed under Y.A.P.II by DJB. Environment Department will make a system for ensuring wastewater treatment up to the prescribed standards. This Department will maintain the database on the drain water quality. Appropriate Action Plan will be drawn up based on the drain water quality results and it will be implemented with the cooperation of related organisation with Delhi Jal Board, Flood & Irrigation Department

and Central Pollution Control Board etc. For managing the functioning the ETPs, this Department will recruit sufficient manpower & develop infrastructure.

**Position of approval of SFC**

Feasibility study is yet to be carried out. SFC approval may be obtained after preparation of D.P.R.

**Starting date of the Scheme**

The implementation of the scheme will started after getting approval from the Planning Commission, Govt. of India.

**Target date of the completion of the Scheme**

Being the new scheme to be implemented in the tenth five-year plan, the target date doesn't arise, besides this will be continuous scheme of this department.

**Financial Targets**

Up to 1 <sup>st</sup> Quarter	:	25%
Up to 2 <sup>nd</sup> Quarter	:	50%
Up to 3 <sup>rd</sup> Quarter	:	75%
Up to 4 <sup>th</sup> Quarter	:	100%

**Pattern of Assistance**

The Government of India will contribute 70% under Yamuna Action Plan phase II and share of Delhi Government will be 30%.

**Any evaluation study made**

The scheme is yet to be started

An outlay of Rs. 1800.00 lacs is approved in the 10<sup>th</sup> Five Year Plan. An outlay of Rs. 20.00 lacs is approved in the Annual Plan 2003-04.