FOREWORD

For sustainable Development, it is necessary that we integrate into our decision making processes, environment concerns and parameters. It involves also the deepening of environment consciousness in the civil society and comprehensive information and data bases. Very significantly, it calls for a holistic rather than sectorally segmented picture of the State of environment. A larger picture, held together by fact, figures and analysis, is required to make our future strategies for environment both realistic and viable. For, Haryana, this first State of the Environment Report (SOER) is an important mile stone in the direction of achieving in the Rio Convention of 1992 and in the connected Govt. of India mandate.

The report would no doubt serve to define a benchmark for the State of the Environment for enabling evaluations of environmental policies and interventions now and in the future. The compilation exercise itself, coordinated ably by the Environment Department, Administrative Staff College of India, Hyderabad, and the Forest Department, has been as synergizing experience with a large number of department and institutions working together. Partial perspectives have moved towards an appreciation of commonality in a shared concern-Environment. This SOER, rich in statistics and information, is bound to reflect the process of various sectors coming together to share the same platform of Environment awareness and commitment. This document reaffirms the resolve of the people and the Government of Haryana, to protect preserve and nourish the Environment of the State and the Country.

SAMIR MATHUR, IAS

Commissioner & Secretary to Govt. of Haryana.

Environment Department.

ACKNOWLDEGEMENT

The genesis of sustainable development lies in the fact that we shouldn't sacrifice our tomorrow for the sake of today. The Rio Earth Summit in 1992 formulated an action plan, Agenda 21, a multifaceted process to address the full range of development & environment issues involving participation of governments, international organizations and major groups in the quest for sustainable development. UNEP (United Nations Environment program) is mandated to prepare global, regional and national State of Environment Reports. Under the aegis of UNEP, the Ministry of Environment & Forest, Govt. of India is getting compiled the State, Haryana has prepared its own State of Environment Report. This report concerns the physical environment of the people of Haryana. The fact that there is degradation of environment. This, the first report of SOER may be considered a bench mark compilation of the environmental parameters for public initiatives, legislative reforms and changes in public behavior. In brief, State of Environment Report is identifying the strengths and weaknesses of current approach and recommending the future course of action.

As s part of process of formulating SOER, GOI decided to tap the available experience and expertise in the country through four national host institutions for assisting in setting up of SOE reporting system and in this respect GOI designated Administrative Staff College of India, Hyderabad as National Host Institution for the state of Haryana.

The process was set in motion the National Host Institution conducting a sensitization workshop attended by representatives of line departments responsible for giving material for bringing out SOER. A State Steering Committee was constituted under the Chairmanship of Chief Secretary to Govt. of Haryana for completing the work of SOER in a time bound manner. Regular meetings/discussions were held and monitoring was done at the level of Chief Secretary to Govt., Haryana. Sh. Samir Mathur Commissioner and secretary to Govt. of Haryana Environment deptt. Has been source of constant inspiration, guidance and encouragement and remained thoroughly involved in the preparation of SOER. Sh. D.S. Dhesi, IAS, previous Commissioner & Secretary to Govt., Haryana were a source of encouragement for the nodal officers/resource persons responsible for the preparation of SOER. The valuable inputs were given by the nodal officers S/Shri J.S. Vashist, Additional Director Agriculture Department, A.k. Gupta, Technical Expert, Industries Department, P.k. Sharma, Mining Engineer, Mines & Geology Department, S.S.Dhir, Superintending Engineer, Urban Development Department, Dilbagh Singh Sihag, District Town Planer, Town & Country Planning Department, K.K. Bhugra, Eic, Huda, O.p. Yadav,PDo, Animal Husbandry Department, G.k. Ahuja,Cf, Forest Department, V.K. Gupta, Deputy ESA, Economic & Statistical Department, S.I. Khullar, CE, Irrigation Department, R.K. Kaushik, FDO, Fisheries Department, Prem Sagar, Jt.Dir,Tourism Department, B.S. Dahiya, Director, CCS, HAU, R.N. Malik, GM, HSIDC, A.K. Sheokhand, XEN, Development & Panchyat Department Sh. Raghubir Singh, Research Officer, Rural Development Sh. R.K. Rohila, Joint Controller Transport. In addition, the Resource Person namely Sh, A.K. Mehta, Joint Director,

Env., Sh.R.k. Julka, Superintending Engineer, HPGCL, Sh. S.k. Khanna, Superintending Engineer PWD(PH), Sh. S.C.Mann, Sc.C., Pollution Control Board, Sh. S.I. Khullar, Chief Engineer, Irragation, Dr. R.D. Jakato, Chief Wildlife Warden Sh.S.L. kasushik, Director, Health, also made rich contribution in compiling the sector-wise chapters.

I am highly thankful to Dr. T. Kolanu, and Professor Dr.G.k. Anand of ASCI, Hyderabad for their valuable guidance given in the preparation of SOER. Dr. R.D.Jakati, IFS, Cwlw in addition to contributing his departmental share to this document also made every effort in his capacity as Resource Coordinator in compiling & drafting this document in a time bound manner. Incorporating the data provided various line department/agencies. The assistance rendered by Research Associates Sh. Sushant kapoor and Ms. Preeti Kaistha is also appreciated. Last but not the least, I appreciated. Last but not the least, I appreciate the work of officers of my Department and their personal/office staff who were found always ready during undertaking this exercise of preparation of SOER.

JAIWANT SHEOKAND, IAS

Director & Special Secretary,

Environment Department, Haryana

PREFACE

Haryana state came into existence on the 1st of Nov. 1966 as a result of the reorganization of the erstwhile Punjab state. Since its formation the state has undergone remarkable developments. And today the state is one of the prosperous states of the country. The per capita income- wise it is amongst the highest in the country. The population below poverty line is around only 8%. The total geographical area of the state is 1.4% of the country's area but it contributes around 6% to the food production of the country. Eight of the twenty districts fall in the National Capital Region and serve as the hinterland to the national capital, Delhi.

However, all these developments are associated with the attendant pressures on the environment. This report, the first of its kind for the state, compiles the status of the environment as of today and the data therein may serve as the baseline for the comparison later. While attempt has been made to record as much relevant information as possible, no claims are made about the same being totally exhaustive.

The report is compiled separately for the important sectors of human activity rather than for each component of environment; and is thud=s oriented towards making suggestions for action plan by the resource managers.

It is presumed that the report while generating enough public awareness for every common person to take action to prevent environmental degradation at his level may, make the managers of the natural resources vigilant about the sustainable use of the resource in their charge.

RD JAKATI, IFS

Chief Conservator of Forests, Haryana

SUMMARY

The Rio conference of 1992 adopted Agenda 21 for the sustainable development of human environment. UNEP is mandated to prepare State of the Environment report at regional and national level. Under the umbrella project of the Ministry of Environment reports are being compiled for all the states in the country. The Ministry of Environment & Forest, Government of India identified the Administrative Staff College of India, Hyderabad as host institution responsible for preparation of State of the environment report.

This report concerns the physical environment of the people of Haryana. The fact that there is a need for assessing the status of the environment has implicit in itself that there is degradation of environment. This, the first report of the State of the Environment may be considered a bench mark compilation of environmental parameters for public use which can be monitored in future for the health of human beings.

This report has been prepared with the readily available information with the various departments the work of which, directly or indirectly, effect environment in the state.

Haryana state is a relatively smaller state of the Indian Union. The state's total geographical area is 44212 sq km which constitutes 1.4% of the Shivalik hills and in the south and southwest by the Aravalli hills. The southern districts have sandy undulating landscape. The central region is more or less a plain Indo-Gangetic area. There are 20 districts for the administration of the state. The river Yamuna flows along the eastern boundary of Haryana and is the only perennial river. The agriculture is the main source of economy and about 65% of the population depends on agriculture. The average population density of state is 478 sq. km. The literacy rate is about 68% (exclusive of children the age of 6 years). The per capita income of the state at 1993-94 prices is Rs. 15721 which is amongst the highest in the country. The population below poverty line is 8.74% which indicates the relative prosperity of the state.

The increasing population and the improvement in the 'quality' of life are the two basic driving forces responsible for the degradation of the environment. These driving forces manifest in the government policy of urbanization, industrialization and increasing the production from agricultural sector. In order to reduce the impact of these pressures, the state government has taken various initiatives. All these have been enumerated sector-wise in this report.

Agriculture:

The demand for increasing the production has increased the use of fertilizers, pesticides and has led to the mechanization of agriculture. The production of food has increased from 2592 thousands tones in 1966-67 to 13,294.8 tones in 2004-05. The expansion of irrigation facilities have lowered the water table at some places but created water table at some places but created water logging elsewhere. This is the reflection of the unchecked utilization of water resource. More than 84% of the land is under cultivation and about 53% of which is irrigated by tube wells and the

other 47% by canals. The area along canal sides in many districts has developed water logging while in those away from the canals the water level is going down. Out of 119 blocks of the state 79 blocks the water level has shown declining trend.

Over the last three decades there has been a continuous increase in the area under rice and wheat cultivation mostly as the outcome of the mechanism of minimum support price for wheat and paddy. The percentage of the net-area-sown under irrigation has increased from 38% in 1966 to 84% in 2003-04. The number of tube wells increased from 1, 04,358 in 1970-71 to 611598 up to 1050027 during 1970-71 to 2004-05. The pesticide consumption increased from 412 tones in 1966 to 4700 tones in 2004-05. Amongst all crops under cultivation in the state the area under cotton is about 5% but its share in pesticide consumption is about 55%.Although the state is one of the smaller states of the Indian Union the consumption of pesticide is amongst the top states in the country. The area under water logged sites and the salinity-affected areas also show a considerable increase. 0.52 Million hectares of land is salt affected.

The soils in Haryana have shown continuous impoverishment. The negative balance in respect of micronutrients like manganese, iron and copper have shown continuous increase over the last three decades reflecting the deteriorating soil fertility status. The net negative in respect of Fe increased from-123 in 1966-67 to515 in 1999-2000, Mn increased from -65 to-358and Cu from-7 to-10 during the same period. Thesoil examination has also revealed contamination with BHC and DDT residues Soils under other crops. Pond water analysis has revealed contamination with organo-chlorine and other pesticides. A few samples of vegetables and fruits have also shown pesticides contamination above MRL values. 42 fruit samples were analyzed and all the samples were found to contain the pesticide residues.

Limited studies conducted at CCSHAU, Hisar have shown that pesticides when used at higher concentration are accumulating in soils and are adversely affecting soil microbial health and soil fertility.

Efforts are being made by the state agency to reduce water logging and for ground water recharge. An externally aided project is being implemented in the state in Shivalik hills for the control the floods. The creation of awareness amongst farmers to reduce the pesticide consumption and educating and training of pesticide dealers has been suggested.

Urban & Rural Development:

One of the most important driving forces is the increasing human population and improvement of the quality of living which is associated with expanding human habitation industrial development and also depleting water table pollution of fresh water sources and also of ambient air quality. Although one of the small states of the Indian union, Haryana is amongst the most prosperous states of the country. The per capita income of the state in the year 2003-04 at 1993-94 prices works out to Rs. 15721 as against Rs. 11013 (Q) average for the whole country. The population density in the state is 478 per sq

km 2004-05. 72% of the total urban population resides in 20 towns with population more than one lac or above. Whereas the growth of urbanization of the country in the last decade has been about 31% that Haryana has been 51%, for Punjab it has been 37% and H.P.32%.

The efforts to lessen the pressure on the National capital Delhi has led to the evolution of the concept of national capital region. Seven of the 20 districts of Haryana fall in the national capital region which contains 41% of the total population of the state. Although the average population density of the state is 478 person per sq Km that of the Haryana part of national capital region is 645 person. In the last about 35 years the number of registered factories in the NCR part of Haryana about has registered about eight fold congestion.

The number of vehicles per hundred sq km of area is 1791 for the country but for Haryana it is 4408. In The decade the vehicles population has increased by 300%. Urbanization in the state, however, has created problems of water pollution, air pollution and urban congestion.

It is estimated that about 33% of the urban population lives in the slums. The highest population of slum dwellers is in the township of Rewari, Faridabad, Hansi and Ambala. Although the number of water connection between 1993-94 and 2001-02 increased by more than 60% the impacts are not visible since the growth of urban and rural population is faster.

Accelerated urban water supply programmed with assistance from the centre is being implemented in the state. In addition Augmentation and Extension Water Supply and Sewerage Scheme in towns of the state are under implementation.

The Yamuna Action Plan phase-II project has been approved the by National River Conservation Directorate. An amount of Rs.62.5 corers would be spent during the period 2003-04.

Integrated development of small and medium towns, environmental improvement of urban Slums, and National Slums Development Programmed are being implanted in the state.

Milk dairies located in the habitation of 12 towns of the state are being shifted outside the urban habitation. The scheme of solid waste management for most of the townships of the state is also under implementation

Energy

- ☐ Availability of energy is the basic input required to sustain economic growth and prosperity of all the sectors.
- ☐ Rapid industrialization, urbanization and expansion of transport facilities has led to the increased consumption of power and petroleum products.

- ☐ The power generation, which was only 343 MW in 1966-67, has risen to 4033 MW in 2005.

- ☐ The state has limited available natural sources. The state depends on the thermal power; the coal mines, however, are located far away. The wind velocity being insufficient is inadequate for power generation.

- ☐ The state depends mainly upon the limited thermal generation capacity installed within the state and hydropower from the jointly owned projects. These thermal power stations they are responsible for air pollution, water pollution and noise pollution.

- ☐ The difference in the availability and consumption of energy is to some extent met with by diesel generators installed in the industries, commercial and residential areas.

- ☐ **Present status of the Consumption of electricity for the year 2004-05 by different sectors is: domestic sector 21%, commercial 5%, miscellaneous 8%, agriculture 41% and industrial sector at 25%.**

- ☐ The Faridabad thermal power station consumes 810933 tones of coal. The ash generated is 26.5% for the years 2004-05. Similarly at Panipat thermal power station, the ash generated is 37.53% for the year 2004-05.

- ☐ Though in the urban areas higher percentage of people are using LPG and kerosene as their major flues, in rural areas majority of them are still relying on the use of dung cake, crop residues and firewood as their main fuel. This is hazardous to the health and also adds to air pollution. The unhindered use of energy by agricultural sector has resulted in the depletion of groundwater in the several parts of the state.

- ☐ In this regard the state has undertaken steps to reduce the environmental impact of power stations such as installation of electronic Bapcon Controllers to bring down stack emission within the prescribed norms and the installation of the dry fly ash collection and disposal system at Panipat and Faridabad TPS.

Apart from these programmes various renewable energy projects have been worked out to trap carbon emission.

Industries & Mining:

Under the large and medium sector 1242 units and small- scale sector 70284 units have been set up which provide employment to about 12.65 lac persons in the state. In line with the changing global and domestic environment the state government has adopted a new industrial policy w.e.f

June 2005. The state has abolished all physical barriers to trade & commerce and has abolished octroi tax.

- There are 56 major grossly polluting industries which discharge their effluents into rivers and lakes. Although 43 of these units comply with the standard laid down by central pollution control board two industries do not comply with the standards.

- Of the 4622 industries categorized as water polluting ones 1839 have established ETP.4275 units are meeting the standards while 500 units have yet to establish ETPs.
- The water quality is being monitored at Palla on Delhi-Haryana border. While most of the parameters being monitored fall more or less within the prescribed limits, the total colliforms have mostly been much more than the maximum of 5000 allowed.

- The water quality of WJC is being monitored at 6 places in the state and that of river Ghaggar at two locations. The total BOD load released in water courses in Haryana by polluting industry and domestic sewage is estimated at around 39750 kg per day. The examination of ground water quality reveals that water in Gurgaon and Dharuhera has fluoride marginally more than acceptable limits.

- The air quality is being monitored at Yamunanagar Faridabad, Sonipat and panipat areas. In Yamunanagar which is an industrial town the SPM count is high. The major problem in the residential areas in most of the towns is motor vehicle traffic. The current capability of air monitoring agency, however, is inadequate for the monitoring purpose.

- Haryana is generating 3818 tones/year incinerable waste,639 tones of recyclable waste and 9250 tones/year of waste suitable for landfill.

- The state government has notified bio-medical waste rules and has authorized five private service providers to operate common facility so that small hospitals can take care of bio-medical waste.

- Four common effluent treatment plants have been established at Kundli, Jind, Murthal & Faridabad. The State Pollution Control Board has prepared an action plan to ensure that all polluting industries set up ETPs by the end of 2005-06.

- The State Pollution Control Board initiated a state wide net work of national ambient air monitoring programme in 1992 with 2 stations

each in Yamunanagar and Faridabad. By the end of 2005 a total of 10 monitoring stations covering 5 towns have been established.

- The total number of air polluting industries is 6465 of which 3880 have installed APCM. However, 1888 are not complying with standards laid down.

- The state has notified 32 acres land in Faridabad for common facilities under Hazardous Waste Management Rules.

MINING:

The state does not have big areas under mining activity. However, there are mines of stones, boulders, sand and marble. On the recommendations of mining Department 107 mining leases for major minerals have been granted. Under the rules framed by the department it is mandatory for the lease holders of major minerals to prepared environment management plan and seeks the approval of committee headed by Secretary, Government of Haryana, Environment Department.

Mining degrades the land and creates air and water pollution. The biodiversity of the area is also affected. The state government proposes to adopt a new policy frame work for the economic operation of mining, addressing the key areas of environment sustainability and resource conservation.

Forests

Forests are of great ecological importance. They not only maintain ground water levels, prevent the floods and soil erosion but also supply different raw materials to many industries e.g. paper and pulp, saw mills, resin, and tourism. Haryana, primarily being an agricultural state is having only 3.5% as the net recorded forest area. The present forest cover area is 1559 sq.km; the dense forest cover is 520 sq. km. The total forest and tree cover is 6.6% of its total geographical area. The natural forests are confined to Himalayan region of Yamunanagar and Panchkula districts.

- ☐ Number of factors responsible for the loss of biodiversity in the state are as follows:
- ☐ In the last about thirty five years the permanent pastures area has reduced from 46000 hectares in 1966-67 to 25000 in 2002-03, the extent of barren and unculturable land has decreased from 232000 to 99000 hectare. Most of these areas have been used for other purposes like cultivation and other land uses.

- ☐ The cattle pressure has increased. In the year 1966 the grazing area available per cattle unit was 0.188 hectares which has reduced to 0.175 hectare in 2003.
- ☐ The increased use of pesticides and agrochemicals has affected the birds' and other small animal population adversely. Chlorpyriphos used for the treatment of seed has taken toll of peafowl population in the state. Diclofenac residue has been responsible for the crash in the population in the most abundant vulture species.
- ☐ Frequent forest fires in the Shivalik areas cause degradation of the natural forest and causes damage to the biodiversity.
- ☐ Afforestation by monocultures on the community lands and other "a waste land under social forestry programmes has reduced the biodiversity of the areas."
- ☐ To reduce the pressure on natural forests and to increase the tree cover in the state the following strategies have been adopted:
- ☐ Social forestry programmes have been taken up on rail, road and canal sides and on the community lands.
- ☐ EU aided community forestry project is being implemented in 300 villages in the state. A EU aided Aravalli Afforestation Project was successfully implemented in 294 villages between 1990 and 1999.
- ☐ The forest department has been promoting agro-forestry on farm lands to reduce the pressure on natural forest.
- ☐ Soil and water conservation programmes are a part of normal forestry works. A World Bank Aided Kandi project was also implemented in the Shivalik areas of the state.
- ☐ Joint forest management is under implementation with 350 Hill Resource Management Societies managing 60,734 hectares of forest land.
- ☐ For the prevention of poaching of animals wireless communication has been provided to the staff and arms to these working in sensitive areas in Shivalik hills.
- ☐ To create awareness amongst people nature education programmes are organized involving school children, farmers and teachers.

Health

- ☐ The major environmental factors which exaggerate the health problem are the ones pertaining to water & sanitation related diseases. The number of such cases reported has been increasing in the last two to three years.
- ☐ The pressures on the human health are mainly associated with the unhygienic living conditions, poor drinking water quality, improper sanitation and facilities etc., which encourage the spreads of diseases. The diseases like cholera, gastroenteritis and diarrhea have shown an increase in the last few years. The polluted air due to various factors such as vehicular emission, industrial pollutants and noise pollution etc lead to various physiological and psychological diseases. The number of TB patients has also increased. The exposure to chemicals & insecticides due to their increased usage for crop production also cause carcinogenic effects.

- ☐ Haryana has made rapid progress in providing health facilities by opening more and more hospitals, PHCs, CHCs, and increased the number of beds for patients in hospitals in the last few years. As a result efforts made by state govt., the status of health has shown the encouraging signs as birth rate has gone up, IMR and death rates have gone down and life expectancy rate has increased as compared to overall Indian rate.
- ☐ To counter the ill effects of the bio-medical waste produced in the state special provisions have been made. In all, 14 incinerators have been provided in Rohtak, Kurukshetra, and Ambala etc. for treating bio-medical waste. Special budget has been allotted to civil surgeons in the state for the training of Para-medical staff, procurement of material and for the proper disposal of waste.

The state government has several programmes like NSPCD ,RNTCP to monitor the out-break of any disease. The water samples are regularly checked for proper chlorine treatment and bacterial contamination. A special new called, 'Sakar Aap ke Dwar' ("SAD") has been launched specially for the factory workers, who are not aware of health hazards. The team of doctors visits their respective premises to guide them on the health matters and treat them.

INTRODUCTION

1.0 BRIEF BACKGROUND TO THE SOE

The State of Environment Report (SOE) provides an over view of the prevailing bio-physical and socio-economic conditions in a particular area. This provides a document to assess how human activates affect the environmental conditions and their implications on health and his well-being.

The State of Environment Report, a project of union Ministry of Environment and Forests, Government of India aims to prepare this document in a common frame work for all the states in the country to enable comparative environmental profiling of different states. The Ministry of Environment and Forest, Government of India identified Administrative Staff College of India (ASCI), Hyderabad as a National Host Institution. The Environment Department, Haryana was designated as a State Host Institution who was responsible for getting prepared the SOE with the help of various departments taking care for the conservation and preservation of environment including prevention, control and abatement of pollution under the guidance given by the National Host Institution.

Within this overall process, the National Host Institution conducted a sensitization workshop, which was attended by the representatives of all the line departments responsible for giving material for bringing out the SOE.

A meeting of the State steering Committee was also held under the chairmanship of the Chief Secretary to Government of Haryana for completing ten work of SOE in a time bound manner. Further for finalizing the strategies for preparation of SOE, a four days Capacity Building programme was held from 29th October to 3rd November, 2003, wherein, it was decided that for the state of Haryana, a sector based report should be prepared to enable the state government to get the best input from the concerned line departments/ Agencies of the state. It was also finalized in the workshop that for achieving the target for getting the comprehensive SOER, there should be three tire system. In the first tire, there should be Nodal Officers of all the line department/agencies, who will collect &compile the data of the department/ agencies and send the same to the Resource Persons designated by the state government for each sectoral chapter. The Resource Person should prepare their draft sectoral chapter on basis of data sent by Nodal Officer and send the same to the Resource Coordinator, who should be the overall in – charge for the entire report.

As a follow up, a meeting was again held on 17.11.2003, wherein in the names of Nodal Officers of various department/agencies responsible for compiling the data of the various department/agencies were finalized. In addition, the names of various Resource Persons responsible for preparing the

sectoral chapters i.e. Energy and Environment, Urban Environment, Rural Environment, Mining and Industries, Agriculture, Irrigation, Animal Husbandry, Transport/Tourism, Forest, Wildlife and Bio-diversity, Health, Environment Monitor and Introductory Chapter were finalized. The Chief Wild Life Warden was nominated as the Resource Coordinator for preparation of SOE for the state OF Haryana.

As per the decision of the state government, the SOE report for the state of Haryana was drafted with the help of various nodal officers and resource persons. A list of the contributors is appended at the end of the report.

2.0 SCOPE OF THE SOE

The State of environment Report (SOE) cover the state of Haryana, which is situated between 27o 39'to 30o 56' n latitude and 74o 27'to 77o 36' e longitude, covering an REA OF 44,212 SQ KM It occupies 1.40% of the total area of the country. The state has natural geographical boundaries of the Shiwalik hills in the north, the river Yamuna in the east and the river Ghaggar in the west. The southwest boundary is provided by a range of Aravalli hills which runs through southern Delhi and Gurgaon district upto Alwar in Rajasthan. The state is bounded by Uttar Pradesh on the east, Punjab in the west, Himachal Pradesh on the north and Rajasthan in the south. Administratively, the state has been divided into 20 districts. Various important aspects of the state including the general profile are detailed below:-

3.0 AREA AND LOCTION

The state of Haryana has an area of 44212sq km which forms 1.4 percent of total area of the country. The state's landscape and soil fertility are remarkably diverse. The national capital Delhi is surrounded about 40 percent of its population falls within the state.

4.0 ADMINISTRATIIVE SET UP

The state of Haryana came into being on Ist November 1966 as the 17th state of the Indian Union, as result of reorganization of erstwhile state of Punjab into Haryana and Punjab. For administrative purposes, the state is divided into 4 revenue divisions namely, Ambala, Hisar, rohtak and Gurgaon. The state is further subdivided into 20 districts, 47 sub-divisions, 67 tehsils, 46 sub-tehsils, 119 development blocks, 106 towns and 6955 villages including inhabited villages. There are 90 state legislature assembly seats and 10 parliamentary seats in the state. At the time of formation of Haryana state, there were seven districts viz., Ambala, Karnal, Rohtak, Gurgaon, Mahendragarh, Hisar and Jind. During the Subsequent reorganization of the state 13 new districts were notified from the time to time by changing the boundaries of the districts. The districts of the state are shown in map below:

5.0 CLIMATE AND RAINFALL

The climate of the state is subtropical, semi-arid to sub-humid, continental and monsoon type. The average rainfall of the state is 560 mm which varies from less than 300mm in south-western parts to over 1000 mm in the hilly tracts of Shiwalik hills. The state has 3 main climate regions. Average annual rainfall and air temperature are given below:

Rainfall and temperature of Haryana.

Region	Mean Rainfall (mm)	Avg. Temperature (0C)
Hot Arid Region	300-500	27
Hot Semi Arid Region	500-750	26
Hot Sub Humid Region	750-1050	24

6.0 PHYSIOGRAPHY

Haryana is located between the Shiwalik hills on the northeast and Thar Desert on the south- west. A topographical depression exists in the canter with its axis passing through Delhi- Rohtak- Hisar and Sirsa on the regional scale. The state also forms a divide between Indus and Ganges basins. Haryana state has a flat topography with altitude varying from 190 to 480m above the mean sea level except some hills of the Shiwalik in the north and those of Delhi system in the south.

The state is bounded on the east by the river Yamuna. Ghaggar, Tangri, Markanda and Chautang are the other important rivers. Its northern part

generally slopes from the north- east to south-west, but the southern section is undulating due to the hills of Aravalli system and sand dunes. The non-perennial streams flowing in the south are Krishnawati and Kotla Bibipur.

Yamuna is the only perennial river. It forms the boundary between Haryana and Uttarpradesh for over 320 km. The Ghaggar River rises on the slopes in the Shiwalik in Sirmur (HP) and enters Haryana near Pinjore. It alternately passes through Punjab and Haryana before entering Rajasthan and ultimately disappears in Hanumangarh area of Rajasthan.

7.0 GEOLOGY

The geological formation ranges from pre- Cambrian to recent times and can be divided into three geological systems, viz.

I. Aravalli System
II. Shiwalik System
III. Indo- Gangetic Alluvial Plains.

Aravalli system is the oldest formation present in south western parts of the state covering Bhiwani, Mahendragarh, Rewari and Gurgaon districts. They are composed of quartzite sandstone, mica schists, Phyllites and crystalline limestone.

Shiwalik System is located in northern part of Ambala and Panchkula districts and is composed of sedimentary rocks. The dominant rocks are sandstone, shale clays and boulders.

Indo-Gangetic Alluvial plains in the state are formed by the deposition of alluvial sediments between Shiwalik and Aravallis and forms a part of great Indo-Gangetic plains. They consist of sand, silts, clays and occasional gravel beds. Windblown sand deposits are found in the form of sandy plains and sand dunes over alluvial deposits in parts of Bhiwani, Hisar, Sirsa and Fatehabad districts.

8.0 SOILS

The soils of Haryana have been divided into 10 district units namely soils of Shiwalik hills, soils of piedmont plains, Soils of Aravalli hills, soils of old alluvial plains, soils of old alluvial plains with sand dunes, soils of active flood plains, soils of aeofluvial plains, soils of Aeolian plain.

9.0 WATER RESOURCES

Haryana state is in a disadvantageous position with regard to rainfall, surface water quantum and groundwater quality. On an average, the state receives 545 mm rainfall annually, as compared to the environmental requirement of 1550 mm and the country's average rainfall of 1250 mm. The total potential utilizable surface and groundwater resource are estimated at 25.7 x 109 m3/year. The total surface water potential is 14.8 x 109 m3/ year and includes the state's share of 4.2 x 109 m3/year of Ravi and Beas water, which is yet to be

developed. The total potential ground water resources are estimated at 10.9 x 109 m3/year including marginal quality groundwater. In addition to canal water and groundwater, effective rainfall for meeting the consumptive use and the demand of crops is estimated at about 10 x 109 m3/ year.

9.1 SURFACE WATER RESOURCES

Haryana is a co- basin state to the Indus basin Yamuna River in Ganga-Brahmaputra Meghna basin and the major surface water resources of the state are its share in Sutlej, Ravi-Beas an Yamuna waters as per various interstate agreements. The long term stream flow data for river Ravi at Madhopur Head works, River Beas at Mandi plain, River Sutlej at Bhakra Dam site and River Yamuna at Tajewala Head works and Okhla weir site are used for statistical and flow distribution analysis.

Summary of Surface Water Resources

Source	Dependability 50%
River Sutlej	4.94
River Ravi- Beas	4.05
River Yamuna	5.88
River Ghaggar	0.48
River Somb/Pathrala drains & Escapes	1.13
Sarda Yamuna Link	0.29

9.2 CANAL SYSTEM

The above sources are used by an extensive canal system constructed in Haryana. About 2.96 Mha, which is about 75% of total culturable area in the state, is provided with surface canal irrigation by following canal systems:

- Bhakra Canal System covering a CCA 1.89 Mha. In the north western and western part of Haryana.
- WJC system covering a CCA of 1.08 Mha. In the north eastern and central part of Haryana.
- Gurgaon canal and Agra canal system covering a CCA of 0.131 Mha and 0.061 Mha respectively in the south western part of Haryana.
- Lift canal covering a CCA of 0.460 Mha in the south western part of Haryana bordering Rajasthan.
- **9.3 GROUNDWATER**

Ground water cell of Dept. of Agriculture, Haryana has carried out extensive studies on the quality and quantity of groundwater in Haryana. For this purpose, it has installed 2021 observations wells spread throughout the state. Out of these

131 are piezometric tube and another 106 as key observation wells. In addition Haryana State Minor Irrigation Tubewell Corporation (HSMITC), Central Ground Water Board (CGWB) and Agriculture Dept. have drilled 639 exploratory bores to assess the quality and quantity of water at various locations of Haryana. Based upon the observations made from the observation wells, groundwater contours for pre-monsoon and post- monsoon have been prepared. It shows that maximum area falls between 3 to 20 metres depth of water table. Almost 13 percent area in pre-monsoon period and 28 percent area in post-monsoon are under critical water table level of 0 to 3 meters. Almost 9 percent of the geographical area has deep water table varying from 20 metres and above. This area falls mostly in the districts of Ambala, Mahendergarh and Rewari.

The percentage of fresh water is more in the shallow zone as compared to deeper zone. Water salinity becomes more predominant with the increase in depth of water zone. If fact, the area under saline water is substantially higher in the deep water zone. Position is more acute in case of districts Rohtak, Hisar, Bhiwani, Sirsa, Jind, Gurgaon and Sonepat.

The groundwater exploitation is highest in the districts of Karnal, Panipat, Kurukshetra, Rewari, Jhajjar and Yamunanagar. The least exploited districts are Bhiwani, Hisar, Panchkula and Sirsa. Groundwater balance is the difference between the net recharge and the net draft from aquifer. It has a net bearing on the long- term sustainability of water availability in the area. A look at the table shows that ground water has been over exploited in the districts is observed in the districts of Bhiwani, Gurgaon, Kaithal and Yamunanagar whereas it is underutilized in case of districts of Hisar, Jind, Panchkula, Rohtak, Jhajjar, Sonepat and Sirsa. While over- exploitation needs to be avoided, under-utilization of ground water potential shows the need for more efforts in this direction.

10.0 SOCIO-ECONOMIC STATUS

The total population of the state as per 2001 census is 21.1 million and has 1.4% of the total area of the country supporting 2% of its population. The percentage of the rural population is 71%. The density of population works out to be 478/sq km. The literacy rate (exclusive of children in the age group of 0-6 yr.) is 67.91%. The population of the state was around 56.59 lakhs in 1951. The population grew by 34% (1951-61) and 32% (1961-71) in the first two decades respectively but later the rate of growth slowed down and the population increased by 28.75% in 1981 and by 27.40% in 1991. The percentage of the population below poverty line reduced from 25% in 1971 to 12% in 1991.

The per capita income of Haryana as recorded in 2003-04 at 1993-94 prices in Rs. 15721. As per the 2001 census there were 861 females per 1000 males as against 865 in 1991.

11.0 AGRICULTURE

Haryana presently has 38.00 lac hectares (2004-05) of cultivable area. In 1966, it was not even producing sufficient food to meet its own requirements. Now, with agricultural development, it accounts for about 6% of the total foodgrain production of the country by producing 11.5 million tons (1996-97) and contributes 4.5 million tons of food grains to the national pool. Agriculture is an important sector of state's economy and its share in the State Domestic Product in 2003-04 (Q) has been about 26%. The yields of most major crops are high and the cropped area has also increased from 45.99 lac hectare in 1966-67 to 63.50 lac hectare in 2004-05 indicating an increase of about 39%.

12.0 FORESTS

Haryana, an intensively cultivated state, is deficient in natural forest. The recorded forest area of the state is 155910 ha which is 3.5% of the geographical area of the state. As per legal classification, Reserved Forest are mainly distributed in the north- eastern and south-eastern districts of state. There Moist Deciduous in the Shiwalik region and Tropical Thorn Forests in the western part of the state.

13.0 CATTLE POPUATION

The population of different animals has undergone changes for various reasons. Earlier cows were maintained as milch cattle and bullocks were put into use as draught animals. Over the last thirty years, this population has shown a considerable decrease. This is because of two main reasons. First was the introduction and the subsequent popularity of tractors among the farming community in Haryana. This resulted in the removal in the bullocks from the agriculture scene thereby reducing the cow population. Secondly, the cows were slowly replaced by the buffaloes because cows yield relatively less quantity of milk as compared to buffaloes and they also require large areas as grazing lands which had been constantly decreasing in the state. On the other hand there is an increase in the population of sheep and goats which could be attributed to economic factors. Because of reduction in grazing lands and consequent reduction in the fodder availability, the number of cows/bullocks decreased. So some people, especially the landless and poor, started rearing sheep and goats instead of cows. Moreover, the sheep and goats can sheep for wool and meat. However, because of the availability of synthetic carpets in the market, the sheep is now reared mainly for meat purposes. There has not been any significant change in the camel population. The marginal reduction in their population is due to the replacement of camels by tractors in the southern districts of the state. The buffalo population in the state has gone up. This is because many people prefer buffaloes over cows for economic reasons. Moreover, buffalo is basically a stall fed animal and doesn't need vast areas of grazing land. The decreased extent of

grazing lands, therefore, didn't affect their population growth. Moreover, because of increase in the irrigational facilities, the extent of land under cultivation of irrigated fodder crop has gone up by about 48% i.e. from 213 thousand ha. In 1977-78 to 316 thousand ha. In 1966-97. The number of tractors in the state has increased many folds. It was 4803 in 1966-67 but 2, 39,814 in 2004-05. This increase is mainly responsible for the decrease in the population of cows and bullocks.

14.0 OBJECTIVES OF SOE

This report has been prepared with the following objectives:

I. To increase awareness and understanding of environment trends and conditions, and their causes and consequences among all stakeholders.
II. To provide a foundation for improved decision making at all levels, from individual states to national governments and
III. To facilitate the measurement of progress towards sustainability.

15.0 CONTENTS OF SOE

This SOE has been divided into number of sectoral chapters. It generally follows the DPSIR frame work which is the most comprehensive one used for SOE reporting. IN the report the chapters have been organized sector wise i.e. Energy, Urban and Rural Environment, Industries and Mining, Agriculture, Health, forest and Wildlife. This has been done with a view to provide sector specific data useful to the relevant department/agency for sensitizing their sector to the environmental needs.

AGRICULTURE

1.0 INTRODUCTION

Agriculture forms the backbone of the economy of Haryana. Though the percentage share of agriculture in the State Gross Domestic Product (SGDP) has declined, about 65% of state's population still depends directly on agriculture. The workers are involved in agriculture activities either as cultivator or agricultural labourers. The indices of Net State Domestic Product at factor cost by major sources at current prices have shown low growth rate of primary sector as compared to secondary and tertiary sectors. In the year 2003-04 the per capita net state domestic product of Haryana at current prices was 270.4.

Haryana is among the leading food grain producers of India. The production of food grains has increased from 2592 thousand tones in 1966-67 to 13, 036 thousand tones in the 2005-06. Wheat and paddy are the principal crops while the other major crops of the state are cotton, sugarcane and vegetables. Major credit of increase in the food grain production in the state goes to green-revolution which led to a sudden jump in the yield per hectare by adopting high yielding variety of seeds, Chemical fertilizers, improved agricultural techniques and practices and use of pesticides. The input – output policies of the government (subsidies on inputs and MSP for output), improved marketing network, rural connectivity the productivity. But the development simultaneously caused natural resource degradation.

Section 1.01 20 PRESSURES ON ENVIRONMENT

The pressure of agriculture on the environment comes from the deliberate efforts to increase agricultural production in the state. It includes increased demand for productivity and area under cultivation.

a. The demand for increase in production has led to increased use of chemicals/ inorganic fertilizers, pesticides, high yielding varieties and mechanization of agriculture.
b. The expansion of irrigation facilities which includes the use of surface water as well as ground water has created the problem of water logged sites and saline patches in some areas while the over exploitation of ground water has lowered ground water level in some other areas in the state.
c. The increased livestock population in the state has also increased the demand for fodder. This has resulted in over extraction of green fodder. Though the growth rate of livestock per sq km was 109 which increased to 137/sq km in 2003. The number of cattle has decreased from 54/sq km in 1997 to 35/sq km in 2003 and number of sheep has reduced from 29/sq km to 14/sq km. The poultry birds increased from 209/sq km to 308/sq km during the same period.

3.0 STATE

3.1 LAND USE PATTERN

a) In Haryana the land is predominantly used for agriculture purposes. The land use pattern in the state does not show any significant shift toward a particular use. If net area sown is compared it has almost been constant for the last three decades. In the year 1970-71 the net area sown was 80.98% of the total area and it was 79.06% for the year 2002-03 (Statistical Abstract of Haryana 2003-04).Similarly the area under forest cover, land not available for cultivation and culturable area has also not shown any big change in last three decades. The major change that can be observed in the land use pattern in Haryana is the Increase in area sown more than once. This has increased almost 100% since 1970-71 from 1392 thousands hectares to 2854 thousand hectares in 2003-04. The total cropped area has increased from 4957 thousands hectare in 1970-71 to 6388 thousand hectare in 2004-05.

b) There has, however, been a marked decrease in the pasture lands and lands unfit for cultivation. A substantial part of these lands has been brought under cultivation or has been put to other uses. The introduction of sprinkler irrigation system, which irrigates undulating uplands, has helped bring these lands under cultivation. These categories of lands and the wilderness areas supported wild biodiversity and small wildlife. The reduction in the extent of these lands has created the problems of man-animal conflict, especially the crop damage by blue bull besides causing the general loss of wild biodiversity.

3.2CROPPING PATTERN

CLASSIFICATION OF AREA IN HARYANA STATE

Year	Total area	% age of forests	Land not available for cultivation	Net area sown	Percentage of net area sown	Culturable Area	Area sown more than once	Total cropped area
1990-91	4378	3.86	417	3575	81.65	3792	2344	5919
2000-01	4402	2.612	470	3526	80.09	3817	2589	6115
2003-04	4374	1.028	532	3434	80.80	3797	2854	6388
2004-05	4374	1.028	532	3560	81.39	3800	2860	6350

Source: Agriculture Department/ HAU

Thre are three major climatic zones of Haryana viz. Arid 58% area (Arid I: Hisar, Fatehabad, and Sirsa 25.7% and Arid II: Part of Rohtak, Jhajjar, Rewari, Part of Mahendergarh, Bhiwani, Part of Jind 32.3%); Semi arid 34% area (Semi arid I: Sonipat, Part of Rohtak, Part of Mahendergarh, Kurukshetra, Kaithal, Karnal & Panipat 17.8% and semi arid II : Faridabad, Gurgaon, and Jind 16.2%)and Dry sub-humid 8% area (Ambala, Panchkula and Yamunanagar).

Rice- wheat is the most important cropping system occupying about 36% area in the semiarid-I, 23% in sub- humid, 9% in semi arid- II, 4% in arid-I and 3% in arid-II. Another important cropping system is cotton- wheat occupying about 26% in arid- I, 4% In semiarid- II, and 2% in arid-II. Sugarcane based cropping system is mainly concentrated i9n irrigated area adjoining to sugar mills with 12% in sub-humid, 2% in semi arid –I,2%% in semi arid-II. And 1.5% in arid –II and 0.3% in arid-I. Bajra- mustard also occupies substantial area, 10% in arid-II, 5% in semiarid II, 2.5% in arid-I. Bajra- wheat is mainly followed in arid-II, semi arid-I, arid-I, arid-I. Fodder based cropping systems are generally grown all over occupied by single cropping of bajra, gram, mustard, moong, cowpea, guar, castor etc.

In state as a whole, maximum area is under rice-wheat (22%), followed by cotton-wheat (16%), bajra-mustard (9%), bajra-gram (5%), fodder-based (4%). The other important cropping systems are maize- wheat, jowar-gram and jowar-mustard.

The cropping pattern in Haryana underwent a major change during the late 60s, and 70s, in the green revolution era. As far as land use is concerned, to give a

historical perspective, the area under various crops has witnessed a major change. After the green revolution, the area increased under cotton, paddy and wheat at the expenses of pulses, maize and gram etc.

Trends in cropping pattern in the state shows clearly that farmers of Haryana are shifting more towards rice, wheat and cash crops like cotton, vegetables, fruits, and sugarcane. The area under cultivation of rice and wheat increased from 269.2 thousands hectares and 1129.3 thousands hectares respectively in 1970-71 to 1054.3 thousands hectares and 2316.5 thousands hectares in the year 2000-01. The area under pulses and cereals other than rice and wheat has reduced, drastically. In the year 1970, the area under cereals was 1310.3 thousand hectares and area under pulses was 832 thousand hectares which has reduced, significantly, to 815.7 thousands hectares and 99.8 thousand hectares respectively in the year 20000-01. There is a sharp increase in the area under the cultivation of the cotton crop from 193.4 thousands hectares in the year 1970-71 to 555.4 thousand hectare in 2000-01. The shift in the cropping pattern in Haryana is more towards water consuming and minerals mining crops. As compared to pulses and oilseed crops the water requirement is more for rice and wheat. The role played by pulses in keeping the soil health has also reduced as area under pulses has also been affected. ON the whole this shift in the cropping pattern in the state is towards non-environment friendly agriculture.

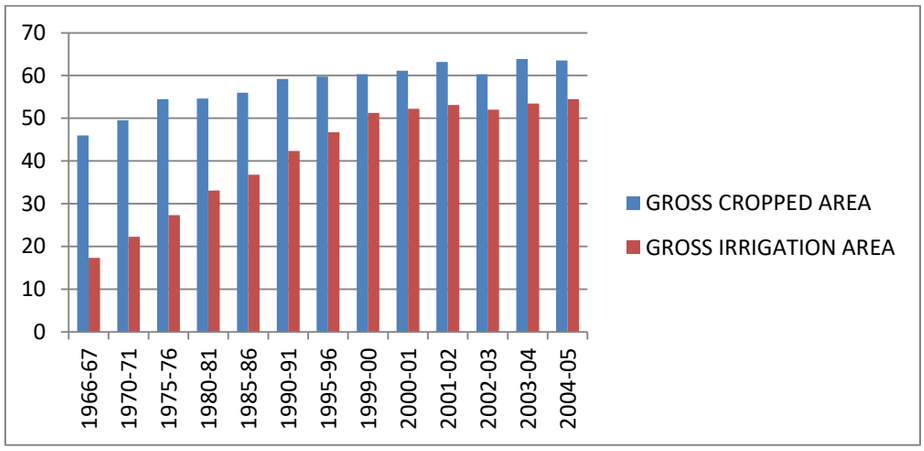
AREA IN HECTARES OF IMPORTANT CROPS IN HARYANA ('000 Ha.)					
YEAR	**RICE**	**WHEAT**	**TOTAL PULSES**	**TOTAL OILSEEDS**	**COTTON**
1970-71	269.2	1129.3	1158.9	142.6	193.4
1980-81	483.9	1479	794.8	311.2	316.2
1990-91	661.2	1850.1	743.0	488.5	490.6
2000-01	1054.3	2316.5	155.0	420.0	555.4
2004-05	1028	2322	174.0	735.0	621.0
2005-06	1025	2308	209.0	735.0	583.0

*Tentative **Source: Agriculture Department/HAU**

3.3 Irrigation

The net area irrigated in Haryana has increased from 37.8% of net sown area in 1966-67 to 84% of net sown area in year 2003-04. This increased is more than 120% increase in area under irrigation in three decades (from 1293 thousand hectares in 1966-67 to 2969 thousand hectares in 2003-04). In Haryana the gross irrigated area has increased from 17.36 lakh hectares in 1966-67 to 53.43 lakh

hectares in 2003-04.This growth is comparatively faster than that in the net irrigated area. The second aspect of irrigation is the source of irrigation water. In year 1966-67 only 289 thousand hectares area was irrigated by the groundwater source (wells/ tube-wells) and rest 1004 thousands hectares by surface water sources (canals/tanks). This shows only 22% of irrigated area was under ground water irrigated by ground water sources and 47% by surface water resources. This clearly depicts the pressure over groundwater sources and explains lowering of groundwater level in some parts of the state. The increase in the number of tube wells and pumping sets in state also indicated the increased pressure on groundwater**.**



GROSS CROPPED AREA AND GROSS IRRIGATED AREA IN HARYANA

GROSS CROPPED AREA AND GROSS IRRIGATED AREA IN HARYANA (Lakh hectares)		
YEAR	GROSS CROPPED AREA	GROSS IRRIGATED AREA
1966-67	45.99	17.36
1970-71	49.57	22.3
1975-76	54.51	27.32
1980-81	54.62	33.09
1985-86	56.01	36.79
1990-91	59.19	42.37
1995-96	59.74	46.73
1999-00	60.29	51.24
2000-01	61.15	52.23
2001-02	63.18	53.11
2003-03	60.32	51.99
2003-04	63.88	53.43
2004-05*	63.50	54.50

* Provisional **Source: Agriculture Department/ HAU**

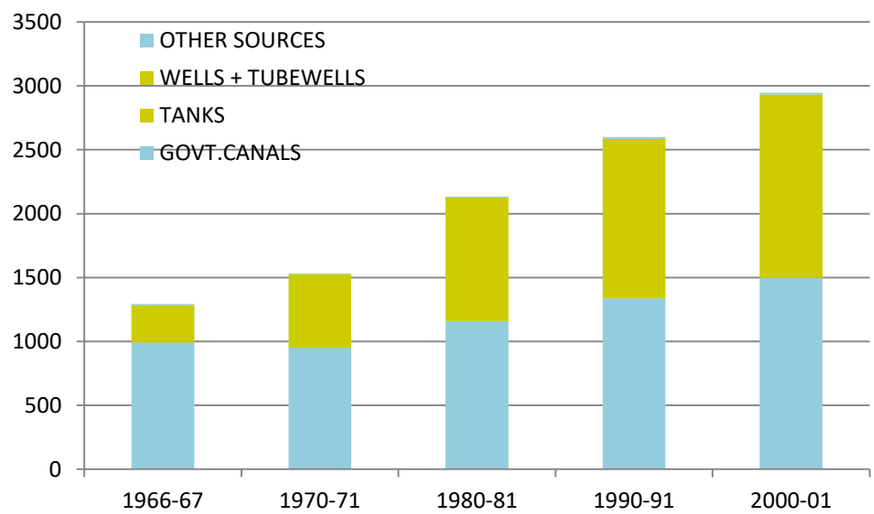
(Sprinkle irrigation is used generally in undulating lands in south Haryana

NET AREA UNDER IRRIGATION IN HARYANA (000'HECTARES)

YEAR	GOVT.CANALS	TANKS	WELLS	TUBE WELLS	WELLS + TUBEWELLS	OTHER SOURCES	TOTAL	PERCENTAGE OF NET AREA SOWN
1966-67	991	4	289	-	289	9	1293	37.8
1970-71	952	1	574	-	574	5	1532	43
1980-81	1161	@	26	941	967	6	2134	59
1990-91	1337	1	@	1248	1248	14	2600	72.7
2000-01	1499	1	@	1431	1431	14	2945	83.9
2003-04	1396	1	@	1561	1561	12	2969	84.0
2004-05*	1395	-	@	1566	1566	12	2976	83.5

*Provisional **Source: Agriculture Department/HAU**

@ MEANS LESS THEN 500 HECATARE.



3.4 PUMPING SETS FOR IRRIGATION

Use of electric motors and diesel engines for irrigation has increased significantly since 1970-71. As against 1,04,358 tube wells and pumping sets in the year 1970-71 it has increased to 6,11,598 (234155 diesel operated and 377443 electric operated) in 2004-05. The government policy of subsidized electricity for agricultural sector has brought about this change. Around 60% of the total sets are electric motor driven

TUBE WELLS AND PUMPING SETS IN HARYANA			
YEAR	**DIESEL SETS**	**ELECTRIC SETS**	**TOTAL**
1970-71	17903	86455	104358
1975-76	65092	139644	204736
1980-81	109353	222674	332027
1985-86	134136	272282	406418
1995-96	155842	341729	497571
1990-91	225848	329448	549296
2000-01	255302	334171	589473
2001-02	254654	340870	595524
2004-05	234155	377443	611598

Source: Agriculture Department/ HAU

3.5FERTILIZERS

The growth in fertilizer consumption over years in the state is given below:

FERTILIZER CONSUMPTION IN HARYANA (NUTRIENTS IN TONNES)				
YEAR	**NITROGENOUS**	**PHOSPHATIC**	**POTASSIC**	**TOTAL**
1970-71	60972	6,680	2,228	70,060
1980-81	1,87,385	31,340	12,098	2,30,823
1990-91	4,43,245	1,38,005	5,042	5,86,292
2000-01	7,14,308	2,06,319	9,668	9,30,295
2003-04	768595	236404	15941	1020940
2004-05	789404	241033	19590	1050027
2005-06	847576	250075	28861	1126512

Source: Agriculture Department/HAU

Use of chemical input in the process of production by agricultural sector paves the way for its progress. Haryana is among is among the states signifying higher consumption of chemical fertilizers. The table above indicates that consumption of chemical fertilizers in the state has increased from 70,060 tones in 1970-71 to 11,26,512 tones in 2005-06.

3.6PESTICIDE

The pesticide consumption in the state over years is given below

YEAR	QUANTITY IN TONNES	AREA COVERED IN 000' HECTARES
1970-71	412	3206
1975-76	1400	3733
1980-81	2150	5058
1985-86	3608	7020
199—91	5164.53	6420
2000-01	5100	7880
2001-02	5020	8798
2004-05	4700	8794
2005-06	4650	8565
		8262

Source: Agriculture Department/HAU

In the table, consumption of pesticides has shown an increasing trend over the years. There has been an increase in the use of pesticides from 412 tones in 1970-71 to 5164.53 tones in 1990-91 and has decreased to 4652 tones in 2005-06.

3.7 PRESENT STATUS OF BIOAGENTS USED IN HARYNA

i) ii)	Trichogramma HaNPV	Maintaining the mass culture of both the agents for research trial purposes at Department of Entomology, CCSHAU, Hisar while at RRS, Uchani (Karnal) the Trichogramma chilonis is mass-produced and recommended for use in sugarcane against stalk borer.
iii) iv)	Trichogramma All bioagents of sugarcane leaf hoppers i.e. egg & nymphal adult parasites	These are mass produced at Co-op. Sugar Mills, Sonepat Bio-control laboratory under the Administrative control of Haryana Sugar Federation and the technical guidance of CCSHAU, Hisar, which was started in 1988 at the initiative of the sugarcane Entomologist, CCS HAU, RRS, UChani (karnal). These bio agents are supplied to the cane growers of Haryana free of cost. Still this laboratory is being working under the technical guidance of CCS HAU, hisar.

Source: Agriculture Department/ HAU

However, Chrysoperla spp., coccinellids, sryphids and some hymenopterous natural enemies are occurring naturally under agro-climate conditions of Haryana but there numbers are sufficient to suppress to suppress the insect- pests in various crops.

3.8 The consumption of pesticides and cropped area in Haryana

The area under various crops and their share in the pesticides consumption is given below

Crop	Pesticide share (%)	Cropped area (%)
Cotton	52-59	5
Rice	17-18	24
Vegetables & Fruits	13-14	3
Plantation crops	7-8	3
Cereals/oilseeds/pulses	6-7	58
Sugarcane	2-3	2

Source: Agriculture Department /HAU

3.9 CONSUMPTION OF PESTICIDES IN VARIOUS STATES/U.T.S

The consumption of pesticides in the states as compared with other states is given below

Sr.No	**State/U.T.**	**Consumption (MT)**	**Sr.No.**	**State/U.t.**	
1.	Andhra Pradesh	9,910	24	Uttar Pradesh	8480
2.	Arunachal Pradesh	30	25	West Bengal	5000
3.	Assam	595	26	A & N Islands	-
4.	Bihar	1700	27	Chandigarh	-
5.	Gujarat	5500	28	Delhi	60
6.	Goa	22	29	Dadra & Nagar Haveli	4
7.	Himachal Pradesh	718	30	Daman & Diu	-
8.	Jammu & Kashmir	110	31	Pondicherry	135
9.	Karnataka	3900	32	Lakshadweep	0.70
10.	Kerala	1100			
11.	Madhya Pradesh	4500		**Total**	**75,417.20**
12.	Maharashtra	6020			
13.	**Haryana**	**4650**			
14.	Manipur	50			
15.	Meghalaya	45			
16.	Mizoram	15			
17.	Nagaland	12			
18.	Orissa	1800			
19.	Punjab	5770			
20.	Rajasthan	2758			
21.	Sikkim	20			
22.	Tamil Nadu	12500			
23.	Tripura	164			

Source: Agriculture Department /HAU

3.10 STATUS OF HERBICIDES USE IN HARYANA (2005-2006)

The Consumption of herbicides in the state is given below

HERBICIDES	VOLUME IN KL./MT 2005-2006	VALUE IN CRORES 2005-2006
ISOPROTURON	400	6.00
BUTACHLOR	795	10.82
ANILOPHOS	410	9.12
METOXURON	8	1.22
METOXURON	9	0.42
GLYPHOSATE	5	0.38
PENDIMETHALIN	11	0.36
TRIFLURALIN	5	0.10
PRETILACHLOR	15	0.37
PARAQUAT	22	0.48
0.32TRIALLATE	16	0.32
PUMASUPER	13	1.56
LEADER	3.1	17.80
TOPIK	25	7.80
RONSTAR	2.5	0.12
ATRAZIN	12	0.23
2,4-DEE	8	0.07
2,4-DNA SALT	2	0.02
OXADIARGYI	0.11	0.34
METSULFURON	48	2.82

Source: Agriculture Department /HAU

The growth of herbicide use was almost 14% and the market value was approximately 41% of total pesticide use in Haryana, during the year 2005-06.

4.0 IMACT:

4.1 LAND DEGRADATION

Loss in the capacity of a given land to support growth of useful plants on a sustainable basis can be broadly termed as land degradation. Degradation of land can be due to water logging, deforestation, improper management of municipal solid wastes, industrial hazardous waste, biomedical wastes, and inadequate treatment of sewage and industrial wastewaters, improper agricultural practices in terms of excessive usage of water, fertilizers, pesticides, and monoculture cropping pattern. It could be physical, chem9ical or biological with each having different processes for the declining productivity. The land degradation factors are:

(b) 4.1.1 WIND EROSION

This is most prevalent in southwestern and western parts of Haryana adjoining the state of Rajasthan. Sand dunes of varying magnitudes are the main features of this part and some of them are under the process of stabilization. In the last3-4 decades by the provision of irrigation facilities through water lift canal systems most of the dune areas have been brought under plough.

Major problems of such soils are severe to moderate erosion through high velocity winds, excesses drainage, high infiltration rate and low water retention capacity. Generally these soils are poor in soil fertility due to exceptionally low organic matter. The efforts are at full swing in arresting the advancement of Thar Desert by plantation of windbreaks, creating vegetative covers, sprinkler irrigation and land leveling though the latter is a costly affair.

(C) 4.1.2 WATER EROSION

This problem is mainly confined to the Shivalik foothills of the state. This area has been continuously denuded during the last century, which resulted in the severe problem of soil erosion, sedimentation and flooding. Marked response of erosion losses to production capacity of soil have been established through various studies. It depends upon the soil type, intensity of rainfall and topography of the area. However, the losses are more pronounced on well-developed soils.

The water erosion problem in Haryana is mainly confined to the foothill area below Shivalik tract in Ambala, Panchkula and Yamunanagar districts of Haryana. The area is characterized by loose and fragile hills with three distinct landforms viz., visually hill top, hill slope and valley. Hill slopes and valley portions are cultivated and are the only source of income to the population. The high intensity rainfall during monsoon season causes severe loss of topsoil. It has been estimated that from a 2% sloping field, there could be a loss of 2.65 tons ha-1 of topsoil and that to of the soil's finer fractions. Consequently, the loss of nutrients could be equivalent to 52 and 5 kg ha-1 of N and K, respectively. Multi-pronged efforts, with financial assistance of The World Bank, are being made for overall development of the area, popularly called as 'Kandi'. These aim at arresting the soil erosion through checks dams and other civil works, tree plantation on slopes etc. The results of field experiments carried out over 4 years have shown that crop residues play an important role in resource conservation. It has been found that run off on 1 percent slopping land was reduced by half from 54-60 percent as a result of addition of Leucaena leucocephala twigs as mulch @ 10 tones/ha. Top Soil erosion also reduced substantially from 5.1 to 1.34 tones/ ha thus conserving soil, water and nutrient resources. Growing of natural grasses was also found equally effective in arresting the soil loss.

Withy the spread of irrigation facilities, total water use per unit area of arable land has gone up steeply. This has resulted in the steep rise in water table in districts of Rohtak, Hisar, jind and Sonipat due to the saucer like topography of the area. As a result of this, large tracts of land have developed salinity, sodicity or both. Though sodicity can be easily and fully reclaimed by use of gypsum but saline soil reclamation is a difficult job unless steps are taken to lower the water table.

4.1.3 WATER LOGGING

RISING AND FALLING TREND OF WATER LEVELS:

During ten years (1974-84) period, six districts constituting nearly 54 percent of the state area experienced rising trend (7 to 43 cm/yr) of water level. The weighted average during this period resulted in the declining water level trend changed to the falling one in the district of Kaithal. The weighted average rise per year in the rising water level areas declined to 19 cm, whereas falling rate increased to 23 cm with an overall declining weighted average in the entire state at a rate of 3 cm per year. Subsequently, with heavy rainfall experienced during 1995, the overall trend reversed with an average weighted rise of 2cm per year for the entire state and increase of weighted rise and decrease of weighted fall at a rate of 20cm and 15cm per year, respectively, during the period 1974-95. The trend continued during 1974-1998 with an average weighted rise of 22.6 cm and weighted fall of 9.8 cm per year and overall weighted rise of 8.6 cm per year in the entire state. The blocks wise status of depth of water level indicated that out of 108 blocks of the state 44 blocks indicated average rise in water level, whereas, the remaining 64 blocks showed the declining trend of average water level, during the period June 1974 to June 1996 (28). At present, 57 percent (25200 km2) of the state area is experiencing the rising trend and rest of the 43 percent (19011 km2) declining trend. With four heavy monsoons (1995-98), the long-term annual rising rate registered a 4cm increase, whereas, in declining water level area, the magnitude of reduction in the declining rate is appreciable (13 cm). The rising water table in several areas has changed water table in several areas has changed the cropping pattern in the state. In the high water table areas rice and sugarcane crops have replaced pearl millet, cotton and pulses.

Extent OF IN WATER TABLE

Block & District	**Water table (in meters below the Ground)**						
	1985-86	1990-91	1995-96	2000-01	2002-03	2003-04	2004-05
AMBALA							
Ambala	**-**	**-**	**-**	**-0.19**	**-0.24**	**-**	**-**
Barara	-0.36	-	-	-	-0.99	-	-3.43
N.garh	-0.10	-	-	-1.24	-0.25	-1.0	-1.27

Shazadpur	-	-	-	-0.07	-	-	0.84
BHIWANI							
Siwani	-	-0.01	-	-0.63	-1.02	-0.48	-
Dadri-I	-	-	-	-	-1.21	-	-
Dadri-II	-	-	-	-0.27	-	-	-0.37-
Badhra	-0.04	-0.39	-	-1.11	-5.08	-3.03	-
B.khera	-	-	--	-0.46	-	-	-
Bhiwani	-	-	-	-0.43	-0.42	-	-
Loharu	-0.37	-0.45	-	-3.12	-3.43	-2.47	-
Tosham	-	-	-	-0.39	-	-	-
Kairu	-	-	-	-1.40	-	-	-
FARIDABAD							
Hathin							
Hodel							
Palwal							
Fardabad							
Ballabgarh							
FATHABAD							
Fatehadab							
Tohana							
Ratia							
Battu Kala							
Bhuna							
GURGAON							
Farukh. Nagar							
F.P.Zhirka							
Gurgaon							
Nagina							
Nuh							
Pataudi							
Punhana							
Sohna							
Taoru							
HISAR							
Adampur							
Barwala							
Hansi							
Bass							
Hisar-I							
Hisar-II							
Narnaud							
Agroha							
Uklana							
JIND							
Alewa							
Julana							
Narwana							
Pillukhera							
Safidon							

Uchana							
Jind							
KURKSHETRA							
Thanesar							
Shahabad							
Pehowa							
Ladwa							
Babain							
KAITHAL							
Guhla							
Kaithal							
Pundri							
Kalayat							
Rajound							
KARNAL							
Karnal							
Indri							
Gharauanda							
Nilokheri							
Assandh							
Nissing							
MOHINDERGARH							
Ateil							
Kanina							
M.garh							
N.chaudhary							
Narnaul							
PANCHKULA							
Pinjore							
Barwala							
Raipur Rani							
Morni							
PANIPAT							
Panipat							
Israna							
Samalkha							
Madlauda							
Bawal							
Jatusana							
Khol							
Rewari							
Nahar							
ROHTAK							
Rohtak							
Maham							
Kalanaur							
Lakhan majra							
Sampla							
JHAJJAR							

Bahadurgar							
Beri							
Jhajjar							
Matanhail							
Salawas							
SONEPAT							
Gohana							
Rai							
Kharkhoda							
Ganaur							
Kathura							
Mundlana							
Sonepat							
SIRSA							
Ellenabad							
Odhan							
Dabwali							
Badaguda							
Nathusari Chopta							
Sirsa							
Rania							
YAMUNANAGAR							
Jagadhari							
Bilaspur							
Chhachhroli							
Sadhaura							
Radaur							
Mustafabad							

Source: Agriculture Department/ HAU

DISTRICT-WISE WATER STRESSED REGIONS

The district-wise position of water stressed regions is given below:

District	**Block**	**Area**	**Names of water stressed regions (Ground water balance in MCM)(block area in sq km)**					
			1985-86 as on 1.4.1985	**1990-01**	**1985-86 as on 1.4.1987**	**2000-01**	**2004-05**	**1985-86 As on 31.3.05**
Ambala	Barara							
	Jagadhari							
	Narainagarh							
K.shetra	Shahaba							

	d							
	Ladwa							
	Radaur							
	Thanesar							
	Pehowa							
	Guhla							
	Kaithal							
	Pundri							
Karnal	Karnal							
	Nilokheri							
	Nissing							
	Assandh a							
	Gharaun da							
	Panipat							
	Samalkh a							
	Indri							
Faridabad	Hodel							
	Faridaba d							
Gurgaon	Gurgaon							
	Pataudi							
	Sohna							
	F.p.Zhirk a							
	Farukh nagar							
	Taoru							
Jhajjar	Sahlawas							
	Matanha il							
M.garh	Bawal							
	Narnaul							
	Kanina							
	M.garh							
	Jatusana							
	Khol							
	Ateli nagal							
	Nagal Chaudha ry							
Hisar	Ratia							
	Tohana							
Sirsa	Dabwali							
	Ellenaba d							

Bhiwani	Badhra							
	Dadri-I							
	Dadri-II							
Jind	Alewa							
	Safidon							
Kaithal	Guhla							
	Pundri							
Panchkula	Raipur Rani							
Painpat	Madlauda							
	Panipat							
	Samalkha							
Rewari	Bawal							
	Jatusana							
	Khol							
	Nahar							
	Rewari							
Yamunanagar	Jagadhari							
	Radaur							
Farehabad								
Jhajjar								
	Total							

Source: Agriculture Department/HAU

4.1.5 SALINIZATION AND SODIFICATION

The problem of salt affected soil is a colossal one and is spread in many countries of the world. The total area of salt affected soils is 954.83 mha, which is more than 7% of the world's total surface area. In India salt affected soils are about 8.5 mha. The extent of this problem in some states of north India is about 1.3 mha in U.p, 0.7 mha in Punjabi and 0.52 mha in Haryana. These salt affected soils are mainly saline, sodic and saline sodic.

4.1.6 QUALITY OF GROUND WATER:

In Panipat, Kaithal, Karnal, Kurukshetra, Yamunanagar and Ambala districts the underground water is predominantly (50-100%) good. Whereas, in the remaining districts of Sonepat, Jind, Rohtak, Hisar, Sirsa, Bhiwani , Mohindergarh, Rewari, Gurgoan and Faridabad it is predominantly (55-80%) poor. Among poor quality waters 18% are sodic, 11% saline and 26% are saline sodic in nature. In the southern zone of Haryana comprising Rewari, Mohindergarh, Bhiwani and Gurgoan districts although the ground water is predominantly sodic / saline-sodic for more than 70% of the net irrigated area the source of irrigation is ground water.

District wise trends in ground water usage:

District	**(Ground water usage—water balance in MCM)**		
Ambala			
Kurukshetra			
Karnal			
Sonepat			
Faridabad			
Gurgoan			
Rohtak			
Jind			
Bhiwani			
MOhindergarh			
Hisar			
Sirsa			
Panchkula			
Yamunangar			

Panipat			
Kaithal			
Rewari			
Fatehabad			
Jhajjar			

Source: Agriculture Department/HAU

Propagation for change in cropping pattern from more water- intensive to less water- intensive crops.

1. Propagation for conjunctive use of surface and ground water in highly saline areas.
2. Propagation for water conservation devices viz. sprinkler/ drip for judicious use of ground water or efficient irrigation system.
3. Artificial recharge in ground water table declining areas.
4. Educating drillers/ farmers for installation of tube wells on scientific lines.
5. Introduction of ground water legislation to regulate and control the development and management of ground water.
6. Follow up of the recommendation of the water conservation mission headed by Hon'ble Chief Minister for bringing out awareness among the farmers for adoption of various water conservation measures in the state so as to use the available water in most judicious manner.

DISTRICT WISE WATERLOGGED AND SALINITY EFFECTED AREAS

Sr. No.	**District**								
1.	Ambala								
2.	Bhiwani								
3	Faridabad								
4.	Gurgaon								
5.	Hisar								
6.	Jind								
7.	Kaithal								
8.	Kurukshetra								
9.	Karnal								
10.	Mohendergarh								
11.	Panipat								
12.	Panchkula								
13.	Rewari								
14.	Rohtak								
15.	Sirsa								
16.	Sonipat								
17.	Yamunangar								
18.	Farehabad								

19.	Jhajjar								
20.	Mewat								
	Total								

Source: Agriculture Department /HAU

4.1.8 SOIL FERTILITY STATUS:

It has been estimated that in 1980, the organic carbon status in 80% soils of Haryana was low, 18% medium and 2% in high category. When soil fertility maps from the data available from soil testing laboratories were prepared in the year 2004, it was found that organic carbon status has further gone down to 92% in low, 7.5% in medium and 0.5% in high category. On an average, 54% soils of the entire Haryana state were found deficient in Zn, 21% in Fe, 2.2% in Cu and only 4.6% in Mn.

On an average in 1999-2000, in the entire state there was a negative balance of -22.7,92.4, -479.9 and -75.1 thousand tones of N,P,K and S which came to be -4.1, -17.08, -88.7 and -13.9 kg ha- 1 of N,P,K and S, respectively. The trend in continue mining of P,K and S indicated that the depletion of these nutrients would continue to increase in future, as a result more and more areas will come under the deficiency of these nutrients. This negative balance is confirmed by the fact that during last two decades in the state the nutrients index for available P,K decreased, and S deficiency increased to 30% soils.

Nutrients Balance in Haryana over years is given below

Year					
N (Kg per ha)					
P (Kg per ha)					
K (Kg per ha)					
S (Kg per ha)					
Zn (Gr per ha)					
Mn(Gr per ha)					
Fe (Gr per ha)					
Cu (Gr per ha)					

Source: Agriculture Department /HAU

4.1.9 EFFECT OF PESTICIDES

1. No long-term studies covering whole of Haryana have been conducted to find deterioration of Soils and ground waters due to continuous use of pesticides. Sporadic work covering few agro-climate regions / crop rotations has been conducted at CCSHAU, Hisar, the brief details of which are given below.

4.1.9.1 SOIL CONTAMINATION WITH PESTICIDES:

All the 24 samples of soils from different locations of rice growing area around Kaul, were analyzed for the estimation of pesticides residues. All the soil samples showed presence of HCH (0.005-0.124 ug/g.), DDT (0.003-0.178 ug/ g) and Endosulfan (0.0022-0.409 ug/g). Aldrin residues were also detected in six samples ranging from 0,.02 to 0.007 ug/ g although in very low amount Dicofol, pendimethalin and chlordane residues were detected in 8, 12 and 3 samples ranging from 0.001 to 0.332 ug/g and from 0.38 to 0.075 ug/g (0.200-1.201 ppb), were presents in 12.8, 28.4 and 12 samples respectively.

4.1.9.2 LEVEL OF PESTICIDE CONTAMINATION OF GROUNDWATER AND SURFACE WATER SAMPLES DURING 2004-05.

All the ground water samples (12) from tube-well and surface water samples (12) from canal were found contaminated with HCH, DDT and Endosulfan. In groundwater, a residue was quite high in comparison to ground water samples. In surface water, residues of HCH varied from 0.499 to2.356 ug.ml. DDT from 0.106 to 1.809 ug./ml. and Endosulfan from 0.77 to 0.475ug/ml. The level of contamination of synthetic pyrethroids and organophosphate residues was also quite high in surface water samples in comparison to ground water samples. Among synthetic pyrethroids only Cypermethrin residues were detected in 3 samples of ground water ranging from 0.009 to 0.116 ug/g and 10 samples of surface water ranging from 0.002 to 0.715 ug/ ml.

Among organophosphates Chlorpyriphos in 10 samples of ground water ranged from 0.007 to 0.135 ug/ml and in all the 12 surface water samples ranging from 0.019 to 0.036 ug/ml. Monocrotphos in 5 samples ranging from 0.935 to 1.015 ug/ml, Malathion in 4 samples ranging from 0.005 to 0.100 ug/ml and Trizophos in 9 samples ranging from 0.085 to 1.745 ug/ml.

SUMMARY:

On considering the tube-well water samples for drinking purpose it has been observed that residues exceeded the maximum residue limit (MRL) of 0.5 ppb (set by European Union (EU) for drinking water and adopted by Government of India (GOI) Notification GSR No. 759E and 760E, dated 29-02-02) in few samples which is a matter of concern from health point of view. Endosulfan among Organ chlorines. Cypermethrin and Deltamethrin among synthetic

pyrethroids and Chlorpyriphos among the organophosphates were the major contaminant and were frequently detected in both the samples.

4.1.9.3 CONTAMINATION OF VEGETABLES AND FRUITS:

1- Monitoring of pesticide residues in vegetable samples during 2003;

All the 60 samples of different vegetables viz. brinjal, okra, cabage, cauliflower and green chilly were found contaminated with organochlorine (OC), synthetic pyrethroids (SP) and organophosphate (OP) insecticides. Among OC besides HCH, DDT and Endosulfan, Docofol and Fipronil were also detected but their residues did not exceed their respective MRL values in any sample. Among SP, residues of Cypermethrin exceeded the MRL value of 0.2 ugg-1 in 2 samples of brinjal where as in 2 samples of cauliflower residues of permethrin were more than the MRL value of 0.5 ugg-1 uggf-1. Among OP, residues of Chlorpyriphos were more than the MRL value of 0.01-1 in 2 samples of cabbage.

2- Monitoring of pesticides residues in vegetables and effect of processing on reduction of residues;

For this study, 27 samples i.e of brinjal, okra and cauliflower were analyzed. The results are as follows:

I. Brinjal:

All the samples were found contaminated with HCH, DDT, and Endosulfan. In addition to these SP, OP, and some herbicices were also detected in measurable amounts. Residues of any of the pesticides did not exceed their respective MRL values. Washing reduced the residues from 27-44 of OC, 26% SP, 77% Oip and 21% of carbonate compounds where as boiling reduction was 39-55% in case of OC,37% of SP, 50% of Carbonates and 100% of OP. About 50-75% reduction due to washing and boiling was for herbicides.

ii Okra:

Okra samples also showed 100% contamination with OC compounds like HCH, DDT Endosulfan and Chlordane. Some synthetic pyrethroids and organophosphates were also detected in measurable amounts. Residues of all the pesticides were below their respective MRL values. Here also, washing reduced the residue of OC from 20-38%, SP31% and OP 50%^ where as boiling reduced the residue of OC from 35-47%, 42% of SP and 75% of OP.

Thus in okra also, boiling was slightly more effectiv3e in reduction of residues. Here residues of herbicides dislodged up to 25% by washing and 92% by boiling.

iii Cauliflower:

Cauliflower samples also showed 100% contamination with OC compounds like HCH, DDT and Endosulfan. Some synthetic pyrethroids and organophosphates were also detected in measurable amounts. Residues of all the pesticides were below their respective MRL values. Here also, washing reduced the residue of OC from 34-36% ,SP, 29% and OP 74% where as boiling reduce the residues of OC from 59-61%^,40% of SP and 92% of OP.

By washing, residues of OC reduced from 20-50%,SP from 26-31% and OP from 50-77% whereas boiling reduced the residues of respective groups by 35-75,37-42 and 75-100%. Overall, boiling was found to be more effective than washing I dislodging the pesticide in tested vegetables.

Fruits:

During 1999-2000, 42 samples of fruits (ber, guava and grapes) collected from farm gate were analyzed. Among these samples although contamination was observed to be 100% but none contained pesticide residues above MRL value. Generally residues of all group[s of insecticides were present.

Thus from the studies it was concluded that pesticidal contamination is 100%, which remained constant during these five years, but the level of contamination is decreasing. Residues of synthetic pyrethroids (SP) and organophosphates were detected frequently. Endosulfans among OC, Chlorpyriphos among OP and Cypermethrin among OP and Cypermethrin among SP have been major contaminants whose residues exceeded MRL values. Overall samples with residues exceeded MRL values are decreasing year by year.

4.1.9.4 PESTICIDES VIS-A-VIS, SOIL MICROBIAL HEALTH AND SOIL FERTILITY:

Soil serves as an ultimate sink for pesticides whether used on crops or directly in soil. Being toxic xenobiotics, there is every likelihood of their exerting adverse toxic on microbial population thus reducing soil fertility.

Research studies conducted over the year under different agro-climatic conditions all over world have revealed that at the concentrations usually applied in field cause a temporary reduction in bacterial and fungal population but the effect is reversed and microbial population gets enhanced in due course of time because microbes start using organic chemicals as source of carbon and energy leading to biotransformation and mineralization of pesticides.

Limited studies conducted at CCSHAU, Hisar and elsewhere have shown that pesticides when used at higher concentration are accumulating in soil as a result of continuous use, may reduce resistance in microbes which in turn adversely affects microbial health and soil fertility. Gupta et al. studied the effect of Lindane, and Aldrin on resistance of 18 isolates and 17 mutants at different concentrations from 100 to 72 with Lindane and 100 to 35 in case of Aldrin at 10

and 10,000-ug ml-1 concentrations. Whereas, in case of mutants, the percent resistance decreased from 100 to 47 and 100 to 28 with Lindane and Aldrin at above concentrations, respectively. Effect of 2,4-D was relatively less in reducing resistance in both soil isolates and mutants.

4.1.10 WEED PROBLEMS:

1 Heavy infestation of E. crusgalli, E. colonum and Cyprus in all the districts that of C. difformis in Ambala district, Paspalum in Hisar, Fatehabad and Karnal and Leptochloda, Fimbrostylis miliacea, Ischaemum rugosum in Fatehabad district in transplanted rice need attention. In addition heavy infestation of Ipomoea, Trianthema portulacastrum, Ammania, Ludwigia and Sphenoclea in isolated pockets is a matter of concern. Trianthema is a problem in most of the Kharif crops except rice.

2 Persistence of herbicide: Butachlor, anilophos, isoproturon, clodinafop, and fenoxaprop were not found to adversely affect the crops in rotation. Sulfosulfuron has been found to adversely effect sorghum, bajra and maize but not rice. This herbicide did not cause any adverse effect on the population of microbes at the end of crop side.

5.0 RESPONSE

5.1 MEASURE TO REDUCE THE USE OF PESTICIDES IN THE STATE:

Awareness is to be created among field functionaries and farmers about IPM concept, identification and monitoring of insept-pests and their natural enemies and diseases through educative field visits/ trainings or personal contact.

1. Use s of pheromone traps and lures if available should be advocated.
2. Reliance on methods other than chemical control such as cultural, mechanical, physical, biological legislative etc. for pest management.
3. There should be monitoring based use of pesticides at economic threshold level.

    i) Care should be taken to follow Good Agricultural Practices (GAP) meaning thereby the proper use of insecticides at appropriate dose at proper time in recommended quantity of water.
    ii) Bio- pesticides should be used though their effectiveness may be slightly inferior to other chemicals.
    iii) Use of safer, low dose chemicals with modest persistence in soil, water and food commodities and with reduced risk to other biota should be given priority.

4. Prevention of dumping of effluents and obsolete pesticides in the surrounding soil and water.
5. Educating/training of pesticides dealers/ distributors etc.

5.2 MEASURES TO REDUCE THE USE OF HERBICIDES:

The possibility of alternate crops in place of rice or wheat can reduce the load of herbicides. Early planting using zero tillage technique can reduce the load of herbicide against Phalaris. Bed planting and interculture using same machine can reduce the requirement of herbicide but there will still be losses caused by weeds.

5.3IRRIGATION AND FLOOD CONTROL UNDER TENTH PLAN (2002-07):

An outlay of Rs. 131800.00 lakh has been approved for tenth plan and Rs. 22500.00 lakh for revised annual plan 2004-05 for major & medium projects/ works to be undertaken are:

1. J.L.N Project.
2. Gurgaon Canal Project.
3. Construction of Satluj Yamuna Canal (Punjab portion).
4. Improvement, reconditioning and remodeling of existing channels.
5. Loharu Canal Project.
6. Rewari Irrigation Stage ii.
7. Ladwa Irrigation Scheme,
8. Nalvi Irrigation Scheme.
9. Improved water management etc.

In order to execute the important flood control and drainage works, a sum of Rs. 180000.00 lakh has been provided for tenth plan and Rs. 3300.00 lakh for revised annual plan 2004-05.

URBAN & RURAL ENVIRONMENT

This chapter covers the issues concerning urbanization and urban environment in Haryana. The issues involved are water availability, water pollution, infrastructure, urban air pollution, and solid waste disposal and land degradation. The scope of this section covers the pressures of development on the environment, the extent of its impact and the response of the state mechanism in ameliorating the degrading scenario but does not extend to understanding and evaluating the environmental awareness and its effectiveness at various levels of the civil society and environmental education imparted within the state. The issues concerning energy, industries, transport tourism, health have been covered but briefly in this chapter as they have been discussed in separate chapters in this report.

1.0 DRIVING FORCES OF ENVIRONMENTAL CHANGE

The developments in the urban areas are mainly responsible for large scale degradation of environment. Some of the significant driving forces are the microeconomic and sectoral policies such as taxation, subsidization, investment strategy, assignment of property rights etc. influencing the economic behavior, which in turn has impact on the environmental profile of the state. For example, the policy of subsidizing the water supply and sewerage tariff of domestic areas creates inefficiency in utilization of water supply and sewerage services, which are mostly provided through state budget.

1.1 INCREASES IN URBANIZATION

Since independence and specifically after the creation of the state of Haryana in November 1966, considerable attention has paid to the development of large, medium and small- scale industries in the state. Efforts have been made to improve the infrastructure in the urban areas. This has resulted in the growth of urban population over the years. The state has an area of 44212 sq km having a population in the state has increased by 28.06 percent against nation's 21.34 percent. During 1981-91, Percentage decadal growth rate of Haryana was 27.40 against nation's 23.86. The decadal growth rate has increased in Haryana during last decade against the decrease in the decadal growth rate of the nation. The urban population constitutes 29 percent of the total population. The population of 68 notified municipal towns has witnessed 50.27 percent growth during 1991-2001 as against 28.06% for the Haryana as a whole.

1.2 POPULATION GROWTH/ URBANIZATION:

The population growth in cities and towns enhances the aspect of environmental strain in urban areas the density of population has

increased from 292 persons per sq km in 1981 to 372 persons per sq km. in 1991 and 478 persons per sq km in 2001 as against nation's 324 persons per sq km in 2001. The trend has been shown in table below:

Census year	**Population of Haryana**	**Percent Decadal Growth.**
1971	10036808	32.23
1981	12922618	28.75
1991	16463648	27.40
2001	21082989	28.06

Statistical Abstract-2005

The diagram attached indicates that the births and deaths in Haryana per thousand are decreasing since 1971. However, the decrease in the birth rate is higher than decrease in death rate.

Sex ratio in Haryana

Sex ratio (females per 1000 males) has declined in Haryana from 865 in 1991 to 861 in 2001 against increase in the nation from 927 in 1991 to 933 in 2001. The table below indicates the sex ratio of the total population and child population of Haryana in comparison with other states.

	No. of females per 1000 males		**Female Child Population per 1000 males in age group**		**No. of females per 1000 males in 2001 in rural and urban area**	
					Rural	**Urban**
India						
Himachal Pradesh						
Punjab						
Haryana						
Delhi						
Rajasthan						
Uttar Pradesh						

Statistical Abstract-2005

Haryana has the lowest sex ratio in 2001 both in urban and rural areas. The table below indicates the comparison of decadal growth of urbanization between Haryana, India and adjoining states. Though it became less during 1980-81 but due to rapid growth in overall living facilities it shot up again after that.

1.2 Decadal growth of urbanization in neighboring states of Haryana.

State				
India				
Punjab				
Haryana				
Himachal Pradesh				

Statistical Abstract-2002-2003

1.3 TRENDS IN URBANIZATION

The towns have been classified into the following size class based on population between 1971 and 2001.

Year			Percent increase between 1971-2001
Total population			
Urban population			
% of urban population to total population			

Statistical Abstract-2002-2003

Trends in urbanization, 1901-2001 is given in the table below and in the diagram. The percentage decadal is very high during 1981-91 and 1991-2001.

TRENDS IN URBANIZATION (1901-2001)

CENSUS YEAR	**TOTAL No. OF UA'S**	**TOTAL POPULATION**	**TOTAL URBAN POPULATION**	**PERCENT URBAN**	**DECENNIAL GROWTH**		**ANNUAL EXPONENTIAL**
1901							
1911							
1921							
1931							
1941							
1951							
1961							
1971							
1981							
1991							
2001							
Source: Statistical Abstract of Haryana 2002-03							

1.4SIZE AND CLASS OF TOWNS:

According to the 2001 census, the state has 58.02 lakh of urban population in the 68 notified municipal towns (including one Municipal Corporation) of different size classes, ranging from less than 20,000 persons to more than 10 lakh persons. None of the notified town has population less than 10000.

1.5 NATIONAL CAPITAL REGION

During the best few decades' efforts have been made to lessen the overcrowding of population in Delhi and to control its rapid population growth. The National Capital Region (NCR) Concept has been developed in recognition of the ever-growing interdependencies among the various inter-looking metropolis. The National Capital Region Cover the parts of Haryana, Rajasthan and Uttar Pradesh and the entire Union Territory of Delhi.

The provisional population of the National capital Region as per 2001Census is 35,875,284 persons, of which 8,689,268 persons belong to Haryana (24.22 percent); 13,782,967 persons fall in Union Territory of Delhi (32.25 percent) and 1,832,923persons are from Rajasthan as sub-region of NCR (5.11 percent).

The proportion of urban population to total population in the National Capital Region is 57.93 percent. Percentage of urban population to total population in sub-region of NCR varies considerably. It is 93.01 percent of Union Territory of Delhi; 34.11 percent in Haryana sub-region.

Out of 20 districts of Haryana, 7 distracts fall in National capital Region containing 41.21 percent of the total population of Haryana according to the provisional results of 2001 census. The National Capital Region (sub region Haryana) contains 40 towns and 2,496, village out 106 towns and 6,955 villages, of Haryana in 2001.

Out of 40 towns, which fall in National Capital Region in Haryana, 23 are census towns. Class wise grouping of individual towns in National Capital Region in Haryana explains the existence of 8 class-III towns, 17 class-IV towns,

Class-V Towns and I class VI town which together claim 48.47 present of the urban population on Haryana in 2001. The eight class I towns are Panipat, Sonipat , Rohtak, Bahadurghar, Rewari , Gurgaon, Faridabad and Palwal- all are important industrial centers attraction migration.

According to 2001 census, the density o population in Haryana has been worked out to 478 persons per square kilometer whereas density in National Capital Region in Haryana is 645 persons as against 403 persons in non-NCR of Haryana attracting migration due to industrial development in the sub- region.

1.6 INDUSTRIAL GROWTH

Number of Industrial in Haryana has increased many times since the creation of the state in 1966. The major growth of industries has been on the NCR area. The number of registered working factories is8804 with estimated 519613 workers in 2001 as compared to 1168 factories and estimated 71016 workers in 1966.

2.0 PRESSURE

2.1 WATER AVAILABILITY

2.1.1 PRESSURE ON GROUND WATER:

The increased number of well/tube well in the urban as rural areas to meet the water requirement is causing depletion in ground water resources. He number of tube well, most of which are in rural area and used mainly for irrigation, has increased from 25311 in 1966-67 to 589473 in 2001-01 and 601991 in 2001-03.

2.1.2 INCREASING DEMAND FOR INDUSTRIAL, COMMERCIAL AND OTHER ACTIVITIES

With the growing industrialization and commercial activity, the demand for water supply is increasing at a rapid pace.

2.2 VEHICULAR PRESSURE

There is an increasing trend in vehicle number in Haryana that is comparable to the trend in India as a whole. The number of motor vehicles on road in Haryana has risen from 14265 in 1966 to 2547910 in 2003-04. Tow wheelers with 1526404 nos. in 2003-2004 are by far the dominant type of vehicles in Haryana. Most of the vehicles pollution is found in urban areas. Between 1990-91 and 2002-2003the numbers of vehicles in Haryana has increased by 478%. Private two wheelers and cars have increased by 492% and 96.6% respectively in the same period. In comparison the numbers of other public service vehicles in the corresponding period have decreased by 4.69%. This level of growth in private mode of transport in comparison to public transport is a significant one.

The table blow indicates the comparison in number of motor vehicles in Haryana and India in relation to area and population in 2001-02:

State	**No. of motor vehicles per**	
Country	**100 sq km of area**	**Lakh of population**
Haryana	4408	9108
India	1791	5671

Source State Transport Controller

2.3 INDUSTRIAL PRESSURE:

As discussed earlier there has been an increase in the activity in the state with the growing number of industrial across different categories.

There are two thermal plants in Haryana, the thermal power plant at Faridabad and at panipat. The pressure to produce more power in order to cater to the demand is increasing day by day.

2.4 INSTALLATION OF GENERATING SETS DUE TO INADEQUATE POWER

Frequent break down of power supply especially during peak demand season necessitates bake up for industrial and commercial establishment. D.G sets are being increasingly deployed by these establishments, which results in increasing the ambient air pollution level in towns

2.5 SOLID WASTE DISPOSAL

2.5.1 MUNICIPAL SOLID WASTE PRESSURE

The combinations of increasing general population and rapid urbanization have exerted an enormous pressure that will continue to build on the urban environment in the form of increasing volumes of municipal solid waste.

2.5.2 INDUSTRIAL HAZARDOUS WASTE PRESSURE

There had been a rapid increase in the industrial base of Haryana after its creation as discussed earlier. One of the problems due to this is the increase in hazardous waste generation. Some of the units responsible for generation of hazardous waste are fertilizer production, chemical, pharmaceutical, petrochemicals, paints and dye, asbestos and general engineering.

2.5.3 BIOMEDICAL WASTE PRESSURE:

Now there is increased awareness about health among people. Correspondingly, medical facilities available in terms of the number of hospitals, their bed strength etc. has also gone up. On the other side, the hospitals are generating wastes also. These need special attention and care in their disposal. This waste could be infections in nature and is capable of causing severe damage to the human health and the environment.

2.5.4 PRESSURE DUE INAPPROPRIATE LAND USE:

Industrialization and urbanization exerts pressure on available land and result in change in the land use pattern. Land conversion from agriculture to non-agriculture use is inevitable in growing economy with a growing population. However, to minimize the use of vulnerable land for agriculture and other purposes, land use planning is important.

2.6 TRANSPORT

2.6.1 ROADS

In Haryana roads and railways are the main modes of transport, though roads play a more prominent role.

The road transport falls into four categories in Haryana:

2.6.1.1 NATIONAL HIGHWAYS:

these roads are the property of the central government and built and maintained by state government. These are considered the main arterial route as they connect big cities, industrial centers, and different state of the country. In the year 1966- 67 the length of the national highway was 767 km and December 2005, it was 1424 km out of which 1083 km is maintained by PWD(B&R) Haryana..

2.6.1.2 STATE HIGHWAYS

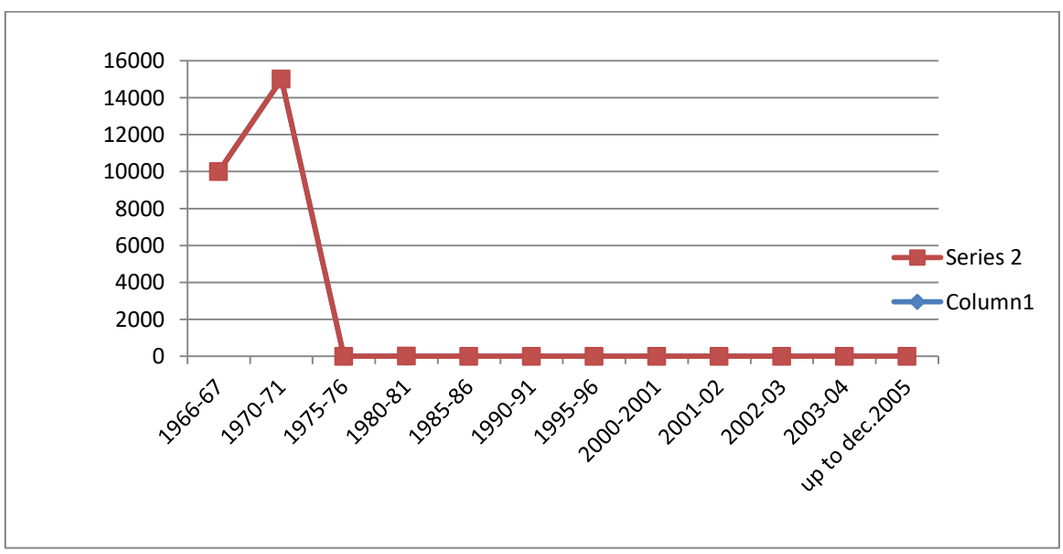
These roads are important roads which connect district head quarters and important town and cities with the capital and national highways. The construction and maintenance of the state government's responsibility. Up to the year December 2005, the total length of roads including state highway, major district roads and other district roads etc. are 22993km against 5370 km in 1966-67.

2.6.1.3 DISTRICT ROADS

These roads connect production centers and markets. They also connect main roads to the interior places of the districts. Major portion of these roads is unmetalled and are therefore unmotorable during the rainy season.

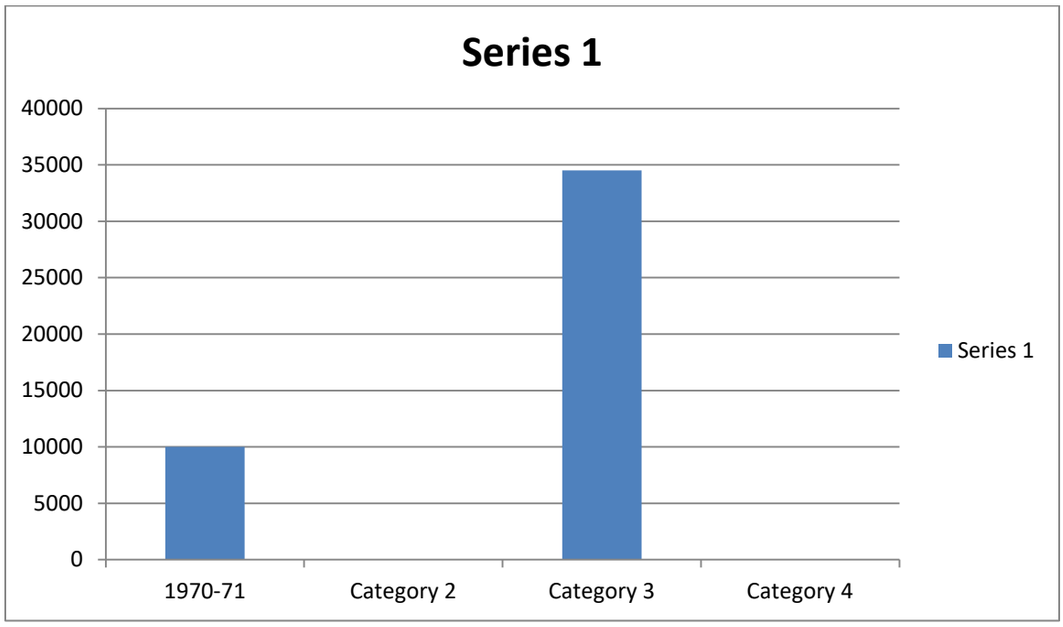
2.6.1.4 VILLAGE ROADS

These roads connect the village with one another and are basically the kuchha roads but the state is laying great emphasis on carpeting these roads and at most of the places the computer has been done.



2.6.2 NUMBERS OF VEHICLES ON ROADS

The Annuexure-1 shows that there is an increase in the numbers of actual vehicles on roads. Ti includes the total numbers of two wheelers, three wheelers and four wheelers. The increase in the number is shown by the diagram given below.



Since 1970-71 the number of the different vehicle on road in Haryana has increased from 28732 to 2547910 in the year 2003-04. Similarly, the table given in the Annexure-2 shows that the number of motor vehicle registered in Haryana has gone up from during the year 1970-71 to 256093 in 2003-04.

The diagram below gives a comparative view between the number of vehicles registered in Haryana and the actual vehicles on road.

2.6.3 VEHICLES MORE THEN 15 YEAR OLD

Annexure-3 shows the towns/cities with the motor vehicles including two-wheelers, three wheelers, card and others on road more than 15 year old.

3.0 STATE:

3.1 WATER RESOURRCES AND ITS AVAILABILITY

All the 68 Notified towns have been provided with piped water supply system. The service level of drinking water supply differs from town to town.

Due to the declining quality of underground water, water supply of number of towns is being based on canal. At present water supply of 29 towns is based on canal with additional tube wells drilled along the river / canal bodies or water bodies wherever suitable

No. Of Municipal Towns	Water supply status in LPCD
5	More than 135LPCD
30	Between 70to 135 LPCD
33	Less than 70 LPCD

The work of augmentation of water supply in the cities of Haryana is being executed under various programmes i.e. against state budget, central programmes and loan from financial institutions. The details are as under:

YEAR	Budget allocation under state programme
1997-98	1200.00
1998-99	1400.00
1999-2000	903.29
2000-01	1184.00
2001-02	813.31

THNTH FIVE YEAR PLAN (Rs.IN LAKHS)

YEAR	Budget allocation under state programme
2002-03	889.70
2003-04	585.92
2004-05	1265.00

The Work of augmentation / improvement of water supply in various towns of Haryana under state plan are in progress. There was a provision of Rs. 1265.00 lakhs during the year 2004-05. The work of installing 36 tube wells, laying of 90km water supply line and construction of 3 ground water tanks have been taken up under this programme in various towns and is completed.

3.2 HOUSING:

Housing board Haryana has constructed houses to cover all categories from weaker section to HIG(High Income Group) in various towns and has provided water supply / sewerage facility and also other infrastructure such as roads, electricity etc. As give in Annexure-4 almost 70% of the houses are for Low income Group and below.

3.3 HEALTH:

Details of hospitals, community health centres, primary health centres and sub centres functioning in govt. /private buildings is given the Annexure-5 (a) and 5 (b). The number is on the rise as can seen from the data given in the annexure.

3.4 OUTDOOR AIR POLLUTION

There are number of sources of air pollution that contribute to the state of air quality in the urban areas. The air pollutions arising from these sources include; particulate matter of varying sizes, nitrogen dioxide, sulphur dioxide, lead, carbon monoxide and ozone. It is recognized that particulate matter is the most serious pollution in Indian cities. Refuse burning and road traffic is the major sources of smaller size particles.

3.5 AIR QUALITY:

Currently the pollution monitored is SPM, RSPM, N02 and S02 of twp locations i.e. in Faridabad and Yamunanagar. The table below shows ambient monitors of above pollutants in 1995-96 and 2000-01 at Faridabad and Yamunanagar.

Ambient Monitoring Locations	1995-96				2000-01			
	S PM	RSPM	N0x	SO2	SPM	RSPM	N0x	SO2
Faridabad	358	NM	14	38	328	NM	16.25	24.6
Yamunanagar	232	NM	22	30.5	181	NM	8.4	18.6

Source PWD (Public Health)

3.6 INDOOR AIR POLLUTION

The four most serious pollutants in the smoke are particulates, carbon monoxide, polycyclic matter and formaldehyde. Concentrations of indoor air pollutants in households that burn traditional fuel can be extremely high. The percentage distribution of households using different types of fu\el for cooking etc, in Haryana in 1998-99 is given below. A positive development in the domestic energy consumption is that LPG is fast becoming the most popular cooking fuel especially in urban areas, as it is cleaner and more efficient than traditional fuels.

Fuel	Urban	Rural	Total
Wood	19.5	74.1	56.9
Crop	0.4	1.0	0.8
Dung cakes	4.4	11.3	9.2

Coal/cakes/lignite/charcoal	0.5	0.1	0.2
Kerosene	9.3	3.7	5.5
Electricity	0.2	0.0	0.1
Liquid petroleum gas	65.5	9.5	27.2
Biogas	0.1	0.1	0.1
Others	0.0	0.3	0.2
Total percent	100.0	100.0	100.0

Source PWD (Public Health)

The physical achievement and policies and plan for the future with respect to environmentally sensitive programmes of non- Conventional Energy Sources Department are described later.

3.7 STATUSOF INDUSTRIAL HAZARDOUS SOLID WASTES:

Under The Hazardous waste management rules 1989(amended in 2000) of the E.P. Act 1989, the state pollution control board is required to regulate generation, transportation and disposal of hazardous waste. Status of hazardous waste generation in areas under jurisdiction of different regional officers of pollution control board is given the chapter on industry and mining.

3.8 FLY ASH WASTE:

Thermal power generation results in the quantities of fly ash. Fly ash generated and utilized from Faridabad thermal power station and Panipat thermal station is given the chapter on Industry. A notification dated 27th August 2003 by ministry of Environment and Forests, Govt. of India New Delhi has been issued regarding use of fly ash for construction in a time schedule. Use of fly ash bricks/blocks and similar products in the construction in a phased manner within a radius of 100 km of the coal or lignite based thermal plant has been specified.

3.9 BIOMEDICAL WASTE SCENARIO:

To address the biomedical waste problem, the Biomedical Waste Management Rules, 2000 were adopted. Present status of biomedical waste generated is as per annexure 6.Current method of disposal of Hazardous waste in given in chapter on Industry.

3.10 URBAN LAND USEIN HARYANA:

Because of rapid urbanization, the Town and Country planning Department has been preparing development plans of the towns, identifying the land use for residential, industrial commercial, open spaces and for other uses.

4.0 IMPACT

4.1 WATER POLLUTUTION:

4.1.1 INCREASING POPULATION:

Population growth in Haryana in the last three decades has increased the use of water resources by households, agriculture and industrial sectors. However, the infrastructure capacity for sanitation facilities or waste treatment plants has fallen short of that necessary to provide for the expanding population.

4.1.2 INADEQUATE URBAN SANITATION FACILITIES:

Lack of adequate sewage collection, disposal and treatment facilities in urban areas contribution towards enhanced levels of biological pollution load in the streams and rivers flowing through/adjoining the towns. Further lack of awareness and personal hygiene something contributes to water borne diseases, such, as diarrhea, dysentery, gastroenteritis and cholera etc. according to the rough estimates the cost of providing sewerage and treatment plants in 68 notified towns including on Municipal Corporation, Faridabad is as given below:

No. of towns	**Cost of completion of sewerage (Rs. in crores).**	**Discharge of effluent (in MLD)**	**Cost of providing STP(Rs. in crores)**
68	120.10	986.00	627.78

4.1.3 INCREASED INDUSTRIAL POLLUTION:

One of the major problems facing the industrial units is the wastewater treatment. Wastewater effluent discharged from the factory can be water polluting.

The industrial scenario of Haryana today shows that there are large number of comical and pharmaceutical industries apart from food processing industries, as a result of which the nature and complexity of water pollution and its constitution has been charging.

4.2 AIR POLLUTION

4.2.1 INDOOR AIR POLLUTION

Traditional biomass resources are used to meet substantial energy demand, especially in the rural areas, the emissions of which are highly pollution and are responsible for many aliments.

4.2.2 OUTDOOR AIR QUALITY:

There are number of sources of air pollution that contribute to the state of air quality in the urban areas. These include vehicles exhaust, emissions from

large industrial plants, medium and small scale industries, thermal power plants, household and commercial establishments though burning cattle waste, suspended road dust migrating from other region and naturally occurring dust.

4.2.3 FUEL CONSUMPTION IN TRANSPORT SECTOR

Air pollution has been aggravated by development in the industrial and the progressive growth of transport sector. Currently in Haryana air pollution is widespread in urban areas and the vehicles are the major contributors. Vehicular emissions are of particular concern because they release lead, SO2, NOx in air.

4.3 UNPLANNED GROWTH:

With the shift from the rural to the urban areas there is congestion and unplanned growth of human settlement in towns and cities forcing major changes in land use. In addition, unauthorized colonies have also come up. the prevailing infrastructure was insufficient and as the demands on eater, roads and sanitary facilities mount by leaps and bounds it results in unhygienic conditions prevailing in some areas.

4.4 URBANIZATION AND THE POOR:

Urbanization brings in its make, multitude of problems affecting the quality of life of the urbanities. Relatively speaking, though the quality of life is better in urban areas when compared to rural areas, there is much to be desired on various parameters. More important, urbanization puts extreme pressure on urban local bodies both in terms of governance as well as provision of services including basic needs like housing, water, sanitation, solid waste management, roads education, health etc., which affect the quality of the urban people.

One major problem reflecting in the urban areas is poverty, as due to scarcity of land, non-availability of developed land at affordable rates or because of excessive land costs the migrants settle down on whatever land is available (mostly the government property) leading to formation of slums. Though not all those living in these slums are poor, a majority of them can be categorized as poor while some of them are extremely poor.

Migration of people from rural areas to urban areas results in the growth of slums, which leads to the development of unhygienic living conditions. Devoid of the most of the basic services, the amount of waste generated has a greater impact on the people living therein than in other areas. It is observed that garbage collection is more efficient in upper and middle class localities than in slum areas. As the slum population is increasing, so does the total waste generated.

4.5 SLUM AND POPULATION AS PER 2001CENSUS:

Of the total population living in 22 main towns of Haryana state 32.47 percent lived in slums areas as can be seen from the table below. 23.25% of urban

population of Haryana lives in slums (i.e. one in every four urban person's lives in slum). In NCR this percentage comes to 30.38.

Classified slum population as per 2001 census			
Name of state/ town	Total population	Slum population	Percentage
PANCHKULA	140992	25140	17.83
AMBALA	139222	22043	15.83
AMBALA SADAR	106378	6693	6.29
YAMUNANAGAR	189587	40202	21.21
JAGDHRI	101300	37878	37.39
THANESAR	122704	50400	41.07
KAITHAL	117226	28276	24.12
KARNAL	222017	58949	26.55
PANIPAT	268823	102813	38.25
SONIPAT	225151	75454	33.51
JIND	136089	37279	27.39
SIRSA	160129	51892	32.41
HISAR	263070	77757	29.56
HANSI	75730	32174	42.49
BHIWANI	169424	41443	24.46
ROHTAK	294537	90645	30.78
BAHADURGARH	126746	39478	31.15
NARNAUL	62091	11279	18.17
REWARI	100946	51754	51027
GURGAON	201759	33570	16.64
FARIDABAD	1054981	491131	46.55
PALWAL	100528	15589	15.51

The classification of slum population, according to 2001 census shows that the highest population was obtained in Rewari 51.27% followed by Faridabad

46.55%, Hansi 42.49% and the lowest was recorded in Ambala Sadar 6.29%. The concentration of slum population is found more at the districts like Faridabad, Panipat, Rohtak as being industrial region they offer better job opportunities for labours and therefore attract high percentage of migrants from neighboring states. Sex ratio in slum is generally expected to be poor including male selective migration. Overall sex ratio in slum of Haryana has turned out to be 824.

4.6 ENERGY CONSUMPION GROWTH:

The demand for energy is increase in economic growth. The per capita consumption has increased from 48 in 1966-67 to 2004-05. The rate of energy growth had been lower than the increased demand resulting into power cuts. The shortfall was, to some extent, overcome by use of private diesel generators in industry/commercial and residential activity particularly in urban areas.

4.7 IMPACT ON WATER AVELABILITY FOR DRINKING AND HOUSEHOLD USE:-

Most of the old areas in the towns have been provided with water supply. There is increase in the number of water connection between 1993-94 and 2001-02 by more than 60% including that more and population is provided whit safe drinking water supply. In spite of efforts as explained earlier the impact is not visible as population growth and urbanization (mainly unapproved/unauthorized colonies) is taking place very fast.

Water table has gone down resulting into installation of deep tube wells. With the increasing depth of water table the energy required to draw water has increased resulting into higher cost of withdrawal of underground water. Due to decreasing yield of the tube wells and deterioration of underground quality of water more and more water supply schemes are being based on canal. Efforts are continuing to provide arrangement of water supply in the existing areas of the town. However. Unapproved colonies have been mushrooming without water supply sewerage and other infrastructural amenities.

4.8 UNSANITARY CONDITIONS:

Efforts have been made in providing sewerage and sewerage treatment plants as stated above. A beginning has been made during the last few years by constructing STPs in various towns. Coverage of sewerage n the existing old area of number of towns has increased. The existence of unapproved colonies and their further growth is creating problem.

Non-provision of treatment plants by some industries and also their non-operation (wherever installed) regularly creates water pollution and unsanitary conditions.

Nature and extract of water pollution exposes the population to eater borne diseases. Lack of provision of sanitation facilities also expose population to various diseases and thereby health impact.

At the household level, major health risk are associated with poor living condition. Lack of sanitation, poor ventilation, inadequate drainage and improper waste disposal of cow dung, particularly in urban slums, spoils the environment and leads to number of diseases.

4.9 HEALTH IMPACT:

Hospitals, PHCs, CHCs etc. are increasing manifolds sine the creation of the state. Health depends on many other factors such as infrastructure and its proper use for water supply, roads, solid waste management etc. it also depends on literacy percentage hygiene and civic sense.

4.9.1 IMPACT DUE TO AIR POLLUTION:

Air pollution on urban and industrial areas result in multiple impacts, including negative effects on human health, visibility, etc. The impact on human health is most significant. Air pollution results in serious health related social costs in the form of lines. Loss of productivity and increased expenditure on medical care are components of the cost of air pollution. Except local pockets in same of the urban aeas, it is not a critical problem in urban areas of Haryana.

4.9.2 IMPACT DUE TO INDOOR AIR POLLUTION:

Approximately 25% of urban population is using wood residues, dung cakes, coal, coke, lignite and charcoal as fuel for cooking. Exposure to indoor air pollution from traditional fuels can cause illness such as acute respiratory infections and lung diseases.

4.9.3 IMPACT OF MUNICIPAL SOLID WASTE:

Solid waste management schemes framed for some towns have been taken in hand their impact will be visible after their completion.

The high rate if non-collection and unscientific disposal of collected municipal solid waste has adverse impacts on the environment as well as health impacts on communities such as;

Attraction of vermin (such as rodents) and insects causes emission of odour and airborne pathogens thus creating an unhygienic atmosphere in the surrounding.

Clogging of sewerage systems due to plastic and other waste entering in the storm/ drain/sewer pipes in the towns leading to unhygienic conditions.

Inadvertent consumption of plastic by animals and the presence of polythene degrades the digestive system leads to impaction and finally the breakdown of the respiration process and killing of the affected animals.

The rag pickers who provide immense service in terms of collecting non degradable solid wastes such as plastics are themselves exposed to infectious disease and toxic fumes of the dumping sites.

The garbage collocation is more efficient in upper and middle class localities than in slum areas.

IMPACT OF INDUSTRIAL HAZARDOUS WASTE:

The disposal of hazardous waste from industries in an environment unfriendly manner can result in environmental hazards and accidents which are both long term and immensely costly to remediate. One of the most irreversible impacts is leaching into underground.

BIOMEDICAL WASTE:

The disposal of bio-medical waste in the municipal solid waste has potential to increase the spread of disease and possibly contaminating the ground water though leaching.

5.0 RESPONSE:

5.1 CENTRAL PROGRAMME:

a) Additional Central Assistance (Basic minimum service):

The Government of India sanctioned a project, costing Rs. 4974.06 lacs for improving water supply in 3 towns namely; kaithal, Bhawani, and Ambala Sadar under Addition Central Assistance. The town wise detail showing estimated cost, total funds allocated upto date and total expenditure is attached at Annexure7.

B) Accelerated Urban Water Supply Programme:

The Government of India has launched a programme to upgrade the the water supply status to 70 litres as per day for the small towns having population less than 20000person as per 1991 census on the basis of 50:50 sharing basis (Central Government: states government).

Total 43 towns of Haryana were having population less than 20000 persons as per 1991 census, out of which 15 have been denotified and have been given status of villages. The schemes for 31 towns have already been approved by Government of India. The schemes for 7 towns have been submitted for approval and the water supply status in 5 towns is more than 70 l/c/day. The town wise details for

notified/ denotified towns showing the position of the estimate and funds allocated so far is attached at annexure 8.

C) 11th Finance commission

The Govt. of India had launched a programme under the recommendations of 11th finance commission to upgrade the infrastructure facilities in the towns located cost, total fund allocated and expenditure is attached at Annexure 9.

5.2 LOAN FROM FINACIAL INSTITUTIONS:

5.1.2 LOAN FROM FINACIAL CAPITAL REGION LPANNING BOARD:

In order to decongest national capital Delhi and to develop economic activity in the surrounding

Areas, the National Capital Region Planning Board was constituted by the Government of India with the main objective to improve the infrastructure faculties in the towns falling under National Capital Region and counter magnet towns.

5.2.2 AUGMENTATION AND EXTENSION OF WATER SUPPLY AND SEWERAGE IN FIVE TOWNS OF HARYANA

A project costing Rs. 7154.56 lacs for improvement of water supply in five town of Haryana namely Sonipat, Rewari, Rohtak, Jhajjar, gurgaon and sewerage in 3 towns namely gurgoun , sonipat, Rohatk was approved in the month of September 2002 by national Capital Planning Board (NCRPB). 75% of the total project cost will be provided by NCRPB as loan assistance and 25% of the project costs shall be borne by the state government. The project is to be completed by October 2006.

The towns wise detail showing estimated cost, total funds allocated up to date expenditure at Annexure 9 and the new projects under NCR sent to Government of India is attached at Annexure10.

5.2.3 AUGMENTATION AND EXTENSION OF WATER SUPPLY AND SEWERAGE IN COUNTER MAGNET TOWN HISAR:

Another project costing Rs. 1593.44 lacs for improvement of water supply and sewerage facilities on hisar counter magnet town of National Capital Region town planning board in September 2002.

5.2.4 AUGMENTTION OF WATER SUPPLY SCHEME FOR FARIDABAD:

To overcome acute water shortage in HUDA sectors and M.C.F area, the Faridabad Town Augmentation Scheme of water supply was prepared by HUDA and Municipal Corporation jointly. The total scheme consist of augmentation of water supply by 20 MGD (90 MLD), its transportation, storage, and water boosting arrangements.

There has been increasing trend in the expenditure incurred on augmentation of water supply. The expenditure incurred on water supply/ augmentation and sewerage provision during the last 55 year under various programs by public Health department and corresponding progress is as per Annexure -11 (b).

Town wise position of the household water sewerage connections in different towns is as per Annexure 12 (a). HUDA has developed some residential and industrial estate etc. the position of water supply and sewerage connections to different households is as per Annexure12 (b).

5.3 WATER POLLUTION IN RIVERS AND STREAMS:

At present one town of Panchkula is covered with sewerage facility. 52 towns have been provided with partial sewerage facilities. 15 towns have no sewerage facility. HUDA has provided sewerage in all the urban estates developed by it. Town wise status of sewerage is as per Annexure-13

There had been increasing trends in river water pollution (Yamuna) and decline in water quality till 1999, but since then the general quality of water has been improving. This is due to the implementation of Yamuna action plan for installation of sewerage treatment plants in different towns. Details are given in annexure 14 (a). Yamuna Action plan phase-II is also proposed to be taken as per detail given below.

5.3.1 YAMUNA ACTION PLAN PROJECT PHASE-II:-

Yamuna action plan phase-II has approved by national river conservation directorate, ministry of environment & forests, govt. of India with the assistance of Japan bank for International Cooperation for Rs.62.50 crores. This project is to be taken up under this project;-

Sr.No.	**Works**	**Amount (Rs.in crores)**
1.	Engineering Technology transfer (interception and diversion sewer works in six main towns of Haryana viz. Yamunanagar-jagadhri, karnal, panipat, sonipat durgaon and Fridabad	34.50
2.	Public participation and Awareness in above 6 towns.	10.00
3.	Institution Capacity Building of public health and Municipal staff in above 6 towns.	9.00
4.	Preparation of Detailed project reports fpr	9.00

	Yamuna Action Plan phase-II	
	Total	62.50

Source PWD (public Health)

During the last 5 year schemes for providing addition sewerage services in Sonipat, Panipat gurgaon, Rohtak ,bahadyrgarh, jhajjar and Rewari have been taken up a large extent under various programmes. Besides this, provision of sewerage is being carried out in various other towns also. Rs.133.12 crores have been spent for providing/improving sewerage system in various towns during the last five years from the state budget in action to details given in annexure 9 and 10 . Huda has provided sewerage in all the residential/industrial and commercial sectors developed by it.In the towns to carry the wastewater from the residential, commercial and industrial areas in various towns. This helps in controlling unsanitary conditions. To some extent storm water drainage system by construction drains/sewers have been provided and is being provided by public Health department in different pockets of the towns to protect them from flooding during rainy season. Rs.16.79 crores was allocated for period 2002-01 to 2003-200 for flood control projects and relief on account of nature calamities.

Common effluent treatment plant is being provided for electroplating industries in Faridabad by shifting them as cluster at one place.

Regular monitoring of water quality is being carried out both for drinking water supply and treated effluent from various STP's installed. Bharat Heavy electrical limited, Haridwar have been monitoring the performance of UASB sewerage treatment plants installed by public Health Department under Yamuna Action Plan.

5.4 OTHER IMPROVEMENT SCHEMES:-

5.4.1 INTEGRATED DEVELOPMENT OF SMALL AND MEDIUM TOWNS (IDSMT)

Objective of the centrally IDSMT schemes is to check pressure of increasing population on bigger cities by developing small and medium towns.

Details of estimated cost, fund released and beneficiary town is given in Annexure-15 (a).

5.4.2 ENVRIONMENT IMPROVEMENT OF URBAN SLUMS (EIUS):

Environment Improvement of Urban Slums Scheme in an integral part of the new 20 point program and aims improving the living conditions of the slum inhabitants by making provisions for civic amenities such as water supply, sewerage , storm water drainage, community baths, community latrines, widening and paving of exiting streets/ roads .

Funds released during the last four year are given in Annuxre-15 (b).

5.4.3 NATIONAL SLUM DEVELOPMENT PROGRAMME (NSDP):

The objective of the Programme is to provide adequate and satisfactory water supply, sanitation, primary education facilities, health care, pre- primary, adult literacy and non- formal education facilities etc.

Funds released during the last four years and beneficiary towns is given in Annexure-15 (a)

5.4.4 SHIFTING OF MILK DAIRIES:

In the first phase12 towns have been selected for shifting of milk dairies wherein the number of exiting dairies is on higher side. As these are situated in the inner parts of the therefore are causing congestion. Out of 12 towns, scheme for shifting of milk dairies in 6 municipal towns falling under the national capital Region (NCR) i.e. Rohtak, Panipat, Sonipat, GurGaon, Bahadurgarh, and Rewari has been sanctioned by National Capital Region Planning Board (NCRPB). The scheme is estimated to cost Rs. 1307.00 lacs out of which Rs.980.25 lacs (75%) is lan from NCRPB and Rs.326.75 lacs (25%) in municipal share. The scheme is proposed to be completed in one year,

In addition, HUDCO has also sanctioned a scheme for shifting milk dairies in 6 towes of haryana namely Jagadhri, Yamunanagar, Ambala city, Ambala sadar, karnal and Hisar. The scheme is estimated to cost Rs. 1805.00 lacs out of which Rs. 1444.00 lacs (80%) is loan component and Rs. 361.00 lacs (20%) is municipal share. Position of estimate and funds is as per Annexure-15 (a)

5.4.4 VALMIKI AMBEDKAR AWAS YOJNA

The objective of this scheme is to provide shelter or upgrade the existing shelter of the slum dwellers living below the poverty line in urban slums in different towns and cities all over the country. VAMBAY id centrally sponsored scheme with 50 per share of centre as subsidy and balance 50%as beneficiaries' share to be raised as loan from HUDCO by the state gote.

A scheme has been formulated for the construction/repair of 3263 slum units at n estimated cost of around 13.37crore. the processed has been sanctioned.

Environmentally sensitive expenditure and physical target and achievements in the urban development are as per Annexure15 (b).

5.5 POLICIES AND PLAN FOR THE FURTHER:-

During the year 2003-04, it was decided by the govt .to install institutional biogas plants in all the goshalas wherever these technically feasible. Accordingly, a survey was carried out and 38 more goshalas were fund technically feasible for

installation of these plants. Institution biogas plant is being installed in these 38 goshalas with a total capacity of 1775 cu.m. When commissioned, a total of 355 qtls of animal waste will be utilized per in these plants.

5.5.1 STATUS AND MUNICIPAL:

With economic development waste generation per capita is increasing. Municipal waste generation in various towns in 2005-2006 is giving as per Annexure 16. Increase in population and urbanization is causing is increase in municipal solid waste.

5.5 MUNICIPAL SOLID WASTE, COLLECTION AND DISPOSAL:

Status of land for solid waste management tretment plant is giving in annexure-17 most of the municipal solid waste collected is disposed of at landfill sites, which have not beem evelopment in a scientific manner.

5.5.3 Urban Solid Waste Management SCHEME:

Solid Waste management project is under implementation in 26 towns as per the detail given below:

Sr. No	**Name of agency financing the scheme**	**Name of town covered**	**Estimated cost(Rs. in lac)**	**Amount of loan released (Rs. in lac)**	**Expenditure incurred till date**	**Target date of completion**
1.	National Capital Region board	Gurgaon, Bhadurgarh, Sonipat, Palwal, Rewari, Rohtak, Panipat, Samalkha, Gohana, Jhajjar, Sohna, Nuh, Hodel, Meham, Bawal,	5656.00 (4242.00 loan Amount +1414.00 MC share)	2121.00	1955.83	December, 2006
2	HUDCO	Yamunanagar, Jagadhri, Thanesar, Kaithal, Karnal, Hansi, Bhiwani, Jind, Narnaul, Hisar	4522.74 (3618.19 as loan+904.55 as MC Share	448.98	469.90	December, 2006
		G.TOTAL	**10178.74**	**2569.98**	**2425.73**	

At present, state of Haryana comprises of 68 local bodies, which includes one municipal corporation, 24 municipal councils and 43 municipal committees. In the first phase, 16 towns namely Gurgaon, bhadurgarh, sonipat palwal, rewari, rohtak, panipat, samalkha, gonaur, jhajjar, sohan nuh, hodel, meham, and bawal falling under NCR, were selected for solid waste management and repair, strengthening of roads a scheme costing Rs. 5656.00 lacs has also got sanctioned from National Capital Region Board with comprised of Rs.4242.00 lacs as loan & Rs.1414.00 lacs as MC share. A sum of Rs.2120.80 lacs has already been released by NCRPB for the scheme. In addition, a scheme for solid waste management for 10 more towns namely, Thanesar, Karnal, Yamunanagar , Bhiwani, Jagadri, Hisar, Jind ,Narnaul, Kaithal And Hansi Cisting Rs. 4522.74 lacs has been sanctioned by HUDCO which comprises of Rs. 3618.19 lacs and Rs. 904.55 lacs as MC share. HUDCO has released a loan amounting to Rs. 448.98 lacs.

Under these schemes the waste is required to be segregated and collected from doorsteps of the households and disposed off through composting of biodegradable & landfill of the inert materials. For primary collection and secondary transportation 764 numbers of 0.5 cum containers, 709 of 1.00 cum containers, 316 of containers for hazardous waste, 12633 litterbins, 4349 containerized handcarts, 483 containerized tricycles,46 thee-wheeler auto cargos and 27 twin container dumper/ placers have been procured for Rs. 926.97 lacs. A sum of Rs. 1563.25 lacs has been spent for the repair strengthening of 240.155 km of roads in 16 NCR towns. Rs 116.98 lacs have been spent for the purchase of land for treatment plants. The solid waste Management Project in these 26 towns is likely to be completed by December 2006.the town-wise detail of expenditure in26 towns is likely to of Haryana is given in the table below. The Govt. of India, ministry of deference has identified10 airfield towns, which included 3 towns of Haryana viz. Ambala sadar, Ambala city and Sirsa, which posed threat to IAF air craft due to menace of bird-hits while taking off or landing at the air field, SWM project for these towns is also under consideration with Government of India. The GOI has entrusted the work of SWM of these towns to National Buliding Construction Company (NBCC). The work of implementation of the scheme is in progress at Sirsa. The land for SWM project for Ambala has been finalized.

A requirement of 30.360crores have been worked out for the left out 37 municipalities and Rs. 76.00crores are required for completion of the project for ongoing works in 26 towns . Thus total requirement of funds amounting to Rs. 106.36crores is required for implementation of SWM scheme in all the towns of Haryana. During the current financial year i.e. 2005-06, Rs.9.10crores have been earmarked under Center Financial Commission. Municipal Corporation, Faridabad which falls in the NCR managing its affairs itself.

5.5.4 TOWNWISE DETAILS PF EXPENITURE INCURRED ON SOLID WASTE MANAGEMENT PROJECT IN 26 TOWNS OF HARYANA

Sr. No	Name of agency financing the scheme	Name of towns covered	Exp. Incurred for purchasing of vehicles and equip-ment in lac.	Exp. Incurred for repair and strengthening of roads in lac.	Exp. Incurred for purchase of land for treatment plant in lac.	Total expenditure in lac.
1	National Capital Region Planning Board (NCRPB)	Gurgaon	51,61	225,17	-	276,78
		Bhadurgarh	45.90	110.50	25.00	181.40
		Sonipat	66.57	145.07	-	211.64
		Palwal	26.74	78.73	-	105.47
		Rewari	19.28	133.42	-	152.70
		Rohtak	83.04	233.76	-	317.16
		Panipat	57.96	196.03	-	2523.99
		Samalkha	8.35	82.79	-	91.14
		Gohana	22.01	26.24	-	48.25
		Gannaur	18.75	61.77	-	82.52
		Jhajjar	20.28	53.93	24.10	98.31
		Sohna	13.51	30.98	-	44.49
		Nuh	4.29	38.05	-	42.34
		Hodel	8.50	83.95	28.858	121.13
		Meham	6.67	13.24	-	19.91
		Bawal	3.99	49.62	-	53.61
		TOTAL	457.57	1563.25	52.95	2073.65
2.	HUDCO	Yamunanagar	47.57	-	28.16	75.73
		Jagadhri	32.57	-	-	32.57
		Thanesar	37.83	-	-	37.83
		Kaithal	34.31	-	-	34.31
		Karnal	55.55	-	35.87	91.42
		Hansi	24.83	-	-	24.83
		Bhiwani	41.74	-	-	41.74
		Jind	99.55	-	-	99.55
		Narnaul	15.01	-	-	15.01
		Hisar	77.56	-	-	77.56
		TOTAL	469.52	-	64.03	533.55
		G.TOTAL	926.97	1563.25	116.98	2607.20

5.6 WATER AVAILABILTY:

Due to depletion in water table, deterioration in the quality of underground water and increase in demand on account of urbanization population growth more and more water supply scheme are being planned on canal based water supply. During the last five years four scheme of Ambala sardar. Kaithal, Gohana and Kalayat have supply system in urban areas. Proposals have been prepared for augmentation of water supply of all the balance towns with water supply status less than 70 lpcd.

Central Ground water Board has its own monitoring system to provide data and information for management of ground water in the state.

Group water regulation need to be implanted/tightened by notifying areas where no typing can be permitted. Ground water regulations need to be constantly monitored. Priority should be given to water conservation projects. Rainwater harvesting should be enforced on existing and new structures / buildings. HUDA has already framed these rules. Policy needs to be framed for users to pay charges for development and also for operation and maintenance. At present the user charges are so low that even the operation and maintenance cost of the infrastructure created for water supply and sewerage is not recoverable.

Unplanned / unapproved and unauthorized colonies should not be allowed to come up which are putting extra burden on the state for provision of water supply and other infrastructure.

In response to urbanization efforts for provision of infrastructure such as water supply, sewerage, electricity etc. in rural areas be made to reduce migration of people from rural to urban areas. Also improvements of transport / communication system between urban and rural areas need to be made.

5.7 WATER POLLUTION:

In spite of the enhanced focus in urban sewerage facilities over the years, only one town of Panchkula has full coverage of sewer. Total funds (Budget+ other sources) during the last 5 year have been increased yet it is not sufficient to cover up demand and supply keeping in view the huge cost involved in providing sewerage and sewerage treatment plants as explained earlier.

Public Health department has already completed the construction of 13 sewerage treatment plants under YAP. Position of S.T.Ps constructed is given as per Annexure-14. It is proposed to take up Phase-II of YAP at a cost Rs. 62.5crores to execute the works as per Annexure-18. It is likely to be started in 2004-05. There is huge gap between the water tariff (user charges) and o & m cost. Govt. has revised the water and sewerage tariff after 1994 w.e.f. 29.12.03. it is still very low as compared to expenditure. Policy needs to be framed for regular increase in

tariff also keeping in view the rising trend in expenditure. Policy needs to be framed to charge development cost from the users

5.8 WATER MONITORING:

Health Department regularly checks drinking water samples for residual chlorine in it through orthotolidin test (O.T. test) and samples are also sent for bacteriological test in laboratories regularly. Public health Department has also set up laboratories one in each district and water sample from drinking water supply system are tested. Chlorination of wells, as and when required, is carried out by health department

H.S.P.C.B. is monitoring the surface quality of Yamuna River and canals in the state. Monitoring of the treated from the S.T.P's under YAP is also being carried out by public health Department, HSPCB and CPCB. Parameters monitored are BOD, dissolved oxygen and total coli form bacteria. Industries are directed to install efficient treatment plants and operate them regularly as per schedule fixed by HSPCB and in case of failure the defaulting industry need to be closed.

5.9 RESPONSE TO FLOODING:

To prevent flooding of urban areas, dewatering arrangement are being made. During the last 4 year an allocation of Rs. 50 lacs per year was made for dewatering. Rs. 16.79croes has been allocation for making permanent arrangement to solve the problem of flooding in some localities in various towns. Such Works are now being carried out regularly every year.

5.10 RESPONSE TO OUTDOOR AIR QUALITY:

HSPCB has its own ambient air quality-monitoring programme in addition to National Ambient Air Quality Monitoring Programme.

Department of Environment/Haryana State Pollution Control Board has been holding seminars.

5.11 RESPONSE TO MUNICIPAL SOLD WASTE:

Municipal Solid waste and its continuous increase indicate that significant land requirement will be necessary for landfill sites. Response actions for the municipal solid waste issue have been directed towards building capabilities in collection and disposal at landfill sites based mostly on social and economic criteria such as transport cost and availability of public land. Environment problems of unscientific design and usage of landfill facilities are being experienced. Greater attention is now being given specially after the introduction of Municipal Solid waste Management Rules-2000.

Solid waste management scheme of 26 towns as stated above after completion will considerably improve the solid waste management. Scheme for another 23 towns have been prepared.

Segregation of solid waste at household level needs to be given a thrust. Urban Development Department and the municipal authorities are building their capabilities to meet the challenges.

5.12 INDUSTRIAL HAZARDOUS WASTE:

A site for disposal of hazardous waste has been finalized at Faridabad. Further action is being taken by H.S.P.C.B. to get it developed for disposal of hazardous waste.

5.13 BIO-MEDICAL WASTE MANAGEMENT:

In response to the bio-medical waste Management rules-2000, Department of Medical Health, urban hospitals, private clinics have made action plan for bio-medical waste collection, treatment and disposal.

5.14 LAND DEGRADATION:

Draft development plan of the towns with future prospective are being prepared in which planned use of land has been earmarked for each purpose such a domestic, industrial, commercial, institutional etc. Even the sites for sewerage treatment plants and solid waste disposal are being earmarked for sustainable planned growth and avoid land degradation.

A drive is needed to stop all encroachments. All wasteland should be recovered by vacating encroachment. Bye pass to various towns be planned and constructed to decongest the inner areas of the town.

5.15 IMPORTANT SCHEME UNDER CONSIDERATION:

Integrated Rail-cum Bus Transit system	Dayabasti-Bijwasan-Gurgaon(committed Rs. 50crores as share of Haryana)
Eastern peripheral expressway	Kundli-Ghaziabad-Noida-faridabd.
Western peripheral expressway	Yet to be finalized, it has to be outside Delhi state
Metro rail project to Gurgoan	RETES have been engaged to study the viability of the project and submit its reports . Rs. 75 lacs already given to RITES for the same
Other road construction proposal	• Expressway between Rao Tula Ram Chowk-Rajiv Choek-Hero Honda chowk on National Highway No. 8. (Already taken up) Alternative links between Gurgaon and Delhi. Alternative link between Faridabad-Delhi

5.16 RESPONSE TO INDUSTRIAL GROWTH: STAREGY

1. Need for adoption of environment sound technologies that minimize waste generation.

2. Separate location of pollution industries.

3. Preparation of E.I.A (Environment impact Assessment) of the designated area. Minimum environmental parameters need to be met by the industries to be located in the designated zones.

4. Visible methods to ensure proper effluent treatment must be maintained. While many industries claim to have treated the wastewater, they do not generally do so. However, since they claim to have done it, the treated water effluent should be used by the industry itself for its own purposes.

Noise pollution studies should be taken up as well measure initiated to control it in areas where standards have exceeded the limits

INTRODUCTION

The most important single factor which plats a pioneering role in the process of economic growth of a country is the availability of energy. It is the basic input required to sustain economic growth. Prosperity of all sectors of economic is influenced by the availability of power. The degree of economic growth, per-capita income and the pre-capita consumption of energy, all have positive correlation with each other. Energy proves to be a dividing line between a subsistence economy and a developed economy.

2.0 PRESSURES

In Haryana priority was given to the development of infrastructure during planning period and huge fund were allocated in different five-year plans. As a result of these facilities the sates has recorded a rapid growth. Generation of power has increased from 343MW in 1966-67 to 4033 MW in oct.2005. The state's rapid agro industrial development during the last 37 years gas enabled it to the position of front-ranker among the states of Indian union. The success of 'green revolution' is also attributed to power generation and its availability.

Rapid urbanization has led to the increased demand for power generation. The per capita consumption has increased from 48 units in 1966-67 to 609 units in 2004-05.

Expansion of transport facilities and industrialization creates direct demand for industrial goods like machinery and engines and result in the increased consumption of power and petroleum products.

3.0 STATE

Haryana state has limited availability of natural sources of energy. There is no hydro- generation potential in the state. Even the coal mines are located far away in other states. There is limited forest area. The wind velocity prevailing in the state is also insufficient to exploit the same for power generation. Although, the solar intensity is relatively higher but the land area limitation does not encourage its large scale harnessing. Therefore, the state depends upon the limited thermal generation capacity installed with-in the state and hydropower from the jointly owned project from where the state gets on the formula evolved by the Government of India for such sharing.

3.3 INSTALLED ELECTRICAL GENERATION CAPACITY

The present demand for power is greatly in excess of generating capacity. The power generation scenario in the state reveals that the demand for power will continue to outstrip the available and planned generation capacity.

Capacity and electric city generation:

Thermal power plant	**Installed Capacity**	**Average electricity generation in million Units. 2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**
F.T.P.S. Faridabad	3 x 55 MW = 165 MW	822.61	808.05	973.14	795.38	867.88
TDL TPS, Panipat	4 x 110 MW + 2 x250 MW = 1360 MW	2727.99	4273.7	4992.26	5949.26	5756.57
WYC HE Project Bhudkalan, Yamuna nagar	4 x 16 MW = 64 MW	241.81	229.15	246.63	246.63	290.48

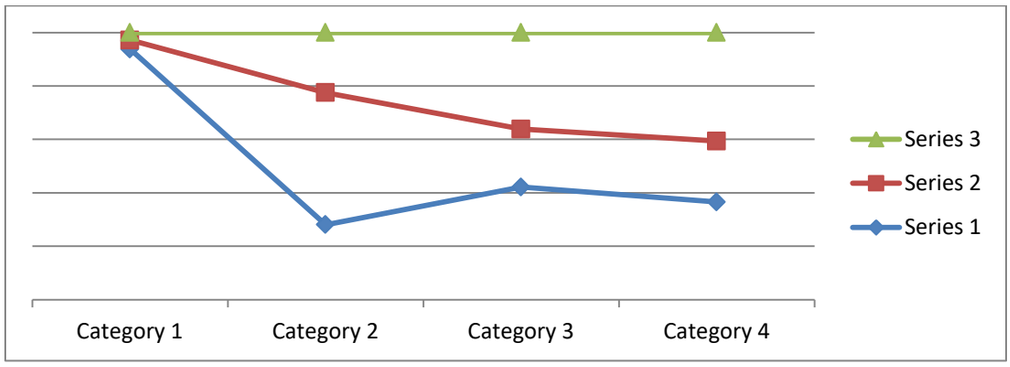
Source HPGCL

Out of this, 1525 MW is coal based units and 64 Mw from hydro units. The major share i.e. About 96% of power is from thermal power station.

3.2 POWER AVAILABILITY AND PER CAPITA CONSUMPTION

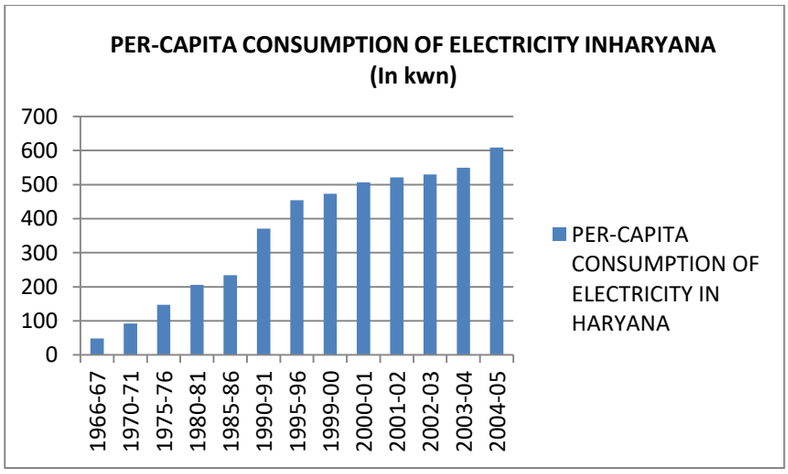
The demand for energy is increasing with economic growth. The state's power availability owing to the installed generation capacity has significantly increased from 601 million KWH during the year 1966-67 to 21454 million KWH in 2004-05. The per capita consumption has increased from 48 in 1966-67 to 609 in 2004-05. The progressive increases in the power availability and per capita consumption of electricity have been shown below.

POWER AVAILABILITY IN HARYANA (MILLION KWH)



3.3 PER-CAPITA CONSUMPTION OF ELECTRICITY IN HARYANA

YEAR	PCC of electricity
1966-67	48
1970-71	92
1975-76	147
1980-81	206
1985-86	234
1990-91	371
1995-96	454
1999-00	473
2000-01	507
2001-02	521
2002-03	530
2003-04	550
2004-05	609



Source HPGCL

The rate of energy generation growth had been lower than the increase in the demand resulting into power cuts. The shortfall is overcome to some extent by the installation of private fossil fuel generation in industry / commercial units and residential activity particularly in urban areas.

3.4 SECTORAL CONSUMPTION PATTERN OF ELECTRICITY

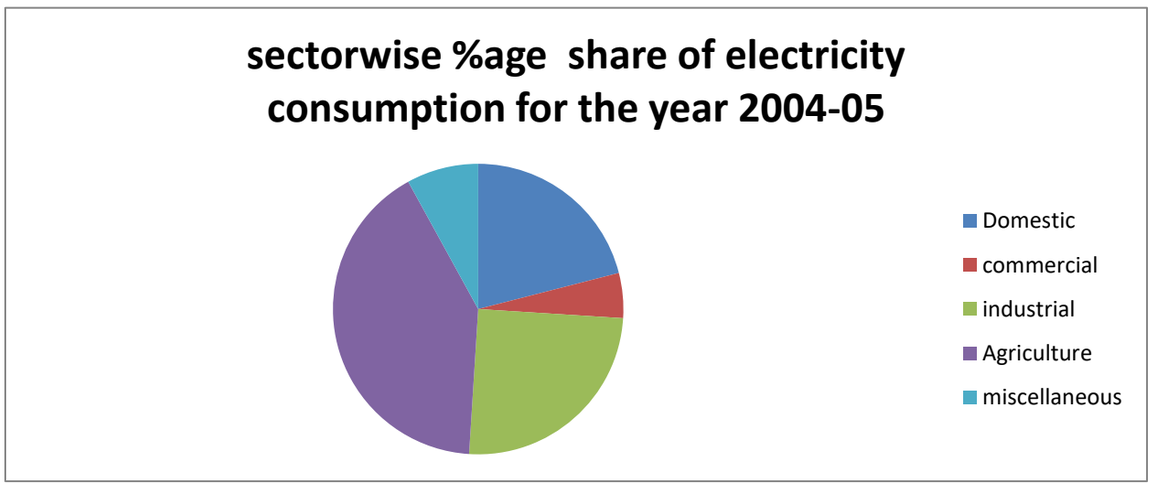
With the development in agriculture, industries, domestic, commercial and social sector the pattern of consumption of electricity has undergone a change as shown in the table below

YEAR	TOTAL	%age share in total consumption				
		DOMESTIC	COMMERCIAL	INDUSTRIAL	AGRICULTURE	MISCELLANEOUS
1966-67	4343.32	6.76	4.2	62.00	22.68	4.15
1970-71	9038.71	6.44	3.55	52.80	33.03	4.18
1975-76	16072.72	7.34	3.15	48.40	36.99	4.11

1980-81	25557.18	8.89	2.85	47.74	37.32	3.19
1985-86	33923.55	14.33	3.32	38.04	40.28	4.03
1990-91	60513.75	18.80	2.89	28.84	44.81	4.66
1995-96	83522.33	19.60	3.09	24.15	46.75	6.42
1999-2000	95977.29	21.76	4.05	19.67	47.83	6.68
2000-01	101436.16	21.23	4.41	20.52	46.89	6.95
2001-02	106074.47	21.55	5.20	23.23	43.58	6.45
2002-03	117206.95	20.19	4.89	32.76	42.93	8.23
2003-04	130708.37	19.85	5.00	24.76	42.93	7.80
2004-05	138131.96	20.53	5.15	25.00	41.22	8.10

Source HPGCL

The table indicate that the share of domestic sector in the consumption of electricity has increased from 6.76% in 1996-67 to 20.53% in 2004-05 which clearly indicates the improved standard of living. The share of agriculture has gone up from 22.6% in 1966-67 to 47.83% in 1999-2000 but has declined to 41.22 in 2004-05. Similarly, consumption of power by the decreased sector first increased from 4.42% in 1966-67 to 5.20% in 2001-02 and then decreased to 5.15% in 2004-05. The share of industrial sector has gone down from 62% in 1966-67 to 25%in 2004-05. Present status of consumption of electricity by different sectors such as domestic, commercial, industrial, agriculture, miscellaneous, have been shown belo



3.5 OTHER ENERGY SOURCES

A considerable amount of energy, traditionally, is derived from other sources like fuel-wood, agriculture waste and cow dung apart from the coal, and the petroleum products in Haryana.

3.5.1 THE PERCENTAGE SHARE OF MAJOR FUELS USED BY HOUSEHOLD

All Income groups	**Firewood**	**Dung cake**	**Crop residue**	**Kerosene**	**LPG**	**Others**	**Total**
(rural Haryana)	30.2	35.8	30.6	2.5	0.2	0.7	100
(urban Haryana)	13.2	9.3	2.6	27.7	38.2	8.9	100

(Source: Haryana Wood Balance Study: NCAER 1998).

3.5.2 PER CAPITA CONSUMPTION OF VARIOUS FUELS IN DIFFERENT ECOLOGICAL REGIONS

Ecological Status	Wood kg. /cap-ita/day	Cowdung kg/ Capita/day	Agriculture crop residue kg /capita/day	Kerosene litres Cap-ita/day	L.P.G cylinders/ ca-pita/ month
Hills	1.6767	0.2629	0.2543	0.0776	0.0345
Plains	0.5973	0.8435	0.6503	0.1666	0.0578
Sandy	0.4255	1.2899	0.9787	0.2340	0.0585
Composite Zone	0.2208	1.0233	0.6338	0.0395	0.0916

(Source: Study on energy Consumption Pattern and technologies in villages of Haryana, Energy Research Centre Punjab Univ. Chandigarh (2000)

LPG is also now widely used apart from other traditional sources, as shown in the table above.

3.5.3 CONSUMPTION OF VARIOUS FUELS IN YEAR 2003-04 IN THE HARYANA STATE	
Diesel	2,20,693 MT
kerosene	1,71,318 MT
Petrol	2,56,054,MT
LPG	2,03,089,MT

(Source-food & Supplies Department, Haryana)

3.6 NON-CONVENTION ENERGY SOURCES

3.6.1 USES OF CATTLE WASTE FOR ENERGY GENERATION IN RURAL AREAS

District	Cattle waste used as cooking fuel in Rural Area (Qtls. Per day)					
	1995-96		2000-01		2001-02to 2005-06	
	No. of plants	Cattle Waste used Per day	No. of plants	Cattle Waste used Per day	No. of plants	Cattle waste used per day
Ambala	1 (25cu.m)	5	1 (25cu.m)	5		
Panchkula	1(25cu.m)	5	2(70cm.m)	14		
Gurgaon	2(70 cm.m)	34	2(70cm.m)	34		
Rohtak	2 (120cm.m)	24	3 (205cu.m)	41		
Jind	--	--	1(185cu.m			
Karnal	--	--	2(145cu.m)			
Kurukshetra	--	--	1(25 cu.m)			
Bhiwani	--	--	2(145cu.m)			
Hisar	--	--	4(340cu.m)			
Kaithal	--	--	1(85cu.m)			
Fatehabad	--	--	1(85cu.m)			

Source Deptt. of Renewal Energy

3.6.2 USES OF CCattle WASTE FOR ENERGY GENERATION IN URBAN AREA

District	Cattle waste used as cooking fuel in urban area (Qtls. Per day)					
	1995-96		2000-01		0221-02 to 2005-06	
	No. of Plants	**Cattle Waste Used Per day**	**No .of plants**	**Cattle Waste used Per day**	**No. of plants**	**Cattle waste used per day**
Sirsa	1(85 cu.m)	17	2(170 cu.m)	34	2(110 cu.m)	22
Panipat	1(60cu.m)	12	2(145 cu.m)	29	Nill	-
Kurukshetra	1(45cu.m)	9		26	3(125 cu.m)	25
Sonipat	2(110cu.m)	22	2(110 cu.m)	22	Nill	-
Jind	--	--	1(85 cu.m)	17	2(200 cu.m)	40
Jhajjar	--	--	1(85 cu.m)	17	1(45 cu.m)	9
Narnaul	--	--	1(60 cu.m)	12	-	-

Source Deptt. of Renewal Energy

3.7 STATUS OF STACK EMISSION MONITORING (PARTICULATE MATTER) TAU DEVI LAL THERMAL POWER STATION, ASSAN, PANIPAT,

Year	Stage I (Unit I&II)(mg/Nm3)	Stage II (Unit III&IV)(mg/Nm3)	Stage III (Unit V) (mg/Nm3)	Stage IV (Unit V)(mg/Nm3)	Permissible limit(mg/Nm3)
2002	70--96	853--48	105--142	108—133	150
2003	124--143	113—140	139—144	130—143	150
2004	133--269	112—210	138	140	150
2005	129	123	-	-	150

Source HPGCL

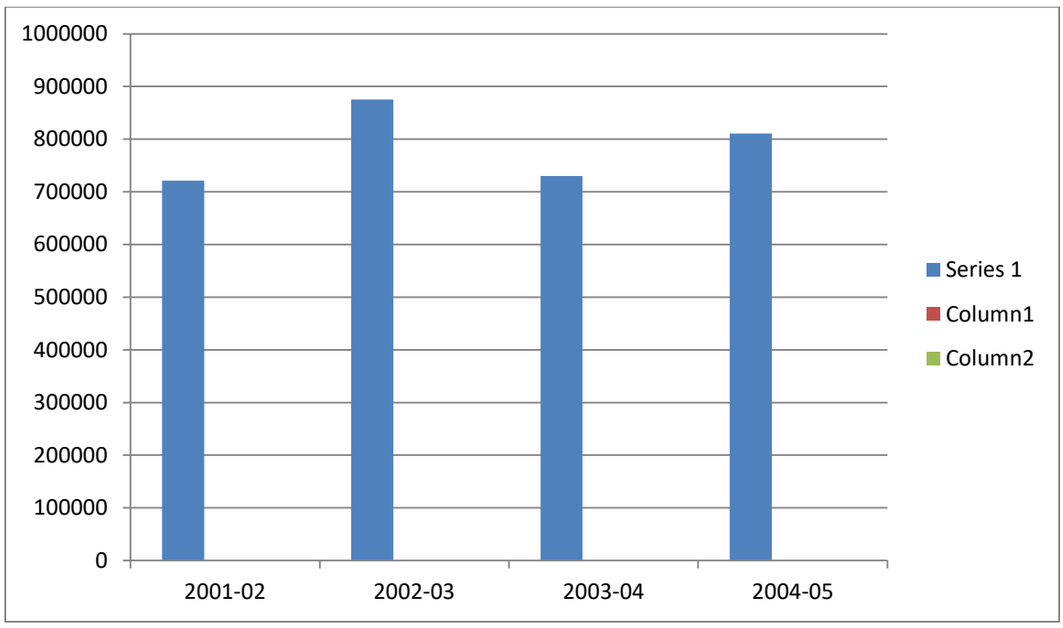
3.8 CAOL CONSUMPION AND ASH CONTENT

The consumption of the coal and the ash generated from it for the past three years shown a constant tread as shown below.

3.8.1 FARIDABAD THERMAL POWER STATION:

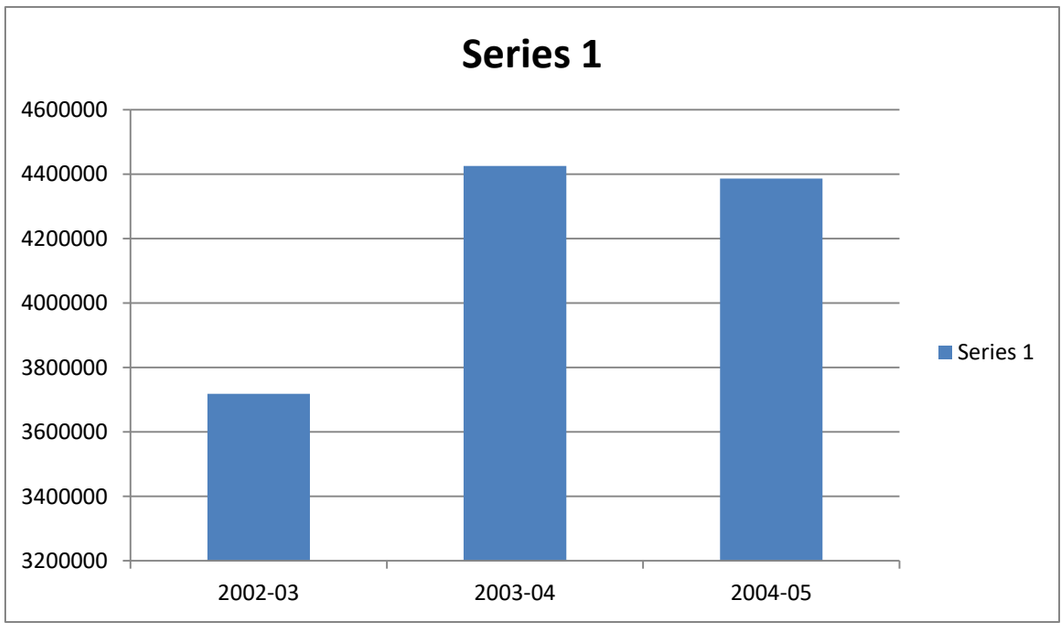
Year	Coal(tonnes)	Ash content (%)
2001-02	720965	28.29
2002-03	875078	29.2
2003-04	730303	30.65
2004-05	810933	26.5

Source HPGCL



3.8.2 TDL THERMAL POWER STATION PANPAT

Year	Coal(tonnes)	Ash content (%)
2002-03	3718289	38.18
2003-04	4425120	39.24
2004-05	4386006	37.53



3.9 EFFLUENT TEST RESULTS

PANIPAT TDL TPS:

The effluent test result of the various content as given below are found to be with in the permissible limits for the years 2002,2003 and 2004 and 2005.

Permissible Limits:	
Oil &Grease-	10

Cod(mg/L)	250
Bod(mg/L)	30
Ph-	6.5 To 8.5
Total suspended solid(mg/L)	-100

SOURCE UTLA DRAIN

Year	Oil &Grease-	Cod(mg/L)	Bod(mg/L)	pH	Total suspended solids
2002	<0.1	27-56.3	10-19.3	4.5-8.4	2.4-10
2003	<0.1-3.2	41-79	14-26	7.1-7.9	43-78
2004	<0.1-1.8	10-76	2.29	7.7-8.09	13-75
2005	<1.0	70	10	7.56	13.6

4.0 IMPACT

The environment effects of the use of various fuels are of growing concern owing to increasing consumption levels. Pollutants associated with the combustion of fossil fuels like SMP, SO2, N0x, and C0 either in transformation activities or in end used pose a major threat to environmental quality and human health. It has been noted by TERI study that in majority of Indian cities WHO air quality with respect to SPM are violated.

The final use of energy also imposes severe environment costs. Industrial and vehicular emissions have assumed serious proportions in urban areas. Petrol driven vehicles are the major source of C0 emission, while diesel-driven vehicles are the major source of N0x.

The unhindered use of energy in the agricultural sector has resulted in the depletion of ground water in several parts of the state.

The various types of pollution likely to be created by coal based thermal power stations can be broadly classified into air pollution, water pollution and noise pollution

These are discussed in relevant paragraphs elsewhere in the report

5.0 RESPONSE

5.1 ACTIVITIES UNDERTAKEN TO REDUCE THE ENVIRONMENTAL IMPACT OF POWER STATIONS ARE AS FOLLOWS.

a) Electronic bapcon controllers have been installed in the Electrostatic precipitators of old units No. 3 & 4 to bring down the stack emission within prescribed norms. Schemes stand completed in December 2002.

b) Ash water recovery system has been installed to reuse the ash pond effluent after necessary treatment. The schemes stands completed at an approximate cost of Rs.9.00crores in January 2002.

c) The deweeding of ash pond lagoons is being carried out from time to time.

d) The ambient air monitoring is being carried out regularly, and the same is within prescribed norms. The emissions from the chimney are also being monitored regularly and are within prescribed norms.

e) The monitoring of water effluents and ground water is being carried out regularly and the same are within prescribed norms.

f) Central Ground Water Board was approached to prepare a scheme / report for avoiding increase in the water logged areas w.r.t. TDL TPS Panipat. The report has been received and the follow out action is being taken regularly.

g) The environment laboratory has been set up at TDL TPS Panipat for monitoring various parameters w.r.t air, water and noise pollution.

h) The green belt is being developed at TDL TPS Panipat though Haryana forest Department.

i) The water sprinkler system and dust suppression system is being installed in the coal handing plant area of TDL TPS, Panipat.

j) The Dry Fly ash Collection and Disposal System is being installed at Panipat Thermal Power Station. The Central Electricity Authority is the consultant

k) The raising of ash dyke by using pond ash has been completed at TDL TPS, Panipat

l) HPGC has taken the following promotional measure for utilization of fly ash:

1. A memorandum of understanding has been signed on 21.4.04 with M/S Gujrat Ambuja cement Limited indicating the likely lifting of dry fly ash on unit 7 & 8 to the extent of 1.5lac MT per annum. The firm has started lifting dry fly ash.

   Another for lifting of 2.11lac t/annum of fly ash has been signed with GACL on 17.8.05. The firm shall start lifting of fly-ash with effect from year 2006.

2. A memorandum of understanding has been signed on 21.4.2004 with M/S J. K. Cement Ltd. for the utilization of dry fly ash of 2.64 lac ton per annum from Tau Devi Lal thermal power Station, Panipat. M/S J.K cement Ltd. shall set up cement grinding plant in the vicinity of tau devil al thermal Power

Station, Panipat. The utilization of dry fly ash is expected to start from April 2006

3. 3. A memorandum of understanding has been signed on 18.8.2004 with M/S Jai Parkash Associates Ltd. for the utilization of 5 lac MT per annum of dry fly ash and one lac ton of pond ash from tau Devi Lal thermal Power Station, Panipat. The lifting of dry fly ash/pond ash is likely start from the year 2006.
4. Setting up of fly ash brick manufacturing plants are under active consideration at TDL TPS, Panipat.
5. HPGCL has given permission to some small users of fly ash. A brief of same is as under:

i)	M/S Shree Ash Tech	200T/day
ii)	M/S Triveni ash Tech	33T/day
iii)	M/S Shree Cement	500T/day
iv)	M/S kalia Fly Ash	10T/day
v)	M/S Verma Const.	50T/day
vi)	M/S Ash Tech Marketing	50T/day
vii)	M/S RIT MOHAN	160T/day

6. Regular press advertisements are being issued twice a year indicating supply of fly ash free of cost to invite private entrepreneurs for setting up of fly ash based units in the vicinity of thermal plants.
7. The dry fly ash collection system is being installed for old units at TDL TPS, Panipat for use of dry fly ash in cement manufacturing. However, at new units (units 7&8) the dry fly ash collection system has already been installed and dry fly ash is being supplied to cement Manufacturer and other use.

5.2 FUTUE STRATEGIES TO ADDRESS ENVIRONMENT IMPACT OF POWER STATIONS.

a. Regular press advertisements shall be issued twice a year indicating supply of fly ash/ pond ash free of cost.
b. Regular monitoring of environmental parameters with respect to ash, water, and noise pollution shall be carried out at thermal power stations.
c. A single by- flue stack of 220 m high has been constructed for new units 7 & 8 as per directions of MoE&F.
d. The pond ash shall be used in future for raising of ash dykes.
e. Inviting private entrepreneurs to set up fly ash based cement manufacturing factories near power stations.

5.3 ENVIROMENT FRIENDLY NON- CONVENTIONAL RENEWABLE ENERGRY PROGRAMMES BEING IMPLEMENTED IN THE STATE.

The Department of non-conventional Energy Sources is responsible for formulating and programmers necessary for popularizing the applications of various non-conventional and renewable source of energy in the state. It is implementing various schemes concerning utilization of solar energy, biogas, microhydel, biomass energy etc.

The following environment friendly renewable energy programmers are being implemented in the state.

(a) Solar Photovoltaic Schemes

Under this category, it is implementing solar lantern, SPV home lighting, and SPV street lighting, SPV water pumping and small Solar Power Packs schemes/programmers.

(B) Bio- Energy

Under this category, it is implementing Biogas Plant/ Institutional Biogas Plant/ Night Soil Based Programmes.

(C) Solar Thermal Schemes

Under this category, it is implementing Solar Water Heating Scheme, Solar Cooker Scheme (Individual/ community/ dish type) and Solar Passive Architecture Scheme.

(D) Special Area Development Projects

Setting up of Energy Parks, Aditya Solar Showrooms and Biomass Assessment Studies.

(E) Wind Energy Programme

(F) Power Projects

Under this category, it is implementing power projects based on biomass, municipal solid waste and small hydroelectricity potential.

(G) Energy Conservation programme

(H) Integrated Rural Energy Programme

5.7 PHYSICAL ACHIEVENENTS WITH RESPECT TO ENVIRONMENTALLY SENSITIVE SCHEME/ PROGRAMMES

Scheme							
Institutional biogas plants							

Source Deptt. of Renewable Energy

5.8 POLICIES AND PLAN FOR THE FUTURE

During the year 2003-04, it was decided by the Government to install institutional biogas plants in all the goshalas wherever these are technically feasible. 96 such plants have already been installed. Institutional biogas plants

have been installed in these 96 goshalas with a total capacity of 5595 cu.m. When commissioned, A total of 1119 qtls of animal waste is utilized per day in these plants.

INDUSTRY AND MINING

INTRODUCTION

Haryana is predominantly an agricultural state but in last three decades the industry & mining sector has also become one of the major contributors to the major contributors to the state economy. The industrial growth has taken a lead especially in automobile, textile, information technology, engineering, basic drugs and pharmaceuticals, chemicals etc. Maruti Udyog Limited which is the largest producer of cars in the country is located in Haryana. M/s Hero Honda who is producer of largest number of motorcycles in the world is also in Haryana.

The state also has mineral resources. The major minerals in the state are stone, quartz, quartzite, silica, china clay, and state.

INDUSTRY

2.0PRESSURE

Haryana is achieving new height on the path of industrial development. Due to excellent law and order condition, cordial relations of the employers and employees and due to sufficient infrastructure facilities available in the state, Haryana has become the first choice of the domestic and foreign investors. The Endeavour of the Govt. is to make Haryana number one state of the Union of India. Haryana today produces more than 50 percent of passenger cars, 50% of motorcycles and 25% of tractors, manufactured in the country. About twenty five percent of India's total production of sanitary ware is from Haryana. One out of every four bicycles in the country is manufactured here. As on 31.03.2005, the number of large and medium units in the state was 1242 besides 70284 small scale industrial units.

The state has more than 1000 projects with foreign technical/ financial collaboration. To mention. To mention only a few, Maruti Udyog, Hero Honda, Modi Alcatel, Sony India, Whirlpool India, Bharti Telecom, Perfetti India, DCM Benetton, TDT Copper, Honda Motorcycle & Scooters. Major Multinational companies that have come to Haryana are: Suzuki, Honda, Sony, Ykk, Whirlpool, Alcatel, Hughes Software, Techumesh, IBM, Microsoft, General Electric, Smithkline beecham, Mitsubishi, Norocool, Benetton, Wipro, Svedala, Yamaha and many more.

Haryana announced its new industrial policy on 6th June 2005. The objective of this policy is to generate employment, particularly in the backward areas of the state. Multi pronged strategy has been adopted to achieve the mission of creating employment for one million persons in the next ten years by adopting simplification of rules & regulations governing industry, effective institutional mechanism, development of strong infrastructure base incentives & concessions to the industry particularly in the backward areas.

3.0 STATE:

3.1 GROSSY POLLUTING INDUSTRIES

The Haryana State Pollution Control Board (HSPCB) has identified about 56 major grossly polluting industries in the state, which discharge their effluents into rivers and lakes. Out of 56 units, 43 units have complied with the directions of HSPCB and are complying with the standards laid down by CPCB/ Ministry of Environment & Forest, Govt. of India. 11 units are lying closed. The remaining 2 units are still defaulters and the Board is taking action against these units**.**

Status of grossly polluting industries in Haryana.

Totqal No. Grossly polluting Industries	
No. of units complying	
No. of units Closed	
Not complying	

The criteria for grossly polluting industries (GPI) are as under:

A. Industries discharging effluents into the rivers and lakes whether directly or indirectly having BOD load of 100 kg./ day or more.
B. Industrial effluents containing toxicants having the effluent quantity 2 kld or more and discharged either directly or indirectly into rivers and lakes.
C. Thermal Power Plants and coal washeries.
D. A CEPT or a cluster of industry proposed to be covered under a Common Effluent Treatment Plant (CEPT)

   The CEPTs are expected to help especially the cluster of small scale industries in the area to treat their waste in a cost effective manner.

Status of water Polluting Industries:

As per the data compiled by Haryana State Pollution Control Board there are 4622 water polluting industries in the state of which 189 units have effluent treatment facilities, and 4275 are meeting t he standards. About 347 polluting units have yet to establish the requires ETPS.

The major types of water polluting industries in Haryana are automobile, engineering, distillery and food processing (including sugar, dairy etc.), leather, chemical, pharmaceutical, refinery, fertilizer, Electroplating, Foundry and others.

3.2STATUS OF WATER POLLUTING CATEGORY OF INDUSTRIES.

Total number of Industries	
ETP (Effluent Treatment plant) not required.	
ETP established	
Standards being met.	
Standards not met	

ETP not established	

(Source: HSPCB 2005)

3.3INCREASING CHEMICALIZATION OF AGRICULTURE:

After the Green Revolution' of late sixties and early seventies there has been a gradual increase of fertilizer consumption both in the irrigated and dry land agricultural regions. Added to this is the growing consumption of pesticides in terms of quantity up to the early nineties. There has been a trend towards he use of pesticide of increased concentration of toxicity. This has led to the increased demand for agro based industries.

3.4WATER POLLUTION MONITORING

3.4.1 MONITORING OF RIVERS AND STREAMS

Under the current institutional framework, it is the responsibility of HSCPB to monitor the surface water quality of various rivers and streams in the state. In Haryana the number of parameters monitored as well as points at which water quality is being monitored are small in number. Dissolved Oxygen, BOD, pH, Total Colifrom bacteria, TDS Chlorides, Nitrates, total hardness, Sulphates are the parameters monitored. He water quality monitoring stations of HSPCB are given in table below. The quarterly analysis data of these stations is being sent to the CPCB regularly.

Water Quality Monitoring Stations in Haryana.

Sr.No	MINAR PROGRAMME
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	

Source HSPB

WATER QUALITY STANDARDS IN INDIA.

Designated best use	Class of water	Criteria
Drinking water source without conventional treatment but after disinfection.	A	
	B	
Drinking water source after conventional treatment & disinfection.	C	
5 days 20C 3 mg/l or less.		
Propagation of wildlife.	D	
Irrigation, industrial cooling, controlled waste.	E	

(Source CPCB, Water Quality- status & statistics)

3.4.1.1 WATER QUALITY OF RIVER YAMUNA:

There are two river monitoring systems in the state. One is river Yamuna which enters the Yamunanagar district and flows through the towns such as Yamunanagar, Karnal, Panipat, and Sonepat before entering Delhi and after Delhi it passes through Faridabad district. The quality of river Yamuna is being monitored by the Central Pollution Control Board. The Haryana State Pollution Control Board is monitoring the quality of Western Yamuna Canal at 6 locations, river Ghaggar at 2 locations, Gurgaon Canal at 2 locations and one location at Kurukshetra. The Board is also monitoring river Yamuna at village Palla along with the Central Pollution Control Board since last 5 years and it has been observed that the BOD level at village Palla of river Yamuna is well within the limits of 3 mg/l. The quality of river Yamuna at village Palla i.e. Haryana- Delhi border meets the water quality criteria of class 'C' category except Colifrom organisms. The quality of river Yamuna at village Palla has remained consistently good during the last 5 years as shown below as the average BOD values has remained well in the permissible limits i.e. 1-3mg/l. during last five year.

The quality of river Yamuna after passing through Delhi territory deteriorates substantially due to joining of 19 drains of Delhi and one Shahadra drain from Uttar Pradesh and is of Class 'E' quality as per water quality criteria and not fit for drinking purpose even after conventional treatment.

3.4.1.2. WATER QUALITY OF RIVER YAMUNA AT PALLA (HARYANA- DELHI BORDER)

Water quality of river Yamuna at Palla							
Year	Parameters						
	PH	Total dissolved Solids mg/l	Chemical oxygen demand mg/l	Bio-chemical oxygen demand mg/l	Dissolved oxygen mg/l	Total Colifrom Nos./100 Ml	Faecal Colifrom Nos/.100 Ml
River-water quality criteria							

Source:

CPCB

The results of river Yamuna at village Palla (Haryana- Delhi border) for 5 year i.e 2000 to 2004 are given in table above. The above results show that BOD value in river Yamuna at village Palla ranges from 1 to 3.0 mg/l i.e well within the permissible limits. This is mainly because of installation of 14 sewage treatment plants in all major towns located along river Yamuna and installation of ETP by all those 302 industrial units having discharge of 5 KLD or more and discharging directly or indirectly Palla in river Yamuna and average BOD value has come down to 2.6 mg/l in the year 2004.

However, the results of BOD in river Yamuna at Okhla after Delhi territory (at the border of Delhi- Haryana) range from 6 to 28mg/l, which is much higher than the prescribed standards. Moreover, total coliform and faecal coliform are also much beyond the permissible limits Even TDS & COD are also on higher side as shown below… Though the parameters are in excess of permissible limits the improvement in quality is expected after the completion of Sewage Treatment Plant in Delhi territory which are under construction. The results of Gurgaon canal at GC-I near Badarpur border is shown in table below which are also on higher side as source of water for Gurgaon canal is river Yamuna.

3.4.1.3 Water quality of river Yamuna at Okhla Bridge (Inlet of Agra and Gurgaon canal)

Water quality of river Yamuna in Delhi Stretch							
Years	PH	Total dissolved Solids mg/l	Chemical oxygen demand mg/l	Bio-chemical oxygen demand mg/l	Dissolved oxygen mg/l	Total Colifrom Nos./100 Ml	Faecal Colifrom Nos/.100 Ml

River-water quality criteria							

Source: CPCB

Source: HSPCB

3.4.1.4. GC1 near Badarpur Border (Minor sample)

Parameter	PH	BOD	COD	DO
Sep-98-Dec 05				

Source: HSPCB

Thus Haryana is providing potable water to Delhi through river Yamuna whereas it is getting sewage in its Gurgaon canal and Agra canal which are originating from the river Yamuna. This is mainly because of joining of 19 polluted drains from Delhi territory in to Yamuna carrying untreated sewage/ trade effluents.

3.4.2 WATER QUALITY OF WESTERN YAMUNA CANAL (WJC).

The results of Western Yamuna canal at following 6 locations for the last 7 years i.e. from 1998 to 2005 are shown in table below which shows that the quality of WC I meets Class 'D' water quality criteria and whereas WC II, WC III,WC IV, C-4 and C-7 meets class 'C' water quality criteria.

1. WJC I Yamuna Nagar.
2. WC I WJC at Karnal.
3. WC III RD 245250 Delhi Border.
4. WC IV Delhi Border RD 282628.
5. C-4 100 Mts. M.s Panipat Distillery, Panipat.
6. C-7 Khubru Fall at RD 145250.

WJC is receiving one nullah from Yamunanagar which carries effluent from major industries of Yamunanagar and sewage of Jagadhri/ Yamunanagar towns. Du8ring no flow periods the effluent from local nullah accumulates In the WJC and when water is water is released into WJC from the river Yamuna after 7-10 days, the accumulated effluent travels in WJC resulting in disturbances in Hyderpur water supply at Delhi which is 200 km downstream of Yamunanagar. But the exact reasons for excessive ammonia in Hyderpur Water Works are not known as lot of animals also bath in this canal near Sonepat area and Delhi area. The water quality of WJC at above locations is given in table below.

Table 3.4.2.1

PLACE	PH	BOD	COD	DO

Source: HSPCB

The above results show that water quality of above mentioned six locations meet the class- 'C' water quality criteria and is suitable for water supply after conventional treatment as the BOD remained within the range of 1-3 mg/l against the permissible limit of 3.0 mg/l. The results of BOD parameter in WC I are also within limits since Sept. 2000 up to December, 2005. It was exceeding during 1998 -2000 in four samples but now since last 5 years it is well within limits.

3.4.3 WATER QUAKITY OF RIVER GHAGGAR.

The HSPCB is monitoring quality of river Ghaggar at following locations and results are tabulated in table below.

1. GH I at Sirsa Dabwali Road.
2. GH II at Chandpur siphon

Table 3.4.3.1

Parameter	PH	BOD	COD	DO

Source HSPCB

The river Ghaggar originates for Morni hills and passes through Haryana, Punjab & Rajasthan. In Haryana territory it receives discharge / effluent from towns such as Kalka, Panchkula, Ambala city etc.

The sewage treatment plants in Panchkula and Kalka towns have already been installed by Haryana Urban Development Authority (HUDA) and the Public Health Department and STP's of Ambala city and Pinjore town are also under construction. The pollution in river Ghaggar is caused by discharge of untreated industrial & sewage from Himachal Pradesh, Chandigarh and Punjab areas into river Ghaggar. While going through the results of river Ghaggar at Dabawali Road Sirsa and Chandpur Syphon shows that BOD values vary from 0.5 to 28mg/l and 0.4 to 50.0 respectively which is much beyond the permissible limit of 3.0 mg/l The results of river Ghaggar at GH I and GH II for 5 years i.e from 1988 to 2005 are given in table above. These excessive results are mainly due to discharge of industrial and sewage effluent from Punjab yerritory into Ghaggar as there is no

discharge into river Ghaggar from Haryana after Ambala city (Which also reaches through Tangri branch in rainy season only which has only negligible effect on its quality due to dilution) up to Dabawali i.e. Rajasthan border. The above results show that river Ghaggar at Sirsa Road & at Chanderpur Syphon is of E class water quality criteria.

3.4.3.2 Pollution Load in Rivers:

An attempt has been made to calculate pollution load generated from industry and the domestic sector. The estimate is based on all towns and cities having population of one lahk or more. Further, the quantity of BOD load released into water courses in Haryana by polluting industry and domestic sewage is estimated as approximately 39750 kg/day.

Estimated BOD discharged by major sectors to rivers in Haryana (in kg/day)

Domestic sector	
Industry Sector	
Sub Total BOD discharged	
Treatment by STPs	
Total BOD Load received by rivers.	

Source: CPCB

3.4.3 GROUND WATER POLLUTION:

There is no agency in the state that is responsible for periodically monitoring of ground water quality for drinking purpose. The Public Health Department is getting its samples tested whenever groundwater source is used for drinking water supply. Irrigation Department, Haryana is doing monitoring of ground water by its ground water cell. The Central Ground Water Board is basically doing ground water quality monitoring.

The Haryana State pollution Control Board has also done one time exercise during 2003 to check the ground water quality of some of industrial towns such as Faridabad, Yamunanagar, Gurgaon, and Dharuhera & Sonepat. It was found that most of parameters were within permissible limits.

The results of ground water near industrial areas of above mentioned towns are given in table below.

3.4.4.1 STATUS OF RESULTS OF GROUND WATER OF GURGAON REGION. SEPT.2003

A/R No.	Parameter					
	Name / source of sample	PH	Total Dissolved Solids mg/l	Total Hardness as CaC03 mg/l	Chloride mg/l	Fluorides mg/l

Source: HSPCB

3.4.4.2 RESULT SHOWING UNDERGROUD WATER QUALITY, YAMMUNANAGAR/ JAGADHRI (RESULTS IN MG/L EXCEPT pH)

Sr.no	Parameters	Near Bhagwati Inds. Area, Yamunanagar	Near Punjab Business & Supply, I.A Yamunanagar	Royal Enterprise, Yamunanagar	Near Bus stand Jagadhri	Gauri Shankar Road Jagadhri	Near Civil Hospital	Near Gaurow Saw Mills	Near Anaj MANdi	Near aperills Yamunanagar
1										
2										
3										
4										

3.4.4.3 RESULT OF TUBEWELL WATER SAMPLE (RESULTS IN MG/L EXCEPT PH) ON FARIDABAD AREA (SEPT.2003)

Sr.No	Parameters	DLF Indl. Area, Faridabad	Sector 27-A, Faridabad	Permissible Limits.

Source: HSPCB

3.4.4.4 TABLE: RESULTS OF GROUND WATER (TUBEWEEL WATER) (RESULTS IN MG/L EXCEPT PH) OF SONEPAT AREA (SEPT., 2003)

Sr. N	Parameters	HSIDC Industrial	HSIDC Industrial	Hi-Power Indust	Tube Wel	Surya Ind	Gau Rave	Hand Pum	Hand Pu	RAju Ke	Kubreja	Permi

o		Estate, Sonepat	Area	ry, Murthal Sonepat	l Indo Malt	u stry, Sonepat	Food, Sone Pat	p Nirma Paint	mp MS Industrial Area	dia in front of Hissar Metal	Food Sector-27-28	ssible Limit
1												
2												
3												
4												
5												

Source: HSPCB

The above results show that ground water quality of Faridabad area, Yamunanagar, Sonepat area are well within permissible limits. However the results of Gurgaon/ Dharuhera area shows fluoride being marginally on higher side i.e. 1.58 to 1.7mg/l against permissible limit of 1.5 mg/l in two samples & res all parameters are within permissible limits. This fluoride is mainly because of soil's natural texture and not because any contamination from industrial or other source.

3.5AIR QUALITY ASSESSMENT

This section contains the air quality assessment of 10 monitoring locations in 4 towns, out of which 2 are in residential and 8 in industrial.

Classifications of Monitoring Stations

Area type	Number of monitoring stations	Number of locations with inadequate data	
		Gaseous pollutants	SPM
Residential			
Industrial			
TOTAL			

Source: CPCB

The status criteria of Ambient Air Quality of various towns have been shown in table below:

Ambient Air Quality status Criteria of various Towns

SPM, NO2 and SO2

Annual Mean Concentration Range (ug/m3)

Pollution Level	Industrial		Residential	
	S02 & NO2	SPM	S02 & NO2	SPM
Low (L)				
Moderate (M)				
High (H)				
Critical(C)				

Source: HSPCB

3.5.1 STATUS OF AMBIENT AIR QUALITY IN HARYANA

The air pollution problem is wide spread in 4 cities, where at least one criteria pollutant exceeded either annual or 24 hourly standards in any of the monitoring locations. The Following tables show the status of ambient Air Quality Mean Concentration range in four cities of Faridabad, Yamunanagar, and Panipat & Sonepat. The Ambient Air Quality Mean concentration for 8 years i.e. from 1998 to 2005 at Faridabad shows critically polluted as far as limits for residential areas are concerned. The SPM data for 8 years is also on higher side i.e. H or M I most of time for industrial area limits t Faridabad. Similarly SPM is on higher side in Yamunanagar and moderately polluted in respect of SPM in Panipat and low I S02 concentration.

3.5.1.1 AMBINT AIR ANNUAL MEANS CONCENTRATION

For Yamunanagar Stations, Ballarpur Industries, Yamunanagar

Year	Area Class	SPM	S02	N0X

Source: HSPCB

3.5.1.2 AMBIENT AIR ANNUAL MEAN CONCENTRATION RANGE FOR FARIDABAD, STATION -1 AND STATION-2

YEAR	STATION NO.	Area Class	SPM	S02	N0X

Source: HSPCB

3.5.1.3 AMBIENT AIR ANNUAL MEAN CONCENTRATION RANGE.
For Sonepat, Station – HSPCB Office, Sonepat

Year	Area Class	SPM	S02	N0X

Source: HSCPB

3.5.1.4 AMBIENT AIR ANNUAL MEAN CONCENTRATION RANGE.
FOR IOC PANIPAT, STATION-1, STATION-2 AND STATION-3

Year	**Station No.**	**Area Class**	**S02**

Source: HSPCB

3.5.1.5 AMBIENT AIR ANNUAL MEAN CONCENTRATION RANGE.
FOR NFL Panipat, Station-1, station-2 and Station-3

YEAR	**STATION NO.**	**Area Class**	**SPM**	**S02**	**N0X**

Source: NFL

IOC Refinery Panipat

Year	**Parameters in micro gram /m3**			
	Spm	**Rspm**	**S02**	**NOx**

Source: IOC

The table shows the number of stations violating annual standards with respect to SPM i.e. individual criteria pollutant. It is quite evident that SPM is the major problem in the residential areas of almost all the cities/ towns. No definite trend about the Ambient Air Quality of any of four cites could be assessed, but SPM is on higher side in all the four cities. A high level of SPM is the most important source of pollution. High domestic use of coal or biomass fuel is still a serious problem resulting in high human exposure to SPM and S02.

The current capabilities of the monitoring agencies to monitor, or to collect information on the sources and emissions are inadequate. Therefore, there is an urgent need to strengthen the monitoring programme.

It should be noted that the data are lacking for quite a few stations due to various reasons such as non-operation of monitoring stations due to fund paucity, lack of equipment, lack of infrastructure and inadequate man- power.

3.6STATE OF INDUSTRIAL HAZARDOUS WASTE AND SOLD WASTES:

Under the Hazardous Waste Management Rules, 1989, the HSPCB is required to regulate generation, transportation, treatment and disposal of hazardous wastes. However, there are no common treatment & disposal TSDF facilities in the estate at present. Currently, the industries generating hazardous wastes are storing their hazardous wastes in non- storage facilities developed by them within their premises as per the directions of the HSCPB. There are about 1145 industrial units generating hazardous wastes in Haryana of which 810 units have been granted authorization. About 86 units are lying closed & remaining applicants are under consideration. The HSPCB has persuaded major hazardous waste generating units to from a society and provide common TSDF at Faridabad. A society with the name HEMS (Haryana Environment Management Society) has been formed and prefeasibility studies have been done by M.s SENES INC. CANDA for the development of the common TSDF at Faridabad. The state govt. has already notified 32 acres of land for this purpose. The common TSDF is expected to be developed by the year 2005-2006. As per inventorisation done by HSCPB, Haryana is generating 3818 tons/year incinerable waste, 639 tones/year recyclable waste and 59250 tones/year suitable for landfill. The status of quantity of hazardous waste in different regions of the state in tones/year is given in table below.

3.6.1 QUANTITY OF HAZARDOUS WASTE (IN TONNES/YR) IN HARYANA

Sr. No	Name of Region	Incinerable	Recyclable	Landfill
1	Panchkula	4	18	895

2	Hisar	0	40	2708
3	Gurgaon	3413	0	888
4	Ballabgarh	37	17	1370
5	Bahadurgarh	0	0	1797
6	Panipat	0	0	4972
7	Yamunanagar	0	210	42174
8	Sonipat	141	354	2532
9	Faridabad	223	0	1913
Total		**3818**	**639**	**59249.58**

(Source: HSPCB)

The potential toxicity of hazardous waste and their impacts differ widely depending upon the nature of hazardous waste.

Yamunanagar region is the largest producer of hazardous waste followed by Panipat, Gurgaon, and Faridabad & Bahadurgarh.

Apart from hazardous waste, industries also generate huge quantities of non- hazardous solids wastes that can also pose severe environmental problems if they are disposed off in an unsafe manner. The major sources of industrial non-hazardous waste are the thermal power plants, which produce fly ash and bottom ash. Indian coal contains 25-40% ash, thermal power generation results in huge quantities of ash. The status of fly ash generated in tones/ year I Haryana is given in table below

3.6.2 GENERATION OF FLY-ASH QUANTITY (TONES) IN THE STATE

Location generation						
Faridabad Thermal Power Station						
Panipat-Thermal Plant						

(Source: HSPCB/ HPGC)

Other industries that contribute substantially to non-hazardous wastes are sugar (press mud), paper and pulp (lime sludge), steel (blast furnace slag & smelting slag), other metal & mining industry (red mud and tailings).

3.7 BIO-MEDICAL WASTE SCENARIO:

Regulators and regulated are both in the process of evolving strategies and action plan to implement Bio- Medical Waste Rules. The HSPCB has given authorization to three private service providers to operate common facilities so that small hospitals/nursing homes which do not have their own facilities can

enter into an agreement with any one of five authorized in Haryana which are required to obtain authorization under the Bio- Medical Waste Rules. Out of these 1709 units have applied for authorization during the year march 2005 and authorizations have been granted to about 1309 units which have entered into an agreement with authorized service providers or having and operating their own facility. The HSCPB has issued closure notice/ prosecution notices to about 400 units for not complying with Bio Medical Waste Rules. The remaining units have been issued show cause notice to enter into agreement with authorized service provider. The quantity of bio medical waste generated in the state is given in table.

3.7.1 Quantity of bio-medical waste generated in the state.

Location	Biomedical waste quantity kg/per year

Source: HSPCB

4.0IMPACT

The impact of the industrial development on various resources has not been studied precisely, however, the following ones are mentioned.

4.1 ON HEALTH

As in many developing countries, water pollution is a major concern in Haryana. Whereas the biological pollution of water has traditionally resulted in the most health impacts, in recent years, the negative impacts of chemical pollutants have also been increasing

The negative health impacts resulting from water pollution are dependent on the nature and extent of water pollution and also the exposure of the population to water borne diseases.

The contamination of water & poor water supply leads to a number of diseases as diarrhea, dysentery, gastroenteritis, cholera, hepatitis and enteric fever and other helminthes diseases. In 2002,107221 cases of diarrhea were reported with 37 deaths. The per capita expenditure on health during the year 2004-2005 in Haryana was Rs. 185.90.

4.2 NEGATIVE OFF SHOOTS OF INDUSTRIAL GROWTH

A negative off shoot of all this growth was that several grossly polluting units were setup in the state. Some of the polluting & hazardous units were also shifted from National Capital Delhi.

A growth trend noticed in the last two decades shows that highly polluting type of industries have shown the highest investments located mostly in Faridabad, Sonepat, Panipat, Yamunanagar, Hisar, Rewari and Jhajjar districts of the state. Polluting industries contribute to pollution of ambient air and also pollute local drain/ stream/river. The combined pollution load of these polluting industries renders the area polluted & stinking. Among the various types of heavily polluting industry such as distillery, basic drugs, fertilizers, cement, thermal power plant, pulp & paper, pesticide, dye & dye intermediate, textile are mainly causing critical air & water pollution. In the state, the major defaulting units are the distillery, pesticides, dye & dye intermediate, textile dyeing, bulk drug, power plants, pulp & paper etc.

4.3 POLLUTION MENACE IN URBAN AREAS

The pollution generated by these industries although limited to smaller area but had an adverse effect on the equality of environment and life. In fact many of the urban areas over-grew as mixed residential, industrial and commercial areas. Haphazard growth of unauthorized industrial units in cities has added to the pollution menace in urban areas. When it came to providing pollution control measures in these industries, space became the major limiting factor making the implementation more difficult. The polluting industries, lack of basic amenities, overcrowding of places, and lack of sufficient infrastructure, mixed and slow moving traffic, and increased consumption of household energy, high rise buildings, and improper drainage conditions have caused fast degradation of environment and thus the quality of life in these agglomerations

From pollution point of view the major pollution in terms of organic load is generated from distilleries followed by paper mills. Since the distilleries generate very concentrated wastewater, it is hard to treat such wastewater. Despite the efforts on treatment of distillery waste, the targeted effluent quality is not achieved. The paper mills are in medium and small scale sector, making it again difficult to manage the effluents. Thus, the paper and pulp mills also create heavy pollution in many areas.

The industries generating chemical pollution can be divided in two categories i.e. 1) those which generate high TDS bearing wastes i.e. pharmaceuticals, rayon fibers, chemicals, caustic soda, soap and detergents, smelters etc, ii) those which generates toxic wastes i.e. pesticides, smelters, inorganic chemicals, organic chemicals, steel plants, pharmaceuticals and tanneries etc.

4.3.1 URBAN OUTDOOR AIR QUALITY

Air pollution is essentially an urban phenomenon as the process of urbanization is intimately related. Heavy industrialization gave an impetus to the process of urbanization. The high density of population and industries in the cities leads to associated vehicular, domestic and industrial emission affecting,

adversely, the health and property of inhabiting citizens. The principal sources and pollutants of possible concern in urban areas are given in tables below.

Principal source and pollutants of possible concern in urban areas

Types of source	Fuel	Main pollutants
Domestic heating cooking	Wood, Peat, Biomass, etc. Coal Light Oil, Gas	Suspended Particular Matter, Carbon Monoxide, Oxides of Nitrogen, Suspended Particular Matter Sulphur dioxide, Carbon Monoxide, Oxides of Nitrogen. Oxides of Nitrogen, Sulphur dioxide
Industrial boilers,	Coal, Heavy Oil	Oxides of Nitrogen, Sulphur dioxide
Power plants Manufacturing		Suspended Particular Matter
Industrial process		Specific pollutants related to nature of process e.g., Sulphur dioxide and mercaptanes from oil refineries; heavy metals from aluminum smelters; iron oxide from steel works; dust from cement works and disposal of solid wastes etc
Transportation	Gasoline	Carbon monoxide, Oxide of nitrogen, Hydrocarbons, Oxidants, Ozone Lead
	Diesel	Suspended particulate matter, oxide of nitrogen, Order, Sulphur dioxide

*Secondary pollutants formed in photochemical reactions I the atmosphere involving other pollutants.

Pollutants and related health hazards

Pollutants	**Effect on human health**
Carbon monoxide	
Nitrogen oxides	
Ozone	
Sulphur dioxide	
Suspended particulate Matter	

Respirable Particulate Matter	
Volatile Organic Substances (VOC)	
Lead	

Source: CPCB

4.4 INDUSTRIAL HAZARDOUS WASTE.

As per Schedule 1 of Hazardous Waste (Management & Handling) Amendment Rules, 2003, wastes generated from 36 types of industrial processes are considered as hazardous wastes irrespective of their quantity. Schedule II also provide list of hazardous waste constituents with concentration limits. The hazardous wastes generated from industries are generally not properly stored in non- leachate/ impervious storage facilities and such wastes are dumped either illegally along road side or along drains, rivers, canals and cause pollution of surface water/ ground waters.

Disposal of hazardous wastes from industries in an environment unfriendly manner can result in environment hazards and accidents which are both long term and immensely costly to remediate. One of the most irreversible impacts is leaching into groundwater.

4.5 BIO MEDICAL WASTES:

The waste generated from hospitals/ clinics/ veterinary hospitals/ clinics/ veterinary hospitals, blood bank/ clinical laboratories come under the category of bio-medical wastes. It contains infectious waste, plastic waste, non-infectious waste, sharp needles etc. which require proper segregation & disposal.

Disposal of biomedical wastes in the municipal solid waste has potential to increase the spread of disease, and possibly contaminate ground waters (through infiltration)

5.0RESPONE

5.1 COMMON EFFLUENT TREATMENT PLANT (CETPs)

There are four CETPs in Haryana, located at HSIDC Industrial Estate, Kundli, Distt. Sonepat, Industrial Estate, Jind & Murthal. Another CEPT has been set up by the Society of Electroplating units at sector-58, Faridabad. The details of these CETPS are given as under:

5.1.1 KUNDLI CEPT

Kundli CETP is presently treating only sewage effluent of about 60-70 units of phase-1 with a capacity of 1.10 MLD. This is basically working as sewage treatment plant (STP) at present and is inadequate. The Industrial units are treating their effluents by providing individual ETPs. The effluent

after treatment is discharged into the drain no.6 which joins river Yamuna parameter up to the standard.

5.1.2 JIND CETP

Industries located in Jind Industrial Estate are discharging their effluents in CETP. This CETP is inadequate, as it is not conforming to the desired standards. The Board has issued notices to HSIDC to upgrade the CETP and meet the standards**.**

5.1.3 CETP MURTHAL:

The capacity of CETP Murthal is 0.1 MLD. In all 5 polluting units and 28 non-polluting units are discharging their effluent into CETP. The CETP is not complying with standards and notices have been issued to HSIDC to upgrade the facilities.

5.1.4 ELECTROPLATING ZONE CETP, SECTRO-58, FARIDABAD

About 300 units have been relocated in sector-58, Faridabad after taking them out from residential areas. They have formed a society and set up a Common Effluent Treatment Plant. The CETP has capacity of 0.7 MLD. It is a chemical treatment to treat wastes, cyanide and chrome bearing wastes separately and then neutralizing it, so as to achieve the standards. The sludge being generated from this CETP is to be taken in a non- leachate hazardous waste site which is yet to be constructed. The society is directed to provide hazardous waste disposal/ storage facility.

CETP at Barhi/ Manesar set up by HSIDC:

The other CETPs are Industrial Estate, Barhi, Distt. Sonepat and Industrial Estate, Manesar which are in operation and are set up by HSIDC which has taken a policy decision of installing CETPs in its all Industrial Estates in Haryana.

CETP at Panipat Textile dyeing units:

About 409 units of textile dying are also being shifted from residential areas to industrial area in Panipat and Common Effluent Treatment Plant will also be set up there by Haryana Urban Development Authority. Plots have already been given to 332 units and project is expected to be completed by December, 2006. This is a success story for the Haryana State Pollution Control Board as highly polluting/Hazardous, electroplating and textile dyeing units are being shifted to approved industrial areas.

5.2 RESPONSE TO OTHER WATER POLLUTION PROBLEMS.

Due to strict imposition of pollution control regulations and involvement of judiciary in implementing pollution control law, it is possible to convince large and

medium categories of industries to adopt pollution control measures. In Haryana there are 3845 polluting industries and out of these 1542 have installed Effluent Treatment Plants and are meeting the standards. In all 3039 units have been granted consent under the provisions of the Water Act which shows that these units are complying with the provisions of the water Act. It has been observed that numbers of ETPs have increased substantially during the last 5 years. It is also mentioned here that all units having discharge of 5 kl and more and discharging effluent in river Yamuna directly or indirectly have installed their ETPs and as a result of this the quality of river Yamuna has improved a lot. The Board has prepared an Action Plan to ensure that all the remaining polluting units must set up ETPs during the year 2005-2006.

An attempt has been made to estimate the pollution load reduction due to adoption of pollution control measures. The status of BOD load generated in tones per day from various categories of industries in Haryana is given in the following tables below.

5.2.1 STATUS OF TOTAL BoD LOAD GENERATED IN TONNES PER DAY FROM VARIOUS CATEGORIES OF INDUSTRIES IN HARYANA.

S.No.	State	BoD Load in tones/ day (Before treatment)	BoD Load in tones/ day (After treatment)
1			

Source: CPCB Assessment of Indi Pollution

5.2.2 DISTILLERY.

Status of water pollution load generated from distillery industry before and after treatment in Haryana.

S.No	State	Production capacity in KLD	Volume of Waste Water generated In MLD.	Pollution Load generated in tones/ day(BOD) Before Treatment	After Treatment/day
1					

Source: CPCB Assessment of Indl Pollution

5.2.3 FERTILIZER

STATUS OF WATER POLLUTIONLOAD GENERATED FROM NITROGENOUS FERTILIZER INDUSTRY IN HARYANA.

S.No	State	Production IN Tones/ day	Volume of Waste Water generated In MLD.	Pollution Load generated in tones/ day(Ammonical Nitrogen)	After Treatment
1					

Source: CPCB Assessment of Indl Pollution

5.2.4 TANNERY:

STATUS OF WATER POLLUTION LOAD GENERATED FROM TANNERY INDUSTRY BEFORE AND AFTER TREATMENT IN HARYANA.

S.No	State	Production IN Tones/ day	Volume of Waste Water generated In MLD.	Pollution Load in tones/ day(BOD)	After Treatment Cr.	BOD	Cr.
1							

Source: CPCB Assessment of Indl Pollution

It is considered that 70% of the tanneries are in small-scale sector and treatment facilities in this sector are not adequate.

5.2.5 SUGAR

THE STATUS OF WATER POLLUTION LOAD GENERATED FROM SUGAR INDUSTRIES BEFORE AND AFTER IN HARYANA.

S.No	State	Production IN Tones/ day	Volume of Waste Water generated In MLD.	Pollution Load in tones/ day	After Treatment.
1					

Source: CPCB Assessment of Indl Pollution

5.2.6 Paper

Status of pollution load generated from large Paper Mills in Haryana.

S.No. In T/day	**Production**	Pollution load generated in terms of BOD in

	Volume of Waste Water MLD	T/day Before treatment		After treatment
1				

Source: CPCB Assessment of Indl Pollution

5.2.7 DOMESTIC WASTE WATER:

An attempt has also been made to compare the reduction in domestic pollution load due to various measures including efforts made by National Conservation Directorate. The Status of domestic wastewater generation and treatment status in Class I and II towns of Haryana (Projected figures of 2001) is given in table.

STATUS OF DOMESTIC WASTEWATER GENERATION AND TREATMENT IN HARYANA (PROJECTED FIGURE OF 2001)

S.No.	**State**	**Waste Water Generation (million liters/day)**	**Waste Water Treatment (million liters/day)**
1			

Source: CPCB Assessment of Indl Pollution

5.3 RESPONSE TO AIR POLLUTION LOAD.

The major source of air pollution form industrial source is due to combustion of fossil fuel. The major pollutant generated from the activity is particulate matters PM, SO2, NOX, HF, HCL, etc.

The chemical process industries are another source of air pollution and pollutants emitted from chemical industries are mainly SO2, SO3, H2SO4, Mist, Ammonia, NO2, HF, HCL etc.

REDUCTION OF AIR POLLUTION LOAD DUE TO VARIOUS MEASURES.

An attempt has been made to estimate air pollution reduction due to various measures taken by Haryana State Pollution Control Board as indicated by particulate matter reduction. The status of air pollution load in terms of particulate matter generation and reduction is presented in table below.

STATUS OF TOTAL AIR POLLUTION LOAD IN TERMS OF PARTICULATE MATTER (PM) LOAD GENERATED BY VARIOUS CATEGORIES OF INDUSTRIES IN HARYANA.

S. No.	**State**	**PM Load in Tones/day without control device.**	**PM Load in Tones/day with control device.**
1			

Source: CPCB Assessment of Indl Pollution

5.3.1 CEMENT

STATUS OF AIR POLLUTION LOAD GENERATED FROM CEMENT PLANTS IN HARYANA.

S. No.	State	Annual installed capacity (million tones)	Pollution load generated in tones/day without control device. (PM)	With control device. (PM)
1				

Source: CPCB Assessment of Indl Pollution

5.3.2 REFINERY

The status of air pollution load generated from refinery industry in Haryana.

S. No.	State	Refinery	Crude processed in tones/day	Average emission of so2 in kg/hr	Average emission of so2 in T/ day (After Treatment)
1					

Source: CPCB Assessment of Indl Pollution

5.3.3 SUGAR

THE STATUS OF AIR POLLUTION LOAD GENERATED FROM SUGAR INDUSTRY IN HARYANA.

S. No.	State	Production in Tones/day	Pollution load generated in Tones/day (PM) without control device.	With control device.
1				

Source: CPCB Assessment of Indl Pollution

5.3.4 THERMAL POWER PLANTS.

THE STATUS OF AIR POLLUTION LOAD GENERATED FROM THERMAL POWER PLANTIN HARYANA.

S. No.	State	Thermal Capacity in MW.	Pollution load in tones /day without control device. P.M	SO2	Pollution load in tones/ day with control device. P.M
1					

Source: CPCB Assessment of Indl Pollution

5.4AIR QUALITY ASSESSMENT

The air quality of different cities/town with respect to three criteria pollutants has been compared with the respective NAMP and has been categorized into four broad categories based on an Exceedence Factor (the ratio of annual mean concentration of a pollutant with that of a respective standard.) The Exceedence Factor (EF) is calculated as follows:

$$\text{Exceedence Factor} = \frac{\text{Observed annual mean concentration of a criterion pollutant}}{\text{Annual standard for the respective pollutant and area class}}$$

The four air quality categories are

- Critical pollution (C) — When EF is more than 1.5
- High pollution (H) — When EF is between 1 and 1.5
- Moderate pollution (M) — When EF is between 0.5 and 1
- Low pollution(L) — When EF is less than 0.5

Thus, from the above categorization, it is obvious that the locations in either of the first two categories are actually violating the standards, although with magnitudes. Those falling in the third category are meeting the standards as of now but are likely to violate the standards in future if pollution continues to increase and not controlled.

5.5 ESTABLISHMENT OF NAMP NETWORK

Under the Air Act (1981), HSPCB is entrusted with the function of air quality management and to undertaking air pollution control programme at state level regular monitoring of air quality and assessment of human exposure and damage to the property is the fundamental requirement for such an air pollution control programme. As an integral part of the air pollution control programme, HSPCB initiated a state wide network of National Ambient Air Monitoring Programme (NAMP) in the year 1992 with 2 stations each in Yamunanagar and Faridabad. Since then the number of monitoring stations have increased, steadily, over the period to 10 stations by 2005 covering 5 cities/ towns. The National Ambient Air Quality Standards are given in below.

National Ambient Air Quality Standards (NAAQM)					
Pollutant	Time sensitive weighted	Concentration in Ambient Air			Method of measurement
		Industrial Area	Residential Rural and	Sensitive Area	

	average		other area		

* Annual arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.
* 24/8 hourly values should be met 98% of the time in a year. However,2% of the time, it may exceed but not on two consecutive days.

5.5POLLUTING UNITS AND POLLUTION CONTROL MEASURES INSTALLED.

As per policy notification issued by the Haryana State Polluting Control Board vide no. HSPCB/98/2413 dated 24th July, 1998 only polluting 44 categories of industries have been covered under the consent management. These 44 categories include 17 heavily polluting & 27 polluting categories of industry. The number of applicants desiring the clearance under the provisions of the Water Act and Air At during the last 6 years i.e. 1997-98 to 2004-05 is shown in diagrams below.

The Board has simplified the procedure for grant of consent to establish/ consent to operate. No Objection Certificate (NOC) is being issued within 7working days once the Board receives complete application. A composite application form has been introduced so that industrial unit can obtain consent to operate under the Water/Air and Hazardous Waste Rules on single application instead of three separate applications. The Board is grating consent for longer period i.e. to 17 categories of heavily up to 5 to 10 years and to Brick Kilns for 10 years period instead of year to year basis.
Chart

The number of pollution control devices installed (PCDS) by these units & their status under Water Act is given in table below.

5.6.1 STATUS OF WATER POLLUTING INDUSTRIES (UPTO 2004-05)

Total no. units	
No. of units installed E.T.P	
No. of units complying	
No. of units not complying	
No. of units in which No ETP required	

Source: HSPCB

5.6.2 STATUS OF AIR POLLUTING INDUSTRIES (UPTO 2004-05)

Total no. units	
No. of units installed A.P.C.M	

No. of units complying	
No. of units not complying	
No. of units in which No APCM required	

Source: HSPCB

The status and trend of total pollution control measures installed both under the Water and Air Act is given in table below.

5.6.3 STATUS OF POLLUTION CONTROL MEASURES INSTALLED UNDER WATER AND AIR ACT:

5.6.4

From the above data IT IS CLEAR THAT THE HSPCB has made efforts in covering almost all polluting industries under its ambit especially during last 5 years as the number of applicants has increased two and half times. Further the number of pollution control devices has also increased which is 250% higher in last 3 years.

5.6DISPOSAL OF BIO-MEDICAL WASTE

As a policy, the Board has decided that from the year 2004 authorization shall be given to only those service providers to operate common facility which have their own facilities such as land/building, double chambered incinerator, autoclave, chemical treatment, shredder, effluent treatment plant & adequate arrangement for segregation/transportation of bio-medical waste. This will ensure proper treatment and disposal of bio-medical wastes.

According to WHO studies about85% of bio- medical waste is non-infections about 10% is infections but non- hazardous and rest 5% is both infectious as well as hazardous in nature..

5.7 THE HAZARDOUS WASTE MANAGEMENT RULES

Haryana State Pollution Control Board has been assigned the duties of regulating management of hazardous waste, biomedical waste and municipal solid waste under the provisions of relevant rules. The basic duties to provide impervious storage facilities within their premises lies with the individual industry and providing common treatment and disposal facility is the responsibility of for common facilities under the Hazardous Waste Management RULES,

The HSPCB has persuaded major hazardous waste generating units to from a society and provide common TSDF at Faridabad. A society with the name HEMS (Haryana Environment Management Society) has been formed and pre-feasibility studies have been done by M/s SENES INC. CANDA for the development of the common TSDF at Faridabad. The state govt. has already notified 32 acres of land

for this [purpose. The common TSDF is expected to be developed by the ear 2005-2006.

MINING

1.0MINERAL RESOURCE

In Haryana, minerals having industrial use designated as major minerals like limestone; iron-ore, silica sand, china clay, quartz quartzite and school slate are available.

The mineral used as construction material known as minor minerals like road metal and masonry stone boulder, gravel, ordinary sand, brick earth, marble, granite, saltpeter and slate stone are also available in the state.

1.2 MINERAL RESOURCE ADMINISTRATION

Central Act [provides that major minerals be granted mining lease for minimum period of 20 years and maximum period of 30 years. For grant of mining lease for major minerals initially a "letter of intent" is granted by state government on the recommendation of the department t enable the applicant to submit mining plan prepared by a recognized consultant (by Indian Bureau of Mines a department of Government of India) approved by Regional Controller IBM Dehradun. On submission of mining plan 'LOI' is converted into mining lease for a period of 20 years by state government. On the recommendation of the department 107 mining leases for major minerals have been granted.14 prospecting license or exploration of major minerals has also been granted. New mining lease of major minerals of more than 5 hectares are required to obtain environment site clearance from Government of India, Ministry of Environment & Forest. Before this clearance these new mines are required to obtain No Objection Certificate from HSPCB and C.P.C.B which is given after mandatory public hearing. The list of 107 major mines along with their location is available with the department

1.3 MINOR MINERALS

The state government in its New Mineral Policy of Sept.2001, amended the rules in Punjab Minor Mineral concession Rules, 1964 for grant of mining leases by public auction for a period of 7 years according to which minor minerals are now being granted by public auction instead of lease on application. Mine lease holders seek approval of a committee headed by Commissioner& Secretary to Govt. of also amended rules governing minor minerals to make it mandatory for the lease of minor minerals to prepare mine plan & get it approved from the competent officer of the department. Minor mineral like stone & sand are given on mining contracts also in the district other than Faridabad& Gurgaon by public auction for a period of 3-5 years. Saltpeter i.e. Shora being a seasonal mineral is

given on annual contract. Two years permits for brick earth are given to brick kiln owners on flat rates of royalty fixed on the basis of size tax at flat rate. Ordinary sand (locally known as Badarpur sand) and stone minor minerals associated with major minerals under the policy of “One area one lease” laid down by the Central Government (in an appeal case) are adopted by the state government.

Yamuna sand deposits of district Karnal, Panipat, Sonepat and Faridabad are granted on mining contracts by public auction as one unit, subject to the condition that contractor shall not carry out mining operation in more than four sites at a time, District Panchkula, Yamunanagar and stone quarries in district Bhiwani, Mahendergarh and Rewari are also now given on contracts by public auction on district as one unit basis for a period of five years, in order to ensure that no illegal mining shall take place in any area which otherwise used to remain vacant.

1.4 MINERAL EXPLORATION

The geological wing of the department is engaged in the search, location and quantification of the minerals investigations and taking up projects in the state which have been approved by the State Geological Programming Coordination Committee in the meeting held in 1999. A project report has been prepared to declare the ‘Flexible Sand Stone ’of village Kalyana in the district Bhiwani as a National Park seeking legal advice. The study of deposit of sit in the Badkhal Lake of district Faridabad and for use of granite deposits available in district Bhiwani for use of ornamental stone was also carried out by the geological wing of the department.

2.0PRESSURES FROM THE MINING INDUSTRY

In all cases demand for mining produce is increasing. As a result there is pressure for opening up more mines. Most of the mines, however, are found in ecologically sensitive areas like forests, important wildlife places and bio diversity rich areas. In the process of exploring, vast lands are dug up and soil thrown away on the mine beds. This leads to change in the character of the soil. It also leads to degradation of the land.

Trees are also cut during the mining process leading to ecological imbalance.

Water resources also diminish when mining is done, reducing the local geological features. Due to the mining activity severe air & water pollution occurs in the area. Some mining operations have touched the ground water table at the quarry floor. The stored water is pumped out & used for plantation, plant purposes & for agriculture.

During mining operations, smoke & dust is generated due to drilling & blasting, location & unloading, transport & crushing of limestone. The

environment impact assessment studies, prior to the start of mining activity, do not fully take into account the impact on bio-diversity.

The small scale mining activity in the state is wide spread. However, certain intensive mining areas have come up which are being exploited by marginal entrepreneurs. The latter are unable to make ground for the protection of environment due to financial constraints and other lease or local related problems.

With the global awareness of environmental protection & financial constraints due to the increase in cost of waste handling, it has become essential:-

1. To upgrade the quarrying technology so as to improve mineral recovery and reduce generation of waste.
2. To reclaim the degraded land and rehabilitate the dumps by a forestation to create a greener belt.

3.0STATE

3.1 INCOME FROM MINERALS

Income from the minerals in the form of royalty (charged on monthly basis) and contract money (charged monthly for contract of more than Rs.5 lac annual money and quarterly for remaining) is steadily increasing every years. Income for last five years is as under:-

Years	**income (in cores)**
1998-1999	**67.65**
1999-2000	**62.46**
2000-2001	**106.29**
2001-2002	**139.97**
2002-2003	**118.87**
2003-2004	**76.77**
2004-2005	**92.04**

Source: Deptt. Of Mines & Geology

3.2 HARYANA CONTROL & LOCATION OF CRUSHER ACT 1991

Stone crusher installed in the crusher zones or which otherwise fulfill the sitting parameter as laid down by the Environment Department and given 'NOC' by Pollution Control Board are licensed under the Act for a period of three years.

3.3 STATUS OF MINERALS RESOURCES

The Department of Mines & Geology Haryana has granted 107 mining leases for major minerals and 14 prospecting licenses for exploration of major minerals have also been granted. Major minerals such as silica sand, stone, china clay, ordinary sand etc. air in abundant quantity in Faridabad and Gurgaon. The extent of mining ranges from 25 to 30% and shall be available for 200 to 500 years in these areas.

Yamuna sand deposits of Karnal, Panipat Sonepat and Faridabad are granted on mining contracts by public auction as one unit subject to the conation that contractor shall not carry out mining operation in more than 4 sites at one time. District Panchkula, Yamunanagar and stone quarries of District Bhiwani, Mahendergarh and Rewari are also now given on contracts by public auction on District as one unit basis for a period of 5 years and there in all 17 units on contract basis per extraction of minor minerals.

4.0 IMPACT

4.1 EXPLOITATION, ECONOMIC DEVELOPMENT AND ENVIRONMENT

- Minerals & metals are important for the economic development & welfare of our society and state.
- The exploration, extraction and exploitation of minerals directly infringes upon and affects the other natural resources like land, water, air, flora-fauna, which are to be conserved & optimally utilized in a sustainable manner.
- The removal of earth incident to mineral exploitation has gone up in the recent years. Man made mountains around mining belts, symbolizing reckless mining practices and degradation of aesthetic value of the area, have come up. The lands' precious soils have depleted at a fast rate creating very severe scarcity of drinking water and an increase in ambient temperature.
- The imperatives of economic development need to be harmonized with protection of environment & forests.
- Mining & ecological preservation are not mutually exclusive propositions but have to be done in consonance with each other.

5.0 RESPONSE

5.1 VISION 2020- ENVIRONMENTALY SUSTAINABLE MINING

The state will focus on developing three or four key minerals- silica sand/ ordinary sandstone, china, clay, quartz, lime stone & slate stone. These minerals have great potential to create economic impact either directly or through the development of downstream industries such as road building, construction projects and other major infrastructure projects. Haryana is surrounded by Delhi (National capital) from three sides and side and road building material for major projects in Delhi.

To develop the mining sector in the state, it is critical to enunciate a clear policy in mining for the sector as a whole. This policy should provide a frame work for economic operation of mining industry while addressing key issued of environmental sustainability, local resettlement and resource conservation.

5.2 ENVIRONMENT IMPACT ASSESSMENT

The following aspects are accommodated in the environment impact assessment notification under environment protection act of the Ministry of Environment & Forest, Govt. of India.

1. Site clearance for prospecting & exploration of major minerals in areas above 50 hectares.
2. Site clearance for mining projects involving major minerals in areas with leases in excess of 5 hectares area.
3. Environmental clearance for mining project involving major minerals with leases in excess of 5 heaters area.

Apart from the above, the following measures if undertaken would go a long way in striking a balance between mining industry & environmental protection.

A legislative program should be drawn up realistically in consultation with mining industry such that the obligations can be discharged in a judicious manner. Industry-wise norms/ standards should be laid down taking into cognizance their feasibility. This would also provide a framework to the state governments that could modify the norms, location-wise in light of the intensity of [pollution. Obviously, the norms to which they belong ought to be treated in a uniform manner.

The mined out areas should immediately be protected/ reclaimed and rehabilitated or developed as fish pond, birds sanctuaries or use as water-sheds for ground water recharge by the concerned lease holder and then hand over to concerned Gram Panchayats.

The collective protection of environment either by the government with the collected funds of mines lease holders will enhance the environment with balanced and sustainable development of the mining sector.

FOREST AND WILDLIFE

INTRODUCTION

Forestry sector in India has traditionally been one of the most organized sectors with more than a century old tradition of management of forests for the welfare of the people. Forests play a vital role in large context of biosphere in maintaining the environment at an optimum quality. It plays a very important role in the maintenance and ecological stability of environment. Forestry as a land use is the most natural and hence very effective in soil and water conservation. It is the store-house of plants and animals. It s also the resource base of water, fuel-wood, fodder, timber, and a number of non-wood forest produce providing sustenance to the poor people living in and around forest and much needed rural employment. It is the source of raw material to a number of industries manufacturing paper, rayon, plywood, verity of panel products such as boards, flush doors, oils etc. Forestry has significant inter-relationship with agriculture, pasture and food producing systems, as it provides critical support through soil and water conservation and maintenance of soil fertility.

1.0Driving forces

1.0HUMAN POPULATION

The causes of degradation of environment are a complex interrelation of social, economic, geological factors. One of the most important reasons, which manifests in different forms is the increasing human population. The increased human population is responsible for the encroachment of forestlands, indiscriminate utilization of forestry resources of Haryana in the hunting of wild animals beyond the sustainable limits. The population of Haryana in the year 1971 after its creation in 1966 was 100.37 lacs which increased to 210.83 lacs in the year 2001 i.e. more than double in 35 years.

1.2 QUALITY OF LIFE AND DEVELOPMENT

The desire to have better quality of living reflects in increased consumption of natural resources including those coming from forests. The increased

consumption gets further magnified by the increased population putting more pressure on the resource.

The condition of forest resource also depends on the developments outside forest boundaries. The conversion of forests and the wilderness areas for developmental actives puts pressure on the remaining areas. In Haryana the permanent pasture lands decreased from 46000 ha in 1996 to 25000 ha in 2002-03. Similarly, the extent of barren and unculturable lands decreased from 232 thousand ha to 99 thousand ha. These areas supported small animals like hares, terrestrial birds, snakes etc.

1.3 LIVE STOCK POPULATION

Large live stock population much more than the carrying capacity have been grazing in forests causing to re-generation and productivity. During last 30 years the lands where domestic animals could graze have also undergone a considerable decline causing pressure on forest areas. The total grazing animal population in the state in 1966 was 3800500 cattle units (without buffalos) and the grazing land available was 715000 ha. This shows increase in cattle pressure on forest areas.

1.4 DEVELOPMENT IN SHIWALIK HILLS

The state has only one percent of its total geographical area under habitat forest and that too in the Shivalik hills. These hills were once covered by dense forest growth with a variety of flora and fauna. Soon after the British occupation of Punjab in the early 19th century, devastation of forest began as a result of fires and reckless felling. People from the plains were encouraged to settle in the hills.

The new settlers cleared to the hills for grazing. Destruction of vegetation took place and bare hill slopes with scattered thorny bushes replaced dense forests. Serious soil erosion became quite common and the once perennial streams became seasonal torrential “chos” washing tones of sand and boulders down the hills causing frequent floods in the plains. The bio-mass productive capacity of the forests has reduced drastically which is insufficient to meet the growing needs of the agrarian population in and around the Shivalik. Most of t he village in this tract are located near the forest areas and population is dependent on them for fuel, fodder and timber requirements.

1.4 WASTELAND CONVERSION

The wastelands, which met the fuel and fodder requirement of the local community gradually, were diverted for various development activates, which resulted into the increased pressure on the biodiversity of the state.

2.0PRESSURE

2.1 HABITAT DESTRUCTION

The following table shows the land use changes in the state over three decades. The wilderness areas have been put to various uses described below.

Year	Permanent pasture	Barren & unculturable	Culturable barren	Current fallow	Forest

(Area in thousand hectares)

Source: Deptt. of Forest & Wild Life

2.1.1 Conversion of waste lands for agriculture use.

2.1.2 Colonization of large extent of areas in Aravallis under the expanding urban pressure of Delhi population.

2.1.3 Ingress of human habitation into the forested hills in Shivalik areas.

2.1.4 Conversion of village common lands for other developmental purposes, agriculture and afforest ion.

2.1.5 Quarrying and mining of the hills for minerals like silica- sand and for stones.

2.1.6 Construction roads, canals, drains, bandhs etc., fragmenting the habitat and changing the original natural water course.

2.2 CATTLE PRESSURE

With 2.5% of the world's land area and 1.8% of world's forest, India is catering to the needs of 16% of human and 18% cattle population of the world. Large livestock populations, much more than the carrying capacity of forests, have been grazing in forests causing damage to regeneration and productivity. In Haryana animal husbandry is an important activity. Over three decades the domestic animal population has generally increased and so also the pressure on the forests.

(Animal population in hundreds)

YEAR	CATTLE	Buffalo	SHEEP	GOAT	CAMEL

Source: Statistical Abstract 2005 Haryana

The total grazing animal population in 1966 was 3800500 cattle (cu) and the total grazing land was 715 thousand hectares. Thus,the availability of the grazing land works out to 0.188 ha/ cu in1966 (not considering the buffalo population). In 2003, the total grazing animal population was 2486800 cu and the total grazing land was 437 thousand hectares. The availability of the grazing lands in 2003 as such works out to be 0.175 ha./cu which is 93% of the value. The cattle pressure, as seen clearly from these calculations, has increase in the last 30 years.

2.3 USE OF PESTICIDES AND OTHER CONTAMINATS

Green revolution was achieved through the cultivation of hybrid varieties of wheat which require irrigation and fertilizers. To control the insect pests on these

hybrid varieties, increasing amount of pesticides were and are used by small animals and birds

The bio-accumulation of these pesticides and the related toxic effects have resulted into the decreased population of small animals and birds. The large scale mortality of pea-fowls was seen in the rural areas of the state. Investigations by Haryana Agriculture University, Hisar revealed that the mortality of pea-fowls because of the consumption of seed treated with Chlorpyriphos. Whereas the recommended quantity for the treatment of seed is 1.5 ml. of the pesticide per kg. Seed, in actual practice the quantity of pesticide used by the farmers was more than four to five times the required doze. The sudden disappearance of the three commonly found Gyps vulture species in the last decade has been caused by the veterinary use of diclofenac, a non- steroidal anti- inflammatory drug.

2.4 HUNTING OF THE ANIMALS BY MAN

Around 1888 lions were hunted by the then rulers in Hisar. Record to this effect is available.

The last remaining tiger in Haryana was shot in the forest between Berwala and Mandhana in Panchkula district. There is no resident tiger population in the state now. The Kalesar forests, however, had resident wild dog population. During the period 1986 to 1970, a campaign under the title “shooting of wild dogs in Kalesar reserved forests ”and“ Annihilation of wild dogs” ws taken up and as per the record available in the Govt. office, the last wild dog was shot in February, 1970.

In 1963, the Secretary Forests, Himachal Pradesh declared award of cash incentives to encourage public in killing of wild animals. Each panther fetched Rs.50/-, Hyaena Rs.15/-, Black bear Rs.15/-, Jackal & wild cats rs.5/-, Monkey Rs.3/- Langur Rs.5/-, fox, Falcons, Baj & Shikras Rs.3/- each.

There has been a total ban on the hunting of all wild animals throughout the country, which came into effect 1991 amendment to Wildlife (protection) Act. Despite this ban and fairly good implementation on the ground, instances of poaching do take place.

There are some communities, especially, Deh, Bangale, Shikaligar and Bawaria etc. who indulge in small game offence on a regular basis. These people hunt hare, monitor lizards, partridges, quails and such other small animals. Earlier, these people used to go for hunting and bring their catch openly. After the stricter implementation these people now bring their catch not on cycles but they change the mode of transportation at the neatest transport head.

The local communities also indulge in the hunting wild animals for various reasons. The survey of some villages in Gurgaon, Rewari and Mahendergarh districts reveal that the wild animals are used for their various medicinal use.

2.5 LOSS OF BIODIVERSITY FROM AGRICULATURE AREA

With increase in population, the land holding decreased considerably. With the need for increasing the agricultural productivity newer hybrid varieties were developed. The agricultural crop varieties, which had evolved over centuries of human efforts, were replaced by newer varieties. The new varieties produced more and so they removed more nutrients from the soil. The enhanced use of pesticides and fungicides prosperity resulted into degradation of environment and eco-system in addition to the loss of flora and fauna from the agricultural systems.

The indiscriminate expansion of agriculture during earlier phase of the five year plans, at the expense of forests and forestlands, has eroded its very foundation i.e. ‘forestry’ on which ecologically secure agriculture must be based. Over-use of land has resulted in the creation of water-logging, salinity and alkalinity, shortage in fuel, fodder and timber and a host of other problems, rendering agriculture less economical land has already been converted into waterlogged land.

2.6 FOREST FIRES

Fires cause enormous damage to the tree, young natural growth, seedlings and wildlife disturbing the ecology of the area. Most of the forest fires in the state are manmade and intentional; some fires, of course, are natural during the dry season. These forest fires not only cause the environmental and ecological degradation within the state but also affects the environment if the national capital region of Delhi.

2.7 AFFORESTATION BY MONOCULTURES

To produce more wood to meet the local fuel wood requirements, large-scale afforestation of the community wastelands was done. Monocultures were raised with high density of trees, which did not allow the growth of other plants. Thus, even the afforestation activities have been responsible to some extent for the loss of biodiversity both inside and outside the forests.

3.0 STATUS OF FOREST RESOURCES IN THE STATE

3.1 FOREST AREA

Haryana is an intensively cultivated state. The state is located in genetic plains meeting Shivalik foothills in the north, Aravallis in the southwest and arid areas. In the west it is highly deficient in natural forests. About 80% (i.e. 35, 13,000 ha.) of its total geographical area (i.e. 44, 21,200 ha.) is under cultivation and 3.5% (i.e. 1, 55910 ha.) is the recorded forests. The dense forest cover with more than 40% density is 520 sq Km.

The present forest cover is 1559 sq km. The dense forest cover with more than 40% cover density has increased from 449 sq km. to 520 Sq km, compared to 1999 figures. The increase in forest cover has mainly been due to intensive plantation actives undertaken in the state during the past years. The total forest and tree cover of the state is now 6.6% of its total geographical area. This indicates that the farm / argo- forestry in the state has been taken as an alternative land use system by farmers. This system of land management has a bright future as it is being propagated ion commercial considerations.

3.2 LAND USE OATTERN IN HARYANA

Item of use	**Area in '000 ha**	**%age**
Total Geographical Area (As per village papers)		
Land put to non agriculture uses		
Forests (as per revenue record)		
Permanent Pasture & other grazing land		
Land under misc. tree crops & groves		
Cultivable wasteland		
Current fallow		
Net sown area		

(Source: Statistical Abstract of Haryana, year 2003-04)

3.3 The state has 0.155 million hectares (about 3.5% of total geographic area of state) under forests. The distribution of forests into various legal classes is as follows. (Annual Administrative report,2004-05 of forests Department)

S.No.	category of forests	Hectare	Percentage
1	Reserved Forest		
2	Protected forests		
	(A) Block area Protected		
	(B) Strips		
	(i) Road sides		
	(ii) Railway line sides		
	(iii) Canal sides		
	(iv) Bunch		
	Total strip forests		
	Total protected forests		
3	Unclassed forests		
4	Forests under section 38 of IFA		
5	Forests under section 4&5 of PLPA 1900		
	Total forests area in the State (100%)	**155910.16**	

Source: Deptt. Of forest & Wild Life

Besides the above forest area, the state has developed community plantation and agro-forests on about 3.1% area belonging to communities and farmers. Thus, the total area under forests and tree cover is about 6.6% which, however, is much below the national goal of one- third area under forest and tree cover.

3.4MAN MADE AND NATURAL FORESTS

The forests in the context of the state could be divided into two main categories: the Shivaliks on the northern border and to the highly degraded forests of the Aravalli hills in the south. The total extent of the forests in the state is 1559 sq.km of which about 8.5% is private forest closed under section 38 of IFA and under Section 4& 5 of Punjab Land preservation Act 1900. The extent of Reserved forests (RF) is 15.98% and that of Protected forests (PF) 74.28%. About 70% of the total PF is in the from of linear strips along rail, road and canal sides.

3.4.1 NATURAL FORESTS

The Shivalik hill forests of the northern part of the state belong to the Northern Tropical Dry Deciduous type with Sal as the important species. In the higher elevation, in Morni hills, the chir pine forests belonging to the Sub tropical type Pine forests cover a small area of 22.7 sq. km. Dry Bamboo Brake forests an edaphic climax, are found on the H.P. border. In the south and south western part, the vegetation belongs to Northern tropical Thorn Forest and cover sizeable area with Acacia nilotica, Prosopis cineraria, Acacia sengal as the important species.

The Aravalli hills in the south carry the edaphic type- Anogeissus pendula forests, most ofDendrocalamus stricts or ban which is in highly degraded state. The blanks and degraded areas have now been planted mainly by Prosopis juliflora. A. Senegal, Holoptelia species etc. under EEC aided Aravalli Afforestation Project. Most of the natural forests are poorly stocked. In the good forests of Shivalik hills the growing stock is around 50-60 m3/ ha.

3.4.2 MAN MADE FORESTS

The degraded forests in the state have been planted mainly by species like A. catechu, A nilotica, Eucalyptus hybrid, D sissoo A tortilis and Prosopis juliflora. The strip forests are wholly man made and carry growing stock up- to 60-80m3. The productivity of the forests depends on may factors but on an average eucalyptus gives a mean annual increment (MAI) of up–to 10 m3 /ha/yr, but under good soil and moisture conditions MAI up- to 30 m3 /ha/yr is obtained. A. nilotica produces MAI up –to 8m3/ ha/yr on strips and about 4m3/ ha/yr in block forests in the semiarid tracts of the state. The growth of A. tortilis which is extensively planted in the sandy deserts of the state gives MAI of about 3-4 m3/ ha/yr.

The traditional agriculture practices, which co-existed harmoniously in the past with natural environment, have changed to become exploitative of nature. The forest resources are depleting gradually day by day due to increase biotic pressure, both from human and cattle which has led to irreparable destruction of wildlife, habitat and damage to the watersheds. The changing life style of new consumer generations have led to the distaste for forests, natural resources or professions related to natural resources and hence the indigenous knowledge is being lost with the passage of time. Such socio-economic developments have

brought about quantitative and qualitative changes and spatial distribution of forests.

Two national parks and ten wildlife sanctuaries in Haryana cover an area of 30390.79 ha. This constitutes 0.687% of the geographic area. The Kalesar protected areas. The most area of Abubshehar wildlife sanctuary covers the bulk of the total area under protected areas. The most area of Abubshehar sanctuary is privately owned agriculture land where not much of regulatory activity is being done.

3.5 NATURAL FOREST ECOSYSTEMS

3.5.1 TREE FORESTS

(a) Transitional Shivalik Sal forests of Kalesar, Yamunanagar district

(b) Transitional Shivalik Chir forests of Morni, Panchkula district.

(c) Anogeissus pendula forests of jhir area in firozpur- Zirka of Gurgaon district

(d) Terminalia chebula forests of Mandhna and Hathia- Udhon in Panchkula district

(e) Dendrocalamus or bans forests of Thadugarh and Pinjore in Panchkula district.

(f) salvadora oleo ides forest of Nimbi – Duloth with Capparis aphylla and Acacia Senegal in Mahendergarh district

(g) Commiphora wightii – Gugal (endangered) forests of Madhogarh in Mahendgarh district.

(h) Strerculia urens and Acacia Senegal forests in Khol of Rewari District

(i) Phoenix forests of Faridabad

(j) Prosopis cineraria, Tamarix articulata forests of Sohlabudin in Mahengarh district.

(k) Hill forests of Anogeissus latifolia, Lannea coromandelica, Acacia catechu in Panchkula and Yamunanagar district.

3.5.2 GRASS LAND ECOSYSTEM

Not many grass ecosystems are preserved in the state. Some of them that can be taken up for preservation are as under:

(a) Cenchrus ciliaris/ Cenchrus setigerus grass land of Nimbi and Duloth forests in Mahengarh district.
(b) Saccharum munja grass lands in Sohlabudin in Mahendergarh district.

(c) Saccharum spontaneum grass lands along the streambed of Sahibi in Jhabua Forest of Rewari district
(d) Neem / Saccharum munja grass lands of Jhumpa in Bhiwani district.
(e) Dholu grass lands of Mandhan (Chrysopogon fulvus)
(f) Eulalioplis binta or Bhabbar grass lands of Morni and Yamunanagar
(g) Desmostachya bipinnata and Vetiveria zizenoides grass lands of Saraswati forests of Kurukshetra.
(h) Diplacnema fusca Karnal grass lands of kallar areas.

3.5.3 WETLANDS ECOSYTEM

(a) Wetland ecosystem of Sultanpur in Gurgaon district

(b) Wetland ecosystem of Bhindawas in Jhajjar district

(c) Wetland ecosystem of chilchila in Kaithal district

(d) Wetland ecosystem of Dam Dama in Gurgaon district

3.5.4 DESERT ECOSYSTEM

Semi-arid ecosystems those are similar to desert ecosystems in Bhiwani, Rewari and **Mahendergarh forest ecosystems.**

3.5.5 RIVERINE ECOSYSTEM

(a) Yamuna river- bank terrace riverine ecosystem

(b) Ghaggar river- bank terrace riverine ecosystem

Above ecosystems are present along Yamuna and Ghaggar rivers of Haryana state.

3.6 THE STATUS OF WILDLIFE IN HARYANA

The status of wildlife resource in Haryana is given below

- 2 National parks
- 10 wildlife sanctuaries
- 2 small zoos : At Pipli and at Rohtak
- Breeding centre of Chinkara (India Gazelle at Kairu in Bhiwani district
- Crocodile breeding centre at Bhaur Saidan in Kurukshetra district.
- Pheasant breeding centre (Red Jungle fowl & Kaleej pheasant) at Morni.
- 2 small deer parks: At Hissar and at Meham

3.7 WILDLIFE CENSUS

The census of wildlife carried out earlier in the stagew gave the following population estimates

Year	**Leopard**	**Wild boar**	**Chital**	**Sambar**	**Barking deer**	**Ghoral**	**Langur**	**Red jungle fowl**	**Chinkara**
1997	30	2933	176	833	726	2312	Na	Na	422
2002	NA	2298	204	942	1031	2867	3149	5322	344

LIST OF NATIONAL PARKS AND WILDLIFE SANCTUARIES

Sr.no Wildlife found	National park/ sanctuary acres	Tehsil/District	Wild animal	Area(in which are
National Park				
1.	Kalesar National Park	Chhachrauli/ Yamunanager	Leopard, Chital barking deer, Ghoral	11457
2.	Sultanpur national Park	Gurgaon	Water birds.	359.51
Wildlife Sanctuary				
1.	Bhindawas Sanctuary	Jhajjar	Water birds, Black buck, Blue bull	1016.94
Partridges				
2.	Nahar Sanctuary	Kosli (Rewari)	Back buck, Bule bull	522.25
3.	Chhilchhila Sanctuary	Kaithal	Water birds	71.45
4.	Bir Shikargarh Sanctuary	Kalka	Chital, Wild boar	1896.00
(Panchkula)				
5.	Abubshehar Sanctuary	Dabwali	Blue bull, partridges	28492.0
	(Sirsa)		and Black buck	
6.	Saraswati Plantation Sanctuary	Guhla-Cheeka Kaithal/ Kurukshetra	Black buck, Hog deer and Wild boar.	11003.0
7.	Khaparwas Sanctuary	Jhajjar	Water birds	204.36
8.	Bir Bara Ban Jind Sanctuary	Jind Hare, Partridges	Blue bull, Monkeys,	1036.0
9.	Kalesar Sanctuary.	Chhachhrauli (yamunanagar) Barking deer	Leopard, Chital Sambhar, Wild goat	13209

10.	Morni Sanctuary	Panchkula	As above	5499.65

4.0 IMPACT

4.1 LOSS OF NATURAL FORESTS

Although there are no figures to prove but most experts belive that natural forests are under pressure and are gradually depleting in the quantity of biodiversity content. There is selective removal of economically va;luable khair from the Shiwalik hills.

4.3 AFFORESTATION BY MONOCULTURES REDUCES BIODIVERSITY

Afforestation on the community lands and other waste lands is carried out by monocultures at a close spacing which reduces the plant diversity including those of grasses in these areas.

4.3 GRAZING PRESSURE PREVENTS NATURAL REGENERATION

With the increase in the pressure of animal grazing on the forest lands there is reduced regeneration of the original vegetation. Only those species of the original crop composition which is not desirable.

4.4 FIRE DESTROYS THE PLANTS AND ANIMALS

Fire not only destroy the regeneration but also kill the soil micro-flora. Only coarse species survive changing the crop composition and depleting the forest. Fires also damage wildlife by destroying the nests of birds, killing small animal thus disturbing the ecosystem and initiating secondary succession.

4.5 REDUCING BIRDS AND ANIMAL POPULATION

Use of pesticides and other environmental contaminants have drastically reduced the bird and the other small animal population. There is increasing number of reports of dog bites in the state. This has been caused by

the increase3d availability of food to the stray dogs because the population of their competitors in the carcass dumps, the vultures, has reduced drastically by the veterinary use of diclofenac. The population of pea-fowls is declining due to chlorpyriphos used tov treat speed before sowing. The population of other bird like black partridge, house sparrow and many other birds and animal is reducing.

4.6 WILDLIFE OFFENCES

The killing of wild animal for various purposes is decreasing their population. Many wild animal which once were found in the state are no more in those areas. The wild dog which was found in Kalesar forests till early seventies is no more in that forest. Many animals like jackal, hare, snakes, pea-fowls etc., are hunted for medicinal purposes. Their population is declining. The following table gives the idea of extent of wildlife offence in the state.

Year	No.of cases detected	Amount of compensation realised in Rs.
2000-01	581	2,15,000
2001-02	821	3,43,739
2002-03	814	4,79,436
2003-04	819	5,11,785
2004-05	603	4,08,100

Source: Deptt. of Forest & Wild Life

4.7 FOREST OFFENCES

The number of forest offences committed in the state is given below

YEAR	**By fire**	**Illicit felling**	**Illicit grazing**	**Others**	**Total**
2000-01	6	5922	1987	2722	10637
2001-02	43	6814	1747	3054	11658
2002-03	48	7866	2581	3459	13954
2003-04	27	8660	1219	3324	13230
2004-05	48	5153	808	2897	8906

Source: Deptt. of Forest & Wild Life

5.0 RESPONSE

5.1 SOCIAL FORESTRY

With the advent of the social forestry programme in the state in early eighties followed by projects like Aravallis & Haryana Community Forestry Projects, the tree cover in the state has now increased to 6.6% of the total geographical area. The Social Forestry Project aided by the World Bank was started during 1982-83. Under this project 70,000 ha. Area of Panchayats/ community lands was planted. Though the social forestry programmes in Haryana got appreciation land was planted. Though the social forestry programmes in Haryana got appreciation from all corners but these programmes have yet to attain dimensions commensurate with the needs. Appreciable efforts were made to ensure the participation and motivation of the people in tree planting programmes but more continuous efforts are required to make them self-sustaining.

5.2 COMMUNITY FORESTRY

PHASE ONE The EU aided Aravallis Project successfully rehabilitee degraded common lands of 294 villages in southern Haryana. For this purpose, all activities for rehabilitation were planned and implemented with active involvement and participation of local people. Nearly 38,000 ha area was rehabilitated through planting and natural regeneration in Aravallis region. Satellite imageries reveal that forest cover of this region, which was around 10,000 ha in 1990, increased to over 42,000 ha in 1997.

PHASE TWO Presently, EU aided community Forestry Project Haryana is being implemented in 300 villages spread over nine districts of Haryana. The project is undertaking plantation on the farm and community lands. 27380 ha. Area will be planted during the project period up-to the year 2008.

5.4 AGRO-FORESTRY PROMOTION

In order to reduce the pressure on natural forests, to protect them for biodiversity conservation agro- forestry is being promoted in the state. More than 20 million plants are supplied for plantation outside forests every year. This is one of the major efforts by the state and compared to such effort of other state it stand among the best in the country

5.5 SOIL AND MOISTURE CONSERVATION

To prevent soil erosion and conserve water, a special project had been under implementation under the World Bank aided Kandi project. These works are also undertaken in most of the districts under various schemes like Integrated Afforestation on watershed basis schemes.

5.6 PEOPLE'S PARTICIPATION / JOINT FOREST MANAGEMENT IMPLEMENTATION

In Haryana, joint forest management was started as early as 1972 though the government notification in this regard was issued in 1990. There are, at present, 350 Hill Resource Management Societies (HRMSs) managing 60,734 ha of forestland. JFM is practiced in degraded forests. The net income is apportioned between the government and the HRMS in the ratio of 70%;30%. The HRMSs contribute 30% of their share towards the improvement and management of areas under their control and another 10% towards Kalyan Kosh (welfare fund)

Forests as land use in villages

Forest area	No. of villages	Total forests area (ha)	Population
Less than 100 ha	71	1388	114,413
100-500 ha	15	3858	12,773
More than 500 ha	4	2721	492
Total	90	7967	127,678

Source: Deptt of Forest & Wild Life

5.7 NATURE EDUCATION AND AWARENESS PROGRAMMES

To create awareness among people and as a tool to improve the biodiversity conservation, the nature education as a schme has been undertaken since the beginning of ninth five year plan period. Every year on the occasion of vanmahostava, wildlife week (first week of October), fire

protection day etc., various competition are organized among the school children and prize are given away. Special nature education camps are also organized for school teachers, farmers, school children.

5.8 WIRELESS COMMUNICATION

Most of the natural forest area is covered by wireless communication network. All forest and wildlife guards posted in these areas have been provided with wireless handsets.

5.9 SUPPLY OF WEAPONS AND VEHICLES TO PREVENT POACHING

Double barrel guns have been given to wildlife guards posted in sensitive areas. All wildlife guards posted in sensitive natural forest areas have also been given motor cycles for better mobility. Two jeeps one at Kalesar wildlife sanctuary and the other at Sultanpur national park have been provided for the control of poaching.

5.10 MONITORING MECHANISM

In order to improve the survival of plantation and keep watch on the money spent on various activities including plantation carried out every year the monitoring and evaluation division carry out evaluation of works in all the districts

5.11 FOREST PROTECTION

The amount spent on forest protection in the last five years is given below (this includes expenditure on fire lines, fire watcher, vehicles, wireless net work etc.)

Year	**Amount in lac Rs.**
1999-00	5.62
2000-01	33.06
2001-02	57.14
2002-03	48.8
2003-04	48.8
2004-05	178.22

Source: Deptt of Forest & Wild Life

BUDGET (FOREST)

Forest Department implements various schemes and programmes for which funds are made available primarily from the state budget. It also implements certain schemes with financial assistance from the central government or with external aids. The budget allocation to the forest department during eighth and ninth plan period is detailed as under:

Department Budget head & code	Budget and Actual Expenditure (Rs. lakh)					
	1999-2000	2000-	2001-	2002-	2003-04	2004-05

			01		02		03					
	BE	**AE**	**BE**	**AE**	**BE**	**AE**	**BE**	**AE**	**BE**	**AE**	**BE**	**AE**
Forestry Plan												
Soil Conservation												
Central Share												

Physical Targets of Afforestation in hectares

Schemes, Projects & Program	**Physical target & achievements**	**1998 -99**	**1999 - 2000**	**2000 -01**	**2001 -02**	**2002 -03**	**2003 -04**	**2004 -05**
Forestry	Targets							
	Achievements							
Soil Conservation	Targets							
	Achievements							
Other	Targets							
	Achievements							

In recent years, in addition funds have also been provided by various agencies like DRDA< Shivalik Developments Board etc. for Afforestation and other activities for certain periods.

BUDGET (WILDLIFE)

The following table gives the plan and non-plan expenditure, including the salary, of wildlife wing in the forest department.

Year	**Non-plan Rs. in lac**	**Plan(Rs . in lac) State centre Total**

Source: Deptt. of Forest & Wild Life

(About 28% of plan expenditure is on the salary component while 72% of non-plan is on salary in the state component)

HUMAN HEALTH

1.0 INTRODUCTION

The health of a community is dependent on several factors; healthful housing, immunization status, poverty, mal-nutrition,, sanitation access to clean drinking water, availability of medical services and many others. The key to prevent and control of most of the disease burden lies in the environment. However, the hard fact that faces us here is that about burden is due to environmental causes.

The modern form of urban and industrial environment and agro-chemicals has compounded the traditional environmental risks such as poor access to water and sanitation.

Today water supply and sanitation related disease burden associated with non-ported in year 2004 and 1, 82,381 cases up to December 2005. Seventeen, and thirty-nine deaths have been reported in the year 2004 and 2005 respectively Outbreak of cholera, dysentery typhoif and hepatitis are attributed to the exposure of water borne pathogens.

The link between water, sanitation and health area complex, inflates by a series of interacting factor and heavily dependent on social attitudes unhygienic practices.

2.0 ENVIRONMENTAL PRESSURES ON HUMAN HEALTH

2.1 HEALTH IMPACT ASSOCIATED WITH HOUSEHOLD ENVIRONMENT

At the house Hold level, major health risk are associated with poor living conditions. Characteristics of contaminated water, poor water availability and lack of sanitation, poor ventilation, inadequate drainage and improper waste disposal and crowding particular in urban slums, define the environment and lead to number of diseases. The associated mortality load is generally reflected in higher deaths due to tuberculosis, respiratory illness, bronchitis and other chronic respiratory illnesses, and gastroenteritis.

Morbidity from helianthus infections, communicable and skin diseases such as scabies and conjunctivitis compound the diseases profile.

2.2 THE BURDEN OF AIR POLLUTION

The environment is degrading rapidly in the third world. Air pollution from industrial activities, vehicular emission and burning of fossil fuels, result in respiratory diseases, cancer etc. The respiratory illness remains the top health concern, especially in children. Variety of sources contribute to the problem are vehicle engines exhaust, house hold stoves refuse burning, industrial boiler and power plants, together with significant level of background dust from unidentified sources.

2.3 AGRO-INDUSTRIAL CHEMICAL POLLUTION

The cropping pattern and use of insecticides and pesticides and emission of gases from various industries are having bad effect on health.

Both chronic and immediate exposure to these agents is known to lead to multiple carcinogenic effects.

2.4 WATER SUPPLY AND SANITATION RELATED DISEASES

Water supply and sanitation related diseases are also major contributor of disease burden in the state.

3.0 STATUS OF HEALTH

3.1 BASIC HEALTH STATUS AND DISEASE BURDEN IN HARYANA

Overall health of population in Haryana has significantly improved over years. The life expectancy is 64.64 years in male, 69.30 years in female, which is higher than India, which is 64.11 years and 65.43 years respectively. Crude birth rate is 27.8 in rural, 22.8 in urban and 26.7 combined. IMR has also gone down. It was 75/1000 in 1991census and 56.8/1000according to(NFHS-1999). Death rate has gone down from 8.6 in 1991 to 8.0 (1999). Haryana has been playing an active role in providing more and more medical facilities; since 1968, special emphasis has been given on health care and delivery facilities in both rural & urban areas in Haryana. Multipurpose workers provide services at sub centres level for family welfare, maternal and child health immunization, environmental sanitation and control of communicable diseases. More and more hospitals, PHCs, CHCs and sub centres have been opened to enhance the medical facilities among the people which are show in the annexure 5a and 5 b.

The status of various diseases which are commonly occurring in the state, the total number of patients, both indoor and outdoor, the deaths caused and the bed available is show in the table below

3.2 IMPORTANT DISEASES PREVALENT IN THE STATE

Disease	**No of cases identified**						
	1985-86	**1990-91**	**1995-96**	**2000-01**	**2002-03**	**2003-04**	**2004-05**
Intestinal infection		693388	597862	697556	568211	158597	168996
Anaemia							
Cataract							
Pulmonary tuberculosis							
Hypertensive, heart disease							
Diabetes							
Respiratory infection							

Source: Health Deptt.

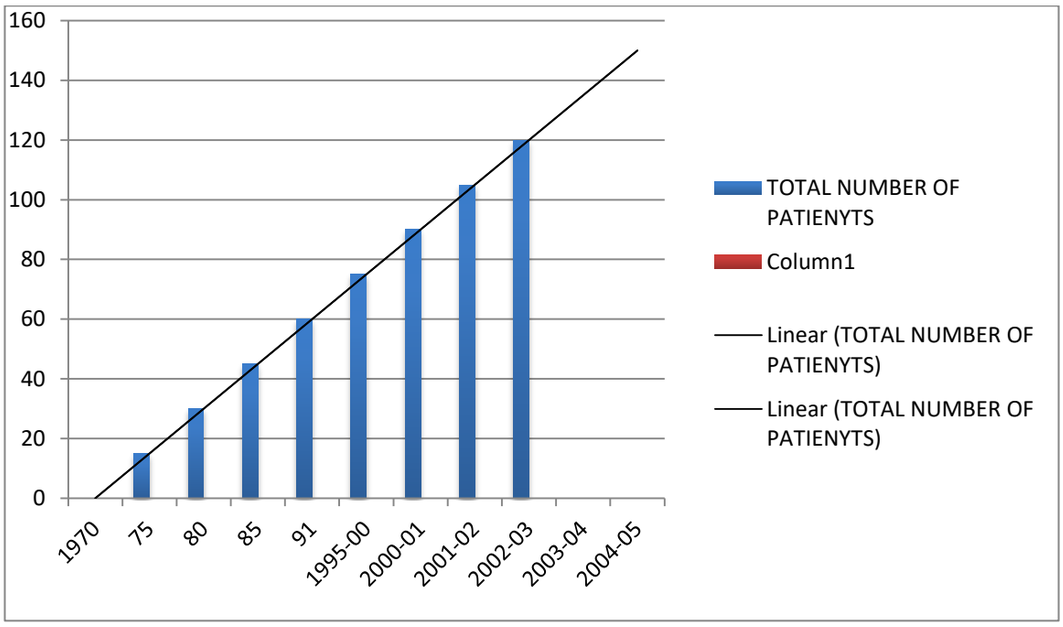
3.3 HOSPITAL ADMISSION IN FOLLOWING ENVIRONMENT RELATED

DISEASES- TRENDS:

Disease	1990-91	1995-96	2000-01	2002-03
Stomach cancer				
Liver cancer				
Prostate cancer				
Lymphoma				
Parkinson's disease				
Cirrhosis of liver				
Nephrital& nephrosis				
Congenital abnormalities				
Unintenital poisoning				
Diaeehea disease				
Polio				
Hepatitis				
Malaria				
Filariasis				
Trachoma				
Intestinal helminthes				
Protein energy malnutrition				
h.pylori (peptic ulcer)				
Acute respiratory infections				
Ch. Respiratory infections				
Lung& related cancer				
Cardio vascular disease				

Source : Health Deptt.

3.4 PATIENTS TREATEDE AND BEDS AVAILBLE IN HARYANA



3.5 NUMBER OF DEATHS CAUSED

Disease	No. of deaths reported in hospital			
	1990-01	1995-96	2000-01	2002-03
Stomach cancer				
Liver cancer				
Prostate cancer				
Lymphoma				
Parkinson's disease				
Cirrhosis of liver				
Nephritis & nephrosis				
Congenital abnormalities				
Unintentional poisoning				
Diarrhoea disease				
Polio				
Hepatitis				
Malaria				
Filariasis				
Trachoma				

Intestinal helinthes				
Protein energy malnutrition				
h.Pylori (peptic ulcer)				
Acute respiratory infections				
Ch. Respiratory infection				
Lungm& related cancer				
Cardio vascular disease				

Source: Health Deptt.

3.6 NO OF ENVIRONMENT RELATED DISEASES

No. of Environment Related diseases

Disease	**Year**					
	1990-91	**1995-96**	**2000-01**	**2002-03**	**2003-04**	**2004-05**
Diarrhea						
Viral Hepatitis						
Bronchitis Asthma						
Skin Disease						
Upper Ref.URI Infection						
Worm Infection						
TB						

Source : Health Deptt.

The growing pollution of our rivers constitutes the biggest threat to public health. Polluted waters lead to various gastrointestinal problems, liver infections, cancer, etc. Children are often the worst affected, dying in large numbers because of diarrhea.

Transmission of water- related diseases:

The water related infections of man are extremely numerous and diverse. In general the following are the ways in which diseases may be carried by water.

- Pathogenic organisms are transmitted organisms are transmitted from one person to another through the domestic water supply system e.g. typhoid and hepatitis.
- Inadequate water `supply, lack of personal cleanliness e.g. trachoma and skin infection
- Infection transmitted by organisms which live in water, like helminths (parasitic flukes) that spend part of their life cycle in water e.g. bilharzias
- Insect vectors which are related in some way to water, transmit infection e.g. yellow fever, malaria etc.

3.7 SOME WATER-RELATED DISEASES AND THEIR CAUSATIVE ORGSNISMS

Disease	Causative organisms	Mode of spread	symptoms
BACTERIA			
Typhoid			
cholera			
Bacterial dysentery			
Leptospirosis			
Viruses			
Infective hepatitis			
Protozoa			
Amoebic dysentery			
Diarrhoea			
Helminths			
Bilharzia			
Guninea worm			

3.7 DISTRICTWISE WATER BORNE DISEASES FOR THE YEAR 2003(JAN-DEC) AND 2004(JAN-MAY)

DISTRICTWISE WATER BORNE DISEASES FOR THE YEAR 2003 (JAN- DEC)AND 2004(JAN-MAY)										
DISTRICTS	**CHOLERA CASES**		**GASTRO-ENTERITIS CASES**		**DIARRHOEA&DYSENTARY CASES**		**VIRAL CASES**		**ENTRIC FEVER CASES**	
	2004	**2005**	**2004**	**2005**	**2004**	**2005**	**2004**	**2005**	**2004**	**2005**
PANCHKULA										
Ambala										

JHAJJAR										
YAMUNANAGAR										
KAITHAL										
PANIPAT										
SONIPAT										
JIND										
SIRSA										
HISAR										
BHIWANI										
ROHTAK										
MOHINDERGARH										
FATEHABAD										
REWARI										
GURGAON										
FARIDABAD										
KURUKSHETRA										

Source : Deptt. of Health

The table given above shows diarrhea and dysentrery as the most prominent disease. During the year 2004 minimal 1967 cases of diarrhea and dysentery were reported from district Sonepat whereas in Jind district this figure rose to 19493. In the year 2005 these cases showed a varied trend minimum being 2065 in district Yamunanagar and maximum 20080 in district Bhiowani.

Viral cases had comparatively low quantitative occurrence in different districts maximum being 350 in district Ambala and minimum being nine in districts Panipat whereas no such case has been registered from districts kKaithal. Further this table implies that the cases of Enteric fever increased from average 72 durinh the year 2004 to 138 up to 2005.

3.8 STATUS BIO-MEDICAL WASTE MANAGEMENT:

The status in the state is as under:-

1. There are 14 incinerators installed in 11 districts , 3 at Faridabad town and one each at Ballabgarh, Bhiwani, Ambala, Hisar, Karnal, and Jind, Kurukshetra, Sirsa, Sonepat and Panchkula. In addition to above one incinerator has been installed at Post Graduate Institute of Medical Science Rohtak and at present all incinerators are in working order. Keeping in view the difficulties and financial constraints it was decided to decentralize the service and all civil surgeons were asked to explore the possibility of proper disposal of Bio Medical Waste in consultation with local IMA president either from locally available firm or any other alternative method. The services have been outsourced for bio medical

waste disposal to private service provider, of other health institutes in the state.

2. All the government health care institutions have been authorizes.
3. In each district, committees (at district hospitals as well as other institutions in the districts) were formed for proper supervision of the work of bio medical waste disposal.
4. An amount of Rs.25000/- to 1, 00,000 was allotted to all the civil surgeons for the authorization/procurement of the material in the state. The Para-medical/musical staffs were given training regarding segregation, transportation and disposal of waste.

4.0 IMPACT OF ENVIRONMENTAL DEGRADATION

4.1 WATER RELATED DISEASES:

Poor quality water supply leads to a number of diseases as diarrhoea, Dysentery, Gastroenteritis, cholera, Hepatitis and enteric fever and other helianthus diseases. In 2004, 179279 cases diarrhoea were reported with 39 deaths.

4.2 AIR POLLUTION RELATED DISEASES

Air pollution related respiratory diseases are also a major source of burden on the health services in the state. Tuberculosis though not directly related to environment but is major health problem in the state. The number of cases of TB reported in 2001 and 2002 were 44351 and 44351 and 47609 respectively.

5.0 RESPONSE

5.1 CURATIVE, PREVENTIVE AND PROMOTIVE SERVICES THROUGH HEALTH INSTITUTIONS.

There are 43 hospitals, 65 community health centres, 404 primary health centres and 2364 sub-centres through which health services are given to Haryana people. Besides this there are TB clinics and ESUI dispensaries and hospitals for doing this work.

All preventive and curative services are rendered through these institutions Water samples are regularly checked for supply of chlorine in it through orthotolidin test (O>T>Test) and samples are also sent for bacteriological test in laboratory regularly. Chlorination of wells, distribution of halogen tables as and when required especially in case of any outbreak and during floods is undertaken.

5.2 NSPCD

This is a programme to control any outbreak and to do regular surveillance of diseases. This programme is running in 5 districts of the state i.e Ambala, Karnal, Sonepat, Bhiwani and Gurgaon. This is a totally centrally sponsored programme in which the communicative and laboratory services have been strengthened in these districts.

5.4 RNTCP

To control the menace of tuberculosis, the new RNTCP programme has been launched in the state. In the first phase, Govt. of India included 3districts i.e. Faridabad, Gurgaon and Sonepat in the state in April 2000. In the 2nd phase two more districts were taken i.e. Karnal and Jind. In the year 2003-04 the remaining districts were also taken up .

5.5 GENERAL MEDICAL CHECK –UP OF INDUSTRIAL WORKERS UNDER THE SWASTHA APKE DWAR PROGRAMMES:

This is a new scheme introduced in Haryana by the chief Minister, on Haryana Day i.e 1st November in 2003. It has been observed that the workers working in the industrial establishments in the state in general are not aware with the various health actives being carried out by the department and do not find time to visit the health institutions due to lack of time ignorance. The good health of worker is directly linked with the productivity and economy oh the state. Keeping in view this fact it has been decided by the department that that under the programme "Swastha Apke Dwar," the general medical check up of all industrial workers in the state be carried out with the aim to create health awareness with reference to HIV/AIDS control, RNTPC,MCH and important health programmes amongst the industrial workers and identification of asymptomatic/symptomatic serious type of health ailments particularly environment related and occupational disease.

Approximately four lacs industrial workers are working in the organized sectors and are covered under ESI Scheme in 15 districts in the state (expert Kurukshetra, Fatehabad, Narnaul and Kaithal). The department has decided to conduct general health check up of all the industrial workers at their working place in the factory premises. This programme will be carried out by the staff working in the ESI hospitals and dispensaries. The additional support if any is provided by respective Civil Surgeons. They identify and select the industrial establishments in their respective areas with the help of branch managers, local officers and ESICs.

5.6 ACTION TAKEN TO CONTROL THE SPREAD OF WATER BORNE DISEASES IN HARYANA STATE PERIOD OF JANUARY 2004 TO MAY 2004

The state health department is actively involved in the disease preventive measures through the various health awareness programmes such as giving health tips, distributing pamphlets and tablets to the public and also repairing of pipes is done wherever necessary as can be seen from the table below.

District	**Health education Health talk given**	**No. of pamphlets distributed**	**Total no. of leaks pipe**		**No. of wells chlorinated**	**Halogen tablets distributed**	**Meetings held for control of water borne diseases**
			Detected	**Repair**			
Ambala							

Bhiwani							
Faridabad							
Fatehabad							
Gurgaon							
Hisar							
Jind							
Jhajjar							
Karnal							
Kaithal							
Kurukshetra							
Mohindergarh							
Panipat							
Panchkula							
Rohtak							
Rewari							
Sonipat							
Sirsa							
Yamunanagar							
Total							

Source: Deptt. of Health

5.7 EXPENDITURE ON HEALTH

The state health department's expenditure on health has increased from 65.9 lacs in the year 1990-91 to 186.90 lacs in 2002-03. The expenditure on the family welfare also rose from 1358.36 in 1990-91 to 5263.63 lacs in 2002-03.

Expenditure on Health (in lacs)			

Source: Deptt. of Health

The expenditure on family welfare (in lacs)				

Source: Deptt. of Health

ENVIRONMENT STRATEGY & PROBABLE ACTION INITIATIVES FOR HARYANA

The environment strategy for the state of Haryana has to be set within the con text of the national environmental framework and sustainable development strategy in India. While the contours of national environment framework is visible the draft environmental policy but in absence of national sustainable development strategy, this environmental strategy for state of Haryana provides an outline of environmental strategy based on the state of Environmental (SoE) Report as well as the consultations carried out during the three dissemination workshops for SoE Report. This environmental strategy also outlines some specific action plans that can be initiated for improving environmental effectiveness of various sectoral plans and programmes. While an action plan for the regional environment could attempt to include an exhaustive list of all possible environmental actions within the region that could undertaken but such an exercise would be cumbersomely long requiring in depth consultations with the stakeholder departments. Action plans provide a key mechanism for securing agreement to the main action and initiatives, which need to be progressed.

Strategic Dimension: To institutionalize environmental management at state level state government should

a) Focus on department- wise environmental coordinators in critical sectors & build their capacities.
b) Attempt to set modest environmental targets (output based or outcome based) for select departments.
c) Ensure that a part of the funds allocated to each department as percentage basis is earmarked for environmental activates to be carried by the respective department.
d) Evolve a mechanism using planning department in coordination with environment department fort monitoring & evaluating the achievement of the targets set in an objective independent manner and
e) Either Chief Secretary of chief Minister's office depending on feasibility should periodically review the progress achieved so as to ensure that a strategic attention is given the environmental dimension in the state planning and programme implementing system.

This apart the interest generated in select officials of various department/ agencies who have participated in the State of Environment Reporting initiative needs to be further reinforced and strengthened by conducting annual department thematic environmental workshops especially in departments like energy, Irrigation, Urban, Transport , Forestry, Agriculture etc.

While it is recognized that environmental education plays a vital role in molding the culture and value system of society towards environmental education is an essential part of the process of developing a more sustainable world. It provides an avenue to generate an understanding and an appreciation of the value of both the intrinsic nature of the environment – its ecological

mechanisms and balances its effects on human development. Hence strategic attention to this dimension is critical from sustainable development perspective.

Urban Sector: While urban master plans if prepared and implemented in a consultative manner with provisions for maintaining the right kind of environmental quality would contribute positively towards urban environmental but most often plans prepared comprehensively are not factored during various decision making process which makes future positive interventions costly and unattractive. Major municipalities should prepare and implement environmental plans that are specific to the city/ town requirements. The studies have shown that inadequate quantities and improper quality of water supplied in both urban and rural areas contributes significantly towards the burden of diseases across India. There is a need of such an approach includes:

1. Augmenting water supply of ULBs.
2. Investing in water distribution and sewage networks by replacing old pipes to prevent leaks and setting up new lines.
3. Reducing in unaccounted for water (non revenue water) by recognizing it as an economic good.

Sanitation needs to given higher priority by learning from the experiences of ULBs like Pune and Alandur etc. for improving sanitation through public private partnership. While ULBs are spending substantial resources for collection and transportation of solid waste but inadequate hazards in the form soil and ground water contamination. Unless integrated solid waste management is management is planned and implemented by evaluating ULBs specific opportunities and constraints (including exploration of public private partnership at various levels) any changes introduced would have marginal benefits. The attention given to segregated collection, transportation, processing and disposal in most of the municipalities is limited .Given the financing options in the form of JNNURM and the recommendations of the 12th Finance Commission most of the financial constraints can be overcome but systemic inertia, lack of human and technical capabilities as well as organizational limitations will continue to hamper scientific management of municipal waste which needs to be addressed o a priority basis through state level initiative.

Urban local bodies need to be encouraged to take up rainwater harvesting in individual as well as community water harvesting structures. Water bodies and lung spaces in the urban areas need to be protected from public/ private in encroachments. Experiences across India shows that creation for leisure and recreational can be economically and environmental by beneficial as user charges collected often tend to meet the operation and maintenance charges. There is need to involve public awareness programme.

Preparation of air quality strategies for major cities in the state needs to be given adequate attention. Such strategies should contain proposals for action initiatives invarious dimensions like transport industries etc.

TRANSPORT SECTOR:

Increased economic growth, changing lifestyles and reducing investments in public transport are resulting in increased preference for private motorized transport as against public and non- motorized transport. City and town specific public transport system public and non-motorized transport. City and town specific public transport systems needs to be planned and implemented through involvement of appropriate authorities such as transport departments, traffic police, town planning authorities road transport corporations etc. Providing affordable efficient, differentiated, public transport options for all sections of population would reduce traffic related accidents and vehicular emissions significantly. Coordinated land use and transport planning is essential for reducing the travel demand. Urban transportation should be sustainable which requires evolution of transport needs of all including the poor, disabled and vulnerable of society. This requires planning to meet requirements of non-motorized transport (bicycles & bicycles) as well as pedestrians. Economic instruments like parking pricing policy needs to evolve. Exercise alternative fuel options such as CNG, LPG, and Electric Vehicles etc. which are environment friendly needs to be incentivized in specific cities/ towns that are experiencing increased pollution levels. Transport department should make attempts to maintain databases including inventorisation of vehicles, speeds, emission factors, adulteration of vehicular fuels, safety aspects etc.

INDUSTRIAL SECTOR

Information n environmental status of surface and ground water is not. Adequate to profile different parts of state in terms of quality and quality aspects. There is a need to augment monitoring equipments and human resources of state Pollution Control Board as well as optimizing usage of existing resources through development & deployment of management information system while large and medium industries to large extent come under regulatory attention but the small and tiny industries especially red category ones do not get the attention that they deserve. There is a need to explore opportunities for monitoring and enforcement using decentralized mechanism by involving govt. entities like ULBs and Panchayats as well as village communities.

Experience shows that instituting a transparency environmental rating and public disclosure system have given effective results, hence the same need to be explored for selected category of industries or location. Increasing investments in building capacities and generating awareness of both regulators as well as professionals have yielded positive benefits. There is a need for inverting in R & D efforts that helps the small and tiny industries to overcoming environmental limitations. Similarly in all industrial estates common treatment facilities need to be set up through public private partnerships. Ambient air water quality

monitoring mechanism needs to strengthen especially in the industrial clusters. The environment cell created in the industries department as part of the overall strategy needs to coordinate with department of environment, State Pollution Control Board in preparing specific action plans for the areas with high industrial concentration. The zoning atlas prepared under the guidance of Central Pollution Control Board needs to be used in taking decision regarding sitting of industries in various parts of the state. If the zoning atlases are not prepared then efforts should be made to get them prepared and more importantly use the same in decision making process. There is need to recognize and reward proactive environmental management within different category of industries so as to induce industries to adopt concrete steps in this direction.

Ensuring all the hazardous waste generated in the state reaches the TSDF site that is proposed to be set up in the state is a must. This is to avoid huge costs of remediation that society has to pay later. Similarly all he biomedical waste needs to be disposed as per the legal requirements. Efforts should be made in the direction of reducing the extent of hazardous waste generated coupled with reward and recognition for better performing units.

While mining is not a major environmental concern in Haryana but existence of stone quarries and other small mines which are not under the regulatory purview is a cause of concern which needs to be addressed through amendment of rules if required to bring them under environmental consent mechanism at state level. There is need to improve environmental monitoring in critically mined areas so as to assess the damage and arrest the degradation of mined areas through multi-institutional interventions including department of mines. Inventory of all mines needs to be developed including assessment of the environmental quality for prioritizing interventions for environmental improvements.

ENERGY SECTOR:

The comprehensive energy perspective plan needs to be prepared at the state level wherein environmental aspects are factored appropriately. Significant environmental aspects are visible in generation, transmission and distribution of power hence adequate attention is to be paid for these dimensions. While there are no state specific quantitative figures but usage of non commercial fuels like biomass for cooking in the rural areas results in huge burden of disease due to indoor air pollution. There is a need for promotion of renewable technology applications through a statewide requirement assessment and adoption programme. While energy conservation. Is a legal requirement for certain category of industries as per Energy Conservation Act. 2001 but experience in states like Andhra Pradesh shows that institutional efforts (Institute of Engineers) if complemented with this legal requirements would help in improving energy means of awareness generation towards energy conservation.

All the renewable energy potentials across the state needs to be assessed and exploited to meet the unmet demands as well as to move towards sustainable energy programme. Inappropriate charges for consumption of energy would not incentivize the consumers to use energy judiciously and efficiently that needs to be factored in pricing policy of energy. Biomass power production using agricultural waste has high potentials for meeting part of the power requirements of the state which needs to be encouraged through right kind price signals and if required it should be further strengthened by encouraging energy plantation in the wastelands. Experience in other countries show that mandating use of solar water heaters for all new urban dwellings within the state could be a good starting point for penetration of the renewable energy technologies.

AGRICULTURE SECTOR

Agriculture should be holistic in nature because change in one living system creates a chain reaction. As a state we are an agro-based economy. Agriculture contributes 30% to state is 1.3% of country's geographical area; 2% of country's population 6-7% of country's population; produces 6-7% of country's geographical intensity; 171%, water available 18.8 MAF requirement -34.0 MAF; This statistics indicates the extent of pressure on natural resources. During 1970's the green revolution was made possible by;

i) Area expansion - no further scope
ii) Irrigation expansion - Very little scope
iii) High yielding varieties - Plateau of field levels- further scope?
iv) Agro- inputs - Fertilizers and other pesticides.
v) Favorable public policies - Remunerative prices, assured marketing.

During 1970's increased food production was a national need. Policy planners, scientist and farmers responded to national call and achieved the unparallel secces in food production. But during this journey of 35 years we as a nation failed to visualize the other impacts of green Revolution Technologies and moved uni-directionally. The fall out of this uni-directional approach has raised serious doubts on sustainability; food and nutritional security and clean environment, which have become issues. The fallouts are:

- Over exploitation of natural resources.
- Poor health of natural resource system.
- Factor productivity declined- imbalanced use of fertilizers.
- Soil degradation- 30% in sulphur, 24% in zinc, 21% in iron, 5% in manganese/ copper, 625 animals deficient in trace elements. These deficiencies have entered in food chain (soil- plant- human).
- Water and environmental pollution.
- Profit margin leveled of – farmers in distress.

HOW TO ADDRESS THESE PROBLEMS:

Who to produce? How much to produce? Where to produce? Should be decided on the basis of natural resources (soil, water climate and ITK). To grow everything, everywhere is against the philosophy of sustainability. We need to bring changes in the agricultural policy planning of the state. Some of the issues which need to be debated and given practical shape are as below:

1 Use of information technology for knowledge of natural resource base/ data with village as a unit. Then decide, which crop which variety which animal, how many, the theory of standard design fit all sizes is not requires now. For example- water= quantity, rain water, canal, tube well. Quality, availability, period, water harvesting. This information will be guiding principles for choice of a cropping system.

2. After this state needs to be divided into zones, say exclusive production zones and linking these zones with the markets local/expert. For example, her chie

a) Zone of Basmati rice –central part of Haryana.

b) Barley for Malt- south west Haryana.

c) Durum wheat for export – export – throughout state with minor adjustment.

d) Vegetable, Frites, Poultry, dairy floriculture and value added products in the NCR region, adopt poly house culture, conversion of bio waste into compost; some percentage of production should be under organic culture. For other infrastructural facilities the model of PURA (Provision of Urban facilities in Rural Area) needs consideration. Training of rural youth (men & women) in primary grading, processing, packaging and value addition as the demand for processed and value added foods is on rice and will continue to rice.

3. Recycling of organic waste/agricultural waste in both rural and urban areas to improve soil productivity, cut down the use of agro -chemical 9fertilizers and pesticides) improve soil productivity of environment /product and life .

4. Consideration of changing food consumption pattern before planning agriculture policy. During the period 1983-2000, the consumption of cereals decreased by 10% in low income group and 20% in high income group; edible oils increased by 77 and 88%, vegetable 50 and 40%, fruits 162 and 184% milk30% in both groups, Meat, eggs and fish 100 and 121%. This is a clear indication that our emphasis should shift from cereals to vegetables, fruits, milk and eggs/meat. Pulses consumption is low production. Therefore, animal husbandry holds the key for diversification; animals – not in quantity but in quality.

5. Stratification of state in respect of livestock population i.e. cow, buffalo, sheep, goat, poultry.

6. Restructuring of mantis.

7. Strengthening warehousing facilities in rural areas.

8. Quality of agro- inputs (Seeds, fertilizers and other chemicals) which will cut down the cost of production, check environment pollution, improves quality.

9. In the quality of the produce for value addition the role of soil, water and climate is very critical, for example potato in Pehowa and Kurukshetra is ideal for making potato chips.

10. Change of mindset of the field officers of the concerned department and then the farmers. There is a change the approach.

Present approach_____ Production orient

Now_____ Need to change the mindset of the farmer's for_____

a) Soil health management.
b) Judicious use of irrigation water- On farm water use efficiency.
c) Adoption of GAP (Good Agricultural Practices.
d) Better utilization of animal resources.
e) Bio-waste management.
f) Value addition

Develop commercial outlook of the farmers.

The department is number of schemes on IPM (Integrated Pest Management), green maturing bio-fertilizers, bio- agents, diversification etc. But there is little impact/no impact. We need to analyze the limiting factors and need a well planned and long term programmes supported by Favorable policies.

FOREST

For the prevention of the degradation and the conversation of forest and wildlife (wild biodiversity) of the state, a multi- pronged strategy; both term and long term need to be adopted. Although some work on these strategies is being implemented, concentrated effort on further strengthening various activities and undertaking newer activities is required.

That in the long run a sustainable land use or the integrated management of land as per land capability classification is a more beneficial desired social objective, compared to high input high output exploitive use of land, needs to be demonstrated. The forested ecosystem needs to be protected and developed so that they can support a greater variety of biodiversity. All natural forest be maintained for biodiversity conservation only. The plantation of indigenous plants instead of monocultures needs to be undertaken along with the standardization and promotion of the nursery techniques of lesser known species. With the development in all other sectors, the wetland in the state is fast disappearing. The provision of water to the wetland and their protection for the conservation of aquatic fauna should be done and sustained efforts be made for maintaining them in future.

To reduce the pressure on the forest areas, eco – development works for raising the fuel- wood and fodder and other income generating activities n areas outside the PA have to be taken up. At the state level promotion of agro-forestry, and production of fuel and fodder on community lands i.e. social forestry, needs to be revived on a larger scale. The combination cropping of agriculture crops and indigenous tree crops of multiple uses should be done as an adjunct to agro-forestry of monoculture using Poplars and Eucalypts. The availability of fuel-wood, now generally required by landless and small farmers will help release of cow-dung necessary for organic farming and improving soil.

The illegal trade in forest products, wildlife and their products from within and passing through state should be prevented for which the protection mechanism needs to be strengthened. To enhance the capability of the department and to sensitize the associated forest staff, training and sensitization programmes have to be taken up on bigger scale than being done now.

Biodiversity conservation is very important for the integrated planning of rural health service using Ayurveda system of medicines. Unless herbal medicinal plant varieties are conservation the physical basis for the practice of Ayurveda suffers irreparable loss. Owing to the excess load, the allopathic system is showing signs of collapse. To resuscitate the system, off loading is necessary. Base line survey of wild animals, other organisms and plants should be undertaking periodically and the utilization of these items be linked to the production potential.

For the conservation of biodiversity outside protected areas amendments to the Panchayat Act is required to be done so that 25 to 30% of the community land is kept under tree cover. The communities and the Panchayats should be prevented from further appropriating the area for other developmental activates.

For all these efforts to be sustained in future and for creating the awareness for the natural resources in the people, Nature education and conservation awareness programmes should be continued with full support and adequate Government funding. Joint Forest Management system needs to be further strengthened by creating a cell in the forest Department to oversee its working. Forest protection mechanism against fire encroachment, illicit feeling, needs to be revamped. To reduce dependence of the local communities on the forests the income generating activates, not involving land and biological resource, need to be promoted and a long term plan to wean away the communities involved in forest and wildlife offences be drawn up.

ANNEXURE-1

		NO. OF DIFERENT VEHICLES ON ROAD IN HARYANA								
YEAR	**AUTOCYCLES/MOTORCYCLES/SCO OTHER**	**AUTO RIKSHAWS**	**JEEPS**	**PRIVATE MOTOR CARS**	**TAXIES**	**OTHER PUBLIC SERVICES**	**GOOD VEHICLES**	**TRACTORS**	**MISCELLAN**	**TOTAL**
1970-71										
1975-76										
1980-81										
1985-86										
1990-91										
1995-96										
2000-01R										
2001-02										
2002-03										
2004-04										

Source: State Transport Controller

ANNEXURE-2

	NUMBER OF DIFERENT TYPES OF MOTORVEHICLES REGISTERED IN HARYANA (DISTRICTWISE)									
YEAR	**CARS**	**JEEPS**	**TRUCKS**	**TAXIES**	**TRACTORS**	**BUSES**	**MOTOR CYCLES/SCOOTER/ AUTOCYCLES**	**AUTORICKSHAWS**	**MISCELLANEOUS**	**TOTAL**
1970-71										
1975-76										
1980-81										
1985-86										
1990-91										
1995-96										
2000-01										
2001-02										
2002-03										
2004-04										

Source: State Transport Controller

ANNEXURE-3

No. of vehicles more than 15 years old

Cities/Towns	**No. of vehicles more than 15 years old**					
	Two wheeler	**Three wheeler**	**Car**	**Bus**	**Goods Carrier**	**Other**
District Transport Office						
Ambala						
Biwani						
Faridabad						
Fatehabad						
Gurgaon						
Hisar						
Jhajjar						
Jind						
Kaithal						
Kurukshetra						
Narnaul						
Panchkula						
Panipat						

Rohtak						
Rewari						
Sirsa						
Sonepat						
Yamuna Nagar						

No. Vehicles more than 15 years old

Cities/ Towns	**Two Wheeler**	**Three Wheeler**	**Car**	**Bus**	**Goods carrier**	**Other**
Registering Authority						
Ambala						
Jagadhari						
Panchkula						
Naraingahr						
Karnal						
Panipat						
Kurukshetra						
Kaithal						
Gulha						
Sonepat						
Gohana						
Rohtak						
Bahadurgarh						
Jhajjar						
Meham						
Bhiwani						
Siwani						
Loharu						
Ch. Dadri						
Hisar						
Hansi						
Fatehabad						
Tohana						
Sirsa						
Dabwali						
Gurgaon						
Nuh						
Ferozepur Zirkha						
Ballabagrh						
Palwal						
Jind						
Narwana						
Safidon						
Mohindergarh						
Narnaul						

Rewari						
Assandh						
Pehowa						
Ganaur						
Kosli						
Ellnabad						
Kalka						
HOdel						
Faridabad						
Hathin						
Ratia						
Samalkha						

Source: State Transport Controller

ANNEXURE 4

PUBLIC UNDERTAKING LOANS RECEIVED AND HOUSES Lac)

NUMBER OF HOUSES CONSTRUCTED

						DURING THE YEAR						UP TO THE END OF THE YEAR					
YEAR	FROM STATE GOVT.	FROM HUDCO	FROM DEBEN	CENTRE.	TOTAL	ECONOMICALLY WEAKER SECTION OF THE SOCIETY	LOW INCOME GROUP	MIDDLE INCOME GROUP	HIGH INCOME GROUP	OTHERS	TOTAL	ECONOMICALLY WEAKER SECTION OF THE SOCIETY	LOW INCOME GROUP	MIDDLE INCOME GROUP	HIGH INCOME GROUP	OTHERS	TOTAL
1972-73 1975-76 1980-81 1985-86 1990-91 1995-96 1998-99 1999-2000 2000-2001 2001-2002 2002-2003																	
2003-2004																	
2004-2005																	
2004-2005																	

ANNEXURE 5a

HEALTH AND FAMILY WELFARE										
	HOSPITALS, DISPENSARIES AND HEALTHCENTERS IN HARYANA									
YEAR	**STATE**	**SPECIAL**				**PRIVATE**				TOTAL
	PUBLIC	POLICE	CANALS	RAILWAYS	OTHERS	LOCAL BODIE	PRIVATE AID	PRIVATE UN SUBSIDIES		
1968										
1970										
1975										
1980										
1985										
1990-91										
1995-96										
2000-01										
2001-02										
2002-03										
2003-04										
2004-05										
							SOURCE: DIRECTOR GENERAL OG HEALTH SERVICES, HARYANA			
NOTE: THE INFORMATION UP TO THE YEAR 1985 RELATES TO 31ST DECEMBER										

ANNEXURE 5 B

HEALTH AND FAMILY WELFARE											
	NUMBER OF MEDICAL (ALLOPATHIC) INSTITUTION IN HARYANA – RIRAL AND										
	RURAL					TOTAL	URBAN				TOTAL
YEAR	HOSPITALS	PHCs	DISPENSARIES	CHCs	SUB-CENTERS		HOSPITALS	PHCs	DISPENSARIES	CHCs	
1											
1968											
1970											
1975											
1980											
1985											
1990-91											
1995-96											
2000-01											
2001-02											
2002-03											
2003-04											
2004-05											
					SOURCE: DIRECTOR GENERAL OF HEALTH SERVICES, HARYANA.							
		PHCs-PRIMARY HEALTH CENTERS									
		CHCs-COMMUNITY HEALTH CENTERS									
		NOTE:THE INFORMATION UP TO YEAR 1985 RELATED 31 DEC.									

ANNEXURE 6	
QUNTITIY OF BIOMEDICAL WASTE GENERATED IN THE STATE	
Location	**Biomedical waste Quantity kg/per year**

ANNEXURE 7

URBAN WATER SUPPLY SCHEME (UNDER BMS)

S.NO.	Name of scheme	Estimated Cost(in lacs)	Total funds Allocated (in lacs)	Total Expenditure Upto 31.12.03
1	Aug. Water Supply Scheme Bhiwani Town			
2	Aug. Water Supply Scheme Ambala			
3	Aug. Water Supply Scheme Kaithal town			
	TOTAL			

Source: PWD (Public Health)

ANNEXURE – 8

ACCELERATED URBAN WATER SUPPLY SCHEMES

(Rs. In lacs)

Sr. No.	Name of scheme	Estt. cost	Date of sanction	Funds allocated upto date			Expdt Upto 31.3.05
				Central Share	State Share	Total	
1.	Sohana						
2.	Pataudi						
3.	Narnaund						
4.	Kanina						
5.	Bawani Khera						
6.	Taoru						
7.	Ratia						
8.	Uchana						
9.	Kalanaur						
10.	Assandh						
11.	Naingarh						
12.	Sadhoura						
13.	Nuh						
14.	Meham						
15.	Ferozepur						
16.	Kaanwali						
17.	Beri						
18.	Pinjor						
19.	Hassanpur						
20.	Kharkhoda						
21.	Punhana						
22.	Loharu						
23.	Mohinergarh						
24.	Haily mandi						
25.	Indri						
26.	Smalkha						
27.	Farukh nagar						
28.	Kayyat						
29.	Ladwa						
30.	Hathin						
31.	Buria						
32.	Ateli mandi						
33.	Bawal						
34.	Jhakhal						
35.	Radaur						
36.	Chhachhrauli						
37.	Nilkheri						
38.	Tarori						
	Total						

Source: PWD (Public Health)

Annexure – 9

HARYANA P.W.D. PUBLIC HEALTH BRANCH

SCHEME UNDER NATIONAL CAPITAL REGION

(Rs. In lacs)

Sr. No.	Name of town	Estimate Cost	Funds allocate by			Expdt. Upto 31.3.05
			NCRPB	State	Total	
Project cost						
Water supply						
1	Water supply Sonipat	1540.24	1155	385	1540	544.34
2	Water supply Rwari	917.44	687.92	229.35	917.27	572.96
3	Water supply Rohtak	1323.43	992.5	330.85	1323.35	1298.96
4	Water supply Jhajjar	1097	822.75	274.25	1097	706.9
5	Water supply Gurgaon	669.27	501.95	167.3	669.25	510.02
Sewerage Schemes						
1	Sewerage scheme Gurgaon	434.22	325.65	108.55	434.2	257.63
2	Sewerage scheme Sonipat	136.38	102.3	34	136.3	77.52
3	Sewerage scheme Rohtak	1036.58	777.43	258.95	1036.38	494
	Total	**7154.56**	**5365.5**	**1788.25**	**7153.75**	**4462.33**
Counter Maqnet Town						
1	W/S & sew. Hisar	1593.44	660	221.65	881.65	637.88
Grand total						**5100.21**

Source: PWD (Public Health)

Annexure -10

New Projects under NCR

List of estimate sent to Government of India for approval

Sr. No.	Name of town	Estimate cost (Rs. In lacs)	
		Water Supply	Sewerage
1	Hodal	430.34	1193.81
2	Sohana	487.5	584.85
3	Palwal	2014.46	975.84
4	Rewari	521	1224.25
5	Rohtak	5900	4425
6	Hansi	3104.57	-
7	Gohana	_	272
8	Panipat	_	366
9	Samalkha	_	809.44
	Total	12457.87	9851.19
	Grand total	Rs. 22309.06 lacs	

Source: PWD (Public Health)

ANNEXURE 11 a

Environment Sensitive Expenditure and Physical Targets & Achievements In the Budgetary Source under All Heads/Programmes

PUBLIC HEALTH, HARYANA

Dept. Under All Heads/Programme	**Budgetary And Actual Expenditure (Rs.Lakh) Under All Head/Programmes**							
Water Supply Sewerage & Storm Water	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05

Environmental Sensitive Major Projects/ Activities and Physical Targets & Achievements 11 (a)

Public Health dept. Haryana

Scheme projects & program	Physical Targets & Achievements	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05
Tube well in no. s	Targets						
	Achievements						
Water supply pipe line in Km's	Targets						
	Achievements						
S.T.P. in numbers	Targets						
	Achievements						
Bossting station	Targets						
	Achievements						
Filtration plant	Targets						
	Achievements						

Source: PWD (Public Health)

ANNEXURE 11 b

Environmental Sensitive Major Projects/ Activities And Physical Targets & Achievements (11 b) (Rs. In lacs)

Scheme projects& program	Physical Tragets & Achievements	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03
Water Supply, Sewerage & Storm Water, building works etc.	Targets						
	Achievements						

Source: PWD (Public Health)

ANNEXURE 12 a

STATE OF NO. OF WATER AND SEWERAGE CONNECTIONS IN VARIOUS TOWNS OF HARYANA STATE UNDER PUBLIC HEALTH DEPARTMENT													
Sr No.	Name of District	Number of connections as on						Sewerage					
		No.of Connections in 1993-94	No of Residential Occupied Houses	% of Connection	No of Connections in 2004-05	No of Residential Oses 2001	% of Connection 2004-05	No. of Residential Occupied Houses 1991	%	No of Connections in 2004-2005	No. of Residential Occupied Houses 1991	No of Residential Occupied Houses 2001	% Connection
1	AMBALA												
2	BHIWANI												
3	FARIDABAD												
4	FATEHABAD												
5	GURGAON												
6	HISAR												
7	JHAJJAR												
8	JIND												
9	KAITHAL												
10	KARNAL												
11	KURUKSHETRA												
12	MOHINDERGARH												
13	PANCHKULA												
14	PANIPAT												

15	REWARI												
16	ROHTAK												
17	SIRSA												
18	SOENPAT												
19	YAMUNAN AGAR												
	Estimation based on Persons per Occupied Census Houde according to census-1991												

Source: PWD (Public Health)

ANNEXURE 12b

States of No. Of Water and Sewerage Connections in Various Towns Of Haryana State Under HUDA

S.NO	DISTRICT/ TOWN/ UE	NO OF CONNECTIONS ON			
		1993-94		2004-05	
		W/S	SEWERAGE	W/S	SEWERAGE
1	Panchkula				
2	Gurgaon				
3	Sonipat				
4	Rohtak				
5	Bahadurgarh				
6	Rewari				
7	Narnaul				
8	Hisar				
9	Hansi				
10	Jind				
11	Sirsa				
12	Fatehabad				
13	Bhiwani				
14	Faridabad				
15	Karnal				
16	Ambala				
17	Naraingarh				
18	Kkr. &Shahbad				
19	Panipat				
20	Kaithal				
	Total				

Source: PWD (Public Health)

ANNEXURE 13

TOWN WI SATUS OF SEWERAGE

Sr. No.	No. sewerage	Sewerage	Sewerage
1.	Assandh	Ambala city	Ambala sadar
2.	Beri	Bahadurgar	Bhiwani
3.	Ferozepur	Barwala	Fatehabad
4.	Hodal	Bawani	Gurgaon
5.	Indri	Bawal	Haily mandi
6.	Kalanaur	Chaakhi	Hansi
7.	Kalayat	cheeka	Hisar
8.	Kharakaudha	Ellenabad	Jind
9.	Mohindergarh	Ganaur	Kaithal
10.	Pataudi	Gharaundha	Kalka
11.	pinjore	Gohana	Karnal
12.	Pundri	Jagdhari	Narnaul
13.	Ratia	Jhajjar	Narwana
.14.	Taoru	Kalanwali	Nilokheri
15.	Tarori	Ladwa	Panipat
16.		Maham	Rewari
17.		Mani	Rohtak
18.		Naraingarh	Sirsa
19.		Narnaund	Sohana
20.		Nuh	Sonipat
21.		Palwal	Thanesar
22.		Pehowa	Tohana
23.		Rania	Faridabad
24.		Safidon	panchkula
25.		Samalkha	
26.		Shahbad	
27.		Siwani	
28.		Uchana	
29.		yamuna	

Source: PWD (Public Health)

ANNEXURE-14 a

POSITION OF SEWAGE TREATMENT PLANT

1. S.T.P' Constructed

Sr. No.	Name of Town	Capacity In MLD	Cost (Rs. In lacs)	Remarks
1	2	3	4	5
(A)YAMUNA ACTION PLAN (P.H. Deptt.)				
1	Yamunanagar	25	1188.65	
		10	494.87	
2	Karnal	40	1611.7	
		8	389.91	
3	Panipat	10	774.84	
		35	1659.65	
4	Sonpat	30	1414.7	
5	Gurgaon	30	1607.3	
6	faridabad	20	1040.62	
		45	1779.66	
		50	2296.68	
7	Chachhrauli	3	264.02	
8	Radaur	1	68.26	
9	Indri	1	74.94	
10	Ghraaunda	1.5	80.29	
11	Palwal	3	210.41	
12	Total	9	945.52	
		322	15932.02	

(B)STATUS PLAN (PUBLIC HEALTH DEPARTMNT)				
1	Kalka	1.2	30	
2	Bhiwani	30	100	
3	Rewari	10	450	
4	jhajjar	55	220	

(c) HUDA				
1	Gurgaon	30	1000	
		68		
2	Panchkula	28	400	
	Total	126	1400	
(d)HSIDC				
1	Ambala	NA	10	
2	Jind	1.1	15.5	
	Total	1.1	25.5	
	Grand Total	434.8	15978.1	

Source: PWD (Public Health)

ANNEXURE-14b

POSITION OF SEWAGE TREATMENT PLANT

1. **S.T.P'S under Construction**

Sr. No.	Name of town	Capacity in MLD	Cost (Rs. In lacs)	Remarks
1	2	3	4	5
(A)YAMUNA ACTION PLAN (P.H/Deptt.)				
1	Chhachhrauli	1	68.26	
2	Radaur	1	74.94	
3	Indri	1.5	80.29	
4	Ghraunda	3	210.41	
5	Palwal	9	945.52	
	Total	15.5	1379.32	
(B) STATE PLAN (PUBLIC HEALTH DEPARTMENT				
1	Jind	17	3608.18	
2	Rohtak	50	4425	
3	Kaithal	10	4125	
4	Narwana	10.5	2165	
5	Ganaur	3	50.86	
Total		14374.04		
(D)HSIDC				
1	Balwal	3	200	
	Grand total A To C	64	2349.32	

Source: PWD (Public Health)

ANNEXURE-15(a)

Sr.No.	Name of District	Sr.No.	Name of town	Estimated Amount	Amount Released By GOI	Amount Released By State Govt.	Total Funds Released
1	**Ambala**	1	Ambala city	516.17		196.14	326.9
		2	Ambala sadar	352.92		75	125
2	**Kaithal**	3	Kaithal		392.21	75	125
		4	cheeka		237.25	90	120
3	**Yamuna Nagar**	5	Yamuna Nagar		475.82	182.58	304.31
4	**kurukshetra**	6	Shahbad		202.55	45	75
		7	Ladwa		136.53	24	40
		8	Thanesar		597.43	150	250
		9	Pehowa		223.3	89.4	149.4
5	**Karnal**	10	Indri		160.75	24	40
6	**Rohtak**	11	Rohtak		44234	84.44	140.73
7	**Sonepat**	12	Gohana		203.59	45	75
		13	Assandh		142.1	48	80
8	**Faridabad**	14	Palwal		358.81	75	125
9	**Mohindergarh**	15	Narnaul		345.29	74	124
		16	Mohindergarh		106.44	24	43.99
10	**Bhiwani**	17	Bhiwani		499.52	169.82	288.03
		18	Charkha Dadri		203.43	90	150
11	**Hisar**	19	Barwala		210.54	90	150
		20	Hansi		358.5	150	250
12	**Fatehabad**	21	Ratia		100.3	24	43.99
		22	Fatehabad		204.59	45	75
13	**Sirsa**	23	Sirsa		550	105	175
14	**Jind**	24	Safidon		210.42	90	120
		25	Narwana		202.55	45	74.79
			Total		**7433.34**	**2110.38**	**1355.76**

Source: PWD (Public Health)

Annexure-15-b

Environmental Sensitive Expenditure & Physical Targets &

Director, Urban Development, Haryana

DEPTT. Budgetary Head and Code	Budgetary and Actull Expenditure(Rs.Lakh)															
	1997-98		1998-99		1999-2000		2000-01		2001-02		2002-03		2003-04		2004-05	
	BE	AE	BE	AE	BE	AE	BE	AE	BE	AE	BE	AE	BE	AE	BE	AE
2217-ud-Plan Code(96)																

The Physical Targets and achievements with Respect to environmentally sensitive major Projects/activities:

Director, Urban Development, Haryana.										
Scheme Project & Programme	Physical Targets&	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Environment Improvement of Urban Slum (EIUS)of 20 point programme	Target (Person to be benefitted)									
	Achievements(Person Benefitted)									

Annexure-15-c

Details Of Schemes Undertaken by Urban Development Department, Haryana				
				(Rs. Lakhs)
Sr.No	**Name of Scheme**	**Estt. Amount up to Dec,2005**	**Funds released up to Dec2005**	**Beneficiary town**
1	**IDSMT**			
2	**Solid waste Management project***			
3	**Shiting Of Dairies**			
4	**Strenghtening of Fire Services**			
5	**Valmiki Ambedker Awas Yojna (Vambay)**			
6	**Environmental Improvement of Urban Slum (EIUS)**			
7	**11th Finance Commission**			
8	**National Slum Development Programme (NSDP)**			
	Under this scheme Rs. 1563.25 lakhs has been expended on construction/ repair of 240.155 km c road, Rs 926.79 lakh has been spent on purchase of vehical and Rs.141.47 lakh has been expended for purchase of land			

ANNEXURE-16

MUNCIPAL WASTE GENRATED IN THE STATE IN TONNES/DAY

SR. NO.	NAME OF M.C.	Solid waste	SR. NO.	NAME OF M.C	Solid waste
1	AMBALA CITY	54.84	48	NARNAUNL	5.95
2	AMBALA CANTTH	41.96	49	FATEHABAD	23.59
3	NARAINGARH	7.17	50	TOHANA	20.29
4	PANCHKULA	55.49	51	RATIA	12.39
5	KALKA	12.14	52	SIRSA	63.29
6	PINJORE	10.04	53	DABWALI	21.19
7	YAMUNA NAGAR	74.69	54	ELLENABAD	12.19
8	JAGADHARI	39.88	55	RANIA	8.25
9	THANESAR	40.42	56	KALANWALI	7.35
10	SHAHBAD	14.68	57	JIND	53.49
11	POEHOWA	13.22	58	SAFIDON	10.84
12	LADWA	9.72	59	NARWANA	19.86
13	KAITHAL	45.85	60	UCHANA	5.55
14	CHEEKA	12.65	61	BHIWANI	66.75
15	KALAYAT	6.59	62	CHARKHI DADRI	17.68
16	PUNDRI	6.70	63	SIWANI	6.24
17	ROHTAK	116.46	64	BAWANI KHERA	6.87
18	MEHAM	7.15	65	BAHADURGARH	47.19
19	KALANAUR	6.63	66	BERI	6.36
20	KARNAL	107.75	67	JHAJJAR	15.36
21	GHARAUNDA	11.88	68	FARIDABAD	415.40
22	ASSANDH	8.94		MUNCIPAL CORPORATION	1365.77
23	TARAORI	8.74			
24	INDRI	6.00		TOTAL	
25	NILOKHERI	6.46			
26	NILOKHERI	103.06			
27	SAMALKHA	11.76			
28	SONEPAT	84.65			
29	GANNAUR	11.45			
30	GOHANA	19.11			
31	KHARKHODA	7.39			
32	GURGAON	79.44			
33	SOHANA	10.86			
34	F/JHIRKHA	6.99			
35	NUH	4.35			
36	TAORU	6.78			
37	HAILY MANDI	6.72			
38	PATAAUDRI	6.33			
39	PALWAL	39.66			
40	HODEL	15.08			
41	REWARI	42.98			
42	BAWAL	4.73			
43	MOHINDERGARH	9.44			
44	NARNAUL	25.03			
45	HISAR	101.07			
46	HANSI	29.82			
47	BARWALA	13.04			

ANNEXURE-17

Name of Distt.	Sr. No.	Name of MCs	Status of land for construction of Sanitary Landfill & compost plant.
Panchkula		Panchkula	Land to be provided by HUDA
		Kalka	Attached with MC Pinjor
		Pinjor	5 acer MC land available
Ambala		Ambla city	Land purchase in vill. Patvi
		Ambala sadar	Attached with MC Ambala City
		Naraingarh	Iand yet to be identified
Kaithal		Kaithal	MC land available
		Pundri	Land to be identified
		Cheeka	MC land available
		Kalayat	Land to be identified
Yamunanagar		Yamunanager	Land purchase
		Jagadhri	Land purchase
Kurukshetra		Thanesar	Irrigation depatt. Has been requested to transfer
			The land identified by MC Thanesar
		Shahabad	Iand yet to be identified
		Ladwa	Iand yet to be identified
		Pehowa	Iand yet to be identified
Karnal		Karnal	land identified on Nadana road
		Tarori	land identified on Nadana road
		Nilokheri	MC land available
		Gharaunda	Iand yet to be identified
		Assandh	Iand yet to be identified
		Indi	land identified in vill.age Gudha.
Panipat		Panipat	Land purchase
		Samalkha	MC land available
Rohtak		Rohtak	MC land available
		Meham	MC land available
		Kalamaur	Land to be identified
Sonepat		Sonepat	Ase is pending with the court of FC Ravanue
			Alternative land is also identified in vill. Jhari
			And is under consideration with DC> Sonepat.
		Gohana	4 acer land identified in Vill. Guddha &
			is under consideration with DC. Sonepat.
		Gannur	MC land available
		Kharkhoda	Land to be identified
Jhajja		Jhajjar	Land purchase
		Bahadurgarh	Land purchase
		Beri	Iand yet to be identified
Faridabad		Faridabad	58.6 acer MGC land available
		Palwal	Land purchase
		Hodel	Land purchase
Gurgaon		Gurgaon	Iand yet to be Fainlised
		Sohana	Iand yet to be identified
		Haily mandi	3 acer panchyat land identified
		Pataudi	4.8 acer MC land available
Rewari		Rewari	Notificcation u/s 4 issued & draft of

			Notification u/s 6 awaited from DC Rewari.
		Balwal	MC land available
Mewat		f/jhirkha	10 acer MC land available
		Nuh	MC land available
		Taoru	2 acer MC land available
Mohindergarh		Narnaul	MC land available
		Mohindergarh	4 acer MC land available
Bhiwani		Bhiwani	MC land but now PH claims this land.
		Charkhidadri	Iand yet to be identified
		Siwani	Iand yet to be identified
		Bawanikhera	Iand yet to be identified
Hisar		Hisar	Matter is under consideration
			With Animals HusbandryDeptt.
		Hansi	17 acer Iand identified
		Barwala	Iand yet to be identified
		Namaund	Iand yet to be identified
Fatehabad		Fatehabad	land available
		Tohana	land identified in village simbalwala
		Ratia	MC land available
Sirsa		Sirsa	Land purchase and work started
		Mandi Dabwali	Iand yet to be identified
		Rania	Iand yet to be identified
		Kalanwali	Iand yet to be identified
		Ellenabad	Iand yet to be identified
Jind	65	Jind	Notification issued U/s 4 & draft
			Notification u/s 6 awaited from DC Jind
	66	Narwana	Land identified and acquisition process is
			Under consideation
	67	Saafidon	12 aceer land identified in vill. Road MC has been
			asked to get NOC from the concerned
	68	Uchana	Iand yet to be identified

ANNEXURE-18

YAMUNA ACTION PLAN PHASE-2

PROJECT APPROVED BUT YET TO BE TAKEN

Sr. No.	DESCRIPTION	AMOUNT (Rs Cr.).	
1	ADDITIONAL L&D SEWER IN- 6 MAIN		
	1)	YAMUNA NAGAR -	
	2)	KARNAL	7.31
	3)	PANIPAT	3.99
	4)	SONIPAT	3.97
	5)	GURGAON	3.99
	6)	FARIDABAD	5.95
	TOTAL		34.5
2	PUBLIC PATICIPATION AND AWARENESS IN 6 MAIN TOWNS		10
3	INSTITUIONAL CAPACITTY BUILDING OF P.H. & MUNCIPAL SAFF IN 6MAIN		9
4	PREPATION OF DETTAILED POJECTS FOR YAP PHASE 2		9
GRAND OTAL			62.5