

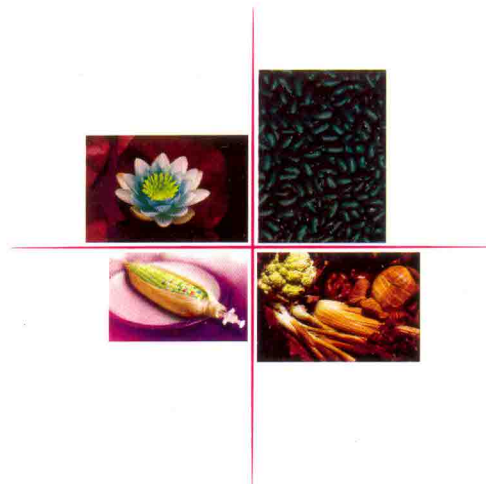


# Madhya Pradesh Biotechnology Policy





GOVERNMENT OF MADHYA PRADESH  
DEPARTMENT OF BIODIVERSITY  
AND  
BIOTECHNOLOGY



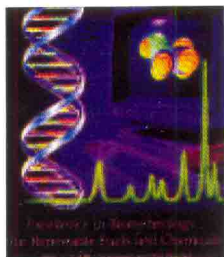
**Madhya Pradesh  
Biotechnology Policy**

2003

# MADHYA PRADESH BIOTECHNOLOGY POLICY

## 1. INTRODUCTION

- 1.1 The Government of Madhya Pradesh has displayed a strong commitment for the socio-economic development of the citizens of the state. Conservation of the state's rich biodiversity, its sustainable use for expanding livelihood security and ensuring equitable sharing of its benefits have been part of this larger commitment.
- 1.2 Development of biotechnology and the spread of benefits through widespread use of its applications have emerged as one of the leading intellectual enterprises of the scientific community the world over. It shall be the endeavor of the state government to create an environment conducive for the application of biotechnological tools to further its commitment for socio-economic development.
- 1.3 Biotechnology is research-led and capital intensive. It demands the supply of trained human resource. At the same time there are strengths emanating out of traditional wisdom that need to be protected and enhanced for the larger common good. Forging an alliance between capital intensive research and modern knowledge on the one hand and traditional wisdom and practices on the other, and promoting partnerships between various stakeholders that include tribal and rural communities, local and state administrations, non-government organisations, scientific establishment and industry can be seen as parameters within which a policy framework can be evolved.
- 1.4 While the playing field transcends state and national boundaries and thereby necessarily involves the Government of India, the State Government shall make efforts at the community and state levels to harness the potential of biotechnology for value addition in agriculture, horticulture, animal husbandry, fisheries, forestry and use of bio-fuels; and to improve the quality of life of the citizens by promoting health and nutritional security and through pollution abatement. To achieve these larger goals the state government shall expand opportunities in biotechnological education and research and take steps to protect and expand the flow of benefits from traditional knowledge and practices.



## 2. OBJECTIVES

**The broad objectives of the policy shall, inter-alia, include promotion of biotechnology applications for:**

- Conservation of the state's biodiversity and the sustainable use of its biotic resources.
- Production of high-yielding, drought and pest - resistant seeds for agriculture and horticulture crops suited to different agro-climatic zones.
- Improvement of the quality of livestock and poultry, especially the breeds indigenous to the state.
- Enhancement of the productive potential of the aquatic eco-system.
- Promotion of cultivation of medicinal and aromatic plants, and the processing and value addition of their produce.
- Production of cost effective drugs that help counter diseases common in the tropical and sub-tropical regions of the country.
- Promote environmentally safe technologies for pollution abatement, especially treatment of urban waste and industrial effluents.
- Afforestation especially in the quick revival of species which have shown a tendency to decline.
- Generation and use of different types of bio-energy.

**To help achieve these objectives the state government through its different organs shall endeavor for the:**

- Expansion of opportunities for biotechnology education for research, industry, farmers and community level extension services.
- Promotion of community based biotechnology applications in agriculture, horticulture, livestock & poultry, fisheries, forestry and health sectors.
- Promotion of studies in the legal and regulatory aspects of intellectual property rights involving different stakeholders including farmers, tribal and rural communities, and the practitioners of traditional and herbal medicine.
- Establishment of biotechnology industry in the state.
- Establishment of a bio-diversity and biotechnology network of institutions and agencies.



### 3. BIODIVERSITY & BIOTECHNOLOGY - A SYMBIOTIC LINKAGE



3.1 The state government took early steps to develop a comprehensive view on the sustainable use of state's natural resources and for the conservation of its rich biodiversity. The setting up of the country's first state level Biodiversity Board under the chairmanship of the Chief Minister on 21<sup>st</sup> October 1999 was the first concrete step in this direction. Under the guidance of the Board and its standing committees of experts on biodiversity conservation, sustainable use of biodiversity and equitable sharing of benefits the state government helped evolve broad strategies for addressing heightened concerns through intra and inter-sectoral initiatives and programs. Under the aegis of the National Biodiversity Strategy and Action Plan- India (NBSAP) the Madhya Pradesh State Biodiversity Strategy and Action Plan (SBSAP) was finalized and the findings put up before the Board. Based on a detailed exercise strategies and actions were shortlisted. Implementation on some of these has commenced. Others will be taken up in the near and mid-term future.

3.2 With the enactment of the Biological Diversity Bill by the Parliament a statutory State Biodiversity Board shall be constituted. The state government's Department of Biodiversity and Biotechnology shall act as the nodal department for implementing measures based on the recommendations of the State Biodiversity Board. It shall also coordinate the application of biotechnology for sustainable use of state's biotic resources in different sectors wherein administrative departments, agencies and organizations have well defined role and responsibilities.

3.3 Under this policy an attempt is made to initiate a set of measures that help in promoting ecosystem stability and environmental security. While the suggested interventions are sectoral there are inevitable overlaps which are perhaps necessary given the fact that biotechnology as a science is inter-disciplinary. While the field of play extends to national and international levels the focus here shall, inter-alia, be on capacity building, participation and application centered community promotion of an strategy. Some of these are described below. While each individually the shall be to determine a for the conservation biodiversity, its expanding livelihood ensuring equitable sector is dealt long-term strategy of the state's sustainable use for security and for sharing of benefits.

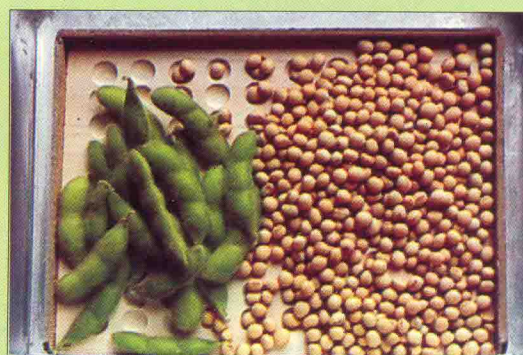
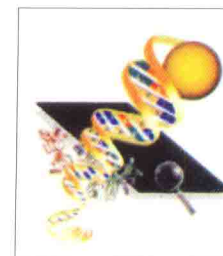
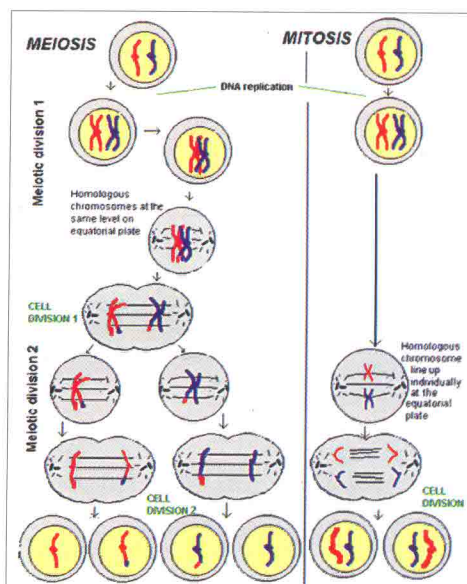


## 4 OPPORTUNITIES FOR BIOTECHNOLOGICAL INTERVENTIONS IN THE STATE



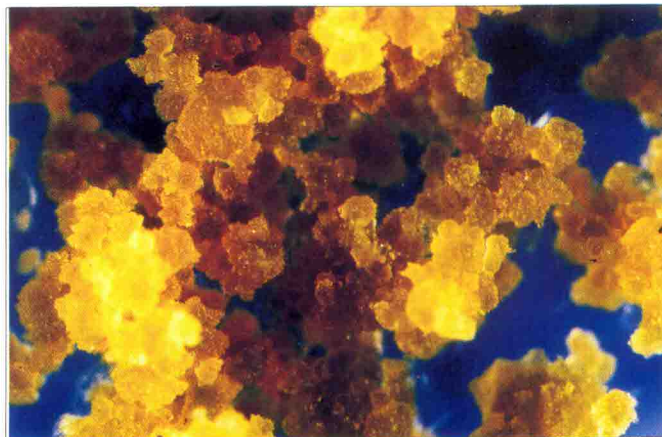
### 4.1 AGRICULTURE, ANIMAL HUSBANDRY & FISHERIES

- Madhya Pradesh has been the largest user of bio-fertilizers amongst all the states. Research and development of bio-fertilizers, which are ecologically friendly, shall continue to receive emphasis. In a similar manner the development of new varieties of bio-pesticides shall be encouraged.
- The concerted program for eco-friendly agriculture involving a package of practices based on locally available biodegradable waste, bio-fertilizers and bio-pesticides shall be steadily expanded to cover the entire state.
- Facilities to provide the benefits of tissue culture technology to the farmers and its large-scale adoption will have to be established to cover all agro-climatic regions including wastelands and degraded forests. Plant tissue culture programs for large-scale production of breeder planting material including for forest tree species shall receive priority.
- Establishment of Gene bank is a practical and effective method to ensure the availability of species diversity. Establishment of such banks shall be encouraged.
- The state is rich in genetically diverse livestock resources. Due to poor quality of feed material, harsh environmental conditions and poor socio-economic conditions of the farmers this wealth



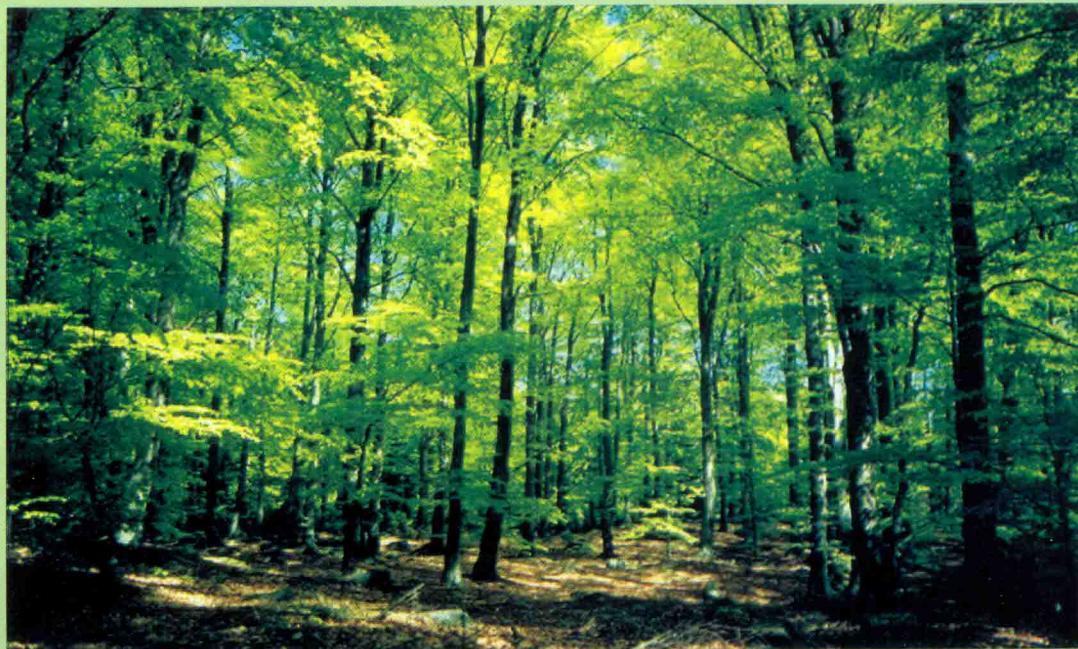
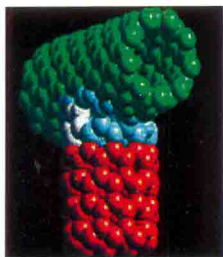
is underutilized. Research programmes based on solving such issues shall continue to receive emphasis.

- Biotechnology application for improving genetic quality of fish stock, obtaining better yields and improve disease resistance shall be encouraged.
- Development of recombinant diagnostics and vaccines for major diseases in livestock/fish and development and formulation of improve animal/fish feed shall be encouraged.

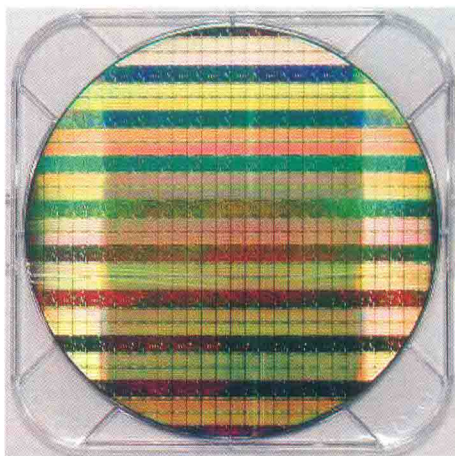


## 4.2 FORESTS

- The application of biotechnology in the forestry sector has been more on control and elimination of pests and fungi that are a threat to commercially important tree species. Genetic improvement of forest crops with simple Mendelian hybridization could have bridged the gap between the demand and supply of forest produce. An endeavor shall be made to identify traits in the commercially important species and take up a comprehensive hybridization programme.

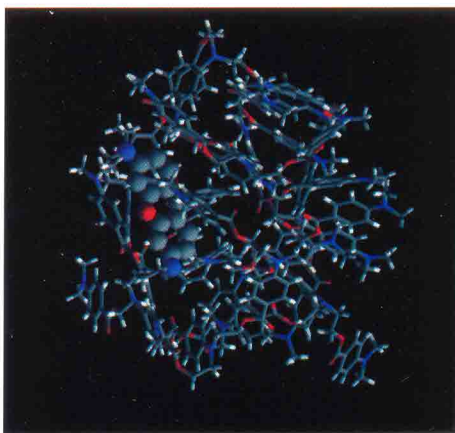


- Faunal biodiversity is crucial for ensuring ecosystem health. Endemism looms as a threat to wildlife. Genetic examination of isolation could help in devising strategies to ensure genetic exchange.
- Non timber forest produce forms an important component of the forest economy. Rural populace especially tribals, to a very large extent, depend on collection and sale of such produce. Use of biotechnology at the community level and in the industrial sector to add value to such a collection shall be encouraged. Identification of such crucial species, their genetic fingerprinting and chemical assaying of their active ingredients needs to be taken up.



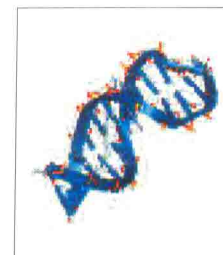
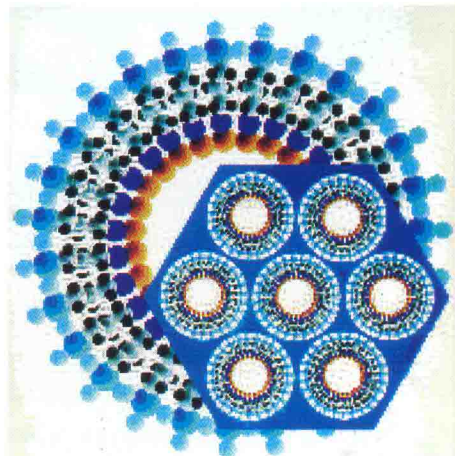
### 4.3 Medicinal & Aromatic Plants

- The state government has initiated a concerted effort to promote the cultivation of medicinal and aromatic plants. Adding value to such produce through traditional and modern techniques of biotechnology shall be encouraged.



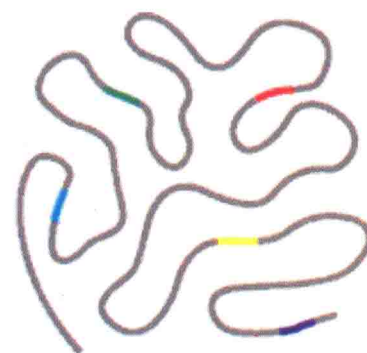
### 4.4 HEALTH AND MEDICAL BIOTECHNOLOGY

- Medical Biotechnology, like in other areas of biotechnology, involves heavy outlays for research. Whereas the private sector industry and the Indian Council for Medical Research lead the field the state government shall in conjunction with all concerned promote efforts on newer vaccines, especially for malaria, tuberculosis, cholera, HIV, rabies, snakebites and Japanese Encephalitis among other diseases.
- The state government shall participate in the development of strategies for prevention and cure of diseases induced by malnutrition, faulty diet and lifestyles. It shall also promote research in reproductive health and contraception.
- Epidemiological studies covering research on air borne microbes (Bio Allergens) through various media like air, water and food shall be promoted.



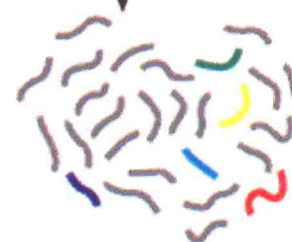
#### 4.5 ENVIRONMENT PROTECTION AND BIO-ENERGY

- Flow of industrial effluents and urban waste into public water bodies and the seepage of chemical residues into aquifers adversely impact the health of human beings as well as of livestock. Bio-remediation provides an alternative to chemical treatment. This shall be encouraged. Root zone technology shall be similarly promoted.
- Bio-fuels shall be promoted as new and alternative source of energy. To help achieve this bio-fuel plantations shall be promoted and pilots established for generation of bio-energy.
- Development of microbial and other biological methods for treatment of solid and liquid waste and for mitigating any other hazardous industrial impact shall be promoted.
- Construction of bio-monitors and bio-indicators for environmental safety shall be promoted.

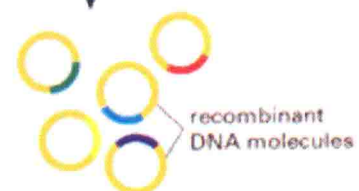


human DNA

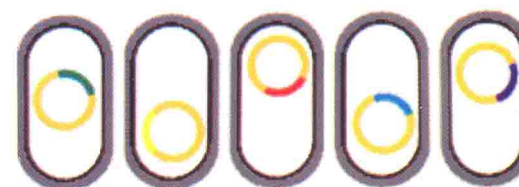
CLEAVE WITH  
RESTRICTION  
NUCLEASE

millions of genomic  
DNA fragments

DNA FRAGMENTS  
INSERTED INTO  
PLASMIDS

recombinant  
DNA molecules

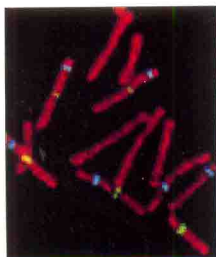
INTRODUCTION  
OF PLASMIDS  
INTO BACTERIA



genomic library

#### 4.6 TRADITIONAL KNOWLEDGE AND WISDOM & AWARENESS GENERATION.

- Madhya Pradesh is rich in its biotic resources. Rural and tribal communities have, over time, through proper selection, elimination and locally evolved techniques developed a vast range of applications and practices which add value to agricultural and forest produce. Steps to help protect the rights of the community over this traditional knowledge base shall be initiated.
- Partnerships between rural and tribal communities and research institutions shall be established to improve and expand the applications environment for traditional knowledge and practices.
- A strategy to derive advantage for these communities under the various statutory provisions of enactments like the Environmental Protection Act, the Wildlife Protection Act, the Plant Varieties & Farmer's Rights Protection Act, the Biological Diversity Act, the Indian Patents Act etc. shall be prepared.



- To spread awareness among stakeholders about the manner in which the provisions of Biological Diversity Act, Plant Varieties & Farmer's Rights Protection Act and various protocols on Bio-safety can positively impact their livelihood status.



## 4.7 COMMUNITY BIOTECHNOLOGY APPLICATIONS

- Modern tools of biotechnology can help enhance the potential of traditional knowledge and practices. This will help in improved production, value addition and promoting the sustainable use of natural resources. Programmes for community level biotechnology especially in the field of agriculture, horticulture, medicinal and aromatic plants, forestry and the livestock sectors shall be designed and implemented.
- IEC programs for promoting household and community level biotechnology applications like fermentation technology, waste treatment and utilization shall be implemented through farmer's groups, milk cooperatives, minor forest produce cooperatives, JFM committees, women's and other self-help groups.

## 4.8 EDUCATION AND TRAINING

- The existing educational facilities shall be expanded by encouraging universities and colleges to set up facilities for undergraduate and post-graduate level programs in biotechnology.
- Technical institutions including agriculture and veterinary colleges, engineering colleges and polytechnics shall be encouraged to introduce degree and diploma level programs for molecular biology biotechnology, bio-informatics, bio-ethics and related fields.
- Technician level courses shall be introduced at ITIs and para medical schools.
- A human resource development plan for the biotechnology sector shall be prepared.

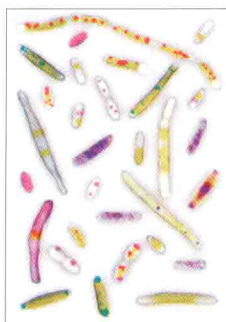


#### 4.9 RESEARCH AND DEVELOPMENT

- Research and development shall receive high priority. A research agenda shall be formulated keeping in view the priorities in various sectors.
- Research capability shall be gradually expanded by encouraging institutions in the state to attract projects sponsored by Ministries and organizations of the Government of India and the private sector. An environment for contract research shall be sought to be created.
- Networking of institutions to optimize the use of resources and maximize output shall be attempted.

#### 5.0 PROMOTION OF BIOTECHNOLOGY INDUSTRY

- An appropriate policy framework for biotechnology industry shall be created. Under this framework while all incentives and concessions available to large, medium and small scale industry shall be made available to biotechnology units, package of additional fiscal and non-fiscal incentives shall also be considered.



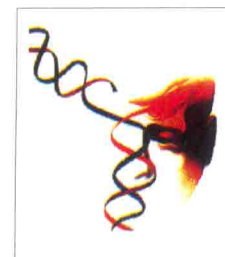
- Integrated Biotechnology Parks shall be set up in the state. These shall provide for modern infrastructure state-of-the-art facilities for setting up research laboratories and manufacturing units. Each park shall have a Business Facilitation Center that shall with the help of a single window clearance facility cover all regulatory aspects and extend help for obtaining power, communication, water supply and waste disposal services.



## 6.0 STRATEGIC INITIATIVES

To translate the salient features of the biotechnology policy into action a set of strategic initiatives shall be implemented. List of such initiatives shall be expanded in the near and mid-term future. Some of the initiatives on which action shall be commenced are as follows:

- 1) Setting up of a world class 'Institute of Life Sciences and Technology,' at Bhopal with an adjunct Biotechnology Park for setting up an incubation center, research laboratories and manufacturing units.
- 2) Establishing a Biotechnology Park, as part of the Special Economic Zone at Indore, with emphasis on agri-biotechnology and pharma-biotechnology units.
- 3) Setting up bio-centers at selected farms of the state agriculture department, State Seeds Corporation and the Krishi Vigyan Kendras of the Agriculture University.
- 4) Expand the bio-village programme of the agriculture department to cover all villages in the state.
- 5) Setting up of a Medicinal & Aromatic Plants Information Exchange .\*



## 7.0 INSTITUTIONAL MECHANISM

- The State Biodiversity Board set up under the Chief Minister will shortly have to be converted into a statutory body under the Biological Diversity Act. The Board so reconstituted shall advise the state government on conservation of biodiversity, sustainable use of its components and equitable sharing of benefits arising out of the utilization of biological resources.
- A State Biotechnology Council shall be established under the chairmanship of the Chief Minister. The council shall oversee the implementation of the Biotechnology Policy. It shall have as its members eminent biotechnologists, educationists and industrialists. It shall also have ex-officio members to represent various departments of the state government.
- The Department of Biodiversity and Biotechnology shall be the nodal department to coordinate activities in the biotechnology sector. However, other important administrative departments like Agriculture, Animal Husbandry, Fisheries, Forests, Housing & Environment, Science & Technology, Health & Family Welfare, Medical Education, Higher Education, Technical Education & Training, Urban Administration & Development, Commerce & Industry shall continue to play an important role in their respective sectors and report to the council.
- In a similar manner the role and contribution of all universities including the Rajiv Gandhi Proudhogiki Vishwavidhyalaya, the Jawaharlal Nehru Krishi Vishwavidhyalaya, other academic institutions, M.P. Council of Science and Technology, State Forest Research Institute (FRI), Indian Institute of Forest Management (IIFM), Regional Research Laboratory, Bhopal, Environment & Planning Coordination Organization (EPCO), the State Pollution Control Board and local bodies in the implementation and success of the policy shall be of vital importance.





# ACTION AGENDA



