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# **MADHYA PRADESH SCIENCE & TECHNOLOGY POLICY - 2007\***

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## PREAMBLE

Science & Technology (S&T) is the most potent tool for development in the world of today. Scientific and technological endeavour is therefore everywhere planned and organized to achieve specific objectives of social, economic and cultural development and prosperity. Be it the governments or the multinational corporations, civil institutions or defence establishments, they all recognize and give due importance to planned scientific and technological development in their plan and strategies.

India's contributions in diverse areas of S&T have been significant since the pre-historic and Vedic times till today. From the distant past to the present, India has always been a scientific and technological power to contend with, not only in applied S&T areas like agriculture, animal husbandry, healthcare, metallurgy, textiles, architecture and water management, but also in basic sciences like linguistics, mathematics, astronomy, chemistry and life sciences. Madhya Pradesh also has had a strong tradition of (S&T); marks of this tradition may be witnessed at Ujjain, Indore, Sanchi, Bhojpur, Maheshwar, Chanderi and several other places of the State.

Madhya Pradesh is unique in the richness of both the material and human resources. The State is endowed with extraordinary agro-climatic and biological diversity. The challenge before the State is to fully harness this potential. The State has to catch up with the frontline areas of modern S&T on the one hand and improve upon its strengths in traditional S&T, on the other.

During Golden Jubilee Celebrations of the State, the Honourable President of India placed before the State Assembly a great vision of a fast developing Madhya Pradesh through full utilisation of its core-strengths; the President also suggested several new missions based largely in appropriate use of science and technology to realise this vision. This new S&T Policy is drafted and being adopted for the specific purpose of aligning the Science and Technology efforts of the State to the vision presented by the President of India.

Madhya Pradesh is one of the first States to have established a Council of Science & Technology (MPCST) in 1981; the State also adopted a Science and Technology Policy Resolution some years ago. This new Science and Technology Policy is in continuation with this deep commitment of the State of Madhya Pradesh to the intensive, planned and appropriate use of Science and Technology for achieving its development goals.

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## BACKGROUND

Madhya Pradesh is one of the fastest growing States in the country today. The State has displayed a strong commitment towards social, economic and cultural development; and, it has been striding ahead in pursuit of its development objectives.

Management of the abundant natural resources of the State, conservation of its rich biodiversity, and sustainable utilisation of this natural abundance for equitable development of all the people have been integral part of the developmental commitment of the State.

Agriculture is the main vocation of its people. As much as 71.5 percent of the working population of Madhya Pradesh is engaged in agriculture, as against the national average of 58 percent. The State is the number one producer of pulses and oilseeds in the country, contributing about a quarter of the total Indian production.

The forest wealth of Madhya Pradesh is the highest in the country. A large number of its people, especially the tribal people, depend on forest produce. The State has made efforts to decentralize management of natural resources through *Panchayati Raj* approach.

The State has a reasonably good infrastructure of higher education. There are 13 state universities, including a university of technology, a university of law and a university of agriculture. In addition, the state has several well-endowed deemed universities.

Madhya Pradesh, because of its central location in India, has remained a crucible of historical currents from North, South, East and West. Its geographical location makes the State a strategic hub.

The eleven Missions for the balanced development of the State that the Honourable President of India has outlined during his address to the State Assembly, and the new S&T Policy that the State is now adopting, are designed in the background of these strengths of the State.

## VISION

Utilise the advances in modern S&T as well as the wide-spread traditional S&T knowledge and skills of the people to recapture ancient glory and grandeur of the State, to achieve prosperity and improved quality of life for all citizens, so as to fully realize the timeless Indian objective of ensuring happiness, health and well-being for all: *Sarve Bhavantu Sukhinah, Sarve Santu Niramayah, Sarve Bhadrani Pashyant, Ma Kaschid Dukh Bhagbhavet.*

## OBJECTIVES

The central theme of this Science & Technology Policy is to ensure that S&T becomes an important and integral component of all development plans and activities in the State. This Policy is being adopted so as to ensure that the requisite mix of traditional as well as modern advances in all branches of S&T is effectively implemented in all sectors of economy including agriculture, manufacturing and services for sustainable and eco-friendly utilization of our abundant natural resources to provide improved quality of life for all citizens.

### **The objectives of S&T Policy shall be to:**

- i. Promotion of basic sciences and innovative practices among the State.
- ii. Ensure effective use of Science, Engineering & Technology to fulfill basic needs of its people.
- iii. Encourage generation, adaptation, transfer and assimilation of technology appropriate to its local needs with the help of basic, applied and developmental research.
- iv. Ensure the development and use of traditional Indian Science & Technologies in all sectors.
- v. Create adequate infrastructure of R&D in Science & Technology areas wherever necessary.
- vi. Encourage industrial houses to set up R&D centers in the State with a view to achieve rapid industrialization.
- vii. Facilitate optimal utilization of natural resources.
- viii. Adopt eco-friendly technologies, which shall also increase employment opportunities in the State.
- ix. Provide for adequate training and skill development opportunities to the vast manpower.
- x. Promote scientific literacy to empower and enrich the society.
- xi. Upgrade and strengthen traditional skills.
- xii. Strengthen and protect intellectual property rights of technology generated in the State.
- xiii. Provide for special technology support and services to export oriented industries viz., medicinal and aromatic plants, leather, textiles, handicrafts and agro-products etc.
- xiv. Ensure the use of S&T for removing regional and social disparities.
- xv. "Har Khet Ko Pani, Har Hath ko Kam" i.e. water to every field and work for every hand, shall be the guiding motto of the suggested S&T Policy".

## GOALS

### **S&T in the State shall be planned for:**

1. (a) Raising productivity of foodgrains in the State from the present about 1 ton per hectare to atleast 2 tons per hectare in the next 5 years and to 3 tons per hectare in the long term.  
  
(b) Doubling per capita availability of milk from the present less than 250 ml to 500 ml per capita per day in five years.  
  
(c) Ensuring growth of net State produce from the agricultural sector at the rate of minimum 10 percent per annum.  
  
(d) Assigning organic agriculture, dairying practices and agro forestry based bio-processing industries a key role in achieving these growth goals.
2. (a) Increasing the number of matriculates to twice the present number within the next 5 years and laying strong foundation in basic sciences and technical skills.  
  
(b) Raising the number of degree, diploma and certificate holders in agriculture, animal husbandry and forestry to five times the present number. The number of Agricultural, Dairying and Veterinary graduates in the State today is a mere 7000.  
  
(c) Doubling the proportion of science, engineering, medicine and Information Technology (IT) professionals among the graduates and post-graduates in the State from the present about 7 percent to at least 15 percent.  
  
(d) To expand opportunities of learning the whole range of skills required to cater to the service sector, and also special needs of Madhya Pradesh to conserve its archaeological and natural heritage.
3. Ensuring productivity potential of forests for environmental stability and ecological balance. Effective implementation of the State Forest Policy and establishment of Forest Conservation Fund of at least Rs.1000 crores with equal participation from the State, Central and International agencies. Ensure appropriate R&D, training and promotional efforts for sustainable harvesting of the forest produce and scientific cultivation, processing and value addition of medicinal and aromatic plants of desired quality, while ensuring Biodiversity conservation.
4. (a) Effective management of water resources for agricultural, domestic and industrial use. Harness additional 50,000 million cubic meters of water for

irrigation and conserving at least 5 percent of water used in irrigation through improved agronomic practices.

- (b) Ensuring availability of potable drinking water for all people and livestock of the State.
5. Creating scientific, technological and infrastructural capacities to ensure that the State reaches 10,00 Megawatts capacity within 5 years, ensuring that transmission & distribution losses are reduced to minimum possible level and also that State obtains a substantial part of its energy requirement from non-conventional energy sources, especially to ensure that the rich bio-resources of the State are effectively utilised to the extent that MP becomes a role model in the area of Bio-fuels, reducing its dependence on fossil fuels.
  6. Arogya for all shall be ensured by all possible means and also involving existing institutions of Indian Systems of Medicine & Homoeopathy (ISM&H) in the state, while creating more where necessary, and ensure their coordinated development under a M.P. University of Health Sciences which should also have a National level R&D centre for research in Health Sciences. Major efforts would be initiated in the areas of preventive and promotional health-care, including nutrition, sanitation, drinking water and Life-style issues, and also promoting Yoga, games & sports in a big way.
  7. Achieving annual growth of employment at the rate of 5% per annum, especially through development of entrepreneurship based in S&T.
  8. Focussing S&T interventions for weaker sections of the Society.
  9. Enhancing growth by harnessing frontier areas of technology such as IT, Biotechnology (BT) and Nanotechnology (NT) etc. and also perspective planning for high-growth areas in 21<sup>st</sup> century like organic foods, eco-tourism, renewable energy and nano-sciences.
  10. 'Banking on Biomass' and striving for Excellence in Biotechnology, especially bio-processing and organic farming on a massive scale is the major corner stone of this policy.

## **STRATEGY AND ACTION PLAN**

In order that the State achieves these goals & objectives, the strategy has to be one of

- (i) consolidating its strengths viz., resources base and building upon them.

- (ii) overcoming its specific weaknesses viz., low literacy rate, poor infrastructure etc.,
- (iii) identifying and grabbing the opportunities available not only within the State or Union of India but also on a global scale &
- (iv) keeping aware of the threats viz., that of population outburst, technological obsolescence and fast depletion of its natural resources. All this can be achieved through appropriate inputs of Science & Technology at specifically identified levels and sectors.

Preparation of M.P. Resource Atlas and also series of District Atlas - extensive profiles of the State's varied material, human power and knowledge resources will be carried out with the help of S&T institutions, R&D agencies in the State and also expert agencies available from outside. Similarly, a detailed analysis of the major problems facing different geo-climatic regions will be carried out to identify the scientific inputs required to fill up technological gaps, which may exist. Although the suggested resource inventory or compilation of basic needs may not be a new idea but, if properly carried out and updated every three years, it will have a radical impact on awareness and confidence level.

Wherever available, the existing R&D institutions in the State (from central, State or corporate sector) as well as post graduate science, engineering and medical colleges shall be approached to help in technology generation, acquisition or assimilation to fulfill our specific local needs, including those of the industries located in the State. Students and youth, both urban and rural, will be involved in a big way in a planned manner.

Wherever required, new R&D institutions will be created or the existing ones upgraded/strengthened to fulfill the desired tasks. Specific Centres of Excellence will be set up in some of existing/upcoming institutions in the State.

In order to achieve the goals set out above in a time-bound manner, the State shall undertake specific initiatives along the following lines:

#### **I. S&T Education & Research**

1. Science education at the Matriculation and Higher Secondary level shall be given a major thrust. The State shall prepare appropriate schemes for improving the science laboratories in all schools, and for upgrading the skills of science teachers. Reputed private schools with proven track-record of performance and social commitment will be capacitated and empowered with adequate fiscal and academic incentives.

2. The quality and quantity of S&T education, including vocational training, at all levels – in schools, colleges, universities and other educational institutions, shall be ensured in all districts of the State, with public - private partnership and e-education facilities. Community participation by involvement of senior citizens including reputed farmers and master-craftsperson will be encouraged by engaging them as visiting guest-teachers and supervisors as social-auditors.
3. The State shall ensure the establishment or upgradation of at least one fully equipped high quality Polytechnic in every district and one good ITI in every block.
4. To give a major thrust to vocational education, the State shall explore the possibility of establishing a new polytechnic stream where intake will be at the level of middle standard passed students and the certificate and diploma of polytechnics in this stream shall be treated equivalent to Matriculation and Higher Secondary, respectively. These people's polytechnics will be geared to promote rural entrepreneurs in a big way.
5. The basic concept and practices of *Nai-Talim* and SUPW (Socially Useful Productive Work) will be implemented in all high schools, and middle schools. The new polytechnic stream shall be in fact an effort to implement *Nai Talim* in the modern context.
6. A State level nodal agency shall be created to develop syllabi, curricula and teacher training practices and modules for the new polytechnic stream and for *Nai Talim* and SUPW components of the regular schools.
7. Education in Science, Technology, Engineering, Medicine (including Ayurveda), Agriculture and other allied fields at the graduate and higher levels shall be given a new thrust. Science teaching departments shall be established in arts and commerce colleges. A new liberal policy for the opening of new engineering and medical colleges in both the private and the public sector shall be evolved. Let there be a new wave of thousands and lakhs of certified technical professional hands going to interior villages, other States and even abroad.
8. The State shall evolve schemes to offer special scholarships and incentives for students in the S&T stream at the graduate and post-graduate level.
9. The State shall give a new thrust to education in entrepreneurship. New technological and other Universities in the private sector shall be encouraged to offer market-driven educational opportunities.
10. While encouraging private participation in education, the State shall evolve a regulatory mechanism to ensure quality and equity in all educational institutions.

11. The State shall endeavour to ensure that at least one institute of excellence each in Science, Engineering and Medicine, along the lines of IISc, IIT and AIIMS, respectively, is set up in the State during the next five years. A centre of Excellence in Biotechnology will be established at the earliest at proper location.
12. **MISSION EXCELLENCE** will be launched to promote scientific aptitude and technical capabilities among school children and youth. ME will focus on skills, innovations, quality and competitiveness at all levels in different sectors.

## **II. Agriculture, Horticulture, Animal Husbandry & Forestry**

Since agriculture and related activities constitute the core competence of the State and the development of the State is dependent on rapid growth of this sector, the following steps shall be undertaken to qualitatively enhance Science and Technology capabilities in these areas:

1. To begin with four Colleges of Jawaharlal Nehru Krishi Vishwavidyalaya (JNKVV), Jabalpur shall be upgraded to fully-fledged Agriculture Universities within the next five years. To start with existing extension centres/KVKs will be upgraded with joint support from the centre and the State Govt.
2. The State shall endeavour to establish one advanced centre for research and extension in the area of Agriculture/Horticulture/Animal Husbandry in each of the eleven agro-climatic zones of the State.
3. The State is undertaking this effort of enhancing agricultural production and productivity at this stage when the value and effectiveness of organic practices is well-established, and since the state is particularly well endowed in resources and skills in this field, it is only appropriate that the Green Revolution of Madhya Pradesh shall be founded in organic practices. Therefore, a State Institute for Traditional Knowledge in Agriculture, Forestry and Related Activities shall be established to promote and conserve this knowledge and biodiversity as also to undertake bioprospecting of its flora. A separate cell or centre to study, conserve and develop traditional knowledge in these sectors shall also be opened in all Universities and Institutes concerned with the sector of Agriculture, Horticulture, Forestry and Animal Husbandry.
4. Regional Development Plans for S&T inputs focussed on specific crops in cereals, pulses, oil seeds, vegetables and other varieties with specific time bound targets shall be prepared for each of the 11 agro-climatic zones of the State.

5. A Centre of excellence for research, quality control, standardization, promotion and certification of organic inputs and produce shall be set up at the State level.
6. A separate Directorate of Organic Agriculture shall be created by bifurcating the present Directorate of Agriculture. A Department of Organic Agriculture shall be established in Jawaharlal Nehru Krishi Vishwavidyalaya (JNKVV), Jabalpur, and later in every Agriculture University set up in the State. The objective of these efforts shall be to nurture and develop a specialised cadre of scientists and extension specialists in organic agriculture and related activities.
7. A separate Department of *Go-Samrakshana* will be created by bifurcating existing Department of Animal Husbandry. Since *Go-Samrakshana* and organic agriculture are highly related activities, the possibility of combining the Directorate of Organic Agriculture and *Go-Samrakshana* shall be seriously explored.
8. Genetically modified organisms shall be allowed to be introduced in the State only after the establishment of their environmental safety. The State shall establish appropriate institutional arrangements for this purpose.

### **III. Water Resources**

1. Harness additional 50,000 million cubic meters of water per year for irrigation and create additional storage capacity through water harvesting, leading to a drought free Madhya Pradesh.
2. Adoption of improved irrigation practices for conserving at least 5% water by 2012 through improved practices, training, popularization and demonstration projects.
3. While carrying forward the new momentum in increasing the irrigation capacity, a special thrust will be given to enhancing utilization of the existing irrigation capacity from 46% to at least 75% within next five years.
4. Identification, renovation and revival of traditional water bodies and structures all over the State shall be given high priority.
5. It will be mandatory to all new constructions to have rain water harvesting system.
6. The State shall introduce a system of water-audit of all major consumers.
7. It shall be mandatory for all major consumers of water to set up systems for water recycling.

8. The State shall empower the State Pollution Control Board to act as the third party agency for testing and monitoring quality of potable water of all public supplies.

#### **IV. Energy and Environment**

1. Effective implementation of State Policy regarding utilization of cultivable waste and barren land for cultivation of appropriate and economically useful plant species with special emphasis on the cultivation of oil-bearing species, which may be used as bio-fuel.
2. Setting up of a National Institute for R&D, training and extension in non-conventional energy.
3. Mission mode research shall be initiated in hydrogen-based energy, conversion of alcohol and oils to biofuel, production of energy from waste and fuel efficient products and processes.
4. The State shall institute a system of energy audit of all major consumers of energy.

#### **V. Health Care, Ayurveda and Traditional Medicine**

1. Promotion of telemedicine and mobile diagnostic-cum-treatment clinics based on traditional as well as modern medicine.
2. State shall set up a University of Ayurveda at the State level and an Ayurveda College in each of 9 divisions of the State.
3. Adoption of Gujarat pattern in regard to *Ayush* in Primary Health Care.

#### **VI. Industrialization**

The main thrust of the State Industrial Policy is on developing infrastructure for enhancing identified industrial clusters.

In regard to S&T intervention for industrial promotion, following institutional arrangements will be made.

- To build a competitive environment, industries and their ancillaries would be promoted in cluster while keeping in mind the availability of raw materials, skilled labour and market potential.
- To develop industrial parks and institutional infrastructures.
- **Exploitation of Minerals:** The available mineral wealth in the State shall be exploited scientifically keeping in view the environmental balance. A

comprehensive techno-economic study and intensive prospecting of the unexplored mineral wealth of the State shall be undertaken.

- **Research & Development of Minerals:** For research and development of minerals, a well equipped laboratory shall be established. For the minerals available in the State, preparation of district-wise mineral inventory and location maps shall be expedited.
  - **Opportunities for Employment:** The areas reserved for Public Sector undertaking where mining has not commenced so far shall be dereserved and thrown open for entrepreneurs to generate new employment opportunities. Lease conditions regarding employment and environment shall be strictly enforced.
  - **Decentralized Rural Industrialization:** Madhya Pradesh has a strong tradition in textiles and so many other artisan crafts widely dispersed in several clusters. Regional Research Laboratory (RRL) and other agencies have already identified this potential. Agencies like MPCON, CEDMAP, State Khadi Gramodyog Board, Forest Department and Handicraft Directorate have listed a vast range of small cottage-scale industries. Recently Self Help Groups (SHGs) are coming forward in a big way. All this hold a huge potential of growth and may contribute in large scale employment opportunities. This Policy suggests S&T inputs for skill development, quality assurance system and higher productivity in decentralized rural industries, both for individual entrepreneurs and collective micro-enterprises. MPCST shall steer this process in a well-planned manner in coordination with all state, national and international agencies. Proper quality assurance is the key to stand against growing competition in the market. A comprehensive mechanism will be evolved to enforce quality assurance on the lines of BIS and NABL.
  - While vigorously carrying forward the plan for industrial rejuvenation of Madhya Pradesh spelled out in the State Industrial Policy document, following supplemental steps shall be undertaken to support the special emphasis of the S&T Policy on Agriculture and allied activities and on the rejuvenation of traditional skills of the people of Madhya Pradesh.
1. (a) A comprehensive scheme shall be drawn up for giving priority and encouragement to industries allied to agriculture and related activities, and those engaged in processing of agricultural, horticultural, dairy and forest produce. Such a scheme shall be prepared and brought into operation within six months of the coming into force of this policy. While drawing up this scheme, priority shall be given to the encouragement of organic produce within this larger field of activity.  
  
(b) Science, technology, engineering and management institutions in the state shall be encouraged to pay special attention to the technological,

managerial and marketing problems of industries based on agriculture, horticulture, dairying and forest produce. A special scheme : Technology support for Agro and forestry based processing industries - shall be created for financing research, development and consultancy projects related to these fields.

(c) The State will ensure necessary steps to develop a single window which may be approached by entrepreneurs engaged in such activities for seeking solutions to their technological, marketing and entrepreneurial problems.

(d). The experiences gained from Vindhya Valley and Vindhya herbals will be carried forward to ensure a strong impact on the beneficiaries, consumers and the market.

- (a) A state-wide survey of various artisanal skills available in Madhya Pradesh, manufacturing and marketing potential of these skills, and the technological, managerial or administrative problems faced by the artisans shall be commissioned and completed within 6 months. ]

(b) Based on the results of the survey, a scheme special shall be drawn up for encouraging small, medium and household scale manufacturing based on the artisanal skills.

## **VII. New Frontiers of Science and Technology**

While the Biotechnology and Information Technology shall be encouraged as per their respective policies, newer areas like Nanotechnology and Smart Materials, Artificial Intelligence organic foods etc. shall be encouraged.

## **VIII. Science Popularization**

1. Madhya Pradesh Vigyan Sammelan shall be held annually and Young Scientist shall be particularly encouraged to promote regional development projects.
2. Popular booklets on various areas of science concerning the people especially children and women will be brought out regularly.
3. An appropriate *Vigyan Patrika* will be published focusing school children.
4. *Zila Vigyan Melas* will be encouraged to promote innovation, creativity and adventure among school students and science teachers.
5. Science museums, herbal gardens, technology parks shall be established at the district level.

6. Popular Science lectures in schools and colleges.
7. Science talent search will be organized regularly to search, nurture, promote and reward the talent children, both from urban and rural areas of the State.

## **ROAD MAP**

1. A special cell shall be created in the State S&T nodal agency, MPCST, to work towards the implementation of the policy objectives and monitor the progress regularly.
2. Once this Policy is adopted by the State, a detailed exercise would follow regarding strategy and steps. Specific Task Forces and Expert Groups shall be constituted involving concerned departments to draft detailed mission proposals and also ensure their implementation in a targeted manner. All efforts will be made to enlist support from central Govt. agencies in this direction. These Committees with inputs and technical services from MPCST shall also prepare blueprints for the new institutions to be created and for strengthening of the existing institutions.
3. A Steering Committee on S&T in the State Planning Board and a S&T Advisory Committee to Chief Minister of M. P. shall be constituted to ensure allocation and proper utilisation of 1% to 2% of SDP to S&T/R&D in the overall budgets of concerned departments, that the efforts are made to obtain central and international funding for the programs/missions proposed and also ensuring that proper utilisation takes place by capacity building in concerned areas. Taking cognisance of the S&T Policy of the Government of India and of the Prime Minister's announcement at the 2007 Indian Science Congress, allocation to S&T shall be progressively increased to 2% of the SDP.
4. The teachers and professors working at different levels from schools to the university departments and technical institutions will be the main fulcrum on which the responsibility of proper implementation of this S&T Policy will rest. Also, the entrepreneurs both in agriculture and industry shall take this Policy forward in their enterprises. The Administration will have an important role in facilitating and capacitating these agencies. All efforts shall be taken to empower the teachers and entrepreneurs to carry forward this task.
5. Let us always remember that science & technology is not a new phenomenon for our society, there is a strong base of indigenous scientific know-how with our farmers, artisans and women, and M.P. has a rich S&T heritage. Let us build upon this indigenous base and move forward into new frontiers.

MP State Policy as visualised and the collective resolve from the base to the apex levels, *if properly implemented*, shall take the State to a new growth trajectory putting Madhya Pradesh into the league of five top states of the nation based on its core strengths and a new paradigm. Let us march forward to fulfil our vision of *Sarve Bhavantu Sukhinah*.