M.A. IV Semester paper IV

Topic:*Integrated science policy of India*

The growth and development of Science and Technology in India is not a decade or a century old activity. There is evidence which shows that it is no less than an ancient saga; the growth and development is evident through the town planning, drainage system, road planning, etc. of the Indus Valley Civilization.

Likewise, throughout from the very ancient period to the medieval or to the modern, the planning and policy of Science and Technology are the major areas of emphasis.

However, after the independence, the five-year planning scheme commenced and over a period of time, Science and Technology accordingly became a major area of emphasis.

Pandit Jawaharlal Nehru, the first prime minister of India was the torchbearer who initiated by laying more emphasis on education and further led the foundation of Science and Technology. Likewise, the first policy relating to Science and Technology was first introduced in 1958.

Over the recent past, India declared the decade 2010-2020 as the "Decade of Innovation."The Various Policies in the Field of Science and Technology
Let us now discuss the various policies implemented in the field of Science and Technology.

 Scientific Policy Resolution of 1958

It was the first science policy that largely emphasized on basic research in almost every field of science.
The policy also put emphasis on developing and making available the basic infrastructure for the development of scientific research.

 The Technology Policy Statement of 1983

The policy of 1983 was the second policy that largely focused on the achievement of technological competence and self-reliance.

 The Science and Technology Policy of 2003

This policy brought the benefits of Science and Technology to the forefront and also focused on the investment required for research and development.

Further, it comes with integrated programs for the socio-economic sectors with the national research and development system to address the national problems and at the same time create a national innovation system.

Science Technology & Innovation Policy 2013

By 2013, Science, Technology and Innovation (STI) became the major drivers of national development.
This policy ensures faster, sustainable, and inclusive development of the people.
Further, the policy focuses on the large demographic dividend and the huge talent pool to define the role in achieving the national goals. The paradigm set by the policy of 2013 is "Science technology and innovation for the people."

*The key features of Policy 2013 are -

- Promoting the spread of scientific temper amongst all sections of society.

- Enhancing skill for applications of science among the young from all social strata.

- Making careers in Science, research and innovation attractive enough for talented and bright minds.

- Establishing world class infrastructure for R&D for gaining global leadership in some select frontier areas of science.

- Positioning India among the top five global scientific powers by 2020.

- Linking contributions of science, research and innovation system with the inclusive economic growth agenda and combining priorities of excellence and relevance.

- Creating an environment for enhanced Private Sector Participation in R&D

- Enabling conversion of R&D outputs into societal and commercial applications by replicating hitherto successful models as well as establishing of new PPP structures.

- Seeding S&T-based high-risk innovations through new mechanisms.

- Fostering resource-optimized, cost-effective innovations across size and technology domains.

- Triggering changes in the mindset and value systems to recognize, respect and reward performances which create wealth from S&T derived knowledge.

- Creating a robust national innovation system.

Key Points of 12th Five-Year Plan (2012-17)

- Besides the policies discussed above, the 12th Five-Year Plan (2012-17) focuses on the following points (of science and technology) −

- Creation and development of national facilities in the field of R&D

- Emphasis on partnership growth of Science and Technology

- Large scale investment into mega science project aimed at the creation of the research and development infrastructure in India as well as abroad (under partnership)

NCSTC

National Council for Science & Technology Communication (NCSTC) emphasizes on the following key points −

- Promote scientific thinking.

- Promote and spread the significance of Science and Technology to masses nationally through different medium such as TV, digital media, print media, and people to people.

- Emphasise on training in Science and Technology Communication.

- Development and dissemination of Science and Technology software.

- Focus on National Children's Science Congress.

Likewise, through different plans and progressive policies, Science and Technology is being further developing in India.

The Government has unveiled a new Science and Technology Policy Statement which follows in the footsteps of the Scientific Policy Resolution (1958) and Science and Technology Policy Statement (1983). After intensive dialogue involving scientists, technologists, social scientists, activists, politicians, administrators and concerned citizens who also involved a draft on the web for discussion, the final version has been approved and announced at the 90th Session of the Indian Science Congress at Bangalore.

The main policy objectives are to advance scientific temper and fully integrate science and technology into all spheres of national activity on a sustainable basis. It would foster scientific research in universities and other institute and create suitable employment opportunities in the S&T sector. Women would be ensured full and equal participation. There would be necessary autonomy and freedom of functioning for academic institutions. Full potential of science would be harnessed to accomplish national strategic objectives with encouragement for research and innovation in areas of relevance for the economy and society. Mechanisms would be strengthened for technology development evaluation, absorption and up gradation from concept to utilization. An IPR regime would be formulated for speedy and effective domestic commercialization of such inventions. Special emphasis would be placed on forecasting, prevention and mitigation of natural hazards. International cooperation would continue to be encouraged.

Briefly, the key points of the strategy and implementation plan of the policy– 2003 are:

1. Science and technology governance and investments: This would involve mechanisms to obtain science and technology planning inputs on a continuous basis from a cross-section of the scientific community. Also, an allocation in a certain percentage would be made by each of the socio-economic ministries for relevant programmers and states would be encouraged to use science and technology for developmental purposes. Universities and institutions would be given full autonomy, flexibility and debureaucratized. It would be ensured that all 'highly science-based ministries and departments of the government would be run by scientists and technologists'. There would be continued existence of the apex S&T advisory body. While the Government would be committed to make the necessary budgetary commitments to raise the level of investment to 2% of GDP, it would be essential for industry to also steeply increase its investments in R&D.
2. Optimal utilization of existing infra- structure and competence by networking of existing infrastructure.
3. Strengthening of the infrastructure for science and technology in academic institutions: Appropriately sized science laboratories would be supported in academic institutions with flexible mechanisms for induction of new faculty in key areas of science.
4. New funding mechanisms for basic research: These would cater to the pro- motion of basic research in science. There would be simplification of administrative and financial procedures.
5. Human resource development: Along with schemes to nurture and attract talent there would be encouragement for quality and productivity in science by mobility of scientists and technologists between industry, academic institutions and research laboratories. This is to be sup- ported by substantial funding, retraining and rescaling. Women's needs would be met through flexibility in rules and regulations. Scientists of Indian origin from abroad would be encouraged to return to India and their networking facilitated.
6. Technology development, transfer and diffusion: An aggressive bench-marking of technologies would be carried out along with adoption, diffusion and transfer of innovation to the productive sectors. An enhanced push would be given to Indian industry to avoid non-tariff barriers in global trade. Training in all aspects of technology management would be initiated in IITs, IIMs and other institutions.
7. Promotion of innovation: Support in all respects would be given for a comprehensive national system of innovation.
8. Industry and scientific R&D: For increasing synergy between academia and industry, 'Autonomous Technology Transfer organizations' would be created in academic institutions to facilitate transfer of know-how generated to industry. Industry would be supported by fiscal and other measures to carry out R&D.
9. Indigenous resources and traditional knowledge: Development of technologies that add value to India's indigenous resources would be supported and the Indian share in the global herbal product market would be increased.
10. Technologies for mitigation and management of natural hazards: A concerted plan for enhancing predictive capabilities and meeting emergencies in natural disasters would be made.
11. Generation and management of intellectual property: The fullest protection to competitive intellectual property from Indian R&D programmes would be made.
12. Public awareness of science and technology: Keeping in mind the need for increasing public awareness of the importance of science and technology in daily life and the directions

which science in frontier areas is taking, popularization of science and dissemination of information would be encouraged. A closer interaction between sciences and social sciences would be assisted.

13. International science and technology cooperation: Those international collaborative programmers contributing directly to India's scientific development and security objectives would be encouraged.

14. Fiscal measures: Innovative fiscal measures are planned and strategies for attracting higher levels of investments both public and private in science and technological development.

Finally, the crux of any policy which is effective implementation would be put in place by expeditious, transparent monitoring and reviewing mechanisms. The Policy–2003 hopes to build a 'new India' which 'uplifts the Indian people and indeed all of humanity.

The Key features of the STI policy 2013

- Promoting the spread of scientific temper amongst all sections of society.
- Enhancing skills for applications of science among the young from all social sectors.
- Making careers in science, research and innovation attractive enough for talented and bright minds.
- Establishing world class infrastructure for R&D for gaining global leadership in some select frontier areas of science.
- Positioning India among the top five global scientific powers by 2020 (by increasing the share of global scientific publications from 3.5% to over 7% and quadrupling the number of papers in top 1% journals from the current levels).
- Linking contributions of Science Research and innovation system with the inclusive economic growth agenda and combining priorities of excellence and relevance.
- Creating an environment for enhanced private sector participation in R &D.
- Enabling conversion of R & D output with societal and commercial applications by replicating hitherto successful models, as well as establishing of new PPP structures.
- Seeking S&T based high risk innovation through new mechanisms.
- Fostering resource optimized cost-effective innovation across size and technology domains.
- Triggering in the mindset & value systems to recognize respect and reward performances which create wealth from S&T derived knowledge.
- Creating a robust national innovation system.

Aspirations of the Policy
The main aspiration elements of the STI policy are:

1. Raising Gross Expenditure in Research and Development (GERD) to 2% from the present 1% of the GDP in this decade by encouraging enhanced private sector contribution.

2. Increasing the number of Full Time Equivalent (FTE) of R&D personnel in India by at least 66% of the present strength in 5 years.

3. Increasing accessibility, availability and affordability of innovations, especially for women, differently bled and disadvantaged sections of society.

Mechanisms

Wide ranging mechanisms are envisaged to be deployed to realize the policy aspirations, a few of these are:

- Promoting the spread of scientific temper amongst all sections of society.
- Enhancing skill for applications of science among the young from all social strata.
- Making careers in science, research and innovation attractive enough for talented and bright minds.
- Empowering women through appropriate STI inputs and investments.
- Facilitating private sector investment in R&D centers in India and overseas.
- Promoting establishment of large R&D facilities in PPP mode with provisions for benefits sharing.
- Permitting multi stakeholders participation in the Indian R&D system.
- "Treating R&D in the private sector at par with public institutions for availing public funds.
- Bench marking of R&D funding mechanisms and patterns globally.
- Aligning Venture Capital and Inclusion Innovation Fund systems.
- Sharing of IPRs between inventors and investors.
- Modifying IPR policy to provide for marching rights for social good when supported by public funds and for co-sharing IPRs generated under PPP.
- Providing incentives for commercialization of innovations with focus on green manufacturing.
- Closing gaps in the translation of new findings at the grassroots and the commercial space.
- Forging strategic partnerships and alliances with other nations through both bilateral and multilateral cooperation in science, technology and innovation.
- Triggering ecosystem changes in attitudes, mindset, values and governance systems of publicly funded institutions engaged in STI activities to recognize, respect and reward performances which create wealth from S&T derived knowledge.

Policy Implementation
Implementation of the proposals contained in the Policy will necessitate consultations with different government departments/ministries and agencies besides consultations with overarching, science and engineering academies industry and business associations etc. Accordingly DST will establish a Policy Implementation Group to expeditiously operational the proposals within the next two years.

Backdrop
Prime Minister, Shrimati Indira Gandhi had announced the Technology Policy Statement (TPS) at the Science Congress in January 1983. It focused on the need to attain technological competence and self-reliance. Several of the statements of TPS were implemented. Subsequently, a Science and Technology Policy (STP) was announced in 2003, seeking to bring science and technology (S&T) together. It basically called for integrating programmes of socio-economic sectors with the national R&D system and the creation of a national innovation

system. The world has changed vastly since then in all spheres of human activity. New paradigms of innovation have emerged, arising, among others, out of the pervasive intrusion of internet and globalization. Even then systems that foster innovation have become country and context specific. India has declared 2010-20 as the "Decade of Innovation." India's demographics have changed significantly too. The youthful populations have high expectations and aspirations of the nation. The Science, Technology and Innovation Policy (STI) 2013 approved by the Union Cabinet is in furtherance of this declaration and aims to bring perspectives to bear on Science & Technology led innovations in the changing context.

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