SCIENCE AND TECHNOLOGY POLICIES

Four major policies have been implemented since independence namely, Scientific Policy Resolution (SPR 1958), Technology Policy Statement 1983 (SPR 1958), Science and Technology Policy 2003 (STP 2003), and Science Technology Innovation Policy 2013 (STIP 2013).

1. SCIENTIFIC POLICY RESOLUTION 1958

- As in many other areas of national importance like economy, polity etc, Jawahar Lal Nehru also established the basic framework for Science and technology in India. He has been the chief architect of Indian scientific endeavor.
- He was quick to realize the role of Science and technology and believed that the scientific development was the only means to overcome the multifaceted problems faced by the country.
- He said, "It is science that can solve the problem of hunger and poverty, of insanitation and illiteracy, of superstition and deadening traditions, of vast resources running to waste, of rich country inhabited by starving people."
- He therefore decided to Include Science and technology as an integral and crucial part of the nation's plans and priorities. He along with P.C. Mahlanobis developed and came out with a blue print for the role of Science and technology in the economic planning of the country.
- Accordingly, various organizations and agencies were established and nurtured for undertaking and coordinating research in various fields of Science and technology and each five-year plan document emphasized and outlined the thrust areas of Science and technology in socio-economic transformation of the country.

Aims

- to foster, promote, and sustain, by all appropriate means, the cultivation of science, and scientific research in all its aspects – pure, applied, and educational;
- to ensure an adequate supply, within the country, of research scientists of the highest quality, and to recognize their work as an important component of the strength of the nation;
- to encourage, and initiate, with all possible speed, programmes for the training of scientific and technical personnel, on a scale adequate to fulfil the country's needs in science and education, agriculture and industry, and defense;
- to ensure that the creative talent of men and women is encouraged and finds full scope in scientific activity;

- to encourage individual initiative for the acquisition and dissemination of knowledge, and for the discovery of new knowledge, in an atmosphere of academic freedom;
- And, in general, to secure for the people of the country all the benefits that can accrue from the acquisition and application of scientific knowledge.

2. TECHNOLOGY POLICY STATEMENT 1983

- As Indian science progressed, it was felt that newer indigenous technologies needed to be developed than as imported technologies were to be efficiently absorbed and adapted.
- The policy statement of 1983 grew out of the felt need for guidelines to cover a wide ranging and complex set of related areas keeping in mind capital scarce character of a developing economy.
- It aims at ensuring that the country's available natural endowments, especially human resources, are optimally used for continued science in the well-being of all sections of people.
- Technological advancement is sought to solve the country's multifarious problems and safeguard its independence and unity.
- The late PM Smt. Indira Gandhi announced on January 3, 1983 at the Indian Science Congress session held at Tirupati the Technology policy of the Government of India.

Aims:

- attain technological competence and self-reliance, to reduce vulnerability, particularly in strategic and critical areas, making the maximum use of indigenous resources;
- provide the maximum gainful and satisfying employment to all strata of society, with emphasis on the employment of women and weaker sections of society;
- use traditional skills and capabilities, making them commercially competitive;
- ensure the correct mix between mass production technologies and production by the masses;
- ensure maximum development with minimum capital outlay;
- identify obsolescence of technology in use and arrange for modernization of both equipment and technology;
- develop technologies which are internationally competitive, particularly those with export potential;

- improve production speedily through greater efficiency and fuller utilization of existing capabilities, and enhance the quality and reliability of performance and output;
- reduce demands on energy, particularly energy from non-renewable sources;
- ensure harmony with the environment, preserve the ecological balance and improve the quality of the habitat; and
- Recycle waste material and make full utilization of by-products. TECHNOLOGY POLICY STATEMENT 1983.

3. SCIENCE AND TECHNOLOGY POLICY 2003

POLICY OBJECTIVES

- To ensure that the message of science reaches every citizen of India, man and woman, young and old, so that we advance scientific temper, emerge as a progressive and enlightened society, and make it possible for all our people to participate fully in the development of science and technology and its application for human welfare. Indeed, science and technology will be fully integrated with all spheres of national activity.
- To ensure food, agricultural, nutritional, environmental, water, health and energy security of the people on a sustainable basis.
- To mount a direct and sustained effort on the alleviation of poverty, enhancing livelihood security, removal of hunger and malnutrition, reduction of drudgery and regional imbalances, both rural and urban, and generation of employment, by using scientific and technological capabilities along with our traditional knowledge pool. This will call for the generation and screening of all relevant technologies, their widespread dissemination through networking and support for the vast unorganized sector of our economy.
- To vigorously foster scientific research in universities and other academic, scientific and engineering institutions; and attract the brightest young persons to careers in science and technology, by conveying a sense of excitement concerning the advancing frontiers, and by creating suitable employment opportunities for them. Also to build and maintain centres of excellence, which will raise the level of work in selected areas to the highest international standards.
- To promote the empowerment of women in all science and technology activities and ensure their full and equal participation.

- To provide necessary autonomy and freedom of functioning for all academic and R&D institutions so that an ambience for truly creative work is encouraged, while ensuring at the same time that the science and technology enterprise in the country is fully committed to its social responsibilities and commitments.
- To use the full potential of modern science and technology to protect, preserve, evaluate, update, add value to, and utilize the extensive knowledge acquired over the long civilizational experience of India.
- To accomplish national strategic and security-related objectives, by using the latest advances in science and technology.
- To encourage research and innovation in areas of relevance for the economy and society, particularly by promoting close and productive interaction between private and public institutions in science and technology. Sectors such as agriculture (particularly soil and water management, human and animal nutrition, fisheries), water, health, education, industry, energy including renewable energy, communication and transportation would be accorded highest priority. Key leverage technologies such as information technology, biotechnology and materials science and technology would be given special importance.
- To substantially strengthen enabling mechanisms that relate to technology development, evaluation, absorption and upgradation from concept to utilization.
- To establish an Intellectual Property Rights (IPR) regime which maximises the incentives for the generation and protection of intellectual property by all types of inventors? The regime would also provide a strong, supportive and comprehensive policy environment for speedy and effective domestic commercialization of such inventions so as to be maximal in the public interest.
- To ensure, in an era in which information is key to the development of science and technology, that all efforts are made to have high-speed access to information, both in quality and quantity, at affordable costs; and also create digitized, valid and usable content of Indian origin.
- To encourage research and application for forecasting, prevention and mitigation of natural hazards, particularly, floods, cyclones, earthquakes, drought and landslides.
- To promote international science and technology cooperation towards achieving the goals of national development and security, and make it a key element of our international relations.
- To integrate scientific knowledge with insights from other disciplines, and ensure fullest involvement of scientists and technologists in national governance so that

the spirit and methods of scientific enquiry permeate deeply into all areas of public policy making. It is recognized that these objectives will be best realized by a dynamic and flexible Science and Technology Policy, which can readily adapt to the rapidly changing world order. This Policy, reiterates India's commitment to participate as an equal and vigorous global player in generating and harnessing advances in science and technology for the benefit of all humankind.

4. SCIENCE-TECHNOLOGY AND INNOVATION POLICY 2013

- The Prime Minister Dr. Manmohan Singh, unveiled the Science, Technology and Innovation Policy (STI) 2013 at the inaugural session of the Centenary session of the Indian Science Congress at Kolkata.
- The STI Policy seeks to send a signal to the Indian scientific community, both in the private and public domain, thatscience, technology and innovation should focus on faster, sustainable and inclusive development of the people.
- The policy seeks to focus on both *STI for people and people for STI.* It aims to bring all the benefits of Science, Technology & Innovation to the national development and sustainable and more inclusive growth.
- It seeks the right sizing of the gross expenditure on research and development by encouraging and incentivizing private sector participation in R & D, technology and innovation activities.
- The policy also seeks to trigger an ecosystem for innovative abilities to flourish by leveraging partnerships among diverse stakeholders and by encouraging and facilitating enterprises to invest in innovations.
- It also seeks to bring in mechanisms for achieving gender parity in STI activities and gaining global competitiveness in select technological areas through international cooperation and alliances.
- The policy goal is to accelerate the pace of discovery, diffusion and delivery of science led solutions for serving the aspirational goals of India for faster, sustainable and inclusive growth. A Strong and viable Science, Research and Innovation system for High Technology led path for India **(SRISHTI)** are the goal for the STI policy.
- Prime Minister, Smt. 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 hasdeclared 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.

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. SCIENCE-TECHNOLOGY AND INNOVATION POLICY 2013
- 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.

ASPIRATIONS OF THE POLICY

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.

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. SCIENCE-TECHNOLOGY AND INNOVATION POLICY 2013

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

5. NATIONAL SCIENCE, TECHNOLOGY, AND INNOVATION POLICY 2020

The Office of the Principal Scientific Adviser to the Government of India (Office of PSA) and the Department of Science and Technology (DST) have jointly initiated the formulation of a new national Science Technology and Innovation Policy (STIP 2020).

- It will be the 5th STIP of India and is being formulated at a crucial juncture when India and the world are tackling the Covid-19.
    - It will integrate the lessons of the pandemic including the building of an Atmanirbhar Bharat by leveraging India's strengths in research and development, design, science and technology workforce and institutions, huge markets, demographic dividend, diversity and data.
- The STIP 2020 formulation process will be six-months long and has been organised into 4 highly interlinked tracks:
    - Track I: It involves an extensive public and expert consultation process through Science Policy Forum, a dedicated platform for soliciting inputs from larger public and expert pools during and after the policy drafting process.
    - Track II: It comprises experts-driven thematic consultations to feed evidence-informed recommendations into the policy drafting process. 21 focused thematic groups have been constituted for this purpose.
    - Track III: It involves extensive intra-state and intra-department consultation with Ministries and States.
    - Track IV: It constitutes an apex level multi-stakeholder consultation.

- **Previous Four STIPs:**
  - **Scientific Policy Resolution 1958**:
    - India's first major science policy can be traced back to the year 1958.
    - SPR 1958 laid the foundation of the scientific enterprise and scientific temper in India.
  - **Technology Policy Statement 1983**:
    - The primary feature of TPS 1983 was technological self-reliance through promotion and development of indigenous technologies.
    - Adoption of indigenous technology would reduce vulnerabilities in critical areas and would help maximise the utilisation of local (human and material) resources.
  - **Science and Technology Policy 2003**:
    - Its aim was to keep up the pace with science and technology, to stay competitive in an increasingly globalised world and to meet the primary goal of equitable and sustainable development.
    - It called to invest heavily in the research and development sector with the aim of increasing investment to 2% of the Gross Domestic Product (GDP).
  - **Science, Technology and Innovation Policy 2013**:
    - The decade of 2010 to 2020 was declared as a decade of innovation.
    - It was acknowledged that in order to stay globally competitive, it was necessary to make a transition into a knowledge-based economy.
    - This policy document was a step in the direction towards building a robust national innovation ecosystem.