



भारत सरकार

राष्ट्रीय अनुसूचित जनजाति आयोग

GOVERNMENT OF INDIA

NATIONAL COMMISSION FOR SCHEDULED TRIBES

No. Policy-7/2012/MTA(STI)/Service/RU-II

To

- 1) Dr.Rameshwar Oraon, Chairperson
- 2) Smt. K.Kamala Kumari, Member
- 3) Shri Bheru Lal Meena, Member

छठी मंजिल, 'बी' विंग, लोकनायक भवन
खान मार्केट, नई दिल्ली-110003
6th Floor, 'B' Wing, Lok Nayak Bhawan
Khan Market, New Delhi-110003

Dated 20-12-2012

Subject: Draft note for the Cabinet on Science, Technology and Innovation (STI) Policy 2013-
regarding.

Sir/Madam,

I am directed to enclose a copy of the O.M. No. 17011/21/2012-P&M dated 13/12/2012 received from Ministry of Tribal Affairs forwarding therewith the Memorandum for Draft note for the Cabinet on Science, Technology and Innovation (STI) Policy - 2013 from Ministry of Science & Technology seeking comments of NCST.

It is requested that views/comments on the draft note may kindly be sent for discussion in the forthcoming meeting of the Commission.

Yours faithfully,

(M.S.Chopra)
Director

Copy for information:-

- 1) PPS to Joint Secretary
- 2) Director (MSC)
- 3) Dy. Director (KDB)
- 4) Consultant (RCD)
- 5) SSA (NIC)
- 6) AD (Coord)

(M.S.Chopra)
Director

S.No. (CR)

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May like to see before
circulation of
AD (Cell)
RORW

NO.17011/21/2012-P&M
Government of India
Ministry of Tribal Affairs
(P&M Division)

Room No. F-281, Bhikaji Place.
August Kranti Bhwan, N. Delhi-110066
Dated 13.12.2012

Immediately
circulate today

OFFICE MEMORANDUM

DD

[Signature]
18/12

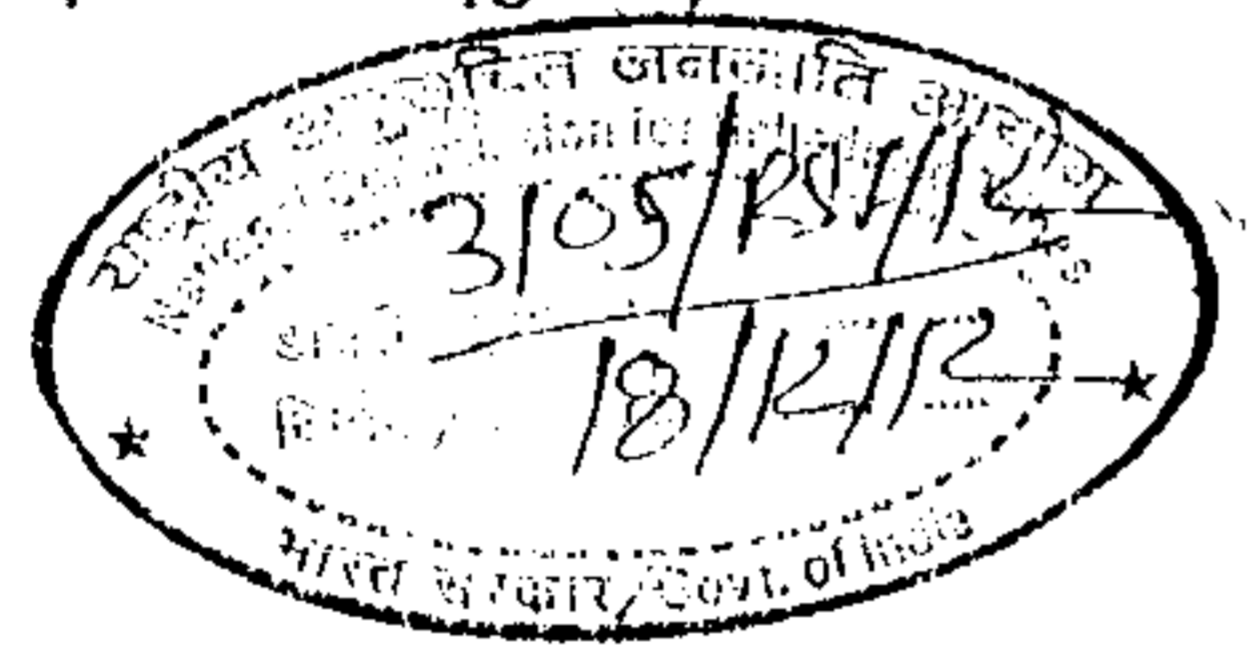
Subject: Draft note for the Cabinet on Science, Technology and Innovation (S TI) Policy 2013-
regarding

~~18-12-12~~
18-12-12
RU/II

The undersigned is directed to forward herewith a copy of D.O No. 11001/01/2012-
PRC of the Ministry of Science and Technology along with the draft for the Cabinet on the
above Subject.

2 It is requested that the comments of the NCST on the draft note for the Cabinet may
kindly be provided urgently so as to enable this Ministry to keep up with the time schedule.

DDRDB/
S-Post



[Signature]
(R H H Hmar)

Under Secretary to the Government of India.
Tel.26182423

To,
The Joint Secretary
National Commission for Scheduled Tribe
Room No.610,B-Wing 6th floor
Lok Nayak Bhawan, Khan Market New Delhi-03

EM/12



भारत सरकार
 विज्ञान और प्रौद्योगिकी मंत्रालय
 विज्ञान और प्रौद्योगिकी विभाग
 टेक्नोलॉजी भवन, नया महरौली मार्ग
 नई दिल्ली-110 016

डा. इन्द्र जीत सिंह आई ए एस
 संयुक्त सचिव
 Dr. Inderjit Singh IAS
 Joint Secretary

GOVERNMENT OF INDIA
 MINISTRY OF SCIENCE & TECHNOLOGY
 DEPARTMENT OF SCIENCE & TECHNOLOGY
 TECHNOLOGY BHAVAN, NEW MEHRAULI ROAD
 NEW DELHI-110 016

D.O. No. 11001/01/2012-PRC

Dated the 3rd December, 2012

5621
 07/12/12
 2798
 6/12/2012
 2013

Dear Madam,

I am enclosing draft Cabinet note along with draft Science, Technology and Innovation (STI) Policy 2013 for comments, if any, of your Ministry / Department. There is urgency in the matter as the Policy is to be formally announced by the Hon'ble Prime Minister on 3rd January 2013 at 100th Session of Indian Science Congress at Kolkata, and before that approval of the Cabinet has to be sought. The matter is likely to be placed before the Cabinet during the 2nd week of December 2012.

2. It is, therefore requested that comments of your Ministry / Department may kindly be sent to this Department within a period of 7 days instead of prescribed period of 15 days.

With Regards

Yours Sincerely,

 (Inderjit Singh)

Received
 at 4:40 pm
 12/12

RS A
 we may respond
 Policy issues indicated
 demerits: promotion of
 water discip research
 and STI for inclusion
 must spell out how the
 tribals excluded tribal
 communities can be benefited
 & their knowledge resource
 appropriately utilised with
 recognition of local wisdom
 involve of local wisdom
 6/12/12

Smt. Vibha Puri Das
 Secretary
 Ministry of Tribal Affairs
 Krishi Bhawan, A - Wing
 Dr. Rajendra Prasad Road
 New Delhi - 110 001

7/12/12
 DSC/PSA
 US/PAM

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No. 11001/01/2012-PRC
MINISTRY OF SCIENCE & TECHNOLOGY
DEPARTMENT OF SCIENCE & TECHNOLOGY

New Delhi, dated the November, 2012

DRAFT

NOTE FOR THE CABINET

SUB: SCIENCE, TECHNOLOGY AND INNOVATION (STI) POLICY 2013

1. INTRODUCTION

The present proposal seeks approval of the Cabinet to the Science, Technology and Innovation (STI) Policy - 2013. Science, Technology and Innovation have emerged as the major drivers of socio-economic development globally. India of the 21st century is an aspiring country. Faster, sustainable and inclusive growth is her aspiration. Science, Research, and Innovation leading to applications of High-technology will need to play defining roles in realizing these aspirations. The national demographic dividend and talent pool offer the STI enterprise unique opportunities for earning a central position in national development and global hi-tech arena.

2. BACKGROUND AND NEED FOR A NEW STI POLICY

Scientific research utilizes money to generate knowledge and innovation converts knowledge into wealth and/or value. India was amongst the first few countries to enunciate a policy on Science.

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India's Scientific Policy Resolution (SPR) of 1958 was a pace setter in the world and remains valid even today. The SPR resolved to "foster, promote and sustain" the "cultivation of science and scientific research in all its aspects". Technology was then assumed to flow from the country's diversified science infrastructure that was so assiduously being established by the government. The SPR also emphasized the use of the scientific approach in all activities of the nation. The Technology Policy Statement (TPS) of 1983 focused on the need to attain technological competence and self-reliance. Several of the statements of TPS were implemented. The Science and Technology Policy (STP) of 2003 sought to bring science and technology (S&T) together. It emphasized the need for higher investment into R&D to address national problems. It 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. Today innovation is no longer a mere appendage to science and technology but has assumed centre stage, in its own right, in the developmental goals of countries around the world. Vertical integration of all dimensions of STI into the socio-economic processes seems to be the only way forward in the emerging global knowledge era. New paradigms of innovation have emerged, arising, among others, out of the pervasive intrusion of internet. Even then

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systems that foster innovation are not universal. They have become country and context specific. India has declared 2010-20 as the "Decade of Innovations". The Government has stressed the need to bring forth a policy that develops synergy between science, technology and innovation. The STI Policy 2013 is in furtherance of this declaration and aims to bring fresh perspectives to bear on S&T led innovations in the changing context.

3. **THE PROPOSAL**

The proposed STI Policy 2013 (Annexure - I) (p. 12-20) seeks to *focus on both STI for people and people for STI*. It aims to bring all the benefits of science, technology and innovation to the national development and sustainable and more inclusive growth. Science and innovations are the creative activities of human genius, public policies of developed and emerging economies emphasize the nurturing and growing of national human resources and talent pool. India derives comparative advantage from her rich pool of talents; the policy thus emphasizes on this aspect and seeks to put in place mechanisms that encourage performance-based reward systems. 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

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by leveraging partnerships among diverse stake holders 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 co-operation and alliances. The policy goal is thus 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 of the STI policy. Aspirations of India would be serviced by an equally aspiring Indian STI system.

The key features/elements of the STI Policy 2013 are:

- 1) Promoting the spread of scientific temper amongst all sections of society.
- 2) Enhancing skill for applications of science among the young from all social strata.
- 3) Making careers in science, research and innovation attractive enough for talented and bright minds.
- 4) Establishing world class infrastructure for R&D for gaining global leadership in some select frontier areas of science.
- 5) Positioning India among the top five global scientific powers by 2020.
- 6) Linking contributions of science, research and innovation system with inclusive economic growth agenda and combine priorities of excellence and relevance.

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- 7) Investing modern science for leveraging traditional knowledge for finding solutions to national challenges.
- 8) Creating an environment for enhanced Private Sector Participation in R&D.
- 9) Enabling conversion of R&D outputs into commercial applications by replicating hitherto successful models as well as establishment of new PPP structures.
- 10) Seeding S&T-based high-risk innovations through new mechanisms.
- 11) Fostering resource-optimized, cost-effective innovations across size and technology domains.
- 12) Triggering changes in the mindset and value systems to recognize, respect and reward performances which create wealth from S&T derived knowledge.
- 13) Creating a robust national innovation system.

4. JUSTIFICATION

India of the 21st century is an aspiring nation. Faster, sustainable and inclusive growth is her aspiration. Integration of all dimensions of STI into the socio-economic processes appears to be one of the major instruments for India to realize her aspirations. The Policy document aims to enable India becoming a global knowledge power by promoting basic research, development of cutting edge technologies and innovation for globally competitive growth to power technology led economic progress of the society. The Policy would

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strengthen the R&D base of the country through proper funding, development and utilization of technologies, building entrepreneurship, mounting mission mode initiatives, attracting talent to science and rejuvenating research in universities and promoting newer forms of public-private partnership. With 2010-20 having been declared as a "Decade of innovations" by the Government, an integrated Science, Technology and Innovation Policy has become essential to bring about the resurgence of an innovative India.

5. FINANCIAL IMPLICATIONS

At present, there are no financial implications. The proposal seeks approval of the STI Policy 2013. The implementation of specific Policy provisos will be initiated through separate schemes/proposals, for which the prescribed scrutiny and approval processes would be followed.

6. INTER-MINISTERIAL CONSULTATIONS

6.1 Since June 2012, Department of Science and Technology (DST) has had discussions and consultations with wide variety of stake holders on the constituents of an STI Policy. Initially, consultations and discussions were held with six policy research institutions in the country to delineate the contours and constituents of a STI policy suited to India's resource endowments. Thereafter

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the three overarching all-India industry and business associations, the Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce and Industry (FICCI), Association of Indian Chambers of Commerce (ASSOCHAM), were charged with organizing consultations on the STI policy with industry, services sectors & NGOs and academia; seven consultation meetings were organized. Based on the inputs received, a zero order policy document was discussed in a meeting with Department of Bio-Technology, Department of Scientific & Industrial Research, Ministry of Earth Sciences, Department of Information Technology, Department of Atomic Energy, Defence Research and Development Organization, Ministry of New & Renewable Sources, ICAR and ICMR. A revised draft was then formulated after taking into consideration the recommendations/suggestions made by these Departments/Agencies. The revised draft was circulated to members of Scientific Advisory Committee to the Prime Minister (SAC-PM), Scientific Advisory Committee to the Cabinet (SAC-C) and a few other leading luminaries of S&T. The draft policy document (Annexure-I) has been prepared based on inputs received during the consultation process.

6.2 The draft Cabinet note along with draft STI Policy 2013 (Annexure-I) was circulated (*being done*) to concerned Ministries

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and Planning Commission, and the comments of the concerned Ministries/Departments had been received (*being obtained now*) by the DST. The Ministries consulted and date of the receipt of their comments are (*will be added on receipt of the comments.*) The comments received from the Ministries /Department consulted have been tabulated, and are given in the Annexure - II (p.) (*will be added on receipt of the comments.*). The copies of the draft Cabinet note were also forwarded to PMO and the Cabinet Secretariat on (*being done*). A copy of the final note for consideration of Cabinet had been forwarded to PMO on (*will be done*). A copy of the final note had also been forwarded to Cabinet Secretariat on the same date (*will be done*).

7. **APPROVAL SOUGHT**

Approval of the Cabinet is sought for the Science, Technology and Innovation Policy 2013 (Annexure-I) (p. 12-20). It is proposed to formally announce the Policy at the 100th Session of the Indian Science Congress on 3rd January 2013. The Policy after approval, shall be published in the official Gazette.

8. **STATEMENT OF IMPLEMENTATION SCHEDULE**

The Statement of Implementation Schedule is at Appendix - I (p. 10).

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9. STATEMENT OF EQUITY, INNOVATION AND PUBLIC ACCOUNTABILITY

The Policy especially highlights and brings to centre stage the role of innovations in national development. It also seeks to bring about gender parity in STI activities. Public accountability will be ensured through a system of periodic reporting to the nation. The Statement of Equity, Innovation and Public Accountability is at **Appendix - II (p. 11)**.

10. APPROVAL OF THE MINISTER IN CHARGE

The Cabinet note has been seen and approved by the Minister of Science & Technology and Earth Sciences.

(Inder Jit Singh)
Joint Secretary to the Government of India
Department of Science and Technology
Telephone No: 011-26516077

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APPENDIX-I

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STATEMENT OF IMPLEMENTATION SCHEDULE

SUB: SCIENCE, TECHNOLOGY AND INNOVATION (STI) POLICY 2013

Gist of decisions required	Projected benefits and results	Time Schedule for implementation
Approval of the Cabinet is sought for the Science, Technology and Innovation Policy 2013	The STI Policy 2013 aims to bring all the benefits of science, technology and innovation to the national development and sustainable and more inclusive growth.	Immediately on receipt of Cabinet approval.

(Inder Jit Singh)
Joint Secretary to the Government of India
Telephone No: 011-26516077

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STATEMENT OF EQUITY, INNOVATION AND PUBLIC
ACCOUNTABILITY

SUB: SCIENCE, TECHNOLOGY AND INNOVATION POLICY 2013

S. No.	The required goal	How does the proposal advance this goal
1.	Equity or Inclusiveness	The Policy seeks to bring about gender parity in STI activities.
2.	Innovation	The Policy especially highlights and brings to centre stage the role of innovations in national development.
3.	Public Accountability	Public accountability will be ensured through a system of periodic reporting to the nation.

(Inder Jit Singh)
Joint Secretary to the Government of India
Telephone No: 011-26516077

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ANNEXURE - I

Science, Technology and Innovation Policy 2013

(DRAFT)



सत्यमेव जयते

Government of India
New Delhi

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Science, Technology and Innovation Policy 2013

Shaping the Future of an Aspiring India

Science, Technology and Innovation (STI) have emerged as the major drivers of national development globally. As India aspires for faster, sustainable and inclusive growth, the Indian STI system, with the advantages of a large demographic dividend and the huge talent pool, will need to play a defining role in achieving these national goals. The national STI enterprise must become central to national development.

Changing Phases of National Policies in S&T

India's Scientific Policy Resolution (SPR) of 1958 resolved to "foster, promote and sustain" the "cultivation of science and scientific research in all its aspects". Technology was then expected to flow from the country's established science infrastructure. The Technology Policy Statement (TPS) of 1983 emphasized the need to attain technological competence and self-reliance. The Science and Technology Policy (STP) of 2003 brought science and technology (S&T) together and emphasized the need for investment in R&D. It called for integrating programmes of socio-economic sectors with the national R&D system to address national problems as well as creating a national innovation system.

The Need for a Science, technology and Innovation Policy

Scientific research utilizes money to generate knowledge and, by providing solutions, innovation converts knowledge into wealth and/or value. Innovation thus implies S&T-based solutions that are successfully deployed in the economy or the society. It has assumed centre stage in the developmental goals of nations. Paradigms of innovation have become country and context specific. India has, hitherto not accorded due importance to innovation as an instrument of policy. The national S & T enterprise must now embrace S&T led innovation as a driver for development.

India has declared 2010-20 as the "Decade of Innovation". The Government has stressed the need to enunciate a policy to synergize science, technology and innovation and has also established the National Innovation Council. The STI Policy 2013 is in furtherance of these pronouncements. It aims to bring fresh perspectives to bear on innovation in the Indian context.

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STI Policy: A New Paradigm

Science, technology and innovation can exist separately on their own in disconnected spaces. But it is their integration that leads to new value creation. India's global competitiveness will be determined by the extent to which the STI enterprise contributes social good and/or economic wealth. There is, therefore, the need to create the necessary framework for enabling this integration in identified priority areas by exploiting endogenous resources, strengths and capacities. New structural mechanisms and models are needed to address the pressing challenges of energy and environment, food and nutrition, water and sanitation, habitat, affordable health care and skill building and unemployment. *"Science technology and innovation for the people"* is the new paradigm of the Indian STI enterprise. The national STI system must, therefore, recognize the Indian society as its major stake holder. Global innovation systems tend to bypass large sections of the community. Innovation for inclusive growth implies ensuring access, availability and affordability of solutions to as large a population as possible. Innovation, therefore, must be inclusive. The instruments of the STI policy will enable this to be realized. The policy will drive both investment in science and investment of science-led technology and innovation in select areas of socio-economic importance. Emphasis will be to bridge the gaps between the STI system and the socio-economic sectors by developing a symbiotic relationship with economic and other policies.

Capturing Aspirations

The key elements of the STI policy 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 inclusive economic growth agenda and combine priorities of excellence and relevance.
- ❖ Investing modern science for leveraging traditional knowledge for finding solutions to national challenges.
- ❖ Creating an environment for enhanced Private Sector Participation in R&D.
- ❖ Enabling conversion of R&D outputs into commercial applications by replicating hitherto successful models as well as establishment of new PPP structures.

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- ❖ 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.

Investment in Research and Development

Global investments in science, technology and innovation are estimated at \$1.2 trillion as of 2009. India's R&D investment is less than 2.5% of this and is currently under 1% of the GDP. Increasing Gross Expenditure in Research and Development (GERD) to 2% of the GDP has been a national goal for some time. Achieving this in the next five years is realizable if the private sector raises its R&D investment to at least match the public sector R&D investment from the current ratio of around 1:3. This seems attainable as the industrial R&D investment grew by 250% and the sales by 200% between 2005 and 2010. Increased private investment is necessary for translating R&D outputs into commercial outcomes. While maintaining current rates of growth in public R&D investments, a conducive environment will be created for enhancing private sector investment in R&D.

The gross budgetary support for the science and technology sector has significantly increased during the last decade. The impact of such increase is becoming evident. India ranks ninth globally in the number of scientific publications and 12th in the number of patents filed. The Composite Annual Growth Rate (CAGR) of Indian publications is around 12±1% and India's global share has increased from 1.8% in 2001 to 3.5% in 2011. But the percentage of Indian publications in the top 1% impact making journals is only 2.5%. By 2020, the global share of publications must double and the number of papers in the top 1% journals must quadruple from the current levels. The citation impact of Indian publications must improve and match at least the world average. Initiatives under the new policy should enable these macro indicators of research to be achieved by 2020.

According to the Global Science Report of the UNESCO, India's current global ranking is commensurate with its number of Full-Time Equivalent (FTE) of R&D personnel. It is imperative that the total number of FTE of R&D personnel increases by at least 66% of the present strength within the next five years.

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Promoting Excellence and Relevance in R&D**Nourishing the Roots**

Ensuring sustainable pipeline of talented youth for science is a challenge. India has mounted some significant initiatives for attracting talent to science and careers with research. Empowering stakeholders for local actions is a key element of these initiatives. The policy framework will further enable school science education reforms by improving teaching methods, science curricula, motivating science teachers and schemes for early attraction of talent to science. Also special incentive mechanisms will be devised to stimulate research in the universities and develop young leaders in science and engineering.

Excellence and Relevance

Investment in basic research will be enhanced for fostering excellence against global benchmarks and focusing on relevance for addressing national challenges.

Gender Parity

Participation of women in STI activities is important. New and flexible schemes to address the mobility challenges of employed women scientists and technologists will be put in place. A broad scope for re-entry of women into R&D and facilitation mechanisms for special career paths in diverse areas will be sought.

Inter-University Centres

The few inter-university centres that have been set up have proved the concept to be a successful and viable one. Such centres need to be multiplied in different fields to enable a wider cross section of university researchers access advanced research facilities and equipment which are otherwise not available in university environments. These will be discipline-specific as well as multi-disciplinary, including humanities, to address the grand challenges in S&T and its applications.

Participation in Global R&D Infrastructure and Big Science

Modern science is increasingly becoming resource intensive. It has become necessary to create high-cost global infrastructures in some fields through international consortia models. Indian participation in such international projects will be encouraged and facilitated to gain access to facilities for advanced research in cutting edge areas of science. This will also enable the Indian industry to gain global experience and competitiveness in some high-technology areas with spin-off benefits.

Performance-Linked Rewards and Investments

Transparent centrally implementable Performance Related Incentive Scheme (PRIS), based on past and proven track record in research, will be put in place to enable grant-

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based investments in such performers. For R&D leading to technology development and knowledge services, the criteria would, however, be institution specific. Centrally instituted incentives to public-funded R&D centres for outcomes leading to public and strategic goods could be introduced.

National Agenda and the STI System

Macro indicators of R&D do not really reflect the innovation capability of a nation. Appropriate indicators, which integrate measures of excellence and inventiveness with relevance and affordable innovation, are necessary for evidence based policy actions. Supply side interventions have hitherto been the main strategy for public investment in R&D. This needs to change. There should be equal emphasis on both supply side interventions and demand based investments.

Around 10 sectors of high impact potential will be identified for directed STI intervention and deployment of requisite resources. Enabling policy instruments that facilitate both institutional research and R&D enterprises to focus their efforts in these areas will be put in place.

The complex value chain of innovation - from idea to market - often calls for STI intervention at all levels: research, technology inputs, manufacturing and services. In the priority areas of socio-economic importance, the policy will enable a holistic approach to intervention, support and investment.

R&D policy for agriculture is articulated by the Indian Council of Agriculture Research (ICAR). Integration of the agriculture R&D policy with the national R&D system and the STI policy will be brought about.

STI inputs to the manufacturing sector can lead to enhanced employment generation. The innovation ecosystem for the sector, however, depends on the nature and size of the enterprise and the context. India's share of global trade in high technology products is at present only around 8% and the present technology intensity of the sector is a low of 6-7%. The aim is to double these through greater technology inputs from R&D. A strategic selection of some industry sectors, where India can aspire for leadership, would be made for stepping up R&D intensity and increase India's share in high-technology trade. Small and Medium Enterprises (SME) generally have low R&D intensity. Special schemes to support R&D as well as related services at the firm or collective level, will be devised and put in place.

The R&D intensity of the services sector is generally low. This needs to be enhanced considerably and the skill base also expanded significantly. For rapidly accomplishing the tasks of modernization of technology-based services, missions in some select service sector areas, will be identified. Deployment of technology-led services for transparent Government machinery will also be supported.

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Climate change is of global concern and India has articulated a National Action Plan for Climate Change (NAPCC) and identified several national missions. The STI system will have an active role in these missions. It will also serve as a source of strategic knowledge to cope with the challenges of climate change as well as to meet equity-based differentiated and shared responsibilities of India.

Attracting Private Sector Investments in R&D

Public funds for partnerships with the private sector for social and public good objectives will be earmarked as a new policy initiative. A National Science, Technology and Innovation Foundation will be established as a Public-Private Partnership (PPP) initiative for investing critical levels of resources in innovative and ambitious projects. The focus of the policy will be:

- ❖ Facilitating private sector investment in R&D centres 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.
- ❖ 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.
- ❖ Launching newer mechanisms for nurturing Technology Business Incubators (TBIs) and science-led entrepreneurship.
- ❖ 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.

Delivery systems for STI outputs to stake holders and Society

Diffusion of scientific outputs and technology interventions into social systems is a multi-layered process. Except for the mission-oriented strategic sectors, the delivery mechanism involves a large number of intermediaries both from the public and private sectors. This requires strengthening of linkages between the scientific and socio-economic sectors. The STI policy will leverage the R&D allocations of socio-economic ministries through a shared vision, mission-oriented approach and adoption of new delivery models with provisions for accountability. The state governments constitute important stakeholders. Measures will be taken to ensure that state-specific S&T vision and plans are informed and guided by the new STI Policy towards which State S&T

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DEPARTMENT OF SCIENCE & TECHNOLOGY

Councils/Boards will be strengthened. NGOs will be accorded a pivotal role in the delivery of STI outputs, especially rural technologies, to the grassroots level.

Ecosystem Changes for Science, Technology and Innovation

Special and innovative mechanisms for fostering academia-research-industry partnerships will be devised. Mobility of experts from academia to industry and *vice-versa* will be facilitated. Success stories in S&T-based innovations from Indian experience would be replicated and scaled up. Regulatory and legal framework for sharing of IPRs between inventors and investors, and for closing gaps in the translation of new R&D findings into the commercial space, would be put in place.

Rigidity of centrally developed plans for investments often does not suit frontline science, technology development and innovation. A flexible approach that allows for fine tuning the Five Year Plan schemes in response to rapid changes in S&T would be put in place with speed, scale and sustainability as key governance parameters.

"Risks" are an integral part of a vibrant innovation system. Risk sharing by the government will significantly increase private sector investment in R&D and technology development. New financing mechanisms for investing in enterprises without fear of failure and options for foreclosing unsuccessful ventures are essential part of an enabling innovation ecosystem. A public procurement policy that favours first of its kind products developed through indigenous innovation and measures to promote such products globally are necessary.

General rules of expenditure control of publicly funded institutions do not suit non-linear growth sectors like science and technology, and more so the innovation sector. Auditing principles should be more aligned to "performance" than "compliance to procedure". The system should be able to differentiate between genuine failures and process deficits.

Specifically the policy will focus on:

- ❖ Prioritizing critical R&D areas like agriculture, telecommunications, energy, water management, health and drug discovery, materials and climate change.
- ❖ Promoting inter-disciplinary research, including traditional knowledge.
- ❖ Promoting mechanisms such as "small idea-small money" and "Risky Idea Fund" to support innovation incubators.
- ❖ Establishment of a Fund for Innovations for Social Inclusion.
- ❖ Supporting STI driven entrepreneurship with viable and highly scalable business models.
- ❖ Investing in young innovators and entrepreneurs through education, training and mentoring.

SECRET

Gaining Global Competitiveness through Collaboration

Open source approaches for public and social goods form interesting innovation systems. Knowledge commons is an emerging theme for managing IPRs created through multi-stake holder participation. The STI Policy will seek to establish a new regulatory framework for data access and sharing as also for creation and sharing of IPRs. The new policy framework will enable strategic partnerships and alliances with other nations through both bilateral and multilateral cooperation in science, technology and innovation. Science diplomacy, technology synergy and technology acquisition models will be judiciously deployed based on strategic relationships.

Public Awareness and Public Accountability of Indian STI sector

Public understanding of science is an important dimension for introducing and reaching the benefits of modern science and technology to the people. The civilizational aspect of science, or scientific temper, needs to be promoted across all sections of the society systematically. Effective science communication methods, by using tools such as the National Knowledge Network, will be initiated.

Public and political understanding of science should be based on evidence and debates with open mind. People and decision makers must be made aware of the implications of emerging technologies, including their ethical, social and economic dimensions. White papers on mission-oriented programmes, with specific deliverables and timelines, will be published. Mechanisms for assessing the performance of the national STI enterprise through an autonomous and robust evaluation system, which includes social scientists, will be established. The national science academies will be accorded a major role in this endeavour of public accountability.

Policy Vision

The guiding vision of aspiring Indian STI enterprise is to accelerate the pace of discovery and delivery of science-led solutions for faster, sustainable and inclusive growth. A **strong and viable Science, Research and Innovation System for High Technology-led path for India (SRISHTI)** is the goal of the new STI policy.

(Inder Jit Singh)

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