

**GOVERNMENT OF INDIA
SCIENCE AND TECHNOLOGY
LOK SABHA**

UNSTARRED QUESTION NO:5977

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NANO MISSION TO PROMOTE R D

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Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

- (a) whether the Government has launched Nano Mission to promote Research and Development in Nano Science and Technology;
- (b) if so, the details thereof including funds allocated, utilised, R&D projects undertaken and their output during the last three years and the current year, phase-wise and year-wise;
- (c) the present status of the Mission and the extent to which the country has benefited from the Mission; and
- (d) the steps taken by the Government to ensure that the Mission becomes a success?

Answer

MINISTER OF STATE IN THE MINISTRY OF SCIENCE AND TECHNOLOGY AND MINISTER OF STATE IN THE MINISTRY OF EARTH SCIENCES (SHRI Y.S. CHOWDARY)

(a) Yes, Madam.

(b) On 3rd May 2007, the Government of India launched the Nano Mission, as an 'umbrella capacity-building programme', for a period of 5 years with an allocation of Rs. 1000 crores, anchored in the Department of Science and Technology (DST). Its objectives are:

Basic Research Promotion.
Human Resource Development.
International Collaborations.
Research Infrastructure Development.
Nano Applications & Technology Development Programmes.
Orchestrating National Dialogues on Multiagency Issues.
The Union Cabinet has also approved continuation of Nano Mission in the 12th Plan Period with an allocation of Rs. 650 crores.

Details of funds allocated and utilized by Nano Mission during the last three years and current year are given in the Annexure I. List of R&D projects undertaken during this period (which falls under Phase II of the Mission in the 12th Plan Period) and their output are given in Annexure II.

(c) The Nano Missions duration has been extended till 31.03.2017 and it is currently in its Phase-II. It is widely acknowledged today that Nano Mission gave a fillip to R&D activities in this emerging area in the country as a whole. As a result of the lead taken by the Nano Mission, some of the benefits that have accrued to the country are as follows:

India today is placed 3rd in the world in terms of scientific publications. It was placed 6th in 2011 and 4th in 2012 and it acquired 3rd position in 2013.

A community of over 2000 researchers in the field of Nano Science & Technology has been built.

The projects/programmes funded by the Nano Mission alone have so far resulted in 5000 research papers in refereed journals, 186 Patents, 600 PhDs and 22 Post-Doctoral Fellows, 900 M.Tech./M.Sc. Students and training of 3500 other technical manpower.

Some of the technologies developed as part of Nano Mission funded projects are: discovery of voltage developing across a single walled carbon nanotube when a liquid flows over it at Indian Institute of Science (IISc), Bangalore; water purification systems for removal of Arsenic, Iron, pesticides and other contaminants using nanotechnology developed at Indian Institute of Technology (IIT), Madras, etc. Besides that, Indian Institute of Technology (IIT), Delhi, is developing/has developed technologies for Fluoride removal, antimicrobial nanofinish based on nanosilver for textiles; Nano TiO₂ based self-cleaning nanofinish for textiles; and electrospun nanofibre web based automotive filter.

As a result of the initiatives taken by the Nano Mission, Indian scientists have now access to advanced characterization and

instrumentation facilities including top-of -the-line ultra high resolution aberration corrected transmission electron microscope in the country and synchrotron radiation and neutron sources abroad.

(d) The Government has arranged for a high-level Nano Mission Council chaired by an eminent scientist to steer the Mission. The Nano Mission Council also consists of Secretaries to 6 other science departments and 7 eminent domain experts. This is to ensure that the best of scientific knowledge and high-level inter-agency linkages are leveraged for promoting this emerging area and tapping its immense potential for public good. As a result, the Nano Mission has been able to support a variety of programmes to achieve its goals, such as individual scientist centric projects, Units on Nano Science, Centres of Nano Technology, Thematic Units of Excellence, Centre for Computational Materials Science, Joint Industry-Institute Projects, Post-Graduate programmes and Post-Doctoral Fellowships in Nano Science and Technology, International Collaborations, etc. To push technology-related programmes in future, the Mission plans to support Proof-of-Concept Projects (POC), Proof-of-Commercial-Value Projects (POCV), Technology Demonstration Projects (TDPs) and Technology Commercialization Projects (TCPs) to target different stages of technology development. The Government, therefore, has granted complete programmatic autonomy to the Mission to adapt to the emerging contours of R&D in this fast-changing field and achieve its objectives successfully.