National Mission on Interdisciplinary Cyber-Physical Systems

2678. DR. BANDA PRAKASH: Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

(a) whether Government is launching National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS) to be implemented by Department of Science and Technology at a total outlay of ₹ 3,660 crore for a period of five years to address the ever increasing technological requirements of the society, the international trends and roadmaps of leading countries for the next generation technologies; and

(b) if so, the details thereof?

THE MINISTER OF SCIENCE AND TECHNOLOGY (DR. HARSH VARDHAN): (a) Yes, Sir. Department of Science and Technology has launched National Mission on Interdisciplinary Cyber Physical Systems (NM-ICPS) in April 2019

(b) The Mission has a roadmap for development of next generation technologies like: Artificial Intelligence, Data Science and Predictive analytics, Internet of Things (IoT), Machine Learning (ML), Deep Learning (DL), Big Data Analytics, Robotics, Self-Monitoring, Analysis and Reporting Technology (SMART), Advanced material, Sensor Networks, Quantum Computing, Quantum Communication, Quantum encryption (Quantum Key Distribution), Cyber Security for physical infrastructure, Geographical Information Systems (GIS), Blockchain Technology etc. The Mission is positioned to work on Technology Development, Translational Research, Human Resource Development (HRD) and Skill Enhancement, Entrepreneurial Development and International Collaborative Research in next generation technologies. The mission is implemented through 15 number of Technology Innovation Hubs (TIH), 6 number of Application Innovation Hubs (AIH) and 4 number of Technology Translation Research Parks (TTRPs) across the country.

Promotion of R&D activities

2679. SHRI K. R. ARJUNAN: Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

(a) whether it is a fact that Government is considering to come out with new measures and schemes for the promotion of people' s participation in research and development;

(b) if so, the details thereof;

(c) whether it is also a fact that Research and Development (R&D) activities in India is at very low as compared to other developing nations; and

(d) if so, the details thereof?

THE MINISTER OF SCIENCE AND TECHNOLOGY (DR. HARSH VARDHAN): (a) and (b) Yes, Sir. The Government has launched a number of new measures and schemes for promotion of people participation in research and development. A number of new schemes launched by the Department of Science and Technology (DST) to attract young researchers that include; National Post Doctoral Fellowship; Early Career Research Award; Overseas Doctoral Fellowship; Overseas Post Doctoral Fellowship; and Teacher Associates for Research Excellence have been launched. These schemes have almost doubled the opportunities for young and aspiring researchers for carrying out R&D in their chosen areas of science and engineering. A new scheme for bringing the best of global science and scientists to India called "Visiting Advanced Joint Research (VAJRA)" has been launched recently. To address gender imbalance, a new scheme called "KIRAN" has been launched and a pilot scheme VIGYAN JYOTI has been started to attract and encourage young women scientists. A scheme to encourage young scientists to write popular articles on their research pursuits called "AWSAR" has also been launched. To boost innovation and Start-up activities a national programme titled NIDHI - National Initiative for Developing and Harnessing Innovations which addresses the entire value chain of Innovations has been launched. To encourage young students to think innovatively, a new programme called "MANAK" –Million Minds Augmenting National Aspirations and Knowledge has been launched to target 10 lakh students every year from class 6 to 10. An internet based dedicated Science Channel and a hourly daily programme on Doordarshan – DD Science has been launched.

The Council of Scientific and Industrial Research (CSIR) has been providing doctoral and postdoctoral fellowships to young budding researchers through various fellowship programmes such as Junior Research Fellowship- National Eligibility Test (JRF-NET), Shyama Prasad Mukherjee Fellowships (SPMF), Senior Research Fellowships (SRF-Direct), Research Associateships (RA) and CSIR-Nehru Postdoctoral Research Fellowship (PDF). Each year a large number of JRFs are awarded through CSIR-UGC NET in the area of basic sciences to pursue doctoral research. Further, CSIR awards Shyama Prasad Mukherjee Fellowships to certain top ranking JRF-NET qualified candidates to nurture the budding scientific talent and to nourish the objective of pursuit of scientific research. Similarly, a large number of young researchers are awarded SRF-Direct in 18 disciplines of basic, engineering, medicinal and pharmaceutical sciences to pursue doctoral research.

The PhD awardees are awarded Research Associateships (RA) for pursing postdoctoral research. Further, to identify promising young researchers with innovative ideas and provide them with training and research opportunities in niche areas of basic science, engineering, medicine and agriculture, CSIR-Nehru PDF scheme has been instituted. CSIR also provides JRF-GATE fellowship to Graduate Aptitude Test in Engineering (GATE) qualified engineering graduates and Graduate Pharmacy Aptitude Test (GPAT) qualified pharmaceutical graduates to pursue research through a suitable PhD programme in Academy of Scientific and Innovative Research (AcSIR) or in any other institution.

The Department of Biotechnology (DBT) is implementing programs to promote peoples participation in the biotechnology research and development activities. Department has created a platform in form of establishing Biotech-Krishi Innovation Science Application Network (Biotech-KISAN) Hubs in each of 15 agro-climatic zones of the country, which aims to connect farmers and scientists to promote Agriculture Innovation and take the new interventions to the farmers and farms.

To attract youth with science background to pursue science as a career, the government has recently enhanced the fellowship stipend.

(c) and (d) No, Sir. As per the latest data available on number of annual research publications in Science Citation Index (SCI) journals, India globally ranks 5th and is ahead of all the developing countries except China. Only USA China, UK and Germany are ahead of India in this regard. India recently surpassed Japan, France, Italy and Russia. India has been progressively improving its world' s ranking in recent years. The country has maintained an annual publication growth rate of nearly 14% over the years as against 4% of global average. India today globally ranks 3rd in Chemical Engineering, Chemistry, Computer Science, Materials Science, Pharmacology and Toxicology, 6th in agriculture, bio-chemistry and mathematics, and 7th in Physics and astronomy. India' s global ranking in terms of quality of research publications has also improved from 14th in 2011 to 11th in 2016 surpassing South Korea, Netherland and Switzerland.

National Institute of Oceanography, Visakhapatnam

2680. SHRI V. VIJAYASAI REDDY: Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

(a) whether it is more than three years since the foundation-stone was laid for shore-based laboratory for National Institute of Oceanography (NIO) near Rushikonda in Visakhapatnam district of Andhra Pradesh;