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Meeting Report

Role of Science, Technology and Innovation in Ensuring Sustainable Development

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Introduction

In the recent past there has been a rapid growth in research endeavours in fundamental sciences as well in applications of science and technology in tackling societal problems. The present number of practicing scientists at global level is highest in human history. Research and Development organizations are emphasizing on innovations in their major R&D programmes so that the outcomes of these activities fructify into commercial exploitation. Of course, science and technology is the key vehicle of development, particularly in the developing economies.

As is well known the United Nations had set up eight Global Millennium Development Goals with the target year of 2015. At least six of these goals including those concerned with eradication of extreme poverty and hunger, reducing child morality, combating dreaded diseases like HIV and Malaria and environmental sustainability require substantial inputs of advance science and technology. All the major international and national organizations of science are deeply concerned about these challenges and therefore several deliberations through important meetings had focused on strategies for achieving sustainable equitable development at global level.

The author is grateful to Prof. R C Sobti, General President, Indian Science Congress Session 2014 for inviting him to organize the first Panel Discussion Session on this topic of considerably importance. Many top leaders of Science like Prof. YT Lee, Nobel Laureate and President of ICSU, Prof. Takashi Onishi, President of the Science Council of Japan, Dr. T Ramasami, Secretary of the Department of Science and Technology, New Delhi and Prof. Raghvendra Gadagkar, President of INSA actively participated in the panel discussion. This report provides a background about the recent initiatives of the INSA in this direction and also summarizes the views expressed by the panelists.

National Science Academies and their Role in Tackling Societal Problems

As is well known, each country with a sound base of science and technology has established a National Science Academy. The science academies work to promote excellence in science and technology, covering different fields; they also work on developing strategies to tackle major societal challenges. The different national science academies are generally associated, at international level, with the following main organizations:

(i) International Council for Sciences (ICSU),

(ii) IAP – the Global Network of Science Academies now named as Inter-Academy Partnership,

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(iii) G – Science Network: *National Science Academies of G8 + 5 Countries,*

(iv) Regional Association of Academies like the Association of Academies and Societies of Sciences in Asia (AASSA), and

(v) Sub-Regional Groups like the one representing South Asia.

The International Council for Science (ICSU) has clearly emphasized on role of S&T in solving societal problems in its mission statement, "to strengthen international science for the benefit of society". It aims to promote science at the highest level and also to utilize the fruits of scientific endeavours to help society in achieving high quality of life.

The United Nations is presently actively engaged in evolving sustainable development goals. For example, in March 2013 around 30 leading scientists from natural and social sciences had deliberated in New York on the framework for sustainable development goals (ICSU-UN Expert Group Meeting, 2013). IAP has pursued this subject with considerable vigour. The main theme of the last International Conference (Rio de Janeiro, February 2013) was "Growth Challenges and Integrated Innovation and Science for Poverty Eradication and Sustainable Development". Recently, IAP with IAMP has issued a statement on Role of Science and Technology in tackling Drug Resistance, Infections and Diseases (IAP/IAMP Statement on Antimicrobial Resistance , 2013).

The group of National Science Academies of G-8 plus countries has come to be known as G – Science Network. Membership of this network is as follows:

(i) US – National Academy of Sciences,

(ii) UK Royal Society, London,

(iii) German National Science Academy Leopoldina,

(iv) French Academy of Sciences,

(v) Italian Academy of Sciences,

(vi) Japan Science Council,

(vii) Canadian Royal Society, Academy of Sciences,

(viii) Russian Academy of Sciences,

(ix) Brazilian Academy of Sciences,

(x) Chinese Academy of Sciences,

(xi) Indian National Science Academy,

(xii) Mexican Academy of Sciences, and

(xiii) South African Academy of Sciences.

A summit meeting of the Presidents of the above Science academies, known as G – Science Meetings, is held every year. Indian National Science Academy had the privilege of hosting the G – Science Meeting of 2013 at New Delhi. This was the first G-Science meeting that was held outside of the G-8 countries. The deliberations of this meeting were focused on the following two themes:

(i) Driving Sustainable Development: *The Role of Science and Technology and Innovation;* and

(ii) Drug Resistance to Infectious Agents – A global threat to humanity.

After detailed deliberations during the summit at Delhi and the following two months, statements were finalized and released simultaneously by all participating academies on 29 May 2013 (G-Science Statement, 2013). These have been taken note of at international level and have been widely cited. During this meeting, the science academies expressed deep concern about the growth of global population. It was emphasized that necessary steps should be taken to ensure that the population does not increase beyond a level, which will make sustainable development difficult to achieve. It is necessary to establish infrastructure for adequate energy sources without impacting the environment. Effective strategies are needed to ensure universal literacy including scientific literacy, affordable health care for all and continuous generation of jobs for the growing youth population across the world. It is well known that resources, which are necessary for providing good living conditions, are limited and

finite. Therefore, the need for sustainable consumption is of paramount importance.

Role of Science Academies in Tackling Societal Challenges

Most of the key sectors, which help strengthening of different aspects of sustainable development require strong inputs of science, technology and innovation. The national science academies often play a key role in these major global initiatives as they are the sources of independent advice based on high quality evidence generated through rigorous research and development efforts. International collaboration among academies helps in rapid growth of new knowledge as well as strengthening science and technology capabilities through collaboration and skill development. This also can be used to proactively engage with the policy bodies that work for sustainable development. In addition, the Academies can undertake major initiatives to promote multi-disciplinary research for sustainable development in all domains. Involvement of general public in these efforts is of considerably importance and most of the academies have programmes of improving public awareness on issues of science, technology and innovation. There is a scope and need for high level South – South and North – South cooperation and mobility of researchers across all boundaries. Several efforts are underway in this direction.

Recent Efforts of Indian National Science Academy in Promoting Regional Collaboration

Efforts have been made by the Indian National Science Academy (INSA) to nucleate regional collaboration among science academies of the south Asian region for evolving strategies to tackle societal problems, which are typical of our region. INSA had for the first time organized a Summit of South Asian Academies in September 2012 in which the following eight Academies participated: (i) Afghanistan Academy of Sciences; (ii) African Academy of Sciences; (iii) Bangladesh Academy of Sciences; (iv) The Academy of Science of Islamic Republic of Iran; (v) Mauritius Academy of Science and Technology; (vi) Nepal Academy of Science and Technology; (vii) Pakistan Academy of Science; and (viii) The National Academy of Sciences, Sri Lanka. The African Academy of Sciences is a pan-African organization, representing 32 African countries and was specifically invited to enhance Indian collaboration with the African region. India has a longstanding strong cultural relationship with Mauritius and their Academy is very keen to collaborate with INSA. Similarly, Iran had been showing keen interest in enhancing collaboration in S&T with India and in particular with INSA. The issues of deliberations during the first Summit included energy options, health care and infectious diseases, science education and inclusive innovation. Short discussions on issues like women in science, urbanization and climate change also took place. A joint signed statement was released at the end of the Summit (Delhi Declaration, 2012). All the participating Academies unanimously resolved in the final session to continue the organization of Summits on an annual basis. This initiative of INSA to enhance regional cooperation in spite of other differences among countries was taken note of at the international level, including that by the Executive Council of the IAP as well as by the Association of Academies and Science Societies of Asia (AASSA).

At the end of the first Summit it was decided to organize a one-day satellite Workshop on 'Women in the Science' together with the Second Summit. AASSA not only sponsored it as an equal partner but also deputed four delegates. It was organized just preceding the Second Summit of South Asian Science Academies. In addition to several top class Indian women scientists, women scientists sponsored by ASSSA from Australia, South Korea, Malaysia and Turkey also participated in the deliberations, which have led to specific recommendations and which have been processed by the INSA Council. In addition to the usual participants, representatives of Bhutan and Myanmar also participated in the Second Summit for the first time. Delegates of Australia, Malaysia, South Korea and Turkey for the satellite Workshop also participated in the Summit and contributed significantly. An important topic of deliberations during the Second Summit was *Sustainable Development – Post 2015 Scenario.* The other issues on which discussions were held included: ICT–Tools

in Enhancing Quality of Higher Education; Health and Well-being; Advances in Biotechnology to improve Agricultural Output, Food and Nutrition; and Role of Science and Technology and Innovation.

Views of the Panelists

During the Panel discussion on Role of Science, Technology and Innovation in Ensuring Sustainable Development, Prof. YT Lee particularly emphasized on the paramount importance of steps needed to control population and environmental degradation and development of strategies which make most efficient use of resources. He highlighted the recent initiative of ICSU in the form of a major project "Future Earth". Prof. T Onishi pointed out that natural disasters as well as tragedies caused by human failure lead to unexpected major problems, which hinder societal development. He referred to the Fukushima Nuclear disaster leading to serious problems and apprehensions in Japan. The Science Council of Japan has taken several steps to scientifically analyze the disaster and pinpoint the sources of problems and possible remedial measures. Dr. T. Ramasami gave a broad vision of national policies and plans of Government of India keeping in view the broad topic of discussion. Prof. Raghvendra Gadagkar stressed the commitment of INSA to continue with the efforts to evolve policies relevant to our country for sustainable development without environmental degradation as well as for strengthening international cooperation.

The author had the privilege of giving the background of the Panel Discussion and provided a brief over-view on efforts being made by several organizations of science academies in this important area. He emphasized that INSA has a lot to gain by enhancing bilateral collaboration with Academies of the North as well as the South. Also we need to play important roles in major bodies like ICSU, IAP, IAC and AASSA.

There was a lively discussion following the presentations by the Panelists on several important issues and the panelists responded to the same.

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