

Meeting Report

Outreach Programme by INSA on Climate Change in India

V RAJAMANI

School of Environmental Sciences, Jawaharlal Nehru University, New Delhi 110067

(Received on October 31, 2014; Accepted November 1, 2014)

Changing climate on Earth is an issue which is looming large over the world. Although many changes are taking place on the surface of the earth, that of climate has become an issue of grave concern to developed countries. And this concern prompted them, to create a world forum called IPCC (Intergovernmental Panel on Climate Change), more than two decades ago, to discuss various aspects of climate change. This forum has met several times in different parts of the world and has come up with several startling findings which are reported in five Assessment Reports. Their meetings and ARs have been widely reported by media. It has been shown by the IPCC, that Earth is warming and this warming and its rate especially are largely due to emission of CO₂ through various economic activities. Yet, the continuing, business-as-usual economic activities indicate that a very large section of human population is oblivious and indifferent to the warming and its consequences. A big question is how to make the general public climate-literate enough to realize that human economy is wholly-owned subsidiary of planetary climate. Earth itself may be doing this climate campaign through several 'Natural Disasters'. We felt that at least scientists dealing with Earth System (Climate is only a subsystem of Earth) should share their knowledge with the general public. How this knowledge based forewarnings, and therefore preparedness, minimised the impacts of the recent cyclones on the east coast of India are excellent examples. Climate change, however, affects every life everywhere and not just for a few days but for a

foreseeable future, as shown by historical and geological records.

In this global context, President of the US National Academy of Sciences, Dr John Boright approached President INSA, Prof. Raghavendra Gadagkar, to enquire if INSA would conduct outreach programs on climate change awareness in India. On request from INSA President, a proposal on climate change campaign was prepared by me and submitted to the US NAS. The proposal was accepted and requested funds were released by the UN Foundation, Washington, as part of their global climate campaign. The process of organising this outreach program was initiated by mid-May, 2014.

In recent years, it has been shown from ground and satellite measurements, ice-core data from East Antarctic and Greenland continents, ocean and lake sediments, real time measurements of Hawaiian air, astronomical observations and calculations and modelling of various air-sea-land interactive parameters, that the annual mean near-surface temperature and atmospheric CO₂ concentration are both increasing and co-vary just as they did in the geological past, at least in the last 800000 years. Polar-Greenland-West Antarctic glaciers are melting at an accelerated rate, and therefore, sea surface temperature and sea level are rising. Based on these observations, the IPCC has issued a warning that if these trends continue unabated by human society, not only its economy, but its own sustainability and that of the biosphere would be in serious jeopardy. The

*Author for Correspondence: E-mail: rajav1946@gmail.com

observed “fever” of earth is a useful symptom or an alarm. Mankind should realize that “climate drives much of whatever goes on, on at Earth’s surface”.

In this global scenario, it is imperative to clearly understand the nature and extent of climate changes that are ongoing in India and how our region has been responding to these changes. Before going to the general public as outreach campaign on climate change, it is essential to evaluate the credibility of the available data and observations on our land and on our adjoining seas. Public should be given only data-based scientific facts to gain credibility on the science of climate change as we understand it. The objective of the campaign is to make at least educated people “climate-literate” to avoid a possible situation of saying “We did not know” about climate change (such ignorance was expressed after the 2004 Tsunami even by scientists of our country).

Towards the above objective, a two day group discussion meeting of scientists working on climate and related issues was arranged on 19th May and 23rd June of this year at the INSA premises. Although many of the invited scientists could not attend, their opinion on various climate issues were solicited and obtained. The two day discussion was focussed on the following questions. They were framed to get maximum and India-centric basic science information of changing climate.

1. Do we observe changing climate in India and if so what are the evidences?
2. Do we know CO₂ concentration in Indian atmosphere, its trend as well as that of its emission?
3. Do we see any trend in the summer monsoon rainfall, extreme precipitation events, floods and droughts and if so can they be related to climate change?
4. Do we have any data-based observations on the Himalayan glaciers and their response to climate change only?
5. Do we see any trend in the physical parameters like sea surface temperature, salinity, pH and

circulation pattern in the Bay of Bengal, Arabian Sea and the Indian Ocean?

6. Do we have any discernable trend in sea level (rise), frequency and intensity of cyclones, storm surges, coastal erosion and deltas sinking along the Indian coast?
7. Do we see any change in crop yields that can exclusively be related to changing climate only?
8. Have we observed any change in the dynamics of entire ecosystem in response to climate change?
9. What are the observed changes in vector-borne diseases that can be due to climate change only?
10. Historically, how changing climate in the subcontinent had impacted its civilisation?

To the extent possible, each of the questions posed here was addressed by the participants using published data from indigenous research and personal observations. Some aspects of climate change such as vegetation and agricultural productivity, ecosystem dynamics and vector-borne diseases did not have enough indigenous data so far for detailed discussion. It was not possible, at least as of now, to come up with credible messages to the public. Nor do we have enough information on how climate has been changing historically in the subcontinent, although they are relevant and useful.

Using well discussed and published data, we have prepared a working document exclusively for the purpose of the outreach program on climate change in India. This document contains the following key messages to pass on to the general public in simple and jargon-free language. The key messages are:

1. Climate Change in India is real. Annual mean temperature in India for the past 110 years shows an increasing trend.
2. Magnitude of temperature and atmospheric CO₂ increase and the year of accelerated rise are comparable to global values.

3. Sea-level and sea surface temperature are also increasing.
4. Long term monsoon rainfall does not show any trend; recent, 50 years, data show slight decreasing trend.
5. Extreme rainfall events show a tendency to increase.
6. Large floods are also on the increase.
7. Frequency of cyclones shows a decreasing trend but their intensity shows an increasing trend.
8. Himalayan glaciers, as a whole, are very slowly retreating.
9. Climate change has an adverse impact on wheat productivity.

These nine aspects of climate change in India are based on indigenous research. These key messages were presented in the outreach campaign with supporting published data

So far, we had conducted the campaign as INSA's "Public-Experts interaction on Climate Change in India" in three cities: 1. in Delhi (on 22.8.2014, at INSA auditorium), 2. in Mumbai (6.9.2014, at IIT KReSIT auditorium) and 3. in Chennai (23.9.2014, at IIT ICSR auditorium), in Ahmedabad (29.11.2014, at PRL) and in Kolkata (5.12.2014 at IICB auditorium). The events were advertised in newspapers in each city, two days before the event. INSA communicated to its fellowship soliciting their participation. Educational institutions were informed of the campaign by the local coordinators, Professors Kanchan Pande (IIT Bombay) and Balaji Chakravarthy (IIT Madras) Utpal Sarkar/Jyoti Ray

(PRL, Ahmedabad) and Nibir Mandal (JU, Kolkata). Good Relations India, an agency employed by the UN foundation for the campaign, helped in media mobilisation.

The events included an introduction to general climate change issues by me, a presentation of published data-based trends in climate parameters by one among the panellists, about two-hour long session of interaction between public and the panellists. The panellists were: R Ramesh (PRL), Devesh Sinha (Delhi University), K. Achutharao (IIT Delhi), Kailash Bansal (NBPGR, Delhi), M S Seshshayee (UAS, Bengaluru), Subimal Ghosh (IIT Bombay) and R C Dhiman (Malaria Institute, Delhi), some of whom could not participate in a given event.

The public response was good, especially from students and social activists in Kolkata and Chennai. Requests were made by the public to continue the campaign in several other places in India as the campaign gives the basic scientific facts on climate change relevant to India. In the interest of the public, particularly the generation next, there is a need to scale up this campaign to the national level. Presently, we have planned to hold similar events in Kolkata, Ahmedabad and Hyderabad before December, 2014. If INSA desires and supports such campaigns in future, periodic and expert review of published data on climate change issues relating to India would be required.

The campaign was made possible by the cooperation of participants in the first two meetings, the panellists, the Council of INSA, and by the encouragement from Prof. Raghavendra Gadagkar and Prof. John Boright. UN Foundation provided the financial support.