Funding grants

I am pained, but not surprised, at the concern expressed by Gowrishankar[1] on the decisive role played by the finance official in the case he has quoted. I would like to compliment him for bringing this case out in the open, by even taking pains to use the RTI Act.

Having dealt with such cases in DST for over a decade and a half, I would like to point out what should have been done by the concerned scientific officer who was dealing with the case, on behalf of the PI. The officer should have taken the case to the Secretary, DBT and convinced him to overrule the decision of the finance officer. It is not clear, if the Secretary, DBT had concurred with the decision of the finance officer. In fact, one could have added a very small teaching grant to the large 'research' grant and requested the PI to organize a training workshop on the use of HPLC to the undergraduate science students from nearby colleges! This is how we could have promoted scientific research with the element of teaching involved in it.

One would have liked to see the comment of the Secretary, DBT on this case, being a purely scientific matter. It is precisely for this purpose that scientists of repute are appointed to the post of Secretary in scientific departments. The Secretary could have taken up the matter with the finance officer for obstructing scientific research. I am aware that the financial officers are supposed to report directly to the Ministry of Finance, but in this case their decision in a technical department of DBT should have been decided by the Head of the department, i.e. the Secretary, DBT. The finance officer could have gone to his boss if he did not agree with the decision of the Secretary, DBT.

If the investigator in the above case was a reputed scientist, with enough funding support otherwise, I would have liked him/her, to have refused to accept the grant 'at gunpoint' and to have brought this to the notice of the Secretary, DBT. A younger researcher may have been more concerned about his future career if he/she had done so, and may have therefore succumbed to the decision of the finance officer.

I think the scientific officers in scientific agencies, when they join their posts, should be trained and briefed by the Secretaries on how to deal with the finance officers and for that matter the scientific community. The finance officers should also be advised on their role. I had often advised my officers that scientific officers are there in these departments to serve the scientific community. 'If this community did not exist out there, they would not have their positions in the departments', is what I used to tell them.

1. Gowrishankar, J., *Curr. Sci.*, 2012, **102**, 1499.

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On the predictive behaviour of the Indian Summer Monsoon 2012

The main objective of this note is to affirm that if trend of all-India rainfall, 4 weeks in advance is the sought objective, then this is achievable; in particular, this applies to the Indian summer monsoon 2012.

The Flosolver Laboratory at CSIR-National Aerospace Laboratories (CSIR-NAL), Bangalore has over the years developed various versions of the software called 'Varsha' for forecasting weather over the globe. The code has a special boundary layer parameterization scheme for the tropics and a refined scheme for handling the moist adiabat. Since 2006, a rainfall forecast for each month in the monsoon season has been made available in the first week of the same month. Since 2007, these forecasts have been routinely sent to the Director General of Meteorology of the India Meteorological Department.

Monsoon 2012 so far has been deficient, and a large number of editorials and articles have appeared in the media giving the impression that a monsoon forecast is simply not feasible, that its character is weird and that one might as well stop forecasting[1,2]. In light of this, it is imperative that the scientific community should be made aware of what forecasts were sent for June and July 2012, along with their assessment (Figure 1).

Given the limitations of available data, various modelling constraints and long standing scientific questions about predictability on longer timescales, we put on record that no claims are made here for the spatial and temporal accuracy of the forecast on the all-India precipitation. But given the long term of one month and the spatial extent of the Indian region along with its highly organized structure, the observed trend is very well captured, although not the precise number. Thus the rainfall was predicted to be deficient in June (by 54%), and it was in fact deficient (only by 29%); similar

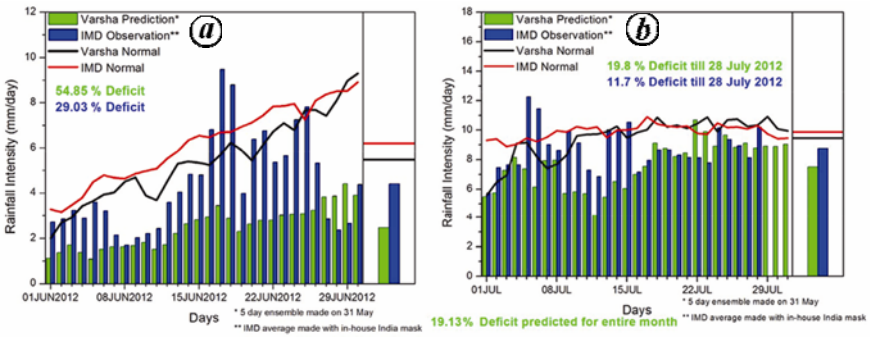

Figure 1. 'Varsha' all-India rainfall forecast and verification for June–July 2012. ***a***, 'Varsha' June 2012; ***b***, 'Varsha' July 2012.

statements hold for the July forecast as well.

Figure 1 shows that the 'Varsha' code picked up the deficit rainfall 3–4 weeks in advance. Therefore, it is not correct to argue that atmospheric models in general do not have the skill of picking up the severe deficit in rainfall for the Indian summer monsoon.

The present author had written a similar letter in January 2010 when the issue regarding the predictive behaviour of Indian monsoon in June 2009 was raised[3].

1. Bagla, P., The monsoon remains a global mystery and we should stop trying to forecast it. *The Hindu*, 26 July 2012.
2. Ramachandran, R., Predicting the monsoon, etc. *The Hindu*, 1 August 2012.
3. Sinha, U. N., *Curr. Sci.*, 2010, **98**, 134–135.

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Extreme sea-level events in coastal regions

A recently published report[1] by the Intergovernmental Panel on Climate Change (IPCC) has made an assessment of the extreme climate events. Their past trends, future projections and vulnerability and adaptation to such events are discussed in the report. The report was based on the efforts of both the working groups of the IPCC, WG I, which deals with the science of climate change and WG II, dealing with impacts, vulnerability and adaptation. Extreme climate events such as cyclones, floods, heat waves and extreme rainfall, etc. were assessed.

In coastal regions, extreme sea-level occur in the form of storm surges, apart from tsunamis, which are not driven by climatic factors. Changes in storm surges can occur when there is a change in the forcing that causes the surges. The forcing is mostly caused by cyclones and in some regions by strong winds. Globally, future projections of tropical or extra tropical cyclones do not indicate a clear change in their frequency or intensity[1].

However, rise in mean sea level can affect the return levels of extreme sea-level, even if changes in frequency or intensity of cyclones do not alter considerably in future. Observations based on the analysis of hourly tide gauge data showed an increase in the occurrence of extreme sea-level worldwide[2]. Similarly, various future projections in different ocean basins using regional climate models and storm surge models showed a similar result. Mean sea level rise can modulate extreme events, by which return periods of extreme sea-level events can reduce in future climate, irrespective of whether changes in storminess occur or not. Many studies, as reported in the IPCC report[1] indicate that the projected changes are primarily due to changes in mean sea level, rather than any changes in storminess.

The east coast of India is particularly vulnerable to the occurrence of storm surges. For the Bay of Bengal, a slight negative trend was observed for the frequency of occurrence of tropical cyclones in the past century[3]. Projections of extreme sea-level using storm surge modelling by including a mean sea-level rise indicate higher return levels along the northeast coast of India, except in the head of the bay[4].

For the coastal regions, to counter the impacts of climate change, adaptation practices are much more relevant and effective than mitigation options. It has now been realized that impacts of mean sea-level rise are long-term, but changes in the occurrence of extreme events are of greater concern at present as well.

Various catastrophic events had occurred in the past along the east coast of India, including the super cyclone, which hit the coast of Odisha in 1999 and the tsunami that mostly affected the southern part of the east coast of India in 2004. These events caused enormous damage and destruction and various steps were taken to restore normalcy in the affected regions. However, the question remains whether we have learnt enough lessons from these experiences? Or have we forgotten the lessons learnt from the past and whenever a new catastrophic event occurs in future, we will find out new ways of coping up with such situations? One way to overcome this problem is to document the practices followed in the past, which will be useful in case of similar situations in future. As part of the second National Communications report[5], brought out by the Ministry of Environment and Forests, Government of India, various inventories, including those of GHG emissions, have been developed. Similarly, adaptation practices need to be documented, which will serve as a useful guide to be followed in future. This will help in planning future adaptation strategies for the coastal zone, which will be useful in countering impacts of climate change in coastal regions.

1. Special report on managing the risks of extreme events and disasters to advance climate change adaptation. Intergovernmental Panel on Climate Change, 2012, pp. 582.
2. Menéndez, M. and Woodworth, P. L., *J. Geophys. Res.*, 2010, **115**, C10011; doi:10.1029/2009JC005997.
3. Niyas, N. T., Srivastava and Hatwar, H. R., Met. Monograph No. 3 Cyclone Warning-3/2009, 2009.
4. Unnikrishnan, A. S., Kumar, M. R. R. and Sindhu, B., *Curr. Sci.*, 2011, **101**, 79–83.
5. Second National Communications to the United Nations Framework Convention on Climate Change. Ministry of Environment and Forests, Government of India, 2012, p. 310.

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