unvaccinated arms of the study sample (a phase 2b/3 study) – a surrogate to this measure being immune parameters developed in the course of vaccination which have a tight correlation with the development of disease or protection to the disease itself. This standard methodology is limited in diseases that are chronic (such as TB and HIV), where the disease process itself may take a long time to manifest and therefore use of surrogate immune markers seems more ‘practical’, although it may be questionable.

Experts in immunology have recommended a panel of tests for evaluating the efficacy of candidate vaccines against tuberculosis. Immune responses to Ag85 (the predominant secretory antigen) appear to be the basis of this selection. We see this in this study as well. Ag 85 specific polyfuntional cd4+ T cells expressing IFN gamma, IL2 and TNF have been a consistent response to this secretory antigen of *Mycobacterium tuberculosis*[4]. This does not however seem to square with the immune picture of the Hepatitis B virus – although HBsAg is the predominant secretory antigen, antibodies to this are protective. In the case of *M. tuberculosis*, both the antigen secreted and the predominant immune response appear to be immune smoke screens offering little protection against illness[1].

What is irrefutable however, is the competency of the agency executing this study, with regard to openness and scientific correctness. The progress of the study has been published periodically either in medical literature, newsletters or on websites from time to time. The lack of objective evidence for vaccine efficacy tests has however sullied their reputation.

The larger fallout however is the initiation/continuance of future studies with these antigens and without a reliable endpoint assessment. Despite the several modifications suggested[2], the fact remains that we need to spend more resource, modifying approaches with a candidate which shows primary failure to the antigen itself (dose escalations, changes in vector, adjuvant, etc.).

Finally, this challenge invokes the need for a response from the scientific community as a whole to systematically approach this problem with clear target-driven approaches. Involvement of funding agencies in segregation and allocation of resources towards the grand challenge of identifying a bio-signature corresponding reliably with protective efficacy is also essential.

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Standardization of family Cucurbitaceae

There is a growing interest in medicinal plant research worldwide. Plants and plant-derived products are widely used in the traditional system of medicine. Often herbal drugs are considered unsafe, found less effective and fail to meet the quality standards due to several reasons. Primary among them are: (i) insufficient expertise in plant identification and lack of pharmacological knowledge; (ii) adulteration and use of substitutes as a result of over-exploitation of medicinal plants; (iii) variations in growing conditions; (iv) genetic variability and (v) diversity in harvesting methods and processing of extracts. It is therefore essential to establish internationally recognized guidelines for assessing their quality.

Cucurbitaceae is an economically and medicinally important plant group. It represents 36 genera and 100 species and is distributed in the tropical to subtropical regions of India. Some of them are cultivated commercially for their edible fruits, whereas others are known to be bitter and poisonous. Genera *Benincasa* Savi., *Bryonia* L., *Bryonopsis* Arn., *Citrullus* Schrad., *Coccinia* Wight & Arn., *Corallocarpus* Welw., *Cucumis* L., *Lagenaria* Ser., *Luffa* Miller, *Momordica* L. and *Trichosanthes* L. are being used in the Indian system of traditional medicine over centuries to cure a wide array of health-related problems[1]. It is observed that some of the closely related species or varieties of these genera bear non-bitter and bitter fruits. Medico-practitioners utilize most of bitter plant species for formulations[2]. *Bryonia*, *Bryonopsis*, *Citrullus*, *Corallocarpus* and *Momordica* bear only bitter fruits, whereas *Coccinia*, *Cucumis*, *Lagenaria*, *Luffa* and *Trichosanthes* bear both bitter and non-bitter fruits. Bitter varieties were found wild on wastelands where human interference was negligible.

Consumption of fresh or canned fruit juice is gaining popularity as an alternative and complementary medicine therapy. But several reports question the toxicity of these juices. In June 2010, a 59-year-old male died in Delhi while his wife was hospitalized after consuming a mix of bottle gourd (*Lagenaria siceraria* (Molina) Standl.) and bitter gourd (*Momordica charantia* L.) juice. An investigation committee reported that the juice contained toxic complex, cucurbitacin, that gave it a bitter taste. Cucurbitacin (tetracyclic triterpiniod) is frequently found in this family. The level of cucurbitacin is intensified by many environmental factors such as high temperature, uneven watering practices, low soil fertility and low soil pH[3].

At present, bitterness of fruit is the only known parameter to differentiate these plants from each other. The voluminous work on the family Cucurbitaceae has been reported with respect to its therapeutic uses as well as phylogenetic relationship and molecular evolution[4–9]. However, species-specific characters for identification of these plants are lacking. Diagnostic characters are important to differentiate plants which bear bitter as well as sweet fruits to check the quality and identity of raw materials and their herbal products. Besides using traditional methods, knowledge of molecular biology and molecular pharmacognosy may be useful to distinguish herbal drugs by molecular marker assay. And an understanding of genetic engineering may help conserve wild resources. Special efforts should be made to standardize raw material and herbal products used by clinicians in India.

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Prediction of the Indian summer monsoon rainfall for 2013 based on past rainfall data

As in previous years, the India Meteorological Department (IMD) has issued a press release[1] that the June–September monsoon rainfall for the country as a whole, i.e. the all-India rainfall (AIRF) is expected to be about 98% of the long-term average (LTA) of 89 cm, with a model error of ±5%. A week before this announcement a private agency issued a forecast[2] that AIRF will be 103% of LTA with an error margin of 4%. AIRF includes the whole of India made up of four sub-regions: Central India (CEIND), North East India (NEIND), North West India (NWIND) and South Peninsular India (PEIND). AIRF is naturally statistically correlated with some of the regional values, but the regions among themselves are not all well correlated. Table 1 shows the basic statistics and Table 2 shows the correlation among the five data series of IMD. It is seen that characterization of AIRF is not a good reflection of what to expect in NEIND and PEIND.

As long-term forecasting of the monsoon is of scientific and of general interest, it is worthwhile to have alternate methods of prognosis. In earlier publications[3,4], Iyengar and Raghu Kanth proposed the method of decomposing the rainfall data series (R_i) into the sum of two uncorrelated time series (I_i and y_i). The first one (I_i) is the dominant Intrinsic Mode Function which is non-Gaussian but amenable for forecasting using ANN methods. The second component (y_i) is nearly Gaussian and hence standard linear regression methods are sufficient for modelling and forecasting. It is found that the method has significant skill to foreshadow rainfall on large space scales with the confidence level progressively decreasing as the data series represents

Table 1. Regional statistics and forecast for 2013

Region	m_R (cm) (1951–2000)	σ_R (cm) (1951–2000)	Coefficient of variation (%)	m_F (cm), forecast for 2013	σ_F (cm), standard error of forecast	Forecast % departure from normal
All-India	88.75	9.26	10.43	76.02	3.64	–14.34
NWIND	61.50	11.43	18.59	44.29	4.56	–27.98
NEIND	143.83	14.75	10.26	147.85	5.82	+2.79
CEIND	97.55	14.30	14.66	70.77	5.30	–27.45
PEIND	71.55	10.85	15.16	72.48	3.61	+1.30

NWIND, North West India; NEIND, North East India; CEIND, Central India; PEIND, South Peninsular India.

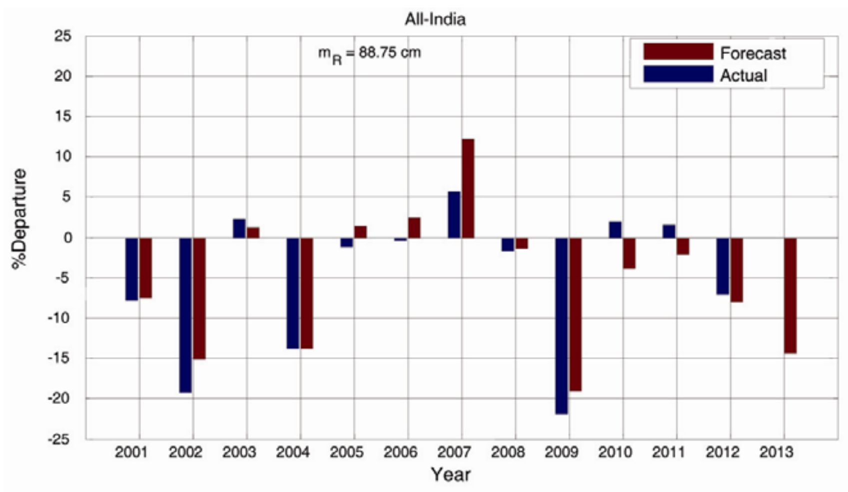

Figure 1. Percentage departure from normal rainfall and one-step-ahead point forecast (2001–2013).