

Do I have the right to discredit statistics as a subject, as in some cases it does not work and the produced results are 'predictions' and not 'exact'? Do I have the right to discourage the statistician?

In conclusion I wish to say that every subject, including bibliometry science, statistics and pure mathematics has its justification. It is wrong to condemn a particular subject, if it does not fit my views.

Not with confrontation but with co-operation and due respect for others'

subject the natural and social scientists can learn from each other.

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2. Simpson, J. A. and Weiner, E. S. C., *The Oxford English Dictionary*, Clarendon Press, Oxford, 1989, vol. XIV, p. 648.
3. Simpson, J. A. and Weiner, E. S. C., *The Oxford English Dictionary*, Clarendon Press, Oxford, 1989, vol. XIV, p. 650.
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Mathematics research

Arunachalam¹ and Narasimha Murthy² describe the fall in standards of mathematical research in India. It is important to assess at this stage, the quality of research publications by Indians or any other nationals. Also, it is important to find out how many research papers have practical relevance/utility in real life. Many papers are being published merely for the sake of publishing or for academic interest; otherwise researchers would perish professionally. It is necessary to find out how many of these research publications are being cited by other researchers.

One reason for fewer number of publications in India is attributed to the introduction of UGC pay-package by the Government of India for the teaching and academic staff. After the introduction of this pay-package along with modes of promotion, most of the academicians were not happy with the modes of promotion. They felt UGC pay-package did not give due credit to potentially good

candidates in academics. It treats performers and non-performers on par with each other.

Of late, brilliant students in mathematics at the higher secondary level do not opt to continue higher education in mathematics. A larger number of students instead opt for the engineering stream. Those who fail to get admission into engineering or other professional courses only join mathematics at the graduate level. Also, because of lack of job opportunities students do not enrol in research programmes. In the recent past, mathematics graduates/postgraduates with computer diplomas have joined the software industry for lucrative salaries. So, only few students with a flair for mathematical research pursue higher studies in mathematics, with the result that no talented mathematician is available to teach mathematics at higher levels. Though appreciable progress is noticed in the international arena in mathematical, statistical and dynamical

modelling, there is hardly any progress in these areas in India. Many research papers being published in mathematical and statistical dynamical modelling have no takers. These research problems have many real-life applications, but have hardly been utilized by researchers in day-to-day applications. If efforts are not made at an early stage, mathematics will die in a few years time in our country, because of the fact that very few students opt for mathematics beyond school level.

1. Arunachalam, S., *Curr. Sci.*, 2002, **83**, 353–354.
2. Narasimha Murthy, S., *Curr. Sci.*, 2003, **84**, 1500–1501.

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Prescribed burning

S. C. Joshi¹ points out that forest fires are one of the most important environmental problems in the Himalayas. Out of 34,286 km² of Uttaranchal forests, every year thousands of hectares of lands are affected by fire². In the current year (2003) about 3000 hectares of forest area were charred by fire. Every summer,

fire-weeks/fire-drills are organized by the forest department for prescribed burning of accumulated dry matter underneath forest canopy, with the aim to check catastrophic wild fires later in the dry spell.

But the so-called prescribed burning is mostly unorganized and causes no less

damage than the accidental fires. A serious anomaly is that similar approach is adopted for all forest types. Prescribed burning is done during the dry spell that reduces the water availability to already thirsty vegetation. New recruits are damaged by the fire, which affects regeneration of the native species and paves way

for encroachment of non-native species. Valuable raw material is burnt, which otherwise could have been recycled in the forest floor itself or in agriculture fields after decomposition. Fire affects soil and geomorphic processes, it volatilizes large amounts of nitrogen and carbon contained in soil organic matter and adds to the problem of global warming and ozone layer depletion. In addition, high rainfall following fire causes soil erosion and reduces water infiltration. Fire damages the habitat of several mammals, birds, reptiles, insects, microorganisms, etc. Burning in pine forests coincides with the period of resin collection, which makes the species more susceptible to fire. Once the resin catches fire, the ground fire transforms to crown fire in no time.

The practice of prescribed burning should not consider trees in isolation. Trees are a part of an ecosystem which involves various other biodiversity ele-

ments. And there are complex linkages between them; therefore the survival of species is interdependent.

Prevention mechanisms should be developed against catastrophic fires. Should we resort to this practice or find other viable options for checking catastrophic fires as well as for maintaining biodiversity of the region? One such option suggested here, practiced in some parts of Uttaranchal, is simply to collect dry matter, such as pine needles and fallen leaves. No major shift in approach is required. The personnel engaged in prescribed burning can be asked to collect dry matter. Villagers in the respective areas can be motivated to participate in this activity. Villagers may be willing to participate, as this can resolve their problem of bedding material for livestock, manure for agriculture fields and grass for livestock. Removal of dry matter promotes growth of grasses, which otherwise would get suppressed by pine needles.

This is an opportune time for the government to evolve a strategy to check recurrence of burgeoning fire incidents. A better understanding of fire effects on different forest types is the need of the hour. This will help us to develop scientifically a sound policy for fire management.

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 2. <http://www.fsiorg.net>.
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Need for microbial type culture collection centre in South India

Biotechnology in industry and academia has attained mainstay now more than ever before. For the ever-increasing demands of food production and to meet the requirements of growing population it is biotechnology (and its different branches, e.g. agricultural, food and industrial biotechnology) which is giving a hand. As the name suggests, it needs living organisms (plants, animals and microbes) or their parts, for an end product. Due to human disturbances or natural calamities we have the danger of losing many of the organisms (whether it be plants, animals or microbes). The red data list of the Botanical Survey of India shows a list of plants which are on the verge of becoming extinct. Such plants or those plants which are medicinally important but rare to get can be preserved in the labs through tissue culture and gene banks. The gene banks will serve not only as backbone for preservation but also help in retrieving if they are completely lost from the system. Each plant species can serve as a reservoir or as a substrate for a host of other organisms including the microbes. Hence, any

loss of higher plants might also reflect in the extinction of microorganisms depending on them, particularly if they are host specific¹, thus causing irreparable damage to biodiversity. While plants can be preserved through nurseries or tissue culture and gene banks, in the case of microbes, invariably it is raising and maintaining pure cultures under laboratory conditions, followed by preservation.

The invention of novel antibiotic compounds or enzymes needs a thorough screening. While a lot of money has to be spent for screening of different microbes, the establishment and maintenance of culture collection centres is a prerequisite. Most of the countries in Europe, USA and China have started patenting their inventions of novel compounds and enzymes from different organisms, while India is still lagging behind in terms of the number of such patents applied. Even though we have vast resources of biodiversity it is unfortunate that we have very few patents granted from India. Thanks to the Biodiversity Convention (Rio de Janeiro, Brazil, 1992), there is

not only an awareness on the importance of biodiversity but also a spurt of activity that has started and been translated into promulgation of laws for the protection of the biodiversity resources in the respective countries, e.g. Australia. Concerns about systematics and biodiversity research in India have been expressed by several authors from time to time^{2–4}. This also includes biosystematists who have become a rare species nowadays. However, there is one more aspect which needs immediate attention which is not only raising cultures of as many organisms as possible, but also properly preserving and maintaining them, so that they can be subjected to advanced screening techniques. In India very few culture collection centres have a large collection covering different groups of organisms, although a few labs in universities and other academic institutions have cultures for their research purpose while industries have selected strains of industrial importance.

For the enormity of a country like India only two culture collection centres are present, viz. IMTECH, Chandigarh