Worship of Mammon

Many, if not all, points made by Balaram[1] and Saidapur[2] about honoraria to scientists deserve serious consideration.

The whole issue of extra emoluments or honoraria for scientists who are identified as 'excellent' needs to be examined dispassionately. There are many such schemes prevalent today. A winner of the Bhatnagar prize is given Rs 15,000 extra. A fellow of at least two science academies gets Rs 15,000 extra. A holder of the J. C. Bose Fellowship gets Rs 20,000 extra. A holder of a Ramanna Fellowship gets Rs 5000 extra. And so it goes on. If someone has more than one of these 'recognitions', then he gets all these amounts put together in some institutions. In other institutions, he or she gets only a part of this. There is no consistency in the way in which these rules are being applied. Some schemes come with research money. Others seem to be outright cash gifts.

Sadly, there does not seem to be any thinking about why we are doling out these amounts. Are we rewarding scientists for their past performance? Or is it that these monetary gifts to scientists are going to improve their future performance? Even if they do, it reflects poorly upon us as a community. I thought that people get into research for the love of the subject, not in order to make money. Some countries are experimenting with these monetary incentives at an even more pervasive level, and are linking them to the number of papers written by a scientist, and the impact factors of the journals in which these papers appear. It is not at all clear if these inducements will put these countries firmly on the path of long term scientific success. Luckily, we have not advanced so far but what is happening already is disturbing enough. The number of nominations for election to some of our academies seems to be on the rise with everyone wanting to get into the mad scramble to get elected to at least two academies. Getting elected to a science academy should be all about getting peer recognition at a very formal level. It should not be about getting Rs 15,000. Is an INSA fellowship therefore equal to Rs 7500 per month? I could go on like this. The moment one starts equating science with cash, all is lost.

There is a well-known saying in our country that Saraswati and Lakshmi do not visit the same house. Perhaps we scientists would do well to ponder about some of these age-old dictums and live our lives accordingly.

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The *h*-index as a biodiversity index

It is often said that biodiversity consists of two components: species richness and evenness[1,2]. Yet, this is not completely correct. Also the actual abundance of each species is an essential component. Finding a way of combining species richness and evenness has turned out to be a non-trivial matter[3,4]. If one wants to introduce actual abundances of each species into a biodiversity measure, the situation will become even more complicated. A simple summary statistic may, however, be a first step in the right direction. We propose that the *h*-index[5], possibly in combination with the *R*-index[6], provides a solution.

When species are ranked according to the number of individuals (on an appropriate scale, i.e. expressed in thousands or hundreds, depending on the actual situation), then this situation's diversity *h*-index is H if H is the largest natural number such that the first H species have an abundance value at least equal to H. These H species may be referred to as the *h-core species*. We note that for some applications abundances are best expressed as biomass, instead of individuals: this does not influence the definition or applicability of the diversity *h*-index.

By definition information is lost when using a summary statistic such as the diversity *h*-index. Yet, in real life situations even the exact number of species – the basis of all diversity measurements – is usually unknown. This, however, plays no role in calculating the diversity *h*-index. Besides being a combination of species richness and abundances, the *h*-index is, moreover, a robust index as the number of species is not used in its calculation. Also the exact abundance of the top species, which is usually high and hence difficult to determine, plays no role. Because of these advantages we think that the diversity *h*-index can be a useful indicator. Of course, the *h*-index is not an index of average species rarity[3] and neither does it satisfy Pielou's requirements[7]. Such a property is a property required for an index that combines species richness and evenness, while the *h*-index is an index that combines species richness and species abundances.

If the abundances of the top species are known, then the *R*-index can be used as a secondary index. Recall that the *R*-index is just the square root of the abundances of the *h*-core species. In the special case that the abundances of these species are equal, then $R = h$. Consequently, the ratio R/h (or perhaps: $(R/h)^2$) is an indicator related to the notion of evenness among the top species.

In order to illustrate the calculation of these indices, we consider the following example of two moth traps[8]. Trap 1 caught nine different species with the following abundances (9, 4, 3, 2, 1, 1, 1, 1, 1), whereas trap 2 caught six different species with abundances (5, 3, 2, 1, 1, 1). The *h*-index related to the first trap is 3, whereas the *h*-index of the second trap is 2. As we have complete data we may also calculate *R*-indices: these are $(9 + 4 + 3)^{1/2} = 4$ and $(5 + 3)^{1/2} \approx 2.83$. Note that if the result of the first trap had been (MANY, 4, 4, 2, 1, 1, 1, 1; eight different

species) then its *h*-index would have been the same.

In conclusion, we would like to point out that these indicators cannot only be applied in ecology, but also in the social sciences, in management, in demography, in research evaluation (where they originated) and in related fields, when replacing the term 'species' by the appropriate relevant term.

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Community forestry – linking conventional and nonconventional forest areas for sustainable development

Community forestry has been defined as 'any situation which intimately involves local people in a forestry activity'[1]. Though this concept does not give a clear picture of ownership of land resource[2], equity share, participation in decision making, etc., it clearly emphasizes the need for active participation of the community in regeneration and protection of the forest resources at all times. This aspect of forestry not only benefits local people but also provides great benefits to the landless people, viz. fodder, fuel wood, small timber and other non-timber forest products (NTFPs)[3]. Community forestry is not a new concept in India. It was developed prior to the pre-colonial period by people in community-owned forests. Most forest lands during the colonial period were brought under the control of the forest department by the forest acts in 1865 and 1878. Notwithstanding, community forestry was started in Kumaon hills, a conventional forest area through active participation of the Panchayat and was popularly known as *Van Panchayat*[2].

During the post-colonial period, community forestry programme was adopted by the forest department to meet the basic requirements of communities through raising trees in nonconventional forest areas, viz. community land and public land through active participation of the community. For instance, in Tamil Nadu, *Acacia nilotica* trees were planted in community lands like foreshores of water reservoirs through active community participation[3].

Similarly, community forestry in Gujarat was started both in public as well as community lands such as roadside plantations, supervised woodlots and village self-help schemes[3]. Now, the community forestry programme has gone beyond the boundaries of nonconventional forest areas. Presently, it is followed in both reserved forests[4] and unclassed state forests (USF) through Joint Forest Management. Thus, the community forestry is a dynamic concept which implies 'forestry of the people, by the people and for the people' that is practised in various types of lands, viz. panchayat land/community land, public land and forest land (Figure 1).

In the recent times, community forestry can be considered as one of the modes to interlink conventional and nonconventional forest areas that can ensure sustainable development through forestry practices in resource rich areas such as northeast India. Possible legal instruments need to be strengthened in order to encourage community participation and benefit sharing under the prevailing acts such as the National Biodiversity Act, 2002.

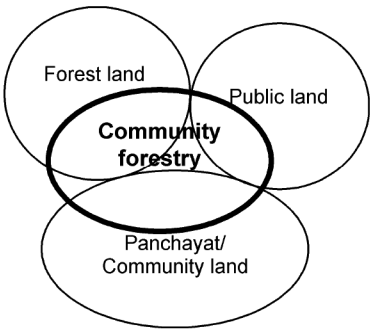

Figure 1. Community forestry interlinks conventional forest area, community land and public land.

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