

CORRESPONDENCE

there is a need to develop criteria and indicators (C&I) for the jhum system for the northeastern states in particular and India in general. Similar to the Bhopal India Process for sustainable forest management that assures sustainable development of the nation⁷, this initiative will facilitate a third-party monitoring and assessment of the management practice of jhum cultivation in the country and help reduce the adverse affect of jhum cultivation with the help of standard C&I. At the same time, it would help the indigenous community to sell the jhum agriculture produce², viz. rice, chilli, potato, cucumber, etc. as a certified product that may have more market value as well, due to its organic nature, as most jhum fields are managed as low-input systems.

The C&I initiatives for the jhum system will eventually help to provide the source and potential of the jhum produce to the national as well as the interna-

tional consumers. For example, *Oryza sativa* total yield from the fields⁸ could be to the tune of 66 to 1161 kg/ha/yr. This is comparable to a marginal agriculture system elsewhere. Besides, this initiative must be incorporated in the policy-making process to restore the cultural identity of the indigenous communities through scientific, sound and eco-friendly traditional management practices/systems and certification.

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Scientometrics and modified *h*-indices

The editorial by Balam¹ entitled ‘Scientometrics: A Dismal Science’, rightly points out the improper emphasis being placed, especially in India, on scientometric data, such as the journal impact factor and more recently the *h*-index, in the assessments of individuals and institutions engaged in research.

We wish to highlight one more problem with the *h*-index, in addition to those mentioned in the editorial. An individual’s *h*-index does not take into account the number of co-authors in the relevant publications, even as it is intuitively obvious that in the case of two individuals with the same *h*-index, the one whose cited papers were shared with fewer co-authors deserves a higher performance ranking. This problem was alluded to by Hirsch himself in his paper describing the *h*-index². Recently, Schreiber³ and Egghe⁴ have independently proposed modifications to the *h*-index that takes multiple co-authorship into account, by assigning fractional (rather than whole) credits to each of the authors

on any paper. The resulting indices have been shown to lead to the generation of a different rank order amongst a group of researchers than that obtained by rankings based on the *h*-index above³.

If one were to take this idea further, more complex equations can also be envisaged in which the fractional credit apportioned to different co-authors in a paper varies according to the position of each in the author list (but such that the sum of all fractional credits for a single paper equals 1). For example, at least in the biological disciplines, the perception has gained ground that the first author and the corresponding author have contributed proportionately more to the paper than other co-authors (who are themselves often perceived to be listed in descending order of their contributions to the paper). The take-home message then is that if it is true that ‘counting papers and citations has become an inescapable activity in the field of science’¹, let us at least use multiple indices rather than place undue reliance on just a single

number, as has recently also been emphasized by Wilcox⁵ in his editorial entitled ‘Rise and fall of the Thomson Impact Factor’.

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