

## Evaluating scientists scientifically

As befits India's premier multidisciplinary journal, any issue of *Current Science* displays a wide range of topics: from everyday to esoteric, micro to macro, recent to remote. Given that the affiliations of most of the contributors show them to be resident Indians, the journal also reflects the range of interests of India's scientific community—which makes it all the more surprising that a topic close to the heart of that community, namely the science of evaluating science and scientists, hardly ever features in these pages. Bibliometrics, the impact factor, *h*-index and several related measures are discussed often enough, but I searched *Current Science* archives in vain for papers on scientific methods of assessing or appraising scientists – papers comparable in scope and depth to those on hundreds of other topics, including slime moulds, encephalitis in children and variation in the size of raindrops. Why this apathy? Perhaps, as with administration, India's scientific community is content to leave the task to bureaucrats, accountants and policymakers, preferably in their advanced years?

The task is by no means easy. If the order in which the authors of a research paper are to be listed can be a matter of serious concern and debate<sup>1</sup>, – let alone the choice of those names – imagine the difficulties in evaluating those authors – not just evaluating their papers for deciding whether to publish them, but evaluating scientists themselves for career advancement. In NGOs, middle- and senior-level management is assessed on its ability to secure funding. Even in a corporate set-up, where the bottom line or the share value can serve as a handy indicator of success, performance appraisal is a complicated task. But even there, out-of-the-box thinking is not unheard of, Netflix being a good example<sup>2</sup>: to cite a specific point, the company has the simplest policies for leave, travel and expenses. Blue-sky research can indeed pose tougher challenges for evaluators, but let us take a far more practical and literally down-to-earth domain, namely agricultural research.

Agricultural research aims at improving farm productivity, at making farming an economically feasible undertaking for farmers, while also taking care of such externalities as soil erosion, water-use efficiency and maintaining desirable genetic variability. And yet, in evaluat-

ing agricultural scientists working on crop *X*, for instance, whether that crop is now more remunerative or indeed whether its yield has increased within a radius of, say, 10 km from a research institute devoted to that crop, is never taken into account. Instead, the performance appraisal, so far as it is not based entirely on the length of service, is largely based on publication record and the annual confidential reports of the scientists being appraised. Often, such appraisals are carried out not on site, not where the work is carried out, but at the headquarters of the research organization, nor, to my knowledge, any representative of the community that such research is intended to benefit (the farming community) is ever a member of the evaluators' panel.

It is precisely because the issue is too complex to be reduced to simplistic yardsticks, whether in the form of crop productivity, publication record, the number of patents, the number of research students or indeed the length of service, that we need more research on evaluation methods. The attraction of the impact factor and similar metrics lies in their simplicity, seeming objectivity, and, more important, ease: instead of having to wade your way through dozens of printed pages, sitting in interviews and seminars, and – horror of horrors, actually handling physical objects and being in the field – all you have to do is to access the relevant database, tap a few keys, make a few clicks with the mouse, and you have a simple number—stark, irreducible, irrefutable.

However, this is a dangerous trend. The moment any appraisal is reduced to a number, that number can be 'gamed' (the *Oxford Dictionary of English* defines this as 'manipulate (a situation) typically in a way that is unfair or unscrupulous'). The rise of the so-called predatory journals<sup>3</sup> is just one undesirable consequence of a system that accords so much importance to publication. For a journal to have an impact factor as commonly understood, it must be covered by *Journal Citation Reports (JCR)*. What if many of the journals in which many members of a whole community publish are not covered by *JCR*? Well, then we come up with our own numerical weighting for journals, as has been done by the National Academy of Agricultural Sciences – the so-called NAAS score – for about 2000 journals, including some that are

covered by *JCR* (for these journals, the score is arrived at by simply adding 6 to the impact factor of a given journal, but limiting the score to no more than 20)<sup>4</sup>. An even more serious way of gaming was that uncovered by *Science*<sup>5</sup>, which reported that authorship of papers in journals covered by *JCR* was on sale: in the 'window' between the formal acceptance of a paper and its publication, whether in print or in electronic form, a name or two can be added to or substituted for other names in the list of authors of that paper so long as the 'new' authors are willing to pay for the privilege.

Before coming up with an appropriate method of evaluation, we need to agree upon what it is that needs to be evaluated. Research is a complex endeavour and more often than not a team effort. Perhaps the most prized is the sheer intellectual prowess: the ability to choose the best approach to solving the problem and conceiving the best way to operationalize that approach. But that is not all. Field research also calls for other skills and abilities such as getting along with others, whether farmers, workers, technicians, patients, or whatever; logistics and planning; patiently recording the required data day after day for months together... . None of these skills, by itself, is enough to publish a paper and yet each is vital to research and therefore needs to be assessed appropriately. Eric Kandel, who won the Nobel Prize in Physiology or Medicine in 2000, scrupulously lists these and similar attributes of his many colleagues in his memoir *In Search of Memory*<sup>6</sup>. To take a more familiar controversy, consider teaching and research: evaluating research is easier because its practitioners can be appraised using such readily applicable metrics as citations and impact factors, whereas practitioners of teaching are evaluated not in terms of their proficiency in teaching at all, but again, in terms of

their research – talk of the proverbial drunk looking for the key not where he lost it, but near the lamp post.

Peer reviewing, despite the bad press it often gets, appears to be a system accepted by the research community. The system has evolved over decades and has in place such safeguards as double-blind reviewing and multiple reviewers, declaration of conflict of interest, and checklists for reviewers. Perhaps we could think of extending the system to make it also a 'reviewing peers' system as it were? Agricultural research institutes in India are reviewed once every five years through the QRT system, which is short for the Quinquennial Review Team. Although not anonymous, it has the merit of conducting most of the review on site and includes field visits and discussions with the staff of the institute being reviewed.

If these reflections prompt those who are far better qualified to start looking for alternatives to the present system of evaluating scientists, this editorial will have served its purpose.

1. Zare, R. N., *Curr. Sci.*, 2014, **106**, 1171–1172.
2. McCord, P., *Harvard Business Review*, 2014; <http://careandgrowth.com/wp-content/uploads/2014/04/How-Netflix-Reinvented-HR.pdf>
3. Gunasekaran, S., *Curr. Sci.*, 2014, **106**, 1173–1174.
4. National Academy of Agricultural Sciences, 2014; <http://naasindia.org/rating.html>
5. Hvistendahl, M., *Science*, 2013, **342**, 1035–1039.
6. Kandel, E. R., *In Search of Memory*, W. W. Norton, 2007.

Yateendra Joshi

A-1/702 Landmark Garden, Kalyani Nagar,  
Pune 411 006, India  
e-mail: yateendra.joshi@gmail.com