

relevant to India, namely e-literacy among senior academicians and their perception of priority.

We sent a total of 410 e-mails to researchers (professor-grade) at leading science schools in India (16 institutions, 177 mails) and abroad (21 institutions, 233 mails). The content was an application to pursue a research internship in the field of molecular biology/biotechnology/biochemistry/pharmacology, depending on the research interests of the professors. In these similar mails, the applicant was stated as an undergraduate student at one of the leading pharmacy schools of India. A CV was attached to make the application more persuasive.

The list of universities abroad included the top 20 universities³, according to the US News and World Report 2011. We received replies from University of Pennsylvania (UPenn) (60%), George Washington University (GWU), Washington (52.94%); Massachusetts Institute of Technology, Boston (50%); UZH/ETH, Zurich (50%); University of Cambridge, UK (37.5%); University of Minnesota (36.36%); McGill University, Canada (33.33%); Harvard University, Boston (28.89%); University of Massachusetts (UMass) (25%); MCPHS (Boston); University of Southern Illinois (17.39%) and British Columbia University, Canada (12.55%).

Replies from Indian institutions included Indian Institute of Science Education and Research (IISER) at Pune/Bhopal (42.86%), Indian Institute of Technology (IIT), Bombay (30.76%); Central Drug Research Institute, Lucknow (28.57%); National Institute of Immunology, Delhi (25%); IIT-Kharagpur (16.67%); IIT-

Madras (15.79%); Indian Institute of Science, Bangalore (15.5%); National Centre for Biological Sciences/TIFR, Bangalore (11.76%); Centre for Cellular and Molecular Biology (CCMB), Hyderabad (9.09%); IIT-Delhi (7.14%); IIT-Guwahati (5.58%); and All India Institute of Medical Sciences (AIIMS), Delhi (0%).

Only 16.38% of professors from Indian universities replied compared to 36.48% from abroad. It took 36 h on an average for a reply. The proportion of bounced e-mails (9%), possibly on account of out-dated addresses, was similar for India and abroad. The websites with obsolete e-mail addresses mainly include AIIMS, Delhi; Chemistry Department, IIT-Indore and Pharmacology and Environmental Toxicology Department, University of Madras, Chennai.

Replies from UPenn, GWU-Washington, IISER, UMass and IIT-Bombay were most responsive and encouraging. On the other hand, some of the pioneer institutions like AIIMS, IIT-Guwahati, IIT-Delhi and CCMB were placed extremely low on the replying index. University of British Columbia, Canada (12.55%) was an exception from West.

Indian professors are possibly no busier than those in the West. Indians occupying senior positions have been probably influenced by the old Indian tradition, which disregards upward communication. Another contributing reason could be that senior academics rely on their secretaries, who have a different perception of priority. Professors, heads of departments and deans are critical decision makers, and their approach

and responsiveness towards students' e-mails can harm the careers of students who find e-mails the most convenient, reliable and affordable. E-mails have the potential of making scientific societies more democratic, responsive and productive, but the above results reveal a serious communication gap between students and teachers in India.

Unsurprisingly, e-responsiveness is greatly enhanced when there is a commercial interest in a transaction. For instance, when we sent queries ($n = 28$) regarding registrations and travel grants to organizers of conferences, we received prompt replies from all in the West and 66.67% from India.

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A comparative analysis of NAAS ratings of 2007 and 2010 for Indian journals

The National Academy of Agricultural Sciences (NAAS), established in 1990, is among the youngest of the Science Academies of India. From time to time the Academy conducts an exercise to identify and rate journals of relevance to agricultural sciences and assigns them NAAS ratings on a scale of 10. The journals include non-impact factor (IF) journals, i.e. not covered by *Science Citation Index (SCI)*, but considered important by

NAAS in the field of agricultural sciences. The ratings are commonly adopted as a criterion to evaluate publication of candidates for selection into State and Central Agricultural Universities in India, and hence are considered important by professionals.

The NAAS has earlier released ratings for scientific research journals based on IF, quality of papers, periodicity, circulation, etc.¹. Rajgopal and Kumar¹ con-

ducted an analysis of these ratings and revealed that Indian scientific journals fall much short of the ratings of international standards. In 2007, NAAS released new ratings for agriculture-related journals, which has been succeeded by the latest ratings of 2010. Here, we attempt to make a comparative assessment of ratings of Indian journals provided by NAAS in 2007 and 2010 to identify the changing trends, their possible implica-

tions to researchers and pattern in rating of journals and their significance to the agricultural research community.

Under the ratings released in 2007, a total of 1607 (pest management science repeated twice) journals were listed, out of which 15.68% was of Indian publications; publishers for 22 journals were however not traced. Coincidentally, these 22 journals were also the ones removed in the 2010 list, besides another 151 Indian journals. In the ratings provided in 2010, a total of 1334 journals were listed out, of which 176 were published in India. These included 101 journals listed in 2007 and 75 newly added journals.

In the ratings released in 2007, the mean rating of Indian journals is 2.85 compared to 7.54 for foreign journals. The percentage of Indian and foreign journals under different rating classes for 2007 is shown in Table 1. In the 2010 ratings, the mean score of Indian journals was 3.38, partly achieved by replacing some of low-rated Indian journals with those of higher quality (see details in Table 2). Whether the publishers failed to provide all necessary information for

re-evaluation of the journals is not known; the reason for their exclusion has however been not provided.

Out of 1189 journals which have been retained in the 2010 ratings, 1071 journals had scores lower than those in 2007. A high percentage (95.50) of foreign journals had lower ratings in 2010, whereas 68.31% of Indian journals reported an increase in their ratings. Among these, 31 are published by various agricultural societies, 21 by State Universities and 16 by private publishers. The maximum increase was noted for *Veterinary Practitioner*, an increase from 1 to 6, followed by *Indian Pediatrics* (from 3 to 7.4), both attaining the top five position among Indian journals in 2010. *Current Science* dropped by 0.6 points to stand at 7.2.

In order to check whether NAAS ratings and IF were akin to each other, we compared the ratings of highly rated NAAS journals with their IF. Unfortunately, certain ambiguities have been observed. For example, according to *SCI 2010*, the IF of *Vegetos*, *Indian Journal of Traditional Knowledge* and *Interna-*

tional Journal of Agricultural and Statistical Sciences is 0, 0.232 and 0.035 respectively, whereas their NAAS ratings were 6.2, 6.5 and 6.5 respectively. Likewise, *Veterinary Practitioner*, which was noted for the highest increase in 2010, had a zero IF (according to *SCI*), whereas *Legume Research* with a NAAS rating of 3 had an IF of 0.13. According to the criteria adopted by NAAS for impact journal as per *SCI* (<http://www.naasindia.org/Announcements/criteriaimpact.doc>), the NAAS rating of *Legume Research* should stand at 6.6.

This analysis has brought forth certain issues that warrant attention. First and foremost is that the quality of Indian publications still falls short of global standards. Presently, there are only two journals (*Indian Pediatrics* and *Journal of Genetics*) with IF of more than 1. In this regard NAAS has an important role in fostering high-quality research and publication by laying down strict criteria for inclusion of their journals in successive ratings.

Secondly, transparency in the evaluation process may be necessary. For example, the *Indian Journal of Forestry*, and *Economic and Political Weekly*, which had a NAAS rating of 4 and 6 respectively, in 2007 have been dropped in 2010. These two journals have a long history of publication in their respective fields and are widely circulated. Yet, the reasons for their removal are not known. This may prove disastrous to professionals and researchers who have earlier published articles in such journals, and in future confuse others in their choice of publication. Further, there is also a concern over the extremely high percentage of foreign journals that have been assigned ratings lower than those in 2007. Here, we take the case of the *Annual Review of Plant Biology*. The journal had an IF of 18.712 in 2007, which rose to 28.415 in 2010. Yet, this journal recorded a decrease of four points between the two NAAS ratings. This further reinforces the need for transparency in the evaluation process.

And finally, it has been observed for some journals that the NAAS ratings assigned to IF journals are not uniform according to the criteria laid down by NAAS itself. Unless these two ratings are comparable or uniform, it would become difficult to judge the quality of research publication by potential candidates applying for teaching or research

Table 1. Percentage of Indian and foreign journals under different rating classes during 2007

Ratings	Percentage of listed journals*	
	Indian	Foreign
0-1	28.17 (71)	1.64 (22)
1-2	13.49 (34)	1.27 (17)
2-3	28.17 (71)	4.42 (59)
3-4	20.63 (52)	5.62 (75)
4-5	1.19 (3)	4.12 (55)
5-6	1.98 (5)	1.87 (25)
6-7	0.79 (2)	0.37 (5)
7-8	4.76 (12)	27.96 (373)
8-9	0.79 (1)	36.73 (490)
9-10	-	15.96 (213)

*Figures in parenthesis indicate number of journals.

Table 2. Percentage of Indian journals removed from 2007 and newly added in the 2010 list under different rating classes

Ratings	Removed*	New
0-1	33.33 (50)	-
1-2	14.97 (23)	6.67 (5)
2-3	29.93 (46)	36 (27)
3-4	19.05 (28)	40 (30)
4-5	1.361 (2)	13.33 (10)
5-6	1.361 (2)	-
6-7	-	4 (3)

*Figures in parenthesis indicate number of journals.

positions. For example, according to the guidelines (<http://www.bhu.ac.in/ELIGIBILITYCRITERIONREVISED15JULY20091.pdf>) issued by Banaras Hindu University, Varanasi, only NAAS ratings would be used to evaluate applicants to be called for interview for teaching positions in the Faculty of Agriculture, whereas this may not be the case in other universities or research institutions. Such discrepancies need to be resolved so that publications can be uniformly evaluated

in different platforms using any chosen index (NAAS or IF).

To conclude, NAAS is the sole Academy that caters to professionals in the field of agriculture in India. Hence, it has to play an active part in uplifting the standards of publication in the field of agricultural research and development. Additionally, transparency in the evaluation process would instil greater confidence amongst professionals in the agricultural community.

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Masdar City: a zero carbon, zero waste myth

Not only in popular media but also on serious scientific fora¹⁻³ the up-and-coming ‘Masdar City’ near Abu Dhabi is being projected as a ‘carbon neutral, zero waste’ urban cluster. It is being repeatedly claimed that Masdar City would serve as a model for carbon neutral, zero waste urbanization of the future².

There is no reason to doubt the noble intentions of the Government of Abu Dhabi in funding this expensive venture – estimated to cost upward of US\$ 22 billion – but it is difficult to see that Masdar City will manage to be a ‘low carbon, low waste’ city, let alone a ‘carbon neutral, zero waste’ one.

The city is envisaged to be powered by solar panels of 130 MW capacity, backed up by 20 MW wind turbines⁴. To this mix will be added geothermal and hydrogen power in the future. No cars driven by fossil fuels will be allowed inside Masdar City; instead a battery-powered, auto-piloted ‘personal transit system’ (PRT) would take those across who would not, instead, prefer to walk through Masdar’s long, narrow, shaded streets designed to reduce outdoor heat⁴.

All this will insulate Masdar City from anthropogenic CO₂ emissions if we ignore the CO₂ contributed by the respiration of the city’s envisaged 50,000–90,000 population. But it would not stop Masdar City from leaving a massive carbon footprint somewhere close by, a footprint which will grow larger and larger with time.

In fact before the first resident moves into Masdar City, the city would have incurred a massive carbon debt in the form of greenhouse gas (GHG) emissions entailed in planning, designing and commissioning of the city. From then on this debt will increase by the minute as the city’s main source of power, solar electricity, is far from carbon neutral⁵. Nor is the wind, geothermal or ‘hydrogen’ energy it proposes to use⁶. Battery-operated vehicles (of the type PRT would consist of) are arguably bigger net GHG emitters than fuel-efficient, gas-driven cars. Masdar City will be zero carbon only in the sense that the GHGs generated due to its construction and functioning will not be emitted in its premises, but some distance away from it.

As for waste management, Masdar City intends to do waste incineration, plastic reuse, metal recycling, composting, etc. Each of these processes is either a net energy consumer or leaves one or the other pollutant to contend with⁵. Masdar’s business-houses and residents will use cell phones, computers and all other gadgets that are used in commercial establishments. The resulting e-waste would enhance energy consumption of Masdar City substantially if the city chooses to fully ‘clean’ and reuse its entire e-waste. This will add substantially to the carbon debt of the city. Hence Masdar City can be ‘zero waste’ only by exporting its waste as it would be exporting its GHG emissions.

Masdar City may set an example worth emulating if it puts up its infrastructure with materials that are low in embedded energy and functions in a way that minimizes consumption of energy and materials. That would not make it 100% eco-friendly, but a lot more eco-friendly than it is presently set to become. Touting Masdar as a zero carbon, zero waste city is, in fact, harmful to the cause of environmental protection because it makes the world believe that it can continue with its present consumerist lifestyle and yet contain global warming.

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