India University Rankings 2016

The National Institutional Ranking (NIR) Framework[1] was developed by the Department of Higher Education, Ministry of Human Resource Development (MHRD), Government of India on 9 October 2014. The ranking is based on 22 parameters under five major heads, several of them employed globally, such as excellence in teaching, learning and research. However, some India-centric parameters were also employed, e.g. outreach, gender equity and inclusion of disadvantaged sections of the society.

It is a laudable effort by MHRD to compile the NIR data of 3565 institutions, including 233 universities, in just 18 months and release the report on 4 April 2016. The most important parameter for NIR is weightage given to research output of universities under the heading 'Research Productivity, Impact and IPR (RPII)', which amounts to 40%. It is a well-known fact that Indian universities are rated poorly in international rankings[2], and none of our institutions appears in the top 200 at the global level.

It is reported in the NIR Framework document that three databases, namely *Web of Science*, *Scopus* and Indian Citation Index, have been used as sources for retrieving the number of publications, citations and collaborative publications for ranking in one or more disciplines. These three databases were searched to determine the quantitative productivity of all 3565 institutions for ranking in terms of research articles published by them and citations received by these publications in a span of three years, i.e. 2012 to 2014.

India University Rankings 2016 data of top 25 universities are provided in a tabulated form. Indian Institute of Science (IISc), Bengaluru occupies the first rank and Guru Nanak Dev University (GNDU), Amritsar the 25th rank. BHU Varanasi is listed at rank 7, Aligarh Muslim University (AMU) at 10 and Panjab University (PU), Chandigarh at 12. However, if we consider ranking on the basis of research output or RPII parameter of the same universities, the ranking position is slightly altered. The first position goes to Institute of Chemical Technology, Mumbai. IISc occupies the 2nd position, while BHU, AMU, PU and GNDU are ranked 10, 7, 6 and 17 respectively.

In 1984, Mehrotra and Lancaster carried out a bibliometric analysis to evaluate the research productivity of Indian scientists. They published their findings, 'where Indian scientists publish', about the research output of universities and national-level research institutes of India. They found that it was largely in *Current Science*[3]. Their findings were based on the analysis of 3378 publications by Indian scientists during the period January 1979 to June 1981 using *Science Citation Index* (*SCI*). It is interesting to recall that among the top 25 institutions of India, IISc occupied the first rank and BHU, AMU, PU and GNDU were ranked at 2nd, 9th, 12th and 25th position respectively. In addition to university ranking, this report concluded that *Current Science* was the most productive Indian journal among the list of 35 Indian science journals used in the *SCI* database.

1. https://www.nirfindia.org/
2. Balaram, P., *Curr. Sci.*, 2004, **86**, 1347–1348.
3. Mehrotra, R. and Lancaster, F. W., *Curr. Sci.*, 1984, **53**, 684–688.

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Box-cut clarity, mathematicians and Make-in India

The Guest Editorial on the 'Make in India' initiative in *Current Science*[1] is perfectly timed and interesting. The authors' ideas can be well understood by any serious researchers. In addition to academic debates, clear steps implemented by the Government for this initiative also need to reach the scientific community, possibly through this journal as well. Being an active promoter of this initiative in India (through my friends in the engineering and applied maths community), I have been, in the recent past, motivating a few of my colleagues in India to set-up the industrial maths wings within IITs/universities. I have also offered to write a white paper to obtain funds to set up such centres and create an environment/platform for scientists such that they make use of mathematics, should there be any product development that involves not only mathematical innovation and imagination, but also mathematical simulations. While I was at the Indian Statistical Institute (ISI) as a permanent faculty a few years ago, I had some exposure on how statistical consultancies take place with industries. Very recently, I have in fact proposed to the Government of India to open up new ISI academic centres in the country such that, apart from other serious advantages, more innovative mathematical sciences and research assistance to product development take place in India. One of my mathematical modelling work that I led while I was at University of Oxford, England has appeared as a chapter (co-author, Maini, P. K.) in a high profile book titled *UK Success Stories in Industrial Mathematics*[2], which provide recent account on how mathematical sciences provide solutions in product development and society. I tried to get a feel for the 'Make in India' initiative while visiting a few academic institutes this summer in India, and wish to see a list of more practical steps on how this initiative works.

Given the importance of the practical nature of this initiative, I request *Current Science* to publish clear-cut steps needed/expected/wanted to implement 'Make-in

India' initiative, perhaps a simple box-cut article for the academic community (not merely an academic-type article) by someone like a Government officer who is responsible for this initiative, so that this piece stands as a reference for younger entrepreneurs in academia in India. A special issue of the journal can be dedicated to the 'Make in India' initiative with constructive debates to help interested scientists in academia and industry.

1. Ghaisas, S. V. and Ananthakrishnan, S., *Curr. Sci.*, 2016, **111**(3), 451–452.
2. Aston, P. J., Mullholland, A. J. and Tant, K. M. M. (eds), *UK Success Stories in Industrial Mathematics*, London Math Society, Institute for Math and its Applications, Springer, 2016.

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World's tenth largest banyan tree at Narora in Upper Ganga Ramsar site, Uttar Pradesh, India

The king of *Ficus* species, *Ficus benghalensis* L. (Moraceae), or the banyan are large evergreen trees distributed throughout India, and also found in Bangladesh, Hawaii, Pakistan and Sri Lanka[1–3]. The species was first described in 1753 (ref. 4) with its specific epithet *benghalensis* denoting 'Bengal', the abode of the great banyan tree of Acharya Jagdish Chandra Bose Indian Botanic Garden, Howrah, West Bengal, presently occupying 16,531 sq. m area[2] and standing only on nearly 2900 prop roots after having lost its mother trunk, for which it is encrypted in the Guinness World Records[3].

The perennial trees of *F. benghalensis* L. serve as a keystone host species of several faunal (monkeys, snakes, birds, wasps, bats, etc.) and floral (lichens, fungi and algae) elements, as well as many other life forms and are also of use as forest fruits[5], shelter and nesting grounds of bees, birds, bats, etc. They are also considered sacred in several religions. During floristic surveys (2012–2016) of the Upper Ganga Ramsar site in Uttar Pradesh (UP), India, extending from Brij Ghat in Ghaziabad district to Narora in Bulandshahr district, a gigantic *F. benghalensis* tree of archaic stature, was unearthed from forest thickets in Ram Ghat region at Narora, about 8 km from the Narora Atomic Power Station (Figure 1). This tree is located on the northeastern flank of River Ganga at 28°10′38.4″N and 78°12′36″E, at 190 m amsl, the highest elevation point of this Ramsar site, and is considered sacred by the local '*jatas*' as 'Siddhwari vriksha' – a wish-fulfiling tree[6]. Therefore, it is carefully guarded, surviving unscathed for over 500 years as a landmark in the Ramsar site landscape. Its main trunk of about 10.5 m perimeter is crowned with a gigantic canopy towering about 40 m tall, with about 230 m perimeter covering about 4069 sq. m area. On the western side it possesses four pillar-like prop roots of 1–2.5 m circumference, anchoring the branches firmly to the ground. Two of these are congested near the main trunk, while the other two are farther off, supporting the westward expanding branches, while all other sides of the canopy are devoid of prop roots (Figure 2). Although all banyan trees are known to possess infinite number of prop roots[2], this tree, with only four one-sided prop-pillar supports of the giant canopy, is unique.

In terms of size and girth, this is the tenth largest among the world's banyan trees, the largest one being Thimmamma Marrimanu in Andhra Pradesh, followed by Kabir Vad banyan tree on the banks of the River Narmada in Gujarat[2,7]; the Giant Banyan tree at Majhi in Lucknow (UP); the Great Banyan tree in the A.J.C.

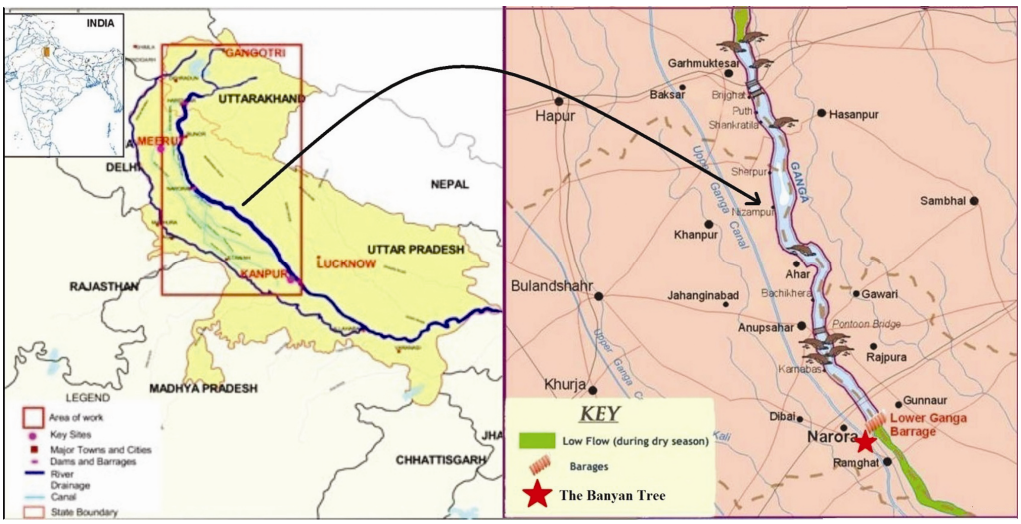

Figure 1. Map of Upper Ganga Ramsar site, Uttar Pradesh, India showing the location of the banyan tree (red star).