(iii) ICT infrastructure (server, computers, customized software for data entry-cum-upload and reporting, and modems for internet connectivity); (iv) fixed schedule for pest surveillance, issue and dissemination of pest management advisories (based on economic threshold levels), and (v) manpower for pest observations, data entry and issue of advisories. Awareness creation among farmers and skill development for pest scouts/ monitors and data entry operators provide strong foundation for e-pest surveillance. There needs to be continuous co-ordination among all the stakeholders right from programme formulation to field-level implementation in terms of knowing the pests status, recommendation of pest management advisories and their dissemination to farmers during each cropping season.

1. https://en.wikipedia.org/wiki/World_Wide_Web
2. http://india.gov.in/e-governance/national-e-governance-plan
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# CSIR in SIR 2015

The latest (2015) version of the SCImago Institutions Rankings (SIR) report[1] has just been released on-line. SIR itself is a secondary evaluation exercise using primary bibliometric data from *SCOPUS*, but with the help of indirect surrogate indicators[2] it is possible to now see the time evolution of progress of leading Council of Scientific and Industrial Research (CSIR) institutions over a seven-year window (2009–15).

Last year, we reported in these pages[2] the progress of CSIR institutions which appeared continuously in all the report years from 2009 to 2014. SIR 2015 has revised data even for earlier years and so we can have a fresh look over the 2009–15 Window. For each of these years, the data used to generate the indicators cover a five-year period; thus, data for the year 2012 cover the five-year period 2008–2012. All indicators have been normalized on a scale of 0–100, with the top institution globally having the 100 grade. In each year, only those institutions that have published over 100 scholarly articles indexed in the *SCOPUS* database during the last year of the period of time are counted. By 2015, 27 out of the 38 constituent laboratories of CSIR make this cut. CSIR as a whole is counted as a 'parent' institution and the 27 'children' are listed separately.

In the present analysis we shall look at one input dimension and two output dimensions. First, we look at the quantity or size dimension: This is the number of articles published during the five-year window, normalized on the 0–100 scale. We indicate this normalized quantity indicator by $Q$. For this entire cycle from 2009 to 2015, the Centre National de la Recherche Scientifique (CNRS), France was listed as the top ranking institution in the world with a score of 100. The second dimension is quality. SIR gives several field-normalized size-independent indicators which are in varying ways proxies for this, but we shall restrict attention to only one – excellence rate, which is the proportion (in %) scientific output of an institution that is included into the set of 10% of the most cited papers in their respective scientific fields, and is a measure of high-quality output of research institutions. Again, for each year, these values are normalized so that the highest ranking performer has a score of 100. The first position has changed hands during the 2009–15 period: the Broad Institute of MIT and Harvard occupied the top rank with an excellence rate score of 100 in 2010 and from 2012 to 2015, while the Research Institute of Molecular Pathology in 2009 and the Whitehead Institute for Biomedical Research in 2011 were credited with the 100 score. We indicate this normalized quality indicator by $q$.

The one size-dependent input indicator, the so-called scientific talent pool (STP), is the total number of authors from an institution in the total publication output of that institution during a particular period of time. This can be asumed to be a meaningful measure of the input into research activities. This is also normalized in the same manner as above and again for the period from 2009 to 2015, CNRS was listed as the largest institution in the world with the score of 100. We indicate this normalized input indicator by STP.

We can compute a single-valued composite outcome indicator by introducing the second-order indicator called the exergy term from the quantity and quality indicators, $X = q^2Q$. Productivity is then computed as $X$/STP and this becomes a plausible performance indicator, where the performance chain follows the scheme given in Box 1.

Table 1 lists this surrogate measure of productivity for the two 'parent' agencies, CSIR and CNRS and the 27 'daughter' institutions of CSIR that made the cut in 2015. CNRS as a whole maintains a productivity indicator that is larger than that of CSIR increasing from 1.8 to 2.3 times that of CSIR during the period. CSIR has also been declining faster: by 2015, CSIR has dropped to 62.2% of the value in 2009. During that same time, CNRS has declined to only 80.9% of its 2009 value in 2015. Note that these relative declines have to be rationalized in term of the very high standards set by the Research Institute of Molecular Pathology with an excellence rate score of 100 in 2009 and the Broad Institute of MIT &

**Box 1.** Scheme.

Input – STP
Output – O = $Q$
Excellence – Exc = $q$
Outcome – $X = q^2Q$
Productivity – $X$/STP.

**Table 1.** Surrogate proxy for per capita scientific productivity of CNRS, CSIR and several CSIR institutions

| CSIR and its constituent laboratories in SIR 2015 | *X*/STP – exergy/scientific talent pool | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | SLOPE |
| Central Drug Research Institute | 231.4 | 242.3 | 249.5 | 273.0 | 267.8 | 268.4 | 305.5 | 10.46 |
| Central Electrochemical Research Institute | 1763.1 | 1592.8 | 1559.1 | 1166.5 | 909.2 | 714.7 | 687.5 | –201.18 |
| Central Electronics Engineering Research Institute | | | | | 56.5 | 42.1 | 43.3 | –6.61 |
| Central Food Technological Research Institute | 576.0 | 561.6 | 428.2 | 322.7 | 273.6 | 208.5 | 169.3 | –74.32 |
| Central Glass and Ceramic Research Institute | | 1138.7 | 1139.7 | 900.7 | 989.2 | 943.3 | 854.1 | –54.97 |
| Central Institute of Medicinal and Aromatic Plants | | | | 96.1 | 90.7 | 139.1 | 205.6 | 37.67 |
| Central Leather Research Institute | 536.4 | 441.0 | 406.1 | 418.2 | 361.3 | 330.8 | 309.8 | –33.75 |
| Central Mechanical Engineering Research Institute | | | | | | 282.2 | 380.3 | 98.10 |
| Central Salt and Marine Chemicals Research Institute | 2363.3 | 2265.4 | 1753.4 | 1369.4 | 1258.9 | 1358.4 | 1268.4 | –199.76 |
| Centre for Cellular and Molecular Biology | 362.3 | 327.1 | 247.5 | 192.4 | 211.3 | 219.8 | 243.5 | –21.69 |
| Council of Scientific and Industrial Research* | 647.6 | 636.8 | 577.4 | 514.4 | 443.7 | 407.8 | 403.2 | –47.32 |
| Indian Institute of Chemical Biology | 162.4 | 222.1 | 203.3 | 249.4 | 241.9 | 282.9 | 315.2 | 22.09 |
| Indian Institute of Chemical Technology | 791.0 | 692.7 | 661.7 | 578.9 | 510.3 | 447.4 | 465.7 | –57.77 |
| Indian Institute of Integrative Medicine | | | | | 173.6 | 252.0 | 295.2 | 60.78 |
| Indian Institute of Toxicology Research | 631.6 | 643.0 | 665.1 | 714.9 | 704.8 | 774.7 | 849.1 | 34.13 |
| Institute of Genomics and Integrative Biology | 236.7 | 310.8 | 371.5 | 364.6 | 341.7 | 379.3 | 428.3 | 24.35 |
| Institute of Himalayan Bioresource Technology | | | | | 478.7 | 498.4 | 344.5 | –67.13 |
| Institute of Microbial Technology | | | | | | 220.6 | 225.9 | 5.31 |
| Institute of Minerals and Materials Technology | | | 757.8 | 825.0 | 805.9 | 774.4 | 883.9 | 20.14 |
| National Aerospace Laboratories | | | | | 269.6 | 281.1 | 237.3 | –16.13 |
| National Botanical Research Institute | 623.0 | 591.6 | 474.9 | 450.2 | 355.7 | 288.3 | 301.7 | –60.34 |
| National Chemical Laboratory | 1245.8 | 1060.1 | 903.0 | 702.4 | 552.3 | 578.1 | 573.4 | –118.99 |
| National Environmental Engineering Research Institute | 324.0 | 396.7 | 510.4 | 443.0 | 487.3 | 457.4 | | 24.90 |
| National Geophysical Research Institute | 141.1 | 150.7 | 148.2 | 159.9 | 166.8 | 162.8 | 174.3 | 5.08 |
| National Institute for Interdisciplinary Science and Technology | 2905.3 | 2991.4 | 2331.3 | 1920.5 | 1389.4 | 1001.7 | 734.8 | –408.32 |
| National Institute of Oceanography | 120.7 | 154.3 | 177.6 | 183.6 | 135.4 | 124.0 | 100.7 | –5.82 |
| National Metallurgical Laboratory | 1169.0 | 1206.3 | 932.4 | 863.8 | 840.4 | 759.8 | 649.2 | –90.88 |
| National Physical Laboratory India | 987.6 | 1276.3 | 1222.5 | 1142.0 | 996.7 | 902.0 | 927.8 | –41.21 |
| Centre National de la Recherche Scientifique* | 1151.9 | 1122.3 | 1047.2 | 980.9 | 957.9 | 951.7 | 931.5 | –38.99 |

*Listed as a parent organization.

Harvard, which occupied the top rank in 2015. The SLOPE function available in Excel is used to compute the progress or decline of the various institutions and this is shown in the last column in Table 1. Sixteen of the CSIR institutions are on a decline, while 11 show steady or good progress. We see that the premier chemistry-based laboratories continue to be in rapid decline, a trend first noticed last year[2]. The biology laboratories are registering relatively good progress. For good measure, the results for CSIR and CNRS as a whole are also included for benchmarking.

1. http://www.scimagoir.com (accessed between 16 and 24 July 2015).

2. Prathap, G., *Curr. Sci.*, 2014, **107**, 1121–1122.

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