Contribution and citation Impact of CSIR, India publications during 2007-11

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Abstract

Introduction: The paper analysis the performance of CSIR at the overall level as well as laboratory level in terms of various indicators during 2007-11. It identifies the strength and weakness of CSIR at the overall level as well as under laboratory level under 13 broad subjects. Materials and Methods: The paper uses Scopes database for analyzing publications on CSIR and its 37 laboratories during 2007-11. Results: The largest contribution of CSIR has been in the area of chemistry, followed by biochemistry, genetics and molecular biology, materials science, chemical engineering, physics, engineering, pharmacology, toxicology and pharmaceutics, agricultural and biological sciences, environmental science, medicine, earth and planetary sciences and energy. Key words: CSIR, India, performance, publications, scientific agency

INTRODUCTION

The Council of Scientific and Industrial Research (CSIR), established in 1942, is an autonomous society, which has a wide ranging character of functions. Its main mission is to provide scientific industrial research and development that maximizes the economic, environmental and social benefits for the people of India. This multi-disciplinary and multi-location council, an ensemble of 37 state-of-art organizations (laboratories, centers and institutions), has served as a springboard of scientific and technological activities in a wide variety of S&T domains. It carries out fundamental and applied R&D in all areas of science and technology (barring atomic energy). CSIR expertise and experience are embodied in its ~4600 scientists and 8000 scientific and technical support personnel, apart from more than 7000 research students. CSIR’s footprint covers sectors as diverse as aerospace, biotechnology, chemicals, drugs and pharmaceuticals, energy, food and food processing, leather and metal, minerals and manufacturing to name a few.

Review of Literature

Only few scientometric studies have been conducted in the past on research agencies and in particular on CSIR, India. Lemoine[1] studied the applicability of Lotka’s law to the distribution of scientific productivity of 7000 Indian scientists of CSIR taking into consideration the sex of scientists. Gupta, et al.[2] examined CSIR male and female scientists productivity at the overall agency level and at the group of laboratories level characterized by broad subjects. Gupta, et al.[3] analyzed the applicability of Lotka’s inverse power law (general and square) and other statistical distributions in the productivity distribution of CSIR scientists at different levels. Gupta, et al.[4] examined research output of CSIR scientists varying in chronological and professional age in engineering science laboratories. Kumar[5] examined the applicability of Lotka’s law as a general inverse square power relationship to the distribution of research productivity in CSIR, India during 1988-92 and 2004-08. Roy and Nagpaul[6] compared the relative efficiencies of different R and D organizations in terms of two input and three output indicators using data envelopment analysis. Roy et al.[7] examined and compared productivity of scientists working in different R&D laboratories of CSIR, India, in terms of five productivity.
indices and at two levels Srinivasan, Raman, Meyyappan and Pichappan\cite{8} comparatively assessed the journal literature produced by laboratories/institutions of CSIR working in different fields. Iyer and Vijayalakshmi\cite{9} proposes a methodology for objectively assessing or evaluating the performance of laboratories of CSIR based on four knowledge portfolios, according to the impact they have on the four goods viz-public, private, social and strategic. Prathap and Nishy\cite{10} demonstrated the use of energy assessment techniques by applying it to the research assessment of the laboratories belonging to CSIR, India.

**Objectives**
The main objective of this study is to assess the contribution and citation impact of Council of Scientific and Industrial Research (CSIR), India during 2007-11. In this regard the study aims at:

i. Analyze overall CSIR’s publications output and citation impact during 2007-11;

ii. Study the overall performance of its 37 laboratories in terms of various indicators; and

iii. Identify the most important subject areas of CSIR and comparing its performance in these subject areas.

**MATERIALS AND METHODS**

This study uses Scopus database and considers 5 years publications data from 2007 to 2011 on Council of Scientific and Industrial Research (CSIR) 37 laboratories for developing S&T indicators. For measuring quality and visibility of Indian research output, the study is based on citations, using 4 years citations window. The citation’s data have been collected till May 2014. For high cited publications (receiving 100 or more citations), citations are counted from the date of publications to the end of May 2014. The study uses a number of absolute publications, citation and collaborative measures for developing S&T indicators. The 37 laboratories of CSIR covered in this study are divided into five subject groups:

i. Engineering Sciences (12 laboratories): NEERI-Nagpur, CBRI-Roorkee, NIIST-Thiruvananthapuram, CMMACS-Bangalore, CIMFR-Dhanbad, IMMT-Bhubaneswar, NML-Jamshedpur, CHERI-Pilani and CSIO-Chandigarh;

ii. Biological Sciences (11 laboratories): CFTRI-Mysore, IGB-Delhi, IITR-Lucknow, CCMB-Hyderabad, NBRI-Lucknow, IHBT-Palampur, IIIB-Kolkatta, IMTECH-Chandigarh, IIIM-Srinagar, CIMP-Lucknow and CDRI-Lucknow;

iii. Physical and Earth Sciences (5 laboratories): NIO-Goa, NGRI-Hyderabad, NPL-Delhi, CEERI-Pilani and CSIO-Chandigarh;

iv. Chemical Sciences (7 laboratories): IIP-Dehradun, CECRI-Karaikudi, NCL-Pune, ICT-Hyderabad, CSMDRI-Bhavnagar, CLRI-Chennai and NEIST-Jorhat and

v. Information Sciences (2 laboratories): NISTADS-Delhi and NISCAIR-Delhi

**RESULTS**

**Overall CSIR output and citation impact**
The number of publications from CSIR during 2007-11, as indexed in Scopus database, has increased from 4542 in 2007 to 5392 in 2011, witnessing an annual average growth rate of 4.72%. Its contribution to India’s total publications output was 6.80% during 2007-11, which has decreased from 8.98% in 2007 to 5.78% in 2011. The citation impact per paper of CSIR was 7.02 during 2007-11, which has decreased from 6.91 in 2007 to 5.88 in 2011 [Table 1].

The 37 laboratories of CSIR together have contributed 23,388 publications, with individual lab output varying from 48 to 2871 and with an average productivity per lab of 632.11 during 2007-11. Of the 37 CSIR laboratories, 15 labs have contributed more than the average productivity of all labs during 2007-11. They are IIT with 2971 publications, followed by NCL (2033), NPL (1610), CDRI (1245), NIIST (1102), CECRI (888), CFTIRI (858), NIO (871), CLRI (828), IIC (826), CSMCRI (815), CCMB (764), ITR (668), NGRI (677) and NBRI (644).

The 37 laboratories of CSIR have received 164234 citations, with an average citation per paper (ACP) of 7.02, varying from 1.73 to 10.45 during 2007-11. Of the 37 laboratories, the 12 have contributed more than the ACPP of all laboratories during 2007-11. These are IGIB with ACPP of 10.45, followed by NIIST(10.28), IITR (10.27), CSMCRI (9.46), CCMB (8.83), IIP (8.78), ICT (8.64), IHBT (7.98), IICB (7.77), IMTECH (7.75), NCL (7.67) and CDRI (7.56). The h-index of 37 labs of CSIR varied from 7 to 64, with average value of 29.73. Eighteen labs have reported h-index more than the average of labs. They are IIT with h-index og 64, followed by NIIST (56), NCL (53), NPL (46), CSMCRI

**Table 1: Contribution and citation impact of CSIR labs, 2007-11**

| Year | CSIR, 2007-11 | India | CSIR share in Indian output |
|------|---------------|-------|-----------------------------|
|      | Publications  | Citations | ACPP | Publications   | |
| 2007 | 4542          | 31380     | 6.91 | 50597         | 8.98 |
| 2008 | 4537          | 32456     | 7.15 | 57669         | 7.87 |
| 2009 | 4391          | 33611     | 7.65 | 65162         | 6.74 |
| 2010 | 4526          | 35072     | 7.75 | 77233         | 5.86 |
| 2011 | 5392          | 31715     | 5.88 | 93336         | 5.78 |
| 2007-11 | 23388       | 164234    | 7.02 | 343997       | 6.80 |
The international collaborative papers (ICP) share of 37 labs of CSIR varied from 0.0% to 28.30%, with average share of 16.40%. Thirteen labs have reported ICP share more than the average of all labs. They are NGRI with ICP share of 28.80%, followed by IMTECH (27.76%), NIO (26.64%), CCMB (25.13%), IICB (22.52%), NIIST (21.32%), CGCRI (20.20%), NCL (20.17%), NML (19.83%), NPL (19.57%), IGIB (18.12%), CECRI (18.02%), NAL (17.96%) and CBRI (16.49%). The high cited publications (HCP) share of 37 labs of CSIR varied from 0.0% to 2.09%, with an average value of 0.57%. Nine labs have achieved HCP share higher than the average value of all labs. They are NIIST with HCP share of 2.09%, followed by IIP (1.75%), IHBT (1.36%), IITR (1.35%), CCMB (1.05%), CFTRI (0.93%), IGIB (0.82%), NCL (0.59%) and IMMT (0.59%) [Table 2].

**Performance of CSIR labs across broad subjects**

The CSIR labs contributed the largest number of publications (7441) in chemistry, followed by biochemistry, genetics and molecular biology (5464), materials science (5115), chemical engineering (3524), physics (3136), engineering (3113), pharmacology, toxicology and pharmaceutics (2846), agricultural and biological sciences (2570), environmental science (2140), medicine (1631), earth and planetary sciences (1322) and energy (648), etc during 2007-11.

**Chemistry**

The 28 labs of CSIR had published 7441 publications, constituting 31.81% share of its total output and 14.17% share of India's output in chemistry during 2007-11. Table 3 gives a scientometric profile of 28 labs of CSIR in chemistry. The publication productivity of each lab varied from 20 to 2017, with an average productivity of 265.75 publications per lab during 2007-11. Eight labs

| Table 2: Publication profile of 37 laboratories of CSIR, 2007-11 |
|-----------------|---------|-----------|---------|-----------|---------|---------|---------|
| Name            | TP      | TC        | ACPP    | H-Index  | ICP     | ICP%    | HCP     | HCP%    |
| IICT-Hyderabad   | 2871    | 24814     | 8.64    | 64        | 377     | 13.13   | 16      | 0.56    |
| NCL-Pune        | 2033    | 15595     | 7.67    | 53        | 410     | 20.17   | 12      | 0.59    |
| NPL-Delhi       | 1610    | 10420     | 6.47    | 46        | 315     | 19.57   | 8       | 0.50    |
| CDRI-Lucknow    | 1245    | 9410      | 7.56    | 44        | 126     | 10.12   | 5       | 0.40    |
| NIIST-Thiruv     | 1102    | 11325     | 10.28   | 235       | 23.21   | 23      | 0.97    |
| CECRI-Karaikudi  | 888     | 5049      | 5.69    | 36        | 160     | 18.02   | 4       | 0.45    |
| CFTRI-Mysore     | 858     | 5476      | 6.38    | 39        | 100     | 11.66   | 8       | 0.93    |
| NIO-Goa         | 871     | 4798      | 5.51    | 33        | 232     | 26.64   | 4       | 0.46    |
| CLRI-Chennai     | 828     | 5051      | 6.10    | 33        | 115     | 13.89   | 3       | 0.36    |
| CECRI-Kolkata    | 826     | 6415      | 7.77    | 39        | 186     | 22.52   | 3       | 0.36    |
| CSMCRI-Bhavn     | 815     | 7707      | 9.46    | 45        | 95      | 11.66   | 4       | 0.49    |
| CCMB-Hyderabad   | 764     | 6748      | 8.83    | 40        | 192     | 25.13   | 8       | 0.55    |
| ITR-Lucknow      | 662     | 6867      | 10.27   | 43        | 92      | 13.77   | 9       | 0.35    |
| NGRI-Hyderabad   | 677     | 2393      | 4.34    | 27        | 195     | 28.80   | 2       | 0.30    |
| NBRI-Lucknow     | 664     | 4185      | 6.30    | 35        | 72      | 10.84   | 3       | 0.45    |
| NEERI-Nagpur     | 623     | 3751      | 6.02    | 35        | 86      | 13.80   | 0       | 0.00    |
| IGIB-Chandigarh  | 607     | 6345      | 10.45   | 41        | 110     | 18.12   | 5       | 0.82    |
| NML-Jamshedpur   | 605     | 3035      | 5.02    | 31        | 120     | 19.83   | 0       | 0.00    |
| IMMT-Bhuban      | 511     | 3225      | 6.31    | 31        | 82      | 16.05   | 3       | 0.59    |
| CGCRI-Kolkata    | 505     | 2851      | 5.65    | 27        | 102     | 20.20   | 1       | 0.20    |
| CIMAP-Lucknow    | 406     | 2040      | 5.02    | 24        | 22      | 5.42    | 0       | 0.00    |
| NAL-Bangalore    | 401     | 1686      | 5.24    | 24        | 72      | 17.96   | 2       | 0.50    |
| IMTECH-Chandigarh| 371     | 2875      | 7.75    | 32        | 103     | 27.76   | 1       | 0.27    |
| IHB-Palampur     | 368     | 2938      | 7.98    | 30        | 35      | 9.51    | 5       | 1.36    |
| IIMM-Srinagar    | 321     | 2014      | 6.27    | 24        | 22      | 8.85    | 0       | 0.00    |
| CEERI-Pilani     | 297     | 612       | 2.06    | 14        | 14      | 4.71    | 0       | 0.00    |
| CIMFR-Dhanbad    | 271     | 597       | 2.20    | 16        | 11      | 4.06    | 0       | 0.00    |
| SERC-Chennai     | 241     | 417       | 1.73    | 11        | 19      | 7.88    | 0       | 0.00    |
| CMERI-Durgapur   | 227     | 820       | 3.61    | 17        | 36      | 15.86   | 1       | 0.44    |
| NEIST-Jorhat     | 180     | 874       | 4.86    | 18        | 16      | 8.89    | 0       | 0.00    |
| IIP-Dehradun     | 171     | 1502      | 8.78    | 24        | 27      | 15.79   | 3       | 1.75    |
| AMPRI-Bhopal     | 165     | 726       | 4.40    | 19        | 14      | 8.48    | 0       | 0.00    |
| CSIO-Chandigarh  | 120     | 330       | 2.75    | 11        | 14      | 11.67   | 0       | 0.00    |
| CBRI-Roorkee     | 97      | 393       | 4.05    | 14        | 16      | 16.49   | 0       | 0.00    |
| NISTADS-Delhi    | 78      | 169       | 2.17    | 9         | 3       | 3.85    | 0       | 0.00    |
| CMMAC-Bangalore  | 55      | 150       | 2.73    | 8         | 9       | 16.36   | 0       | 0.00    |
| NISCAIR-Delhi    | 48      | 94        | 1.96    | 7         | 0       | 0.00    | 0       | 0.00    |
| Total and Average| 23388   | 164234    | 7.02    | 29.73     | 3835    | 16.40   | 133     | 0.57    |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers
have contributed more than the average productivity of all labs: IICT (2017), NCL (1109), CDRI (516), CSMCRI (502), NIIST (436), CLRI (397), CECRI (393) and NPL (378). The 28 labs have registered an average citation impact per paper (ACPP) of 8.99 (varying from 3.96 to 19.98) in chemistry during 2007-11 and nine labs have received more than the average of all labs: NIIST (11.98), IHBT (11.43), CSMCRI (10.39), IITR (10.3), IICT (10.29), NPL (9.31), IGIB (9.23), NCL (9.10) and CDRI (8.74). The 28 labs have registered an average h-index of 22.67 (varying from 8 to 51) during 2007-11. Ten labs have registered h-index higher than the average h-index of all labs: IICT (42), CDRI (36), IITC (34), IGIB (33), CCMB (32), IITR (310, NCL (31), CSMCRI (29),

### Biochemistry, genetics and molecular biology

The 22 labs of CSIR had published 5414 publications, constituting 23.15% share of its total output and 12.57% share of India's output in biochemistry, genetics and molecular biology during 2007-11. Table 3 gives a scientometric profile of 22 labs of CSIR in biochemistry, genetics and molecular biology. The publication productivity of each CSIR lab varied from 22 to 949, with an average productivity of 246.09 publications per lab during 2007-11. Seven labs have contributed more than the average productivity of all labs: IICT (949), CDRI (590), IICB (451), CCMB (441), NCL (424), IGIB (359) and CFTRI (252). The 22 labs have registered an average citation impact per paper (ACPP) of 8.55 (varying from 4.41 to 11.42) in biochemistry, genetics and molecular biology during 2007-11 and seven labs have received more than the ACPP of all labs: CSMCRI (11.42), CCMB (10.41), NIIST (10.06), IGIB (9.82), IITC (9.29), IHBT (9.24), NPL (9.00), IITR (8.53) and IMTECH (8.53). The 22 labs have registered an average h-index of 23.09 (varying from 2 to 42) during 2007-11. Eleven labs have registered h-index higher than the average h-index of all labs: IITC (42), CDRI (36), IITC (34), IGIB (33), CCMB (32), IITR (310, NCL (31), CSMCRI (29),

### Table 3: Scientometric profile of CSIR labs in chemistry, 2007-11

| Name           | TP   | TC   | ACPP | H-index | ICP   | ICP Share | HCP   | HCP %  |
|----------------|------|------|------|---------|-------|-----------|-------|--------|
| IICT-Hyderabad | 2017 | 20757| 10.29| 51      | 240   | 11.90     | 7     | 0.35   |
| NCL-Pune      | 1109 | 10091| 9.10 | 45      | 208   | 18.76     | 6     | 0.54   |
| CDRI-Lucknow  | 516  | 4508 | 8.74 | 37      | 30    | 5.81      | 2     | 0.39   |
| CSMCRI-Bhavn   | 502  | 5218 | 10.39| 41      | 65    | 12.95     | 5     | 1.00   |
| NIIST-Thiruv   | 436  | 5225 | 11.98| 44      | 100   | 22.94     | 13    | 2.98   |
| CLRI-Chennai   | 397  | 2817 | 7.10 | 31      | 53    | 13.35     | 2     | 0.50   |
| CECRI-Karaikudi| 393  | 2705 | 6.88 | 28      | 17    | 4.33      | 2     | 0.51   |
| NPL-Delhi      | 378  | 3520 | 9.31 | 34      | 84    | 22.22     | 4     | 1.06   |
| IICB-Kolkata   | 170  | 1298 | 7.64 | 23      | 31    | 18.24     | 1     | 0.59   |
| IMMT-Bhuvn     | 154  | 949  | 6.16 | 20      | 18    | 11.69     | 0     | 0.00   |
| CFTRI-Mysore   | 153  | 1045 | 6.83 | 23      | 18    | 11.76     | 1     | 0.85   |
| IIIM-Srinagar  | 134  | 903  | 6.74 | 19      | 3     | 2.24      | 0     | 0.00   |
| CGCRI-Kolkata  | 109  | 722  | 6.62 | 17      | 26    | 23.85     | 0     | 0.00   |
| CIMAP-Lucknow  | 103  | 408  | 3.96 | 20      | 14    | 12.62     | 0     | 0.00   |
| NEERI-Nagpur   | 102  | 775  | 7.60 | 20      | 31    | 30.39     | 0     | 0.00   |
| IIP-Dehradun   | 95   | 697  | 7.34 | 17      | 15    | 15.79     | 0     | 0.00   |
| NEIST-Jorhat   | 83   | 478  | 5.76 | 15      | 12    | 14.46     | 8     | 9.64   |
| NML-Jamshedpur | 81   | 505  | 6.23 | 15      | 10    | 12.35     | 0     | 0.00   |
| IHB-Palampur   | 75   | 857  | 11.43| 19      | 2     | 2.67      | 3     | 4.00   |
| IGIB-Delhi     | 73   | 674  | 9.23 | 20      | 31    | 42.47     | 3     | 4.11   |
| IITR-Lucknow   | 63   | 649  | 10.30| 14      | 21    | 33.33     | 3     | 4.76   |
| NBRI-Lucknow   | 62   | 381  | 6.15 | 16      | 3     | 4.84      | 0     | 0.00   |
| CCMB-Hyderabad | 56   | 421  | 7.52 | 15      | 14    | 25.00     | 0     | 0.00   |
| NIO-Goa        | 49   | 397  | 8.10 | 14      | 15    | 30.61     | 0     | 0.00   |
| NAL-Bangalore  | 41   | 240  | 5.85 | 11      | 6     | 14.63     | 0     | 0.00   |
| IMTECH-Chand   | 38   | 321  | 8.45 | 13      | 13    | 34.21     | 0     | 0.00   |
| CMERI-Durgapur | 32   | 205  | 6.44 | 11      | 10    | 31.25     | 0     | 0.00   |
| NGR-Andhra     | 20   | 148  | 7.40 | 8       | 7     | 35.00     | 0     | 0.00   |
| Total and Average | 7441 | 66915 | 8.99 | 22.67 | 1096 | 14.73   | 60   | 0.81   |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers
IMTECH (26), CLRI (25) and CFTRI (25). The 22 labs have registered an average international collaborative share (ICP) of 16.00% (varying from 5.41% to 27.65%) and 9 labs have contributed more than the average share of ICP of all labs: NIIST (27.65%), CCMB (25.85%), IMTECH (25.43%), ICB (24.39%), NIO (23.29%), IITR (19.25%), IGIB (19.22%), CLRI (17.83%) and NPL (17.14%). The 22 labs in biochemistry, genetics and molecular biology have received an average share of high cited papers (HCP) of 0.59% (varying from 0.0% to 2.00%) during 2007-11 and nine labs have contributed more than the average share of HCP of all labs: NIIST (27.65%), CCMB (25.85%), IMTECH (25.43%), IICB (24.39%), NIO (23.29%), IITR (19.25%), IGIB (19.22%), CLRI (17.83%) and NPL (17.14%). The 22 labs in biochemistry, genetics and molecular biology have received an average share of high cited papers (HCP) of 0.59% (varying from 0.0% to 2.00%) during 2007-11 and nine labs have contributed more than the average share of HCP of all labs: NIIST (27.65%), CCMB (25.85%), IMTECH (25.43%), IICB (24.39%), NIO (23.29%), IITR (19.25%), IGIB (19.22%), CLRI (17.83%) and NPL (17.14%).

**Materials science**

The 22 labs of CSIR had published 5115 publications, constituting 21.87% share of its total output and 12.04% share of India’s output in materials science during 2007-11. Table 4 gives a scientometric profile of 22 labs of CSIR in materials science. The productivity of each CSIR lab in material science varied from 28 to 837, with an average productivity of 222.39 publications per lab during 2007-11. Nine labs have contributed more than the average productivity of all labs: NPL (837), NCL (690), CECRI (482), NIIST (475), IICT (420), NML (401), CGCRI (331), CLRI (254) and CSMCRI (238). The 22 labs have registered an average citation impact per paper (ACPP) of 7.50 (varying from 2.38 to 9.39) in materials science during 2007-11 and seven labs have received more than the average ACPP of all labs: CSMCRI (9.39), IMMT (9.04), IICT (8.95), NIIST (8.54), NCL (8.48), IITR (7.91) and NPL (7.77). The 22 labs have registered in materials science an average h-index of 21.59 (varying from 6 to 38) during 2007-11. Ten labs have registered h-index higher than the average of all labs: IICT (38), NCL (37), NIIST (36), NPL (35), CECRI (31), CSMCRI (28), NML (25), CGCRI (23), NAL (23) and IMMT (22). The 22 labs have registered an average international collaborative share (ICP) of 19.10% (varying from 0.0% to 25.0%) and 9 labs have contributed more than the average share of all labs: IICB (25.0%), NEIST (24.14%), NCL (24.06%), NIIST (23.37%), IMMT (22.99%), IGIB (21.43%), NPL (21.27%), CECRI (21.21%) and NML (20.95%). The 22 labs in materials science have received an average share of high cited papers (HCP) of 0.41% (varying from 0.0% to 1.19%) during 2007-11 and five labs have received more than the average share of all labs: IICT (1.19%), NAL (1.16%), NIIST (0.84%), NCL (0.58%) and IMMT (0.57%).

**Chemical engineering**

The 27 labs of CSIR had published 3524 publications, constituting 15.11% share of its total output and 16.48% of India’s output in chemical engineering during 2007-11. Table 5 gives a scientometric profile of 27 labs of CSIR in chemical engineering. The productivity of each CSIR lab varied from 21 to 765, with an average productivity of 130.51 publications per lab during 2007-11. Eight labs have contributed more than the average productivity of all labs: IICT (765), NCL (588), CSMCRI (265), CECRI (241), CLRI (223), NIIST (191), IMMT (141) and NEERI (134). The 27 labs have registered an average citation impact

| Name (location) | TP | TC | ACPP | H-Index | ICP | ICP Share | HCP | HCP%  |
|-----------------|----|----|------|---------|-----|-----------|-----|-------|
| IICT-Hyderabad  | 949| 8819| 9.29 | 42      | 104 | 10.96     | 3   | 0.32  |
| CDRI-Lucknow    | 590| 4948| 8.39 | 36      | 63  | 10.68     | 4   | 0.68  |
| IICB-Kolkata     | 451| 3750| 8.31 | 34      | 110 | 24.39     | 1   | 0.22  |
| CCMB-Hyderabad   | 441| 4592| 10.41| 32      | 114 | 25.85     | 3   | 0.68  |
| NCL-Pune         | 424| 3138| 7.40 | 31      | 54  | 12.74     | 1   | 0.24  |
| IGIB-Delhi       | 359| 3527| 9.82 | 33      | 69  | 19.22     | 2   | 0.56  |
| CFTRI-Mysore     | 252| 1537| 6.10 | 25      | 32  | 12.70     | 1   | 0.40  |
| IMTECH-Chandigarh| 232| 1979| 8.53 | 26      | 59  | 25.43     | 1   | 0.43  |
| CLRI-Chennai     | 230| 1763| 7.67 | 25      | 41  | 17.83     | 2   | 0.67  |
| NIIST-Thiruvan   | 217| 2184| 10.06| 2       | 60  | 27.65     | 3   | 1.38  |
| IITR-Lucknow     | 213| 1817| 8.63 | 31      | 41  | 19.25     | 4   | 1.88  |
| NBRI-Lucknow     | 174| 1069| 6.14 | 20      | 18  | 10.34     | 0   | 0.00  |
| CSMCRI-Bhavn     | 158| 1804| 11.42| 29      | 15  | 9.49      | 2   | 1.27  |
| IHB-Talvar       | 150| 1386| 9.24 | 21      | 19  | 12.67     | 3   | 2.00  |
| CIMAP-Lucknow    | 140| 808 | 5.77 | 20      | 8   | 12.35     | 0   | 0.00  |
| IIIM-Srinagar    | 112| 831 | 7.42 | 20      | 11  | 9.82      | 0   | 0.00  |
| NEERI-Nagpur     | 81 | 500 | 6.17 | 16      | 10  | 12.35     | 0   | 0.00  |
| NIO-Goa          | 73 | 612 | 8.38 | 16      | 17  | 23.29     | 1   | 1.37  |
| NPL-Delhi        | 70 | 630 | 9.00 | 20      | 12  | 17.14     | 1   | 1.43  |
| CECRI-Karaikudi  | 39 | 316 | 8.10 | 10      | 4   | 10.26     | 0   | 0.00  |
| NEIST-Jorhat     | 37 | 163 | 4.41 | 11      | 2   | 5.41      | 0   | 0.00  |
| IMMT-Bhubaneswar | 22 | 127 | 5.77 | 8       | 3   | 13.64     | 0   | 0.00  |
| **Total and Average** | **5414** | **46300** | **8.55** | **23.09** | **866** | **16.00** | **32** | **0.59** |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers
per paper (ACPP) of 8.49 (varying from 3.50 to 10.82) in chemical engineering during 2007-11 and ten labs have received more than the ACPP of all labs: NIIST (10.82), IITR (10.58), NCL (9.58), IICT (9.43), NEERI (9.41),

| Table 4: Scientometric profile of CSIR labs in materials science, 2007-11 |
| Name | TP | TC | ACPP | H-Index | ICP | ICP Share | HCP | HCP % |
| NPL-Delhi | 837 | 6504 | 7.77 | 35 | 178 | 21.27 | 3 | 0.36 |
| NCL-Pune | 690 | 5852 | 8.48 | 37 | 166 | 24.06 | 4 | 0.58 |
| CECRI-Karaikudi | 482 | 3536 | 7.34 | 31 | 79 | 16.39 | 1 | 0.21 |
| NIIST-Thiruv | 475 | 4055 | 8.54 | 36 | 111 | 23.37 | 4 | 0.84 |
| IICT-Hyder | 420 | 3759 | 8.95 | 38 | 74 | 17.62 | 5 | 1.19 |
| NML-Jamshedpur | 401 | 2817 | 7.02 | 25 | 84 | 20.95 | 0 | 0.00 |
| CGCRI-Kolkata | 331 | 2414 | 7.29 | 23 | 54 | 16.31 | 1 | 0.30 |
| CLRI-Chennai | 254 | 1126 | 6.55 | 23 | 31 | 18.02 | 2 | 1.16 |
| CSMCRI-Bhavn | 238 | 2234 | 9.39 | 28 | 35 | 14.71 | 0 | 0.00 |
| IMMT-Bhuvn | 174 | 1573 | 9.04 | 22 | 40 | 22.99 | 1 | 0.57 |
| NAL-Bangalore | 172 | 1126 | 6.55 | 23 | 31 | 18.02 | 2 | 1.16 |
| AMPRI-Bhopal | 113 | 686 | 6.07 | 16 | 8 | 7.08 | 0 | 0.00 |
| CEERI-Pilani | 82 | 328 | 4.00 | 10 | 7 | 8.54 | 0 | 0.00 |
| IITR-Lucknow | 58 | 459 | 7.91 | 13 | 10 | 17.24 | 0 | 0.00 |
| CMERI-Durgapur | 51 | 166 | 3.25 | 10 | 9 | 17.65 | 0 | 0.00 |
| NEERI-Nagpur | 50 | 327 | 6.54 | 17 | 3 | 6.00 | 0 | 0.00 |
| SERC-Chennai | 42 | 100 | 2.38 | 7 | 7 | 16.67 | 0 | 0.00 |
| CSIO-Chan | 36 | 188 | 5.22 | 14 | 9 | 25.00 | 0 | 0.00 |
| CECRI-Karaikudi | 32 | 221 | 6.91 | 12 | 6 | 18.75 | 0 | 0.00 |
| CDR-Lucknow | 30 | 183 | 6.10 | 10 | 0 | 0.00 | 0 | 0.00 |
| IIP-Dehradun | 29 | 137 | 6.69 | 20 | 11 | 10.58 | 1 | 0.96 |
| NEIST-Jorhat | 29 | 167 | 5.76 | 10 | 7 | 24.14 | 0 | 0.00 |
| CBRI-Roorkee | 28 | 120 | 4.29 | 9 | 1 | 3.57 | 0 | 0.00 |
| IGIB-Delhi | 28 | 201 | 7.18 | 12 | 6 | 21.43 | 0 | 0.00 |
| Total and Average | 5115 | 38339 | 7.50 | 21.59 | 977 | 19.10 | 21 | 0.41 |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers

| Table 5: Scientometric profile of CSIR labs in chemical engineering, 2007-11 |
| Name | TP | TC | ACPP | H-Index | ICP | ICP Share | HCP | HCP % |
| IICT-Hyderabad | 765 | 7216 | 9.43 | 4 | 109 | 14.25 | 7 | 0.92 |
| NCL-Pune | 588 | 5634 | 9.58 | 38 | 14 | 2.38 | 3 | 0.51 |
| CSMCRI-Bhavn | 265 | 2409 | 9.09 | 26 | 27 | 10.19 | 0 | 0.00 |
| CECRI-Karaikudi | 241 | 1650 | 6.85 | 26 | 39 | 16.18 | 1 | 0.41 |
| CLRI-Chennai | 223 | 1445 | 6.48 | 21 | 33 | 14.80 | 1 | 0.45 |
| NIIST-Thiruv | 191 | 2067 | 10.82 | 36 | 61 | 31.94 | 1 | 0.52 |
| IMMT-Bhuvn | 141 | 1037 | 7.35 | 23 | 15 | 10.64 | 0 | 0.00 |
| NEERI-Nagpur | 134 | 1261 | 9.41 | 26 | 24 | 17.91 | 0 | 0.00 |
| NPL-Delhi | 120 | 1035 | 8.63 | 26 | 26 | 21.67 | 2 | 1.67 |
| CFTRI-Mysore | 104 | 696 | 6.69 | 20 | 11 | 10.58 | 1 | 0.96 |
| IIP-Dehradun | 94 | 684 | 7.28 | 20 | 8 | 8.51 | 0 | 0.00 |
| IITR-Lucknow | 86 | 910 | 10.58 | 23 | 18 | 20.93 | 3 | 3.49 |
| NML-Jamshedpur | 73 | 629 | 8.62 | 17 | 13 | 17.81 | 0 | 0.00 |
| CDRI-Luck | 62 | 217 | 3.50 | 11 | 4 | 6.45 | 0 | 0.00 |
| CGCRI-Kolkata | 46 | 284 | 6.17 | 13 | 3 | 6.52 | 0 | 0.00 |
| IHBT-Palampur | 43 | 381 | 8.86 | 14 | 1 | 2.33 | 3 | 6.88 |
| ICB-Kolkata | 38 | 216 | 5.68 | 10 | 4 | 10.53 | 0 | 0.00 |
| NAL-Bangalore | 38 | 169 | 4.45 | 7 | 5 | 13.16 | 0 | 0.00 |
| NBR-Lucknow | 36 | 301 | 8.36 | 15 | 6 | 16.67 | 1 | 2.78 |
| NEIST | 36 | 231 | 6.42 | 11 | 2 | 5.56 | 0 | 0.00 |
| IMTECH-Chan | 34 | 287 | 8.44 | 12 | 8 | 23.53 | 0 | 0.00 |
| IGIB-Delhi | 32 | 252 | 7.88 | 11 | 3 | 9.38 | 0 | 0.00 |
| NIO-Goa | 32 | 224 | 7.00 | 13 | 6 | 18.75 | 1 | 3.13 |
| CCMB-Hyderabad | 31 | 238 | 7.68 | 11 | 5 | 16.13 | 0 | 0.00 |
| IIIM-Srinagar | 27 | 137 | 5.07 | 8 | 1 | 3.70 | 0 | 0.00 |
| CIMFR-Dhanbad | 23 | 115 | 5.00 | 7 | 1 | 4.35 | 0 | 0.00 |
| CMERI-Durgapur | 21 | 189 | 9.00 | 10 | 4 | 19.05 | 1 | 4.76 |
| Total and Average | 3524 | 29914 | 8.49 | 17 | 451 | 12.80 | 25 | 0.71 |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers
CSMCRI (9.09), CMERI (9.0), IHBT (8.86), NPL (8.63) and NML (8.62). The 27 labs have registered in chemical engineering an average h-index of 17 (varying from 4 to 38) during 2007-11. Eleven labs have registered h-index higher than the average h-index of all labs: NCL (38), NIIST (36), NPL (26), NEERI (26), CSMCRI (26), CECRI (26), IITR (23), IMMT (23), CLRI (21), IIP (20), CFTRI (20). The 27 labs have registered an average international collaborative share (ICP) of 12.80% (varying from 2.33% to 31.94%) and 14 labs have contributed more than the average share of ICP of all labs: NIIST (31.94%), IMTECH (23.53%), NPL (21.67%), NEERI (19.05%), NIO (18.75%), NEERI (17.91%), NML (17.81%), NBRI (16.67%), CECRI (16.18%), CCMB (16.13%), CLRI (14.80%), IICT (14.25%) and NAL (13.16%). The 27 labs in chemical engineering have received an average share of high cited papers (HCP) of 0.71% (varying from 0.0% to 6.98%) during 2007-11 and seven labs have received more than the average share of HCP of all labs: IHBT (6.98%), CMERI (4.76%), IITR (4.25%), NPL (21.67%), NEERI (21.67%), CECRI (21.67%), NAL (13.16%).

Physics
The 17 labs of CSIR had published 3136 publications, constituting 13.41% share of its total output and 6.31% of India’s output in physics during 2007-11. Table 6 gives a scientometric profile of 17 labs of CSIR in physics. The productivity of each CSIR lab varied from 28 to 905, with an average productivity of 184.47 publications per lab during 2007-11. Seven labs have contributed more than the average productivity of all labs: NPL (905), NCL (359), CECRI (284), IICT (259), CGCRI (234), NML (194) and NIIST (191). The 17 labs have registered an average citation impact per paper (ACPP) of 5.90 (varying from 3.62 to 7.77) in physics during 2007-11 and six labs have received more than the ACPP of all labs: NPL (7.77), NCL (7.50), CECRI (6.28), IICT (6.28), CGCRI (5.96), and NML (5.93). The 17 labs have registered in physics an average h-index of 16.53 (varying from 8 to 32) during 2007-11. Eight labs have registered h-index higher than the average h-index of all labs: NPL (32), NCL (28), IICT (23), CECRI (22), NIIST (20), CGCRI (20), CSMCRI (17) and NML (17). The 17 labs have registered an average international collaborative share (ICP) of 20.73% (varying from 4.20% to 32.14%) and eight labs have contributed more than the average share of ICP of all labs: NIO (32.14%), IICB (28.57%), NPL (28.35%), CGCRI (27.78%), NCL (24.51%), IMMT (23.33%), NAL (22.48%) and NPL (21.33%). The 17 labs in physics have received an average share of high cited papers (HCP) of 0.10% (varying from 0.0% to 0.52%) during 2007-11 and three labs have received more than the average share of HCP of all labs: NIIST (0.52%), NCL (0.28%) and NPL (0.11%).

Pharmacology, toxicology and pharmaceutics
The 17 labs of CSIR had published 2846 publications, constituting 12.17% share of its total output and 13.93% share of India’s output in pharmacology, toxicology and pharmaceutics during 2007-11. Table 7 gives a scientometric profile of 17 labs of CSIR in pharmacology, toxicology and pharmaceutics. The productivity of each CSIR lab varied from 36 to 761, with an average productivity of 167.41 publications per lab during 2007-11. Five labs have contributed more than the average publication productivity of all labs: IICT (761), CDRI (524), IITR (256), NCL (207) and and IICB (174). The 17 labs have registered an average citation impact per paper (ACPP) of 8.66 (varying from 4.22 to 10.11) in pharmacology, toxicology and pharmaceutics during 2007-11 and four labs have received more than the ACPP of all labs: CDRI (10.11), CCMB

Table 6: Scientometric profile of CSIR labs in physics, 2007-11

| Name           | TP  | TC  | ACPP | H-Index | ICP  | ICP Share | HCP | HCP %  |
|----------------|-----|-----|------|---------|------|-----------|-----|--------|
| NPL-Delhi      | 905 | 5687| 6.28 | 32      | 193  | 21.33     | 1   | 0.11   |
| NCL-Pune       | 359 | 2691| 7.50 | 28      | 88   | 24.51     | 1   | 0.28   |
| CECRI-Karaulkudi| 284 | 1384| 4.87 | 22      | 59   | 20.77     | 0   | 0.00   |
| IICT-Hyderabad  | 259 | 1544| 5.96 | 23      | 31   | 11.97     | 0   | 0.00   |
| CGCRI-Kolkata  | 234 | 1371| 5.86 | 20      | 65   | 27.78     | 0   | 0.00   |
| NML-Jaipur     | 194 | 947 | 4.88 | 17      | 55   | 28.35     | 0   | 0.00   |
| NIIST-Thiruv   | 191 | 1200| 6.28 | 20      | 38   | 19.90     | 1   | 0.52   |
| NAL-Bangalore  | 129 | 690 | 5.35 | 15      | 29   | 22.48     | 0   | 0.00   |
| CECRI-Pilani   | 119 | 555 | 4.66 | 11      | 5    | 4.20      | 0   | 0.00   |
| CLRI-Chennai   | 104 | 416 | 4.00 | 12      | 18   | 17.31     | 0   | 0.00   |
| IMMT-Bhubaneswar| 90  | 534 | 5.93 | 15      | 21   | 23.33     | 0   | 0.00   |
| CSMRI-Bhavanagar| 74  | 598 | 7.77 | 17      | 13   | 16.88     | 0   | 0.00   |
| NEERI-Nagpur   | 49  | 184 | 3.76 | 12      | 3    | 6.12      | 0   | 0.00   |
| CSIO-Chan      | 45  | 163 | 3.62 | 8       | 8    | 17.78     | 0   | 0.00   |
| CEMER-Durgapur | 41  | 215 | 5.24 | 9       | 7    | 17.07     | 0   | 0.00   |
| NIO-Goa        | 28  | 158 | 5.64 | 9       | 9    | 32.14     | 0   | 0.00   |
| IICB-Kolkata   | 28  | 158 | 5.64 | 11      | 8    | 28.57     | 0   | 0.00   |
| Total and Average| 3136| 18495| 5.90| 16.53 | 650 | 20.73 | 3 | 0.10 |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers
The 17 labs have registered an average h-index of 21.35 (varying from 9 to 39) during 2007-11. Eight labs have registered a higher h-index than the average h-index of all labs: IICT (39), CDRI (37), IITR (31), CLRI (24), NCL (24), IICB (23), IGIB (22) and IIIM (22). The 17 labs have registered an average international collaborative share (ICP) of 9.28% (varying from 5.45% to 28.57%) and eight labs have contributed more than the average share of ICP of all labs: CCMB (28.57%), IICB (16.67%), NEERI (13.89%), IGIB (12.99%), IITR (11.33%), NIO (10.53%), CFTRI (10.14%) and CLRI (9.73%). The 17 labs in pharmacology, toxicology and pharmaceutics have received an average share of high cited papers (HCP) of 0.46% (varying from 0.0% to 3.33%) during 2007-11 and seven labs have received more than the average share of HCP of all labs: NIIST (3.33%), NIO (2.63%), IGIB (1.30%), IITR (1.17%), CLRI (0.88%), IICB (0.57%) and NCL (0.48%).

### Agricultural and biological sciences

The 21 labs of CSIR had published 2570 publications, constituting 10.99% share of its total output and 7.26% share of India’s output in agricultural and biological sciences during 2007-11. Table 8 gives a scientometric profile of 21 labs of CSIR in agricultural and biological sciences.

| Name              | TP  | TC   | ACPP | H-Index | ICP  | ICP Share | HCP  | HCP % |
|-------------------|-----|------|------|---------|------|-----------|------|-------|
| CFTRI-Mysore      | 527 | 3901 | 7.4  | 37      | 55   | 10.44     | 8    | 1.52  |
| NBRI-Lucknow      | 320 | 1983 | 6.2  | 25      | 40   | 12.50     | 1    | 0.31  |
| NIO-Goa           | 240 | 1813 | 7.55 | 24      | 61   | 25.42     | 0    | 0.00  |
| IHB-Palampur      | 181 | 970  | 5.36 | 20      | 18   | 9.94      | 0    | 0.00  |
| CIMAP-Lucknow     | 177 | 660  | 3.73 | 14      | 5    | 2.82      | 0    | 0.00  |
| CCMB-Hyderabad     | 161 | 969  | 6.02 | 21      | 41   | 25.47     | 0    | 0.00  |
| IICT-Hyderabad     | 114 | 796  | 6.98 | 22      | 9    | 7.89      | 2    | 1.75  |
| NIIST-Thiruvanapuram | 101 | 829  | 8.21 | 22      | 30   | 29.70     | 1    | 0.99  |
| CSICB-Bhavn        | 92  | 510  | 5.54 | 16      | 10   | 10.87     | 0    | 0.00  |
| NCL-Pune           | 89  | 546  | 6.13 | 18      | 20   | 22.47     | 0    | 0.00  |
| CDRI-Lucknow       | 79  | 303  | 3.84 | 13      | 5    | 6.33      | 0    | 0.00  |
| IITR-Lucknow       | 77  | 500  | 6.49 | 16      | 9    | 11.69     | 2    | 2.60  |
| IGIB-Delhi         | 66  | 463  | 7.02 | 14      | 9    | 13.64     | 1    | 1.52  |
| IICB-Kolkata       | 59  | 398  | 6.75 | 15      | 10   | 16.95     | 0    | 0.00  |
| NEERI-Nagpur       | 59  | 435  | 7.37 | 17      | 4    | 6.78      | 0    | 0.00  |
| NGRIL-Hyderabad     | 54  | 183  | 3.39 | 10      | 8    | 14.81     | 0    | 0.00  |
| IIM-Srinagar       | 54  | 268  | 4.96 | 11      | 4    | 7.41      | 0    | 0.00  |
| IMTECH-Chandigarh  | 52  | 313  | 6.02 | 12      | 21   | 40.38     | 0    | 0.00  |
| CLRI-Chennai       | 25  | 164  | 6.56 | 9       | 1    | 4.00      | 0    | 0.00  |
| NEIST-Jorhat       | 24  | 74   | 3.08 | 6       | 0    | 0.00      | 0    | 0.00  |
| NPL-Delhi          | 19  | 88   | 4.63 | 7       | 2    | 10.53     | 0    | 0.00  |
| Total and Average  | 2860| 24635| 8.66 | 21.35   | 264  | 9.28      | 13   | 0.46  |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers
The productivity of each CSIR lab varied from 19 to 527, with an average productivity of 122.38 publications per lab during 2007-11. Six labs have contributed more than the average productivity of all labs: CFTRI (527), NBRI (320), NIO (240), IHBT (181), CIMAP (177) and CCMB (161). The 21 labs have registered an average citation impact per paper (ACPP) of 6.29 (varying from 3.08 to 8.21) in agricultural and biological sciences during 2007-11 and nine labs have received more than the ACPP of all labs: NIIST (8.21), NIO (7.55), CFTRI (7.40), NEERI (7.37), IIGB (7.02), IICB (6.75), CLRI (6.56) and IITR (6.49). The 21 labs have registered an average h-index of 16.62 (varying from 6 to 37) during 2007-11. Nine labs have registered h-index higher than the average h-index of all labs: CFTRI (37), NBRI (35), NIO (24), IITC (22), CCMB (21), IHBT (20), NCL (18) and NEERI (17). The 21 labs have registered an average international collaborative share (ICP) of 14.09% (varying from 0.00% to 40.38%) and seven labs have contributed more than the average share of ICP of all labs: IMTECH (40.38%), NIIST (29.70%), CCMB (25.47%), NIO (25.42%), NCL (22.47%), IICB (16.95%) and NGRI (14.81%). The 21 labs in agricultural and biological sciences have received an average share of high cited papers (HCP) of 0.58% (varying from 0.0% to 2.60%) during 2007-11 and five labs have received more than the average share of HCP of all labs: IITR (2.60%), IICT (1.75%), CFTRI (1.52%), IGIB (1.52%) and NIIST (0.99%).

### Engineering

The 25 labs of CSIR had published 3113 publications, constituting 13.31% share of its total output and 5.35% share of India’s output in engineering during 2007-11. Ten labs have contributed more than the average productivity of all labs: NPL (408), CECRI (239), NML (235), NAL (225), SERC (207), NCL (205), CEERI (195), CGCRI (169), NIIST (156) and IIT (1131). The 25 labs have registered an average citation impact per paper (ACPP) of 5.09 (varying from 1.29 to 16.13) in engineering during 2007-11 and eleven labs have received more than the ACPP of all labs: IITR (16.13), CSMCRI (8.88), IGIB (8.28), IICT (7.97), NIIST (7.71), NCL (7.64), NEERI (7.20), CFTRI (6.17), CGCRI (6.05), CLRI (5.68) and NPL (5.24). The 25 labs have registered an average h-index of 14.48 (varying from 6 to 25) during 2007-11. Twelve labs have registered h-index higher than the average h-index of all labs: NCL (25), NIIST (24), NPL (24), IICT (22), CECRI (22), IITR (21), CGCRI (18), NML (17), CSMCRI (16), NEERI (16), CFTRI (15) and IMMTI (15). The 25 labs have registered an average international collaborative share (ICP) of 16.58% (varying from 4.00% to 37.50%) in engineering and 12 labs have contributed more than the average share of ICP of all labs: NGRI (37.50%), CGCRI (28.99%), IIP (26.92%), NML (22.13%), NCL (22.13%), CSMCRI (21.37%).

### Table 9: Scientometric profile of CSIR labs in engineering, 2007-11

| Name               | TP  | TC   | ACPP | H-Index | ICP Share | HCP | HCP % |
|--------------------|-----|------|------|---------|-----------|-----|-------|
| NPL-Delhi          | 408 | 2138 | 5.24 | 24      | 84        | 20.59 | 0.49  |
| CECRI-Karaikudi    | 239 | 1041 | 4.36 | 22      | 44        | 18.41 | 0.42  |
| NML-Jamshedpur     | 235 | 1070 | 4.55 | 17      | 52        | 22.13 | 0.00  |
| NAL-Bangalore      | 225 | 684  | 3.04 | 13      | 19        | 8.44  | 0.44  |
| SERC-Chennai       | 207 | 323  | 1.56 | 10      | 17        | 8.21  | 0.00  |
| NCL-Pune           | 205 | 1567 | 7.64 | 25      | 45        | 21.95 | 0.49  |
| CEERI-Pilani       | 195 | 324  | 1.66 | 10      | 12        | 6.15  | 0.00  |
| CGCRI-Kolkata      | 169 | 1022 | 6.05 | 18      | 49        | 28.99 | 0.59  |
| NIIST-Thiruv       | 156 | 1203 | 7.71 | 24      | 31        | 19.87 | 2.28  |
| IICT-Hyderabad      | 131 | 1044 | 7.97 | 22      | 28        | 21.37 | 0.00  |
| IMMT-Bhubaneswar   | 123 | 563  | 4.58 | 15      | 25        | 20.33 | 0.00  |
| CMERI-Durgapur     | 101 | 344  | 3.41 | 12      | 12        | 11.88 | 1.00  |
| CLR-Cochin         | 88  | 500  | 5.68 | 14      | 11        | 12.50 | 1.00  |
| AMPRI-Bhopal       | 82  | 379  | 4.62 | 14      | 6         | 7.32  | 0.00  |
| CSMCRI-Bhavn       | 77  | 684  | 8.88 | 16      | 6         | 7.79  | 0.00  |
| NIO-Goa            | 73  | 278  | 3.81 | 10      | 14        | 19.18 | 1.00  |
| IITR-Lucknow       | 71  | 1145 | 16.13| 21      | 15        | 21.13 | 1.00  |
| CFTRI-Mysore       | 64  | 395  | 6.17 | 15      | 8         | 12.50 | 0.00  |
| NEERI-Nagpur       | 61  | 439  | 7.20 | 16      | 8         | 13.11 | 0.00  |
| CBRI-Roorkee       | 44  | 187  | 4.25 | 10      | 4         | 9.09  | 0.00  |
| CIMFR-Dhanbad      | 42  | 54   | 1.29 | 6        | 4         | 9.52  | 0.00  |
| CSIO-Chan          | 42  | 69   | 1.64 | 6        | 5         | 11.90 | 0.00  |
| IIP-Dehradun       | 25  | 125  | 4.81 | 6        | 7         | 26.92 | 0.00  |
| IGIB-Delhi         | 26  | 207  | 8.28 | 9        | 1         | 4.00  | 0.00  |
| NGRI-Hyderabad      | 24  | 53   | 2.21 | 7        | 9         | 37.50 | 0.00  |
| Total and Average  | 3113| 15838| 5.09 | 14.48    | 516       | 16.58 | 0.39  |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers
(21.95%), IICT (21.37%), IITR (21.13%), NPL (20.59%), IMMT (20.33%), NIIST (19.87%), NIO (19.18%) and CECRI (18.41%). The 25 labs in engineering have received an average share of high cited papers (HCP) of 0.39% (varying from 0.0% to 1.41%) during 2007-11 and nine labs have received more than the average share of HCP of all labs: IITR (1.41%), NIO (1.37%), NIIST (1.28%), CLRI (1.14%), CMERI (0.99%), CGCRI (0.59%), NCL (0.49%), NPL (0.49%) and NAL (0.44%).

Environmental science

The 24 labs of CSIR had published 2140 publications, constituting 9.17% share of its total output and 10.07% share of India’s output in environmental science during 2007-11. Table 10 gives a scientometric profile of 24 labs of CSIR in environmental science. The productivity of each CSIR lab varied from 19 to 329, with an average productivity of 89.17 publications per lab during 2007-11. Eight labs have contributed more than the average productivity of all labs: NEERI (329), IITR (236), NIO (209), NBRI (162), IICT (151), NGRI (115), NCL (109) and CLRI (101). The 24 labs have registered an average citation impact per paper (ACPP) of 7.76 (varying from 2.57 to 18.28) in environment science during 2007-11 and eleven labs have received more than the ACPP of all labs: NIIST (18.28), IHBT (10.76), IICT (10.57), NIO (10.04), NML (9.59), IMMT (8.89), NPL (8.87), CSMCRI (8.45), IITR (8.31), NBRI (8.30) and IIP (7.90). The 24 labs have registered in environment science an average h-index of 15.50 (varying from 6 to 27) during 2007-11. Twelve labs have registered h-index higher than the average h-index of all labs: IICT (27), IITR (26), NEERI (26), NBRI (24), NIIST (23), NIO (20), NPL (20), NCL (20), CLRI (19), IMMT (18), CECRI (18) and CSMCRI (17). The 24 labs have registered an average international collaborative share (ICP) of 13.69% (varying from 1.45% to 42.11%) and 12 labs have contributed more than the average share of ICP of all labs: CBRI (42.11%), CCMB (34.62%), IMTECH (30.00%), NIIST (26.87%), NML (25.00%), IIP (23.81%), IMMT (22.78%), AMRRI (19.05%), NCL (16.51%), NIO (16.27%), IICT (15.89%) and CDRI (13.89%). The 24 labs in environment science have received an average share of high cited papers (HCP) of 0.79% (varying from 0.0% to 6.90%) during 2007-11 and eight labs have received more than the average share of HCP of all labs: IHBT (6.90%), NIIST (5.97%), IMMT (2.53%), IICT (1.99%), NPL (1.33%), CECRI (1.38%), CLRI (0.99%) and IITR (0.85%).

Earth and planetary sciences

The 8 labs of CSIR had published 1322 publications, constituting 5.65% share of its total output and 9.91% share of India’s output in earth and planetary sciences during 2007-11. Table 11 gives a scientometric profile of 8 labs of CSIR in earth and planetary sciences. The productivity of each CSIR lab varied from 26 to 487, with an average productivity of 165.22 publications per lab during 2007-11. Two labs have contributed more than the average productivity of all labs: NGRI (487) and CBRI (42.11%). The 8 labs have registered an average citation impact per paper (ACPP) of 7.76 (varying from 2.57 to 18.28) in earth and planetary sciences during 2007-11 and six labs have received more than the ACPP of all labs: NIIST (18.28), IHBT (10.76), IICT (10.57), NIO (10.04), NML (9.59), IMMT (8.89). The 8 labs have registered in earth and planetary science an average h-index of 15.50 (varying from 6 to 27) during 2007-11. Twelve labs have registered h-index higher than the average h-index of all labs: IICT (27), IITR (26), NEERI (26), NBRI (24), NIIST (23), NIO (20), NPL (20), NCL (20), CLRI (19), IMMT (18), CECRI (18) and CSMCRI (17). The 8 labs have registered an average international collaborative share (ICP) of 13.69% (varying from 1.45% to 42.11%) and 12 labs have contributed more than the average share of ICP of all labs: CBRI (42.11%), CCMB (34.62%), IMTECH (30.00%), NIIST (26.87%), NML (25.00%), IIP (23.81%), IMMT (22.78%), AMRRI (19.05%), NCL (16.51%), NIO (16.27%), IICT (15.89%) and CDRI (13.89%). The 8 labs in earth and planetary science have received an average share of high cited papers (HCP) of 0.79% (varying from 0.0% to 6.90%) during 2007-11 and six labs have received more than the average share of HCP of all labs: IHBT (6.90%), NIIST (5.97%), IMMT (2.53%), IICT (1.99%), NPL (1.33%), CECRI (1.38%), CLRI (0.99%) and IITR (0.85%).
NIO (408). The 8 labs have registered an average citation impact per paper (ACPP) of 4.31 (varying from 1.92 to 5.39) in earth and planetary sciences during 2007-11 and two labs have received more than the ACPP of all labs: NIO (5.39) and NPL (5.39). The 8 labs have registered in earth and planetary sciences an average h-index of 14.25 (varying from 8 to 25) during 2007-11. Three labs have registered h-index higher than the average h-index of all labs: NIO (25), NGRI (23) and NPL (16). The 8 labs have registered an average international collaborative share (ICP) of 24.66% (varying from 4.23% to 32.11%) and two labs have contributed more than the average share of ICP of all labs: NIO (32.11%) and NGRI (30.8%). The 8 labs have registered an average share of high cited papers (HCP) of 0.15% (varying from 0.0% to 2.60%) during 2007-11 and one lab have received more than the average share of HCP of all labs: NIO (0.49%).

**Medicine**

The 13 labs of CSIR had published 1631 publications, constituting 6.97% share of its total output and 2.36% share of India’s output in medicine during 2007-11. Table 12 gives a scientometric profile of 13 labs of CSIR in medicine. The productivity of each CSIR lab varied from 32 to 272, with an average productivity of 125.46 publications per lab during 2007-11. Five labs have contributed more than the average productivity of all labs: CDRI (272), CCMB (227), IICB (211), IGIB (196) and IITR (181). The 13 labs have registered an average citation impact per paper (ACPP) of 7.83 (varying from 3.91 to 9.72) in medicine during 2007-11 and five labs have received more than the ACPP of all labs: IITR (9.72), IGIB (9.42), IMTECH (9.22), CCMB (8.56) and NCL (8.09). The 13 labs have registered in medicine an average h-index of 17.61 (varying from 10 to 26) during 2007-11. Six labs have registered h-index higher than the average h-index of all labs: CCMB (26), IITR (25), IGIB (25), IICB (25), CDRI (23) and CFTRI (21). The 13 labs have registered an average international collaborative share (ICP) of 19.74% (varying from 9.18% to 31.67%) and eight labs have contributed more than the average share of ICP of all labs: INTECH (31.67%), IICB (27.96%), NEERI (25.53%), IICT (25.53%), NCL (24.53%), CCMB (22.91%), CFTRI (22.62%) and IGIB (21.43%). The 13 labs in medicine have received an average share of high cited papers (HCP) of 0.67% (varying from 0.0% to 3.57%) during 2007-11 and four labs have received more than the average share of HCP of all labs: CFTRI (3.57%), NEERI (2.13%), NCL (1.89%) and CCMB (1.32%).

**Immunology and microbiology**

The 18 labs of CSIR had published 1357 publications, constituting 5.80% share of its total output and 11.65% share of India’s output in immunology and microbiology during 2007-11. Two labs have contributed more than the average productivity of all labs: CDRI (272) and CCMB (227). The 18 labs have registered a citation impact per paper (ACPP) of 7.06 (varying from 1.92 to 9.42) in immunology and microbiology during 2007-11 and three labs have received more than the ACPP of all labs: CDRI (9.42), IICB (9.42) and IGIB (9.22). The 18 labs have registered an average h-index of 17.91 (varying from 10 to 26) during 2007-11. Five labs have registered h-index higher than the average h-index of all labs: CCMB (25), IITR (25), IGIB (25), IICB (25), CDRI (23) and CFTRI (21). The 18 labs have registered an average international collaborative share (ICP) of 23.75% (varying from 9.18% to 31.67%) and seven labs have contributed more than the average share of ICP of all labs: INTECH (31.67%), IICB (27.96%), NEERI (25.53%), IICT (25.53%), NCL (24.53%), CCMB (22.91%), CFTRI (22.62%) and IGIB (21.43%). The 18 labs in immunology and microbiology have received an average share of high cited papers (HCP) of 0.67% (varying from 0.0% to 3.57%) during 2007-11 and four labs have received more than the average share of HCP of all labs: CFTRI (3.57%), NEERI (2.13%), NCL (1.89%) and CCMB (1.32%).

**Table 11: Scientometric profile of CSIR labs in earth and planetary sciences, 2007-11**

| Name               | TP  | TC     | ACPP | H-Index | ICP | ICP Share | HCP | HCP % |
|--------------------|-----|--------|------|---------|-----|-----------|-----|-------|
| NGRI-Hyderabad     | 487 | 2088   | 4.29 | 23      | 150 | 30.80     | 0   | —     |
| NIO-Goa            | 408 | 2201   | 5.39 | 25      | 131 | 32.11     | 2   | 0.49  |
| CIMFR-Dhanbad      | 142 | 273    | 1.92 | 12      | 6   | 4.23      | 0   | —     |
| NPL-Delhi          | 96  | 517    | 5.39 | 16      | 16  | 16.67     | 0   | —     |
| IMMT-Bhubnaneswar  | 72  | 237    | 3.29 | 11      | 9   | 12.50     | 0   | —     |
| NML-Jamshedpur     | 58  | 146    | 2.52 | 10      | 5   | 8.62      | 0   | —     |
| NEERI-Nagpur       | 33  | 126    | 3.82 | 9       | 4   | 12.12     | 0   | —     |
| CMMAC-Bangalore    | 26  | 110    | 4.23 | 8       | 5   | 19.23     | 0   | —     |
| **Total and Average** | **1322** | **5698** | **4.31** | **14.25** | **326** | **24.66** | **2** | **0.15** |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers

**Table 12: Scientometric profile of CSIR labs in medicine, 2007-11**

| Name               | TP  | TC     | ACPP | H-Index | ICP | ICP Share | HCP | HCP % |
|--------------------|-----|--------|------|---------|-----|-----------|-----|-------|
| CDRI-Lucknow       | 227 | 1944   | 8.56 | 26      | 52  | 22.91     | 3   | 1.32  |
| CCMB-Hyderabad     | 181 | 1759   | 9.72 | 25      | 26  | 14.36     | 1   | 0.55  |
| IICB-Kolkata       | 196 | 1847   | 9.42 | 25      | 42  | 21.43     | 0   | 0     |
| IGIB-Delhi         | 211 | 1606   | 7.61 | 25      | 59  | 27.96     | 1   | 0.47  |
| IITR-Lucknow       | 272 | 1921   | 7.06 | 23      | 50  | 18.38     | 1   | 0.37  |
| CIMAP-Lucknow      | 84  | 642    | 7.64 | 21      | 19  | 22.62     | 3   | 3.57  |
| CFTRI-Mysore       | 98  | 700    | 7.14 | 17      | 9   | 9.18      | 0   | 0     |
| IIIM-Srinagar      | 60  | 553    | 9.22 | 16      | 19  | 31.67     | 0   | 0     |
| CLRI-Chennai       | 67  | 378    | 5.64 | 14      | 12  | 17.91     | 0   | 0     |
| IICT-Hyderabad     | 53  | 429    | 8.09 | 13      | 13  | 24.53     | 1   | 1.89  |
| IMTECH-Chandigarh  | 70  | 378    | 5.4  | 12      | 9   | 12.86     | 0   | 0     |
| NCL-Pune           | 47  | 184    | 3.91 | 12      | 12  | 25.53     | 1   | 2.13  |
| NEERI-Nagpur       | 65  | 424    | 6.52 | 10      | 8   | 25.53     | 0   | 0     |
| **Total and Average** | **1831** | **12765** | **7.83** | **17.81** | **330** | **19.74** | **11** | **0.67** |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers
share India’s output in immunology and microbiology during 2007-11. Table 13 gives a scientometric profile of 18 labs of CSIR in immunology and microbiology. The productivity of each CSIR lab varied from 27 to 142, with an average productivity of 75.39 publications per lab during 2007-11. Eight labs have contributed more than the average productivity of all labs: CDRI (142), CCMB (120), CFTRI (119), IGIB (108), IMTECH (108), IICB (107), NIIST (95) and IICT (82). The 18 labs have registered an average citation impact per paper (ACPP) of 7.42 (varying from 4.09 to 9.98) in immunology and microbiology during 2007-11 and eight labs have received more than the ACPP of all labs: IICB (9.98), IGIB (8.52), IICT (8.44), IMTECH (8.19), NIIST (8.18), CCMB (8.18), NEERI (8.01) and NIO (7.61). The 18 labs have registered in immunology and microbiology an average h-index of 15.55 (varying from 5 to 23) during 2007-11. Ten labs have registered h-index higher than the average h-index of all labs: NIIST (23), IGIB (20), CCMB (20), CDRI (20), CFTRI (20), IICT (19), IICB (18), NEERI (18), IMTECH (17) and NCL (16). The 18 labs have registered an average international collaborative share (ICP) of 16.36% (varying from 4.35% to 35.79%) and six labs have contributed more than the average share of ICP of all labs: NIIST (35.79%), IMTECH (26.85%), IICB (24.30%), NIO (21.05%), CCMB (19.17%) and CMCRI (18.52%). The 18 labs in immunology and microbiology have received an average share of high cited papers (HCP) of 0.52% (varying from 0.0% to 3.70%) during 2007-11 and five labs have received more than the average share of HCP of all labs: CMCRI (3.70%), IICT (2.44%), NIIST(2.11%), NCL (1.45%) and CFTRI (0.84%).

### Energy

The 13 labs of CSIR had published 648 publications, constituting 2.77% share of its total output and 6.06% share of India’s output in energy during 2007-11. Table 14

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### Table 13: Scientometric profile of CSIR labs in Immunology and microbiology, 2007-11

| Name | TP | TC | ACPP | H-Index | ICP | ICP Share | HCP | HCP % |
|------|----|----|------|---------|-----|------------|-----|-------|
| CDRI-Lucknow | 142 | 902 | 6.35 | 20 | 22 | 15.49 | 0 | 0.00 |
| CCMB-Hyderabad | 120 | 981 | 8.18 | 20 | 23 | 19.17 | 0 | 0.00 |
| CFTRI-Mysore | 119 | 722 | 6.07 | 20 | 14 | 11.76 | 1 | 0.84 |
| IGIB-Delhi | 108 | 920 | 8.52 | 20 | 15 | 13.89 | 0 | 0.00 |
| IMTECH-Chandigarh | 108 | 885 | 8.19 | 17 | 29 | 26.85 | 0 | 0.00 |
| IICB-Kolkata | 107 | 1068 | 9.98 | 18 | 26 | 24.30 | 0 | 0.00 |
| NIIST-Thiruv | 95 | 777 | 8.18 | 23 | 34 | 35.79 | 2 | 2.11 |
| IICT-Hyderabad | 82 | 692 | 8.44 | 19 | 10 | 12.20 | 2 | 2.44 |
| NCL-Pune | 69 | 434 | 6.29 | 16 | 3 | 4.35 | 1 | 1.45 |
| NEERI-Nagpur | 71 | 569 | 8.01 | 18 | 4 | 5.63 | 0 | 0.00 |
| NIO-Goa | 57 | 434 | 7.61 | 14 | 12 | 21.05 | 0 | 0.00 |
| NBR-Lucknow | 49 | 339 | 6.92 | 12 | 7 | 14.29 | 0 | 0.00 |
| IITR-Lucknow | 49 | 326 | 6.65 | 13 | 7 | 14.29 | 0 | 0.00 |
| IHBT-Palampur | 44 | 180 | 4.09 | 14 | 2 | 4.55 | 0 | 0.00 |
| CLRI-Chennai | 38 | 240 | 6.32 | 12 | 2 | 5.26 | 0 | 0.00 |
| IIIM-Srinagar | 38 | 250 | 6.58 | 12 | 3 | 7.89 | 0 | 0.00 |
| CIMAP-Lucknow | 34 | 220 | 6.47 | 11 | 4 | 11.76 | 0 | 0.00 |
| CMCRI-Bhavnagar | 27 | 126 | 4.67 | 5 | 5 | 18.52 | 1 | 3.70 |
| Total and Average | 1357 | 10065 | 7.42 | 280 | 222 | 16.36 | 7 | 0.52 |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers

### Table 14: Scientometric profile of CSIR labs in energy, 2007-11

| Name | TP | TC | ACPP | H-Index | ICP | ICP Share | HCP | HCP % |
|------|----|----|------|---------|-----|------------|-----|-------|
| NCL-Pune | 96 | 736 | 7.67 | 17 | 0 | 0.00 | 0 | 0.00 |
| IICT-Hyder | 93 | 1140 | 12.26 | 23 | 0 | 0.00 | 0 | 0.00 |
| CECRI-Karikal | 87 | 390 | 4.48 | 14 | 0 | 0.00 | 0 | 0.00 |
| CIMPFR-Dhanbad | 84 | 116 | 1.38 | 7 | 9 | 10.71 | 0 | 0.00 |
| NPL-Delhi | 73 | 437 | 5.99 | 13 | 0 | 0.00 | 0 | 0.00 |
| IIP-Dehradun | 59 | 301 | 9.83 | 11 | 1 | 2.38 | 0 | 0.00 |
| IMMT-Bhubaneswar | 36 | 317 | 8.81 | 14 | 1 | 2.78 | 1 | 2.78 |
| CSMCRI-Bhavnagar | 29 | 282 | 9.72 | 12 | 4 | 13.79 | 0 | 0.00 |
| NML-Jamshedpur | 24 | 85 | 3.54 | 6 | 0 | 0.00 | 0 | 0.00 |
| NIIST-Thiruv | 23 | 317 | 19.09 | 13 | 6 | 26.09 | 2 | 8.70 |
| CLRI-Chennai | 22 | 233 | 10.59 | 13 | 1 | 4.55 | 0 | 0.00 |
| NAL-Bangalore | 20 | 101 | 5.05 | 7 | 5 | 25.00 | 0 | 0.00 |
| CMERI-Durgapur | 19 | 29 | 1.53 | 5 | 0 | 0.00 | 1 | 5.26 |
| Total and Average | 648 | 4718 | 7.28 | 11.92 | 27 | 4.17 | 4 | 0.62 |

TP: Total papers, TC: Total citations, ACPP: Average citation per paper, ICP: International collaborative papers, HCP: High cited papers
gives a scientometric profile of 13 labs of CSIR in energy. The productivity of each CSIR lab varied from 19 to 96, with an average productivity of 49.84 publications per lab during 2007-11. Five labs have contributed more than the average productivity of all labs: NCL (96), IICT (93), CECRI (87), CIMFR (84) and NPL (73). The 13 labs have registered an average citation impact per paper (ACPP) of 7.28 (varying from 1.38 to 19.09) in energy during 2007-11 and seven labs have received more than the ACPP of all labs: NIIST (19.09), IICT (12.26), CLRI (10.59), IIP (9.83), CSMCRI (9.72), IMMT (8.81) and NCL (7.67). The 13 labs have registered in energy an average h-index of 11.92 (varying from 5 to 23) during 2007-11. Eight labs have registered h-index higher than the average h-index of all labs: IICT (23), NCL (17), IMMT (14), CECRI (14), NIIST (13), CLRI (13), NPL (13) and CSMCRI (12). The 13 labs have registered an average international collaborative share (ICP) of 4.17% (varying from 0.0% to 26.09%) and five labs have contributed more than the average share of ICP of all labs: IICT (26.09%), NCL (25.0%), IMMT (13.79%), CECRI (10.71%) and NIIST (4.55%). The 13 labs in energy have received an average share of high cited papers (HCP) of 0.62% (varying from 0.0% to 8.70%) during 2007-11 and three labs have received more than the average share of HCP of all labs: IICT (8.70%), CMERI (5.26%) and CLRI (2.78%).

**DISCUSSION AND CONCLUSION**

The CSIR research network comprising of 37 labs together contributed 23388 publications, increasing from 4542 in 2007 to 5392 in 2011, with an annual average publication growth rate of 4.72%. The CSIR contribution in India’s total publications output was 6.80% during 2007-11, which decreased from 8.98% in 2007 to 5.78% in 2011. The productivity of individual CSIR labs varied from 48 to 2871, and with an average productivity per lab of 632.11 during 2007-11. The average citation impact (on a 4 year citation window) per paper of CSIR research labs varied from 1.73 to 10.45, with an average citation per paper of 7.02 during 2007-11, decreasing from 6.91 in 2007 to 5.88 in 2011. The h-index of 37 labs of CSIR varied from 7 to 64, with average value of 29.73. The share of international collaborative papers (ICP) of 37 labs of CSIR varied from 0.0% to 28.30%, with average share of 16.40%. The share of high cited publications (HCP) of 37 labs of CSIR varied from 0.0% to 2.09%, with an average value of 0.57%.

Chemistry research contributed the highest share of publications (31.81%) from 37 labs of CSIR to overall CSIR output during 2007-11, followed bybiochemistry, genetics and molecular biology (23.15%), materials science (21.87%), chemical engineering (15.11%), physics (13.41%), engineering (13.31%), pharmacology, toxicology and pharmaceutics (12.171%), agricultural and biological sciences (10.99%), environmental science (9.17%), medicine (6.97%), earth and planetary sciences (5.65%) and energy (2.77%).

The CSIR labs made the highest contribution in chemical engineering (16.48% share) to Indian national research output during 2007-11, followed by chemistry (14.17%), pharmacology, toxicology and pharmaceutics (13.93%), biochemistry, genetics and molecular biology (12.57%), materials science (12.04%), immunology and microbiology (11.65%), environmental science (10.07%), earth and planetary sciences (9.91%), agricultural and biological sciences (7.26%), energy (6.06%), physics (6.31%), engineering (5.35%) and medicine (2.36%).

The 37 labs of CSIR made the highest citation impact per paper (8.99) in chemistry during 2007-11, followed by pharmacology, toxicology and pharmaceutics (8.66), biochemistry, genetics and molecular biology (8.55), chemical engineering (8.49), medicine (7.83), environmental science (7.76), materials science (7.50), immunology and microbiology (7.42), energy (7.28), agricultural and biological sciences (6.29), physics (5.90), engineering (5.09) and earth and planetary sciences (4.31).

The 37 labs of CSIR achieved the highest h-index value (23.09) in biochemistry, genetics and molecular biology during 2007-11, followed by chemistry (22.67), materials science (21.59), pharmacology, toxicology and pharmaceutics (21.35), medicine (17.61), chemical engineering (17.00), agricultural and biological sciences (16.62), physics (16.53), immunology and microbiology (15.55), environmental science (15.50), engineering (14.48), earth and planetary sciences (14.25) and energy (11.92).

The 37 labs of CSIR achieved the highest share (24.66%) of international collaborative publications in earth and planetary sciences during 2007-11, followed by physics (20.73%), medicine (19.74%), materials science (19.10%), engineering (16.58%), immunology and microbiology (16.36%), biochemistry, genetics and molecular biology (16.00%), chemistry (14.73%), agricultural and biological sciences (14.09%), environmental science (13.69%), chemical engineering (12.80%), pharmacology, toxicology and pharmaceutics (9.28%) and energy (4.17%).

The 37 labs of CSIR achieved the highest publications share (0.81%) of high cited papers in chemistry during 2007-11, followed by environment science (0.79%), chemical engineering (0.71%), medicine (0.67%), energy (0.62%), biochemistry, genetics and molecular biology (0.59%), agricultural and biological sciences (0.58%),
immunology and microbiology (0.52%), pharmacology, toxicology and pharmaceutics (0.46%), materials science (0.41%), engineering (0.39%), earth and planetary sciences (0.15%) and physics (0.10%).

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