

R&D ANALYSIS OF SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATIONS (SIROs)

A STUDY REPORT



सत्यमेव जयते

Department of Scientific & Industrial Research (DSIR)
Ministry of Science and Technology, Government of India, New Delhi

JANUARY 2019

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Department of Scientific & Industrial Research (DSIR)
Ministry of Science and Technology, Government of India, New Delhi

January 2019

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PUBLISHED BY

DSIR, Ministry of Science & Technology

PRINTED BY

TERI Press

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The presentation of the data, facts in this publication and the opinion expressed therein are based on the data submitted by the SIROs and not necessarily those of DSIR or TERI and they cannot be held accountable for above.

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Contents

Foreword	v
Preface	vii
Executive Summary	ix
Key Findings at a Glance	xii
Project Advisory and Review Committee	xv
Chapter 1 : Introduction	
Department of Scientific and Industrial Research	3
1.1 DSIR: An Overview	3
1.2 Scientific and Industrial Research Organizations (SIROs) Recognition Scheme at a Glance	5
Chapter 2: About the Study	11
2.1 Background	13
2.2 Objectives of the Study	14
2.3 Constitution of the Project Advisory and Review Committee	16
2.4 Methodology of the Study	16
2.5 Structure of the Questionnaire	17
2.6 Details of Data Received	18
2.7 Processing and Analysis of Data	18
2.8 Project Outcomes	19
2.9 Assumptions, Hypothesis, and Limitations	19
Chapter 3: Key Findings and Analysis	21
3.1 Background	23
3.2 Data Analysis	24
3.3 Organizational Structure	25
3.4 Zonal Distribution of SIROs in Pan India	26
3.5 R&D Manpower	27
3.6 Sharing and Accessibility of R&D Facilities/ Infrastructure	28
3.7 R&D Expenditure	29
3.8 Knowledge Creation: Research Output and Growth	30
3.9 Knowledge Exchange/Transfer	35
3.10 Societal Relevance	37

3.11 Conclusion	40
3.12 Acknowledgements	41
Annexures	43
Annexure 1: Total List of SIROs- 661	44
Annexure 2: List of SIROs Responded	55
Annexure 3a: Survey Questionnaire for the Natural and Applied Sciences, Agricultural Sciences, and Medical Sciences	67
Annexure 3b: Survey Questionnaire for the Social Sciences	71
Annexure 3c : Online Survey Form	74
Annexure 4: Sample Compendium Structure	75



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वैज्ञानिक और औद्योगिक अनुसंधान विभाग
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Foreword

It gives me immense pleasure to note that Department of Scientific & Industrial Research (DSIR) is supporting R&D activities of Scientific and Industrial Research Organizations (SIROs) in the areas of Natural and Applied Sciences, Medical Sciences, Agricultural Sciences and Social Sciences. The prime objective of SIROs is to catalyze S&T based interventions, for inclusive growth in the country.


SIROs are the S&T driven organizations present Pan-India. Over the years, a strong S&T infrastructure of SIROs has been created in the country covering chain of National laboratories, Institutes, Specialized R&D centers which continuously provide expertise, technically trained manpower, and technological support to both the Industry and Society.

The present study report and compendium is an effort to share the research highlights of DSIR recognized SIROs with scientific community.

I hope that this document would facilitate knowledge networking and gainful use of science and technology in addressing societal challenges.

I am glad to know that this publication also reflects the contributions made by SIROs towards National missions such as Make in India, Skill India, Clean India, Digital India, etc.

I wish SIROs grow leaps and bounds and wish them success in their endeavours.


[Shekhar C. Mande]

New Delhi

Preface



DSIR recognition is the flagship programme and the only scheme in the Government system for accreditation/benchmarking the R&D activities and infrastructure of not-for-profit sector known as Scientific and Industrial Research Organizations (SIROs). SIROs recognized by DSIR includes Industry associations, Academic institutions, R&D laboratories, Government entities, Technology parks, and Universities/Colleges.

SIROs have been contributing immensely in the area of scientific and industrial research, design and development of indigenous technology to achieve technological self-reliance and minimize foreign inputs.

At present, there are 661 SIROs duly recognized by DSIR; of these, 283 are in the area of natural and applied sciences, 254 are in the area of medical sciences, 41 are in the area of agricultural sciences, and 83 are in the area of social sciences.

DSIR has earlier published the compendium of SIROs highlighting their profiles in the year 1990. The compendium acted as a valuable reference source to various stakeholders, allowing free exchange of ideas and thoughts. The need was felt to build a deeper understanding of SIROs and conduct a detailed study on the significance and achievements of the research programs/activities, R&D infrastructure, R&D achievements/S&T interventions, industrial linkages and collaborations of DSIR recognized SIROs, in different sector areas. As a result, this in-house study on SIRO scheme was initiated.

The output of the present study has been compiled in two parts: (i) Study Report on SIROs and (ii) Compendium of R&D Profile of SIROs published in Two Volumes.

The study report represents the salient features of SIROs such as their zonal distribution, sharing of R&D infrastructure, R&D expenditure trends, analysis of research projects, publications, patents & technologies developed/commercialized, etc. represented in the graphical format.

The two volumes of compendia showcase the case studies on SIROs, exhibiting a brief on their research areas and projects, R&D expenditure, R&D infrastructure including R&D personnel and equipment, technical collaborations, etc. Efforts have also been made to showcase the R&D achievements of SIROs and disseminate their technologies across the country.

The main feature of the study is that it highlights the contributions of SIROs in various National Missions initiated by the Government of India. It

is hoped that this study would be a source of motivation and inspiration to other NGOs performing R&D to acquire S&T capability and obtain SIRO recognition.

DSIR is thankful to all SIROs and TERI, without whose support this study would not have been possible. I also appreciate the expert members of the Advisory Committee for providing useful insights in this report.

DSIR welcomes comments/suggestions on the report.

Dr. S.K. Deshpande

Scientist-G & Head-RDI

DSIR

Executive Summary

Department of Scientific & Industrial research (DSIR) had launched a scheme of granting recognitions to non-government, not-for profit organizations as Scientific and Industrial Research Organizations (SIROs) in 1988. The key objective of this scheme is to promote their activities in the area of scientific and industrial research, design and development of indigenous technology to achieve technological self-reliance and minimize foreign inputs. The SIROs are the S&T driven organizations present Pan-India. There are 661 SIROs recognized by DSIR; of these 283 are in the area of Natural and Applied sciences, 254 are in area of Medical sciences, about 41 are in the area of Agricultural sciences, and about 83 are in the area of Social sciences.

The key benefits derived from the scheme are:

- (i) It is the only scheme in the entire Government system for accreditation/ benchmarking the R&D activities and infrastructure of not-for-profit sector in India.
- (ii) The SIROs recognized by DSIR are eligible for customs duty exemption and concessional GST under notification nos. 51/96-customs dated 23.07.1996; no. 24/2007-customs dated 01.03.2007; no. 43/2017-customs dated 30.06.2017; no. 45/2017-central tax (rate) & 47/2017-integrated tax (rate) dated 14.11.2017; no. 9/2018-central tax (rate), no. 09/2018-union territory tax (rate) & no. 10/2018-integrated tax (rate) dated 25.01.2018; and state tax (rate) as applicable and all notification, as amended from time to time.
- (iii) DSIR recognition makes SIROs eligible for receiving funds for R&D from other government departments and agencies such as DST, DBT, ICMR, ICAR, etc., where recognition to the R&D centre by DSIR is a requirement.
- (iv) The SIRO recognition scheme emanates from the section 35(1)(ii)/(iii) of Income tax Act, 1961, and hence attract funding for research for national and International projects. Organizations recognized as SIROs may further be entitled for notifying under section 35(1)(ii)/(iii) of Income tax Act, 1961, wherein exemptions to the donor are given on funds donated for pursuing research activities.
- (v) Since the organizations recognized as SIROs are not-for-profit, any earnings made out by fees, products, technologies transferred, etc., is ploughed back to the organization for further research.
- (vi) The SIROs are also eligible for any other fiscal incentives announced by the Government of India from time to time.

DSIR had earlier published the compendium of SIROs highlighting their profiles in the year 1990. The compendium acted as a valuable reference source to various stakeholders, allowing free exchange of ideas and thoughts. The need was felt to conduct a detailed survey on the significance and achievements of the research programs/activities, R&D infrastructure, R&D achievements/S&T interventions, industrial linkages and collaborations of DSIR recognized SIROs, in different sector areas.

The task of collecting, compiling, analysing and publishing the Report cum compendia was outsourced by DSIR to The Energy and Resources Institute (TERI), New Delhi. The target groups for data collection were the R&D institutes and organizations, Head of the departments of universities and Institutes recognized as SIROs. A questionnaire comprising of 19 points was designed for each of the 04 subject areas and circulated to all SIROs recognized by DSIR through both offline and online mode (Annexure 1 & 2).

The primary data was collected from SIROs, after regular follow-up with the institutes and organization, so that the data collected are in right format. After rigorous follow-ups, the response from 595 SIROs was received; of these 251 are in the area of Natural and Applied Sciences, 233 are in area of Medical Sciences, 37 are in the area of Agricultural Sciences and 74 are in the area of Social Sciences.

All information received from SIROs within stipulated time was collated and an attempt was made to measure the R&D performance and outcome of SIROs. The information was designed into case studies showcasing their research areas & projects, R&D expenditure, R&D infrastructure including R&D personnel & equipment, research achievements along with the societal or national relevance and technical collaborations, etc.

The output of the study has been compiled in two parts: (i) *R&D Analysis of SIROs : A Study Report* (ii) *Compendium of R&D Profile of SIROs* published in two Volumes.

The Analysis study report has been compiled in three chapters. Chapter 1 gives a brief introduction about DSIR and the SIRO recognition scheme. It also gives the zonal distribution of SIROs across the country. Chapter 2 deals with the objectives of the study, framework adopted, data sources, collection and data analysis highlighting the key parameters. Chapter 3 presents the Key Findings which includes the analysis on organization type, regional distribution, data on the research personnel engaged in SIROs, equipment/facilities available with SIROs and its usage, R&D expenditure trends, knowledge creation which includes analysis of research projects, publications, patents and technologies developed/commercialized, knowledge transfer including details on collaborations: industrial and institutional.

The report contains the R&D Indicators Graphs on the following themes:

- » Organizational structure
- » Zonal/regional distribution (subject-wise and state-wise)
- » R&D manpower analysis
- » SIROs research facilities user distribution
- » R&D expenditure trends
- » Research areas
- » Research publications (National/International)
- » Patents (Indian, Foreign; Filed/Granted)
- » Technologies transferred/commercialized
- » Knowledge exchange/transfer
- » Collaborations: National and International; Industrial and Institutional
- » Societal relevance

SIROs are community-based organizations who have linked themselves to national missions with specific mandates for carrying out societal action oriented research programmes. This publication also reflects the gainful use of science and technology for addressal of society challenges. The Government of India is keen to use science and technology for national development and societal transformation. National missions such as Make in India, Skill India, Clean India, Digital India, etc., have been identified to be amongst nation's priorities for driving the manufacturing domain and creating appropriate skill sets among unemployed youth. The section on societal relevance has been particularly included to showcase their contributions towards national missions. Efforts have been made to present the data

in the context which is relevant in today's scenario making it interesting and of practical use to diverse categories of audience and all the stakeholders.

The Compendium of R&D Profile of SIROs has been brought out in two volumes: Volume I gives details of SIROs in the area of Natural and Applied Sciences and Agricultural Sciences and Volume II focusses on Medical Sciences & Social Sciences area. The R&D profiles in this book show SIROs which could be Industry Associations or academic institutions or R&D laboratories or Government entities or Technology Parks or Universities/Colleges, and have registered themselves as a Trust or a Society or a Section 8 (erstwhile Section 25) company as per Company's Act 2013. Some important information pertaining to the Research strengths and Outcomes have been packaged briefly and presented as a box item.

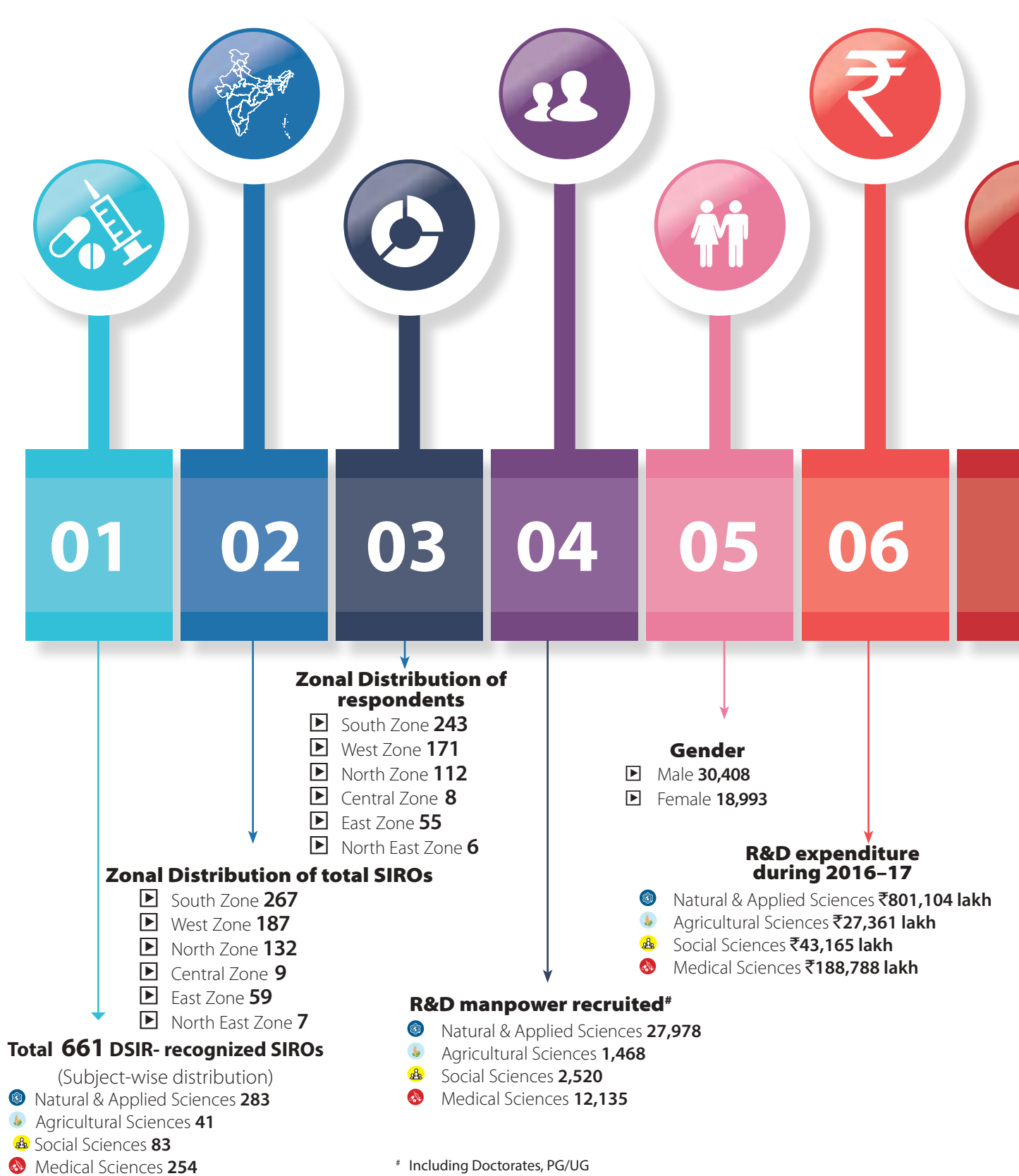
SIROs are committed, qualified and self-motivated organizations having centers of excellence in frontier areas such as textiles, wool, silk, sugar, rubber, pharmaceuticals, chemicals, renewable energy, electronics, metallurgy, automotives, gems, etc. They have created impressive infrastructural facilities for R&D including sophisticated testing facilities and laboratory equipment. SIROs also intend to inculcate scientific temper and create awareness, especially in the young minds. They have developed several indigenous products which are import substitutes. SIROs have been focussing towards sustainable development and transferred technologies to industries and/or to the society. Now, scientists and technologists have been ignited to work on societal problems/concerns through integrating science, technology, and innovation. SIROs have been trying to address the societal challenges and over a period of time have developed technological solutions across several sectors, for societal benefits.

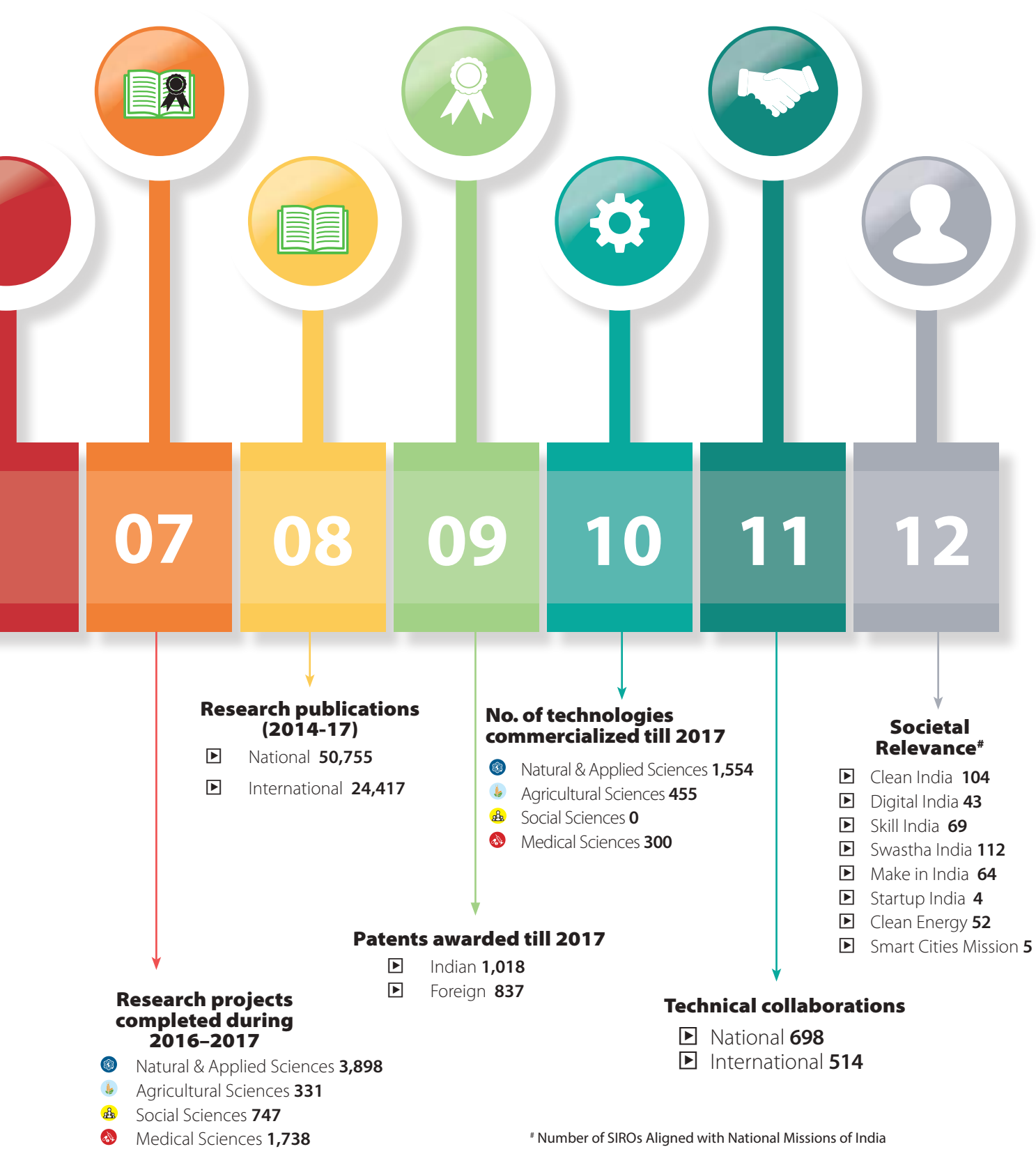
Majority of SIROs recognized by DSIR are self-sustaining organizations which do not get grants for operation, maintenance, and salary from Government. Increased private investment is necessary for translating their R&D outcomes into commercial products. In India, private sector investments into R&D are significantly lower than those in developed and other emerging economies.

TERI collected data from all the SIROs and the profiles are developed based on the inputs received from the responding organizations and it is presumed that the information submitted by them is complete. Nonetheless, it is hoped that the study report and compendium would highlight the tangible outcomes, research infrastructure, patents, publications, technologies, collaborations, and linkages, in different sector areas and be a useful source of information to scientists, technologists, implementing institutions, funding agencies and policymakers. This publication is also a collection of several new and different technologies which have been emerged from the work done by SIROs in the past 3 to 5 years.

These attempts are made to capture and showcase the dynamism in SIROs recognized by DSIR through a detailed analysis highlighting their research infrastructure, R&D projects and research achievements. This will help to identify the areas of strengths and gaps and provide a direction to find solutions. The compendium of SIROs is a repository of information that would help in dissemination of knowledge, explore new opportunities, and also encourage the R&D people associated with these SIROs. In addition, the compendia would provide useful information regarding the industrial research going on in the country by non-commercial sector and the kind of research infrastructure available. The compendia would also highlight the collaborations and linkages amongst SIROs and those with industries, universities, national labs, etc., and enable positive connections.

Key Findings at a Glance





Number of SIROs Aligned with National Missions of India

Project Advisory and Review Committee

CHAIRMAN

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Scientist 'G', Head-RDI

Department of Scientific and Industrial Research (DSIR)

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CHAPTER 1

INTRODUCTION

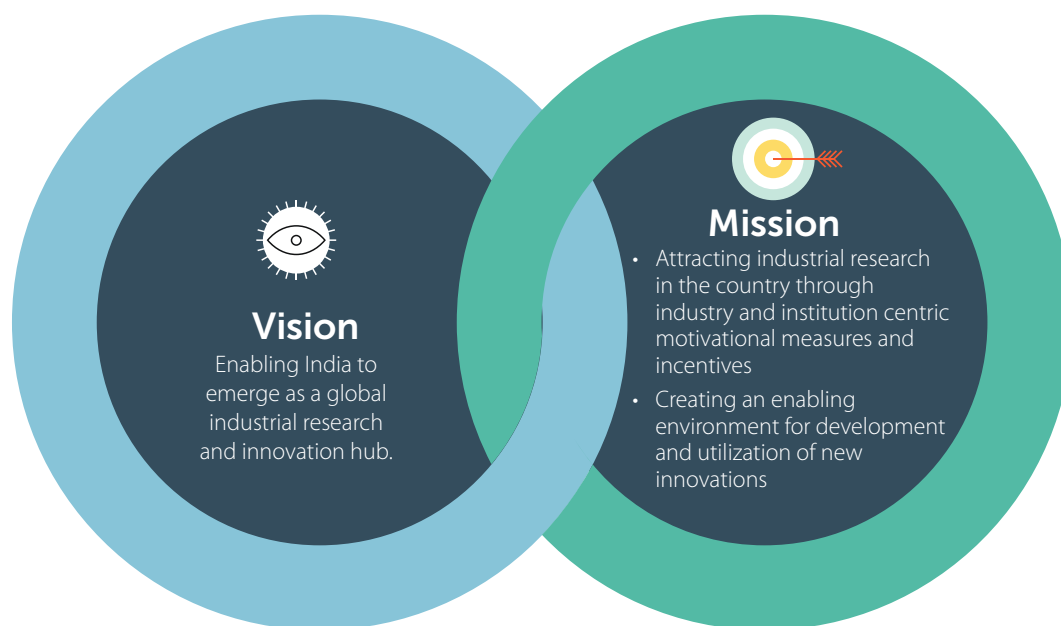


DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH

1.1 DSIR: An Overview

The Department of Scientific and Industrial Research (DSIR) is a primary organ of the Ministry of Science and Technology, Government of India. Over the years, DSIR has consolidated its primary endeavours and has given it some specific contours; which are enumerated as: *to promote the R&D undertaken by the industries; support a larger cross-section of small and medium industrial units to develop state-of-the-art, globally competitive technologies of high commercial potential; catalyse a faster commercialization of lab-scale R&D; enhance the share of technology-intensive exports in the overall exports; strengthen industrial consultancy and technology-management capabilities; and establish user-friendly information networks to facilitate scientific and industrial research in the country.* The other concerns include providing a viable link between scientific laboratories and industrial establishments for the transfer of technologies that facilitate investment in R&D through various programmes along with activities under the scheme that are centred around promoting industrial R&D, development and commercialization of technologies, acquisition, management and export of technologies, promotion of consultancy capabilities, etc.

The DSIR has been supporting innovative research projects directed towards improving the technological and industrial competitiveness of the industry. The DSIR programmes have been catering to all aspects concerned with the transformation of research and innovation ranging from conceiving the idea to its commercialization in the market.



DSIR has been engaged in assisting policymakers, researchers, technocrats, and entrepreneurs with innovative research ideas towards the setting up of potentially successful, knowledge-based companies. The programmes have provided support and have helped in the up-scaling of technologies, products, and processes at the proof-of-concept stage leading up to the pre-commercialization stage along with providing support for the marketing of such technologies for commercial applications.

Besides, the DSIR also undertakes specific, need-based studies to assess the impact of the emerging technologies on industrial competitiveness. The various programmes and activities under the scheme are centred around promoting industrial R&D, development and commercialization of technologies, acquisition, management and export of technologies, promotion of consultancy capabilities, etc. The specific schemes under the 12th Five Year Plan are as follows:

» **Access to knowledge for technology development and dissemination**

Access to Knowledge for Technology Development and Dissemination (A2K+) is a scheme targeted towards developing mechanisms to disseminate science, technology and innovation related information to industries, research and academic institutions, in-house R&D units of industry, Scientific & Industrial Research Organizations (SIROs), consultants, industry associations, techno-entrepreneurs, government departments, and others.

Programmes supported are the following:

1. Supporting industrial technology related studies (A2K+ Studies)
2. Supporting the organization of national and international conferences, exhibitions, etc. (A2K+ Events)
3. Support for Technology Development and Utilization Programme for Women (TDUPW)
4. Continuing support to Technology Development and Demonstration Programme projects (TDDP)

» Building industrial R&D and common research facilities. This includes:

1. Common Research and Technology Development Hubs (CRTDH)

This is a new programme aimed at creation of Common Research and Technology Development Hubs (CRTDHs) to encourage research and technology development activities by MSEs.

2. Industrial R&D Promotion Programme (IRDPP)

This is the flagship programme of the department aimed to bring R&D into sharper focus by strengthening and promoting R&D infrastructure in Industry, Public Funded Research Institutions (PFRI) and Scientific and Industrial Research Organizations (SIROs). This programme also provides fiscal incentives to scientific research.

3. Asian and Pacific Centre for Transfer of Technology (APCTT)

This is the committed programme and Government of India has committed to support the centre through DSIR. APCTT has the status and membership identical to subsidiary body of Economic and Social Commission for Asia and the Pacific (ESCAP). The objectives of the Centre are to assist the members and associate members of ESCAP through strengthening their capabilities to develop and manage national innovation systems. Apply technology; improve the terms of transfer of technology and identify and promote the development and transfer of technologies relevant to the region.

4. Information Technology and e-Governance (ITeG)

This is a mandatory programme that was formed in the mid of the Xth Plan period to facilitate the accelerated usage of various Information Technology opportunities and hence provide an IT-enabled work environment in the Department.

» **Patent Acquisition and Collaborative Research and Technology Development (PACE)**

The PACE scheme provides catalytic support to industries and institutions for development and demonstration of innovative product and process technologies, traversing the journey from proof of concept or laboratory stage to pilot stage, so that they can be launched for commercialization. The scheme also participates in initiatives of other Ministries / Departments for technology development and demonstration, e.g., under the IMPRINT initiative of the Ministry of Human Resource Development (MHRD), the department supports proposals of institutions of national importance, such as IITs, IISc, etc., jointly with MHRD.

» **Promoting innovations in Individuals, Start-ups, and MSMEs (PRISM)**

PRISM (Promoting Innovations in Individuals, Start-ups and MSMEs) scheme aims to support individual innovators which will enable to achieve the agenda of inclusive development. It would also provide support to institutions or organizations set up as Autonomous Organization under a specific statute or as a society registered under the Societies Registration Act, 1860 or Indian Trusts Act, 1882 leading to development of state-of-the-art new technology solutions aimed at helping MSME clusters.

1.2 Scientific and Industrial Research Organizations (SIROs) Recognition Scheme at a Glance

The main objective of recognition scheme for Scientific and Industrial Research Organizations (SIROs) is to bring together voluntary organizations operating in not-for-profit system. DSIR is the nodal government department for granting recognition to SIROs, which are not-for profit organizations such as:

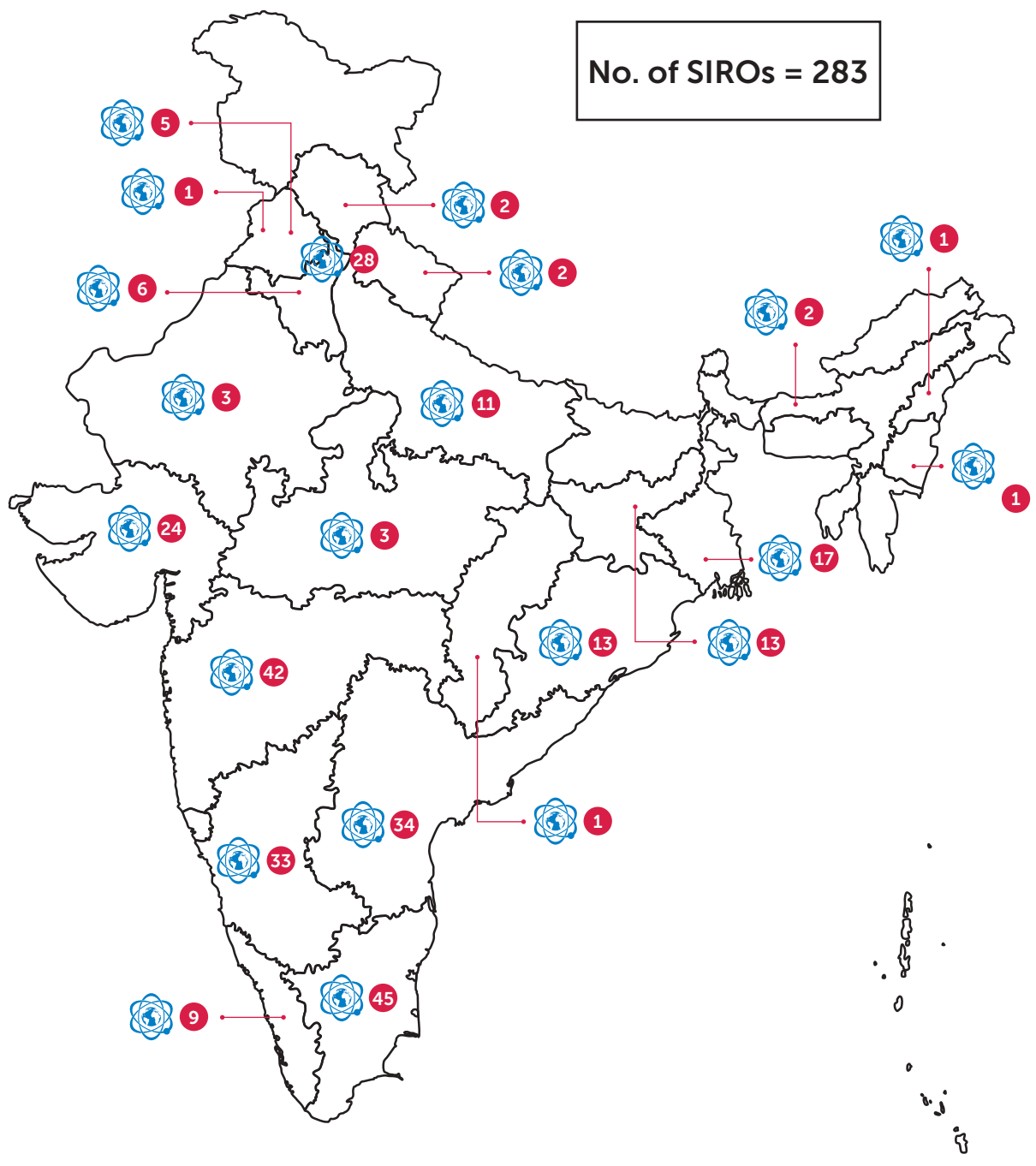
- (a) Associations, that is, societies with the objective of undertaking scientific and/or industrial research registered under the Societies Registration Act, 1860, or any such act passed by the State Government and as registered trusts with the main objective of undertaking scientific and/or industrial R&D;
- (b) R&D companies incorporated as Section 8 (erstwhile Section 25) of the Companies Act, 2013, set up for engaging in R&D activities;
- (c) Scientific institutions with the adequate infrastructural facilities to undertake scientific and/or industrial research and having undertaken any kind of scientific and/or industrial research as the its main objective; or professional bodies with the undertaking/promoting the undertaking of scientific and/or industrial research as its main objective;
- (d) Universities established or incorporated by/or under a Central or State Act, including institutions declared u/s 3 of the University Grants Commission Act, 1956; and
- (f) Colleges affiliated to universities that have undertaken scientific research in specific disciplines.

The recognition scheme for SIROs aims to promote their activities in the area of scientific and industrial research, design, and development of indigenous technology to achieve technological self-reliance, and to minimize foreign inputs.

Organizations seeking support under the scheme will undertake activities for the extension of knowledge in the fields of the Natural and Applied Sciences, Agricultural Sciences, Social Sciences, and Medical Sciences. Functional SIROs having clearly stated the objectives of undertaking scientific research, broad-based Governing Council, Research Advisory Committee, research personnel, infrastructure facilities for research, well-defined, and time-bound research programmes, and clearly stated objectives of undertaking scientific research are considered eligible for recognition by the DSIR.

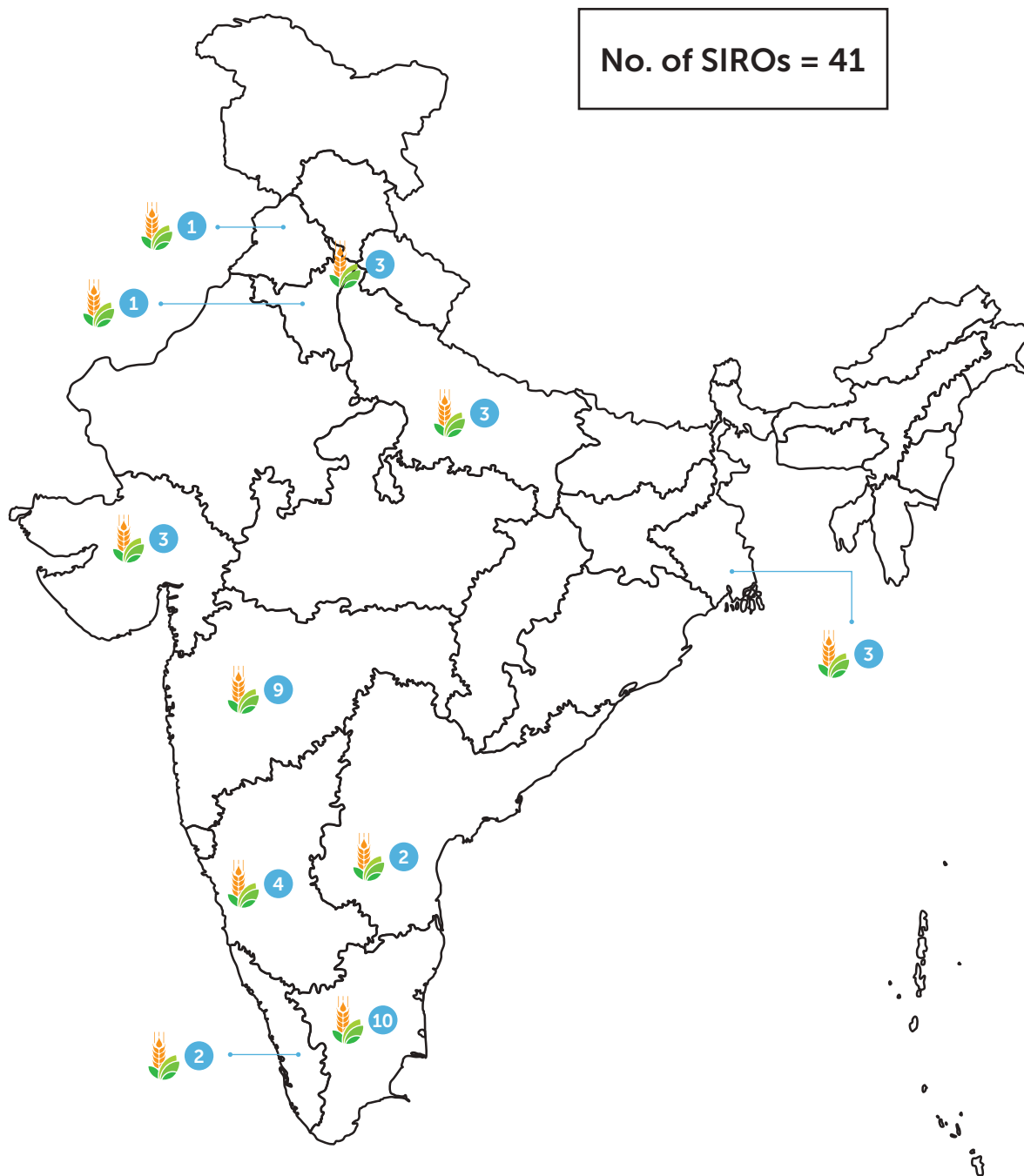
SIROs recognized by the DSIR are eligible for customs duty exemption and concessional GST under notification nos 51/96-customs dated 23.07.1996; no. 24/2007-customs dated 01.03.2007; no. 43/2017-customs dated 30.06.2017; no. 45/2017-central tax (rate) & 47/2017-integrated tax (rate) dated 14.11.2017; no. 9/2018-central tax (rate), no. 09/2018-union territory tax (rate) & no. 10/2018-integrated tax (rate) dated 25.01.2018; and state tax (rate) as applicable and all notification, as amended from time to time. The recognition would help them to evolve their research infrastructure by way of the overall administrative support assistance and other assistance as may be necessary for the efficient working of a research-oriented organization.

State-wise Distribution of SIROs in Natural and Applied Sciences



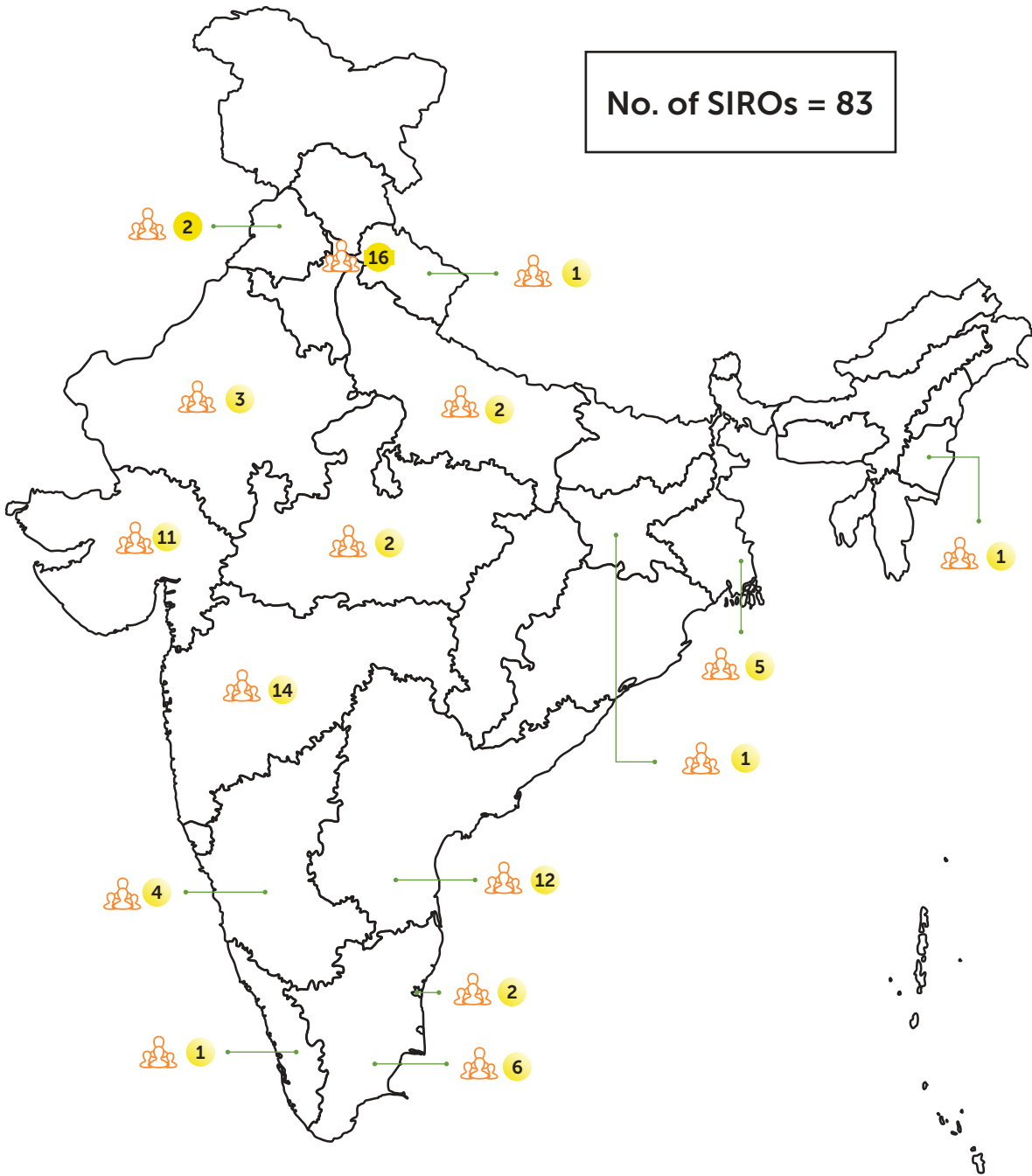
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State-wise Distribution of SIROs in Agricultural Sciences



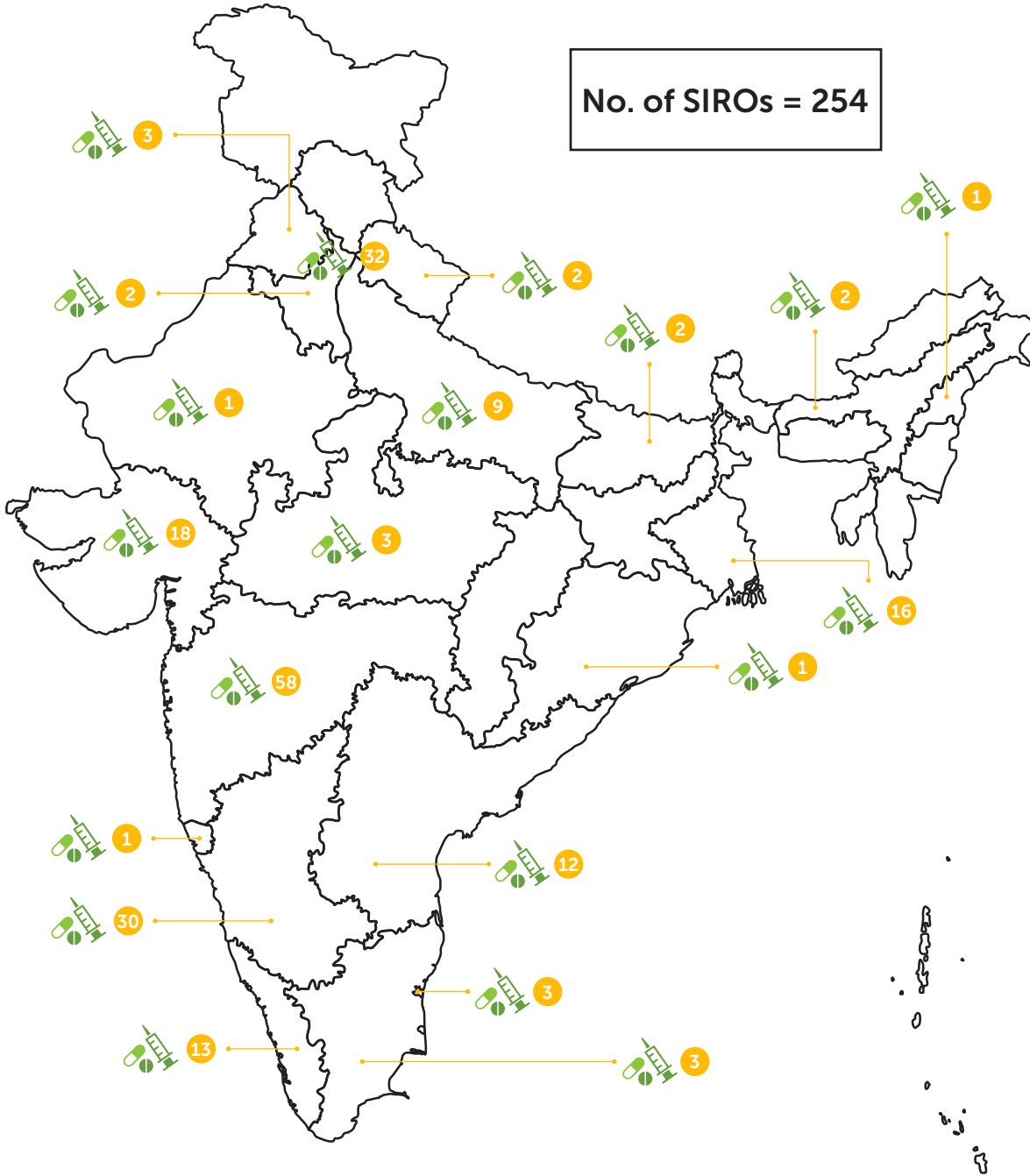
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State-wise Distribution of SIROs in Social Sciences

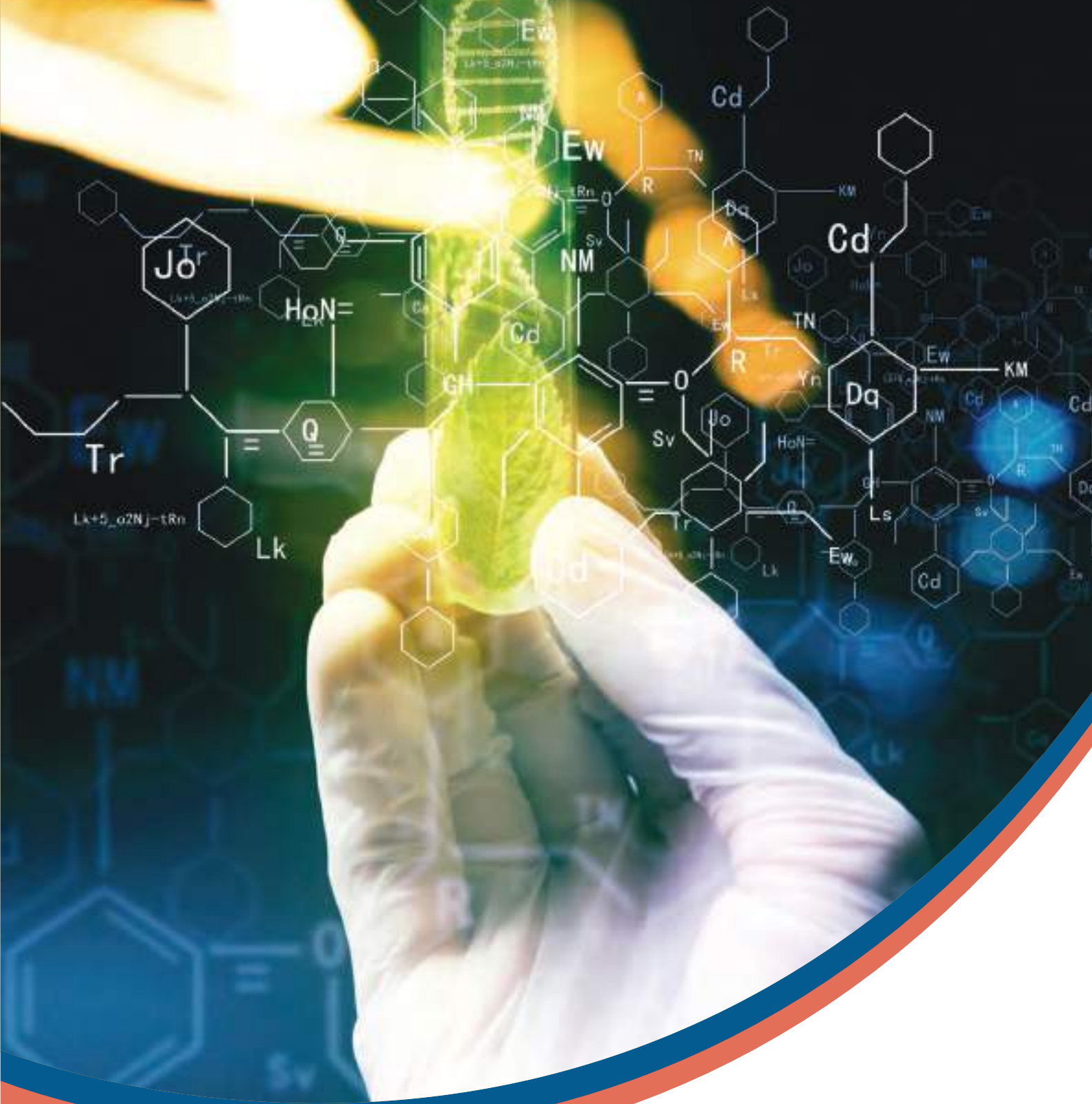


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State-wise Distribution of SIROs in Medical Sciences



Disclaimer: Not to Scale



CHAPTER 2

ABOUT THE STUDY



ABOUT THE STUDY

2.1 Background

For more than a decade now, the DSIR has been instrumental in promoting SIROs' activities and best practices. It has extended support to about 661 SIROs (Annexure 1).

DSIR has earlier published the compendium of SIROs highlighting their profiles in the year 1990. The compendium acted as a valuable reference source to various stakeholders, allowing free exchange of ideas and thoughts. The need was felt to conduct a detailed study on the significance and achievements of the research programs/activities, R&D infrastructure, R&D achievements/S&T interventions, industrial linkages and collaborations of DSIR recognized SIROs, in different sector areas.

The task of collecting, compiling, analysing and publishing the report-cum-compendia was outsourced by DSIR to The Energy and Resources Institute (TERI), New Delhi. The target groups for data collection were the R&D institutes and organizations, Heads of departments of Universities, and Institutes recognized as SIROs.

2.2 Objectives of the Study

The objectives of the present study are laid out as follows;

- » To conduct a detailed study on the significance and achievements of the research programmes/ activities, R&D infrastructure, R&D achievements/S&T interventions, industrial linkages, and collaborations of the DSIR-recognized SIROs; compile an exhaustive report based on the study; highlight the tangible outcomes; present the various data analysis, research infrastructure, patents, publications, technologies commercialized for societal benefits, technological interventions, and collaborations and linkages in the different research/focus/subject areas.
- » To provide details of the major technologies/ breakthroughs in a crisp, presentable format after collecting the basic information from the SIROs.
- » To identify the gaps and provide the way forward in the future.
- » To develop a searchable database, which is based on the study, to capture and share knowledge for the benefit of all stakeholders.
- » To compile and print an exhaustive, final report highlighting the SIRO profiles and their outcomes.
- » To bring out a compendium of two volumes of more than 600 SIROs highlighting their significant areas.
- » To compile a study report based on the analysis of the data provided by SIROs.

Scope

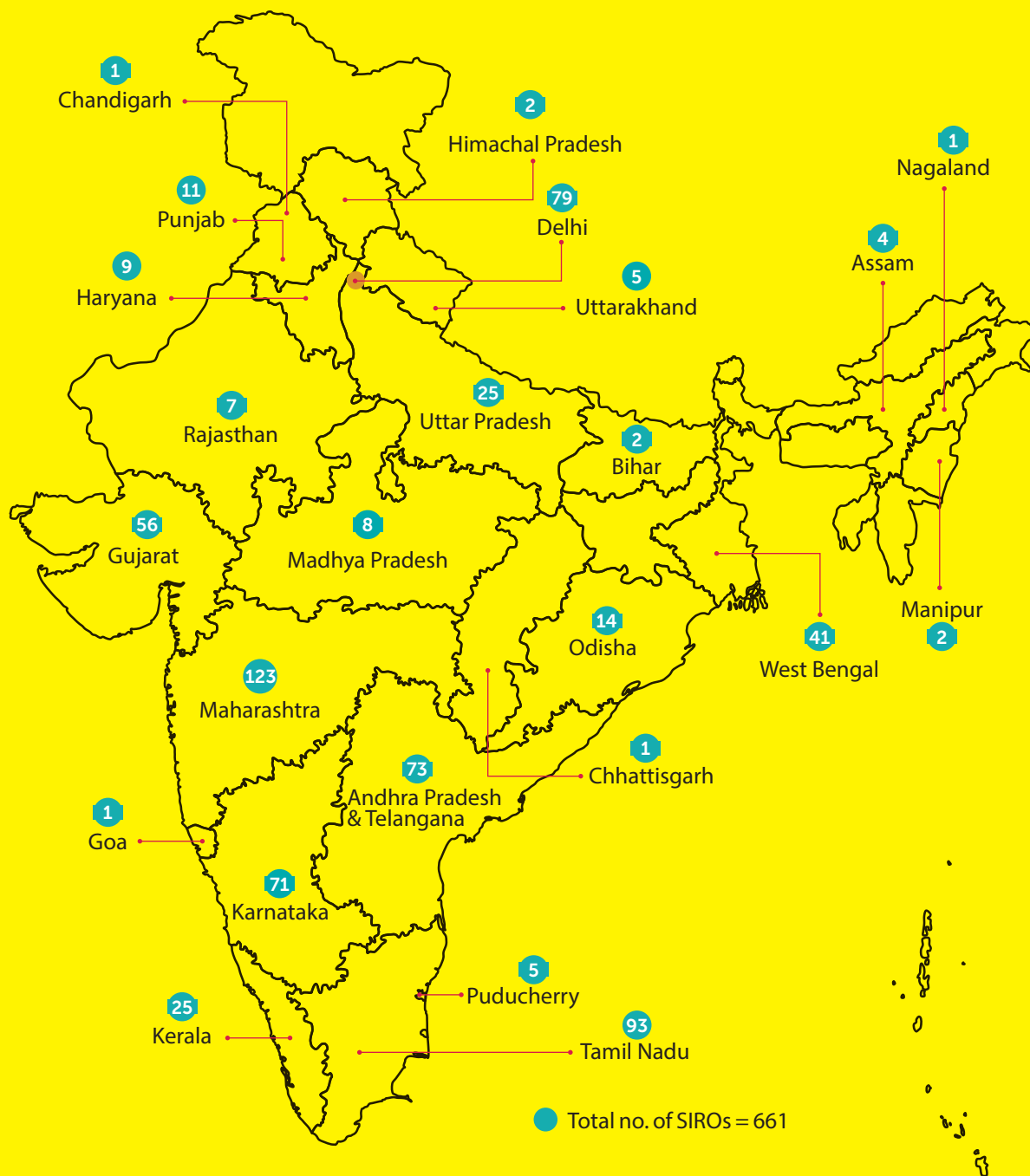
In light of these aims, it is crucial for the DSIR to maintain a deep understanding of India's research programme and performance. In order to do so, this study presents data and analysis on various pragmatic areas such as:

- » Category-wise distribution of SIRO organizations in the country
- » Manpower strength in R&D
- » Research facilities and infrastructure development
- » Expenditure incurred in R&D
- » Knowledge creation, research output, growth, and impact

Distribution of SIROs

The SIROs are distributed across length and breadth of the country. DSIR has been bringing out a directory of recognized scientific and industrial research organizations every year; the publication covers details of all SIROs having valid recognition by DSIR along with the name and address, DSIR recognition number and period of validity of the recognition of all the recognized SIROs. Based on this, an analysis of the state-wise presence of SIROs was made for all four subject areas: Natural and Applied Sciences (NS), Agricultural Sciences (AS), Social Sciences (SS), and Medical Sciences (MS). The figures indicating the state-wise distribution are shown below.

Distribution of SIROs



Disclaimer: Not to Scale

2.3 Constitution of the Project Advisory and Review Committee

A Project Advisory and Review Committee (PARC) consisting of experts from diverse areas had been constituted to guide, monitor and review the progress of the project, with the approval of the DSIR. The PARC members were identified from DSIR, IIT-D, CSIR, TERI, and other reputed research organizations.

2.4 Methodology of the Study

DSIR provided the subject-wise list of recognized SIROs along with the point of contact to TERI for primary data collection. For the purpose of data collection, the target group for the study is the heads of the organizations, who have been accorded DSIR-SIRO recognition. All such DSIR-recognized SIROs

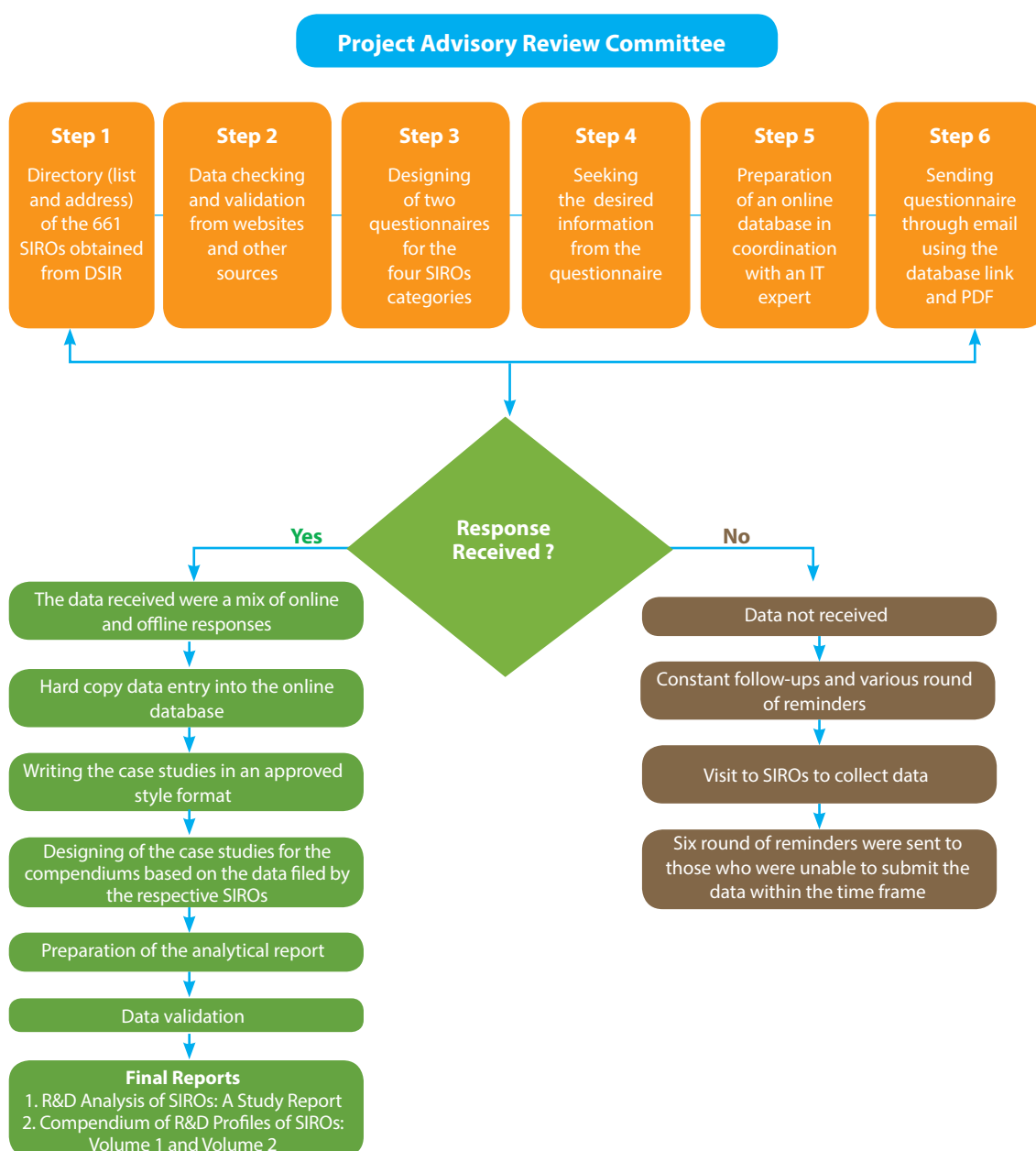


FIGURE 1: Flowchart for the data collection process

had been approached for this study. The schematic structure shown in Figure 1 gives a glimpse of the processes followed to achieve the maximum results.

The 661 organizations were divided amongst the four different subjects, namely, the Natural and Applied Sciences (11), Agricultural Sciences (12), Social Sciences (13), and Medical Sciences (14). The subject-wise break-up of the organizations is given in Table 1.

Sectors	No. of SIROs
Natural and Applied Sciences (11)	283
Agricultural Sciences (12)	41
Social Sciences (13)	83
Medical Sciences (14)	254
Total	661

Stakeholders

The survey was conducted using detailed questionnaires. These questionnaires were circulated amongst the different stakeholders/representatives of industry association; scientific and academic institutions; non-governmental organizations; and state government agencies. Through regular and rigorous follow-ups, primary data were collected and collated.

2.5 Structure of the Questionnaire

The initial questionnaire designed and suggested by DSIR contained very few questions. The questionnaire was deliberated at length by the PARC members, keeping in view the objectives and focus of the study. The previous questionnaire was revamped by incorporating lot of new components in the questionnaire, so that the outcome of the study is more useful and comprehensive. Finally, two different set of questionnaires relevant to the subjects in which a SIRO is working, were designed to collect first-hand data from all the 661 SIROs. Questionnaire 1 (Annexure 3a) was for those SIROs falling under the Natural and Applied Sciences, Agricultural Sciences, and Medical Sciences, whereas Questionnaire 2 (Annexure 3b) was for the Social Sciences. The questions for the Social Sciences (Code 13) subject was different from the other subject areas (Codes 11, 12, and 14).

Development of database structure

As depicted in Annexure 3c, an online database form was created based on questionnaires 1 and 2. This database was developed using Visual Basic and MS-Access platform. Using a unique ID and password, SIROs can open the database and fill up both the numeric and textual forms. This is a searchable database as well.

Data Collection Process

The data collection from the SIROs across India was conducted in the following ways:

- » **Offline survey form:** The survey questionnaires, with respect to the 661 projects, were forwarded to the concerned organization and the point of contact through post. A copy of the questionnaires have been given as Annexures 3a and 3b.
- » **Online survey form:** The URL of the online questionnaire with a unique password was also sent to all the concerned organizations through email. A process flow of the online survey is shown in Annexure 3c.

» **Regular follow up:** Collecting detailed data from the SIROs was an exhaustive and tedious process. Collecting primary data from the above-mentioned stakeholders was a tedious process, therefore, a team of TERI professionals constantly interacted with PIs and HoDs of various organizations. Regular follow ups were done with organizations who had not submitted data either online or offline. There were several queries to be resolved in order to collect data for all 22 questions. The DSIR helped TERI in many ways, ranging from collecting the data to send out reminders. With the institutes and organizations, the data collection was done in the right format and, at the end of this process, a data set was prepared, which was later used in the data analysis of each individual SIRO.

2.6 Details of Data Received

A team of information professionals from TERI was engaged in checking and validating the directory's published data; this was done by using the respective website and personally calling the organization. Almost 90% of the data were checked and rechecked by the following means:

- » Validation from the DSIR's in-house database
- » SIRO websites
- » Communicating with the organization's concerned person(s)

The data collection from the SIROs across India was conducted in the following ways:

Table 2 shows the comprehensive list of SIROs and list of SIROs that responded to the questionnaire.

TABLE 2: The response status of SIROs	
Total number of SIROs (Annexure 1)	661
Total number of SIROs responded (Annexure 2)	595

2.7 Processing and Analysis of Data

The collected data were stored in files. Some of the major steps followed in the process are as follows:

- » Structured programming was made for entering the data.
- » The information was broken down into a number of fields as per the requirements of the study.
- » The information received through the questionnaires was stored in the specially designed MySQL software-enabled database.
- » Codes were developed to analyse the data directly through the software, as per the following parameters: Organization/institution/agency-wise outcome; Subject area-wise outcome; Year-wise outcome.

Based on the types of institutes outcome amongst others, each of the above parameters were analysed in terms of the following categories:

- » Name and location of the SIRO
- » Type of organization
- » Major research strength of the organization
- » Product/processes development/under development
- » Research facilities/infrastructure available
- » Innovative elements in the research
- » Potential for I P generation, patents filed
- » Market/commercialization potential
- » National/societal relevance of the R&D

- » Collaborations/linkages/partners
- » Photographs of the research activities

2.8 Project Outcomes

The output of the study has been compiled in two parts: (i) Study Report on SIROs (ii) Compendium of R&D Profile of SIROs published in two volumes. The 'R&D Analysis on SIRO' contains the analysis on organization type, regional distribution, data on the research personnel engaged in SIROs, equipment/facilities available with SIROs and its usage, R&D expenditure trends, knowledge creation which includes analysis of research projects, publications, patents and technologies developed/commercialized, knowledge transfer including details on collaborations: industrial and institutional. The section on societal relevance has been particularly included to showcase their contributions towards National Missions of India. The compendium is the most comprehensive, exhaustive, and detailed outcome of the entire exercise. It reflects the significant outcomes achieved by SIROs in the various fields, which are described in Figure 2.

The compendium has been developed based on the data collected from the SIROs using the survey questionnaire methodology. After extensive data collection and correction, it was deduced that there are 661 recognized SIROs from which, the data had to be culled out. It was decided in PARC meeting that based on the inputs received from all 595 SIROs, at least two pages need to be devoted for each SIRO case study.

The efficacy of this study is as follows:

- » Policy changes, for example, those relating to fiscal incentives for scientific research, indigenous technology development, foreign direct investments, etc.
- » Changes in the technological priorities in the country towards the targeted economic and industrial development or to cope with any unforeseen circumstances.
- » Acceptance and endorsement of departmental vision in the government and industry circles.
- » Linkages with international agencies.
- » Adoption of new legislations, including environmental legislation affecting industrial research and technology development.
- » Deployment of an adequate and well-qualified manpower.
- » Availability of adequate infrastructural facilities.
- » Involvement in matters related to industrial research, industrial competitiveness, and the emerging technological areas that the country must adopt.
- » Industrial research and technological interventions in the government's flagship and mission mode programmes.

2.9 Assumptions, Hypothesis, and Limitations

The following limitations and challenges were experienced while collecting the data from SIROs.

- » Several SIROs were registered with the DSIR as their parent company, such as a trust, society, etc. whereas the data collected from the universities, colleges, and institutions were constituted under trust.
 - A few of the organizations have discontinued with their SIRO status.
 - The data for a few SIROs had to be collected from multiple locations.
 - Textual-based responses were difficult to analyse.
 - Encapsulation of enormous SIROs textual data into two pages for case study development.
- » Several organizations were reluctant to respond online. This reluctance could be attributed to data that needed to be shared with us, subject to approval from their competent authorities.



FIGURE 2: Major areas identified for the preparation of case studies

All efforts have been made to capture accurate information to the extent possible. The blend of textual and numerical data collected was a big challenge. The purpose was not only to depict an analytical picture, but also to write case studies for the compendium. The textual data provided by SIROs runs into several pages. The team at TERI had to rewrite the case studies without omitting any vital information for it to reflect over a two-page spread.



CHAPTER 3

KEY FINDINGS AND ANALYSIS



3.1 Background

The scientific and technological (S&T) activities play a vital role in the economic, social, and physical development of a country. Huge investments are needed in S&T research activities and this calls for a judicious utilization of scarce resources, such as equipment, skilled manpower, raw materials, etc. Data collection and analysis pertaining to the resources devoted to S&T activities, therefore, assume significant importance. The growth of S&T, its performance, and impact on society and the economy are indicators to assess the effectiveness of planning and policy formulation.

In the present study, for data collection, subject-wise questionnaires were distributed to the 661 SIROs spread across India. The SIROs are categorized subject-wise as: the Natural and Applied Sciences (NS) (11); Agricultural Sciences (AS) (12); Social Sciences (SS) (13); and Medical Sciences (MS) (14). The state-wise distribution of 661 scientific organizations are shown in Table 3.

TABLE 3: State-wise distribution of SIROs in India

States	No. of SIROs	Natural & Applied Sciences (11)	Agricultural Sciences (12)	Social Sciences (13)	Medical Sciences (14)
Andhra Pradesh and Telangana	73	34	2	12	25
Assam	4	2	0	0	2
Bihar	2	0	0	0	2
Chandigarh	1	1	0	0	0
Chhattisgarh	1	1	0	0	0
Delhi	79	28	3	16	32

Contd...

States	No. of SIROs	Natural & Applied Sciences (11)	Agricultural Sciences (12)	Social Sciences (13)	Medical Sciences (14)
Goa	1	0	0	0	1
Gujarat	56	24	3	11	18
Haryana	9	6	1	0	2
Himachal Pradesh	2	2	0	0	0
Jharkhand	2	1	0	1	0
Karnataka	71	33	4	4	30
Kerala	25	9	2	1	13
Madhya Pradesh	8	3	0	2	3
Maharashtra	123	42	9	14	58
Manipur	2	1	0	1	0
Nagaland	1	0	0	0	1
Odisha	14	13	0	0	1
Puducherry	5	0	0	2	3
Punjab	11	5	1	2	3
Rajasthan	7	3	0	3	1
Tamil Nadu	93	45	10	6	32
Uttar Pradesh	25	11	3	2	9
Uttarakhand	5	2	0	1	2
West Bengal	41	17	3	5	16
Total	661	283	41	83	254

3.2 Data Analysis

The data, extracted from the online database, was analysed on the basis of simple statistical tools. Out of the 661 SIROs (Annexure 1), 595 responses (Annexure 2) have been received from SIROs that filled in the questionnaire with all the necessary details. The data received from SIROs is based on Questionnaire 1 and Questionnaire 2, as shown in Annexure 3a and Annexure 3b. The analytical graph (see Figure 3) depicts the number of SIROs that responded to the survey.

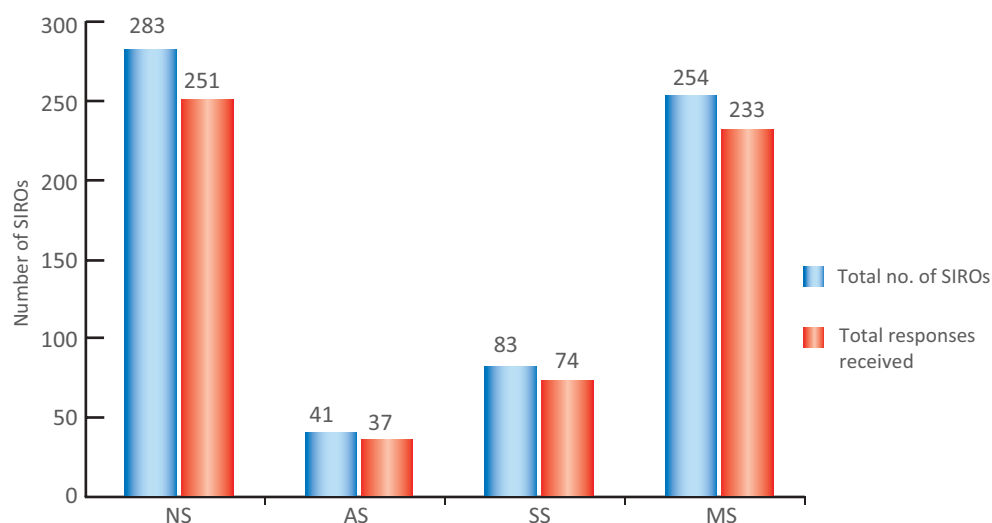


FIGURE 3: Number of total SIROs vs the responses received

The response rate of SIROs has been summarized as follows:

- » **Natural and Applied Sciences (NS):** Out of the 283 organizations, 251 (89%) SIROs responded.
- » **Agricultural Sciences (AS):** Fewer numbers are registered under this category; out of the 41 SIROs, we have received responses from 37 (90.2%).
- » **Social Sciences (SS):** In this subject, the response rate is close to 74 (89%) and the number of SIROs registered are 83.
- » **Medical Sciences (MS):** Out of the total 254 SIROs, 233 organizations (91.73%) in this subject have responded.

3.3 Organizational Structure

There are two distinct categories of organizations represented in SIROs, on the basis of source of funds, governmental and non-governmental organizations (NGOs). The government organizations include registered societies, universities, state organizations, etc., and the non-government organizations, which include society, trust, Section 8 Company and universities, etc. As depicted from the data shown in Figure 4, 60%–70% of the organizations are from the non-governmental sector. In contrast, under the Medical Science subject, majority of SIROs are NGOs which have hospitals attached to them.

As per the legal identity, SIROs are broadly distributed into four major categories, which are: (i) trusts; (ii) societies; (iii) universities/institutes/labs; and (iv) Section 8 Companies as per the Company's Act, 2013. The data represented in Figure 5 has a number of organizations which are distributed in the mentioned categories. It clearly explains that the number of societies is more in Natural and Applied Sciences followed by Social Sciences and then Agriculture Sciences. Although in case of Medical Sciences subject

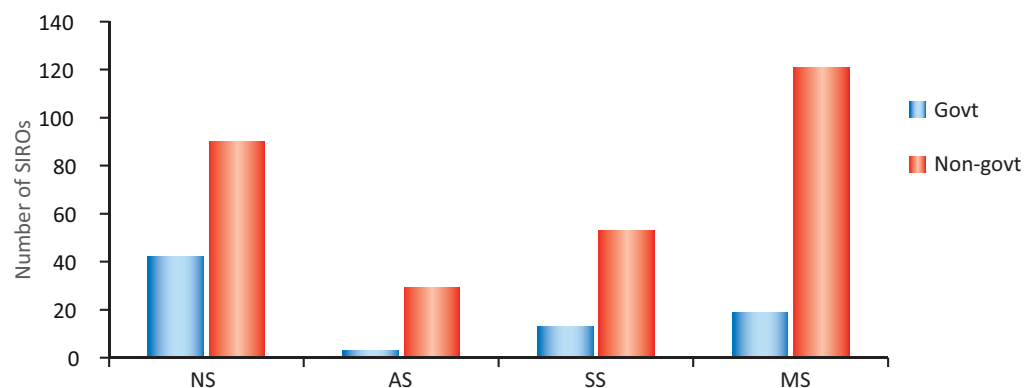


FIGURE 4: Types of government and non-governmental institutions registered as SIROs

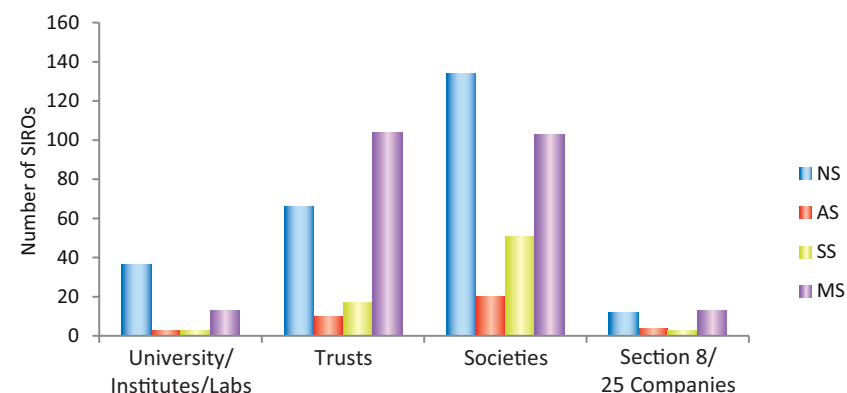


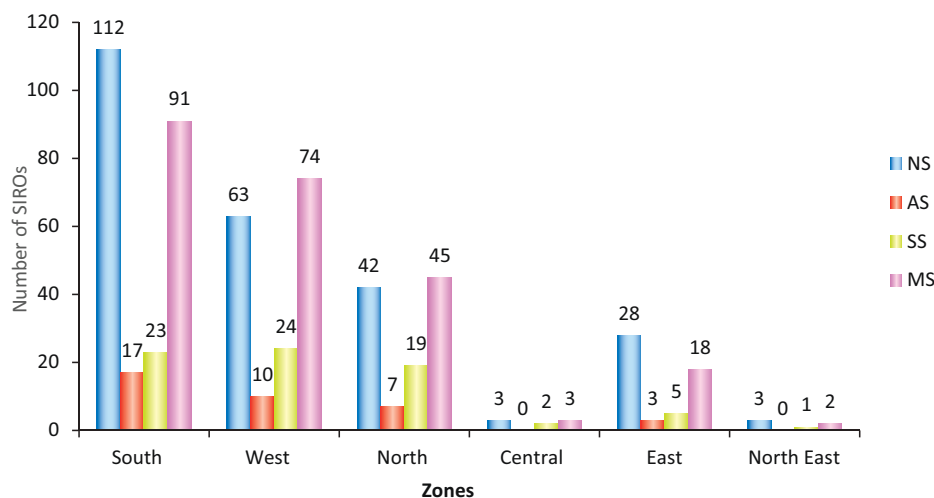
FIGURE 5: SIROs distribution based on the legal status

area the ratio of distribution of SIROs amongst Societies and Trusts are almost equal. While analysing the data from the questionnaire, it was noted that a large number of societies and trusts had registered their parent body, but currently, the R&D activities are being carried out by the SIRO research labs institutionalized in universities and academic institutions.

3.4 Zonal Distribution of SIROs in Pan India

The pan-India presence of SIROs has already been discussed earlier. Figure 6 shows the zone-wise distribution of 661 SIROs . Here an attempt has been made to analyse the zone-wise response rate.

As per the data (see Figure 7) received, the number of recognized SIROs is maximum in the South zone, from where the maximum number of responses have been received. This may be because of the reason that the South zone, that is, Karnataka, Andhra Pradesh, Telangana, Kerala, Tamil Nadu, and Puducherry



South Zone: Andhra Pradesh, Telangana, Karnataka, Kerala, Tamil Nadu, Puducherry, Lakshadweep, and Andaman and Nicobar.
West Zone : Dadra and Nagar Haveli, Daman and Diu, Goa, Gujarat, Karnataka, Maharashtra, and Rajasthan
North Zone: Delhi, Haryana, Jammu and Kashmir, Himachal Pradesh, Uttar Pradesh, Punjab, and Uttarakhand
Central Zone: Madhya Pradesh and Chhattisgarh
East Zone: Odisha, West Bengal, Bihar, and Jharkhand
North-east Zone: Assam, Sikkim, Nagaland, Meghalaya, Manipur, Mizoram, Tripura, and Arunachal Pradesh

FIGURE 6: Zone-wise distribution of SIROs

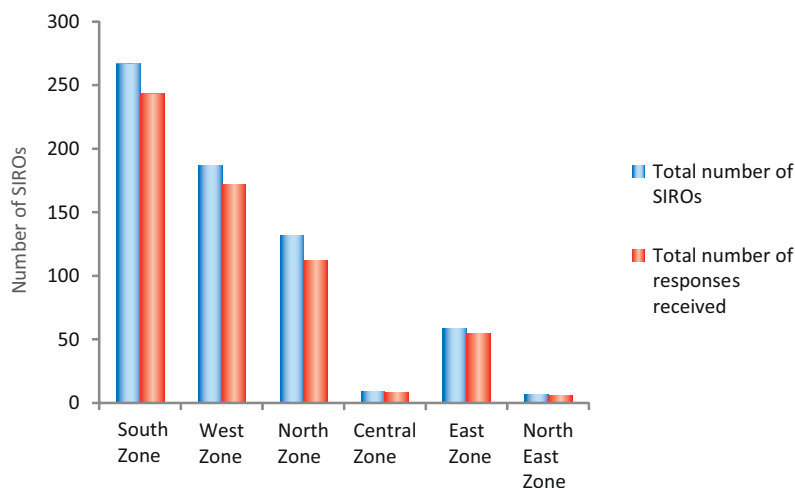


FIGURE 7: Zonal distribution of the responses received

are extensively involved in all the four sectors in Research and Development. In case of the South zone and West zone, almost 91% of the data responses have been received with respect to the total number of the registered SIROs.

3.5 R&D Manpower

Core competency that blends with appropriate qualifications are of the utmost importance as experienced and skilled manpower is the need of the hour in India. The scientific human capital base is vast and, in some cases, few individual scientists rank amongst the best in the world. Investments are required in keeping the knowledge, expertise, and skills.

Figure 8 gives an analysis of the distribution of R&D manpower in all the four subjects areas in the last three financial years, 2014–17. The full-time R&D manpower strength is high as compared to other part-time and contractual manpower. As depicted in the data, the Natural and Applied Sciences have highest number of manpower as compared to the other three subjects. This has been followed by the Medical Sciences, Social Sciences, and then the Agricultural Sciences. In comparison, part-time employee strength in the Natural Sciences is more than the other three subjects.

Figure 9 depicts the qualification-wise manpower distribution in the four subjects. In the graph, the percentage of doctorates, graduates, and postgraduates is more in the Natural and Applied Sciences. This could be because maximum number of organizations are registered under this subject and the

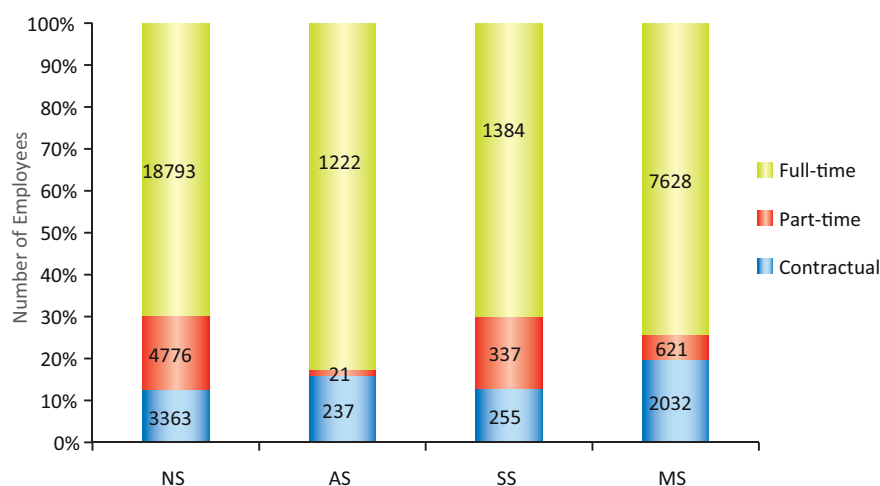


FIGURE 8: Distribution of employees during 2014–17

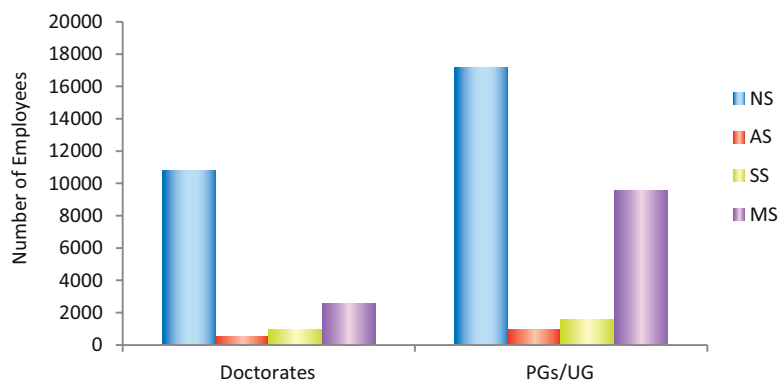


FIGURE 9: Employee distribution based on qualifications

research involved in this subject is more towards experimental research. This number is followed by the Medical Sciences subject as this is involved in the development of the current trends in technologies with respect to health areas.

Figure 10 represents the gender-wise distribution of employees in the various R&D divisions. On an average 30%–50% of employees in all subject areas are females, such as 31.90% females work in AS, 34.40% in NS and 41.57% in SS. However in the MS, the male–female distribution is almost 52% and 48% respectively, which is a very promising as here the number of women is almost equal to men, which shows the inclination of female population towards the medical science subject.

This data provides a detailed analysis of the situation regarding the entry and retention of women in the science subjects and also suggests certain measures that might help in making the higher education more compliant towards female professionals. The gender-wise employees distribution figure provides a comprehensive view on the status of women in science, their background, and how they pursue higher studies and research.

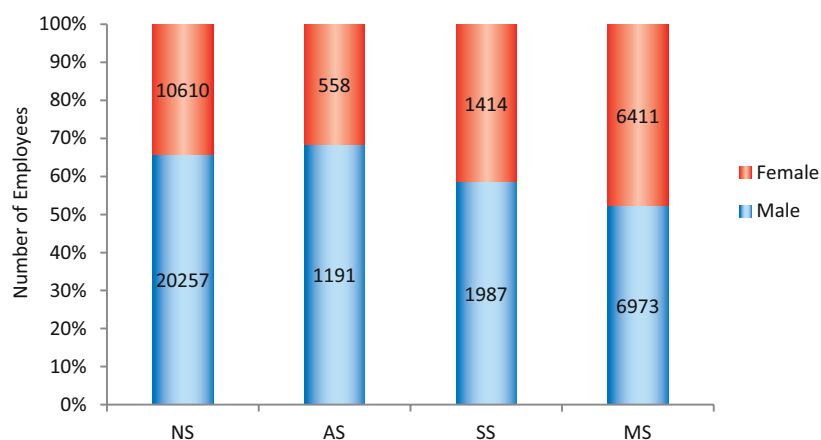


FIGURE 10: Gender-wise employee distribution

3.6 Sharing and Accessibility of R&D Facilities/ Infrastructure

The establishment of national laboratories and research institutes has a special importance in a country such as India where medium and small-scale producers contribute a considerable proportion to the industrial production. Unlike the larger producers, these industries cannot afford to have research facilities of their own. The research institutions enable cost reduction and help in improving the quality of their products. The establishment of these laboratories and institutes is thus complementary to the objective of promoting the development of small-scale industries. In addition to these major research institutes, it is desirable to direct attention to the improvement of techniques in industries. Such improvement may ultimately produce a far greater result all over the country than a limited number of large-scale industries.

Figure 11 represents the sharing and usage of SIROs research infrastructure by other users such as academic groups, industries, and individuals. Furthermore, SIROs approached by more than one group are depicted as 'multiple'. As per the given graph, amongst academicians, individuals, and industries, the research users in the respective SIROs are the maximum from the academic side. The sharing and accessibility is observed to be highest in NS subject area which may be attributed to its inter-disciplinary nature, followed by medical sciences. The Social Sciences and the Agricultural Sciences subject have fewer number of research users.

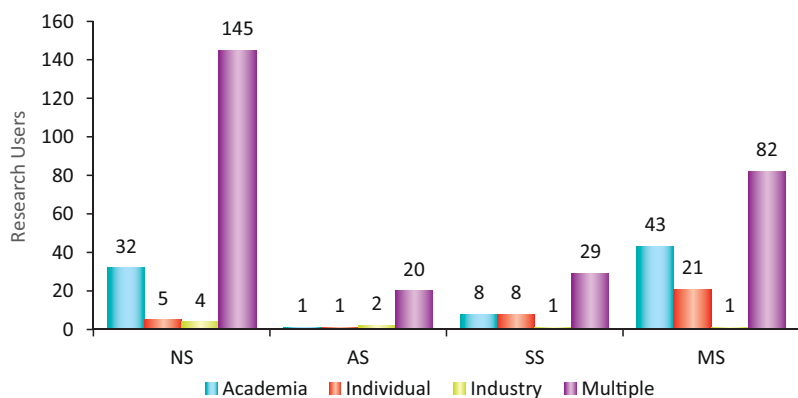


FIGURE 11: Sharing and accessibility by research users

3.7 R&D Expenditure

The Department of Scientific and Industrial Research (DSIR) and Department of Science & Technology (DST) is primarily a policy making body for S&T sector in India. National Science and Technology Management Information System (NSTMIS), DST has been bringing out *Research and Development Statistics: At a Glance*.¹ In their recent publication they have depicted the following data in context to research and development in the country.

India's gross expenditure on R&D (GRED) has tripled in the last decade to ₹85,326 crore in 2014–15 from ₹24,117 crore in 2004–05. It is estimated at ₹104,864 crore in 2016–17. In the present report, an attempt has been made to analyse the expenditure trends of SIROs for the period 2014 to 2017.

The expenditure has been classified in accordance with the subject areas such as Natural Sciences (NS), Agriculture Sciences (AS), Social Sciences (SS) and Medical Sciences (MS) during the years 2014 to 2017. As shown in Figure 12, the expenditure in all the years is almost similar for all the subject areas in the said years and in NS, AS and SS the expenditure has shown a slight decrease while in MS the graph is representing a slight increase. In NS, AS, and SS the percentage decrease in the expenditure by SIROs is decreased by 3.9%, 10.9%, and 15.7% respectively, which can be considered as a slight decrease. And in MS the percentage increase is around 18.39%, this may be due to the fact that the R&D in medical

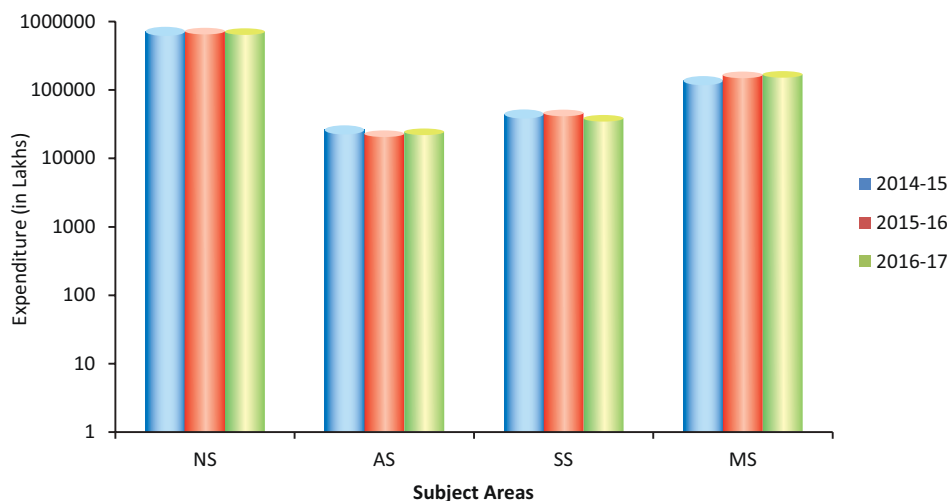


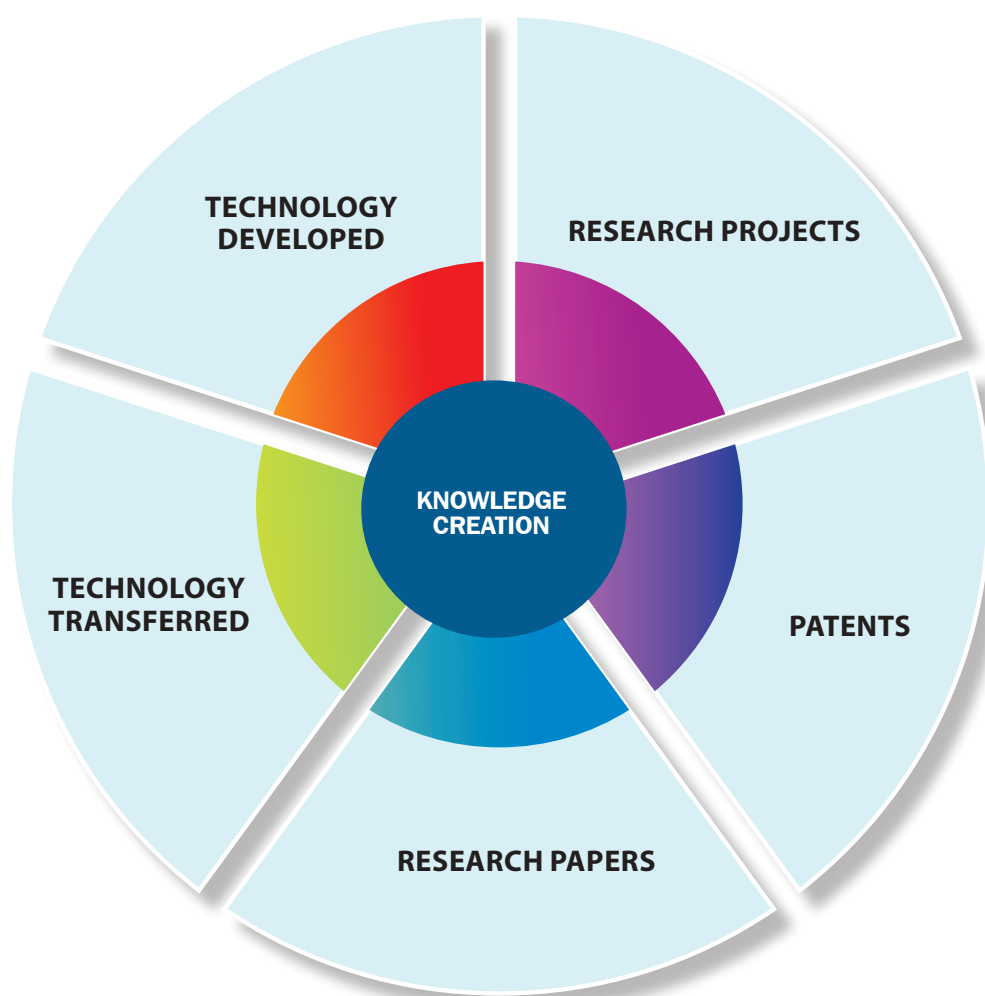
FIGURE 12: Subject-wise R&D expenditure during FY 2014–2017

¹ DST, 2017. Renewable and Development Statistics: At a Glance. (2017-18). Ministry of Science and Technology, DST, Government of India.

sector has been increased and the medical facilities such as machines and medical aids have improved in couple of years and people are also benefitted with the same.

3.8 Knowledge Creation: Research Output and Growth

Through the creation, acquisition, adaptation, dissemination, and use of knowledge in developing countries, R&D sector is also developing rapidly. The creation of knowledge is the process of inventive activity. It is usually the result of an explicit R&D effort typically carried out by scholars, scientists, and engineers. The key institutions involved in the creation of knowledge are R&D laboratories, universities, and private R&D centres. Like knowledge creation, adaptation also requires research and experimentation. In the private sector, the dissemination of knowledge happens when enterprises expand, sale helping in dissemination of knowledge, or transfer their knowledge, or when other firms or organizations imitate or replicate the knowledge others have created. The efficient dissemination of knowledge requires appropriate mechanisms to educate the potential users in the benefits of the related technology; this is a process that is inclusive of broad educational advance and not just the provision of technical information. Much dissemination also occurs through the sale of new machinery or other inputs that embody a new technology. There are also specialized institutions, such as R&D organizations, productivity organizations, and consulting firms that specialize in helping disseminate technologies through various means. These efforts usually involve explicit training, demonstration projects, or technical assistance on how to use the technology. Using new technologies usually requires



literacy as well as specialized training. Also, beyond education, using new technology often requires access to complementary inputs and supporting industries, and access to finance for new equipment, inputs, or purchase of the technology license.

In this study, the research output of the SIROs were measured in terms of the following:

- » Number of publications in national and international refereed journals
- » Number of research projects awarded
- » Number of technologies developed indigenously in the country to meet the requirement
- » Number of technologies transferred from one domain to another domain
- » Number of patents filed or awarded out of the R&D

Most countries that are behind the global technological frontier can take advantage of acquiring knowledge that already exists elsewhere in the world and adapting it for use in their local settings. Often this is done through trade and through formal technology transfer agreements. Foreign technology owners are not always willing to license their cutting-edge technology.

3.8.1 Research Project Trends

The R&D analysis in Figure 13 revealed that trend in the number of on-going research projects is the increasing in all the subject areas and the maximum is in Natural and Applied Sciences. The trend of Social Sciences (117%) and Agriculture Sciences (137%) is almost equal and similar for years 2014–17. The growth of the on-going projects in Natural and Applied Sciences is 145.86% and in case of Medical science, which shows the constant increase over the years is 133.23%.

As depicted in Figure 14, there is an increasing trend in number of completed projects in all the subject areas and the highest is in NS, similar to the case of on-going projects. The growth of NS, AS, and MS in years 2014 to 2017 is 45.44%, 27.77%, and 49.31%, respectively. It may be inferred that more value added projects aiming tangible/societal benefits may have been supported by the governing agency. However the overall growth in the number of completed projects in Social Sciences is the maximum in percentage, i.e., 104.09%, which could be due to the policy advancement by the governing body to give value-added projects aiming societal benefits rather than small projects.

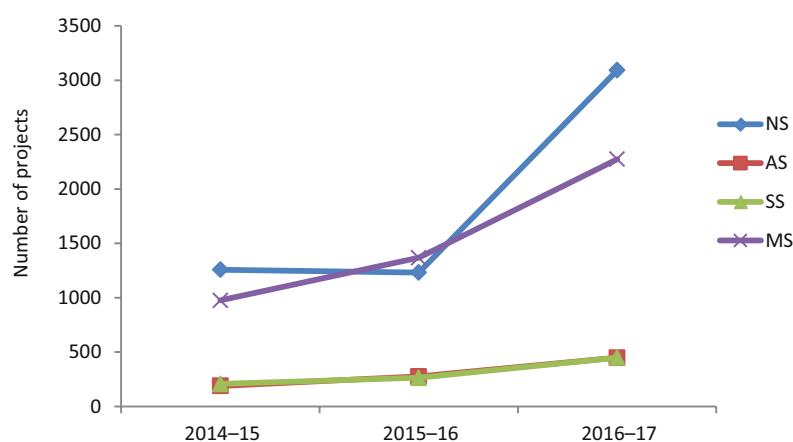


FIGURE 13: Number of ongoing projects during 2014–17

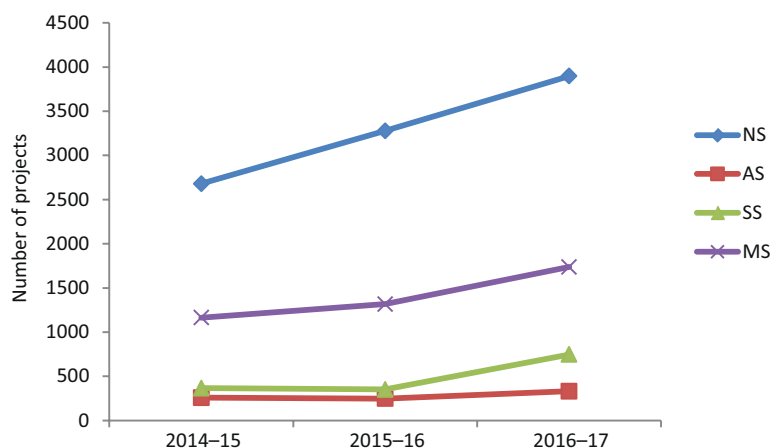


FIGURE 14: Number of completed projects during 2014–17

3.8.2 Analysis of Research Publications from SIROs

India ranks 5th in the global research publication output where countries from North America, Europe, and the Pacific dominate both in terms of quantitative and qualitative research, as is revealed by the joint study by the Council of Scientific & Industrial Research - National Institute of Science Technology and Development Studies (CSIR - NISTADS) and the Indian Institute of Science Education and Research (IISER).²

Data collected from SIROs as part of the research output consists of journal articles, monographs, presentations in conferences and seminars, and technical reports. Separate trends have been shown for national and international publications across different categories of SIROs. As depicted in Figure 15, scientists consider research articles published in national publication have been considered as the most preferred way. Over 88% of the research findings are reported in nationally published journals in the Natural and Applied Sciences subject. While most research articles are published in different nationally published academic journals, newsletters are from the Natural and Applied Sciences; and this is followed by the Medical Sciences subjects. Around 1,107 research articles were published in the Social Sciences subjects as compared to 337 in the Agricultural Sciences subjects. The decrease in the

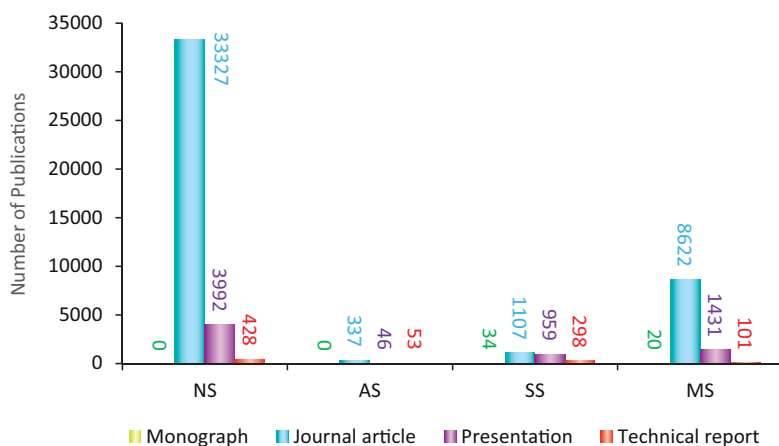


FIGURE 15: National publications such as monograph, journal article, presentation, and technical report in four subjects

² The National Academy of Sciences, 2018. Science, its competitive Strength and its Relevance to National Needs. Report by NASI study group. Allahabad. 37p.

number of publications in Agricultural Sciences can be due to the fact that there are the least number of SIROs (41) registered under the Agricultural Sciences. As part of the national publications, the maximum of presentations were made by the Natural and Applied Sciences, followed by the Medical Sciences. The Natural and Applied Sciences is multidisciplinary in nature and provides a conducive environment for collaborations. It is construed that the primary focus in most SIROs is publications and not patents since they work for society.

As shown in Figure 16, the international publication in the fields of Natural and Applied Sciences such as the research articles are maximum as compared to the other subjects. The Medical Sciences subject area published 5,508 articles, the Agricultural Sciences published 3,571 research articles, and only 417 articles were published in the Social Sciences subject area. The idea of publishing monographs is accepted amongst the NS, AS, and SS, although there are 29 monographs published in MS.

The case of journal articles is the same for national and international publications as scientists and researchers prefer this as the most favourable and valuable method of disseminating their research outcomes.

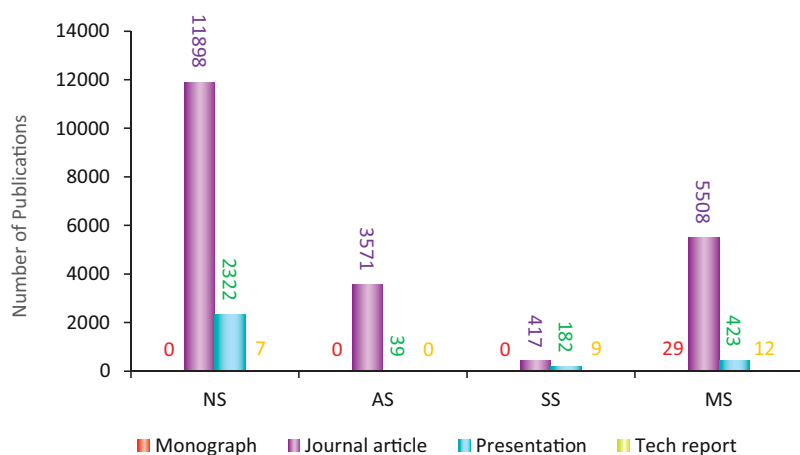


FIGURE 16: International publications, such as monograph, journal article, presentation and technical reports in four subjects

3.8.3. Patent status of SIROs

The IP (Intellectual Property) transactions in India are at its peak. Numerous worldwide patent filings are recorded in the year 2017. From pharma giants to the largest automobile organizations, information technology to the electronic companies, all have established an IP portfolio worldwide. From the recent survey it can be depicted that the foreign companies have a huge footprint in the Indian IP landscape. With an increase in demand in R&D globally, the foreign companies turned themselves towards the need of IP protection. This trend of IP protection is not only adopted by the foreign companies but many Indian start-ups and technology incubators have shown interest in patent protection. Patent filings by Indian applicants are growing at a rate of about 11.6% each year, whereas foreign applicant filings are growing at a rate of about 31.7% since 2016.³

³ India: Trend of IP in India And Introduction of Indian Patent Office As An International Searching Authority. By Aayush Sharma, dated 23 July 2018. <http://www.mondaq.com/india/x/721696/Patent+Trend+Of+IP+In+India+And+Introduction+Of+Indian+Patent+Office+As+An+International+Searching+Authority>

The statistical data published by WIPO disclose that the number of patent applications filed in India has witnessed a steady growth and has plateaued out in the recent past. Pharmaceutical patents are ranked second with respect to the volume of applications but are still a fraction of pharmaceutical patents are filed worldwide. A study of the patenting trends is important to evaluate the current process in the Industry.⁴

The data given in Figures 17 and 18 show the status of both Indian and foreign patents filed and awarded to SIROs working in the subject areas NS, AS, SS, and MS. As visible in Figures 17 and 18 the maximum number of patents in filed and awarded category are in Natural and Applied Sciences. However it is observed that the success rate of awarded with respect to filed patents is highest in case of foreign patents of NS as 63% of patents have been awarded.

As far as the statistics of the number of filed patents both in the Indian and Foreign categories, the maximum number of patents are in NS, followed by MS, AS and then SS. However if we look at the success rate of awarded with respect to the filed patents both Indian and foreign, the maximum rate in Indian is of Agriculture Sciences, i.e., 32.40% and in foreign is of Social Sciences, i.e., 84.61%.

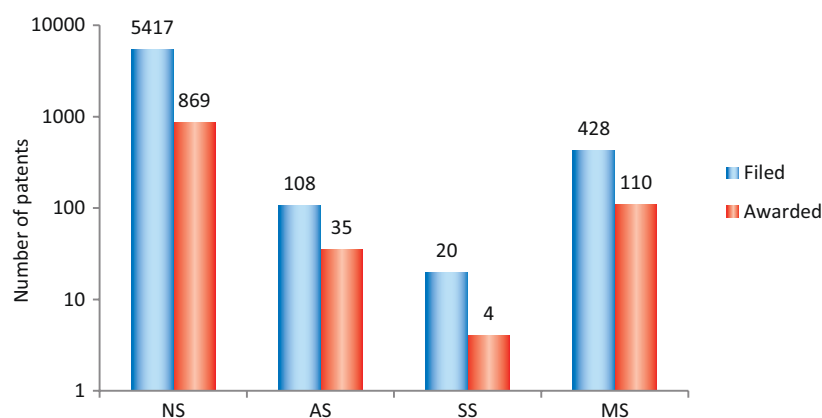


FIGURE 17: Indian patents filed and awarded to SIROs in various subjects till date

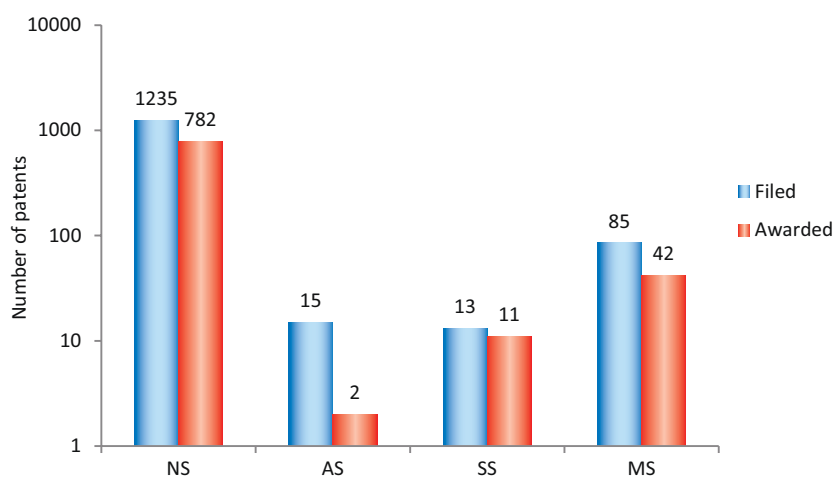


FIGURE 18: Foreign patents filed and awarded to SIROs in various subjects till date

⁴ India: Trend of IP in India and Introduction of Indian Patent Office As An International Searching Authority. By Aayush Sharma, dated 23 July 2018. <http://www.mondaq.com/india/x/721696/Patent/Trend+Of+IP+In+India+And+Introduction+Of+Indian+Patent+Office+As+An+International+Searching+Authority>

3.8.4 Technology transferred/commercialized

As per the data provided (see Figure 19), the Natural and Applied Sciences have a major share in the commercialization of technologies as compared to the other three subjects.

Natural and Applied Sciences has 63% and 80% share in commercializing products as well as services (see Figures 20 and 21). This may be due to the fact that the research in this subject is mostly experimental and the deliverables produced in the project, too, display tangible outcomes. However, the commercialization of products and services in the SS is zero per cent as the research involves field surveys, case research, and statistical analysis of qualitative and quantitative data for societal development. However, output of empirical research in SS area is captured by papers published, books published, and conference proceedings/presentations.

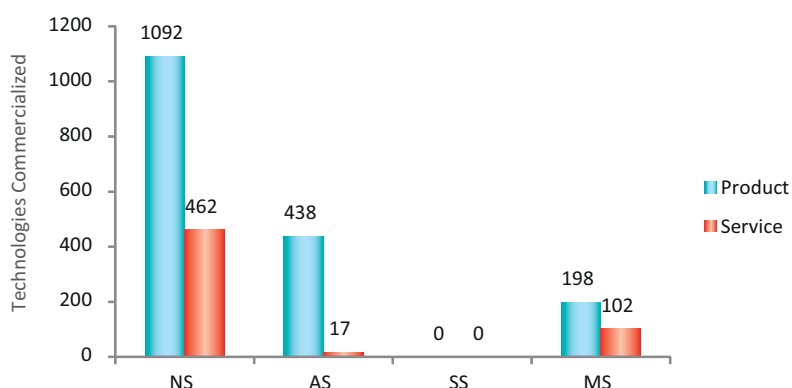


FIGURE 19: Total number of technologies commercialized in the subjects

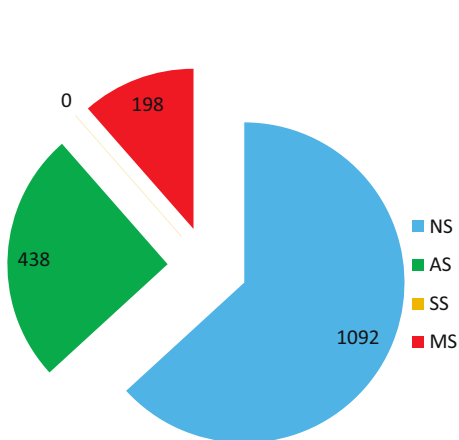


FIGURE 20: Total number of products commercialized

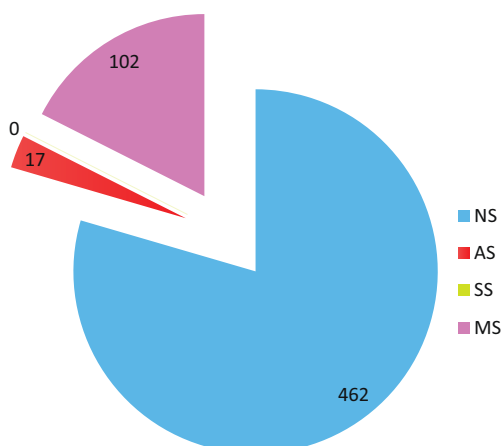


FIGURE 21: Total number of services commercialized

3.9 Knowledge Exchange/Transfer

A strong, scientific knowledge base is one of India's traditional key assets, which has enabled the country in becoming globally recognized and credited for its research activities. Despite these merits, the global position of Indian research is currently being challenged by a rapidly changing research landscape. Simultaneously, India's research base is faced with the implications of globalization of markets and industries, modern technologies, and a need to address societal issues such as climate change. In its broad innovation strategy, the importance of improving knowledge transfer between public research

institutions and third parties, including industry and civil society organizations has been identified as one of 10 key areas for action.

The need for sharing knowledge between research institutions and industry has become increasingly evident in the recent years. Historically, research institutions were perceived as a source of innovative ideas and the industry offered a way of maximizing the use of these ideas. However, the past decade has seen a meaningful change in the roles of both parties. Many companies are developing open, innovative approaches for R&D, combining in-house and external resources and aiming to maximize economic value from their intellectual property even when it is not directly linked to their core businesses. The companies have begun treating public research as a strategic resource. Parallely, it has become clear that research institutions may play a more active role in their relationship with the industry to maximize the use of the research results. This new role requires a specialized staff to identify and manage knowledge resources with business potential, that is, how best to take a new idea to market, ensure the appropriate resources (such as funding, support services, etc.) for it to materialize, and to obtain adequate buy-ins by all stakeholders.

3.9.1 National and international collaborations

In the last three decades, universities have enlarged their entrepreneurial activities in many dimensions, including patenting and licensing, creating science parks, promoting university spin outs, investing equity in start-ups, and collaborating with the industry in research projects. The industry these days considers university–industry collaborative links through joint research, consulting or training arrangements as the important channels of knowledge creation and transfer. As a result, research contracts and joint research agreements are widespread.

Collaborative projects have important benefits both for the industry and academia. Because such projects give access to highly qualified scientists and help them in keeping up to date with new, innovative ideas and in exploring the applications of new scientific discoveries. Academics provide appropriate assistance with experimentation, access to university analytical skills or the use of equipment. In addition, research partners can exploit economies of scale and scope in the generation of R&D and benefit from the synergies related to the exchange of complementary know-how.

In Figure 22, the total number of collaborations of the different SIROs is mentioned amongst the four subjects at the national and international levels. The collaborations are with government and non-governmental organizations, private institutes, academic institutes, R&D organizations, and so on. As mentioned, the maximum number of collaborations in the last three years is in the Natural and Applied Sciences, both nationally and internationally, followed by the Medical Sciences.

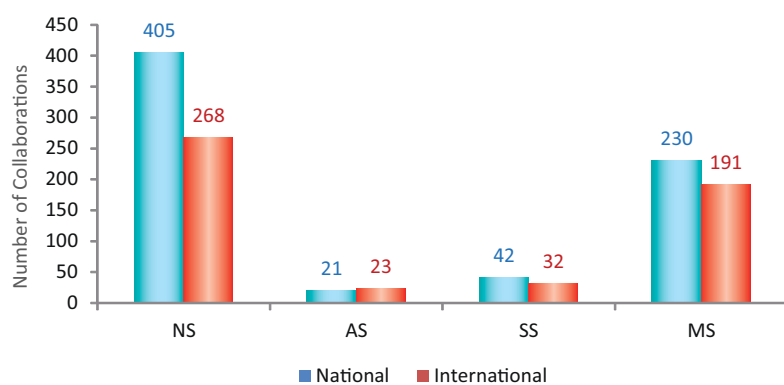


FIGURE 22: Total number of national and international collaborations in different subject areas

Figure 23 shows the average number of collaborations per institute. Here as well, the maximum number of collaborations is in the Natural and Applied Sciences sector, both nationally and internationally. However, if we look closely, the status of the total number of collaborations and the average number of collaborations as shown in Figures 22 and 23, respectively. Here it may be inferred as almost every organization has collaborated with at least two institutes both nationally and internationally for R&D activities (see Figure 23).

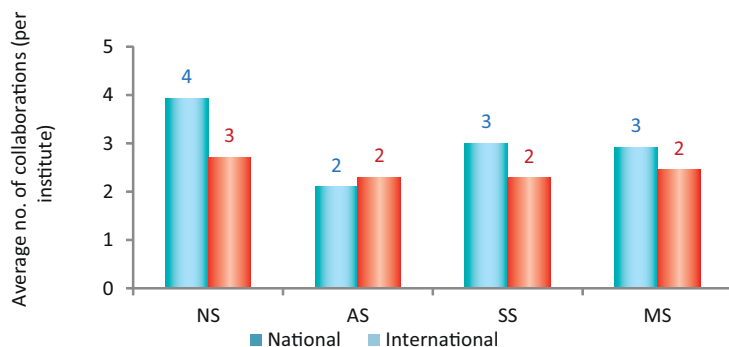


FIGURE 23: Average number of national and international collaboration (per institute) in different subject areas

3.10 Societal Relevance

3.10.1 Transforming India

Turning ambition into reality, the Make in India Campaign, launched on September 25, 2014, is a major national initiative covering 25 sectors which focuses on making India a global manufacturing hub. The campaign aims to take the manufacturing growth to 10% on a sustainable basis by introducing a business-friendly regulatory environment, enhancing the ease of doing business, and amongst others, improving the manufacturing infrastructure. In a short span of time, the obsolete and obstructive frameworks of the past have been dismantled and replaced with a transparent and user-friendly system that is helping drive investment, foster innovation, develop skills, protect IP, and build cutting edge manufacturing infrastructure. The most striking indicator of progress is the unprecedented opening up of key sectors—including railways, defense, insurance and medical devices—to dramatically boost the levels of Foreign Direct Investment. Amongst the slew of reforms and measures announced under the programme, the noteworthy mentions include new de-licensing and deregulation measures to reduce complexity, and increase speed and transparency. Also, there is now a 24×7 online process of applying Industrial License & Industrial Entrepreneur Memorandum through an e-Biz portal and Udyog Aadhaar. In terms of infrastructure, new smart cities and industrial clusters are being developed to integrate and increase connectivity between rail, road, port, and air networks to support the manufacturing sectors. In order to boost jobs in the manufacturing sector, new youth-focused programmes have been introduced under the Skill India programme. Further, the National Intellectual Property Rights Policy 2016 was recently announced to nurture innovation and R&D activities in the country. These and many more initiatives have already started reflecting positively in India's ranking on the World Bank's Ease of Doing Business' Index, where in 2017 out of 190 countries, India stood at 100 and as of 2018, India's ranking is 77th, which is better than its 2017 performance.⁵

⁵ www.pib.nic.in

3.10.2 The Make in India Vision⁶

With Asia developing as the outsourcing hub of the world, India is soon becoming the preferred manufacturing destination of most investors across the globe. Make in India is the Indian government's effort to harness this demand and boost the Indian economy.

Manufacturing currently contributes just over 15% to the national GDP. The aim of this campaign is to boost this to a 25% contribution as is seen with the other developing nations of Asia. In the process, it is expected that it would generate jobs, attract more foreign direct investment, and transform India into a manufacturing hub preferred around the globe. The Honorable Prime Minister of India called for all those associated with the campaign, especially the entrepreneurs and the corporates, to step in and discharge their duties as Indian nationals by First Developing India and by asking investors to endow the country with foreign direct investments. With Make-in-India initiative, a robust foundation was also laid for several complementary initiatives such as Digital India, Start-up India and Skill India, which would enhance employment generation and reduce poverty in the country.

Digital India: Linking millions, The Digital India Scheme is a flagship programme of the Government of India with a vision to transform the country into a digitally empowered society and knowledge economy. *How Digital India will be realized: Pillars of Digital India?* Digital India is an umbrella programme that covers multiple Government Ministries and Departments. It weaves together a large number of ideas and thoughts into a single, comprehensive vision so that each of them can be implemented as part of a larger goal. Each individual element stands on its own, but is also part of the larger picture. Digital India is to be implemented by the entire government with the overall coordination being done by the Ministry of Electronics and Information Technology (MeitY).

Start-Up India: Empowering fledgling businesses, on January 16, 2016 schemes to promote a startup ecosystem in India was announced as 'Startup India'. This has immense importance because, for starters, it was the first-of-its-kind dialogue between India's startup community and the government. Startup India is a flagship initiative of the Government of India, intended to build a strong ecosystem for nurturing innovation and startups in the country. The aim is to drive sustainable economic growth and generate large-scale employment opportunities. The Government, through this initiative aims to empower startups to grow through innovation and design.

Skill India: Developing human capital, the Skill India campaign was launched to train people, and to create opportunities and scope for the development of the talents of the Indian youth as well as to develop sectors which come under skill development along with identifying new sectors for skill development. The new programme aims at providing training and skill development covering each and every village. Emphasis needs to be laid on skilling the youth in such a way that they get employment while also improving entrepreneurship. This scheme will provide training, support, and guidance for all traditional occupations, such as carpentry, tailoring, weaving, etc. More emphasis will be given to areas, such as rural estate, construction, transportation, tourism, and so on where skill development is inadequate or nil. Skill development will enhance the workforce for Make in India.

As shown in Figure 24, under the Natural and Applied Sciences, the maximum number of SIROs have worked in almost all government-related schemes. However, in case of the Swastha Bharat Mission (SBM), the majority of organizations working are from the medical sector. A possible reason for this is the nature of the goal of the Swastha Bharat scheme and how it aligns directly with the objective of the Medical Sciences subject.

⁶ <https://www.mapsofindia.com/government-of-india/make-in-india.html>; last accessed on October 11, 2018

SIROs working for the various schemes are depicted as follows:

In the Natural and Applied Sciences as depicted in Figure 24(a), 26% of the organizations are working for the Clean India mission and 19% and 17% are working for the Skill India and Make in India missions, respectively. Moreover, 13% is working for Clean Energy and 11% is working for Digital India and Swastha Bharat, respectively.

In the Agricultural Sciences as depicted in Figure 24(b), 22% of the organizations are working under the Clean Energy as well as Clean India missions, respectively, and 19% and 17% of SIROs are working in the Digital India and Make in India schemes, respectively, and the remaining 20% organizations are working for Skill India and Swastha Bharat, respectively.

In the Social Sciences as depicted in Figure 24(c), 33% of the organizations are working for Clean India, 19% are working for Swastha Bharat, 18% are working for the Skill India and Make in India schemes of the Government of India, and 6% are working for Digital India and Clean Energy.

In the Medical Sciences as depicted in Figure 24(d), the majority of the organizations are working under the Swastha Bharat schemes of the Government of India, which is almost 92% as the objective of both schemes and the medical sector is similar and 6% are working for the Clean Energy scheme.

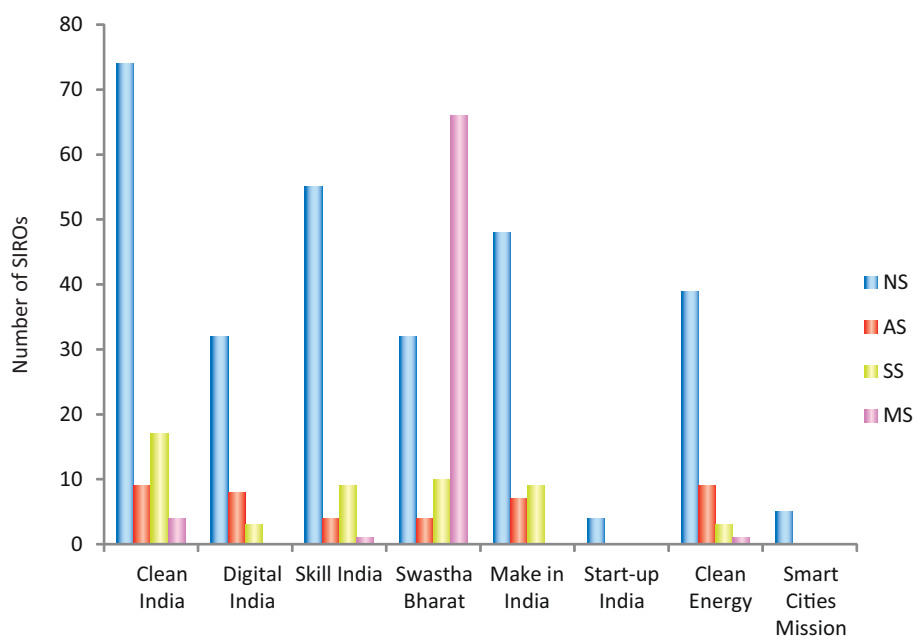


FIGURE 24: SIROs contributing in various National Missions of the Government of India

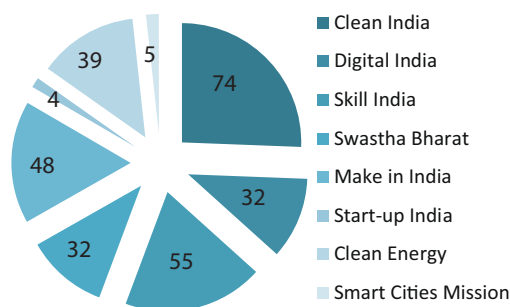


FIGURE 24(A): Distribution of SIROs contributing in different schemes of the Government of India in the Natural and Applied Sciences

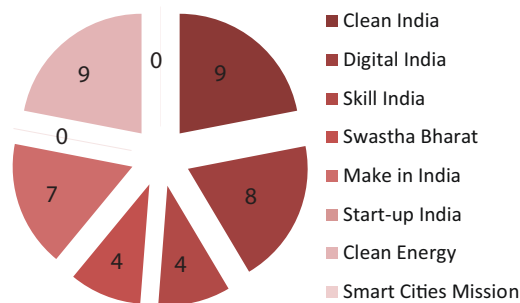


FIGURE 24(B): Distribution of SIROs contributing in different schemes of the Government of India in the Agricultural Sciences

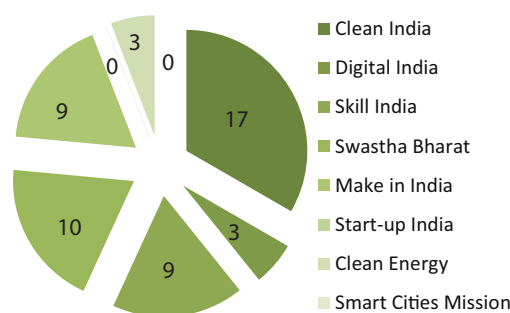


FIGURE 24(C): Distribution of SIROs contributing in different schemes of the Government of India in the Social Sciences

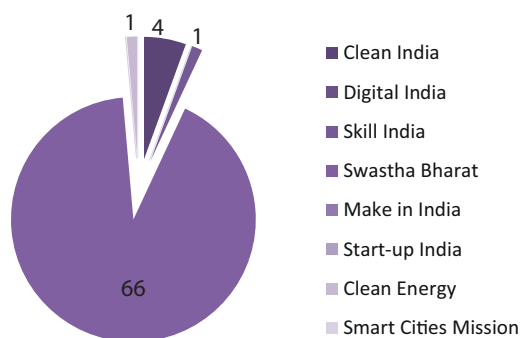


FIGURE 24(D): Distribution of SIROs contributing in different schemes of the Government of India in the Medical Sciences

3.11 Conclusion

An attempt has been made to analyse the data collected from 661 organizations, which are registered as SIROs in India. These SIROs are working in four subject areas, namely, the Natural and Applied Sciences, Agricultural Sciences, Social Sciences, and Medical Sciences. The SIROs are working for their Research & Development in the said sectors, by developing new products and technologies and their awareness and utilization for betterment of mankind.

The key output of SIROs are the number that have been completed, on-going projects, projects outputs such as publications both national and international, the number of patents filed as well as awarded, copyrights, etc., and the expenditure utilized by the SIROs. The SIROs are distributed in legal identities as Universities/Institutes/Labs, Trusts, Societies and Section 8 Companies. The trend in the cumulative expenditure by various SIROs during the years 2014–2017, the maximum expenditure is experienced by those SIROs which are registered as societies, although the trend of the societies is not increasing but there is a slight decrease from year 2014–15 to 2016–17. The constant increase in the expenditure over the years is seen only in Section 8 companies, rest in both the cases of Universities/Institutes/Labs and Trusts have shown a relevant growth in year 2016–17 from 2014–15.

The R&D analysis revealed that trend in the number of on-going research projects is increasing in all the subject areas and the maximum is in Natural and Applied Sciences. The trend of Social Sciences and Agriculture Sciences is almost equal and similar for years 2014–17. The growth of the on-going projects in case of Medical Sciences shows the constant increase over the years.

As depicted, there is an increasing trend in all the subject areas and the highest is in NS, similar to the case of on-going projects. The overall growth in the number of completed projects in Social Sciences is the maximum, this can be due to the fact that the type of project in SS are mostly awareness campaigns, road shows, etc., which are mostly for societal benefits but takes less time to execute thus increase in number.

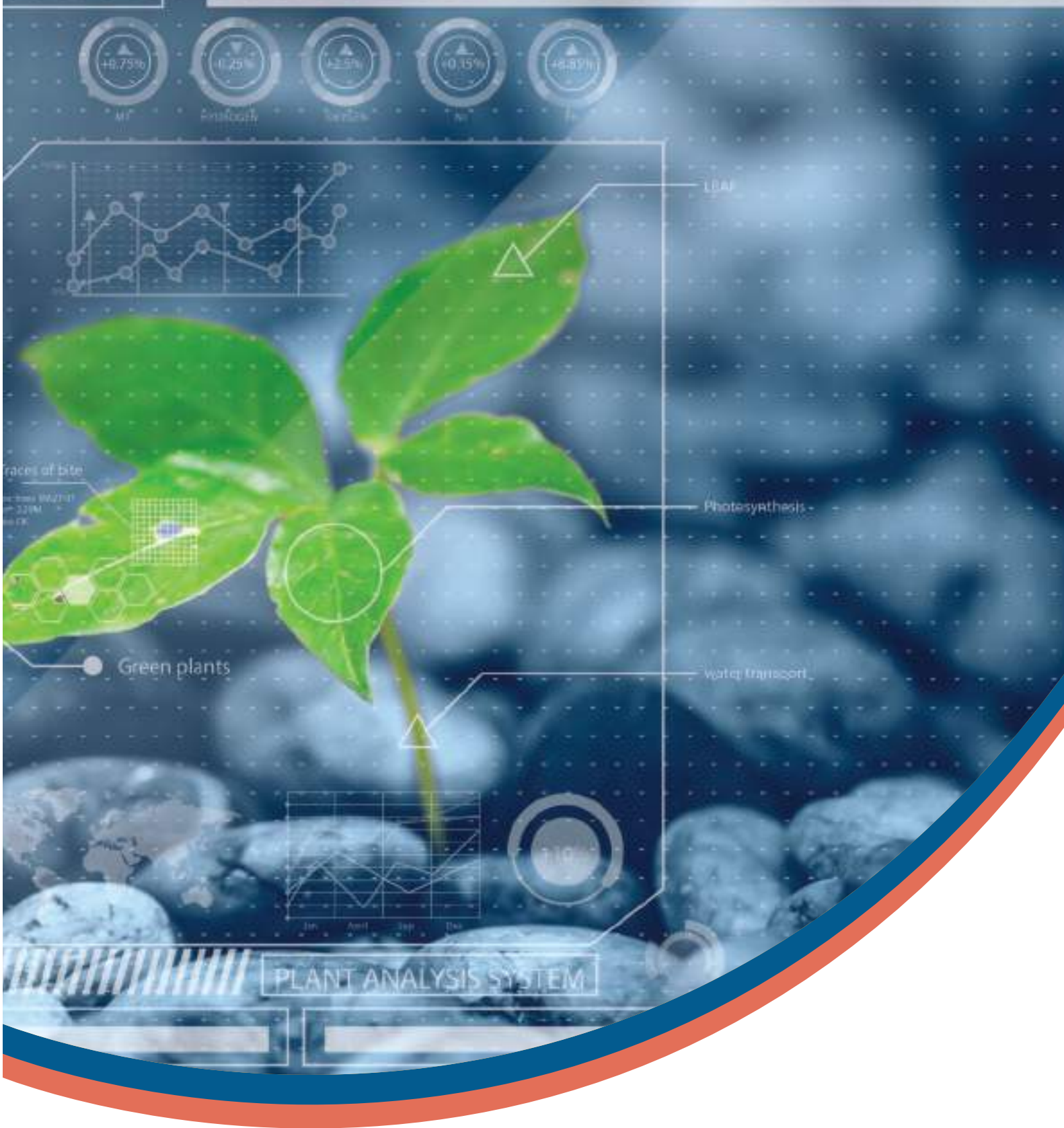
- » The SIROs are spending substantial amount on R&D. Although few organizations have stated that they are not maintaining separate accounts but would do that soon.
- » SIROs have mentioned varied research details. In future, they may be asked to submit outcome-bound focussed research, which has made an impact in the society. Also, SIROs may be asked to give details on the centres of excellence in research.
- » The gender-wise analysis of R&D manpower revealed that the percentage of women scientists contributing in R&D is significant and may enhance further.
- » From the data it is observed that, the SIROs in Medical Sciences category need to scale-up their efforts towards technology commercialization.

The research outcome data comprises national and international publications, such as monographs, journal articles, presentations, technical reports, and patents (both Indian and foreign) filed and awarded. As per the data provided, in all four sectors there are 50,755 national publications and 24,417 international publications from 2014–16. Regarding publications, the mode of publication used most frequently and the maximum number of publications are in the form of journal articles. Through this it can be inferred that scientists and researchers chose this as their preferred mode to disseminate the outcome of their activities.

SIROs have filed significant number of patents. This report would definitely go a long way in highlighting their research outcomes and motivate other organizations to pursue research.

3.12 Acknowledgements

We sincerely thank all the SIROs for providing the data as per the survey questionnaire for this study and compendium. Without their support, this study would not have been possible. We are also grateful to the expert members of the Advisory Committee for providing valuable suggestions and guidance from time to time. We are also thankful to TERI team and TERI Press for taking up this mammoth task along with DSIR.



ANNEXURES

Annexure 1: Total List of SIROs- 661

1. Aaranyak
2. Aarthi Educational and Charitable Trust
3. Able Disabled All People Together (ADAPT)
4. Academy of Life Sciences of the Society of Plant Reproductive Biologists
5. Academy of Scientific and Innovative Research
6. Acharya & BM Reddy College of Pharmacy of J M J Education Society
7. Adamas Institute of Technology
8. Adhiyamaan Educational and Research Institutions
9. Aditya Academy
10. Aditya Institute of Technology and Management
11. Admar Mutt Education Foundation
12. Aeronautical Development Agency
13. Agri Biotech Foundation
14. Ahmedabad Textile Industry's Research Association (ATIRA)
15. Akhil Bhartiya Gramin
16. Aladipatti Vaithialinga Nadar Pathirakali Ammal Educational and Charitable Trust
17. All India Heart Foundation
18. Amala Cancer Research Centre Society
19. Amity University
20. Amrita Vishwa Vidhyapeetham
21. Amul Research and Development Association
22. Ankush Shikshan Sanstha
23. Apollo Hospitals Educational & Research Foundation
24. APT Research Foundation
25. Aravind Medical Research Foundation
26. Ardent Foundation
27. AMAI Charitable Trust
28. Arogydham Global Aids Research Foundation
29. Artemis Education and Research Foundation
30. Arthritis Research & Care Foundation
31. Arya Vaidyasala
32. Asha Foundation, Bangalore
33. Ashoka Trust for Research in Ecology and the Environment (ATREE)
34. Asian Healthcare Foundation
35. Asian Institute of Public Health
36. Aspee Agricultural Research and Development Foundation
37. Associated Electronics Research Foundation
38. Association for Research Homoeopathy
39. Asthagiri Herbal Research Foundation
40. Auroville Foundation
41. Avantha Centre for Industrial Research and Development
42. AVP Research Foundation (formerly AVT Institute for Advanced Research of The Ayurvedic Trust)
43. Ayurved Research Foundation, Delhi
44. B R Nahata College of Pharmacy
45. B V Patel Pharmaceutical Education and Research Development Centre
46. Bai Jerbai Wadia Hospital for Children and Institute of Child Health Research Society
47. BAIF Development Research Foundation
48. Bakul Finechem Research Centre
49. Bangalore Baptist Hospital
50. Bangalore Medical Services Trust
51. Bannari Amman Institute of Technology
52. Barasat Cancer Research & Welfare Centre
53. Barwale Foundation (formerly Mahyco Research Foundation)
54. Indo-American Cancer Hospital and Research Institute
55. Baun Foundation Trust (Baun Foundation Medical Research Centre)
56. Bhagwan Mahavir Medical Research Centre
57. Bharati Vidyapeeth
58. Bharatiya Sanskriti Darshan Trust
59. Bioscience Research Foundation
60. Biotech Park
61. Bioved Research Society
62. Birbal Sahni Institute of Palaebotany
63. Birla Institute of Technology
64. Birla Research Institute for Applied Sciences

65. Bombay Natural History Society
66. Bose Institute
67. Breach Candy Medical Research Centre
68. C R Rao Advanced Institute of Mathematics, Statistics and Computer Science (AIMSCS)
69. CV Raman College of Engineering of Raman Education Society
70. Cachar Cancer Hospital & Research Centre
71. Cancer Foundation of India
72. Cancer Institute (WIA)
73. Cardiac Research and Educational Foundation
74. CBCI Society for Medical Education
75. Center for Development of Imaging Technology
76. Center for Study of Science, Technology and Policy,
77. Central Board of Irrigation & Power
78. Central Coir Research Institute
79. Central Council for Research in Ayurvedic Sciences
80. Central Council for Research in Homoeopathy
81. Central Council for Research in Siddha
82. Central Council for Research in Yoga and Naturopathy
83. Central Himalayan Environment Association (CHEA)
84. Central India Institute of Medical Sciences
85. Central Institute of Road Transport
86. Central Manufacturing Technology Institute
87. Central Power Research Institute
88. Centre for Brain Research
89. Centre for Cellular and Molecular Platforms (C-CAMP)
90. Centre for Chronic Disease Control (CCDC)
91. Centre for Development of Advanced Computing (C-DAC)
92. Centre for Ecology Development and Research
93. Centre for Economic and Social Studies
94. Centre for Environment and Development (CED)
95. Centre for Excellence in Wireless Technology (CEWIT)
96. Centre for Good Governance
97. Centre for Human Genetics
98. Centre for Materials for Electronics Technology
99. Centre for Nano and Soft Matter Sciences
100. Centre for Natural Biological Resources and Community Development (CNBRCD)
101. Centre for Organization Development
102. Centre for Policy Research
103. Centre for Research in Rural and Industrial Development
104. Centre for Science and Environment
105. Centre for Social Studies
106. Centre for the Development of Glass Industry
107. Centre for the Study of Developing Societies
108. Centre for Wildlife Studies
109. CEPT University
110. Chalapathi Institute of Pharmaceutical Sciences
111. Charutar Arogya Mandal
112. Charutar Vidyamandal
113. Chellaram Diabetes Institute
114. Chennai Dental Research Foundation
115. Chennai Mathematical Institute
116. Chest Research Foundation
117. Chettinad Academy of Research & Education
118. Chinmaya International Foundation
119. Chittaranjan National Cancer Institute
120. Christian Medical College and Hospital Association
121. Christian Medical College Ludhiana Society
122. CMR Technical Education Society
123. Community for Social Work
124. Consultancy Development Centre
125. Consumer Education and Research Centre
126. Council of Pushpa Gujaral Science City
127. Council of Scientific & Industrial Research
128. CSI Holdsworth Memorial Hospital Association
129. CVS Krishna Murthy Theja Charities
130. Dabur Research Foundation
131. Dalmia Centre for Research & Development
132. Dalmia Institute of Scientific & Industrial Research

133. Dayanand Medical College & Hospital Managing Society
134. Dayanand Sagar Institutions of Mahatma Gandhi Vidya Peeth Trust
135. Deen Dayal Research Institute
136. Deenanath Mangeshkar Hospital and Research Centre
137. Deepak Foundation
138. Devki Devi Foundation Max Super Speciality (a unit of Devki Devi Foundation)
139. Dharamashila Cancer Foundation and Research Centre
140. Diabetes Foundation
141. Diabetic Association of India
142. Disha Education Society
143. Divya Yog Mandir Trust
144. Down Town Charity Trust
145. Dr B V Raju Foundation
146. Dr B V Rao Institute of Poultry Management & Technology
147. Dr D Y Patil Vidyapeeth
148. Dr Jivaraj Mehta Smarak Health Foundation
149. Dr Mane Medical Foundation & Research Centre
150. Dr P B Homoeopathic Research Foundation
151. Dr Reddy's Institute of Life Sciences
152. Dr Shroff Charity Eye Hospital
153. Dr Sivanthi Aditanar College of Engineering of Aditanar Educational Institution
154. Durbar Mahila Samanwaya Committee
155. Durga Charitable Society
156. Dystrophy Annihilation Research Trust
157. Electrical Research & Development Association
158. Electronics and Quality Development Centre
159. ELLA Foundation
160. Entrepreneurship Development Centre
161. Environmental Resources Research Centre
162. Er Perumal Manimekalai Telugu Minority Educational and Charitable Trust
163. Era Lucknow Medical College of Era Educational Trust
164. Eternal University of the Kalgidhar Trust
165. Eye Research Centre
166. F I A M C Bio-Medical Ethics Centre
167. Father Muller Charitable Institute (FMCI)
168. Fetal Care Research Foundation
169. FICCI Research and Analysis Centre
170. FIE Research Institute
171. Fluid Control Research Institute
172. Fluorosis Research & Rural Development Foundation
173. Footwear Design & Development Institute
174. Foundation for Agriculture Resources Management and Environmental Remediation (FARMER)
175. Foundation for Democratic Reforms
176. Foundation for Ecological Research, Advocacy and Learning
177. Foundation for Environment & Economic Development Services
178. Foundation for Environmental Medicine
179. Foundation for Innovation and Technology Transfer
180. Foundation for Life Sciences and Business Management
181. Foundation for MSME Clusters
182. Foundation for Research in Genetics & Endocrinology
183. Foundation for Revitalisation of Local Health and Traditions
184. Free Polio Surgical and Research Foundation
185. G H Raisonni Educational & Medical Foundation
186. G H R. Education Foundation Society
187. GVK Emergency Management and Research Institute,
188. Gandhi Institute for Technological Advancement (GITA) of Vidya Bharati Educational Trust
189. Gandhi Institute of Engineering & Technology
190. Gandhi Institute of Technology of Balaram Panda Trust, Gramadiha
191. Ganga Orthopedic Research and Education Foundation
192. Garhwal Community Development & Welfare Society
193. Gaudiya Mission
194. Gayatri Vidya Parishad College of Engineering(Autonomous)
195. Gemmological Institute of India
196. Genome Foundation

197. GHR Labs and Research Centre
198. Giri Institute of Development Studies
199. GITAM University
200. Global Hospital and Research Centre
201. Global Medical Education and Research Foundation
202. Gokaraju Rangaraju Educational Society and Gokaraju Rangaraju Institute of Engineering & Technology
203. Government Tool Room and Training Centre
204. Gujarat Ayurved University
205. Gujarat Ecological Education and Research Foundation
206. Gujarat Ecology Society
207. Gujarat Environment Management Institute (GEMI)
208. Gujarat Grassroots Innovations Augmentation Network (GIAN)
209. Gujarat Industrial Research Development Agency (GIRDA)
210. Gujarat Institute of Desert Ecology (GUIDE)
211. Gujarat Institute of Development Research
212. Gujrat Energy Research and Managmrnt Institute (GERMI)
213. Gujrat Methodist Church Caardiothoracic and Vascular Research Society.
214. Haffkine Institute for Training, Research and Testing
215. Hari Shankar Singhania Elastomer & Tyre Research Institute
216. Harish Chandra Research Institute
217. Haryali Centre for Rural Development,
218. Healing Fields Foundation
219. Healis-Sekhsaria Institute for Public Health
220. Health Action by People
221. Help Life
222. Swami Rama Himalayan University
223. Hirabai Cowasji Jehangir Medical Research Institute
224. Health Related Information Dissemination Amongst Youth
225. Hyderabad Eye Research Foundation
226. Hyderabad Science Society
227. IKP Knowledge Park
228. Iladevi Cataract & Intraocular Lens Research Centre
229. India Diabetes Research Centre
230. Indian Academy of Sciences
231. Indian Burns Research Society
232. Indian Council for Research on International Economic Relations
233. Indian Council of Medical Research
234. Indian Institute of Chemical Engineers
235. Indian Institute of Education
236. Indian Institute of Food Processing Technology
237. Indian Institute of Foreign Trade
238. Indian Institute of Geomagnetism
239. Indian Institute of Health Management Research
240. Indian Institute of Management Bangalore
241. Indian Institute of Management Calcutta
242. Indian Institute of Management
243. Indian Institute of Packaging
244. Indian Institute of Psychometry
245. Indian Institute of Public Health Gandhinagar
246. Indian Institute of Technology Delhi
247. Indian Institute of Technology Bombay
248. Indian Jute Industries' Research Association
249. Indian Jute Machinery Research & Development
250. Indian Medical Scientific Research Foundation
251. Indian Pharmacopoeia Commission
252. Indian Plywood Industries Research and Training Institute
253. Indian Register of Shipping
254. Indian Research Institute for Integrated Medicine
255. Indian Rubber Manufacturers Research Association
256. Indian Statistical Institute
257. Indira Gandhi Institute of Development Research
258. Indira Gandhi National Centre for the Arts
259. Indraprastha Cancer Society and Research Centre
260. Indian National Science Academy
261. Insect Biopesticide Research Centre
262. InsPIRE Network for Environment (Formerly, Winrock International India)

263. Institute for Communicative & Cognitive Neurosciences
264. Institute for Design of Electrical Measuring Instruments
265. Institute for Development and Research in Banking Technology
266. Institute for Environmental Research & Social Education (IERSE)
267. Institute for Financial Management and Research
268. Institute for Human Development
269. Institute for Plasma Research
270. Institute for Studies in Industrial Development
271. Institute of Applied Statistics & Development Studies
272. Institute of Bioinformatics
273. Institute of Bio-informatics and Applied Biotechnology
274. Institute of Bioinformatics and Computational Biology (IBCB)
275. Institute of Defence Scientists and Technologists
276. Institute of Economic Growth
277. Institute of Environmental Studies & Wetland Management
278. Institute of Livelihood Research and Training
279. Institute of Liver and Biliary Science
280. Institute of Mental Health and Hospital
281. Institute of Neurosciences Kolkata
282. Institute of Pesticide Formulation Technology
283. Institute of Public Enterprises
284. Institute of Public Health
285. Institute of Pulmocare & Research
286. Institute of Scientific Research on Vedas
287. Institute for Stem Cell Biology and Regenerative Medicine
288. Institute of World Wide Education & Technology
289. Integral University
290. International Advanced Research Centre for Powder Metallurgy & New Materials
291. International Institute of Ayurveda of Arya Vaidya Rama Varier Educational Foundation of Ayurveda
292. International Institute of Biotechnology and Toxicology (IIBAT)
293. International Institute of Information Technology
294. International Institute of Waste Management (IIWM)
295. International Union for Health Promotion and Education
296. Inter-University Centre for Astronomy and Astrophysics
297. Islamic Academy of Education
298. ITC Sangeet Research Academy (Formerly Sangeet Research Academy)
299. Jai Research Foundation
300. Jain Vishva Bharati
301. Jan Swasthya Sahyog
302. Jaslok Hospital & Research Centre
303. Jawaharlal Nehru Aluminium Research Development & Design Centre
304. Jawaharlal Nehru Technological University Anantapur
305. Jawaharlal Nehru Centre for Advanced Scientific Research
306. Jeevan Blood Bank and Research centre
307. JK Lakshmi Pat University
308. JSS Medical College
309. Jubilee Centre for medical Research
310. K.E.M. Hospital Research Centre
311. K.J. Research Foundation
312. K.S.R. Educational & Charitable Trust
313. Kaivalyadhama Shriram Madhava Yoga Mandir Samiti
314. Kalasalingam and Anandam Ammal Charities
315. Kamala Nehru Memorial Hospital
316. Kamayani Prashikshan & Sanshodhan Society
317. Kamineni Academy of Medical Sciences and Research Centre
318. Kamineni Education Society
319. Karnataka Haridasa Scientific Research Centre
320. Karnataka State Sericulture Research & Development Institute
321. Karpaga Vinayaga College of Engineering and Technology of Karpaga Vinayaga Educational Trust

322. Karve Institute Of Social Service, Pune
323. KIIT University
324. KIIT- Technology Business Incubator (KIIT-TBI) KIIT- School Of Biotechnology, KIIT University
325. KIMS Foundation & Research Centre
326. Kishore Memorial Charitable Trust (SOPHITORIUM GROUP OF INSTITUTIONS)
327. KMCH Research Foundation,
328. KMR Educational Society
329. Konark Institute of Science and Technology
330. KRIPA Foundation
331. Krishnamacharya Yoga Mandiram
332. Kumarappa National Handmade Paper Institute
333. L J College of Pharmacy of Lok Jagruti Kendra
334. Lata Medical Research Foundation
335. Lavu Educational Society (Vignan's Foundation for Science, Technology & Research)
336. LBS Centre for Science & Technology
337. Lepra Society
338. Lilavati Kirtilal Mehta Medical Trust
339. Lokmanya Medical Research Centre
340. Lokmanya Tilak Hospital Silver Jubilee Research Foundation
341. Loyola Centre for Research and Development of Xavier Research Foundation
342. Loyola College Society
343. LPG Equipment Research Centre
344. M S Ramaiah University of Applied Sciences
345. M S Ramaiah Medical College & Hospitals
346. M.G.R. Educational Society
347. M P Birla Institute of Fundamental Research
348. M S Swaminathan Research Foundation
349. M S Chellamuthu Trust and Research Foundation
350. Maa Research Foundation
351. Madanapalle Institute of Technology and Science, Madanapalle of Ratakonda Ranga Reddy Educational Academy
352. Madras Diabetes Research Foundation
353. Madras School of Economics
354. Magadh Human Resource Development Trust
355. Maharashtra Association for the Cultivation of Science (Agharkar Research Institute)
356. Maharashtra Medical Research Society
357. Maharashtra State Grape Growers' Association
358. Maharishi Markandeshwar University Trust
359. Mahatma Gandhi Labour Institute
360. Mahatma Gandhi Mission's Medical College
361. Mahavir Cancer Sansthan
362. Mandke Foundation
363. Mangalore University
364. Man-Made Textile Research Association (MANTRA)
365. Manovikas Kendra Rehabilitation and Research Institute for the Handicapped
366. Maratha Mandal Trust
367. Marri Educational Society, Secundrabad
368. Maruthi Educational Society
369. Maternal Health and Research Trust
370. Mazumdar Shaw Medical Foundation
371. Media Lab Asia
372. Medical Research Centre of Bombay Hospital Trust
373. Mepco Schlenk Engineering College
374. Metabolic Disorders Research Centre
375. MIMS Research Foundation
376. Mirpur Institue of Medical Science
377. Molecular, Diagnostics, Counseling, Care & Research Centre
378. Moogambigai Charitable and Educational Trust
379. Moving Academy of Medicine and Biomedicine
380. MSME-Technology Development Centre, Process cum Product Development Centre (PPDC)
381. Mudra Foundation for Communications Research and Education
382. Muljibhai Patel Society for Research in Nephro-Urology
383. Mustard Research & Promotion Consortium
384. Nagri Eye Research Foundation Trust
385. Nalanda Dance Research Centre
386. Nansen Environmental Research Centre
387. Naorji Godrej Centre for Plant Research
388. Narayana Hrudayalaya Foundation

389. Narayana Medical College
390. Narayana Nethralaya Foundation
391. National Academy of Agricultural Sciences
392. National Agriculture And Food Analysis And Research Institute
393. National Centre for Cell Science
394. National Council for Cement & Building Materials
395. National Council of Applied Economic Research
396. National Council of Science Museums
397. National Health and Education Society
398. National Horticultural Research & Development Foundation
399. National Innovation Foundation
400. National Institute of Advanced Studies
401. National Institute of Bank Management
402. National Institute of Construction Management & Research (NICMAR)
403. National Institute of Design
404. National Institute of Food Technology Entrepreneurship and Management (NIFTEM)
405. National Institute of Immunology
406. National Institute of Mental Health and Neurosciences
407. National Institute of Miner's Health
408. National Institute of Ocean Technology
409. National Institute of Pharmaceutical Education and Research
410. National Institute of Public Finance and Policy
411. National Institute of Rock Mechanics
412. National Institute of Science & Technology (NSIT)
413. National Institute of Technology Surathkal
414. National Institute of Wind Energy (NIWE)
415. National Law School of India University
416. National Tea Research Foundation (NTRF)
417. NATRIP Implementation Society (NATIS)
418. Nature Conservation Foundation
419. Nature Cure and Yoga Trust
420. Natya Shodh Sansthan
421. NAWAD TECH [National Waterways Development Technology]
422. Netaji Subhas Chandra Bose Cancer Research Institute
423. NIIT Institute of Information Technology
424. Nimbkar Agricultural Research Institute
425. Nirma University
426. Nitte University
427. Non-Ferrous Materials Technology Development Centre
428. Noorul Islam Educational Trust
429. Northern India Textile Research Association
430. Nutrition Foundation of India
431. Pandit Deendayal Petroleum University
432. Parimal Banerji International Research Foundation
433. Peermade Development Society
434. Periyar Maniammai Institute of Science and Technology (PMIST)
435. Physical Research Laboratory
436. Pondicherry Institute of Medical Science
437. Poona Blind Men's Association's
438. PRAGYA
439. Prashanti Cancer Care Mission
440. Prayas
441. PRAYAS (Initiative in Health, Energy Learning and Parenthood)
442. Prince Aly Khan Hospital,
443. PRIST University
444. Prof G M Reddy Research Foundation
445. Prof. M. Viswanathan diabetes Research Centre
446. PSG & Son's Charities
447. Public Health Foundation of India
448. Public Health Research Institute
449. Punjab Biotechnology Incubator
450. Punjab State Council for Science and Technology
451. Pushpagiri Medical Society
452. Pushpawati Singhanian Research Institute for Liver, Renal and Digestive Diseases
453. Ragas Dental College and Hospital of Ragas Educational Society
454. Raja Balwant Singh college
455. Rajalakshmi Engineering College
456. Rajdhani Engineering College of Samriddhi Educational Trust

457. Rajeev Gandhi Memorial College of Engineering and Technology (RGM CET) of Parameswara Educational Academy
458. Ram Narain Ruia College, Mumbai City of Shikshana Prasarak Mandali, Pune
459. Ramakrishna Mission Residential College
460. Raman Centre for Applied and Interdisciplinary Sciences
461. Raman Research Institute
462. RGCF Poona Hospital and Research Centre
463. Ruptech Educational India
464. Rural Development Society
465. S Nijalingappa Sugar Institute
466. S M Sehgal Foundation
467. Safa Educational Society
468. Sagi Ramakrishnam Raju Engineering College Association,
469. Sahrdaya College of Engineering and Technology of Irinjalakuda Diocesan Educational Trust
470. Salim Ali Centre for Ornithology and Natural History
471. Sam Higginbottom University of Agriculture, Technology and Sciences
472. Samast Patidar Aarogya Foundation
473. Samatvam Science and Research for Human Welfare Trust
474. Sangath
475. Sanjeevani Medical Foundation
476. Sanjivani Rural Education Society
477. Santhigiri Ashram
478. Saraswati Dental College & Hospital
479. Sardar Patel Institute of Economic and Social Research
480. Sardar Patel Post Graduate Institute of dental and Medical Sciences
481. Sardar Patel Renewable Energy Research Institute
482. Saroj Gupta Cancer Center & Research Institute
483. Satyendra Nath Bose National Centre for Basic Sciences
484. Saveetha Engineering College
485. Schieffelin Institute of Health Research & Training Centre
486. Schizophrenia Research Foundation (India)
487. SCI Tech Centre
488. Scientific and Industrial Testing and Research Centre
489. SCMS Institute of Bioscience & Biotechnology Research & Development of Pratap Foundation for Education and Training
490. Seth G. S. Medical College and KEM Hospital Diamond Jubilee Society Trust
491. SETH Research Foundation
492. Sethu Educational Trust
493. Shanmugha Arts, Science, Technology & Research Academy (SASTRA)
494. Sharmila Institute of Medicinal Products Research Academy
495. Sheth Vadilal Sarabhai Medical Research Foundation Trust
496. Shiromani Gurdwara Parbhandak Committee's Guru Nanak Khalsa College of Arts, Science and Commerce
497. Shivani Educational and Charitable Trust (Synergy Institute of Engineering & Technology,)
498. Shivrath Centre of Excellence in Clinical Research
499. Shri A M M Murugappa Chettiar Research Centre
500. Shri Dharamsthal Manjunatheshwara Educational Society
501. Shri Guru Ram Dass Educational Society (Chandigarh Engineering College)
502. Shri Vile Parle Kelavani Mandal's Shri C B Patel Research Centre for Chemistry & Biological Sciences
503. Shrimati Kashibai Navale Medical College and General Hospital
504. Shriram Scientific & Industrial Research Foundation
505. Sir Ganga Ram Trust Society
506. Sir Hurkisondas Nurrotumdas Medical Research Society
507. Sir M Visvesvaraya Institute of Technology of Sri Krishnadevaraya Educational Trust
508. Sitaram Bhartia Institute of Science & Research
509. Society for Education Welfare and Action - SEWA Rural
510. Society for Applied Microwave Electronics Engineering and Research (SAMEER)
511. Society for Applied Studies

512. Society for Biomedical Technology
513. Society for Development Alternatives
514. Society for Electronic Transactions and Security (SETS)
515. Society for Energy, Environment & Development
516. Society for Health Allied Research and Education, India (SHARE-INDIA)
517. Society for Innovation and Development Innovation Centre, Indian Institute of Science
518. Society for Institute of Development Management
519. Society for PRIST Research and Training
520. Society for Research and Initiatives for Sustainable Technologies & Institutions (SRISTI)
521. Society For Welfare of the Handicapped Persons
522. Sona College of Technology (Chockalingam Trust)
523. SOUKYA Foundation Charitable Trust
524. Spastics Society of Karnataka
525. Sree Chitra Tirunal Institute for Medical Sciences and Technology
526. Sree Sastha Institute of Engineering & Technology
527. Sreenidhi Institute of Science and Technology (SNIST)
528. Sri Aurobindo Ashram Trust
529. Sri Aurobindo Institute of Medical Sciences
530. Sri Aurobindo Society
531. Sri Balaji Educational & Charitable Public Trust
532. Sri Lakshmi Ammal Educational Trust
533. Sri Narayani Hospital & Research Centre of Sri Sakthi Amma Health Care Trust
534. Sri Rajeshwara Educational Society
535. Sri Ramachandra University
536. Sri Ranganatha Paduka Vidyalaya Trust
537. Sri Sankaradeva Nethralaya
538. Sri Sathya Sai Institute of Higher Learning
539. Sri Shyam Sundar 'Shyam' Institute of Public Cooperation and Community Development
540. Sri Venkateshwara Education Society
541. Sri Venkateswara Institute of Medical Sciences
542. SRI vishnu educational society
543. Srimaharshi Research Institute of Vedic Technology
544. Srinivasa Education Academy
545. SRM Institute of Science and Technology
546. SRM University Haryana
547. St James Hospital Trust Pharmaceutical Research Centre
548. St Joseph's Institute of Science & Technology Trust
549. St Martha's Hospital
550. St Martin's Children's Educational Society
551. St Stephen's Hospital of St. Stephen's Hospital Society
552. St Vincent Educational Society
553. St Xavier's College
554. Sumandeep Vidyapeeth Trust
555. Sun Agro Biotech Research Centre
556. Sunderlal Jain Charitable Eye Hospital Society
557. Surat Raktadan Kendra & Research Centre
558. Sushrut Medical Care and Research Society
559. Swami Vivekananda Yoga Anusandhana Samsthana
560. Swasthiyog Pratishthan Research Centre Fracture & Orthopedic Hospital
561. Sweekar Academy of Rehabilitation Sciences
562. TALEEM Research Foundation
563. Tamil Isai Sangam
564. Tamil Nadu Agricultural University
565. Tamil Nadu Food grains Marketing Yard (TFMY),
566. Tamilnadu Science and Technology Centre
567. Tamilnadu Veterinary and Animal Sciences University (TANUVAS)
568. Tata Institute of Fundamental Research (National Centre of the Govt. of India for Nuclear Science & Mathematics)
569. Tata Institute of Social Sciences
570. Tata Medical Centre Trust
571. Tea Board
572. Tea Research Association
573. Technology Based Incubator (TBI)
574. Technology Information, Forecasting and Assessment Council (TIFAC)

575. Teja Educational Society (Geetanjali College of Engineering & Technology),
576. Telangana State Pollution Control Board
577. Thalassemia and Sickle Cell Society
578. The Automotive Research Association of India
579. The Baba Jaswant Singh Trust
580. The Bombay Textile Research Association
581. The Cashew Export Promotion Council of India (CEPCI)
582. The Child's Trust Medical Research Foundation
583. The Deccan Sugar Technologists' Association
584. The EFI Social and Labour Research Foundation
585. The Energy and Resources Institute (Formerly Tata Energy Research Institute)
586. The Foundation for Medical Research
587. The Foundation for Research in Community Health
588. The George Institute for Global Health
589. The Gujarat Cancer Society
590. The Gujarat Research and Medical Institute
591. The IIS University
592. THE INCLEN Trust International
593. The Indian Planetary Society
594. The Indian Society of Agricultural Economics
595. The Indian Society of International Law
596. The Institute of Chartered Accountants of India
597. The Institute of Company Secretaries of India
598. The Institute of Health Systems
599. The Institute of Mathematical Sciences
600. The Institute of Road Transport
601. The Institution of Electronics and Telecommunication Engineers
602. The Institution of Engineers (India)
603. International Institute of Management and Entrepreneurship
604. The K.J. Somaiya Institute of Applied Agricultural Research
605. The K.R. Cama Oriental Institute
606. The Kasturba Health Society
607. The Kelkar Education Trust
608. The Kuppaswami Sastri Research Institute
609. The Leprosy Mission Trust India
610. The Maharashtra Association of Anthropological Sciences
611. The Mother's Service Society
612. The Mount Carmel Educational Society
613. The National Academy of Sciences, India (NASI)
614. The Puri Foundation for Education in India
615. The Research Society of Bombay College of Pharmacy
616. The Science Foundation for Tribal & Rural Resource Development,
617. The SIMA Cotton Development and Research Association
618. The South India Textile Research Association
619. The South Indian Education Society
620. The Sugar Technologists' Association of India
621. The Synthetic and Art Silk Mills' Research Association (SASMIRA)
622. The Talwar Research Foundation
623. The Voluntary Health Services
624. Thrombosis Research Institute India,
625. Tiruchirappalli Regional Engineering College Science & Technology Entrepreneurs' Park (TREC-STEP)
626. Toc H Institute of Science & Technology
627. U N Metha Institute of Cardiology & Research Centre
628. UGC-DAE Consortium for Scientific Research
629. Ujjain Charitable Trust Hospital & Research Centre
630. University of Pennsylvania Institute for the Advanced Study of India
631. UPASI Tea Research Foundation
632. Valliammai Society
633. Valsad Raktdan Kendra
634. Varanashi Research Foundation
635. Vardhaman College of Engineering of Vardhaman Educational Society
636. Varun Herbals
637. VasantDada Sugar Institute
638. Vastushilpa Foundation for Studies & Research in Environmental Design
639. Ved Vignan Mahavidya
640. Vedanta Cultural Foundation

641. Vel Shree R Rangarajan Sakunthala Educational Academy
642. Vel Trust (1997)
643. Vels Institute of Science, Technology and Advanced Studies
644. Venu Charitable Society
645. Vipassana Research Institute
646. Vishwanand Kendra
647. Vision Research Foundation
648. Vittal Mallya Scientific Research Foundation
649. Vivekananda Institute of Biotechnology
650. Vivekanand Medical Foundation & Research Centre
651. Vivekananda Institute of Medical Sciences of Ramakrishna Mission Seva Pratisthan
652. Wadia Institute of Himalayan Geology
653. Waterfalls Institute of Technology Transfer
654. WICMA R&D Centre of Western India Corrugated Box Manufacturers' Association
655. Wool Research Association
656. World Healthal Trust
657. World Renewal Spiritual Trust
658. World Wide Fund for Nature-India
659. Xavier Labour Relations Institute
660. YR Gaitonde Medical, Educational and Research Foundation
661. Zandu Foundation for Health Care

Annexure 2: List of SIROs Responded

Natural and Applied Sciences (251)

1. Aaranyak
2. Aarthi Educational and Charitable Trust
3. Academy of Scientific and Innovative Research
4. Adamas Institute of Technology
5. Adhiyamaan Educational and Research Institutions
6. Aditya Academy
7. Aditya Institute of Technology and Management
8. Admar Mutt Education Foundation
9. Aeronautical Development Agency
10. Agri Biotech Foundation
11. Ahmedabad Textile Industry's Research Association
12. Aladipatti Vaithialinga Nadar Pathirakali Ammal Educational and Charitable Trust
13. Amity University
14. Ankush Shikshan Sanstha
15. Ashoka Trust for Research in Ecology and the Environment
16. Associated Electronics Research Foundation
17. Auroville Foundation
18. Avantha Centre for Industrial Research and Development
19. Ayurved Research Foundation, Delhi
20. B.V. Patel Pharmaceutical Education and Research Development Centre
21. Bakul Finechem Research Centre
22. Bannari Amman Institute of Technology
23. Bharati Vidyapeeth
24. Bioscience Research Foundation
25. Biotech Park
26. Birla Institute of Technology
27. Birla Research Institute for Applied Sciences
28. Bose Institute
29. C R Rao Advanced Institute of Mathematics, Statistics and Computer Science
30. C V Raman College of Engineering of Raman Education Society
31. Centre for Development of Imaging Technology
32. Centre for Study of Science, Technology and Policy
33. Central Board of Irrigation & Power
34. Central Coir Research Institute
35. Central Himalayan Environment Association
36. Central Institute of Road Transport
37. Central Manufacturing Technology Institute
38. Central Power Research Institute
39. Centre for Ecology Development and Research
40. Centre for Environment and Development (CED)
41. Centre for Excellence in Wireless Technology
42. Centre for Materials for Electronics Technology
43. Centre for Nano and Soft Matter Sciences
44. Centre for Science and Environment
45. Centre for the Development of Glass Industry
46. Centre for Wildlife Studies
47. CEPT University
48. Charutar Vidyamandal
49. Chennai Mathematical Institute
50. CMR Technical Education Society
51. Council of Pushpa Gujaral Science City
52. Council of Scientific & Industrial Research
53. Dalmia Institute of Scientific & Industrial Research
54. Disha Education Society
55. Down Town Charity Trust
56. Dr B V Raju Foundation
57. Dr D Y Patil Vidyapeeth, Pune
58. Dr Sivanthi Aditanar College Of Engineering Of Aditanar Educational Institution

59. Electrical Research & Development Association
60. Electronics and Quality Development Centre
61. Entrepreneurship Development Centre
62. Environmental Resources Research Centre
63. Er. Perumal Manimekalai Telugu Minority Educational and Charitable Trust
64. Eternal University of the Kalgidhar Trust
65. FICCI Research and Analysis Centre
66. FIE Research Institute
67. Fluid Control Research Institute
68. Foundation for Agriculture Resources Management and Environmental Remediation
69. Foundation for Ecological Research, Advocacy and Learning
70. Foundation for Environment & Economic Development Services
71. Foundation for Innovation and Technology Transfer
72. Foundation for Life Sciences and Business Management
73. Foundation for MSME Clusters
74. Foundation for Revitalisation of Local Health and Traditions
75. Gandhi Institute for Technological Advancement (GITA) of Vidya Bharati Educational Trust
76. Gandhi Institute of Engineering & Technology
77. Gandhi Institute of Technology of Balaram Panda Trust
78. Gayatri Vidya Parishad College of Engineering
79. Gemmological Institute of India
80. GITAM University
81. Gokaraju Rangaraju Educational Society and Gokaraju Rangaraju Institute of Engineering, & Technology
82. Government Tool Room and Training Centre
83. Gujarat Ecological Education and Research Foundation
84. Gujarat Ecology Society
85. Gujarat Environment Management Institute
86. Gujarat Grassroots Innovations Augmentation Network
87. Gujarat Industrial Research Development Agency
88. Gujarat Institute of Desert Ecology
89. Gujarat Energy Research and Management Institute
90. Hari Shankar Singhanian Elastomer & Tyre Research Institute
91. Harish Chandra Research Institute
92. Hyderabad Science Society
93. IKP Knowledge Park
94. Indian Academy of Sciences
95. Indian Institute of Chemical Engineers
96. Indian Institute of Geomagnetism
97. Indian Institute of Packaging
98. Indian Institute of Technology Delhi
99. Indian Institute of Technology Bombay
100. Indian Jute Industries' Research Association
101. Indian Jute Machinery Research & Development
102. Indian Plywood Industries Research and Training Institute
103. Indian Register of Shipping
104. Indian Rubber Manufacturers Research Association
105. Indian National Science Academy
106. Institute for Design of Electrical Measuring Instruments
107. Institute for Environmental Research & Social Education
108. Institute of Environmental Studies & Wetland Management
109. Institute of Pesticide Formulation Technology
110. International Advanced Research Centre for Powder Metallurgy & New Materials
111. International Institute of Information Technology
112. Inter-University Centre for Astronomy and Astrophysics
113. Islamic Academy of Education
114. Jawarharlal Nehru Centre for Advanced Scientific Research
115. JK Lakshmiapat University
116. K S R Educational & Charitable Trust

117. Kalasalingam and Anandam Ammal Charities
118. Karnataka State Sericulture Research & Development Institute
119. Karpaga Vinayaga College of Engineering and Technology of Karpaga Vinayaga Educational Trust
120. KIIT University
121. KIIT- Technology Business Incubator (KIIT-TBI) KIIT- School Of Biotechnology, KIIT University
122. Kishore Memorial Charitable Trust
123. KMR Educational Society
124. Konark Institute Of Science And Technology
125. Kumarappa National Handmade Paper Institute
126. LBS Centre for Science & Technology
127. Loyola College Society
128. LPG Equipment Research Centre
129. M S Ramaiah University of Applied Sciences
130. M G R Educational Society
131. M P Birla Institute of Fundamental Research
132. Madanapalle Institute of Technology and Science, Madanapalle of Ratakonda Ranga Reddy Educational Academy
133. Maharashtra Association for the Cultivation of Science (Agharkar Research Institute)
134. Maharishi Markandeshwar University Trust
135. Mangalore University
136. Man-Made Textile Research Association
137. Maratha Mandal Trust
138. Marri Educational Society
139. Maruthi Educational
140. Media Lab Asia
141. Mepco Schlenk Engineering College
142. Nansen Environmental Research Centre
143. National Agriculture And Food Analysis And Research Institute
144. National Council for Cement & Building Materials
145. National Council of Science Museums
146. National Innovation Foundation
147. National Institute of Advanced Studies
148. National Institute of Construction Management & Research
149. National Institute of Design
150. National Institute of Ocean Technology
151. National Institute of Science & Technology (NSIT)
152. National Institute of Technology Surathkal
153. National Institute of Wind Energy
154. National Tea Research Foundation
155. Nature Conservation Foundation
156. Nirma University
157. Nitte University
158. Non-Ferrous Materials Technology Development Centre
159. Noorul Islam Educational Trust
160. Northern India Textile Research Association
161. Pandit Deendayal Petroleum University
162. Physical Research Laboratory
163. PRAGYA
164. PRIST University
165. PSG & Son's Charity
166. Punjab Biotechnology Incubator
167. Punjab State Council for Science and Technology
168. Raja Balwant Singh college
169. Rajalakshmi Engineering College
170. Rajdhani Engineering College of Samridhhi Educational Trust
171. Rajeev Gandhi Memorial College of Engineering and Technology (RGM CET) of Parameswara Educational Academy
172. Ram Narain Ruia College, Mumbai City of Shikshana Prasarak Mandali, Pune
173. Ramakrishna Mission Residential College
174. Raman Centre for Applied and Interdisciplinary Sciences
175. Raman Research Institute
176. S Nijalingappa Sugar Institute
177. Sagi Ramakrishnam Raju Engineering College Association,
178. Sahrdaya College of Engineering and Technology of Irinjalakuda Diocesan Educational Trust
179. Salim Ali Centre for Ornithology and Natural History
180. Sanjivani Rural Educational Society
181. Sardar Patel Renewable Energy Research Institute

182. Satyendra Nath Bose National Centre for Basic Sciences
183. Saveetha Engineering College
184. SCI Tech Centre
185. Scientific and Industrial Testing and Research Centre
186. Sethu Educational Trust
187. Shanmugha Arts, Science, Technology & Research Academy
188. Shiromani Gurdwara Parbhandak Committee's Guru Nanak Khalsa College of Arts, Science and Commerce
189. Shivani Educational and Charitable Trust (Synergy Institute of Engineering & Technology,)
190. Shri A M M Murugappa Chettiar Research Centre
191. Shri Vile Parle Kelavani Mandal's Shri C.B.Patel Research Centre for Chemistry & Biological Sciences
192. Shriram Scientific & Industrial Research Foundation
193. Society for Applied Microwave Electronics Engineering and Research
194. Society for Development Alternatives
195. Society for Electronic Transactions and Security
196. Society for Energy, Environment & Development
197. Society for Innovation and Development Innovation Centre, Indian Institute of Science
198. Society for Research and Initiatives for Sustainable Technologies & Institutions
199. Sona College of Technology
200. Sree Sastha Institute of Engineering & Technology
201. Sreenidhi Institute of Science and Technology (SNIST)
202. Sri Rajeshwara Educational Society
203. Sri Ranganatha Paduka Vidyalaya Trust
204. Sri Sathya Sai Institute of Higher Learning
205. Sri Venkateshwara Education Society
206. SRI vishnu educational society
207. Srimaharshi Research Institute of Vedic Technology
208. Srinivasa Education Academy
209. St Joseph's Institute of Science & Technology Trust
210. St Martin's Children's Educational Society
211. St Vincent Educational Society
212. St Xavier's College
213. Sumandeep Vidyapeeth Trust
214. Tamilnadu Science and Technology Centre
215. Tamilnadu Veterinary and Animal Sciences University (TANUVAS)
216. Tata Institute of Fundamental Research
217. Tea Research Association
218. Technology Information, Forecasting and Assessment Council
219. Teja Educational Society (Geetanjali College of Engineering & Technology),
220. The Automotive Research Association of India
221. The Bombay Textile Research Association
222. The Deccan Sugar Technologists' Association
223. The Energy and Resources Institute (TERI)
224. The IIS University
225. The Indian Planetary Society
226. The Institute of Road Transport
227. The Institution of Electronics and Telecommunication Engineers
228. The Kelkar Education Trust
229. The Mount Carmel Educational Society
230. The National Academy of Sciences, India (NASI)
231. The Puri Foundation for Education in India
232. The Science Foundation for Tribal & Rural Resource Development,
233. The South India Textile Research Association
234. The South Indian Education Society
235. The Sugar Technologists' Association of India
236. The Synthetic and Art Silk Mills' Research Association
237. Tiruchirappalli Regional Engineering College Science & Technology Entrepreneurs' Park (TREC-STEP)
238. Toc H Institute of Science & Technology
239. UGC-DAE Consortium for Scientific Research
240. Valliammai Society

241. Vardhaman College of Engineering of Vardhaman Educational Society
242. VasantDada Sugar Institute
243. Vastushilpa Foundation for Studies & Research in Environmental Design
244. Vel Shree R.Rangarajan Dr.Sakunthla Educational Academy
245. Vel Trust (1997)
246. Vels Institute of Science, Technology and Advanced Studies
247. Vittal Mallya Scientific Research Foundation
248. Wadia Institute of Himalayan Geology
249. WICMA R&D Centre of Western India Corrugated Box Manufacturers' Association
250. Wool Research Association
251. World Wide Fund for Nature-India

12 - AGRICULTURAL SCIENCES (37)

1. Academy of Life Sciences of the Society of Plant Reproductive Biologists
2. Akhil Bhartiya Gramin Vikas Sanstha
3. Aspee Agricultural Research and Development Foundation
4. Asthagiri Herbal Research Foundation
5. BAIF Development Research Foundation
6. Bioved Research Society
7. Bombay Natural History Society
8. Centre for Natural Biological Resources and Community Development (CNBRCD)
9. Community for Social Work
10. Dayanand Sagar Institutions of Mahatma Gandhi Vidya Peeth Trust
11. Dr B V Rao Institute of Poultry Management & Technology
12. Indian Institute of Food Processing Technology
13. Insect Biopesticide Research Centre
14. International Institute of Biotechnology and Toxicology
15. Jai Research Foundation
16. Loyola Centre for Research and Development of Xavier Research Foundation
17. M S Swaminathan Research Foundation
18. Maharashtra State Grape Growers' Association
19. Mustard Research & Promotion Consortium
20. Naoroji Godrej Centre for Plant Research
21. National Horticultural Research & Development Foundation
22. Nimbkar Agricultural Research Institute
23. Peermade Development Society
24. Prof. G M Reddy Research Foundation
25. S M Sehgal Foundation
26. Sam Higginbottom University of Agriculture, Technology and Sciences
27. Sun Agro Biotech Research Centre
28. Tamil Nadu Agricultural University
29. Tamil Nadu Food grains Marketing Yard
30. Tea Board
31. The Cashew Export Promotion Council of India
32. The K J Somaiya Institute of Applied Agricultural Research
33. The SIMA Cotton Development and Research Association
34. UPASI Tea Research Foundation
35. Varanashi Research Foundation
36. Varun Herbals
37. Vivekananda Institute of Biotechnology

13- SOCIAL SCIENCES (74)

1. Ardent Foundation
2. Centre for Economic and Social Studies
3. Centre for Organization Development
4. Centre for Policy Research
5. Centre for Research in Rural and Industrial Development
6. Centre for Social Studies
7. Centre for the Study of Developing Societies
8. Chinmaya International Foundation
9. Consumer Education and Research Centre
10. Deendayal Research Institute
11. Deepak Foundation
12. Durbar Mahila Samanwaya Committee
13. Foundation For Democratic Reforms
14. Garhwal Community Development & Welfare Society
15. Gaudiya Mission
16. Giri Institute of Development Studies
17. Gujarat Institute of Development Research
18. Haryali Centre for Rural Development,
19. Healing Fields Foundation
20. Healis-Sekhsaria Institute for Public Health
21. Indian Council for Research on International Economic Relations
22. Indian Institute of Education
23. Indian Institute of Foreign Trade
24. Indian Institute of Management Bangalore
25. Indian Institute of Management Calcutta
26. Indian Institute of Psychometry
27. Indira Gandhi National Centre for the Arts
28. Institute for Development and Research in Banking Technology
29. Institute for Financial Management and Research
30. Institute for Human Development
31. Institute for Studies in Industrial Development
32. Institute of Applied Statistics & Development Studies
33. Institute of Economic Growth
34. Institute of Livelihood Research and Training
35. Institute of Public Enterprise
36. Institute of Public Health
37. Institute of Scientific Research on Vedas
38. Jain Vishwa Bharati
39. Karnataka Haridasa Scientific Research Centre
40. Karve Institute Of Social Service
41. KRIPA Foundation
42. Krishnamacharya Yoga Mandiram
43. M S Chellamuthu Trust and Research Foundation
44. Madras School of Economics
45. Mudra Foundation for Communications Research and Education
46. Nalanda Dance Research Centre
47. National Council of Applied Economic Research
48. National Institute of Bank Management
49. National Institute of Public Finance and Policy
50. Natya Shodh Sansthan
51. Prayas
52. Rural Development Society
53. Sardar Patel Institute of Economic and Social Research
54. Society for Education Welfare and Action Rural- SEWA Rural
55. Society for Institute of Development Management

56. Sri Aurobindo Society
57. Sri Shyam Sundar 'Shyam' Institute of Public Cooperation and Community Development
58. Sweekar Academy of Rehabilitation Sciences
59. TALEEM Research Foundation
60. Tamil Isai Sangam
61. Tata Institute of Social Sciences
62. The EFI Social and Labour Research Foundation
63. The George Institute for Global Health
64. The Indian Society of Agricultural Economics
65. The Indian Society of International Law
66. The Institute of Chartered Accountants of India
67. International Institute of Management and Entrepreneurship
68. The K R Cama Oriental Institute
69. The Kuppaswami Sastri Research Institute
70. The Mother's Service Society
71. University of Pennsylvania Institute for the Advanced Study of India
72. Ved Vignan Mahavidya Peeth
73. Vedanta Cultural Foundation
74. Vipassana Research Institute

14- MEDICAL SCIENCES (233)

1. Able Disabled All People Together
2. Acharya & BM Reddy College of Pharmacy of J M J Education Society
3. All India Heart Foundation
4. Amala Cancer Research Centre Society
5. Apollo Hospitals Educational & Research Foundation
6. APT RESEARCH FOUNDATION
7. Aravind Medical Research Foundation
8. AMAI Charitable Trust
9. Arogydham Global Aids Research Foundation
10. Artemis Education And Research Foundation
11. Arthritis Research & Care Foundation
12. Arya Vaidyasala
13. Asha Foundation, Bangalore
14. Asian Healthcare Foundation
15. Asian Institute of Public Health
16. Association for Research Homoeopathy
17. AVP Research Foundation
18. B R Nahata College of Pharmacy
19. Bai Jerbai Wadia Hosital for Children and Institute of Child Health Research Society
20. Bangalore Baptist Hospital
21. Bangalore Medical Services Trust
22. Barasat Cancer Research & Welfare Centre
23. Indo-American Cancer Hospital and Research Institute
24. Bhagwan Mahavir Medical Research Centre
25. Bharatiya Sanskriti Darshan Trust
26. Breach Candy Medical Research Centre
27. Cachar Cancer Hospital & Research Centre
28. Cancer Foundation of India
29. Cancer Institute (WIA)
30. Cardiac Research and Educational Foundation
31. CBCI Society for Medical Education
32. Central Council for Research in Ayurvedic Sciences
33. Central Council for Research in Homoeopathy
34. Central Council For Research In Siddha
35. Central Council for Research in Yoga and Naturopathy
36. Central India Institute of Medical Sciences
37. Centre for Brain Research
38. Centre for Cellular and Molecular Platforms
39. Centre for Chronic Disease Control
40. Centre for Human Genetics
41. Chalapathi Institute of Pharmaceutical Sciences
42. Charutar Arogya Mandal
43. Chellaram Diabetes Institute
44. Chennai Dental Research Foundation
45. Chest Research Foundation
46. Chettinad academy of Research & Education
47. Chittaranjan National Cancer Institute
48. Christian Medical College and Hospital Association
49. Christian Medical College Ludhiana Society
50. Dabur Research Foundation
51. Dayanand Medical College & Hospital Managing Society
52. Deenanath Mangeshkar Hospital and Research Centre
53. Dharamshila Cancer Foundation and Research Centre
54. Diabetes Foundation
55. Diabetic Association of India
56. Divya Yog Mandir Trust
57. Dr Jivaraj Mehta Smarak Health Foundation
58. Dr Mane Medical Foundation & Research Centre
59. Dr P B Homoeopathic Research Foundation
60. Dr. Reddy's Institute of Life Sciences
61. Dr. Shroff Charity Eye Hospital
62. Durga Charitable Society
63. Dystrophy Annihilation Research Trust
64. ELLA Foundation
65. Era Lucknow Medical College of Era Educational Trust

66. Eye Research Centre
67. Father Muller Charitable Institute
68. Fetal Care Research Foundation
69. Fluorosis Research & Rural Development Foundation
70. Foundation for Environmental Medicine
71. Foundation for Research in Genetics & Endocrinology
72. Free Polio Surgical and Research Foundation
73. G V K Emergency Management and Research Institute,
74. Ganga Orthopedic Research and Education Foundation
75. Genome Foundation
76. GHR Labs and Research Centre
77. Global Hospital and Research Centre
78. Gujarat Ayurved University
79. Gujrat Methodist Caardiothoracic and Vascular Research Society.
80. Haffkine Institute for Training, Research and Testing
81. Health Action by People
82. Help Life
83. Himalayan Institute Hospital Trust
84. Hirabai Cowasji Jehangir Medical Research Institute
85. Health Related Information Dissemination Amongst Youth
86. Iladevi Cataract & Intraocular Lens Research Centre
87. India Diabetes Research Centre
88. Indian Burns Research Society
89. Indian Institute of Health Management Research
90. Indian Institute of Public Health Gandhinagar
91. Indian Medical Scientific Research Foundation
92. Indian Pharmacopoeia Commission
93. Indian Research Institute for Integrated Medicine
94. Indraprastha Cancer Society and Research
95. Institute for Communicative & Cognitive Neurosciences
96. Institute of Bioinformatics
97. Institute of Bio-informatics and Applied Biotechnology
98. Institute of Liver and Biliary Science
99. Institute of Mental Health and Hospital
100. Institute of Neurosciences Kolkata
101. Institute of Pulmocare & Reserch
102. Institute for Stem Cell Biology and Regenerative Medicine
103. Integral University
104. Jan Swasthya Sahyog
105. Jaslok Hospital & Research Centre
106. Jeevan Blood Bank and Research centre
107. JSS Medical College
108. Jubilee Centre for Medical Research
109. K E M Hospital Research Centre
110. K.J.Research Foundation
111. Kaivalyadhama Shriram Madhava Yoga Mandir Samiti (SMYM)
112. Kamala Nehru Memorial Hospital
113. Kamayani Prashikshan & Sanshodhan Society
114. Kamineni Academy of Medical Sciences and Research Centre
115. Kamineni Education Society
116. KIMS Foundation & Research Centre
117. KMCH Research Foundation,
118. L J College of Pharmacy of Lok Jagruti Kendra
119. Lata Medical Research Foundation
120. Lepra Society
121. Lilavati Kirtilal Mehta Medical Trust
122. Lokmanya Medical Research Centre
123. Lokmanya Tilak Hospital Silver Jubilee Research Foundation
124. M. S. Ramaiah Medical College & Hospitals
125. Maa Research Foundation
126. Madras Diabetes Research Foundation
127. Magadh Human Resource Development Trust
128. Maharashtra Medical Research Society SIRO
129. Mahatma Gandhi Mission's Medical College
130. Mandke Foundation
131. Manovikas Kendra Rehabilitation and Research Institute for the Handicapped

132. Maternal Health and Research Trust (MHRT)
133. Mazumdar Shaw Medical Foundation
134. Medical Research Centre of Bombay Hospital Trust
135. Metabolic Disorders Research Centre
136. MIMS Research Foundation
137. Mirpur Institute of Medical Science
138. Molecular, Diagnostics, Counseling, Care & Research Centre
139. Moving Academy of Medicine and Biomedicine
140. Muljibhai Patel Society for Research in Nephro-Urology
141. Nagri Eye Research Foundation Trust
142. Narayana Hrudayalaya Foundation
143. Narayana Medical College
144. Narayana Nethralaya Foundation
145. National Centre for Cell Science
146. National Health and Education Society
147. National Institute of Immunology
148. National Institute of Mental Health and Neuroscience
149. National Institute of Miner's Health
150. Nature Cure and Yoga Trust
151. Netaji Subhas Chandra Bose Cancer Research Institute
152. Nutrition Foundation of India
153. Parimal Banerji International Research Foundation
154. Pondicherry Institute of Medical Science
155. Poona Blind Men's Association's
156. Prashanti Cancer Care Mission
157. PRAYAS
158. Prince Aly Khan Hospital,
159. Prof. M. Viswanathan Diabetes Research Centre
160. Public Health Foundation of India
161. Public Health Research Institute
162. Pushpagiri Medical Society
163. Pushpawati Singhanian Research Institute for Liver, Renal and Digestive Diseases
164. RGCF Poona Hospital and Research Centre
165. Samatvam Science and Research for Human Welfare Trust
166. Samast Patidar Aarogya Foundation
167. Sangath
168. Sanjeevan Medical Foundation
169. Santhigiri Ashram
170. Saraswati Dental College & Hospital
171. Sardar Patel Post Graduate Institute of Dental and Medical Sciences
172. Saroj Gupta Cancer Centre & Research Institute
173. Schieffelin Institute of Health Research & Training Centre
174. Schizophrenia Research Foundation
175. SCMS Institute of Bioscience & Biotechnology Research & Development of Pratap Foundation For Education and Training
176. Seth G. S. Medical College and KEM Hospital Diamond Jubilee Society Trust
177. SETH Research Foundation
178. Sharmila Institute of Medicinal Products Research Academy
179. Shivrath Centre of Excellence in Clinical Research
180. Shri Dharamsthala Manjunatheshwara Educational Society
181. Shrimati Kashibai Navale Medical College and General Hospital
182. Sir Ganga Ram Trust Society
183. Sir Hurkisondas Nurrotumdas Medical Research Society
184. Sitaram Bhartia Institute of Science & Research
185. Society for Applied Studies
186. Society for Biomedical Technology
187. Society for Health Allied Research and Education, India
188. Society For Welfare of the Handicapped Persons
189. SOUKYA Foundation Charitable Trust
190. Sree Chitra Tirunal Institute for Medical Sciences and Technology
191. Sri Aurobindo Ashram Trust
192. Sri Aurobindo Institute of Medical Sciences
193. Sri Balaji Educational & Charitable Public Trust
194. Sri Lakshmi Ammal Educational Trust
195. Sri Narayani Hospital & Research Centre of Sri Sakthi Amma Health Care Trust

196. Sri Ramachandra University
197. Sri Sankaradeva Nethralaya
198. Sri Venkateswara Institute of Medical Sciences
199. SRM Institute of Science and Technology
200. St James Hospital Trust Pharmaceutical Research Centre
201. St Martha's Hospital
202. St Stephen's Hospital of St. Stephen's Hospital Society
203. Sunderlal Jain Charitable Eye Hospital Society
204. Surat Raktadan Kendra & Research Centre
205. Sushrut Medical Care and Research Society
206. Swami Vivekananda Yoga Anusandhana Samsthana
207. Swasthiyog Pratishthan Research Centre Fracture & Orthopedic Hospital
208. Tata Medical Centre Trust
209. Thalassemia and Sickle Cell Society
210. The Baba Jaswant Singh Trust
211. The Child's Trust Medical Research Foundation
212. The Foundation for Medical Research
213. The Foundation for Research in Community Health
214. The Gujarat Cancer Society
215. THE INCLIN Trust International
216. The Institute of Health Systems
217. The Kasturba Health Society
218. The Leprosy Mission Trust India
219. The Maharashtra Association of Anthropological Science (MAAS)
220. The Research Society of Bombay College of Pharmacy
221. The Talwar Research Foundation
222. The Voluntary Health Services
223. U N Metha Institute of Cardiology & Research Centre
224. Ujjain Charitable Trust Hospital & Research Centre
225. Valsad Raktadan Kendra
226. Venu Charitable Society
227. Vishwanand Kendra
228. Vision Research Foundation
229. Vivekanand Medical Foundation & Research Centre
230. Vivekananda Institute of Medical Sciences of Ramakrishna Mission Seva Pratisthan
231. World Healthal Trust
232. YR Gaitonde Medical, Educational and Research Foundation
233. Zandu Foundation for Health Care

Annexure 3a: Survey Questionnaire for the Natural and Applied Sciences, Agricultural Sciences, and Medical Sciences



Department of Scientific and Industrial Research
Ministry of Science and Technology
Government of India

Study on DSIR Recognized SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATIONS (SIROs) Survey Form (for Code: 11, 12 & 14)

1. Name & address of the SIRO Headquarter

(You are requested to provide the Point of Contact, Headquarter/Main campus address, tel. no. mob no, email, and website)

2. Type of organization (Section 25/8 Company/Trust/Society/University)

(Please provide type of organization under which your organization is registered; please provide the registration number and year of registration)

- (i) Govt or Non-Govt

If Govt. then is it:

- National Lab/institute
- State Lab/Institute
- University (Please mention Central or State)
- Society (Autonomous, other, specify)
- Section-25/8 Company
- Any other, pl specify

If Non-govt, then is it;

- Trust
- Society-NGO (Non Government Organization)
- Section-25/8 Company
- Private University
- Any other, pl specify

(Please provide type of organization under which your organization is registered, please provide the **registration number** and year of registration (optional))

3. Major Research Areas in 5-10 Keywords

(Separate forms have to be filled for diversified areas in bullet points; one organization can fill not more than three forms. Please be specific.)

4. Total Manpower for Research

(Please mention Total number of Researchers; Male and Female worked in the research projects including Full time and Contractual employees)

Total No of R&D personnel	PhD	Masters/Graduates	Others	Full time	Part time/ Contractual	Gender M/F/O

--	--	--	--	--	--	--

5. Kindly make separate sub-points & tables for: [FY 2014-15 onwards]

- New Products developed or/under development
- New Processes developed or/under development
- New Prototypes developed
- New instruments developed
- IPR's held (Patents, Copyrights, Trademarks, Design Registrations, etc.)
- New Principle/Theory developed
- New crop variety developed & registered
- Any other

(Please provide number and details of specific products or processes developed by your organization)

Total Product Developed	Details	Total Process developed	Details

6. Research facilities/infrastructure (give example)

- Please list out the Research Facilities and Infrastructures available/ installed; for use in R&D ; in your organization.
- Is the research infrastructure being used by industry/individuals/academia?
- Whether shared – How many times/percentage (internal/external)/efforts made to encourage sharing

7. Is the SIRO maintaining separate accounts for R&D (Yes/No)

8. Sources of income for R&D and R&D Expenditure for (INR in lakhs)

(Please provide financial details for last 3 years only)

FY 2014-15		FY 2015-16		FY 2016-17	
Sources of income for R&D*	R&D Expenditure	Sources of income for R&D*	R&D Expenditure	Sources of income for R&D*	R&D Expenditure

***Government sources/Donations/International funding/Any other (pl specify)**

9. Major research outcomes

Major research work or innovation accomplished (best of last three years) along with the project name, Pls, methodology adopted, project value, outcome as report/paper/service/product/patent etc.

Innovative Elements developed in Products or Services (with details)

10. (a) Total number of research project completed till date

Please give details of major research projects

S.NO	Year of completion	Research Projects Completed

11. Total number of on-going projects [Box]

Please give details of major research projects

S No	Year of sanction	Research Projects

12. IP generation (Till date)

	Title of the Patent	Total No of Patents filed	Patents awarded	In Process
National				
International				

13. No of Publications (Published/Accepted) in Peer reviewed journals only, year-wise details for past three years (2014-2016)

	Title	Year of Publication	Author	National/International
Books				
Journals				
Conference Proceedings/Presentations				
Technical Reports				

14. Commercialization potential (max 10)
(List of the innovative products/services that are introduced in the market or ready for commercialization)

	Total No	Details (Revenue earned by way of licensing the Developed Products/Processes/Prototypes etc.)
Total Products Commercialized		
Total Services for Commercialization		
Partner for Commercialization		

15. Societal Relevance of the R&D
(How your organization's products and services is relevant for the society. If the Technologies, Products are commercialized by your organization, then please provide the details)

	Details with social relevance
Products	
Services	
Technologies	
Awareness programme etc	

16. Technology knowhow Transfers
(E.g. Whether the technique/know-how such as treatment, surgical, diagnostic etc transferred to the society has impacted large number of masses/ Developed cost effective method of production of food/agricultural produce, etc.)

17. Connectivity with National Programmes of Government of India
What are the technological interventions developed steering the national missions like Swachh Bharat, Clean Energy, Digital India, Make in India, Swastha Bharat, Skill India etc.)

	Details of the technology developed	Societal use/relevance details

Products		
Services		
Technologies		
Any other		

18. Technical Collaborations/Linkages/Industrial Partners, etc. (MoU Signed, Co-authorship in publications, patents, etc.)

(Has your organization collaborated or Linked with Partners. If so, please provide the details.)

List maximum 10

National	International
-----------------	----------------------

19. Photograph (s) of research activities/ research facilities or products developed (in jpg or tiff format)

(Please provide one or two best pictures, high resolution in JPEG or TIFF formats only)

20. How DSIR recognition/registration helped in facilitating R&D

(Customs and excise duty benefits, Obtaining Grant-in-aid projects from Local and International Agencies, Any other, please specify)

Please give rating 1 to 5 (with 1 being lowest and 5 being the highest)

1 (very low)	2 (low)	3 (average)	4 (high)	5 (very high)
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21. Suggestions to strengthen SIRO recognition scheme

(in brief points only)

22. Any other relevant information

Only for MEDICAL SIROs: (in FY 2014-15, 2015-16, 2016-17 (Rs in Lakhs).

[BOX ITEM]

- R&D expenditure done on import of equipment or consumables dedicated for R&D
- Provide the names and brand of top five equipment or consumables purchased with cost

Signature with Seal

Annexure 3b: Survey Questionnaire for the Social Sciences



The Energy and Resources Institute



Department of Scientific and Industrial Research
Ministry of Science and Technology
Government of India

STUDY ON DSIR RECOGNIZED SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANIZATIONS (SIROs) Survey Form (for Code: 13 Social Science Organizations)

1. Name & location of the SIRO

(You are requested to provide the Point of Contact, Headquarter/Main campus address, tel. no. mob no, email, and website)

2. Type of organization (Section 25 Company/Trust/Society/University)

(Please provide type of organization under which your organization is registered; please provide the registration number and year of registration)

(i) Govt and Non-Govt

(ii) National Lab/institute; University (Private, Central, State); State Lab/Institute, Trust (No. of technical colleges under the trust), Society-Autonomous, Society-NGO, Section-25 Company

(Please provide type of organization under which your organization is registered, please provide the registration number and year of registration)

3. Major Research Strength (THEMATIC RESEARCH AREAS) in 5-10 Keywords

(Separate forms have to be filled for diversified areas in bullet points; one organization can fill not more than three forms. Please be specific.)

4. Total Manpower for Research

(Please mention Total number of Researchers; Male and Female worked in the research projects including Full time and Contractual employees)

Total No of Researchers	PhD/Masters/Graduates/Others	Full time	Part time/ Contractual

5. Kindly Make separate sub-points & tables for:

- New Products developed or/under development
- New Processes developed or/under development
- New Prototypes developed
- New instruments developed
- IPR's registered
- Copyrights
- Trademarks
- New Principle/Theory developed
- New crop variety developed & registered

(Please provide number and details of specific products or processes developed by your organization)

Total Product Developed	Details	Total Process developed	Details

6. Research facilities/infrastructure

(Please list out the Research Facilities and Infrastructures available/ installed; for use in R&D ; in your organization.)
Is the research infrastructure being used by industry/individuals/academia?

7. Is the SIRO maintaining separate accounts for R&D (Yes/No)

(If yes, please provide your bank details)

8. R&D Expenditure for (in lakhs)

(Please provide financial details for last 3 years only)

FY 2014-15	FY 2015-16	FY 2016-17

9. R&D Funding source:

(Government sources/Donations/International funding/Any other (please specify)

10. Innovative Elements in Research/Break-through technologies developed

Major research work or innovation accomplished (best of last three years) along with the project name, PIs, methodology adopted, project value, outcome as report/paper/service/product/patent etc.

Innovative Elements developed in Products or Services (with details)

11. Total number of Empirical research projects completed till date

(Please list out best of three research projects along with parameters used to measure its efficacy, if any)

Empirical Research Project	Year	Efficacy measured and parameters used

12. Total number of on-going projects

(Please list out research projects ongoing and what steps you have taken to measure its efficacy)

Research Project	Year	Efficacy measured and parameters used

13. Potential for IP generation; Patents Filed (Till date)

	Title of the Patent	Total No of Patents filed	Patents awarded	In Process
National				
International				

Title of Patents:

Area/Scope of Patent:

Patent citations:

Patents Commercialized:

Alone/Co-authorship:

14. No of Publications (Published/Accepted) year-wise details for past five years (2011-2016)

	Books/Monographs	Journal Articles	Technical Reports	Presentations in Conferences
National				
International				

Citation index?

How many are co-authored?

15. No of Skill based training programmes conducted

Total no of Training Programmes	Year	Stakeholders	Outcome (in brief)

16. National /Societal Relevance of the R&D highlighting Societal Innovations

(How your organization's products and services is relevant for the society. If the Technologies, Products are commercialized by your organization, then please provide the details)

	Details of the technology developed	Societal use/relevance details
Products		
Services		
Technologies		

17. Connect established with National programmes of GOI and deadlines set if any

What are the technological interventions developed steering the national missions like Swacch Bharat, Clean Energy, Digital India, Make in India, Swastha Bharat, Skill India etc.)

	Details of the technology developed	Societal use/relevance details
Products		
Services		
Technologies		

18. Collaborations/Linkages/Partners (MoU Signed, Co-authorship in publications, patents, etc.)

(Has your organization collaborated or Linked with Partners? If so, please provide the details.)

19. Any photograph of research activities (in jpg or tiff format)

(Please provide one or two best pictures, high resolution in JPEG or TIFF formats only)

20. How DSIR recognition/registration helped in facilitating R&D to excel R&D by SIROs

(Customs and excise duty benefits, Obtaining Grant-in-aid projects from Local and International Agencies, Any other, please specify)

21. Recommendations/Suggestions, if any

(in brief points only)

Signature with seal

Annexure 3c : Online Survey Form


 Department of Scientific and Industrial Research (DSIR)
 Ministry of Science and Technology
 Government of India

[HOME](#) [ABOUT DSIR](#) [ABOUT SIRO](#) [PROJECT ADVISORY/REVIEW](#) [CONTACT US](#) [LOGOUT](#)

SIGN IN

User Email:

Password:

Forgot your password?

Study on Research Programmes/activities, R&D Infrastructure, R&D Achievement/5&T Interventions, Industrial Linkages and Collaborations of DSIR recognized SIROs
Background
 The Department of Scientific and Industrial Research (DSIR) is the nodal Department for granting recognition to In-house Research

 **DSIR**

[HOME](#) [ABOUT DSIR](#) [ABOUT SIRO](#) [PROJECT ADVISORY/REVIEW](#) [CONTACT US](#) [EMAIL US](#) [SEND EMAIL](#)

1 2 3 4

***Mandatory**

Q.1) Name & address of the SIRO Headquarter
(Please mention postal code, Pin Code, Contact, Headquarter/Main campus address, Telephone, Mobile, email, and website)

Name of organization	Headquarter (Main campus address)
<input type="text" value="Institute of Scientific Research India"/>	<input type="text" value="Institute of Scientific Research India, C/ No. 42, Sector 13, Gurgaon, Haryana"/>
Telephone No.	Mobile No.
<input type="text" value="011-26116277"/>	<input type="text" value="9890114270"/>
Email	Website
<input type="text" value="india@dsir.gov.in"/>	<input type="text" value="http://www.dsir.gov.in"/>

Q.2) Type of organization (Section 25/Section 8 Company/Trust/Society/University)
(Please provide type of organization under which your organization is registered, please provide the registration number and year of registration)

Government Non-government

Unique ID	Registration Number	Registration Year
<input type="text" value="190422286-1109"/>	<input type="text" value="P/11/04/2019"/>	<input type="text" value="Select Year"/>

Q.3) Major Research Areas in 5-10 Keywords (Comma separated)
(Please write the research areas in selected Domains, their relevance, stability, effect, Impact, Remedies, applications, computer logs, Activities and Learning)

Q.4) Total Manpower for Research
(Please mention Total number of Researchers Male and Female or Others worked in the research projects including Full time and Contractual employees)

Number of

Annexure 4: Sample Compendium Structure



▲ Supersonic Wind Tunnels

BIRLA INSTITUTE OF TECHNOLOGY

Brief Description

BIT Mesra (located 16 kms from Ranchi, the Jharkhand state-capital) has been engaged in nurturing minds through a rich heritage of academic excellence. The institute is actively pursuing advanced research programmes which are focussed towards advancement of human knowledge and development of society. Research efforts are directed towards solving complex problems, delivering social benefits and driving economic prosperity, nationally as well as globally.

R&D Set-up

The following are the research facilities provided by the organization:

- Central Instrumentation Facility
- Building Science Lab
- Building Construction & Model Making Lab
- Concrete and Road Materials Laboratory
- Soil Mechanics Laboratory
- Surveying and Project Laboratory
- Structural Engineering Laboratory
- Environmental Engineering Laboratory
- Hydraulics Laboratory
- Bohlin Rheometer
- Dynamic Mechanical Analyser
- Laminar Flow Reactor
- Gas Chromatography
- Injection Moulding (85H)
- High Performance Liquid Chromatography
- Fused Deposition Modelling
- Solar Energy Lab
- Engineering Mechanics Lab

- Engineering Measurement Lab
- Hydrogen Lab
- Metrology and Metallurgy Lab

Sources of income for R&D

- Government sources
- International funding
- Grant-in-aid

R&D expenditure (₹ in lakhs)

The SIRO is maintaining separate accounts for R&D.

FY 2014-15= 195.68

FY 2015-16= 381.63

FY 2016-17= 793.96

R&D Achievements

Products developed

- Endotoxin free L-asparaginase
- Nanobiocomposite for bone regeneration
- Reb A production from PGPR
- Production of Prodigiosin from bacteria
- Intellectual Calibers and Research in E-learning: VLSI Design

Processes developed

- Dye removal from industrial waste
- Preservation of local mushroom Rugra
- Development of OCT process for retinal imaging
- An embedded fibre Bragg grating (FBG) sensing system to determine the strain information in woven E-glass fabric-reinforced epoxy composite laminates.
- A new LPG-ANN based interrogation technique for interrogating a large number of FBG sensors.
- A dual grating based superstructure fibre Bragg grating

Registered Office

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Recognition Status

File No.: 11/161/1990-TU-V
Initial Recognition: 1990
Valid Until: March 31, 2019

R&D Manpower

Doctorates: 225
PGs & Graduates: 61

Research Areas

- Engineering and Technology
- Pharmacy
- Bio-engineering
- Science
- Social Science and Management

Research Outcomes

- Paper published: 33
- IPR held
 - » Patents filed: 46
 - » Patents awarded-16

(SFBG) has been designed which can provide both dual-band multichannel characteristics as well as multi-parameter sensing.

- An efficient fibre-optic sensor based on a superstructure SFBG for simultaneous strain and temperature measurement has been experimentally demonstrated.
- An ultra-narrow band optical multi-channel comb filter has been designed with the combined effect of Gaussian sampling and periodic chirp which would be useful in multiplexing and optical signal processing.

Interdepartmental prototype models developed/designed

- Developed a prototype object detection system using ultrasonic waves for mining applications with SD Engineers, Ranchi.

Organization is involved in various research projects such as:

- Development of carbocyclic nucleosides as possible anti-hepatitis B virus (HBV) agents
- Evaluation of antiviral and anticancer potentials of Lac exudate/ dye.
- Induced Doping of Chemically Synthesized Processable Conducting Poly – Phenylene Die Mine
- Development of highly porous nano structure metal/mixed metal oxide spheres for removal of arsenic
- Automatic Question Generation and Evaluation-based System for Instant Assessment of Learning in School Level
- Investigation on rare earth substituted layered perovskites for ferroelectric and piezoelectric application
- Development of polymer- ceramic

nanocomposites with high dielectric constant

- Arsenic enrichment agricultural Soil with potential impact on crops and food security of Shibgunj, Jharkhand, India

Technical Collaborations

National

National Remote Sensing Center, ISRO, Hyderabad; Pharmaceutical Sciences and Technology; Ranbaxy/ Sun Pharma, Gurgaon; Matrix, Hyderabad; Mylan, Hyderabad; Lupin, Pune; Hetero, Hyderabad; Microtherapeutics, Chennai; Central Drug Research Institute, Lucknow; Indian Institute of Science, Education & Research, Kolkata; IIT-IISM, Dhanbad; CSIR IMMT, Bhubaneswar; IIT Delhi, etc.


International

International Centre for Integrated Mountain Development (ICIMOD), Nepal; CERTARA, Translational Science Solutions, USA; University of Torino, Italy; Universidad De Santiago De Compostela, Lugo, Spain; Prince of Songkla University, Thailand; University of Aveiro, Campus Santiago, Portugal, etc.

Societal Relevance

The following R&D outcomes are of national/societal significance:

The organization is involved in national or societal missions, some of them are:

- Awareness programme for organic farming- Healthy life, substantive increase in income of the villagers
- Health checkup camp
- Awareness programme for cashless transactions- Ten villages are literate with cashless transactions
- Awareness programme for girls' education
- Cleanliness awareness drive. 

About SIRO Scheme

The Department of Scientific and Industrial Research (DSIR) is the nodal government department for granting recognition to not-for-profit Scientific & Industrial Research Organizations (SIROs). The organizations eligible for recognition are Registered Trusts, Registered Societies, Companies incorporated as section 8 (erstwhile section 25) of the Companies Act, 2013, Universities, etc. having the objective of undertaking scientific and/or industrial research.

The Recognition Scheme for SIROs aims to bring together voluntary organizations operating in non-commercial sector with a view to promote their activities in the area of scientific and industrial research, design and development of indigenous technology to achieve technological self-reliance. The SIROs recognized by DSIR are eligible for customs duty exemption and concessional Goods & Services Tax (GST) under various Notifications issued and as amended by the Ministry of Finance from time to time. The recognition would help them to evolve research infrastructure by way of overall administrative support assistance and other assistance as may be necessary for the efficient working of a research-oriented organization.



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