



सत्यमेव जयते

Department of Science & Technology  
Govt. of India

# EVALUATION OF IMPACT OF DST-FIST PROGRAM

## REGIONAL REPORT: EAST AND NORTH EAST STATES

JANUARY 2021

SPONSORED  
BY  
CHORD-NSTMIS DIVISION,  
DEPARTMENT OF SCIENCE & TECHNOLOGY

GOVT. OF INDIA  
NEW DELHI

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By

**KnIDS**

Centre For  
Knowledge Ideas  
and  
Development Studies

Centre for Knowledge Ideas and  
Development Studies

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Regional Report: East and North East states

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KnIDS has been given the responsibility of East and North-East (ENE) region of the study comprising of 11 states, 65 institutes, 264 departments and 330 grants. All the grantees were not quite forthcoming and cooperative. However, we could finally receive responses from 77% grantees. We take this opportunity to convey our sincere thanks to all the participating departments and institutions.

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We at KnIDS, however, remain solely responsible for any shortcoming in the Report.

Pradosh Nath (PI), and KnIDS Research Team

<b>List Of Acronyms</b>	
<b>AAA</b>	Academic & Administrative Assurance
<b>AMC</b>	Annual Maintenance Contracts
<b>AP</b>	Andhra Pradesh
<b>BHU</b>	Benaras Hindu University
<b>CCU</b>	Central Coordinating Unit
<b>CHORD</b>	Centre for Human and Organisational Resource Development
<b>DBT</b>	Department of Bio Technology
<b>DST</b>	Department of Science & Technology
<b>ENE</b>	East & North East
<b>ERA</b>	European Research Area
<b>FIST</b>	Fund For Improvement Of S&T Infrastructure
<b>GATE</b>	The Graduate Aptitude Test in Engineering
<b>GDP</b>	Gross Domestic Product
<b>GIS</b>	geographic information system
<b>HOD</b>	Head of the Department
<b>HR</b>	Human Resources
<b>IIT</b>	Indian Institute of Technology
<b>IPR</b>	Intellectual Property Right
<b>KNIDS</b>	Centre for Knowledge Ideas and Development Studies
<b>MCI</b>	Medical Council of India
<b>MOSPI</b>	Ministry of Statistics and Programme Implementation
<b>NA</b>	Not Applicable
<b>NAAC</b>	National Assessment and Accreditation Council
<b>NE</b>	North East
<b>NER</b>	North Eastern Region
<b>NET</b>	National Eligibility Test
<b>NSTMIS</b>	National S&T Management Information System
<b>PG</b>	Post-graduate
<b>PI</b>	Principle Investigator
<b>PM</b>	Prime Minister
<b>PPP</b>	Private Public Partnership
<b>RI</b>	Research Infrastructures
<b>SAHAJ</b>	Scientific Infrastructure Access for Harnessing Academia University Research joint Collaboration

## List Of Acronyms

<b>SAIF</b>	Sophisticated Analytical Instrument Facilities
<b>SATHI</b>	Sophisticated Analytical & Technical Help Institute
<b>SCI</b>	Science Citation Index
<b>SD</b>	Standard Deviation
<b>SGDP</b>	State Gross Domestic Product
<b>SPR</b>	Science Policy Resolution
<b>SPSS</b>	Statistical Package for Social Sciences
<b>SRIMAN</b>	Scientific Research Infrastructure for Maintenance and Networks
<b>SRISTI</b>	Shared Research Infrastructure for Science, Technology and Innovation
<b>STI</b>	Science Technology and Innovation
<b>STIP</b>	Science, Technology and Innovation Policy
<b>STP</b>	Science and Technology Policy
<b>TDS</b>	Tax Deduction at Source
<b>TPS</b>	Technology Policy Statement
<b>UG</b>	Under Graduate
<b>UP</b>	Uttar Pradesh
<b>USA</b>	United States of America
<b>UT</b>	Union Territory

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# **Evaluation of Impact of DST-FIST Program**

## **Regional Report: East and North East states**

### **Executive Summary**

#### **Major Observations**

Seen in terms of each state's share in GDP and population the flow of the FIST grant indicate that push has been given to the institutions from less endowed states. At the same time, states having institutions of national repute received major support.

Private institutions and constituent colleges received only 1% of the FIST grant in ENE states. 86% went to government supported and autonomous institutions.

Most of the projects granted to the institutions in ENE states are in Level-1 category, both in number and volume of grants. When compared with the grant amount it has been observed that only 73% of the amount utilised. Remoteness of North-East states is one of the main reasons, in addition to administrative and maintenance cost issues.

There are institutions running higher education and research programmes for over hundred years. DST-FIST programme has been handholding about 20% institutions for introducing and running PG and Ph.D. programmes. In about 50% cases, the original PIs either superannuated or left the institute. However, in 80% of the cases very senior members of the faculty are handling the projects.

Central govt. institutions are better off in terms of the facilities available. IPR cell and incubation centres are rare. Most of the grantee departments have classrooms in the range of 1-5. The scenario does not differ much over the types of institutions. It appears that more expensive or sophisticated the equipment more is the chance of breakdown. Utilisation of the equipment is in the range of 76% to 100%; including considerable users from outside the institutes.

While the general perception is significant improvement in most of the aspects, there are comparatively stronger negative views about administrative support. Working space also remained a matter of concern for most of the institutions. There is improvement, post FIST, in international publications and collaboration. However, most of the respondents do not think there is any remarkable improvement in the overall working environment. Fund release

related issues and inadequate infrastructure have been suggested as impediments by some respondents.

It appears that post FIST; universities did not gain much in terms of manpower. Whereas the number of scientists has increased in research institutions. Both student intakes in higher education and research (M.Phil. and Ph.D.) and pass percentage in higher division/grade have shown significant increase post FIST.

There is a sort of unanimity that there has been considerable improvement in paper publication, impact factor and citation after FIST grant. So, has been receiving national and international awards. However, patent and commercialisation of technology have not accelerated.

The two stories above bring out the role of leadership in deriving extensive benefit and creating impact from a programme like DST-FIST.

## **Conclusion**

In one sentence, there is tremendous appreciation of the programme among the grantees of the ENE states. The departments visited would proudly take around the facilities that were created through FIST grants. There is a consensus, also revealed through hard data, that FIST has opened up opportunities for the recipient departments, both faculties and students. Outcome in terms of student's intake, performance of the students, quality publications, award, recognitions, collaboration have seen notable positive changes. More detailed takeaways are:

Report on ENE states cover 11 states including big states in the plains, namely, West Bengal, Odisha, and Jharkhand as eastern states, and seven states in North East. Among North East states Assam is different from other six smaller states. Assam has established institutions of national importance, and unlike other six states, has a place in higher education and research in science and technology.

The DST-FIST has played twin role of supporting advanced research and education in established and renowned institutions in one hand, and handheld other institutions to promote higher education and research.

Govt supported and autonomous institutions are the major recipients of the FIST support. Privately owned institutions are rare in the list.

Among the grantees Central Govt. Institutions are better equipped in terms of available infrastructure. It has been seen that in many cases fund disbursed under FIST could not be fully utilised. North-East states face specific problems related to transportation of equipment that delays installations after purchase of the equipment.

FIST funds have been used mainly for equipment. Some older generation equipment is still in working conditions while many comparatively new equipment face breakdown related problems. In general utilisation of equipment is in the range of 76 to 100 % range with considerable internal usages and users from other institutions.

Although there are not significant improvements in the faculty positions of the grantee departments, there are significant positive changes in student intakes in higher degree courses, and pass percentages with better divisions and grades. More numbers of students are qualifying for sought after competitive exams.

There are remarkable positive changes in national and international publications with higher citation in higher impact factor journals. National and international collaborations, award, and recognitions for the faculties have seen positive changes. Patent and commercialisation of technology are not in the domain of any major initiatives. Dissatisfaction with administrative process is quite common.

Off the questionnaire discussion with the respondents and other faculty members helped decipher many aspects that become decisive for deriving best benefits from the FIST grants. Among many stories two presented in the report succinctly bring out the role of leadership in making the FIST give best.

### **Recommendations**

Dearth of facilities and infrastructure, but indomitable dedication, commitment and passion to prove them is how one can describe the science departments in the institutions in North East states. The marginal utility of investment in research infrastructure in these institutes, therefore, is much higher than the institutes in other states. At the same time the faculty members in these institutions, due to some psychological barrier, generally hesitate to approach the funding agencies in Delhi; too distant for them.

The study would therefore like to recommend flow of more FIST funds to the institutions in these states. It is also felt that they need some kind of handholding for encouraging them to apply for the grants under FIST.

As it has been observed, the privately owned institutions of higher education, which has grown at a very fast pace over last decade, have negligible presence in the FIST grant list. They constitute a big chunk of the available pool of S&T education and research. Such institutions also should be encouraged to apply for the FIST grants.

In many cases, the FIST project suffered in the North East states due to not so easy communication network. Such issues may be taken into account while granting grants.

There are cases that bring out the need for associated infrastructure for implementation of the FIST projects. The host institute has to make such infrastructure available. The approval of grant has to make such availability as precondition.

Maintenance of the equipment is a nagging issue faced by most of the institutions. The grant should include maintenance cost of the equipment under separate head.

There are equipment that require dedicated trained operator. The application for the grant should seek clear information on such requirements. Cost related to trained operator of the equipment should be included in the total grant amount.

There is equipment that remains operational and extensively used even after the FIST grant period is over. However, maintenance of such equipment becomes a major problem. So when the equipment demands repair or replacement of some components. The matter may be taken up for optimum utilisation of the equipment.



## Introduction to Regional Report: East and North East States

DST-FIST grants are given to departments of Universities, Institutions and colleges (whole college) in states. In the report we have used ‘Grant’ for DST-FIST project granted to a department (or college), and ‘Grantee’ for a department in a Universities/ Institutes/ schools/ centres/ colleges.

There are 11 states in East and North East (ENE) region to be covered for the study. The table 1 shows total number of projects funded under DST-FIST during 2000-2011. The table also shows the number of responses received, and declined for the study. Out of total 330 projects under DST-FIST during 2000-2011, West Bengal had a share of 56.67% projects, followed by Assam at 16.06%, and Odisha at 11.52%. Of total 330 projects, responses for the present study could be received from 254 (76.74%) projects.

These 254 (responses) projects were granted to 210 departments of 54 universities/institutions as shown in table 2. In West Bengal, 94 departments in 26 universities/institutions received grants for 120 projects. In Assam 51 projects went to 44 departments of 7 universities/institutions, and in Odisha 30 departments in 12 institutions received 34 projects.

Over the years, 2000-2011, as shown in table 3, FIST grants in ENE witnessed dip during 2004-2007. As the accompanying Fig 3 shows, over 2000 to 2011 all categories like, number of institutions receiving grants, no. of grants sanctioned and the % share of a year of the total grants during 2000 -2011, show an elongated ‘U’ shaped trajectory.

Table 4 shows the growth of FIST grants in ENE states vis-à-vis the total FIST grants during the study period. It is interesting to note from the accompanying figure 4 that the shares for both number of grants and value of grants over the years show a downward trajectory.

**Table 1: State-wise Number of FIST grants studied in ENE**

Name of States	No. of projects (%) of total	No. of responses received (%)	No. with no response/declined(%)	Not traceable
Arunachal	1 (0.30)	1 (100.00)	X	X
Assam	53 (16.06)	51 (96.23)	2 (3.78)	X
Manipur	10 (3.03)	10 (100.00)	X	X
Meghalaya	11 (3.33)	11 (100.00)	X	X

Name of States	No. of projects (%) of total	No. of responses received (%)	No. with no response/declined(%)	Not traceable
Mizoram	3 (0.91)	3 (100.00)	X	X
Nagaland	3 (0.91)	3 (100.00)	X	X
Sikkim	1 (0.30)	1 (100.00)	X	X
Tripura	5 (1.52)	5 (100.00)	X	X
Odisha	38 (11.52)	34 (89.48)	4 (10.52)	X
Jharkhand	18 (5.45)	15 (83.34)	3 (16.68)	X
West Bengal	187 (56.67)	120 (64.17)	64 (35.83)	3
Total	330 (100.00)	254 (76.74)	73 (22.36)	3 (1.00)

**Table 2: State-wise number of respondent institutions and departments**

State	No. of Institute	No. of Dept./School/Center/college	No. of Grants	(%) of no. of Grants
Arunachal	1	1	1	0.40
Assam	7	44	51	20.10
Jharkhand	2	13	15	5.90
Manipur	1	7	10	3.90
Meghalaya	1	9	11	4.30
Mizoram	1	3	3	1.20
Nagaland	1	3	3	1.20
Odisha	12	30	34	13.40
Sikkim	1	1	1	0.40
Tripura	1	5	5	2.00
West Bengal	26	94	120	47.20
Total	54	210	254	100.00

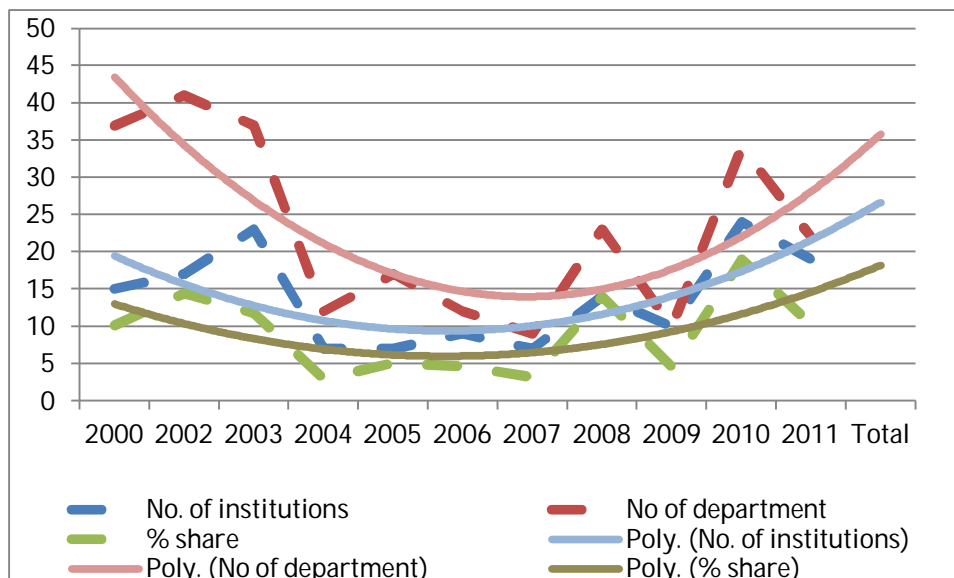
**Table 3: Expansion trajectory of FIST grants in ENE**

Years	No. of institutions	No. of grants	Grant Amount (Rs. In lakhs)	% of grant amount
2000	15	37	1791.20	10.16
2002	17	41	2540.50	14.41

Years	No. of institutions	No. of grants	Grant Amount (Rs. In lakhs)	% of grant amount
2003	23	37	2079.10	11.79
2004	7	12	520.10	2.95
2005	7	17	892.00	5.06
2006	9	12	811.50	4.60
2007	7	9	561.80	3.19
2008	14	23	2476.50	14.04
2009	10	10	809.20	4.59
2010	24	34	3350.10	19.00
2011	19	22	1801.60	10.22
Total	152	254	17633.40	100.00

**Note:** As shown in Table 2 above, total number of institutions supported under FIST in ENE is 54. Different departments of these institutes received grants in different years, and counted as separate institutes for each year for the table 3.

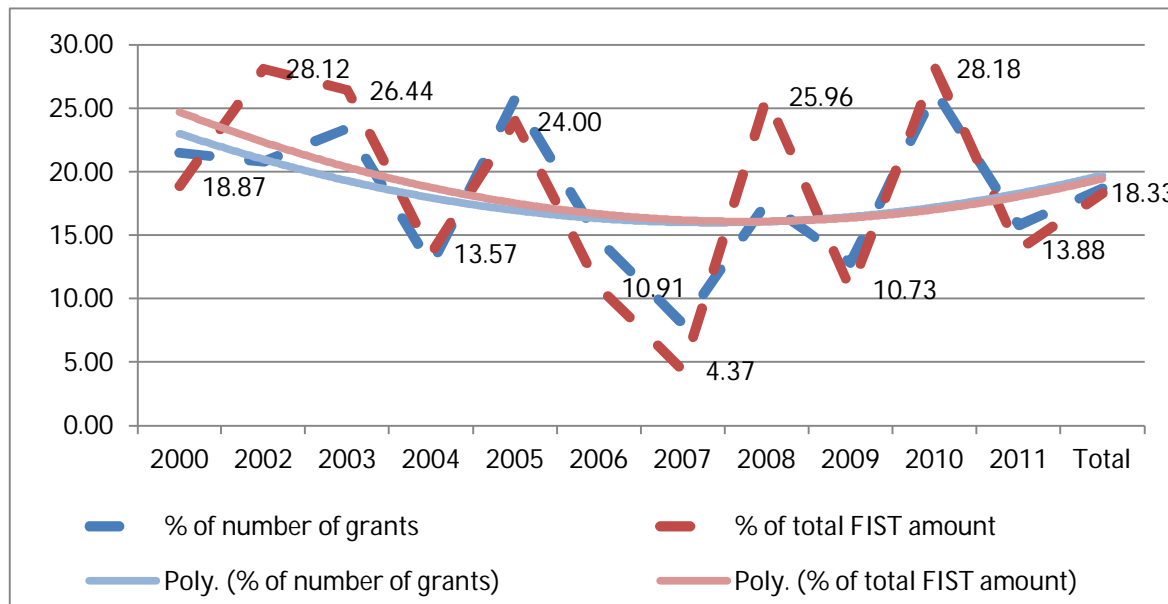
**Fig 3: Expansion trajectory of FIST grants in ENE**



**Table 4: Share of ENE states in total FIST grants, 2000 - 2011**

Years	% in total number of grants	% in total FIST grant
2000	21.51	18.87
2002	20.81	28.12
2003	23.42	26.44
2004	12.63	13.57
2005	25.76	24.00
2006	14.63	10.91
2007	8.04	4.37
2008	17.56	25.96
2009	12.82	10.73
2010	26.36	28.18
2011	15.83	13.88
Total	18.69	18.33

**Figure 4: ENE and total FIST grants over the years**



#### **A note on the way survey has been conducted**

The note elaborates the problems faced during the investigation or information collection phase of the study. Every institutions/department has been contacted through e-mail with all necessary authorization documents and purpose of the study asking for time for appointment.

Rarely there has been any response except in a very few cases. The process followed and problem faced are detailed below:

Step 1: First e-mail to the HOD, and the head of the institutions. In case of universities also contacted the VC, Registrar, and Dean.

Step 2: Reminder mails after couple of weeks waiting period and not receiving any response.

Step 3: Send another mail with time and date of the visit. Again, there was no response in most of the cases. However, once there on the mentioned time and date, mostly received well, except a few cases.

Step 4: Visit the unit and face one of the following problems:

a. A very cordial and helpful PI who will spare time, if not then and there, a latter slot of the day. After a good half an hour discussion, he would request that the questionnaire be left with him. He would find suitable time to have a look and fill it up. And would send it in some given time. Generally, the time comes in most of the cases only after repeated reminders. And in some cases, the time never comes.

b. The PI or HOD has retired, and the incumbent pleading ignorance about the whole thing. Some of them, however, agreed to look into the matter and also submitted the filled in questionnaire, albeit, on a later date, and of course after reminders.

c. Another category of responses is from suspicious PIs/HODs, who would interrogate extensively before agreeing to respond to the questionnaire. Again, the questionnaire was to be left with them for actions in a future time. In some cases, filled up questionnaires were actually received from them.

d. The polite non-respondents are a category for whom much time is devoted without any result. They would plead they are extremely busy, burdened with responsibilities of various types. They would never say no, would ask for some more time, and finally would not submit.

e. The hostile respondents, although not many, would straight away refuse. Some of them even said they did not know what is DST, and would not act unless there is a letter from the secretary DST. Some of them could be tamed and convinced, but most of them refused.

f. Yet another category is 'not traceable'. We found 2 such units.

g. Two units, although very cooperative, expressed their helplessness because their status has changed from institutions to Universities, and no old records were available.

Step 5. Managed to get responses from 254 FIST grantees, out of total 328.

# Chapter 1

## Introduction, genesis of DST-FIST program and need of the present Study

### S&T policies and genesis of DST-FIST

“History suggests that the countries that have managed to grow rapidly have done so by doing many things right, not just one or two things. With respect to such policies, it appears that potential pay-offs may be very high, but only if science and technology are perceived as complements to effective economic policies, not as substitutes.” Rosenberg (1990).

Historically, developed economies of Europe successfully intertwined the economic policies with the S&T policies. These countries have enjoyed the time-tested tradition of private initiatives in S&T research through University-industry collaborations. The result has been a robust S&T research system with enviable S&T infrastructure, and some European countries emerging as knowledge and technology hub, and innovation superpower.

Unlike Europe, science education and research in pre-independence India remained largely loosely connected with the production system or economic priorities. The first ever government policy, in this regard, has been enunciated in the Scientific Policy Resolution (SPR), 1958. This policy emphasised on building suitable infrastructure for science education and practice of science. 1960's, therefore, witnessed establishment of several institutions of national importance for science education and R&D. The SPR 1958, however, had underlying assumption that the knowledge pool thus created would be carried to the production system and enrich the economy in its endeavour to become self-reliant in high technology areas.

With gradual realisation that it is technology that rules the roost, and science education and R&D, do not smoothly flow to technology and to the production system a policy with special focus on technology generation priorities has been the felt need. The Technology Policy Statement (TPS) 1983, therefore, laid emphasis on strengthening of indigenous technology base addressing the vulnerability of technology dependence and also developing capabilities in the emerging areas like information technology, electronics and bio-technology. That was the time when globalisation coupled with economic liberalisation was becoming the new world economic order. The year 1991 saw major shift in Indian economic policies through liberalisation of Indian economy. This made the policy of technology self-reliance (the

guiding principle of TPS 1983) dormant. Nevertheless, these policies spearheaded the initiatives for building valuable infrastructure for S&T education and research. Globalisation, as a direct fall out of the revolutionary changes in technology with its consequent ramifications on social and economic practices, necessitated revamping the practice of S&T education and research, and necessary infrastructure. The very first concrete initiative in this regard has been launched in the year 2000 as DST-FIST<sup>1</sup> (Fund for Improvement of S&T infrastructure) with a budget of Rs. 75 crores to complement and match the aspiration of the country for a significant presence in the global market place where the winning rule is fostering technological advantage. The programme envisaged facilitating and strengthening R&D infrastructure in universities and institutions of higher education. Began with selected areas of research and institutes/universities of recognised expertise, over the period of execution priority areas, institutes/universities, and the size of fund expanded substantially. The investment under FIST programme has crossed Rs. 2000 crores over last two decades. The total fund increased substantially over the years. A review of the programme was taken up in the year 2008 in the form of impact study for the grants received during 2000 -2005 and 2002-2007<sup>2</sup>. The study highlighted substantial impact and gains of the initiative, and thereby substantiated the enhanced activities under the FIST programme. Another thrusts for such initiative came from the Science and Technology Policy (STP) 2003 that outlined the roadmap involving all stakeholders for building an STI ecosystem that would help mobilisation of human and physical resources for both investment in R&D and as well as strengthening education and research infrastructure in the universities and Institutes. It set a target of achieving 2% GDP for R&D. The FIST programme, therefore, got a fillip and expanded both in numbers of projects funded and also the volume of funding. In the following, we present chronological development of the FIST programme over time, and also actual execution of the programme in terms of number of projects, fund invested, over the states and levels of funding. Table 1.1 presents the chronological development of the programme. It is to be noted that when the scheme was formally launched in the year 2000 funding used to be done at two levels (Level-1 and Level-2) with financial limits of Rs. 100 lakhs and Rs. 200 lakhs respectively for both govt. and private organisations. In the year 2006, the limit was extended to Rs. 300 lakhs (Level-1) and Rs. 1000 lakhs (Level-2), with a caveat of 50:50 modes for private organisations. In the year 2009, a new Level (Level-0) was introduced with financial limit of Rs. 50 lakhs exclusively for PG colleges, not for any

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<sup>1</sup>See [www.fist-dst.org](http://www.fist-dst.org) for details of the programme

<sup>2</sup>The study was based on 213 responses out of total 459 recipients of the grants during 2000-05 and 2002-07.

specific department of the college. Subsequently limit was extended to Rs. 100 lakhs in 2010 and again to Rs. 150 lakhs in 2017. In 2018, a new level named as Level-4 was introduced exclusively for such ‘Departments those have already been supported for two cycles at Level-2 and have obtained at least one Very Good and/ or Excellent in each/ both of these cycles of support’. In the year 2019 further notification was made reiterating, ‘Support (@100%) would be provided for pure Govt. organizations only for high quality research; teaching activities would be discouraged. For Private self-financed as well as Govt. aided organizations the sanctioned grant would be provided on 50:50 mode (i.e. 50% by Govt. and 50% by the Private/Govt. aided organization) only for high quality research’. Then there were special FIST packages for states and regions from where there were not many applications for funding. These states and region were identified as Bihar, J&K and North East states. ‘Three Special Package programs: one for the states in the North-East Region (2008), Jammu & Kashmir (J&K) state (2009) and Bihar (2012) were initiated for augmentation of the teaching and research facilities at the S&T departments of the Colleges and Universities. While the NER Special Package is developed for a total estimated cost of Rs. 70 crores for five years and that of J&K and Bihar state are about Rs. 60 crores and Rs. 76 crores respectively for 5 years duration’.

The spread of the programme across the country is shown in the table 1.2. It is apparent that states such as Tamil Nadu, Karnataka, Maharashtra, and West Bengal have the institutions that are most active using the FIST grants advantage. Table 1.3 presents progress of FIST under different levels.

**Table 1.1: Chronological development of FIST**

Year	Chronological development	Purpose
1999	Scheme was conceptualized	To facilitate support towards augmenting higher education and research largely at the Departments of Universities and other academic sectors (including PG Colleges) by augmenting basic infrastructural facilities for teaching as well as for conducting research in basic or applied S&T areas. Support (@100%) was extended to both Govt. and Private organizations for both PG teaching and advanced research.
2000	FIST was formally launched at 2 levels with financial limits:	
2000-2005	Level-1: up to Rs. 100.00 lakhs Level-2: up to Rs. 200.00 lakhs	
2006	Upper limits at both the levels were revised: Level-1: up to Rs. 300.00 lakhs Level-2: up to Rs. 1000.00 lakhs	Support (@100%) was provided to only Govt. and Govt. aided organizations for both PG teaching and advanced research infrastructure. For Private self-financed organizations, the sanctioned grants were provided on 50:50 mode (i.e. 50% by Govt. and 50% by the Private organization) for only research purpose.



Year	Chronological development	Purpose
2009	FIST support revised to 3 levels with financial limits: Level-0: up to Rs. 50.00 lakhs Level-1: up to Rs. 300.00 lakhs Level-2: up to Rs. 1000.00 lakhs	Introduction of Level '0' support exclusively for PG Colleges. The unit of support was College as whole rather than individual Departments of the College.
2010	FIST support quantum was revised with financial limits: Level-0: up to Rs. 100.00 lakhs Level-1: up to Rs. 300.00 lakhs Level-2: up to Rs. 1000.00 lakhs	Upper limit of support for the PG Colleges at Level '0' was revised to Rs. 100.00 lakhs from Rs. 50.00 lakhs.
2017	FIST support quantum was revised with financial limits: Level-0: up to Rs. 150.00 lakhs Level-1: up to Rs. 300.00 lakhs Level-2: up to Rs. 1000.00 lakhs	Upper limit of support for the PG Colleges at Level '0' was revised to Rs. 150.00 lakhs from Rs. 100.00 lakhs.
2018	FIST support revised to 4 levels with financial limits: Level-0: up to Rs. 150.00 lakhs Level-1: up to Rs. 300.00 lakhs Level-2: up to Rs. 1000.00 lakhs Level-3: up to Rs. 2000.00 lakhs	Introduction of Level '3' support exclusively for such Departments those which have already been supported for 2 cycles at Level 2 and have obtained at least one Very Good and/ or Excellent in each/ both of these cycles of support.
2019	FIST support levels with financial limits: Level-0: up to Rs. 150.00 lakhs Level-1: up to Rs. 300.00 lakhs Level-2: up to Rs. 1000.00 lakhs Level-3: up to Rs. 2000.00 lakhs	Support (@100%) would be provided for pure Govt. organizations only for high quality research; teaching activities would be discouraged. For Private self-financed as well as Govt. aided organizations the sanctioned grant would be provided on 50:50 mode (i.e. 50% by Govt. and 50% by the Private/ Govt. aided organization) only for high quality research.

Source: DST-FIST

**Table 1.2: Expansion of the FIST across various States in the country**

States/UT	Institution (no.)	Departments (no.)	Projects (no.)	Amount Sanctioned (Rs. in Lakhs)
A & N	1	1	1	80.00
Andhra Pradesh	7	33	38	1966.90
Arunachal Pradesh	1	1	1	75.70
Assam	7	44	51	3611.70
Bihar	3	4	4	98.50
Chhattisgarh	4	8	9	316.50
Delhi	8	34	38	4197.70
Goa	2	11	13	798.50
Gujarat	8	25	31	1632.10
Haryana	4	19	21	910.30
Himachal Pradesh	6	17	18	906.80

States/UT	Institution (no.)	Departments (no.)	Projects (no.)	Amount Sanctioned (Rs. in Lakhs)
Jammu& Kashmir	3	13	15	668.80
Jharkhand	2	13	15	1016.90
Karnataka	27	98	117	13609.60
Kerala	46	103	111	4811.70
Madhya Pradesh	12	24	24	845.30
Maharashtra	39	78	92	6093.40
Manipur	1	7	10	485.50
Meghalaya	1	9	11	587.80
Mizoram	1	3	3	139.50
Nagaland	1	3	3	73.00
Odisha	12	30	34	2011.10
Puducherry	2	9	11	886.90
Punjab	17	59	68	3792.90
Rajasthan	16	34	37	2110.40
Sikkim	1	1	1	20.00
Tamil Nadu	66	222	250	16440.80
Telangana	10	43	53	3522.30
Tripura	1	5	5	114.30
Uttar Pradesh	33	92	115	12354.00
Uttarakhand	12	33	39	2518.30
West Bengal	26	94	120	9497.90
<b>Total</b>	<b>380</b>	<b>1170</b>	<b>1359</b>	<b>96194.80</b>

**Table 1.3: Expansion of the FIST under different levels over the years**

Year	Level-0	Amount (Rs. In lakhs)	Level-1	Amount (Rs. In lakhs)	Level-2	Amount (Rs. In lakhs)
2000	-	-	97	3370.30	75	6123.40
2002	-	-	131	4659.70	66	4375.20
2003	-	-	118	4052.30	40	3812.10
2004	-	-	67	2092.70	28	1739.30
2005	-	-	44	1845.90	22	1870.40
2006	-	-	64	3914.90	18	3525.70
2007	-	-	79	4102.70	33	8755.70

Year	Level-0	Amount (Rs. In lakhs)	Level-1	Amount (Rs. In lakhs)	Level-2	Amount (Rs. In lakhs)
2008	-	-	100	6028.20	31	3511.80
2009	9	398.90	40	2084.00	29	5060.60
2010	28	1620.30	71	4708.20	30	5560.00
2011	35	2577.30	65	4053.10	39	6352.80
Total	72	4596.40	876	40911.40	411	50686.90

### Other programmes/initiatives on S&T infrastructure

There was another thrust on technological innovations in the subsequent policy known as Science, Technology and Innovation Policy (STIP), 2013. The decade of 2000-2010 has been declared as the ‘decade of innovation’; as recognition to the fact that in the globalised world to remain competitive in the global market the imperative is creation of science led technological advantage. Important action point has been building an innovation ecosystem with active participation of the private sector in the directed R&D programmes.

Apart from FIST, DST also has initiated programmes like SAIF and SATHI to augment sophisticated instrument and equipment for higher level of R&D. Under Sophisticated Analytical Instrument Facilities (SAIF), eighteen such facilities have been created at different institutes of excellence across the country. The programme is executed through web portal Shared Research Infrastructure for Science, Technology and Innovation (SRISTI), and annually it provides services to nearly 10,000 researchers. On the other hand, Sophisticated Analytical & Technical Help Institute (SATHI) is located in IITs and BHU for providing professionally managed services with efficiency, accessibility and transparency of highest order under one roof to service the demands of industry, start-ups and academia.<sup>3</sup> The draft Scientific Research Infrastructure Sharing Maintenance and Networks (SRIMAN) Policy 2019<sup>4</sup> is another initiative of the DST that lays the protocol for developing regional ecosystem for the following:

- Procurement and maintenance of equipment and infrastructure for research
- Providing access and sharing of scientific equipment and infrastructure
- Disposal of scientific equipment and infrastructure

<sup>3</sup>For details see <https://dst.gov.in>

<sup>4</sup>For details see <https://dst.gov.in>

- Capacity Building of operators and technicians for efficient operations
- Monitoring of usage of expensive scientific research infrastructure
- Infrastructure Management for efficient operations

Like DST, other S&T department like Department of Bio Technology (DBT) also initiated infrastructure related programme known as Scientific Infrastructure Access for Harnessing Academia University Research Joint Collaboration (SAHAJ). Under this programme each DBT Autonomous Institute and DBT supported Infrastructure programme will make available its high-end equipment and infrastructure to Research Institutes, Universities, colleges and start-ups / entrepreneurs<sup>5</sup>.

### **Impending issues on S&T infrastructure (national and global level)**

While these initiatives have taken wings, the high rate of obsolescence and continuous sophistication of instruments and equipment for scientific research has the imperative that strengthening of R&D infrastructure is a continuous process. In the SRIMAN policy statement of DST it is envisaged, ‘development of research infrastructure is very expensive and hence it becomes important for a developing country like India to carefully plan for it and develop mechanisms for its efficient use. RI has taken a center stage among developing and developed countries with growing focus on enhancing social and economic value and promoting development based on science and technology. Therefore, development of scientific infrastructure is critical for advancement of nation with ease of access and greater emphasis for their optimal utilization.’<sup>6</sup> These programmes echo the spirit that has been expressed in the Prime Minister’s address in the Science Congress. The PM said, “*Building a strong S&T infrastructure that is accessible to academia, start-ups, and industry and R&D labs is a priority of the government to address the problems of ease of access, maintenance, redundancy and duplication of expensive equipment in our Scientific Institutions. The desirability of establishing professionally managed, large regional centers in PPP mode housing high value scientific equipment should be examined*”. *Hon’ble Prime Minister of India Shri Narendra Modi- at 104<sup>th</sup> Indian Science Congress on 3<sup>rd</sup> January, 2017.*

The PM went a step further to highlight the issue of maintenance, redundancy, and duplication of expensive equipment. Programmes like DBT’s SAHAJ, and DST’s SRISTI portal for SAIF and SATHI are protocols for optimum utilization and management for sharing

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<sup>5</sup> For detail see [dbtindia.gov.in](http://dbtindia.gov.in)

<sup>6</sup>For detail see <https://dst.gov.in>

sophisticated equipment among scientists from different institutions and for industries, particularly MSMEs and start-ups. Even the developed economies that traditionally had very strong research infrastructure been also facing the need for revamping their research infrastructure to keep their foothold on the technological superiority. Founded in 2011, Science Europe, the European association representing the interests of major public research performing and research funding organisations of Europe, observed in its policy document, “Research Infrastructures (RIs) are of utmost importance for Europe’s global competitiveness” (Science Europe policy brief ‘On Research Infrastructures in EU Framework Programming January 2017). Council of Canadian Academies declares overdrive for strengthening RIs in its policy declaration August 2019 aimed at building the future of Federal Science. "Federal science happens in close to 200 laboratories and other major facilities across Canada, most of which are showing their age," "This report is timely and necessary if Canada is to become a leader in transforming science for society through the next generation of science and technology infrastructure." National Academies of Sciences, Engineering and Medicine, USA outlines the need for strong RI for University Research and Teaching, Academic-industrial interface for technology development Infrastructure. (National Research Council 2003 Materials Science and Technology: Challenges for the Chemical Sciences in the 21st Century. Washington, DC: The National Academies Press.). Recently UK government has increased budgetary support for research infrastructure to infuse life to its decaying RI.

The Horizon 2020 of Science Europe policy brief also focuses on similar issues:

- World-class RIs attract world-class scientists who can address the grand challenges facing society. These grand challenges trigger complex research questions, requiring the production of high-quality data and attracting the best talents to address them.
- Excellent RIs often provide a nucleus for an ecosystem of research organisations, small- and medium-sized enterprises (SMEs) and start-ups.

One of the principal assets of Europe is its rich and diverse landscape of regional and national RIs. These RIs need to be better connected so that European researchers can access the ones they need, regardless of their location in Europe. The transnational access mechanism of Horizon 2020, if used effectively, can enrich this connection and strengthen the European Research Area (ERA).

## **Need of the present study**

For execution of the policy of strengthening S&T infrastructure and optimum utilisation of the same important issues identified in these policy documents are, a. identification of the priority areas, b. sources and extent of funding, c. utilisation of the infrastructure created, d. operation, maintenance and management of the facilities. In the developing economies, corporate funding of R&D and infrastructure is not rare as it is in the developing countries like India. Nevertheless, these documents recognise the fact that flow of corporate funding is neither adequate nor easy for RI required for basic and high-end S&T research. Federal funding, therefore, has been considered as a necessity.

After about two decades of push towards strengthening S&T infrastructure in the institutes of higher education and research, the reasonable look back is to assess its impact and need, if any, for course corrections or/and reinvigorate the programme. The above-mentioned issues (a. identification of the priority areas, b. sources and extent of funding, c. utilisation of the infrastructure created, d. operation, maintenance and management of the facilities), however, also remain to be understood. The present report is the result of this felt need from the initiator, which is DST, of the programme.

## Chapter 2

### Review of literature, Methodology and the execution plan of the study

For a very long time the literature on impact of S&T used to be focused on economic gains from investment in S&T infrastructure and R&D. The pioneering work by Solow (1957) integrated S&T in the production function; and after estimating the contribution of labour and capital in the GDP, residual was attributed to S&T, which in Solow model was defined very broadly and also included non-S&T factors.<sup>7</sup> It is to be noted that by the end of 1990's this particular area of research was going out of fashion. NSF's early observation on this issue ("the returns of (science) is so large that it is hardly necessary to justify or evaluate the investment" NSF: 1957) prevailed.

Limitations of the mainly econometrics studies brought in two important distinctions in the understanding of S&T and society/economy. First is the distinction between 'impact' and 'output'. More often than not, they are used interchangeably. Output is the direct result of science and technology, say a new product introduced in the market. Impact is the effect that this product would have on the society and economy. The studies on gains from S&T focused mainly on the output aspect, whereas studies on impact of S&T are rare. Godin and Dore (2005); Godin (2010).

The second distinction is between gains as internal and external to S&T. There would be both impact and output as internal and external returns to S&T. While the studies referred above dealt mainly with the external return of S&T, the internal return to S&T remained largely under researched. Pioneering work in this regard was initiated in SPRU, Sussex and CWTS, Leiden. Pavitt (1991) and Martin (1996) developed indicators that measure the gains for S&T. Salter and Martin (2001) later improved upon Pavitt, and identified at least six categories of benefits:

- Increasing the stock of useful knowledge

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<sup>7</sup>Later years, Denison (1962; 1967), and Jorgenson and Grilliches (1958), among others, considerably improved the Solow model. There after research on this field took two different streams: a. impact of R&D on output and productivity growth (among others Coe and Helpman:1995; Grilliches:1980, 1986, 1995; Mansfield:1988; Nadiri: 1980; Verspagen: 1995) and b. impact on rate of return to investment (Bernstien: 1988, 1989; Grilliches: 1980, 1986; Mansfield: 1977, 1980; Odagiri: 1983, 1985; Terleckyj: 1974, 1980; Scherer: 1982,1984; Suzuki: 1993 – to name a select few).

- Training skilled graduate
- Creating new scientific instrumentation and methodologies
- Forming network and stimulating social interactions
- Increasing the capacity for scientific and technological problem solving
- Creating new firms

The FIST programme is all about strengthening the S&T infrastructure of Universities and academic institutions. The impact assessment, therefore, has to be carefully designed developing indicators that would refer to gains, both impact and output, as internal to S&T. About the programme FIST the DST website writes, “Considering the present status of the S&T sector in the universities and related academic institutions who are in dire need for strengthening the existing S&T infrastructure support with adequate funding and associated flexibility, Government of India in the year 2000 announced a major new initiative titled "Fund for Improvement of S&T infrastructure in universities & higher educational institutions (FIST)" to rebuild the Science & Technology infrastructure in the country. “The objective is to generate high calibre manpower and strengthen the repository of national intellectual wealth in Science & Technology (S&T) sector, which if channelized properly, may lead to socioeconomic development.”

There are only a few studies on the evaluation of outcome of the intervention in the educational and research institutions. Most of the articles talk about principles, guidelines and methodology required for impact evaluation in general. Earle Janice (2013) developed a common guideline and report on behalf of US department of education, with objective to assess the impact of funding/support given to the education and research institutions. The report describes some indicators like types of research, knowledge generation, education interventions, strategies and scale up research those can be useful to assess the impact of funding in such organizations. Similarly, Bamberger Michael (2012) proposed the guideline and framework of different type of impact analysis like quantitative, qualitative, multilevel mixed methods including in-depth interview, focus group discussion, key informants, participant observation, document analysis, internet surveys, group interviews, photography and GIS methods that might be useful for impact evaluation. A report was prepared by the European Science Foundation (2011) on evaluation of publicly funded research. The report recommended some guideline for evaluation of the research i.e. (a) every process of an evaluation should be planned carefully from the design of the study to the discussion of the results; (b) evaluation should have a specific goal and address a real problem. (c) The use of appropriate methodologies and indicators needs to be given special consideration. The



Organization for Economic Co-operation and Development (OECD) Paris (2011) prepared a report for evaluation of Research organization. They presented a framework for evaluation of the research organization and suggested that Peer Review articles published, Citation of the articles and important ideas generated by the organization etc. are the main impact of the research organization.

The expected first order impact of the DST-FIST programme, therefore, is strengthening the competence internal to the S&T sector. When achieved, the second order impact on socio-economic development to follow. The first impact study (2008) Questionnaire part A and B, however, did not adequately deal with the Salter-Martin parameters. In the section on 'Methodology', we suggest ways to incorporate new parameters for measuring internal returns to S&T. Another important issue is to retain the competence gained in the organisation. Nath et al (2002) argues the case for creating a 'learning organisation'. S&T competence and intellectual wealth generated through R&D activities are human embodied. A 'learning organisation' would have appropriate mechanism to hone human embodied knowledge as part of organisation knowledge. The impact analysis has to focus on the learning part of the organisational activities.

## **Objective, Methodology, and Execution of the study**

### **Objectives**

Following are the objectives of the proposed study as suggested by the FIST implementing division in the line of the advice of the Expert committee constituted specially for the purpose of the study.

1. To evaluate the impact of DST-FIST program on university departments / centres, colleges and institutes in terms of their academic and research outcome during 2000 to 2011.
2. To identify best practices in terms of procedures, processes and managerial practices among recipient organizations and DST.
3. To suggest policy imperatives for strengthening of the scheme.

### **Methodology adopted for the study**

In the light of the above discussion in the Literature Review, the methodology has to be geared to measure impact internal to S&T and the organisation. Since organisational practices and human resource endowment of the organisation would be unique for each case, a sample survey of the impact of various projects over large number of universities and institutions

might not be suitable methodological option. A complete enumeration of all the cases is, therefore, proposed to be undertaken.

The survey would be undertaken on the basis of a pre-designed questionnaire. The available questionnaire from the earlier surveys appears to be inadequate in the light of the literature reviewed above. The available questionnaire is to be supplemented by suitably incorporating categories suggested by Salter and Martin cited above. Accordingly, we are proposing following categories to capture the impact and output internal to S&T and the organisation. The suggested new categories are indicative and would be further refined in consultation with the peers, stakeholders, and other experts.

The Questionnaire designed for the purpose of the study incorporated the following dimensions and issues broadly in the line of the understanding derived from the literature review.

**Table 2.1: Issues to be focussed in the study**

<b>Impact on Science (advances in knowledge)</b>	
Specialities	a. New training programme b. Enrolment of in the new programme c. Number of new journals and articles
Theories	a. Invention of a new theory b. Use of the new theory (citation)
Methodologies	a. Conception of a new methodology b. Use of the methodology (citation)
Facts	a. Discovery of a new fact b. Use of the fact (citation)
Models	a. Construction of a new model b. Use of the model (citation)
<b>Research Activities</b>	
Contribution to research	a. Number of new publications
Type of research	a. Diversification b. Intensification
Inter sectoral	a. Number of publications
Interdisciplinary	a. Number of publications b.
International	a. Number of publications
<b>Training of researchers</b>	
Research competence	a. Defining a research problem, organising project, collection of data, analyses of data
Related competence	a. Writing, computing, management
<b>Technology</b>	
Product and process	a. Achieving and improving a product and process

	<ul style="list-style-type: none"> <li>b. Value of sales</li> <li>c. Patents</li> <li>d. Licenses</li> <li>e. Citations</li> </ul>
Services	a. Development of new services
Know how	a. Number of organisation and individuals trained in
<b>Recognition</b>	
Credibility, visibility, prizes, awards	<ul style="list-style-type: none"> <li>a. Members in the committees (national and international bodies)</li> <li>b. Members in the decision-making bodies of govt.</li> <li>c. Nomination to represent the country</li> <li>d. Promotion acquired</li> <li>e. Prizes received</li> <li>f. Acquired higher degree/diploma/honours</li> <li>g. New career opportunities</li> </ul>
<b>Impact on Curricula</b>	
New courses	<ul style="list-style-type: none"> <li>a. Number of new courses</li> <li>b. Enrolment</li> </ul>
New Training programme	<ul style="list-style-type: none"> <li>a. Number of new programmes</li> <li>b. Enrolment</li> </ul>
Pedagogical tools	a. New pedagogical tolls introduced
<b>New human Resources</b>	
Added for the project	<ul style="list-style-type: none"> <li>a. Research fellows, Assistants with qualifications at the time of entry</li> <li>b. Faculty, qualifications at the time of entry</li> </ul>
Career opportunities	<ul style="list-style-type: none"> <li>a. How many left with higher experiences/qualifications</li> <li>b. Jobs opted by the personnel left</li> </ul>
<b>Learning Organisation</b>	
<b>Project team</b>	<ul style="list-style-type: none"> <li>a. Composition of the team</li> <li>b. Devolution of project activities</li> <li>c. Intra team and inter team communication</li> </ul>
<b>Project output</b>	<ul style="list-style-type: none"> <li>a. Credit sharing</li> <li>b. Representation in the seminar and conferences (who at what level)</li> <li>c. Training and skill development</li> </ul>
<b>Attrition and retention of HR</b>	<ul style="list-style-type: none"> <li>a. Team members left the team and organisation. How many and where?</li> <li>b. Extent of expertise loss and replenishment</li> <li>c. The system of retaining expertise, if any</li> </ul>

## Execution of the Study

1. Target population and sample size: As suggested by DST Expert Group, the beneficiary's institutions were divided into five zones (East & North East, Western, Northern, Southern and Central). As per the norms of the FIST program, the grants were provided at three levels (0, I & II). DST provided the basic information of each institution funded under FIST program during 2000-2011. Total 1602 projects were under the central coordinating unit as per DST Expert group division. Complete enumeration was done for all 1359 projects supported under FIST program of DST. The project assistant (field)/ investigator visited each beneficiary institution. Information was collected through personal interview, review of office records and documents, acquiring photographs of the facilities developed under FIST program. The brief summary of number of institutions central region is presented in Fig 2.1. below. Proportional resource allocation for data collection and other activities is adopted. This was because of the numbers of beneficiaries in each geographic region were unequal. It was assumed that the impact was proportional to the amount of grants received by the institutions.

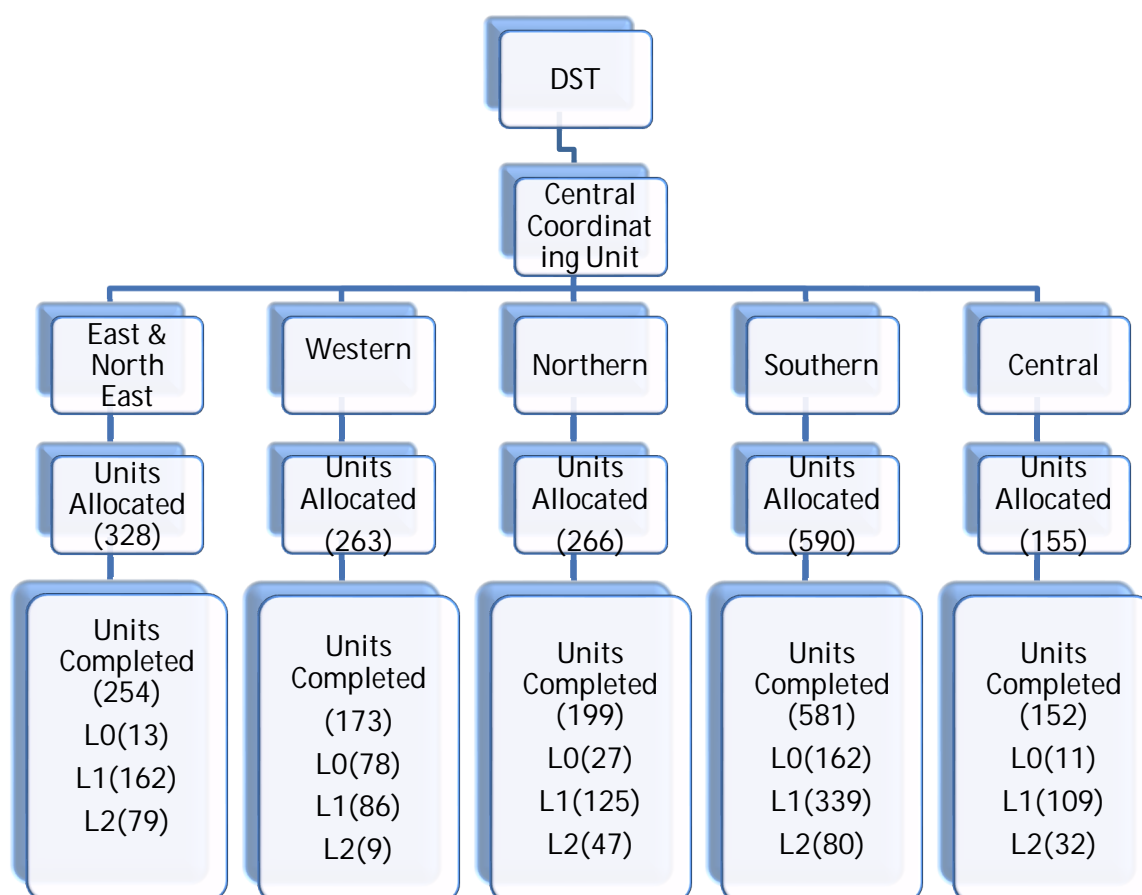


Fig 2.1: The operational structure of the study.

**2. Data Collection Tool:** A questionnaire (Appendix a) for data collection has been developed by the Central Coordinating Unit in consultation with national expert group (DST) and all regional PIs. It consists of 9 sections, which explores various aspects of impact evaluation of Department/Center/Institute/College. The questionnaire designing (soft and hard) has been taken care by central coordinating unit for homogeneity and provided to each region for data collection.

**3. Field-testing and Pilot Study:** Field-testing or pilot testing of data collection instruments/tools were done to see feasibility and adaptability of developed tools or instruments. Questionnaire seems relevant during pilot study. No changes incorporated in the final questionnaires.

**4. Training of Investigators:** Each associated region recruited their required project staff. The training of investigators has been organized by their associated regions only to carry out the data collection work and simultaneously the testing of questionnaire.

**5. Field Operation and Data Collection:** Each Project Assistant (field) / investigator were provided print version (hard copy) of questionnaire. In the field, investigator goes to the allocated units with their paper questionnaire and gather information by personal interaction with the Head of Department or any allocated faculty member of the department, and data entry of each questionnaire is made in excel format provided by Central Coordination Unit. Initially it was thought that the faculty/HOD will respond but due to quantum of response, they took some time to gather the information. So, it was decided to send the information by e-mail and ask for appointment. Our field visits were then initiated to departments with scheduled time and got the information filled. Some of the Key points we faced while field operation are:

- i. Primary respondent for the questionnaire may be Principal Investigator (PI) of corresponding FIST assistance. In the absence of PI, present person in charge the project or Head of Department/Institution may be contacted and appropriate respondent may be decided in consultation with the above authority.
- ii. The details of the interviewer, starting and ending time of interview should be should clearly be recorded in cases were responded are busy and cannot spare time to respond to all questions in one go.
- iii. In case of any difficulty during the field operation activity, the investigators may contact the corresponding regional coordinator/PI, CCU & DST.

**6. Responsibility of Central Coordinating Unit:**

- i. Questionnaire development.
- ii. Overall monitoring and supervision of project and submission of quarterly progress report.
- iii. To evolve the data analysis plan including standardization of report format and tables.
- iv. Overall compilation of data and to carry out exploratory analysis for validity and reliability checks.
- v. Data analysis and report writing and submission.

**7. Responsibility of Regional PI's:**

- i. Recruitment of staff and field investigators.
- ii. Establish close coordination with central coordinating unit.
- iii. Planning and execution of data collection in the respective region according to the methodology approved in the project.
- iv. Submitting data to DST and CCU after data cleaning, reliability and validation analysis.
- v. Supervision and monitoring of data collection in respective region.
- vi. Preparation of regional reports as pre-form given by CCU for submission to DST and CCU.

**8. Reference period:** The FIST grants provided during year 2000-2011 will be included in the study. The grants provided in 2011 will be evaluated up to 2016 (i.e. five years after approval).

**9. Method of processing and analysing:** Data cleaning and exploratory analysis has been conducted as data collection activity is over. The final set of tables will be evolved in consultation with National Expert Committee and will be produced at the end of data collection. Advanced statistical software and data mining tools i.e. Statistical Package for Social Sciences (SPSS), R programming language has been used for final analysis. Text data analysis is done for open-ended questions.

**10. Time schedule of activities giving milestones (18 months)**

**Table 2.2: Time frame for the study**

<b>Reno.</b>	<b>Time</b>	<b>Activity</b>
1.	6 months	Questionnaires development, Expert group meeting, Staff selection, Purchase of equipment's and development of the project website, Design of the questionnaires in the tablets, Training of the digital questionnaires, Field testing of the digital questionnaires, Modification in the questionnaires, Distribution of work to zonal investigators,
2.	9 months	Data collection by the investigators, Random monitoring of data collection and its quality, by principal investigators/co investigators and DST members on random basis.
3	3 months	Data analysis, report writing and dissemination.

## **Limitations and Clarifications**

- 1) Since the study was conducted in 2018-19, so there will be a huge chance of recall-lapse. Respondents were unable to provide accurate information/suggestions on their respective department's grant.
- 2) Most of the respondents are not the original PI of the project. As some of the grants were old, so the PIs from those years were mostly retired/superannuated and the other, respondents from the faculty were assigned to the investigators.
- 3) The questionnaire does not include the response of all stakeholders of the DST-FIST grant recipients.
- 4) The study period is 2000-2011, should not be misunderstood that the period beyond 2011 is not covered at all. Since the project initiated in 2011 continues for 5 years, the study actually covers the years 2011 – 2016 as well.

## **Report structure**

The Report is divided into eight more chapters, in addition to above two chapters on Introduction, and Methodology. (For regional reports, there is a separate chapter on Introduction). Chapter 3 presents Criteria for FIST grant and Characteristics of grant recipients; chapter 4 is on Infrastructure & Equipment created under FIST grant; chapter 5 deals with impact on working environment and capacity building; chapter 6 is on impact on manpower; chapter 7 is on the qualitative assessment of the administrative process for implementation of the FIST projects; chapter 8 presents a few cases considered as successful cases in implementing FIST grants; chapter 9 is on overall impact of the FIST grants

perceived by the grantees. Rounding off for conclusion and recommendation is presented in chapter 10. Chapters are divided in to sections along with section-wise observations. Every chapter ends with broad observations and conclusions.

**Tables referred in the text are appended together in the Appendix 1: Chapter-wise tables.**

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## Chapter 3

### Criteria for FIST grant and Characteristics of grant recipients

#### Structure of the chapter

This chapter has four sections, namely, Criteria of the grant, Types of institutions receiving grants, Levels and flow of DST-FIST grants, and present Academic status of the grantee institutions. Every section ends with broad observation from the data/information used. Tables referred in the text are appended together in the Appendix 1: Chapter-wise tables.

#### Criteria

Apart from the official norms of eligibility and procedures for applications for the FIST grant, which will be part of the general report, in this regional report we try to see if the flow of fund to different states reveals any macro level parameters. We try to see the association, if any, with the state GDP, population, and the grants received.

ENE states are widely different from each other in terms of demographical, geographical, and economic characteristics. They also differ widely in terms of history of science education and research. While major four states, West Bengal, Assam, Odisha and Jharkhand have a tradition of science education, other 8 states are quite beginner in this respect. Among the four, West Bengal particularly has quite a few institutions of national reputation in science education and research in India. This is reflected in the demand for FIST grants from the ENE states. Table 3.1a shows that West Bengal shares about 41% of the total number of grants and 54% of the total amount of grant given to ENE states during the study period, 2000-2011.

Table 3.1b suggests interesting dimension of the flow of grants in the ENE states. The table juxtaposes ENE states' share in all India GDP and population. It is apparent that ENE states' shares in total number of FIST projects and grant amount closely match the respective shares in GDP and population. Variations might be due to the presence of institutes of national importance in a few states and government policy priority of promoting higher level of science education in the smaller states of ENE.

## **Types of institutions receiving Grants**

By types of institution, we mean the governing status of the institutions, namely, govt., autonomous, private etc. As for the types of institution receiving grants, as the table 3.2 shows, clear favourites are central government institutions with a share of 43% of the number of grants given and 46% of the total amount of grants sanctioned. This is followed by the state government institutions with a share of 25% and 31% for number and amount of grants, respectively. Together with autonomous institutions, government supported organisations received 86% of the number of grants and 94% of the total amount of the grants. Private institutions and constituent colleges received only 1% of the number and amount of the grants. Similar is the picture if seen in terms of the number of grants given to institutions of different types, as shown in table 3.2.

## **Levels of DST-FIST grants and flow of grants**

As mentioned in the beginning, DST-FIST grants began with two levels of funding, namely Level1 (L1) and Level2 (L2). Level0 (L0) has been introduced from the year 2009. It is to be noted from the table 3.3a and the corresponding figure that the FIST programme lost part of its steam after initial years (2000-2003) to partially regain in 2010, but never really attaining the spirit of the first couple of years. Table 3.3b and the accompanying figure 3.3b show the sanctioned and disbursed amount over the study period. Overall, 83.60% of the sanctioned amount has been disbursed. How and why the sanctioned amount remains undisbursed or unclaimed may be an important point of investigation.

Again state-wise distribution of different levels of FIST grant shows the same pattern as narrated above. Table 3.4 shows that 47.2% of the projects went to the institutions in West Bengal followed by 20.1% in Assam and 13.4% in Odisha. Overall utilization of grant, however, is only 73% (table 3.5), which requires attention. There could be several reasons for unutilized fund; a few of which (as came up during the discussions with the respondents) are problems related to procurement and installations of the equipment (particularly in the institutes in the North Eastern states due to transportation problems), administrative issues, maintenance related problems, and also inadequate project planning. It would be also interesting to know if unutilized fund has any relations with the type and ownership of the institutions (table 3.6). Since most of the grantee institutes have state government as the main source of financial support, administrative complexity, if any, would be an interesting point of investigations. An inter-regional comparison may also bring out interesting insights. Then

there are institutions and departments getting grants more than once (Table3.7). Are there any institutions or departments having issues related to unutilised funds?

### **Present academic status of the grantee Institutes**

The history of academic activities of the grantees would indicate, a. grants going to the institutions that have already established activities in higher education (PG programme) and research (Ph.D. programme), and b. grants complementing the institutes to initiate higher education and research. Table 3.8 presents the responses from 210 (out of 254) recipient institutions. Interesting observation from the table is that about 80% grantees were already having programmes in higher education and research. In addition, about 2% institutions have been running such programmes for last more than 100 years, and another 13% for last 50 years. At the same time, the DST-FIST programme was handholding about 20% grantees for initiating courses in higher education and research.

The academic activities of an organization depend on the sustained initiatives of the faculty. Effective execution of and deriving benefit from programme like FIST largely depend upon the sustained interest and initiatives of the leadership, in this case the PIs. In many cases, PIs change job or superannuate with possible instability. As the table 3.9 shows, about 50% cases the original PIs either changed the job or superannuated. However, table 3.11 suggests that in about 80% cases the FIST programme is being handled by senior and very senior faculty member. Share of different states in working status of PIs, and share in own state are shown in table 3.12a and table 3.12b. Therefore, among ENE, states Assam's share in working PIs is 27% (table 3.12b), its share in its own state is 52% (table 3.12b). For West Bengal, the corresponding figures are 50% and 52%, in tables 3.13a and 3.13b, respectively.

**Observations:** Seen in terms of each state's share in GDP and population the flow of the FIST grant indicate that push has been given to the institutions from less endowed states. At the same time, states having institutions of national repute received major support.

Private institutions and constituent colleges received only 1% of the FIST grant in ENE states. 86% went to government supported and autonomous institutions.

Most of the projects granted to the institutions in ENE states are in Level-1 category, both in number and volume of grants. When compared with the grant amount it has been observed that only 73% of the amount utilised. Remoteness of North-East states is one of the main reasons, in addition to administrative and maintenance cost issues.

There are institutions running higher education and research programmes for over hundred years. DST-FIST programme has been handholding about 20% institutions for introducing and running PG and PhD programmes. In about 50% cases, the original PIs either superannuated or left the institute. However, in 80% of the cases very senior members of the faculty are handling the projects.

**Table 3.1a: ENE States' share in number and value of FIST Grants (Sanctioned)**

State	No. of Projects	% of Projects	Total amount (Rs. in lakhs)	% of total amount
Arunachal	1	0.40	75.70	0.40
Assam	51	20.10	3611.70	20.50
Jharkhand	15	5.90	1016.90	5.80
Manipur	10	3.90	485.50	2.80
Meghalaya	11	4.30	587.80	3.30
Mizoram	3	1.20	139.50	0.80
Nagaland	3	1.20	73.00	0.40
Odisha	34	13.40	2011.10	11.40
Sikkim	1	0.40	20.00	0.10
Tripura	5	2.00	114.30	0.60
West Bengal	120	41.20	9497.90	53.90
Total	254	100.00	17633.40	100.00

**Table 3.1b: ENE States' share in national GDP, population and number and value of FIST Grants (Sanctioned)**

State	Share in GDP*	Share in population**	% of Projects	% of total amount
Arunachal	0.10	0.12	0.07	0.08
Assam	1.76	2.58	3.75	3.75
Jharkhand	1.42	2.73	1.10	1.06
Manipur	0.10	0.22	0.74	0.50
Meghalaya	0.14	0.25	0.81	0.61
Mizoram	0.08	0.09	0.22	0.15
Nagaland	0.09	0.17	0.22	0.08
Odisha	2.52	3.47	2.50	2.09
Sikkim	0.10	0.05	0.07	0.02
Tripura	0.20	0.31	0.37	0.12

State	Share in GDP*	Share in population**	% of Projects	% of total amount
West Bengal	6.34	7.55	8.83	9.87
Total	12.72	17.53	18.69	18.33

**Source:** Calculated from \*Gross state Domestic Product, 1 August 2019, MOSPI, GOI; \*\* Census 2011.

**Table 3.2: Type of institution-wise number and value of grants (Rs. In lakhs)**

Institution Type	No. of Instt.	% of Instt.	No. of Grants	% of Grants	Amount Disbursed	% Of total amount
Central Government Institution	11	20.40	109	42.90	6756.40	45.80
State Government Institution	26	48.10	88	34.60	4492.90	30.50
Autonomous Institution	10	18.50	39	15.40	2579.70	17.50
Deemed University	4	7.40	15	5.90	779.20	5.30
Constituent college	2	3.70	2	0.80	87.20	0.60
Private Institution	1	1.90	1	0.40	46.00	0.30
Total	54	100.00	254	100.00	14741.50	100.00

**Table 3.3a: Allocation of grants over different levels during the study period**

Years	Level wise no. of sanctioned grants/projects				
	L0	L1	L2	Total	%
2000	N.A.	28	9	37	14.60
2002	N.A.	27	14	41	16.10
2003	N.A.	25	12	37	14.60
2004	N.A.	8	4	12	4.70
2005	N.A.	11	6	17	6.70
2006	N.A.	9	3	12	4.70
2007	N.A.	6	3	9	3.50
2008	N.A.	14	9	23	9.10
2009	N.A.	6	4	10	3.90
2010	7	17	10	34	13.40
2011	6	11	5	22	8.70
Total	13	162	79	254	100.00



## Chapter 4

### Infrastructure & Equipment created under FIST grant

This chapter deals with the existing infrastructure available to the grantee organisations. Since the DST-FIST programme is all about strengthening infrastructure for S&T education and research, investigation in this regard has been focussed on the existing and improvement or changes after FIST grant. This was done on the basis of a list of wide-ranging equipment, instruments as well as general facilities like classrooms, library, Internet access etc.

#### Available infrastructure

Table 4.1 gives an account of the facilities available to the grantee departments. While Internet facility is generally available to most of the departments, research lab facilities are yet to be available in large number of departments. The same facilities when seen in terms of the types of the grantee institutions, it is seen (from table 4.2 and 4.2a (%)) that central govt. institutions are better off than the state govt. or autonomous institutions in most respect of the facilities. Other institutions being very small in number are not brought in for comparison. Table 4.3 shows that there is not much difference in the infrastructure availability among the central govt. and state govt. institution with financial autonomy. Examining the same in terms of level of grants, table 4.4 shows that grantees at level-2 have better infrastructure facilities compared to those at level-1 and Level-0. At the state levels infrastructure in West Bengal is distinctively different from other states, followed by Assam and Odisha.

#### Infrastructure for services

Table 4.6 shows that while placement cells are there in about 93% of the institutions, IPR cell and Incubator centres are not common. Incubation centres are there only in 39% institutions. In terms of the type of institutions, as shown in table 4.7, Central government institutions are way ahead of state government institutions. Comparison with other types of institutions would not be very meaningful due to small numbers. Over all pictures that emerge (from tables 7-10) is that placement cells are there in most of the institutes, where as IPR and Incubation cell is not many in numbers.

## **Infrastructure Classroom**

72% of the departments have 10 or fewer classrooms, as can be seen from table 4.11. It appears that most of the respondent departments are small in size. In addition, about 60% responding departments have classrooms in the range of 1-5 (table 4.12). Again, availability of general classrooms and smart classrooms do not significantly differ among the types of institutions (table 4.13 and 4.14). The observations remain more or less the same when seen in terms of the levels of grants (tables 4.15 and 4.16).

## **Investment on infrastructure**

While the FIST fund is for infrastructure in general, there is an emphasis on the equipment, as that is the major requirements expressed by PIs and respondents. Table 4.17 shows the same – 88% of the investment was on equipment, followed by Internet and Communication, and lab renovation.

With reference to the table 4.18a it is to be noted that overall, 54% of the equipment bought are working, while 56% of the equipment purchased during 2000-2003 are still working, and 82% of equipment purchased during 2012-15 are working, the same for 2015-2018 is only 16.06%.

The table 4.19 clarifies the observation to some extent. It suggests that more expensive the machine less is the working life. In other words, machines that are more expensive are more prone to breakdown.

More than 50% of the equipment purchased has been installed within six months of procurement of the same (table 4.20). However, it is also to be noted that about 5% of the equipment took more than 12 months for installation after procurement.

The idea behind funding equipment through FIST is to create a facility point that would benefit many within the grantee organisation and users from other academic fraternity. Table 4.21 shows the extent of utilisation of such equipment. In terms of number of per week internal user of the equipment 27.5% equipment are used by about 15+ users per week. The external users are about 5 per week for 17% of the equipment. Table 4.22 presents extent of utilisation of the equipment procured with FIST grant. The last column shows the percentage

utilisation of the equipment in the range of 76-100%. It is to be noted that older the equipment higher is the per cent utilisation.

**Observations:** Central govt. institutions are better off in terms of the facilities available. IPR cell and incubation centres are rare. Most of the grantee departments have classrooms in the range of 1-5. The scenario does not differ much over the types of institutions. It appears that more expensive or sophisticated the equipment more is the chance of breakdown. Utilisation of the equipment is in the range of 76% to 100%; including considerable users from outside the institutes.

**Table 4.1: Available Infrastructure in the grantee departments**

<b>Facilities</b>	<b>No. of response</b>	<b>(%)</b>
Dept. Library	173	82.40
Internet faculty/Scientist	203	96.70
Internet students/staff	204	97.10
Internet Library	193	91.90
Internet Office/Admin	203	96.70
Computerized Admission	190	90.50
Computerized Exam	127	60.50
Computational facilities	195	92.90
Res Labs Bio	87	41.40
Res Labs Chem	100	47.60
Res Labs Phy	106	50.50
Lab safety	182	86.70

**Table 4.6 (4.10): Infrastructure available in the Institutes at the time of survey**

<b>Facilities</b>	<b>No. of response (%)</b>
Placement cell	50(92.60)
IPR Cell	28(51.90)
Incubation Center	21(38.90)

## Chapter 5

### Impact on working environment and capacity building

The main objective of the study has been assessment of the impact of FIST grants on the S&T education and research. This chapter deals with the impact on working environment and capacity building. Table 5.1 is on working environment captured through general infrastructure like workspace, cleanliness, communication system, attitude of the administration etc. Responses were sought on qualitative assessment of the selected issues. In general, there is significant improvement in most of the aspects. It is, however, interesting to note that there are comparatively stronger negative views about the administrative and office support. Working space also remains a problem that did not improve even after execution of the FIST programme. Table 5.2 presents the impact on work environment, the output side. As table 5.2 shows, most of the respondents do not think that there have been any radical changes in the working environment. About 26% suggests that there is improvement in international publications and collaboration.

So far capacity building is concerned (Table 5.3), there is more than 100% change in most of the aspects except, understandably, participation in the international conference. Regarding Lab and computational facility 23% and 15%, respectively feel that there are improvements after the execution of the FIST. Regarding impediments (table 5.4) fund related issues have been mentioned by 31% of the respondents, whereas 20% think lack of infrastructure as an impediment. It appears that there are no other major impediments.

**Observations:** While the general perception is significant improvement in most of the aspects, there are comparatively stronger negative views about administrative support. Working space also remained a matter of concern for most of the institutions. There is improvement, post FIST, in international publications and collaboration. However, most of the respondents do not think there is any remarkable improvement in the overall working environment. Fund release related issues and inadequate infrastructure have been suggested as impediments by some of the respondents.

## Chapter 6

### Impact on Manpower and Capacity Building

#### Impact on Manpower

Tables 6.1 to 6.5 present the assessment of impact on manpower of the grantee departments. Overall change in manpower is 13.6%, maximum being in the category 'Scientist'. Category Assistant Professor shows higher SD after FIST. Along with small % change in the total number the SD indicates new inductions in a few departments. Lower SD after FIST and negative percentage change of the total number for associate professors is likely indicator of promotions from the Asst Prof posts along with no new recruitment (table 6.1). Table 6.2 suggests, when seen in terms of the types of the institutions, that after FIST there are manpower gains mainly in the categories like scientists, and researchers in central govt. and state govt. institutions followed by deemed universities. Since 'scientist' as a faculty manpower category exists only in the R&D institutions, and not in the universities, it appears that post FIST universities did not gain much in terms of manpower. Exactly similar gains are noticed when seen in terms of level of funding (table 6.3).

#### Impact on capacity building

There is increase in sanctioned seats in all higher education categories from Graduation to Ph.D. programmes. However, SD also has increased in all categories except M.Phil. (table 6.4). Table 6.5 shows that admission in post-graduation courses has significantly improved after FIST, albeit with higher SD. There are positive changes in pass percentage after FIST grant, with a slight dip in post-graduation courses that has brought down the overall percentage course, and very significant change in Ph.D. from 85% before FIST to 84% after FIST. There is positive percentage change in students getting first division after FIST, with again slight dip in M.Phil. but very significant percentage gain in Ph.D. programme (table 6.7).

#### Impact on volume and quality of research output

Publications in different forms and platforms are important research output. This section captures if FIST funding had any impact on the quality and volume of publications. Table 6.8 shows gains in all forms of publications, in which publication of original articles increased by 163%, and for books it is 98%. How do the members of faculty view the contribution of FIST

on the performance of the department? Table 6.9 presents a snapshot. There is a sort of unanimity that there has been considerable improvement in paper publication, impact factor and citation after FIST grant. However, regarding patents, commercialisation of technology and product/process development the trend is not distinguishable. As another indicator post FIST there is huge improvement in the various types of national and international level awards and recognitions for the faculty and scientists of the department (Table 6.10).

**Observations:** It appears that post FIST universities did not gain much in terms of manpower. Whereas number of scientists have increased in research institutions. Both student intakes in higher education and research (M.Phil. and Ph.D.) and pass percentage in higher division/grade have shown significant increase post FIST.

There is a sort of unanimity that there has been considerable improvement in paper publication, impact factor and citation after FIST grant. So, has been receiving national and international awards. However, patent and commercialisation of technology have not accelerated.

**Table 6.1: Impact on volume of Manpower of the grantee department**

Manpower	No. Before FIST		No. After FIST		% Change
	$\Sigma$	Mean $\pm$ SD	$\Sigma$	Mean $\pm$ SD	
Asst Prof	1475	10 $\pm$ 19	1656	11.3 $\pm$ 26.50	12.30
Ass Prof	747	5.1 $\pm$ 9.10	719	4.9 $\pm$ 7.70	-3.70
Prof	311	2.1 $\pm$ 2.90	397	2.7 $\pm$ 3.60	27.70
Scientist	38	0.3 $\pm$ 1.30	123	0.8 $\pm$ 5.30	223.70
Research staff	242	1.6 $\pm$ 15.30	273	1.9 $\pm$ 12.80	12.80
Tech Staff	798	5.4 $\pm$ 10.50	877	6 $\pm$ 11.80	9.90
Admn Staff	740	5.1 $\pm$ 13.30	897	6.1 $\pm$ 18.20	21.20
Total Category	4351		4942		13.60

Fig 6.1: Impact on volume of Manpower of the grantee department

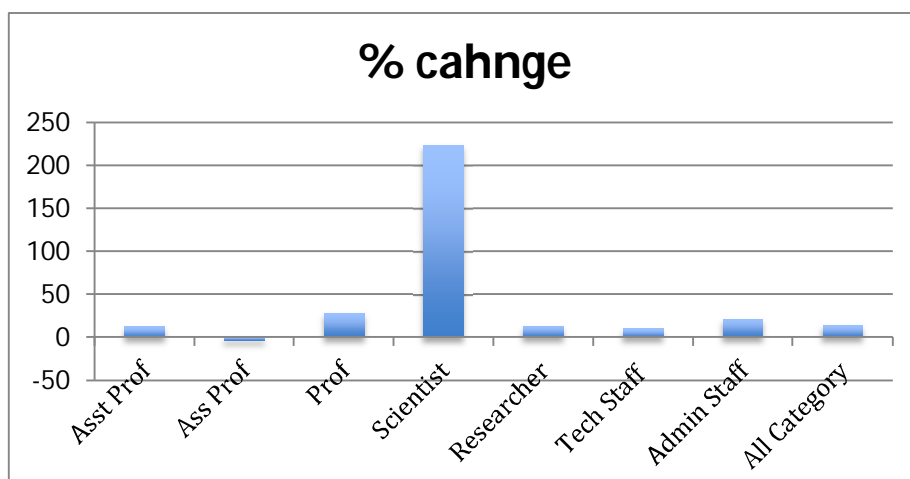


Table 6.8: Change in Publication

<b>Publications</b>	<b>Before FIST</b>	<b>After FIST</b>	<b>% Change</b>
Books(N=93)	470	929	97.70
Books Chapter(N=100)	646	1358	110.20
Original articles(N=130)	6232	16446	163.90
Review articles(N=74)	498	989	98.60
Case reports/ Editorial Notes(N=39)	68	195	186.80
Articles in Conference Proceeding(N=103)	2714	7257	167.40
Paper Presentation in Conference (N=108)	2775	7826	182.00
Monograph(N=27)	21	60	185.70
Others(N=24)	122	214	75.40
<b>Total</b>	<b>13546</b>	<b>35274</b>	<b>160.40</b>

## Chapter 7

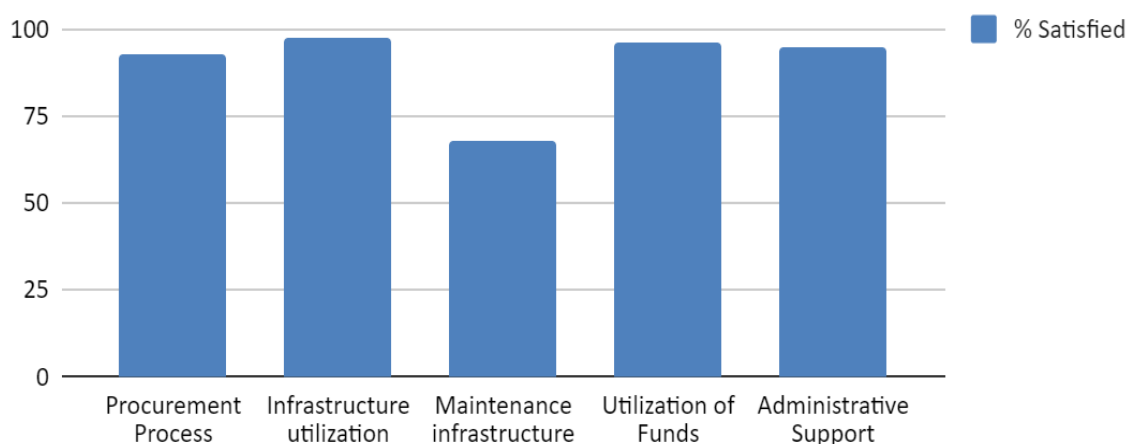
### Administrative processes for implementation of FIST projects

This chapter focuses on the process of implementation of the projects under FIST grant. As the table 7.1 shows, five different aspects of the administrative processes are examined for the present study. Those are: Procurement Process, Infrastructure utilization, infrastructure Maintenance, Utilization of Funds, Administrative Support. Information used in this chapter is based on the assessment of the respondents from the departments. The table suggests that there is an overall satisfaction (over 90% level) with the administrative processes, except in the case of maintenance of infrastructure for which satisfaction level is 68%. Following tables detail the responses on each process separately.

**Table 7.1: Administrative Processes**

Process	N	Number Satisfied	% Satisfied
Procurement Process	184	171	93.00
Infrastructure utilization	184	179	97.30
Maintenance infrastructure	170	115	67.60
Utilization of Funds	176	169	96.00
Administrative Support	173	164	94.80

**Fig. 7.1: Administrative Processes**





Five processes in the table were further elaborated with positive responses, constrained faced, and suggestion on the process with set of supplementary questions as detailed in tables 7.2 to 7.16 in the Appendix. Important highlights are tabulated below.

<b>Process</b>	<b>Positive response</b>	<b>Constrained faced</b>	<b>Suggestions</b>
Procurement Process	Procedure made easy for 24% of the respondents. 15% said Admin was supportive	Not having tech staff for operation and maintenance. No Provision of AMC	Financial Power for PI
Infrastructure utilization	More than 50% finds proper utilisation, and resulting positive changes in output.	Same as above	Administrative autonomy for PI. Training of tech staff for operation and maintenance
Maintenance infrastructure	Institute provided fund for infrastructure	No tech staff, lack of administrative support. No AMC	Fund for AMC. Also, provision of tech manpower
Utilization of Funds	Infrastructure improved	Same as above	Autonomy for PI. Timely release of money.
Administrative Support	Supportive administration	Process delay due to non-cooperative administration	e-management

## **Chapter 8**

### **Success Stories of the DST-FIST programme from ENE states**

What should we consider as success of a programme like DST-FIST? In simple accounting, terminology if grant received under the programme has been utilized for the purposes specified in the grant the same would be considered as success. The output and outcome of the grant, however, would vary depending upon the way it has been used for harnessing the research and academic capabilities of the grantee department. The expectation of impact under the FIST programme has been that the grant would be utilized in such a way that the performance would be reflected in the expansion of the activities of the department in terms of student intake; courses offered, publications, research activities, Ph.D., collaborations etc.

While most of the departments studied, barring a few, reported significant positive changes in the academic and research activities, the departments that stand out are the ones that could expand their academic activities through new collaborations. In addition, in most the cases the same could happen due to the dynamic leadership of the head of the department. In our perception, therefore, the leadership is the singular most important factor that could expand the boundary of success of the project beyond the defined criteria.

We, therefore, have chosen two cases where the role of leadership is visible determinant of the success that pushed the boundary.

#### **Success story 1**

##### **Department of Zoology, North Eastern Hill University**

**SR/FIST/LSII-039/2000 (Level-2)**

###### **About the institute and the department:**

The department was established in 1974. They received two FIST grants, first one in 2000, and the other one in 2014. They offer Undergraduate, Postgraduate, M.Phil., and Ph.D. courses. Financially they are supported by the central government. In 2000, they received a level-2 project from DST FIST. They have all kinds of Internet and computational facilities but separate chemical research labs and separate physical research labs are required.

**About Grant:**

The Department of Zoology received an amount of Rs. 46.5 lakhs in the year 2001. Professor K. Chatterjee was the project coordinator at the time of first FIST grant. Rs. 40 lakhs were used for the procurement of equipment. Rs. 50,439 was used for the establishment of the internet and communication facility and Rs. 1.5 lakhs were used for the repair and maintenance of existing equipment.

**Academic Achievements:**

Academic achievement of the department has been quite significant. Original articles published before FIST was 108 that went up to 130 After the FIST program. Number of Review articles published before FIST was 2 and After FIST were 4. Number of conference papers the department produced Before FIST program were 10 After FIST: 14 Number of international awards Before FIST were 12 and After FIST the department received even more, 18 awards. Number of National awards received by the department deserves to be mentioned from 3 before FIST to 6 after FIST. Other achievements of this department like the following also deserves to be mentioned

Number of International recognitions Before FIST: 10 After FIST: 12

National recognition Before FIST: 2 After FIST: 6

National seminar Before FIST: 4 After FIST: 6

International Seminar before FIST: 1 After FIST: 2

**Attributes of the success:**

The department was very satisfied with their procurement of instruments. The fund was utilized properly to meet all the necessary requirements. They received all kinds of administrative support in the process of procurement. With the support of DST FIST, they could maintain their infrastructure in a satisfactory manner. They increased their computational and major equipment facilities. Along with these developments, there has been a significant rise noticed in the enrolment of research scholars and number of Ph.D. awarded students. Central facilities for research for this institution enhanced with proper maintenance of the equipment with manpower.

What is most commendable is the passion and dedication of Prof. Saha, head of the department. Prof. N. C. Saha and his scholars spend long time in the laboratory, which they are visibly proud of. Prof. Saha has infectious enthusiasm that motivates the scholars to come up with new research ideas. This is reflected in the collaborative research works with the younger faculties of the physics and chemistry departments of the university. In these connections, we had the opportunity to meet the faculty members who are collaborating with the Zoology department. There are several papers published in the international journals. These papers are the result of the inter-departmental collaborative works. The collaborators were also applauding the dynamism and initiatives of the Zoology department and Prof. Saha and his research team.

**Impediments faced:** No impediments faced.

## **Success story 2**

### **Ocean Engineering & Naval Architecture, IIT Kharagpur SR/FIST/ETII-034/2003 (Level-2)**

**About the institute and the department:** The department was established in 1952. They offer Undergraduate, Postgraduate and Ph.D. courses. They got their Level-2 project in 2003. They have placement cells in organization, IPR cell, incubation center, lab safety, and other computational and Internet facilities.

#### **About Grant:**

The Department of Ocean and Naval Architecture of IIT Kharagpur received an amount of Rs. 100 lakhs in the year 2004. Professor D. Sen was the project coordinator at the time of this FIST grant. The entire amount of funds received was used for the procurement of equipment. The department purchased a *Wave Generation System*; the current status of the equipment states that it is in well working condition. While no AMC was received, this equipment has managed to *generate funds worth 102.3 lakhs*.

#### **Academic Achievements:**

In terms of research publication, the improvement is rather impressive; original articles published by the department has gone up to 80 (after FIST) from 10 (before FIST), articles in conference proceedings went up to 55 (after FIST) from 10 (before FIST) and paper

presentation in conference has increased staggeringly as well 15 (before FIST) to 75 (After FIST).

**Attributes of the success:**

According to the department, the DST FIST has proven to be a huge success, as it has made the following possibilities like -

Performing experiments in the hydrodynamics Lab

Manpower training with the facility acquired

Development of Knowledge base in the field of experimental Hydrodynamics.

Number of faculty has gone up from 10 (before FIST) to 14(after FIST). Sanctioned strength of graduate students went up to 61(after FIST) from 22 and that of 8 (before FIST) to 21 (after FIST) for postgraduate students. The rise in the Sanctioned strength of Ph.D. students has been quite high from a mere 5 it has gone upto 45 (after FIST). The success rate of students admitted and the number of students graduated after completing their respective courses /thesis has been 100 percent. It can be safely said the DST FIST project has benefited this department greatly, and scholars and faculty of this department have made impressive progress in terms of research and building potential for future researchers in this discipline.

The department has shown extraordinary alacrity when the installed Wave Generation System was giving trouble. The system has been imported from Denmark. Getting it repaired by the original company was found to be very expensive. After rigorous searching within the country, they found appropriate expertise in Jadavpur University and Cultivation of Science, Jadavpur. The whole process began with informal interactions and visits that finally resulted to long-term collaborations. Together they could not only bring the Wave generating system functional without incurring much expense, they have build-up capabilities of erecting such system. The result has been expansion of the departmental activities to several new dimensions and providing services to various civil and defence requirement.

Again, this is an example of the leadership of the head of the department that could motivate not only own colleagues but peers from other institutions as well.

**Impediments faced:**

Department did not face much of an impediment, except that the funds for installing wave beach were not granted.

**Observation:** The two stories above bring out the role of leadership in deriving extensive benefit and creating impact from a programme like DST-FIST.

## Chapter 9

### Overall impact of DST-FIST support: Qualitative Assessment

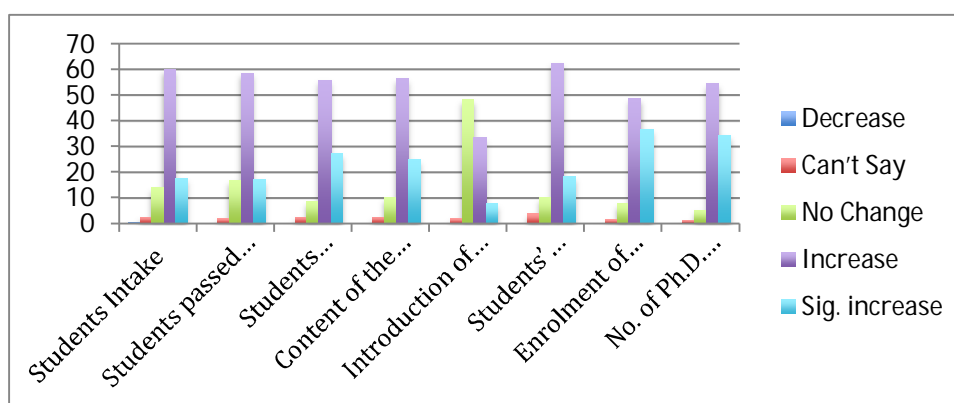
All the respondents were asked to express their views on the impacts of DST-FIST. This was in addition to the data on similar issues. Respondents were asked to rate the impact in 5 categories, ranging from decrease to significant increase as shown in the table 9.1. The set of questions were broadly divided in to three categories, namely, impact on students, on faculty and on output and recognition, as presented in fig 9.1 to 9.3 respectively. For all the three group of indicators if we count ‘increase’ and ‘significant increase’ together, positive impact of the DST-FIST funding comes out as general consensus, barring issues like faculty position, both sanctioned and filled up.

**Table 9.1: Overall Impact of DST-FIST Support**

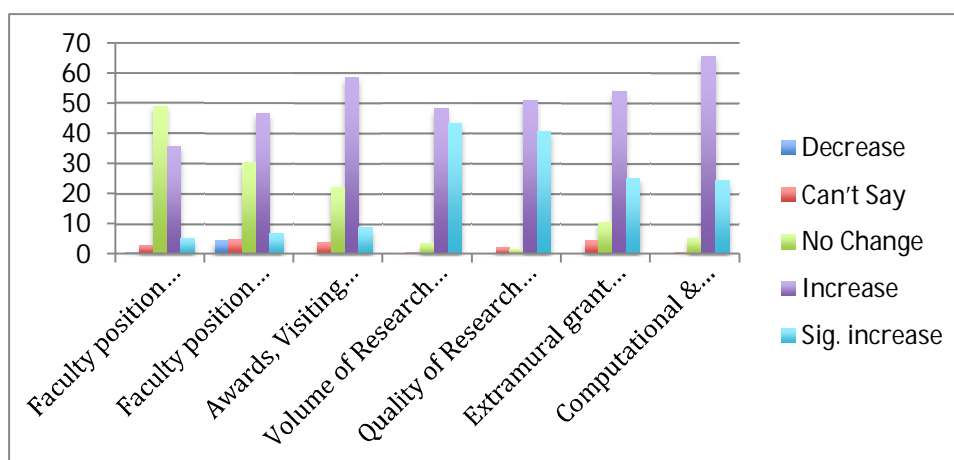
Items	Decrease (%)	Can't Say (%)	No Change (%)	Increase (%)	Sig. increase (%)
Students Intake	1(0.50)	5(2.40)	29(13.80)	126(60)	37(17.60)
Students passed out	0(0)	4(1.90)	35(16.70)	123(58.60)	36(17.10)
Students NET/GATE etc. Result	0(0)	5(2.40)	18(8.60)	117(55.70)	57(27.10)
Content of the Syllabus	0(0)	5(2.40)	21(10)	118(56.20)	52(24.80)
Introduction of the New PG Program, if any	0(0)	4(1.90)	101(48.10)	70(33.30)	16(7.60)
Students' placement	0(0)	8(3.80)	21(10)	131(62.40)	38(18.10)
Enrolment of Research Students	0(0)	3(1.40)	16(7.60)	102(48.60)	77(36.70)
No. of Ph.D. Award	0(0)	2(1)	11(5.20)	114(54.30)	72(34.30)
Faculty position (Sanctioned)	1(0.50)	6(2.90)	103(49)	75(35.70)	11(5.20)
Faculty position (Filled)	9(4.30)	10(4.80)	64(30.50)	98(46.70)	14(6.70)
Awards, Visiting assignments, PDF assignments	0(0)	8(3.80)	46(21.90)	123(58.60)	18(8.60)
Volume of Research Publications by Faculty/ Scientists	0(0)	1(0.50)	7(3.30)	101(48.10)	91(43.30)
Quality of Research Publications by Faculty/ Scientists	0(0)	4(1.90)	3(1.40)	107(51)	85(40.50)
Extramural grant received	1(0.50)	9(4.30)	22(10.50)	113(53.80)	53(25.20)
Computational & Major Equip. facilities in	0(0)	1(0.50)	11(5.20)	138(65.70)	51(24.30)

Items	Decrease (%)	Can't Say (%)	No Change (%)	Increase (%)	Sig. increase (%)
the department					
Departmental Library facilities	0(0)	6(2.90)	59(28.10)	101(48.10)	29(13.80)
Accreditation level by the NAAC/NBA/UGC/MCI peer review team	0(0)	14(6.70)	24(11.40)	113(53.80)	43(20.50)
Academic reputation and visibility	0(0)	2(1)	3(1.40)	141(67.10)	54(25.70)
Community/ outreach program	0(0)	17(8.10)	43(20.50)	114(54.30)	23(11)
Attracting talent to organization	1(0.50)	13(6.20)	26(12.40)	133(63.30)	25(11.90)
Visitors from abroad/ reputed institutes	0(0)	4(1.90)	29(13.80)	140(66.70)	26(12.40)
Quality of Teaching	0(0)	2(1)	7(3.30)	137(65.20)	54(25.70)
Research Environment	0(0)	1(0.50)	0(0)	108(51.40)	91(43.30)

**Fig 9.1: Impact of DST-FIST on students and their performance**

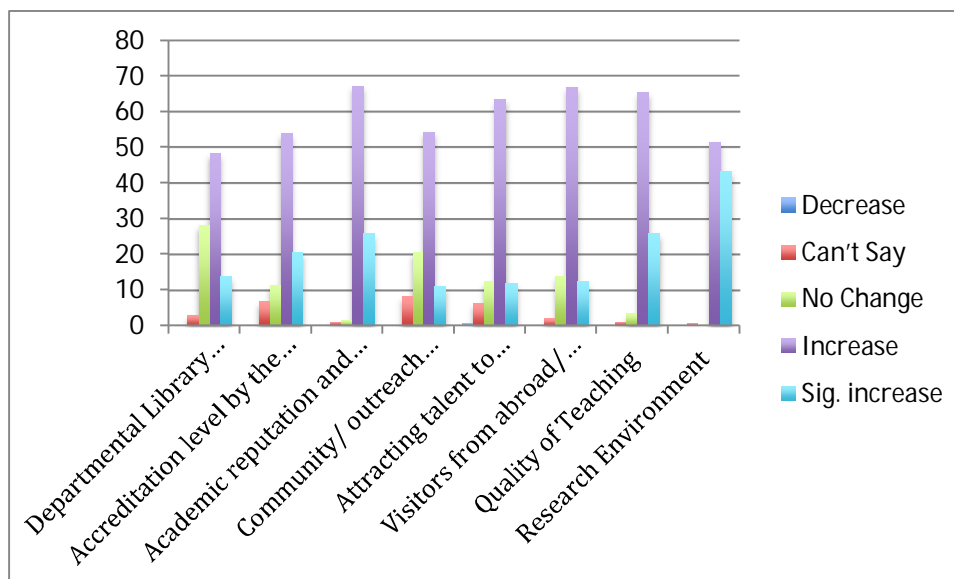


**Fig 9.2: Impact of DST-FIST on faculty and their performance**





**Fig 9.3: Impact of DST-FIST on output and recognition**



**Suggestion: Improvement of S&T and DST initiatives**

Respondents were also asked to lend their suggestions for improvement in the science and technology of this country with special reference to the efforts being made by the Department of Science and Technology. Not many respondents were forth coming; hence, responses received are not adequate for drawing any generalised observations.

**Table 9.2: Suggestions for improvement**

Issues	East & North East No. (%)
Technical staff for handling Equipment	6(1.30)
Timely release of funds(Research, Infrastructure, teaching, Equipment, manpower)	19(4.20)
Research Improvement/Development/ Environment of university/ Education policy/collaborations	52(11.60)
Administrative Problem	4(0.90)
Skill Development(Science & Technology)/Institutional Development	3(0.70)
Improvements in labs/teaching/networking facility advanced laboratory at college level	0(0)
Infrastructure/Equipment addition and maintenance	6(1.30)
Computational facility	1(0.20)
Not Sufficient faculty members	0(0)

<b>Issues</b>	<b>East &amp; North East No. (%)</b>
Continuous support of DST/Annual monitoring of projects	30(6.70)
More Funds/AMC/Grants for technicians/funds for school level	54(12.10)
Additional support for UG &PG Students	2(0.40)
Evaluation of DST FIST is to be made after completion of project	2(0.40)
No/nil/null/none/no suggestion/no response	254(56.70)
Not relevant to question /irrelevant	15(3.30)
NA/ Not applicable	0(0)

## Chapter 10

### Conclusions and recommendations

#### Conclusion

In one sentence, there is tremendous appreciation of the programme among the grantees of the ENE states. The departments visited would proudly take around the facilities that were created through FIST grants. There is a consensus, also revealed through hard data, that FIST has opened up opportunities for the recipient departments, both faculties and students. Outcome in terms of student's intake, performance of the students, quality publications, award, recognitions, collaboration have seen notable positive changes. Takeaways that are more detailed are:

Report on ENE states cover 11 states including big states in the plains, namely, West Bengal, Odisha, and Jharkhand as eastern states, and seven states in North East. Among North East states, Assam is different from other six smaller states. Assam has established institutions of national importance, and unlike other six states, has a place in higher education and research in science and technology.

The DST-FIST has played twin role of supporting advanced research and education in established and renowned institutions in one hand, and handheld other institutions to promote higher education and research.

Govt. supported and autonomous institutions are the major recipients of the FIST support. Privately owned institutions are rare in the list.

Among the grantees, Central Govt. Institutions are better equipped in terms of available infrastructure. It has been seen that in many cases fund disbursed under FIST could not be fully utilised. North-East states face specific problems related to transportation of equipment that delays installations after purchase of the equipment.

FIST funds have been used mainly for equipment. Some older generation equipment is still in working conditions while many comparatively new equipment face breakdown related problems. In general, utilisation of equipment is in the range of 76 to 100 % range with considerable internal usages and users from other institutions.

Although there are not significant improvements in the faculty positions of the grantee departments, there are significant positive changes in student intakes in higher degree courses, and pass percentages with better divisions and grades. More numbers of students are qualifying for sought after competitive exams.

There are remarkable positive changes in national and international publications with higher citation in higher impact factor journals. National and international collaborations, award, and recognitions for the faculties have seen positive changes. Patent and commercialisation of technology are not in the

Dissatisfaction with administrative process is quite common.

Off the questionnaire, discussion with the respondents and other faculty members helped decipher many aspects that become decisive for deriving best benefits from the FIST grants. Among many stories two presented in the report succinctly, bring out the role of leadership in making the FIST give best.

### **Recommendations**

Dearth of facilities and infrastructure, but indomitable dedication, commitment and passion to prove to themselves is how one can describe the science departments in the institutions in North East states. The marginal utility of investment in research infrastructure in these institutes, therefore, is much higher than the institutes in other states. At the same time the faculty members in these institutions, due to some psychological barrier, generally hesitate to approach the funding agencies in Delhi; too distant for them.

The study would therefore like to recommend flow of more FIST funds to the institutions in these states. It is also felt that they need some kind of handholding for encouraging them to apply for the grants under FIST.

As it has been observed, the privately owned institutions of higher education, which has grown at a very fast pace over last decade, have negligible presence in the FIST grant list. They constitute a big chunk of the available pool of S&T education and research. Such institutions also should be encouraged to apply for the FIST grants.

In many cases, the FIST project suffered in the North East states due to not so easy communication network. Such issues may be taken into account while granting grants.

There are cases that bring out the need for associated infrastructure for implementation of the FIST projects. The host institute has to make such infrastructure available. The approval of grant has to make such availability as precondition.

Maintenance of the equipment is a nagging issue faced by most of the institutions. The grant should include maintenance cost of the equipment under separate head.

There is equipment that require dedicated trained operator. The application for the grant should seek clear information on such requirements. Cost related to trained operator of the equipment should be included in the total grant amount.

There is equipment that remains operational and extensively used even after the FIST grant period is over. However, maintenance of such equipment becomes a major problem. More so when the equipment demands repair or replacement of some components. The matter may be taken up for optimum utilisation of the equipment and FIST grants.

# Evaluation of Impact of DST-FIST Program

Regional Report: East and North East states

## Appendix – 1: Chapter-wise tables

### Introduction to regional report: ENE States

**Table 1: State-wise Number of FIST grants studied in ENE**

Name of States	No. of projects (%) of total	No. of responses received (%)	No. with no response/declined (%)	Not traceable
Arunachal	1 (0.30)	1 (100)	X	X
Assam	53 (16.06)	51 (96.23)	2 (3.78)	X
Manipur	10 (3.03)	10 (100)	X	X
Meghalaya	11 (3.33)	11 (100)	X	X
Mizoram	3 (0.91)	3 (100)	X	X
Nagaland	3 (0.91)	3 (100)	X	X
Sikkim	1 (0.30)	1 (100)	X	X
Tripura	5 (1.52)	5 (100)	X	X
Odisha	38 (11.52)	34 (89.48)	4 (10.52)	X
Jharkhand	18 (5.45)	15 (83.34)	3 (16.68)	X
West Bengal	187 (56.67)	120 (64.17)	64 (35.83)	3
Total	330 (100)	254 (76.74)	73 (22.36)	3 (1.00)

**Table 2: State-wise number of respondent institutions and departments**

State	No. of Institute	No. of Dept./School /Center/college	No. of Grants	(%) of no. of Grants
Arunachal	1	1	1	0.40
Assam	7	44	51	20.10
Jharkhand	2	13	15	5.90
Manipur	1	7	10	3.90
Meghalaya	1	9	11	4.30

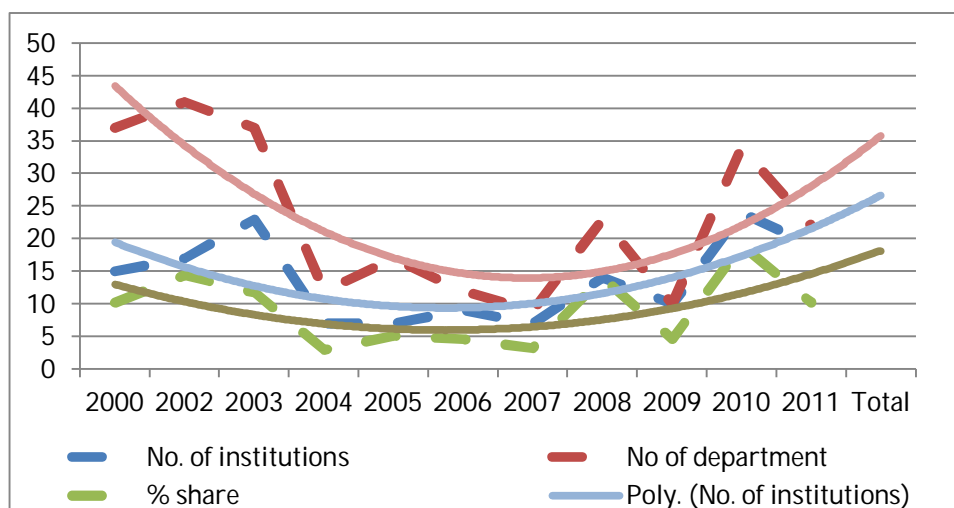
State	No. of Institute	No. of Dept./School /Center/college	No. of Grants	(%) of no. of Grants
Mizoram	1	3	3	1.20
Nagaland	1	3	3	1.20
Odisha	12	30	34	13.40
Sikkim	1	1	1	0.40
Tripura	1	5	5	2.00
West Bengal	26	94	120	47.20
Total	54	210	254	100

**Table 3: Expansion trajectory of FIST grants in ENE**

Years	No. of institutions	No. of grants	Grant Amount (Rs. In lakhs)	% of grant amount
2000	15	37	1791.20	10.16
2002	17	41	2540.50	14.41
2003	23	37	2079.10	11.79
2004	7	12	520.10	2.95
2005	7	17	892.00	5.06
2006	9	12	811.50	4.60
2007	7	9	561.80	3.19
2008	14	23	2476.50	14.04
2009	10	10	809.20	4.59
2010	24	34	3350.10	19.00
2011	19	22	1801.60	10.22
Total	152	254	17633.40	100.00

**Note:** As shown in Table 2 above, total number of institutions supported under FIST in ENE is 54. Different departments of these institutes received grants in different years, and counted as separate institutes for each year for the table 3.

**Fig 3: Expansion trajectory of FIST grants in ENE**

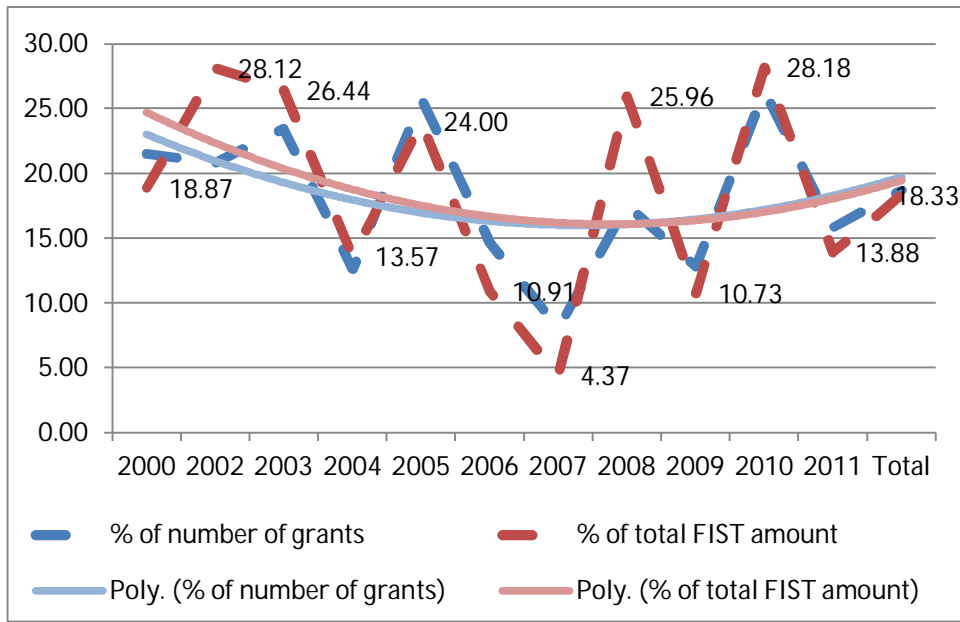


**Table 4: Share of ENE states in total FIST grants, 2000 - 2011**

Years	% in total number of grants	% in total FIST grant
2000	21.51	18.87
2002	20.81	28.12
2003	23.42	26.44
2004	12.63	13.57
2005	25.76	24.00
2006	14.63	10.91
2007	8.04	4.37
2008	17.56	25.96
2009	12.82	10.73
2010	26.36	28.18
2011	15.83	13.88
Total	18.69	18.33



**Figure 4: ENE and total FIST grants over the years**



# Chapter 1: Introduction, genesis of DST-FIST program and need of present Study

**Table 1.1: Chronological development of FIST**

Year	Chronological development	Purpose
1999	Scheme was conceptualized	To facilitate support towards augmenting higher education and research largely at the Departments of Universities and other academic sectors (including PG Colleges) by augmenting basic infrastructural facilities for teaching as well as for conducting research in basic or applied S&T areas. Support (@100%) was extended to both Govt. and Private organizations for both PG teaching and advanced research.
2000	FIST was formally launched at 2 levels with financial limits: Level 1: up to Rs. 100.00 lakhs Level 2: up to Rs. 200.00 lakhs	
2000-2005		
2006	Upper limits at both the levels were revised: Level 1: up to Rs. 300.00 lakhs Level 2: up to Rs. 1000.00 lakhs	Support (@100%) was provided to only Govt. and Govt. aided organizations for both PG teaching and advanced research infrastructure. For Private self-financed organizations, the sanctioned grant was provided on 50:50 modes (i.e. 50% by Govt. and 50% by the Private organization) for only research purpose.
2009	FIST support revised to 3 levels with financial limits: Level 0: up to Rs. 50.00 lakhs Level 1: up to Rs. 300.00 lakhs Level 2: up to Rs. 1000.00 lakhs	Introduction of Level '0' support exclusively for PG Colleges. The unit of support was College as whole rather than individual Departments of the College.
2010	FIST support quantum was revised with financial limits: Level 0: up to Rs 100.00 lakhs Level 1: up to Rs 300.00 lakhs Level 2: up to Rs 1000.00 lakhs	Upper limit of support for the PG Colleges at Level '0' was revised to Rs. 100.00 lakhs from Rs. 50.00 lakhs.
2017	FIST support quantum was revised with financial limits: Level 0: up to Rs. 150.00 lakhs Level 1: up to Rs. 300.00 lakhs Level 2: up to Rs. 1000.00 lakhs	Upper limit of support for the PG Colleges at Level '0' was revised to Rs. 150.00 lakhs from Rs. 100.00 lakhs.
2018	FIST support revised to 4 levels with financial limits: Level 0: up to Rs. 150.00 lakhs Level 1: up to Rs. 300.00 lakhs Level 2: up to Rs. 1000.00 lakhs Level 3: up to Rs. 2000.00 lakhs	Introduction of Level '3' support exclusively for such Departments those which have already been supported for 2 cycles at Level-2 and have obtained at least one Very Good and/ or Excellent in each/ both of these cycles of support.
2019	FIST support levels with financial limits: Level 0: up to Rs. 150.00 lakhs Level 1: up to Rs. 300.00 lakhs Level 2: up to Rs. 1000.00 lakhs Level 3: up to Rs. 2000.00 lakhs	Support (@100%) would be provided for pure Govt. organizations only for high quality research; teaching activities would be discouraged. For Private self-financed as well as Govt. aided organizations the sanctioned grant would be provided on 50:50 mode (i.e. 50% by Govt. and 50% by the Private/ Govt. aided organization) only for high quality research.

Source: DST-FIST

**Table 1.2: Expansion of the FIST across the country**

States/UT	Institution (no.)	Departments (no.)	Projects (no.)	Amount Sanctioned (Rs. in Lakhs)
A & N	1	1	1	80.00
Andhra Pradesh	7	33	38	1966.90
Arunachal Pradesh	1	1	1	75.70
Assam	7	44	51	3611.70
Bihar	3	4	4	98.50
Chhattisgarh	4	8	9	316.50
Delhi	8	34	38	4197.70
Goa	2	11	13	798.50
Gujarat	8	25	31	1632.10
Haryana	4	19	21	910.30
Himachal Pradesh	6	17	18	906.80
Jammu & Kashmir	3	13	15	668.80
Jharkhand	2	13	15	1016.90
Karnataka	27	98	117	13609.60
Kerala	46	103	111	4811.70
Madhya Pradesh	12	24	24	845.30
Maharashtra	39	78	92	6093.40
Manipur	1	7	10	485.50
Meghalaya	1	9	11	587.80
Mizoram	1	3	3	139.50
Nagaland	1	3	3	73.00
Odisha	12	30	34	2011.10
Puducherry	2	9	11	886.90
Punjab	17	59	68	3792.90
Rajasthan	16	34	37	2110.40
Sikkim	1	1	1	20.00
Tamil Nadu	66	222	250	16440.80
Telangana	10	43	53	3522.30
Tripura	1	5	5	114.30
Uttar Pradesh	33	92	115	12354.00
Uttarakhand	12	33	39	2518.30
West Bengal	26	94	120	9497.90
<b>Total</b>	<b>380</b>	<b>1170</b>	<b>1359</b>	<b>96194.80</b>

**Table 1.3: Expansion of the FIST under different levels over the years**

	<b>Level-0</b>	<b>Amount (Rs. In lakhs)</b>	<b>Level-1</b>	<b>Amount (Rs. In lakhs)</b>	<b>Level-2</b>	<b>Amount (Rs. In lakhs)</b>
2000	-	-	97	3370.30	75	6123.40
2002	-	-	131	4659.70	66	4375.20
2003	-	-	118	4052.30	40	3812.10
2004	-	-	67	2092.70	28	1739.30
2005	-	-	44	1845.90	22	1870.40
2006	-	-	64	3914.90	18	3525.700
2007	-	-	79	4102.70	33	8755.70
2008	-	-	100	6028.20	31	3511.80
2009	9	398.90	40	2084.00	29	5060.60
2010	28	1620.30	71	4708.20	30	5560.00
2011	35	2577.30	65	4053.10	39	6352.80
Total	72	4596.40	876	40911.40	411	50686.90

## Chapter 2: Review of literature, Methodology and the Execution plan of the study

**Table 2.1: Issues to be focussed in the study**

<b>Impact on Science (advances in knowledge)</b>	
Specialities	d. New training programme e. Enrolment of in the new programme f. Number of new journals and articles
Theories	c. Invention of a new theory d. Use of the new theory (citation)
Methodologies	c. Conception of a new methodology d. Use of the methodology (citation)
Facts	c. Discovery of a new fact d. Use of the fact (citation)
Models	c. Construction of a new model d. Use of the model (citation)
Research Activities	
Contribution to research	b. Number of new publications
Type of research	c. Diversification d. Intensification
Inter sectoral	b. Number of publications
Interdisciplinary	c. Number of publications d.
International	b. Number of publications
Training of researchers	
Research competence	b. Defining a research problem, organising project, collection of data, analyses of data
Related competence	b. Writing, computing, management
Technology	
Product and process	f. Achieving and improving a product and process g. Value of sales h. Patents i. Licenses j. Citations
Services	b. Development of new services
Know how	b. Number of organisation and individuals trained in
Recognition	
Credibility, visibility, prizes, awards	h. Members in the committees (national and international bodies) i. Members in the decision-making bodies of govt. j. Nomination to represent the country k. Promotion acquired l. Prizes received

<b>Impact on Science (advances in knowledge)</b>	
	m. Acquired higher degree/diploma/honours n. New career opportunities
<b>Impact on Curricula</b>	
New courses	c. Number of new courses d. Enrolment
New Training programme	c. Number of new programmes d. Enrolment
Pedagogical tools	b. New pedagogical tools introduced
<b>New human Resources</b>	
Added for the project	c. Research fellows, Assistants with qualifications at the time of entry d. Faculty, qualifications at the time of entry e.
Career opportunities	c. How many left with higher experiences/qualifications d. Jobs opted by the personnel left
<b>Learning Organisation</b>	
Project team	d. Composition of the team e. Devolution of project activities f. Intra team and inter team communication
Project output	d. Credit sharing e. Representation in the seminar and conferences (who at what level) f. Training and skill development
Attrition and retention of HR	d. Team members left the team and organisation. How many and where? e. Extent of expertise loss and replenishment f. The system of retaining expertise, if any

**Table 2.2: Time frame for the study**

<b>Reno.</b>	<b>Time</b>	<b>Activity</b>
1.	6 months	Questionnaires development, Expert group meeting, Staff selection, Purchase of equipment's and development of the project website, Design of the questionnaires in the tablets, Training of the digital questionnaires, Field testing of the digital questionnaires, Modification in the questionnaires, Distribution of work to zonal investigators,
2.	9 months	Data collection by the investigators, Random monitoring of data collection and its quality, by principal investigators/co-investigators and DST members on random basis.
3	3 months	Data analysis, report writing and dissemination.

## Chapter 3

### Criteria for FIST grant and Characteristics of grant recipients

**Table 3.1a: ENE States' share in number and value of FIST Grants (Sanctioned)**

State	No. of Projects	% of Projects	Total amount (Rs. in lakhs)	% of total amount
Arunachal	1	0.40	75.70	0.40
Assam	51	20.10	3611.70	20.50
Jharkhand	15	5.90	1016.90	5.80
Manipur	10	3.90	485.50	2.80
Meghalaya	11	4.30	587.80	3.30
Mizoram	3	1.20	139.50	0.80
Nagaland	3	1.20	73.00	0.40
Odisha	34	13.40	2011.10	11.40
Sikkim	1	0.40	20.00	0.10
Tripura	5	2.00	114.30	0.60
West Bengal	120	41.20	9497.90	53.90
Total	254	100.00	17633.40	100.00

**Table 3.1b: ENE States' share in national GDP, population and number and value of FIST Grants (Sanctioned)**

State	Share in GDP*	Share in population**	% of Projects	% of total amount
Arunachal	0.10	0.12	0.07	0.08
Assam	1.76	2.58	3.75	3.75
Jharkhand	1.42	2.73	1.10	1.06
Manipur	0.10	0.22	0.74	0.50
Meghalaya	0.14	0.25	0.81	0.61
Mizoram	0.08	0.09	0.22	0.15
Nagaland	0.09	0.17	0.22	0.08
Odisha	2.52	3.47	2.50	2.09
Sikkim	0.10	0.05	0.07	0.02
Tripura	0.20	0.31	0.37	0.12
West Bengal	6.34	7.55	8.83	9.87
Total	12.72	17.53	18.69	18.33

**Source:** Calculated from \*Gross state Domestic Product, 1 August 2019, MOSPI, GOI; \*\* Census 2011.

**Table 3.2: Type of institution-wise number and value of grants (Rs. In lakhs)**

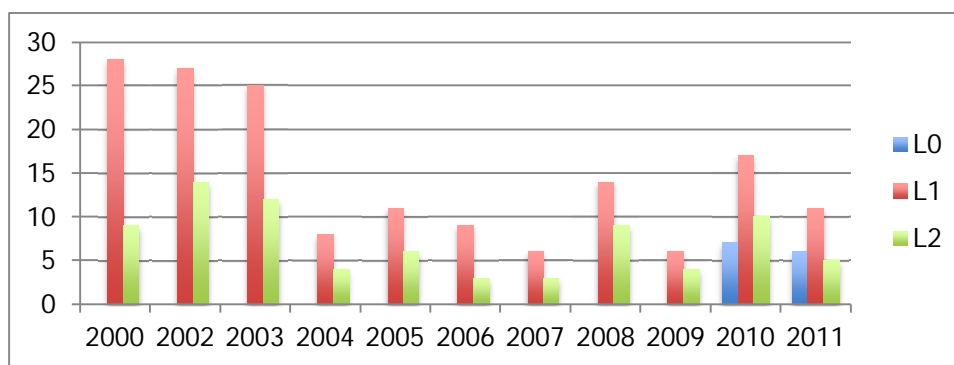
Institution Type	No. of Instrt.	% of Instrt	No. Of Grants	% Of Grants	Amount Disbursed	% total amount
Central Government Institution	11	20.40	109	42.90	6756.40	45.80
State Government Institution	26	48.10	88	34.60	4492.90	30.50
Autonomous Institution	10	18.50	39	15.40	2579.70	17.50
Deemed University	4	7.40	15	5.90	779.20	5.30
Constituent college	2	3.70	2	0.80	87.20	0.60
Private Institution	1	1.90	1	0.40	46.00	0.30
Total	54	100.00	254	100.00	14741.50	100.00

**Table 3.3a: Allocation of grants over different levels during the study period**

Years	Level wise no. of sanctioned grants/projects				
	L0	L1	L2	Total	%
2000	N.A.	28	9	37	14.60
2002	N.A.	27	14	41	16.10
2003	N.A.	25	12	37	14.60
2004	N.A.	8	4	12	4.70
2005	N.A.	11	6	17	6.70
2006	N.A.	9	3	12	4.70
2007	N.A.	6	3	9	3.50
2008	N.A.	14	9	23	9.10
2009	N.A.	6	4	10	3.90
2010	7	17	10	34	13.40
2011	6	11	5	22	8.70
Total	13	162	79	254	100.00



**Fig 3.3a: FIST grants at different levels during the study period**



**Table 3.3b: Grant amount over the study period**

Year	Total	% Total	Amount Sanctioned (Rs. in lakhs)	%	Amount Disbursed (Rs. in lakhs)	% of sanctioned amount
2000	37	14.60	1791.20	14.60	1319.10	73.64
2002	41	16.10	2540.50	16.10	2235.70	88.00
2003	37	14.60	2079.10	14.60	1998.70	96.13
2004	12	4.70	520.10	4.70	381.70	73.39
2005	17	6.70	892.00	6.70	515.00	57.74
2006	12	4.70	811.50	4.70	503.10	62.00
2007	9	3.50	561.80	3.50	434.40	77.32
2008	23	9.10	2476.50	9.10	2213.50	89.38
2009	10	3.90	809.20	3.90	704.90	87.11
2010	34	13.40	3350.10	13.40	2849.00	85.04
2011	22	8.70	1801.60	8.70	1586.50	88.06
Total	254	100.00	17633.40	100.00	14741.50	83.60

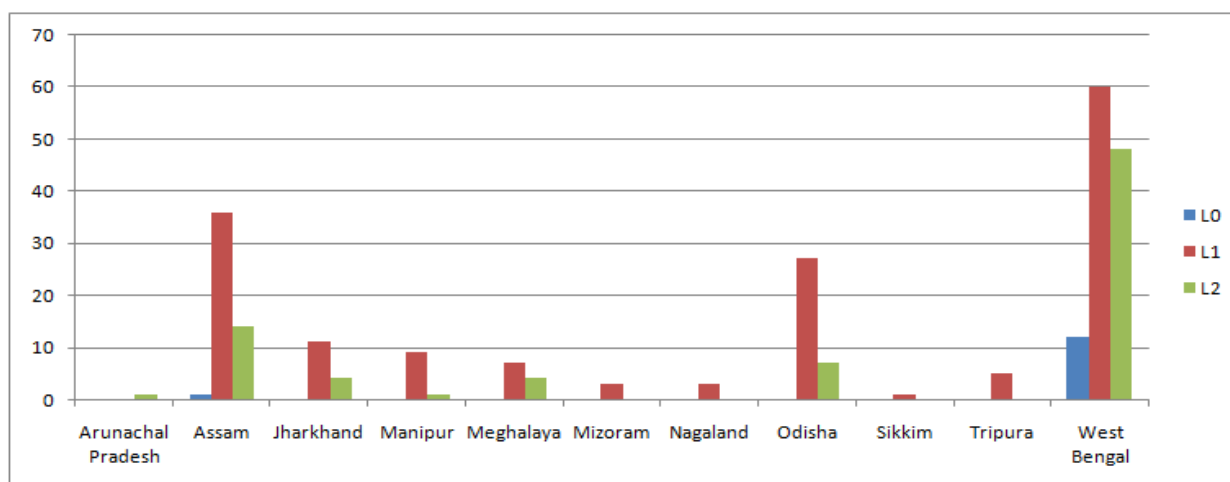
**Graph 3.3b: Grants amount sanctioned and disbursed (Rs. In lakhs)**



**Table 3.4: State-wise Distribution of level of Grants (no.)**

State	L0	L1	L2	Total	% Total
Arunachal Pradesh	0	0	1	1	0.4
Assam	1	36	14	51	20.1
Jharkhand	0	11	4	15	5.9
Manipur	0	9	1	10	3.9
Meghalaya	0	7	4	11	4.3
Mizoram	0	3	0	3	1.2
Nagaland	0	3	0	3	1.2
Odisha	0	27	7	34	13.4
Sikkim	0	1	0	1	0.4
Tripura	0	5	0	5	2.0
West Bengal	12	60	48	120	47.2
Total	13	162	79	254	100

**Fig 3.4: State-wise Distribution of level of grants (No.)**



**Table 3.5: Amount Utilization (in Crores)**

Amount Sanctioned	Amount Utilized	Amount Unutilized
176.30	128.3 (72.77%)	48.0 (27.23%)

**Table 3.6: Ownership types of the DST-FIST grantee university/institute**

<b>Source of Financial Support</b>	<b>No. of Inst./Dept. (%)</b>
Central Government	13(24.10)
State Government	31(57.40)
Others	9(16.70)
Total	53(98.10)

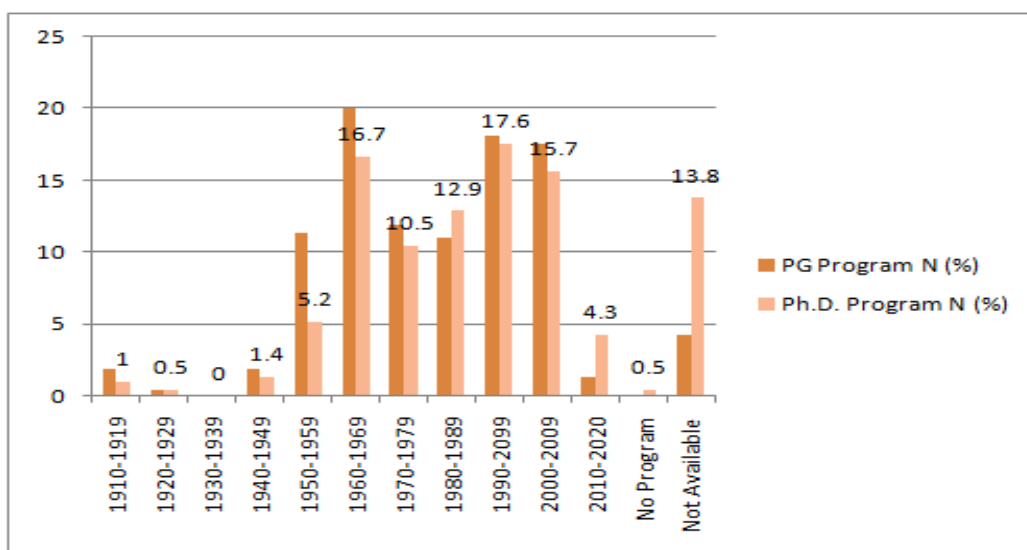
**Table 3.7: Repeat grants of the DST-FIST funding**

<b>No. of FIST Grants</b>	<b>No. of Departments (%)</b>
Received Once	160(76.20)
Received Twice	44(21.00)
Received Thrice	6(2.90)
Total	210

**Table 3.9: Commencement of academic programs in the grantee institutions**

<b>Year of Commencement</b>	<b>PG Program</b>	<b>Ph.D. Program</b>
	<b>N (%)</b>	<b>N (%)</b>
1910-1919	4(1.90)	2(1.00)
1920-1929	1(0.50)	1(0.50)
1930-1939	0(0.00)	0(0.00)
1940-1949	4(1.90)	3(1.40)
1950-1959	24(11.40)	11(5.20)
1960-1969	42(20.00)	35(16.70)
1970-1979	25(11.90)	22(10.50)
1980-1989	23(11.00)	27(12.90)
1990-2099	38(18.10)	37(17.60)
2000-2009	37(17.60)	33(15.70)
2010-2020	3(1.40)	9(4.30)
No Program	0(0.00)	1(0.50)
Not Available	9(4.30)	29(13.80)
Total	210	210

**Fig 3.9: Commencement of academic programs in the grantee institutions**



**Table 3.10: Working Status of the PIs**

Status	N (%)
Working	123(49.20)
Superannuated	98(39.20)
Joined other Inst.	14(5.60)
Any Other	15(6.00)
Total	250

**Table 3.11: Gender of Respondent**

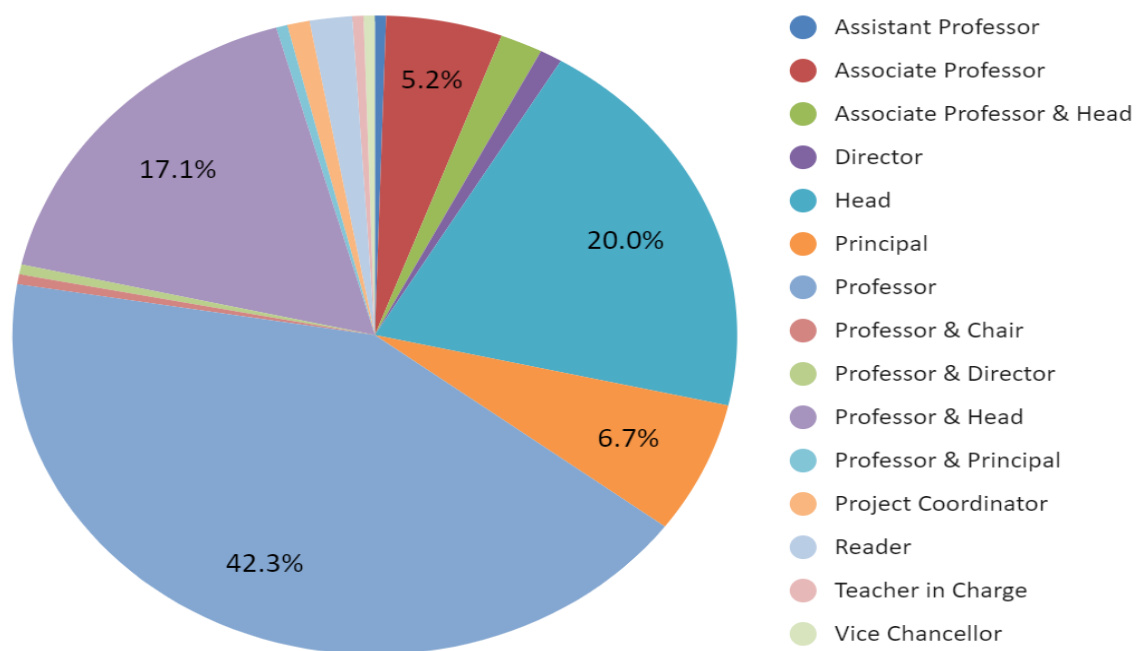
Gender of PI	Total (%)
Male	178(84.80)
Female	32(15.20)
Total	210

**Table 3.12: Designation of Respondent**

Designation of Coordinator	Total (%)
Assistant Professor	1(0.50)
Associate Professor	11(5.20)
Associate Professor & Head	4(1.90)

Designation of Coordinator	Total (%)
Director	2(1.00)
Head	42(20.00)
Principal	14(6.70)
Professor	89(42.40)
Professor & Chair	1(0.50)
Professor & Director	1(0.50)
Professor & Head	36(17.10)
Professor & Principal	1(0.50)
Project Coordinator	2(1.00)
Reader	4(1.90)
Teacher in Charge	1(0.50)
Vice Chancellor	1(0.50)
Total	210

**Fig 3.12: Designation of Respondent**

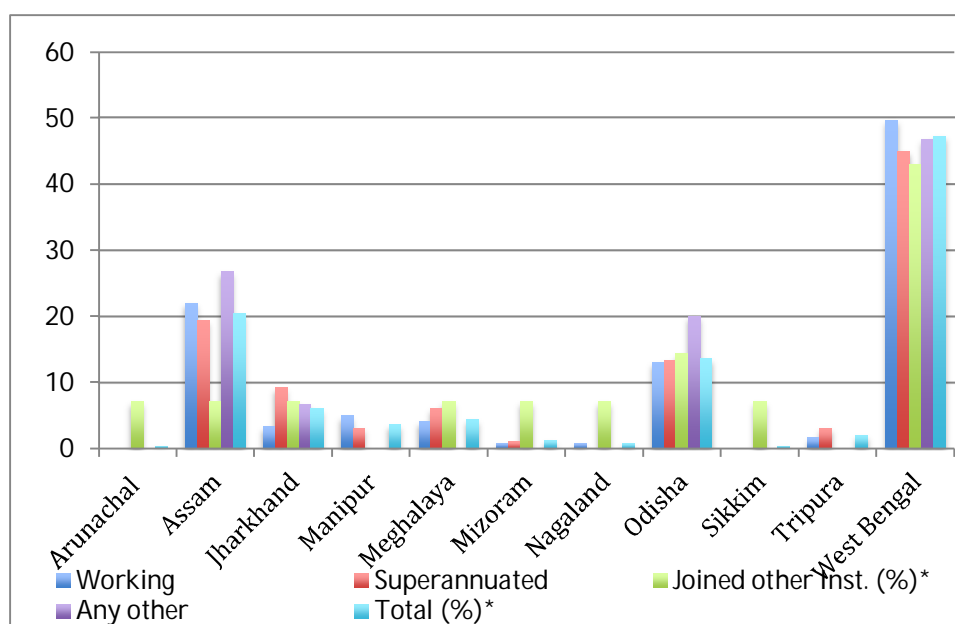


**Table 3.13a: State-wise working status of the PIs (across the states)**

State	Working (%)*	Superannuated (%)*	Joined other Inst. (%) *	Any other (%)*	Total (%) *
Arunachal	0(0.00)	0(0.0)	1(7.10)	0(0.00)	1(0.40)
Assam	27(22.00)	19(19.40)	1(7.10)	4(26.70)	51(20.40)
Jharkhand	4(3.30)	9(9.20)	1(7.10)	1(6.70)	15(6.00)
Manipur	6(4.90)	3(3.10)	0(0.00)	0(0.00)	9(3.60)
Meghalaya	5(4.10)	6(6.10)	0(0.00)	0(0.00)	11(4.40)
Mizoram	1(0.80)	1(1.00)	1(7.10)	0(0.00)	3(1.20)
Nagaland	1(0.80)	0(0.00)	1(7.10)	0(0.00)	2(0.80)
Odisha	16(13.00)	13(13.30)	2(14.30)	3(20.00)	34(13.60)
Sikkim	0(0.00)	0(0.00)	1(7.10)	0(0.00)	1(0.40)
Tripura	2(1.60)	3(3.10)	0(0.00)	0(0.00)	5(2.00)
West Bengal	61(49.60)	44(44.90)	6(42.90)	7(46.70)	118(47.20)
Total	123	98	14	15	250

Note: \* % is on column total

**Fig 3.13a: State-wise working status of the PIs (across the state)**

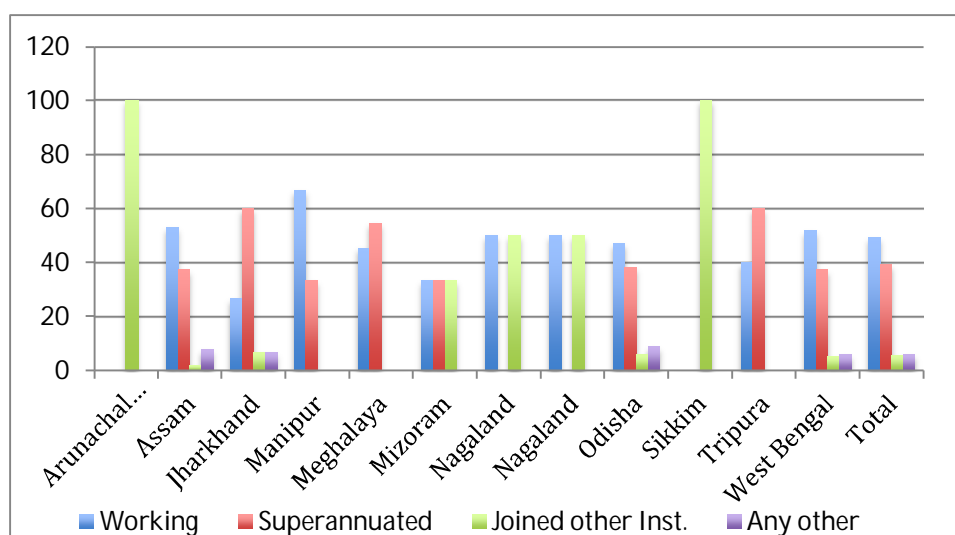


**Table 3.13b: State-wise working status of the PIs (within the state)**

State	Working	%	Superannuated	%	Joined other Inst.	%	Any other	%	Total	%
Arunachal	0	0	0	0	1	100	0	0	1	100
Assam	27	52.94	19	37.25	1	1.96	4	7.84	51	100
Jharkhand	4	26.67	9	60.00	1	6.67	1	6.67	15	100
Manipur	6	66.67	3	33.33	0	0.00	0	0.00	9	100
Meghalaya	5	45.45	6	54.55	0	0.00	0	0.00	11	100
Mizoram	1	33.33	1	33.33	1	33.33	0	0.00	3	100
Nagaland	1	50.00	0	0.00	1	50.00	0	0.00	2	100
Nagaland	1	50.00	0	0.00	1	50.00	0	0.00	2	100
Odisha	16	47.06	13	38.24	2	5.88	3	8.82	34	100
Sikkim	0	0.00	0	0.00	1	100.00	0	0.00	1	100
Tripura	2	40.00	3	60.00	0	0.00	0	0.00	5	100
West Bengal	61	51.69	44	37.29	6	5.08	7	5.93	118	100
Total	123	49.20	98	39.20	14	5.60	15	6.00	250	100

Note: % is on row total

**Fig 3.13b: State-wise working status of the PIs (within the state)**



**Table 3.14: Distribution of sanctioned and received amount (level-wise) during 2000-2011**

Years	Level wise no. of sanctioned and received amount in lakhs								
	L0		L1		L2		Total		
	Snctd	Rcvd	Snctd	Rcvd	Snctd	Rcvd	Snctd	Rcvd	% Rcvd
2000	N.A.	N.A.	1172.50	800.80	618.70	518.40	1791.20	1319.10	73.60
2002	N.A.	N.A.	1209.50	1112.50	1331.00	1123.10	2540.50	2235.70	88.00
2003	N.A.	N.A.	1065.10	1126.70	1014.00	872.00	2079.10	1998.70	96.10
2004	N.A.	N.A.	340.70	281.70	179.40	100.00	520.10	381.70	73.40
2005	N.A.	N.A.	408.00	327.60	484.00	187.40	892.00	515.00	57.70
2006	N.A.	N.A.	271.50	202.30	540.00	300.80	811.50	503.10	62.00
2007	N.A.	N.A.	377.00	282.40	184.80	152.00	561.80	434.40	77.30
2008	N.A.	N.A.	1070.80	934.90	1405.70	1278.60	2476.50	2213.50	89.40
2009	N.A.	23.5	231.70	161.20	577.50	543.70	809.20	704.90	87.10
2010	461.00	664.80	1343.10	1037.40	1546.00	1146.80	3350.10	2849.00	85.00
2011	466.50	424.80	476.30	372.40	858.80	789.30	1801.60	1586.50	88.10
Total	927.50	1089.60	7966.10	6639.80	8739.80	7012.10	17633.40	14741.50	83.60

**Table 3.15: Level wise distribution of sanctioned amount in E & NE region states**

States	Level wise sanctioned amount in Lakhs			
	L0	L1	L2	Total Amt. in Lakhs (%)
Arunachal Pradesh	Nil	Nil	75.70	75.70(0.40)
Assam	61.00	1471.40	2079.30	3611.70(20.50)
Jharkhand	Nil	459.20	557.70	1016.90(5.80)
Manipur	Nil	432.50	53.00	485.50(2.80)
Meghalaya	Nil	286.00	301.80	587.80(3.30)
Mizoram	Nil	139.50	Nil	139.50(0.80)
Nagaland	Nil	73.00	Nil	73(0.40)
Odisha	Nil	1441.70	569.40	2011.10(11.40)
Sikkim	Nil	20.00	Nil	20(0.10)
Tripura	Nil	114.30	Nil	114.30(0.60)
West Bengal	866.50	3528.60	5102.80	9497.90(53.90)
Total	927.50	7966.10	8739.80	17633.40



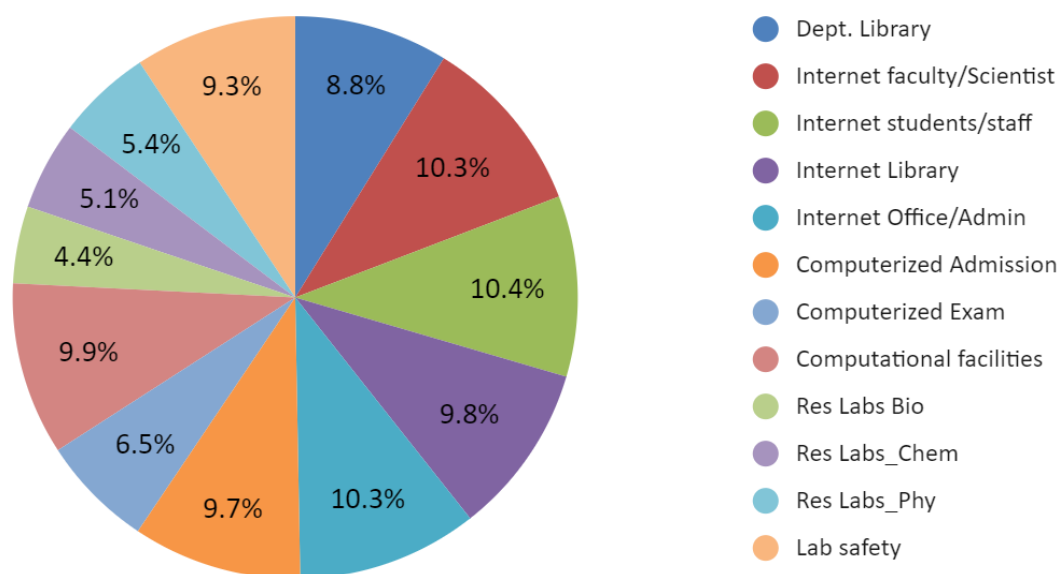
## Chapter 4

### Infrastructure & Equipment created under FIST grant

**Table 4.1: Available Infrastructure in the grantee departments**

Facilities	No. of response	(%)
Dept. Library	173	82.40
Internet faculty/Scientist	203	96.70
Internet students/staff	204	97.10
Internet Library	193	91.90
Internet Office/Admin	203	96.70
Computerized Admission	190	90.50
Computerized Exam	127	60.50
Computational facilities	195	92.90
Res Labs Bio	87	41.40
Res Labs_Chem	100	47.60
Res Labs_Phy	106	50.50
Lab safety	182	86.70

**Fig 4.1: Available Infrastructure in the grantee departments**



**Table 4.2: Types of grantee institution and infrastructure of the departments (nos.)**

Facilities	Academic status (Institutions)					
	Central Govt. (n=88)	State Govt. (n=72)	Autonomous (n=34)	Deemed University (n=13)	Constituent college (n=2)	Private Institution (n=1)
Dept. Library	67	64	30	9	2	1
Internet faculty/Scientist	84	70	33	13	2	1
Internet students/staff	85	70	33	13	2	1
Internet Library	79	66	32	13	2	1
Internet Office/Admin	83	70	34	13	2	1
Computerized Admission	82	61	32	12	2	1
Computerized Exam	57	39	20	11	0	0
Computational facilities	79	67	34	12	2	1
Res Labs Bio	33	36	12	5	1	0
Res Labs_Chem	38	37	16	7	1	1
Res Labs_Phy	40	37	17	9	2	1
Lab safety	80	63	23	13	2	1

**Table 4.2a: Types of Grantee and infrastructure of the departments (%)**

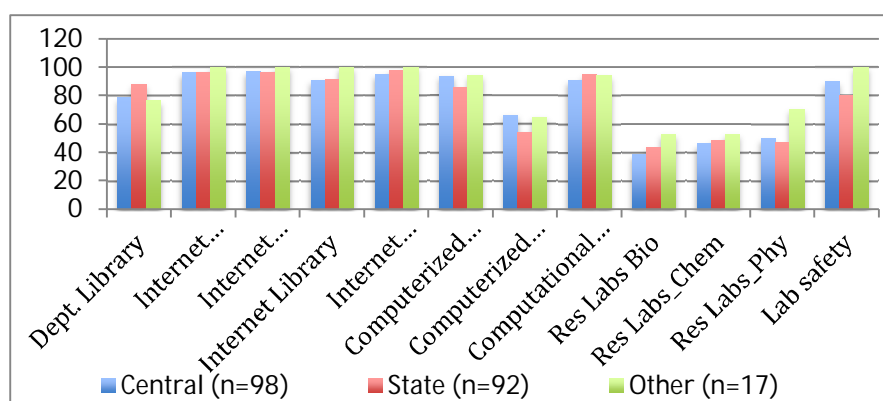
Facilities	Academic status (Institutions)					
	Centre Govt. (n=88)	State Govt. (n=72)	Autonomous (n=34)	Deemed University (n=13)	Constituent college (n=2)	Private Institution (n=1)
Dept. Library	76.14	88.89	88.24	69.23	100.00	100.00
Internet faculty/Scientist	95.45	97.22	97.06	100.00	100.00	100.00
Internet students/staff	96.59	97.22	97.06	100.00	100.00	100.00
Internet Library	89.77	91.67	94.12	100.00	100.00	100.00
Internet Office/Admin	94.32	97.22	100.00	100.00	100.00	100.00
Computerized Admission	93.18	84.72	94.12	92.31	100.00	100.00
Computerized Exam	64.77	54.17	58.82	84.62	00.00	00.00
Computational facilities	89.77	93.06	100.00	92.31	100.00	100.00

Facilities	Academic status (Institutions)					
	Centre Govt. (n=88)	State Govt. (n=72)	Autonomous (n=34)	Deemed University (n=13)	Constituent college (n=2)	Private Institution (n=1)
Res Labs Bio	37.50	50.00	35.29	38.46	50.00	0
Res Labs_Chem	43.18	51.39	47.06	53.85	50.00	100.00
Res Labs_Phy	45.45	51.39	50.00	69.23	100.00	100.00
Lab safety	90.91	87.50	67.65	100.00	100.00	100.00

**Table 4.3: Department level infrastructure in the institutes with financial autonomy**

Facilities	Institutes with financial autonomy					
	Central (n=98)	%	State (n=92)	%	Other (n=17)	%
Dept. Library	77	78.57	81	88.04	13	76.47
Internet faculty/Scientist	94	95.92	89	96.74	17	100.00
Internet students/staff	95	96.94	89	96.74	17	100.00
Internet Library	89	90.82	84	91.30	17	100.00
Internet Office/Admin	93	94.90	90	97.83	17	100.00
Computerized Admission	92	93.88	79	85.87	16	94.12
Computerized Exam	65	66.33	50	54.35	11	64.71
Computational facilities	89	90.82	87	94.57	16	94.12
Res Labs Bio	38	38.78	40	43.48	9	52.94
Res Labs_Chem	45	45.92	45	48.91	9	52.94
Res Labs_Phy	49	50.00	43	46.74	12	70.59
Lab safety	88	89.80	74	80.43	17	100.00

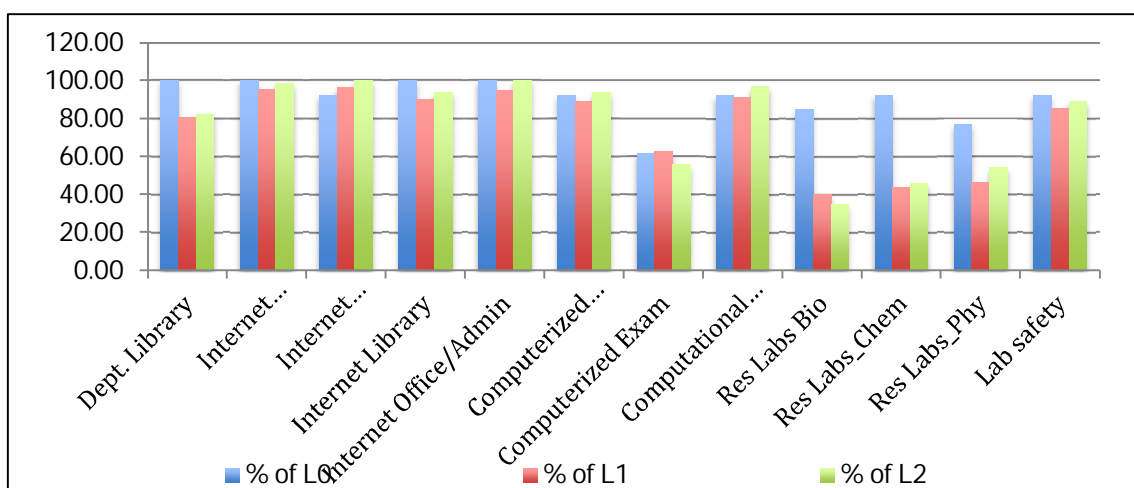
**Fig 4.3: Department level infrastructure in the institutes with financial autonomy**



**Table 4.4: Infrastructure available in Dept. (funding Level wise)**

Facilities	L0 (n=13)	% of L0	L1 (n=134)	% of L1	L2 (n=63)	% of L2	Total (%)
Dept. Library	13	100.00	108	80.60	52	82.54	173(82.40)
Internet faculty/ Scientist	13	100.00	128	95.52	62	98.41	203(96.70)
Internet students/ staff	12	92.31	129	96.27	63	100.00	204(97.10)
Internet Library	13	100.00	121	90.30	59	93.65	193(91.90)
Internet Office/ Admin	13	100.00	127	94.78	63	100.00	203(96.70)
Computerized Admission	12	92.31	119	88.81	59	93.65	190(90.50)
Computerized Exam	8	61.54	84	62.69	35	55.56	127(60.50)
Computation facilities	12	92.31	122	91.04	61	96.83	195(92.90)
Res Labs Bio	11	84.62	54	40.30	22	34.92	87(41.40)
Res Labs_Chem	12	92.31	59	44.03	29	46.03	100(47.60)
Res Labs_Phys	10	76.92	62	46.27	34	53.97	106(50.50)
Lab safety	12	92.31	114	85.07	56	88.89	182(86.70)

**Fig 4.4: Infrastructure available in Dept. (funding Level wise)**



**Table 4.5: Infrastructure available in the Dept. (state-wise, nos.)**

Facilities	State											Total (%)
	AP n=1	Ass n=44	Jha n=13	Man n=7	Meg n=9	Miz n=3	Nag n=3	Odi n=30	Sik n=1	Tri n=5	WB n=94	
Dept. Library	1	41	9	4	5	3	1	28	1	4	76	173(82.40)
Internet faculty/Scientist	1	43	13	6	9	3	2	30	1	5	90	203(96.70)
Internet students/staff	1	43	13	6	9	3	2	30	1	5	91	204(97.10)
Internet Library	1	42	13	5	9	3	2	27	1	4	86	193(91.90)
Internet Office/Admin	1	42	13	6	9	3	2	30	1	4	92	203(96.70)
Computerized Admission	1	41	13	6	8	3	2	25	1	4	86	190(90.50)
Computerized Exam	1	26	11	5	8	3	1	17	0	3	52	127(60.50)
Computational facilities	1	41	12	6	9	3	2	29	1	5	86	195(92.90)
Res Labs_Bio	0	13	5	3	4	1	1	17	0	2	41	87(41.40)
Res Labs_Chem	1	19	6	2	2	2	1	20	0	1	46	100(47.60)
Res Labs_Phys	1	20	10	3	3	3	0	19	1	2	44	106(50.50)
Lab safety	1	40	13	6	9	2	3	26	1	5	76	182(86.70)

AP = Arunachal Pradesh; Ass = Assam; Jha = Jharkhand; Man = Manipur; Meg = Meghalaya;

Mz = Mizoram; Nag = Nagaland; Odi = Odisha; Sik = Sikkim; Tri = Tripura; WB = West

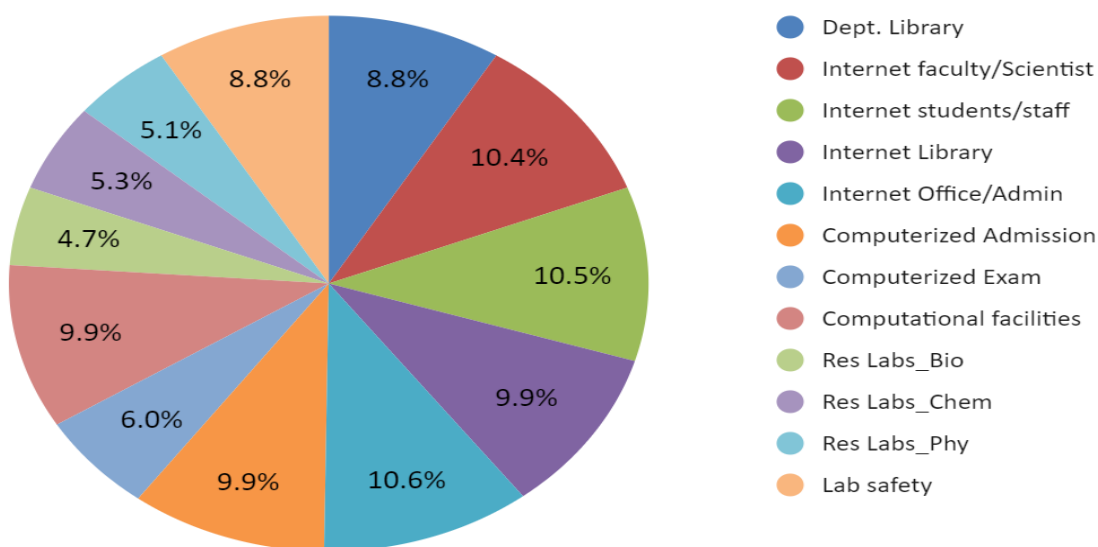
Bengal.

**Table 4.5a: Infrastructure available in the Dept. (state-wise) (%)**

Facilities	State										
	AP n=1	Ass n=44	Jha n=13	Man n=7	Meg n=9	Mz n=3	Nag n=3	Odi n=30	Sik n=1	Tri n=5	WB n=94
Dept. Library	100	100	20	9	56	7	33	93	2	80	81
Internet faculty/Sc	100	98	30	14	100	7	67	100	2	100	96
Internet students/staff	100	98	30	14	100	7	67	100	2	100	97
Internet Library	100	95	30	11	100	7	67	90	2	80	91
Internet Office/Admin	100	95	30	14	100	7	67	100	2	80	98
Computerized Admission	100	93	30	14	89	7	67	83	2	80	91
Computerized Exam	100	59	25	11	89	7	33	57	0	60	55
Computational facilities	100	93	27	14	100	7	67	97	2	100	91
Res Labs_Bio	0	30	11	7	44	2	33	57	0	40	44
Res Labs_Chem	100	43	14	5	22	5	33	67	0	20	49
Res Labs_Phy	100	45	23	7	33	7	0	63	2	40	47
Lab safety	100	91	30	14	100	5	100	87	2	100	81

AP = Arunachal Pradesh; Ass = Assam; Jha = Jharkhand; Man = Manipur; Meg = Meghalaya; Mz = Mizoram; Nag = Nagaland; Odi = Odisha; Sik = Sikkim; Tri = Tripura; WB = West Bengal.

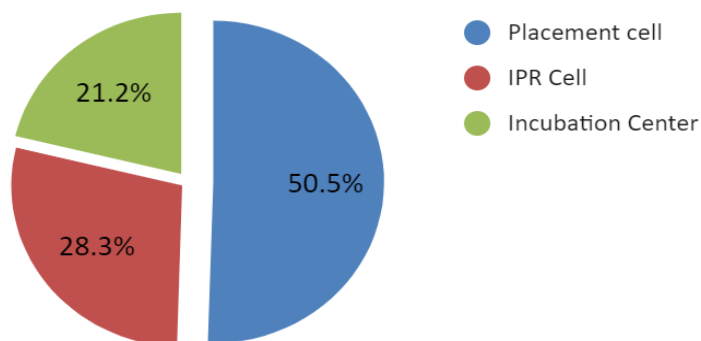
**Fig 4.5: Infrastructure available in the Dept. (state-wise %)**



**Table 4.6: Infrastructure available in the Institutes at the time of survey**

Facilities	No. of response (%)
Placement cell	50(92.60)
IPR Cell	28(51.90)
Incubation Center	21(38.90)

**Fig 4.6: Infrastructure available in the Institutes at the time of survey**



**Table 4.7: Infrastructure available at Institutes (academic status-wise)**

Facilities	Academic status (Institutions)						
	Central Govt. (n=11)	State Govt. (n=26)	Autonomous (n=10)	Deemed University (n=4)	Constituent college (n=2)	Private Institution (n=1)	Total (%)
Placement cell	11	22	10	4	2	1	50(92.60)
IPR Cell	9	9	5	4	1	0	28(51.90)
Incubation Center	8	5	4	2	1	1	21(38.90)

**Table 4.8: Infrastructure available in the institutes (financial autonomy)**

Facilities	Organization Wise (Missing=1)			
	Central (n=13)	State (n=31)	Other (n=9)	Total (%)
Placement cell	13	27	9	50(92.60)
IPR Cell	11	12	4	28(51.90)
Incubation Center	8	6	6	21(38.90)

**Table 4.9: Infrastructure available in the Institutes (Level Wise)**

Facilities	Level			
	L0 (n=11)	L1 (n=35)	L2 (n=8)	Total (%)
Placement cell	10	32	8	50(92.60)
IPR Cell	1	21	6	28(51.90)
Incubation Center	3	14	4	21(38.90)

**Table 4.10: Infrastructure available in the Institutes (State-wise)**

State	Placement cell	IPR Cell	Incubation Center
Arunachal	1	1	0
Assam	7	4	3
Jharkhand	2	2	1
Manipur	1	1	1
Meghalaya	1	1	1
Mizoram	1	1	1
Nagaland	1	1	1



State	Placement cell	IPR Cell	Incubation Center
Odisha	11	9	5
Sikkim	1	1	1
Tripura	1	1	0
West Bengal	23	6	7
Total	50 (92.6)	28 (51.9)	21(38.9)

**Table 4.11: Availability of General Classrooms in the Dept.**

Range (No. of Classroom)	General Classroom in the Dept. (%)
1-5	106 (50.50)
6-10	46 (21.90)
11-15	7 (3.30)
16-20	2 (1.00)
21+	23 (11.00)
Not Applicable	3 (1.40)
Not Available	23 (11.00)
Total	210

**Table 4.12: Distribution of Smart Classrooms available in the Dept.**

Range (No. of Smart Classroom)	Smart Classroom in the Dept. (155)
	N (%)
1-5	125(59.50)
6-10	17(8.10)
11-15	3(1.40)
16-20	2(1.00)
21+	8(3.80)
Not Applicable	13(6.20)
Not Available	42(20.00)
Total	210

**Table 4.13: Availability of Classrooms in the Dept. /Inst.(Academic status-wise)**

Range	Academic status						Total
	Central Government Institution	State Government Institution	Autonomous Institution	Deemed University	Constituent college	Private Institution	
1-5	45(57.70)	39(58.20)	17(60.70)	4(50.00)	1(50.00)	0(0.00)	106(57.70)
6-10	25(32.10)	14(20.90)	5(17.90)	2(25.00)	0(0.00)	0(0.00)	46(25.00)

Range	Academic status						Total
	Central Government Institution	State Government Institution	Autonomous Institution	Deemed University	Constituent college	Private Institution	
11-15	1(1.30)	5(7.50)	0(0.00)	1(12.50)	0(0.00)	0(0.00)	7(3.80)
16-20	1(1.30)	0(0.00)	1(3.60)	0(0.00)	0(0.00)	0(0.00)	2(1.10)
21+	6(7.70)	9(13.40)	5(17.90)	1(12.50)	1(50.00)	1(50.00)	23(12.50)
Total	78	67	28	8	2	2	184

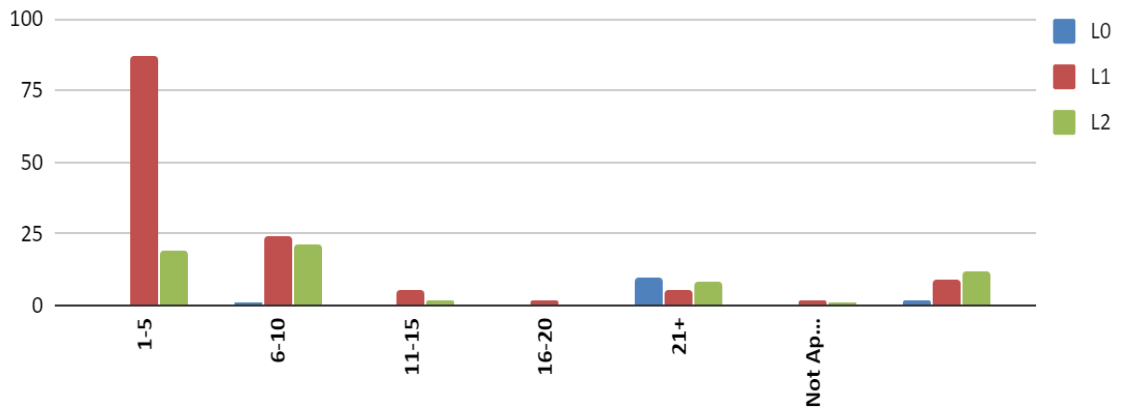
**Table 4.14: Availability of Smart Classrooms in the Dept./Inst. (Academic status-wise)**

Range	Academic status						Total
	Central Government Institution	State Government Institution	Autonomous Institution	Deemed University	Constituent college	Private Institution	
1-5	48(76.20)	49(86.00)	20(83.30)	5(62.50)	2(100.00)	1(100.00)	125(80.60)
6-10	10(15.90)	5(8.80)	1(4.20)	1(12.50)	0(0.00)	0(0.00)	17(11.00)
11-15	1(1.60)	0(0.00)	0(0.00)	2(25.00)	0(0.00)	0(0.00)	3(1.90)
16-20	0(0.00)	0(0.00)	2(8.30)	0(0.00)	0(0.00)	0(0.00)	2(1.30)
21+	4(6.30)	3(5.30)	1(4.20)	0(0.00)	0(0.00)	0(0.00)	8(5.20)
Total	63	57	24	8	2	1	155

**Table 4.15: Availability of Classrooms in the Dept./Inst.(Funding Level-wise)**

Range	Project level			
	L0	L1	L2	Total
1-5	0	87	19	106(50.00)
6-10	1	24	21	46(21.90)
11-15	0	5	2	7(3.30)
16-20	0	2	0	2(1.00)
21+	10	5	8	23(11.00)
Not Applicable	0	2	1	3(1.40)
Not Available	2	9	12	23(11.00)
Total	13	134	63	210

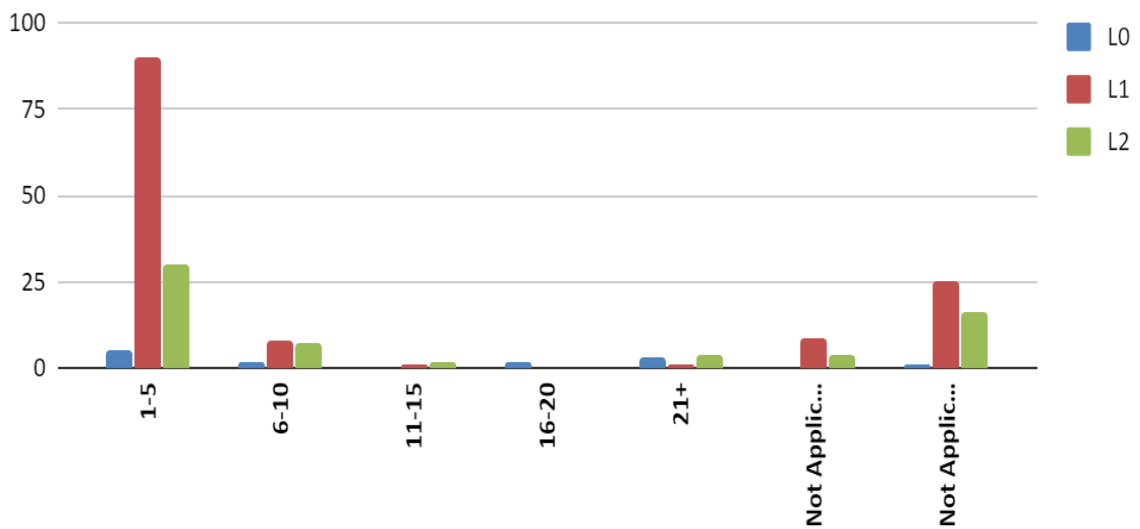
**Fig 4.15: Availability of Classrooms in the Dept./Inst.(Funding Level-wise)**



**Table 4.16: Availability of Smart Classrooms in the Dept./Inst. (Funding Level wise)**

Range	Project level			Total
	L0	L1	L2	
1-5	5	90	30	125(59.50)
6-10	2	8	7	17(8.10)
11-15	0	1	2	3(1.40)
16-20	2	0	0	2(1.00)
21+	3	1	4	8(3.80)
Not Applicable	0	9	4	13(6.20)
Not Available	1	25	16	42(20.00)
Total	13	134	63	210

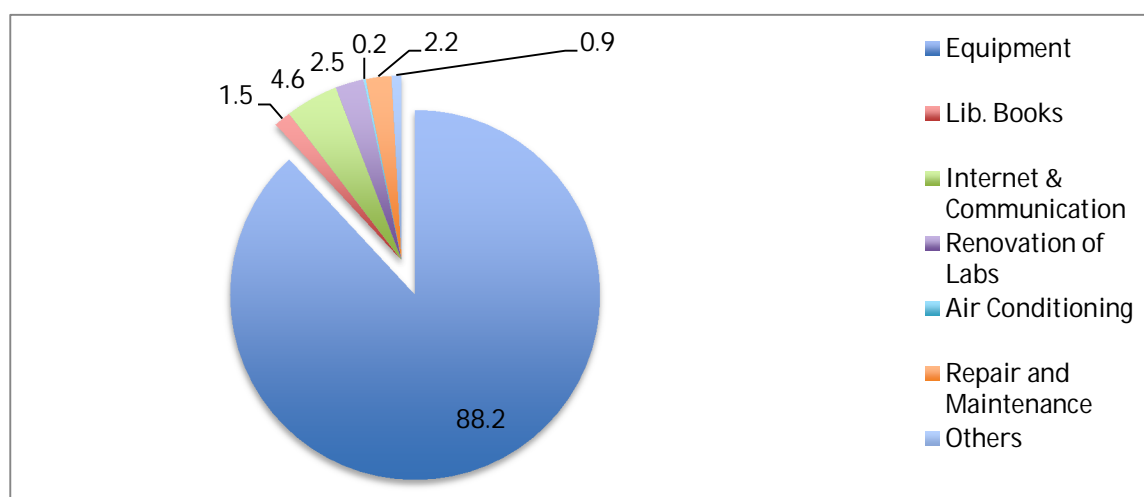
**Fig 4.16: Availability of Smart Classrooms in the Dept./Inst. (Funding Level wise)**



**Table 4.17: Investment on Infrastructure created under FIST**

Description	Total Amount in Lakhs (%)
Equipment	12499.90(88.20)
Lib. Books	209.00(1.50)
Internet & Communication	645.10(4.60)
Renovation of Labs	352.40(2.50)
Air Conditioning	30.60(0.20)
Repair and Maintenance	304.90(2.20)
Others	123.30(0.90)
Total	14165.10

**Fig 4.17: Investment on Infrastructure created under FIST**



**Table 4.18: Current Status of Equipment procured under FIST**

Year of Equipmen Purchased	No. of Items Purchased	Status			
		Working		Non-Working	
		N	%	N	%
2000-2003	128	72	7.10	48	13.40
2003-2006	391	207	20.30	149	41.60
2006-2009	200	137	13.40	31	8.70
2009-2012	326	266	26.10	31	8.70
2012-2015	306	199	19.50	19	5.30
2015-2018	137	22	2.20	0	0.00
Missing values	388	118	11.60	80	22.30
Total	1876	1021	100.00	358	100.00

\*Working + Non-Working + Missing (Status) (1021+358+497) = 1876

\* Total No. of Equipment = 1876

**Table 4.18a: Current Status of Equipment procured under FIST (%)**

Year of Equipment Purchased	No. of Item Purchased	Status			
		Working		Non-Working	
		N	%	N	%
2000-2003	128	72	56.25	48	37.50
2003-2006	391	207	52.94	149	38.11
2006-2009	200	137	68.50	31	15.50
2009-2012	326	266	81.60	31	9.51
2012-2015	306	199	65.03	19	6.21
2015-2018	137	22	16.06	0	0.00
Missing values	388	118	30.41	80	20.62
Total	1876	1021	54.42	358	19.08

**Table 4.19: Equipment procured under FIST (Cost & Current Status)**

Cost range Rs.	No. of Equipmen	% of Equipment	Working		AMC	
			n	%	N	%
0-100000	811	43.20	387	37.90	91	40.10
100000-1000000	715	38.10	409	40.10	61	26.90
1000000-2000000	124	6.60	68	6.70	20	8.80
2000000-3000000	64	3.40	54	5.30	21	9.30
3000000-5000000	35	1.90	28	2.70	10	4.40
5000000-10000000	28	1.50	24	2.40	7	3.10
10000000-20000000	14	0.70	14	1.40	7	3.10
20000000+	3	0.20	3	0.30	1	0.40
Missing	82	4.40	34	3.30	9	4.00
Total	1876	100.00	1021	100.00	227	100.00

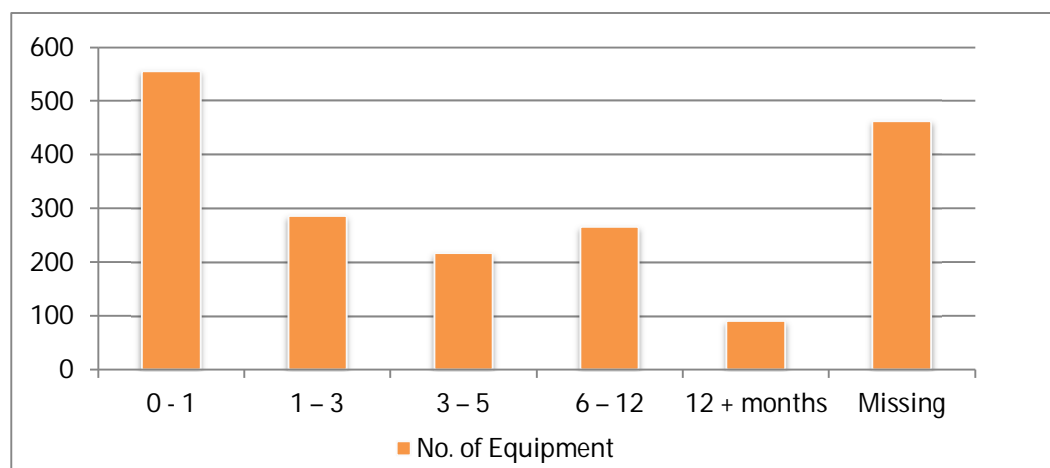
\*Working + Non-Working + Missing (1021 + 358 + 497) = 1876

\*AMC (Yes) + AMC (No) + AMC (Missing) (227+ 880 + 769) = 1876

**Table 4.20: Time gap between Purchase and Installation of Equipment**

Gap. (months)	No. of Equipment	% Equipment
0 - 1	556	29.60
1 - 3	286	15.20
3 - 5	217	11.60
6 - 12	265	14.10
12 + months	90	4.80
Missing	462	24.60
Total	1876	100.00

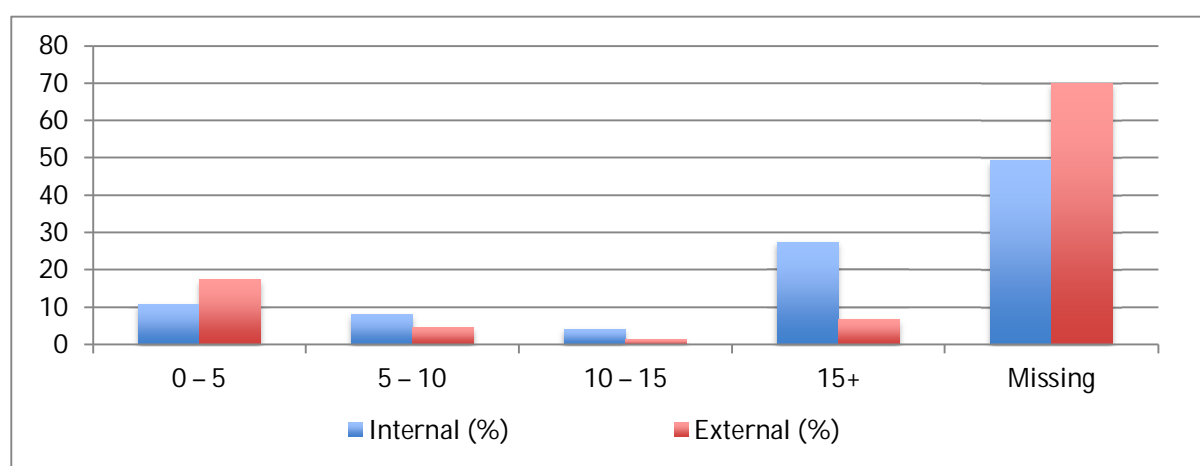
**Fig 4.20: Gap between Purchase and Installation of Equipment**



**Table 4.21: Utilization of Equipment procured under FIST**

No. of Users per week	Internal		External	
	No. of Equip.	% Equipment	No. of Equip.	% Equipment
0 – 5	204	10.90	326	17.40
5 – 10	153	8.20	88	4.70
10 – 15	78	4.20	23	1.20
15+	516	27.50	126	6.70
Missing	925	49.30	1313	70.00
Total	1876	100.00	1876	100.00

**Fig 4.21: Utilization of Equipment procured under FIST**

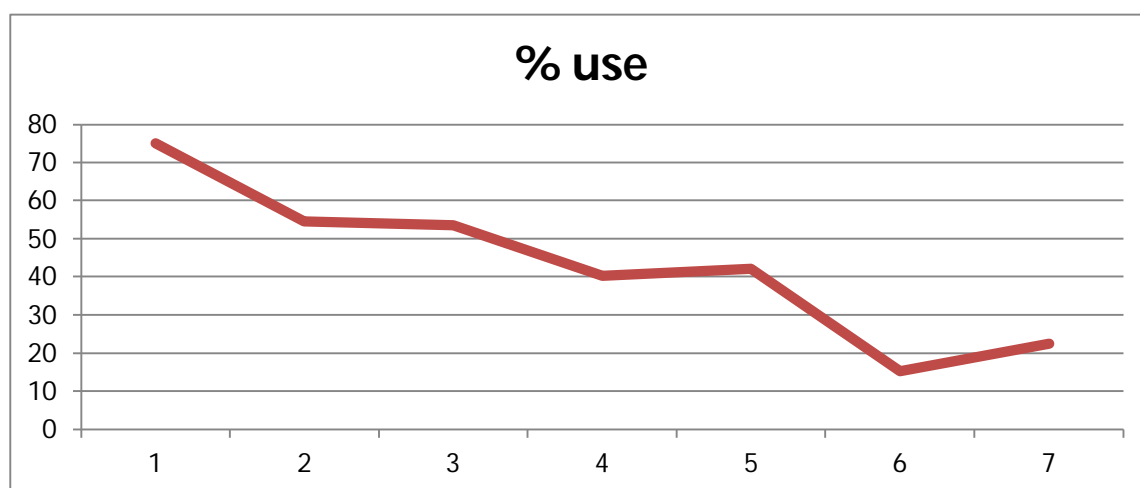


**Table 4.22: Utilization of Equipment (purchase year-wise)**

Purchase Yr.	No. of Equipment	≤ 25 Percent	26-50 Percent	51-75 Percent	76-100 Percent	%
2000- 2003	128	2	4	3	96	75.00
2003-2006	391	1	3	12	213	54.48
2006-2009	200	0	0	15	107	53.50
2009-2012	326	3	4	19	131	40.18
2012-2015	306	3	2	19	129	42.16
2015-2018	137	0	0	6	21	15.33
Missing	388	2	4	18	87	22.42
Total	1876	11	13	92	784	41.79

\*388 (112-percentage utilised is missing, 276-both purchase yr. and percentage utilised missing)

**Fig 4.22: Percentage Utilization of Equipment**



Note: Horizontal axis represents year of purchase as 1 for 2000-03 and so on 6 for 2015-18

## Chapter 5

### Impact on working environment and capacity building

**Table 5.1: Impact on Working Environment of the grantee department (inputs)**

Factors	Decrease N (%)	Can't say N (%)	No change N (%)	Improved N (%)	Sig. Improved N (%)
Cleanliness	0(0.0)	6(2.90)	23(11.00)	109(51.90)	61(29.00)
Room Temp., Light & Ventilation	0(0.0)	8(3.80)	39(18.60)	100(47.60)	52(24.80)
Sufficient Working Space	0(0.0)	6(2.90)	59(28.10)	94(44.80)	42(20.00)
Communication: Internet, Telephone, etc.	0(0.0)	3(1.40)	25(11.90)	95(45.20)	77(36.70)
Personnel Development Opportunities	0(0.0)	10(4.80)	9(4.30)	114(54.30)	68(32.40)
Administrative and Office Support	0(0.0)	6(2.90)	57(27.10)	115(54.80)	22(10.50)
Motivation for innovation	0(0.0)	2(1.00)	2(1.00)	121(57.60)	75(35.70)

**Table 5.2: Impact on Working Environment of the grantee department (outputs)**

Item	E & NEN (%)
Research Publication & Collaboration	171 (26.60)
Lab Facility (Equipment, Instruments) and its maintenance.	147 (22.90)
Computation (Computer) and Internet (Networking) Facility	97 (15.10)
Classroom, Lab and working space Renovated	63 (9.80)
Teaching and Learning Environment	39 (6.10)
Student's (UG, PG and PhD) facility improved	27 (4.20)
Library (Increase in number of books)	21 (3.30)
Receiving other extramural grants	16 (2.50)
Addition of Faculty / Staff /Collaboration.	3 (0.50)
None/Nil/No Suggestion	2 (0.30)
Irrelevant to the question	17 (2.60)
NA/ No Response/ Not applicable	40 (6.20)
Total	643

**Table 5.3: Impact on Capacity Building of the grantee Department**

Activities	Before FIST	After FIST	% Change
National Seminar/ Conf.	501	1076	114.80
International Seminar/ Conf.	177	254	43.50
Workshops	225	559	148.40
Short term training Program	85	247	190.60



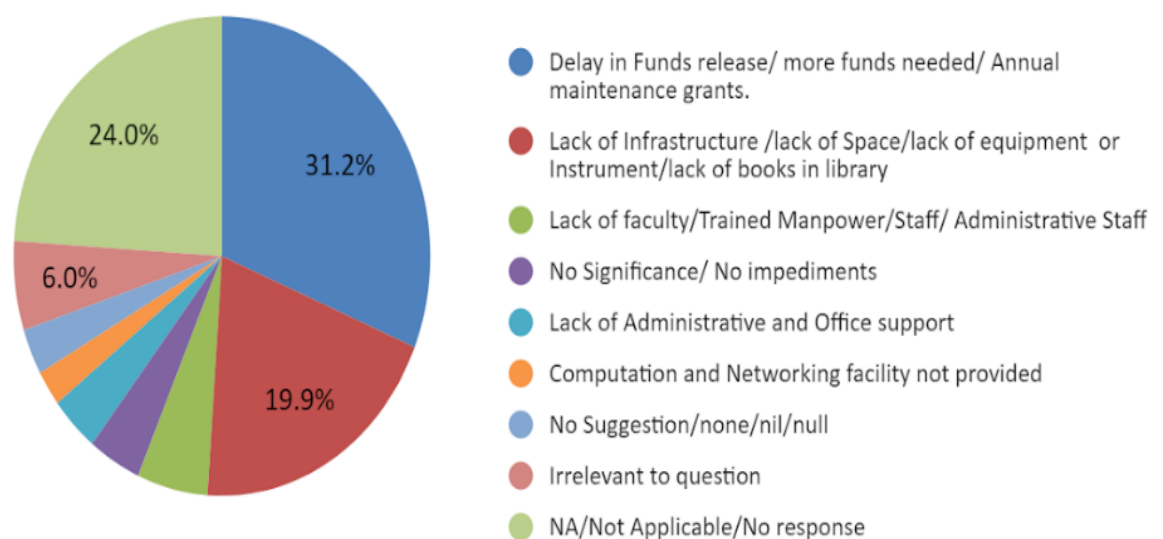
Activities	Before FIST	After FIST	% Change
Faculty Development Program	75	196	161.30
Management Development Program	19	42	121.10
Upgradation of Technical staff	36	78	116.70
Others	37	74	100.00
Total	1155	2526	118.70

**Table 5.4 Impediments in execution of DST-FIST project**

Item	North
Delay in Funds release/ more funds needed/ Annual maintenance grants.	130 (31.2)
Lack of Infrastructure /lack of Space/lack of equipment or Instrument/lack of books in library	83 (19.9)
Lack of faculty/Trained Manpower/Staff/ Administrative Staff	23 (5.5)
No Significance/ No impediments	17 (4.1)
Lack of Administrative and Office support	16 (3.8)
Computation and Networking facility not provided	10 (2.4)
No Suggestion/none/nil/null	13 (3.1)
Irrelevant to question	25 (6.0)
NA/Not Applicable/No response	100 (24.0)
Total	417

\*Factors obtain by text data analysis

**Table 5.4 Impediments in execution of DST-FIST project**



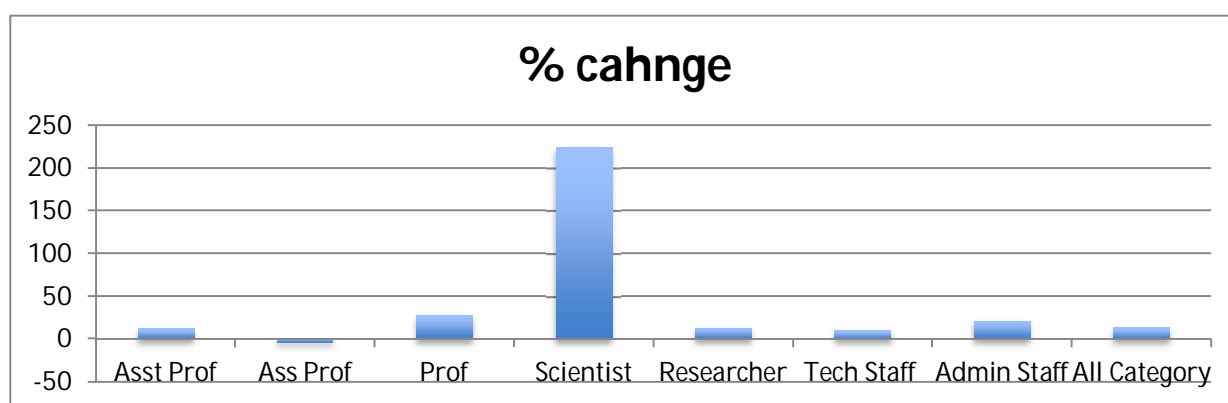
## Chapter 6

### Impact on Manpower

**Table 6.1: Impact on volume of Manpower of the grantee department**

Manpower	No. Before FIST		No. After FIST		% Change
	$\Sigma$	Mean $\pm$ SD	$\Sigma$	Mean $\pm$ SD	
Asst Prof	1475	10 $\pm$ 19	1656	11.3 $\pm$ 26.50	12.30
Ass Prof	747	5.1 $\pm$ 9.10	719	4.9 $\pm$ 7.70	-3.70
Prof	311	2.1 $\pm$ 2.90	397	2.7 $\pm$ 3.60	27.70
Scientist	38	0.3 $\pm$ 1.30	123	0.8 $\pm$ 5.30	223.70
Research staff	242	1.6 $\pm$ 15.30	273	1.9 $\pm$ 12.80	12.80
Tech Staff	798	5.4 $\pm$ 10.50	877	6 $\pm$ 11.80	9.90
Admn Staff	740	5.1 $\pm$ 13.30	897	6.1 $\pm$ 18.20	21.20
Total Category	4351		4942		13.60

**Fig 6.1: Impact on volume of Manpower of the grantee department**

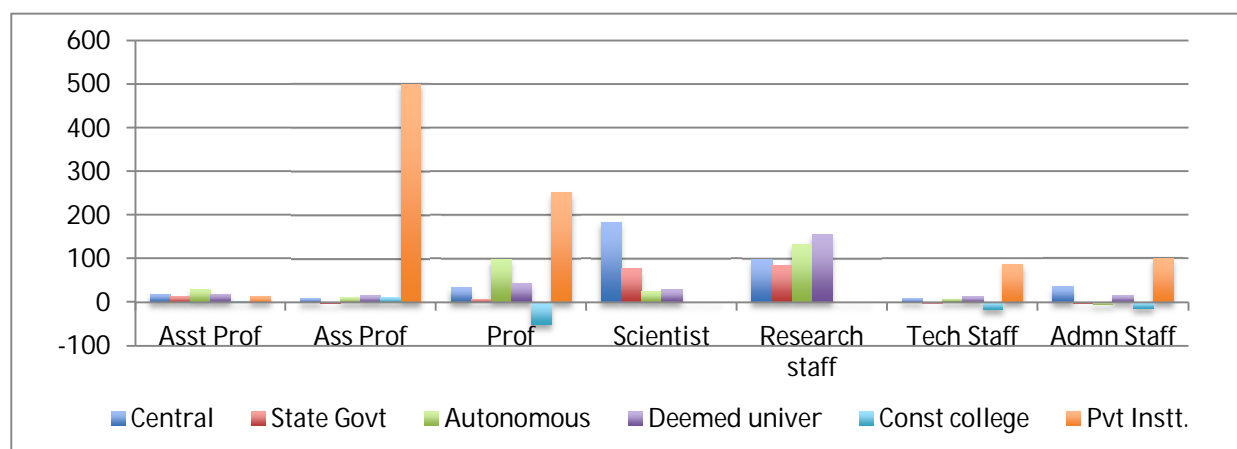


**Table 6.2: Impact on volume of manpower of the grantee department/ Institutions (institution types)**

Manpower		No. Before FIST		No. After FIST		% Change
		$\Sigma$	Mean $\pm$ SD	$\Sigma$	Mean $\pm$ SD	
Central Government Institution	Asst Prof	383	4.9 $\pm$ 3	453	5.8 $\pm$ 3.70	18.30
	Ass Prof	233	3.4 $\pm$ 2.10	253	3.7 $\pm$ 2.50	8.60
	Prof	318	4.2 $\pm$ 3.40	425	5.6 $\pm$ 3.80	33.60
	Scientist	42	2.8 $\pm$ 6	119	7.9 $\pm$ 22.50	183.30
	Research staff	132	7.8 $\pm$ 18	262	15.4 $\pm$ 24.40	98.50
	Tech Staff	262	4.5 $\pm$ 3.50	283	4.9 $\pm$ 3.20	8
	Admn Staff	177	2.6 $\pm$ 1.90	240	3.6 $\pm$ 7.20	35.60
State Government	Asst Prof	609	10.7 $\pm$ 18.90	692	12.1 $\pm$ 19.80	13.60

Manpower		No. Before FIST		No. After FIST		% Change
		$\Sigma$	Mean $\pm$ SD	$\Sigma$	Mean $\pm$ SD	
Institution	Ass Prof	411	7.5 $\pm$ 11.30	401	7.3 $\pm$ 11.90	-2.400
	Prof	174	3.6 $\pm$ 3.40	185	3.8 $\pm$ 3.50	6.30
	Scientist	26	3.7 $\pm$ 2.90	46	6.6 $\pm$ 7.80	76.90
	Research staff	46	5.1 $\pm$ 3.80	85	9.4 $\pm$ 9.90	84.80
	Tech Staff	229	5.5 $\pm$ 5.70	226	5.4 $\pm$ 6.20	-1.30
	Admn Staff	292	7.1 $\pm$ 11.90	286	7 $\pm$ 12.50	-2.10
Autonomous Institution	Asst Prof	160	6.7 $\pm$ 9.20	207	8.6 $\pm$ 11.30	29.40
	Ass Prof	131	5.5 $\pm$ 4.40	144	6 $\pm$ 6.20	9.90
	Prof	74	3 $\pm$ 1.90	147	5.9 $\pm$ 5.50	98.60
	Scientist	4	4 $\pm$ 0	5	5 $\pm$ 0	25
	Research staff	3	1 $\pm$ 1	7	2.3 $\pm$ 3.20	133.30
	Tech Staff	205	8.2 $\pm$ 13.30	221	8.8 $\pm$ 10	7.80
	Admn Staff	95	3.5 $\pm$ 4.30	90	3.3 $\pm$ 3	-5.30
Deemed University	Asst Prof	130	10 $\pm$ 4.50	155	11.9 $\pm$ 7.10	19.20
	Ass Prof	29	2.6 $\pm$ 2.10	33	3 $\pm$ 2.80	13.80
	Prof	41	3.2 $\pm$ 2.40	59	4.5 $\pm$ 2.40	43.90
	Scientist	7	3.5 $\pm$ 3.50	9	4.5 $\pm$ 6.40	28.60
	Research staff	20	3.3 $\pm$ 4.50	51	8.5 $\pm$ 6.40	155
	Tech Staff	79	6.6 $\pm$ 3.90	89	7.4 $\pm$ 2.70	12.70
	Admn Staff	53	4.1 $\pm$ 3.10	61	4.7 $\pm$ 5.20	15.10
Constituent college	Asst Prof	39	19.5 $\pm$ 21.90	40	20 $\pm$ 21.20	2.60
	Ass Prof	19	9.5 $\pm$ 10.60	21	10.5 $\pm$ 12	10.50
	Prof	2	2 $\pm$ 0	1	1 $\pm$ 0	-50
	Scientist	0	0 $\pm$ 0	0	0 $\pm$ 0	0.0
	Research staff	0	0 $\pm$ 0	0	0 $\pm$ 0	0.0
	Tech Staff	18	9 $\pm$ 9.90	15	7.5 $\pm$ 7.80	-16.70
	Admn Staff	22	11 $\pm$ 14.10	19	9.5 $\pm$ 12	-13.60
Private Institution	Asst Prof	15	15 $\pm$ 0	17	17 $\pm$ 0	13.30
	Ass Prof	1	1 $\pm$ 0	6	6 $\pm$ 0	500
	Prof	2	2 $\pm$ 0	7	7 $\pm$ 0	250
	Scientist	0	0 $\pm$ 0	0	0 $\pm$ 0	0.0
	Research staff	0	0 $\pm$ 0	0	0 $\pm$ 0	0.00
	Tech Staff	15	15 $\pm$ 0	28	28 $\pm$ 0	86.70
	Admn Staff	1	1 $\pm$ 0	2	2 $\pm$ 0	100

**Fig 6.2: Impact on volume of manpower of the grantee department /Institutions (institution types)**



**Table 6.3: Impact on volume of manpower of the grantee department/Institutions (Level of grant types)**

Manpower		No. Before FIST		No. After FIST		% Change
		Σ	Mean ± SD	Σ	Mean ± SD	
L0	Asst Prof	510	46.4±21.90	552	50.2±22.40	8.20
	Ass Prof	311	25.9±13.90	329	27.4±14.10	5.80
	Prof	38	4.8±7.10	33	4.1±7.20	-13.20
	Scientist	9	9±0	24	24±0	166.70
	Research staff	5	2.5±0.70	17	8.5±3.50	2400
	Tech Staff	179	22.4±18.60	146	18.3±10.70	-18.40
	Admn Staff	229	22.9±17.70	226	22.6±18.70	-1.30
L1	Asst Prof	527	4.5±3.80	646	5.6±4.90	22.60
	Ass Prof	305	2.9±1.90	307	2.9±2.20	0.70
	Prof	320	3±2.20	410	3.8±2.40	28.10
	Scientist	52	3.7±5.90	126	9±23.20	142.30
	Research staff	101	4.6±6.80	258	11.7±15.90	155.40
	Tech Staff	354	4±3.70	399	4.5±4.40	12.70
	Admn Staff	254	2.7±2.20	258	2.8±2.60	1.60
L2	Asst Prof	299	6.2±3.70	366	7.6±4.40	22.40
	Ass Prof	208	4.7±2.40	222	5±3.70	6.70
	Prof	253	5.1±3.50	381	7.6±4.80	50.60
	Scientist	18	1.8±2.80	29	2.9±2.30	61.10
	Research staff	95	8.6±21.10	130	11.8±24.10	36.80
	Tech Staff	275	6.4±4.40	317	7.4±5.90	15.30
	Admn Staff	157	3.3±2.70	214	4.5±8.50	36.30

**Table 6.4: Impact on Sanctioned Seats in Various Courses**

Courses	No. Before FIST		No. After FIST		% Change
	$\Sigma$	Mean $\pm$ SD	$\Sigma$	Mean $\pm$ SD	
Graduation (N=73)	13310	182.3 $\pm$ 421.30	16740	229.3 $\pm$ 503.30	25.80
Post-graduation (N=171)	6654	38.9 $\pm$ 32.80	9650	56.4 $\pm$ 61.40	45.00
M. Phil (N=30)	419	14 $\pm$ 14.90	500	16.7 $\pm$ 16.20	19.30
Ph.D.(N=95)	1824	19.2 $\pm$ 19	3588	37.8 $\pm$ 39.10	96.70
PG Diploma(N=7)	105	15 $\pm$ 2.70	138	19.7 $\pm$ 11.40	31.40
Total	22312		30616		37.20

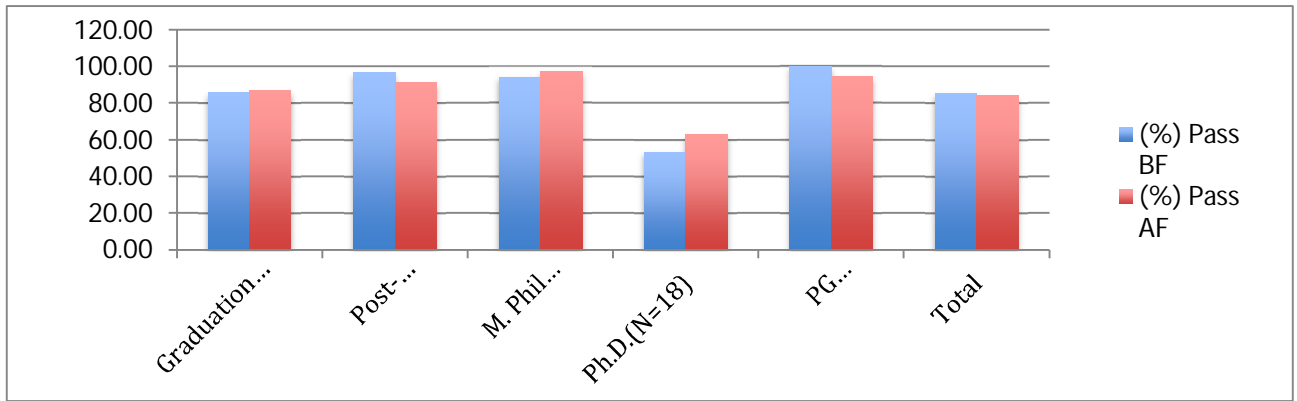
**Table 6.5: Impact on Admission in Various Courses**

Courses (N)	Before FIST		After FIST		% Change
	$\Sigma$	Mean $\pm$ SD	$\Sigma$	Mean $\pm$ SD	
Graduation (N=48)	10782	224.6 $\pm$ 507	13449	280.2 $\pm$ 661.10	24.70
Post-graduation (N=108)	3948	36.6 $\pm$ 27.90	11884	110 $\pm$ 635	201
M. Phil (N=11)	110	10 $\pm$ 4.80	126	11.5 $\pm$ 5	14.50
Ph.D.(N=14)	264	18.9 $\pm$ 29	283	20.2 $\pm$ 14.40	7.20
PG Diploma(N=5)	73	14.6 $\pm$ 3.80	75	15 $\pm$ 3.30	2.70
Total	15177		25817		70.10

**Table 6.6: Impact on Pass Percentage in Various Courses**

Courses	Before FIST			After FIST		
	No. Admission	No. Passed	(%) Pass	No. Admission	No. Passed	(%) Pass
Graduation (N=68)	5367	4613	85.95	7048	6120	86.83
Post-graduation (N=143)	5321	5144	96.67	7277	6635	91.18
M. Phil (N=23)	198	187	94.44	223	217	97.31
Ph.D.(N=89)	2008	1076	53.59	3452	2166	62.75
PG Diploma(N=7)	109	109	100.00	109	103	94.50
Total	13003	11129	85.59	18109	15241	84.16

**Fig 6.6: Impact on Pass Percentage in Various Courses**

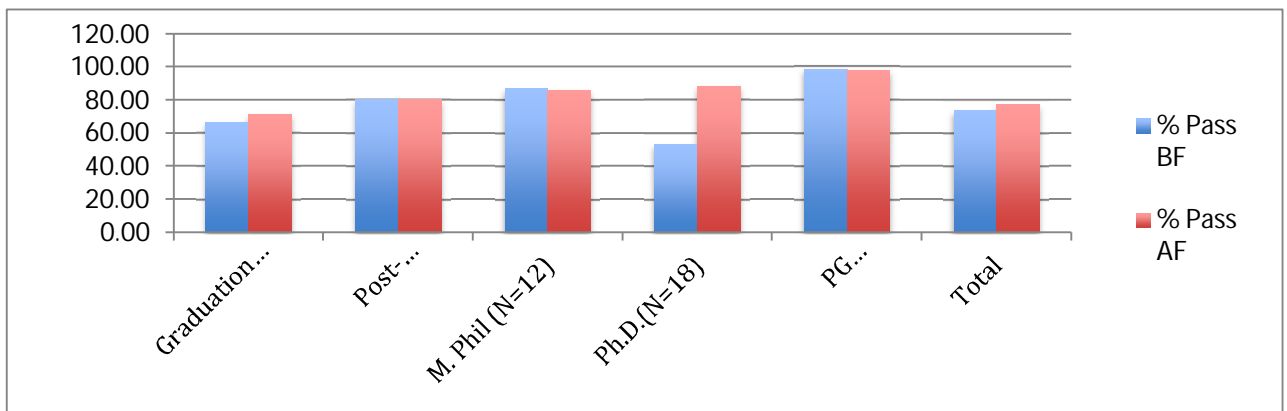


**Table 6.7: Students Passed with quality improved or First Division**

Courses	Before FIST			After FIST		
	No. Admission	No. Passed (Grade A)	(%) Pass	No. Admission	No. Passed (Grade A)	(%) Pass
Graduation	3970	2646	66.65	4816	3432	71.26
Post-graduation	4475	3589	80.20	5703	4586	80.41
M. Phil	121	105	86.78	142	122	85.92
Ph.D.	359	191	53.20	410	362	88.29
PG Diploma	101	100	99.01	136	133	97.79
Total	9026	6631	73.47	11207	8635	77.05

\*Ph.D. = Awarded

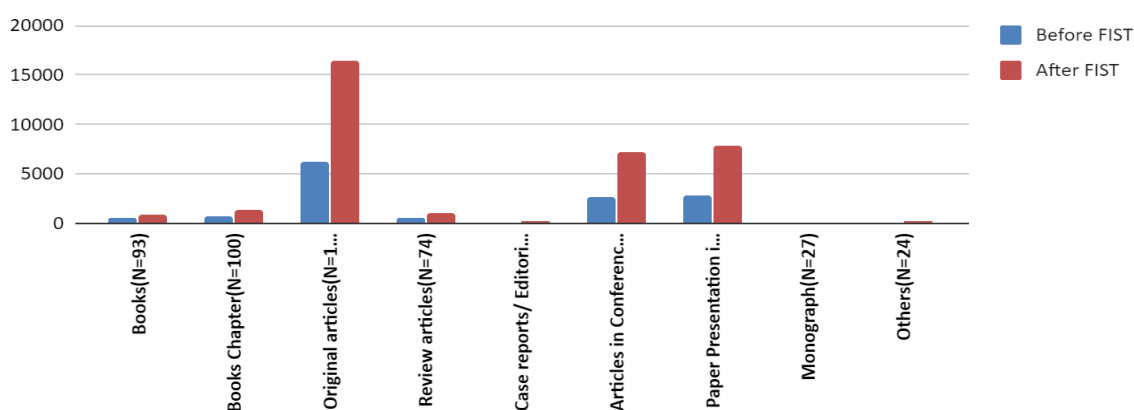
**Fig 6.7: Students Passed with quality improved or First Division**



**Table 6.8: Change in Publication**

<b>Publications</b>	<b>Before FIST</b>	<b>After FIST</b>	<b>% Change</b>
Books(N=93)	470	929	97.70
Books Chapter(N=100)	646	1358	110.20
Original articles(N=130)	6232	16446	163.90
Review articles(N=74)	498	989	98.60
Case reports/ Editorial Notes(N=39)	68	195	186.80
Articles in Conference Proceeding(N=103)	2714	7257	167.40
Paper Presentation in Conference (N=108)	2775	7826	182
Monograph(N=27)	21	60	185.70
Others(N=24)	122	214	75.40
<b>Total</b>	<b>13546</b>	<b>35274</b>	<b>160.40</b>

**Fig 6.8: Change in Publication**



**Table 6.9: Trend in Research Funding and Output**

<b>Items</b>	<b>Status of DST-FIST Support N=210</b>				
	<b>Decrease N (%)</b>	<b>Can't say N (%)</b>	<b>No change N (%)</b>	<b>Improved N (%)</b>	<b>Sig. Improved N (%)</b>
Intramural Grants	1 (0.50)	13 (6.20)	36 (17.10)	104 (49.50)	34 (16.20)
Extramural Grants	0 (0)	10 (4.80)	15 (7.10)	120 (57.10)	48 (22.90)
Patents Filed	0 (0)	28 (13.30)	77 (36.70)	71 (33.80)	12 (5.70)
Commercialization of Technology	0 (0)	49 (23.30)	99 (47.10)	34 (16.20)	3 (1.40)
Product and Process	0 (0)	39 (18.60)	73 (34.80)	71 (33.80)	3 (1.40)

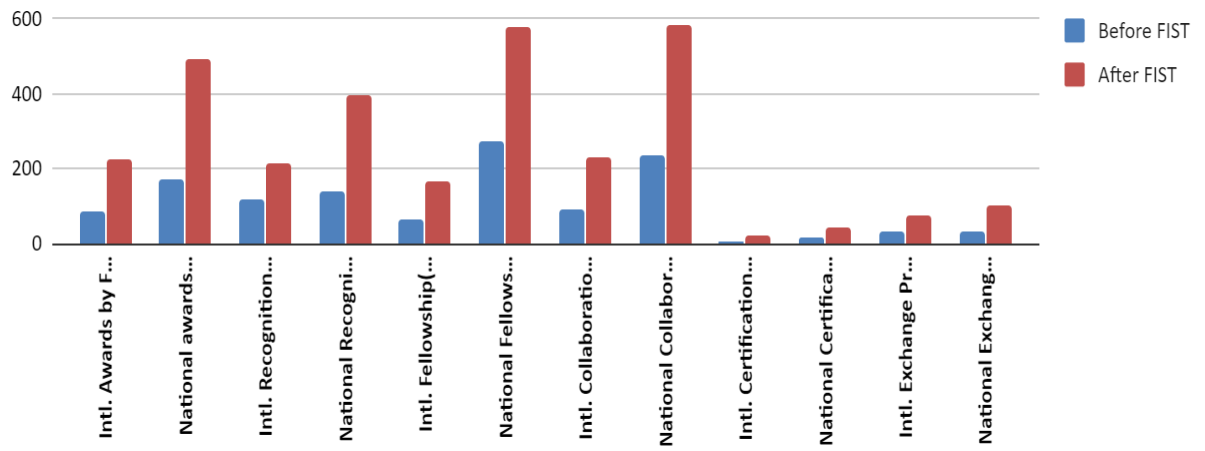
Items	Status of DST-FIST Support N=210				
	Decrease N (%)	Can't say N (%)	No change N (%)	Improved N (%)	Sig. Improved N (%)
Development					
Papers Published	1(0.50)	3 (1.40)	6 (2.90)	102 (48.60)	85 (40.50)
Trend in Impact Factor	0 (0)	4 (1.90)	5 (2.40)	106 (50.50)	80 (38.10)
Trend in Citation Index	0 (0)	4 (1.90)	4 (1.90)	118 (56.20)	68 (32.40)
Consultancy	0 (0)	31 (14.80)	69(32.90)	73 (34.80)	20 (9.50)
Extension Work	0 (0)	20 (9.50)	53 (25.20)	99(47.10)	20 (9.50)

**Table 6.10: Awards and Recognitions by Faculty/ Scientists**

Items	Before FIST	After FIST	% Change
Intl. Awards by Faculty	85	226	165.9
National awards by Faculty	173	491	183.8
Intl. Recognition to Faculty	117	212	81.2
National Recognition to Faculty	139	398	186.3
Intl. Fellowship	65	168	158.5
National Fellowship	271	575	112.2
Intl. Collaboration	91	232	154.9
National Collaboration	237	585	146.8
Intl. Certification	5	20	300
National Certification	16	43	168.8
Intl. Exchange Program	30	76	153.3
National Exchange Program	33	103	212.1
Total	1262	3129	147.9



**Fig 6.10: Awards and Recognitions by Faculty/ Scientists**



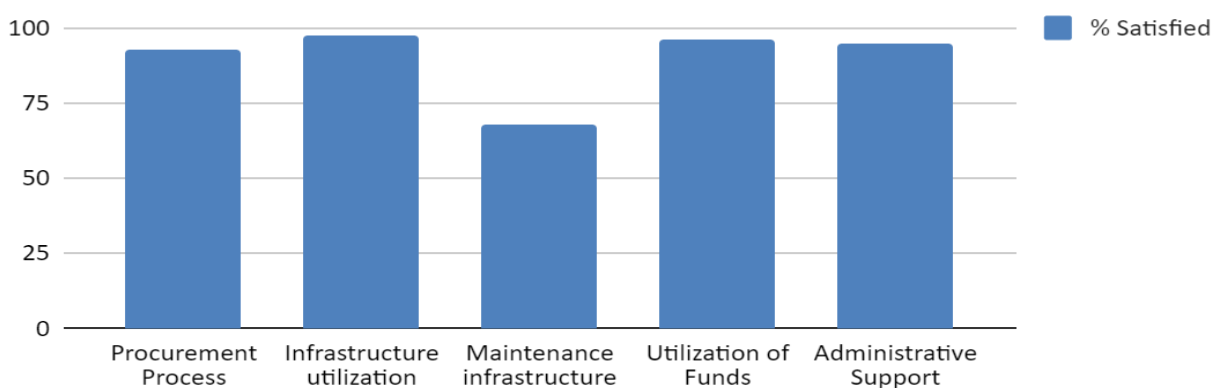
## Chapter 7

### Administrative processes for implementation of FIST projects

**Table 7.1: Administrative Processes**

Process	N	Number Satisfied	% Satisfied
Procurement Process	184	171	93.00
Infrastructure utilization	184	179	97.30
Maintenance infrastructure	170	115	67.60
Utilization of Funds	176	169	96.00
Administrative Support	173	164	94.80

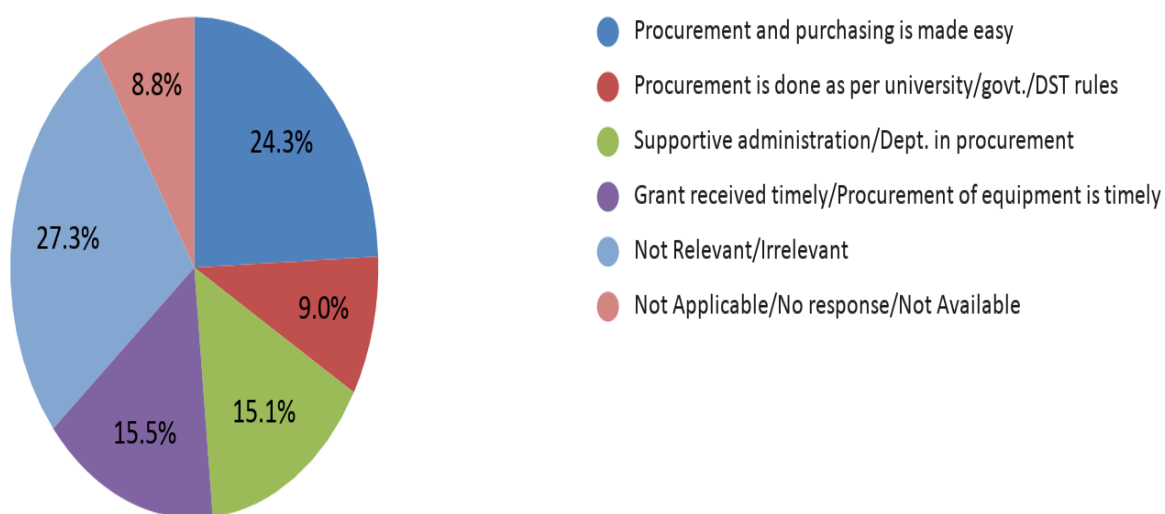
**Fig. 7.1: Administrative Processes**



**Table 7.2: Positive response on Procurement Process**

Issues	ENE
Procurement and purchasing are made easy	113 (24.30)
Procurement is done as per university/govt./DST rules	42 (9)
Supportive administration/Dept. in procurement	70 (15.10)
Grant received timely/Procurement of equipment is timely	72 (15.50)
No positive points	0 (0)
Nil/No suggestions/None	0 (0)
Not Relevant/Irrelevant	127 (27.30)
Not Applicable/No response/Not Available	41 (8.80)
Total	465

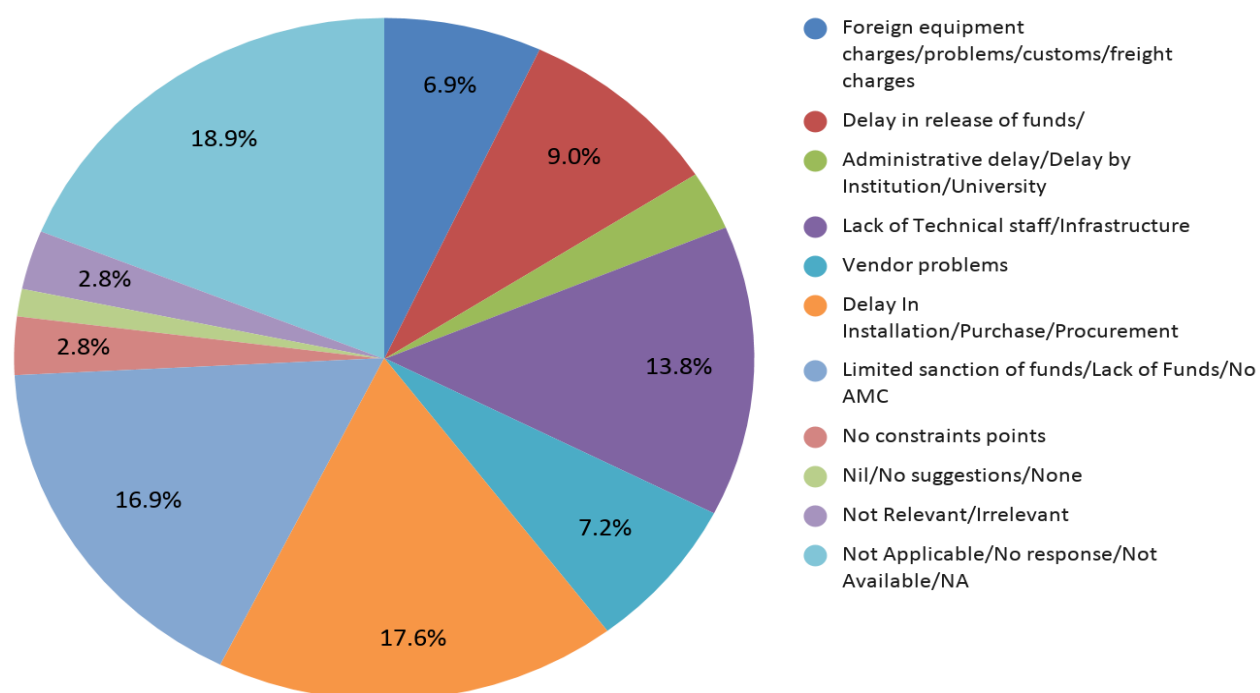
**Fig 7.2: Positive response on Procurement Process**



**Table 7.3: Constrained faced on Procurement Process**

Item*	E&NE N (%)
Foreign equipment charges/problems/customs/freight charges	27(6.90)
Delay in release of funds/	35(9)
Administrative delay/Delay by Institution/University	11(2.80)
Lack of Technical staff/Infrastructure	54(13.80)
Vendor problems	28(7.20)
Delay in Installation/Purchase/Procurement	69(17.60)
Limited sanction of funds/Lack of Funds/No AMC	66(16.90)
No constraints points	11(2.80)
Nil/No suggestions/None	5(1.30)
Not Relevant/Irrelevant	11(2.80)
Not Applicable/No response/Not Available/NA	74(18.90)
Total	391

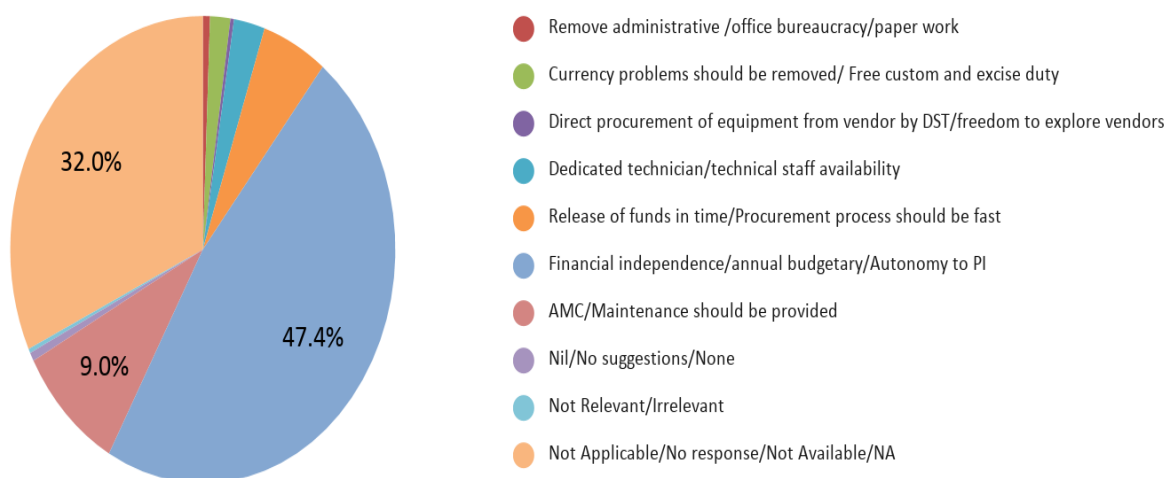
**Fig 7.3: Constrained faced on Procurement Process**



**Table 7.4: Suggestion based on Procurement Process and time**

Issues	E&NE N (%)
Centralized purchase and procurement system	0(0)
Remove administrative /office bureaucracy/paper work	2(0.60)
Currency problems should be removed/ Free custom and excise duty	6(1.70)
Direct procurement of equipment from vendor by DST/freedom to explore	1(0.30)
Dedicated technician/technical staff availability	9(2.60)
Release of funds in time/Procurement process should be fast	19(5.50)
Financial independence/annual budgetary/Autonomy to PI	163(47.40)
AMC/Maintenance should be provided	31(9)
Travel and hospitality grant should be made/More funds for different eases	0(0)
Nil/No suggestions/None	2(0.60)
Not Relevant/Irrelevant	1(0.30)
Not Applicable/No response/Not Available/NA	110(32)
Total	344

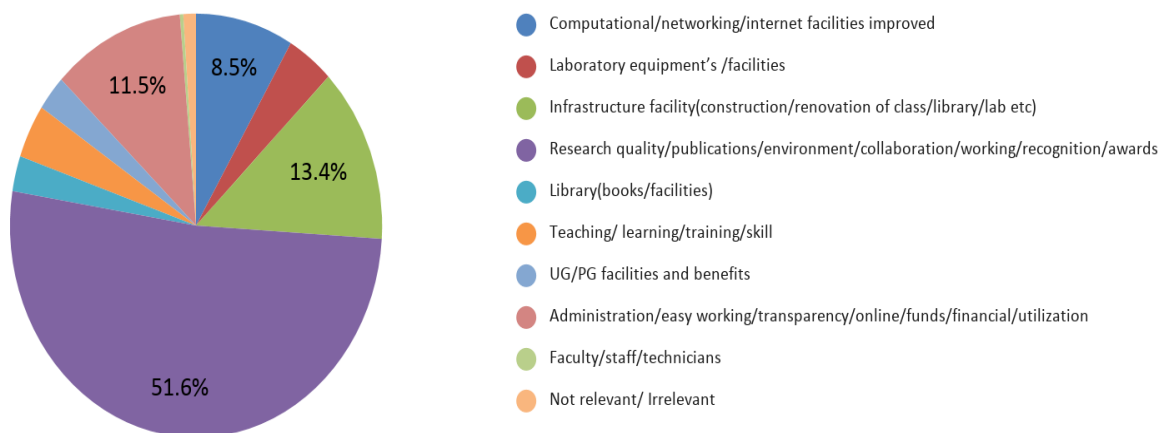
**Fig 7.4: Suggestion based on Procurement Process and time**



**Table 7.5: Positive response on Utilization of infrastructure & service**

Issues	E&NE N (%)
Computational/networking/internet facilities improved	31(8.50)
Laboratory equipment's /facilities	15(4.10)
Infrastructure facility (construction/renovation of class/library/lab etc)	49(13.40)
Research quality/publications/environment/collaboration/working/recognition/awards	189(51.60)
Library(books/facilities)	10(2.70)
Teaching/ learning/training/skill	15(4.10)
UG/PG facilities and benefits	10(2.70)
Administration/easy working/transparency/online/funds/financial/utilization	42(11.50)
Faculty/staff/technicians	1(0.30)
No positive points	0(0)
No/None/Nil/No Suggestion	0(0)
Not relevant/ Irrelevant	4(1.10)
NA/No Response/Not Application	0(0)
Total	366

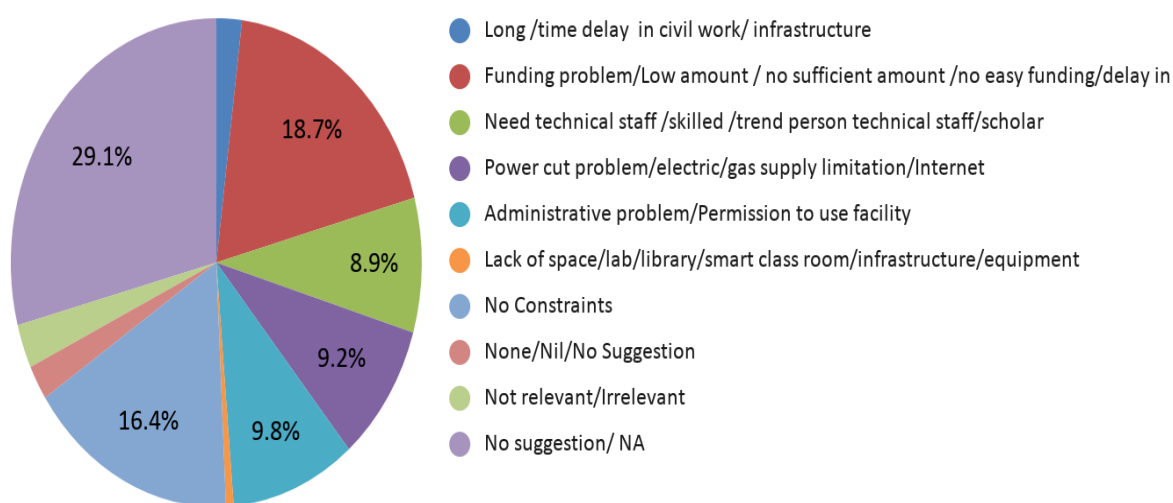
**Fig 7.5: Positive response on Utilization of infrastructure & service**



**Table 7.6: Constrained faced on Utilization of infrastructure & service**

Item*	E&NE N (%)
Long /time delay in civil work/ infrastructure	7(2)
Funding problem/Low amount / no sufficient amount /no easy funding/delay in funding/AMC/next phase grant	65(18.70)
Need technical staff /skilled /trend person technical staff/scholar	31(8.90)
Power cut problem/electric/gas supply limitation/Internet	32(9.20)
Administrative problem/Permission to use facility	34(9.80)
Lack of space/lab/library/smart class room/infrastructure/equipment	2(0.60)
No Constraints	57(16.40)
None/Nil/No Suggestion	8(2.30)
Not relevant/Irrelevant	10(2.90)
No suggestion/ NA	101(29.10)
Total	347

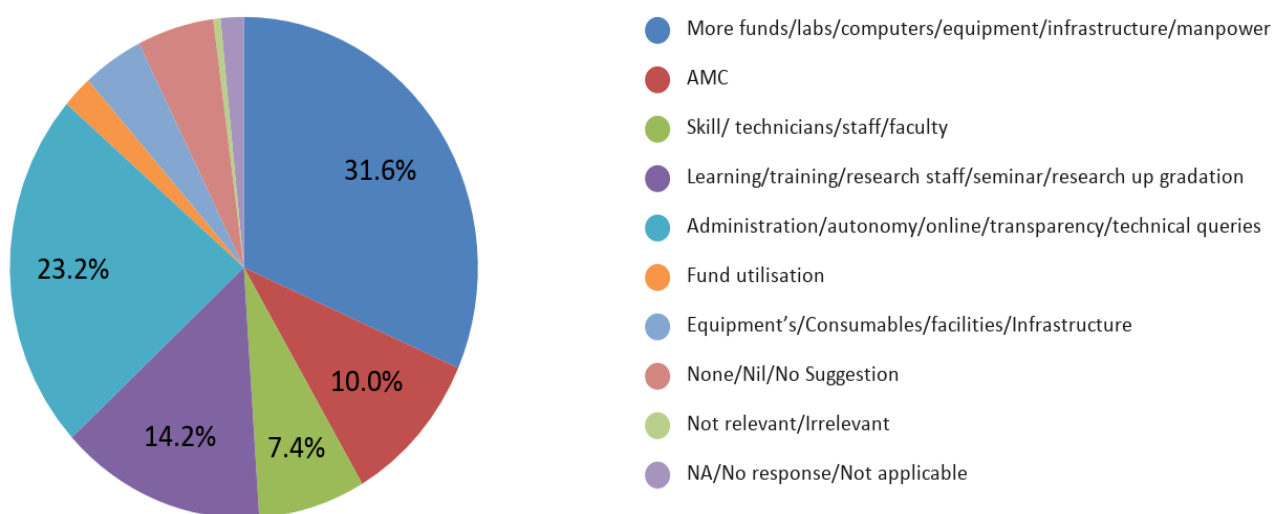
**Fig 7.6: Constrained faced on Utilization of infrastructure & service**



**Table 7.7: Suggestion based on Utilization of infrastructure & service**

Item*	E&NE N (%)
More funds/labs/computers/equipment/infrastructure/manpower	60(31.60)
AMC	19(10)
Skill/ technicians/staff/faculty	14(7.40)
Learning/training/research staff/seminar/research up gradation	27(14.20)
Administration/autonomy/online/transparency/technical queries	44(23.20)
Fund utilisation	4(2.10)
Equipment's/Consumables/facilities/Infrastructure	8(4.20)
None/Nil/No Suggestion	10(5.30)
Not relevant/Irrelevant	1(0.50)
NA/No response/Not applicable	3(1.60)
Total	190

**Fig 7.7: Suggestion based on Utilization of infrastructure & service**

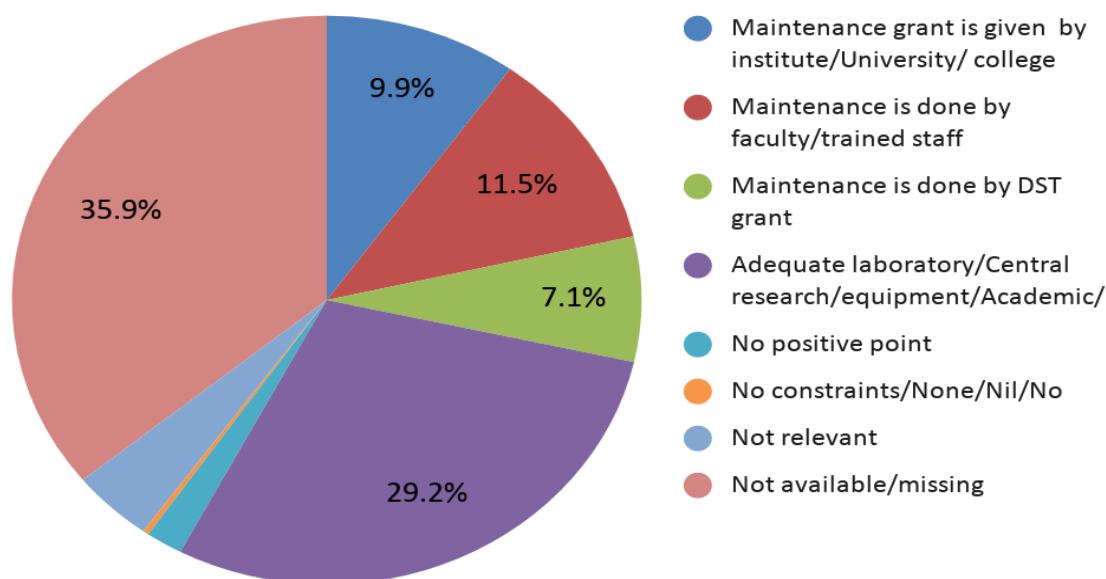


**Table 7.8: Positive response on Maintenance of Infrastructure**

Item*	E&NE N (%)
Maintenance grant is given by institute/University/ college	31(9.90)
Maintenance is done by faculty/trained staff	36(11.50)
Maintenance is done by DST grant	22(7.10)
Adequate laboratory/Central research/equipment/Academic/lab	91(29.20)
No positive point	6(1.90)
No constraints/None/Nil/No suggestion	1(0.30)
Not relevant	13(4.20)
Not available/missing	112(35.90)
Total	312



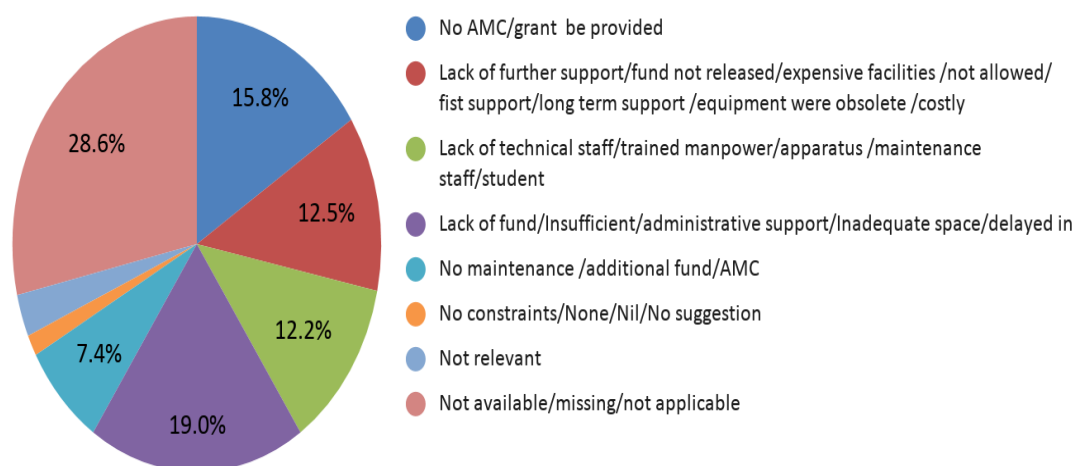
**Table 7.8: Positive response on Maintenance of Infrastructure**



**Table 7.9: Constrained faced on Maintenance of Infrastructure**

Item*	E&NE N (%)
No AMC/grant be provided	53(15.80)
Lack of further support/fund not released/expensive facilities /not allowed/ fist support/long term support /equipment were obsolete /costly	42(12.50)
Lack of technical staff/trained manpower/apparatus /maintenance staff/student	41(12.20)
Lack of fund/Insufficient/administrative support/Inadequate space/delayed in payment	64(19)
No maintenance /additional fund/AMC	25(7.40)
No constraints/None/Nil/No suggestion	5(1.50)
Not relevant	10(3)
Not available/missing/not applicable	96(28.60)
Total	336

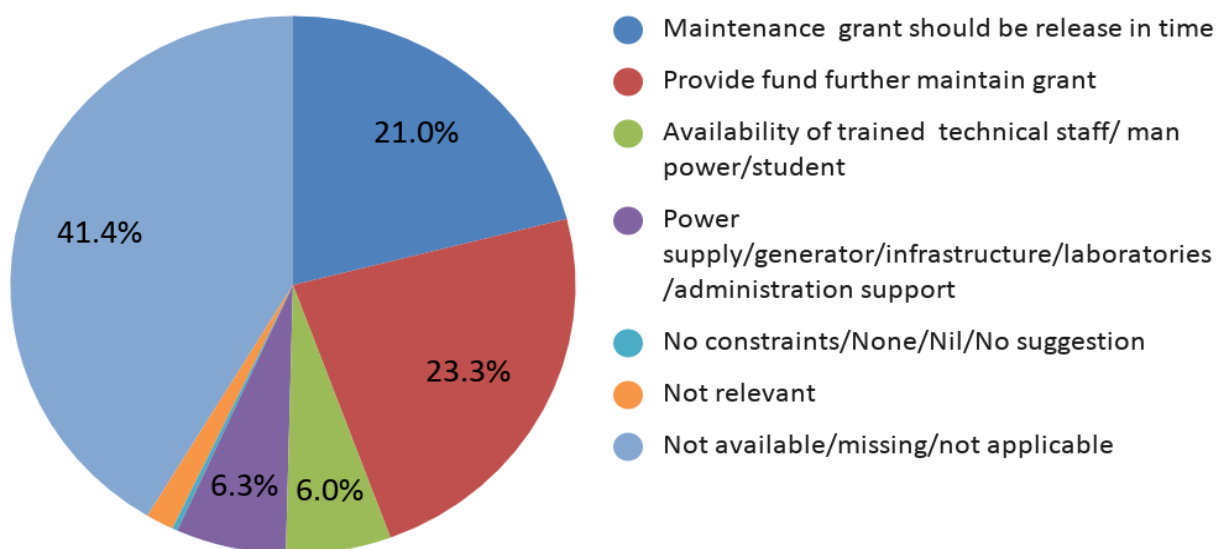
**Fig 7.9: Constrained faced on Maintenance of Infrastructure**



**Table 7.10: Suggestion based on Maintenance of Infrastructure**

Item*	E&NE N (%)
Maintenance grant should be released in time	63(21)
Provide fund further maintain grant	70(23.30)
Availability of trained technical staff/ man power/student	18(6)
Power supply/generator/infrastructure/laboratories/administration support	19(6.30)
No constraints/None/Nil/No suggestion	1(0.30)
Not relevant	5(1.60)
Not available/missing/not applicable	124(41.30)
Total	300

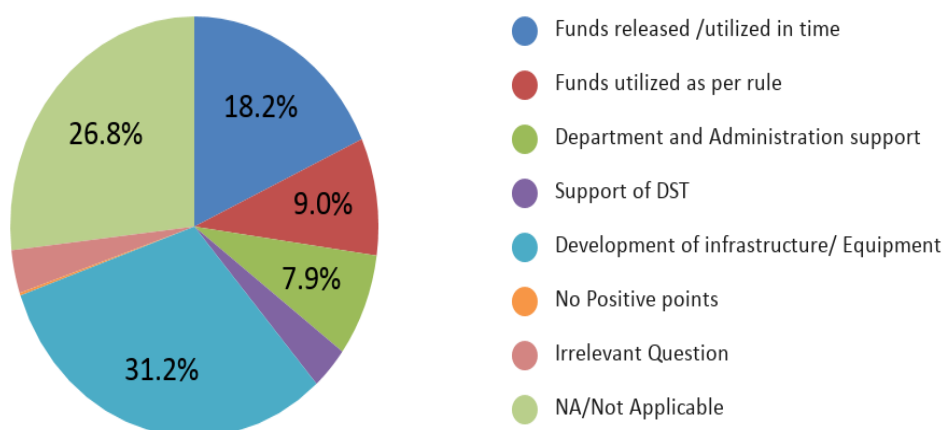
**Fig 7.10: Suggestion based on Maintenance of Infrastructure**



**Table 7.11: Positive response on Utilization of Fund**

Item*	E&NE N (%)
Funds released /utilized in time	64(18.10)
Funds utilized as per rule	32(9)
Department and Administration support	28(7.90)
Support of DST	12(3.30)
Development of infrastructure/ Equipment	110(31.10)
No Positive points	1(0.20)
None/Nil/No suggestion/No constraint	0(0)
Irrelevant Question	12(3.30)
NA/Not Applicable	94(26.70)
Total	353

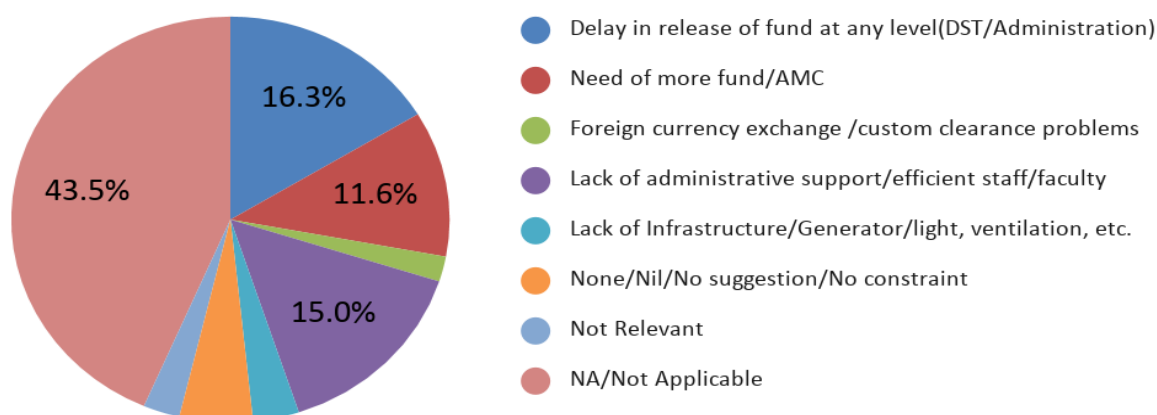
**Fig 7.11: Positive response on Utilization of Fund**



**Table 7.12: Constrained faced on Utilization of Fund**

Item*	E&NE N (%)
Delay in release of fund at any level (DST/Administration)	48(16.30)
Need of more fund/AMC	34(11.60)
Foreign currency exchange /custom clearance problems	6(2)
Lack of administrative support/efficient staff/faculty	44(15)
Lack of Infrastructure/Generator/light, ventilation, etc.	10(3.40)
None/Nil/No suggestion/No constraint	16(5.40)
Not Relevant	8(2.70)
NA/Not Applicable	128(43.50)
Total	294

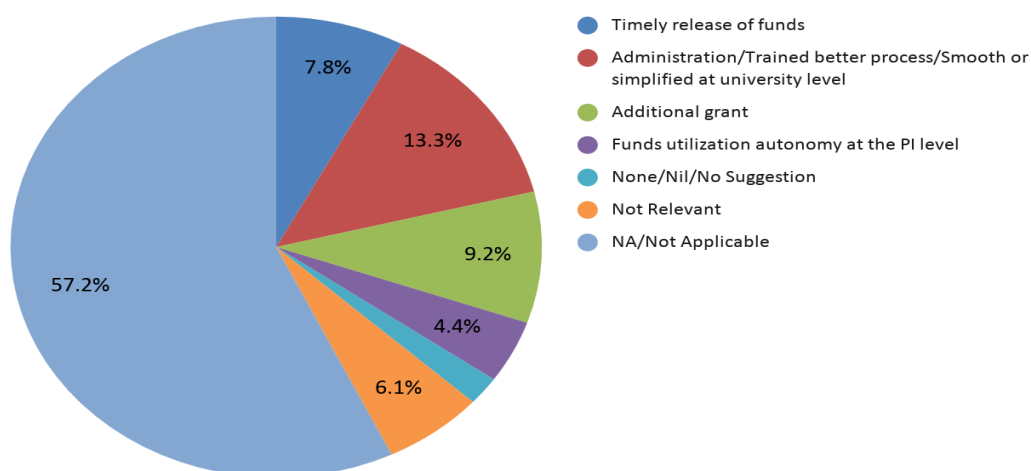
**Fig 7.12: Constrained faced on Utilization of Fund**



**Table 7.13: Suggestion based on Utilization of Fund**

Item*	E&NE N (%)
Timely release of funds	23(7.80)
Administration/Trained better process/Smooth or simplified at university level	39(13.30)
Additional grant	27(9.20)
Funds utilization autonomy at the PI level	13(4.40)
None/Nil/No Suggestion	6(2)
Not Relevant	18(6.10)
NA/Not Applicable	168(57.10)
Total	294

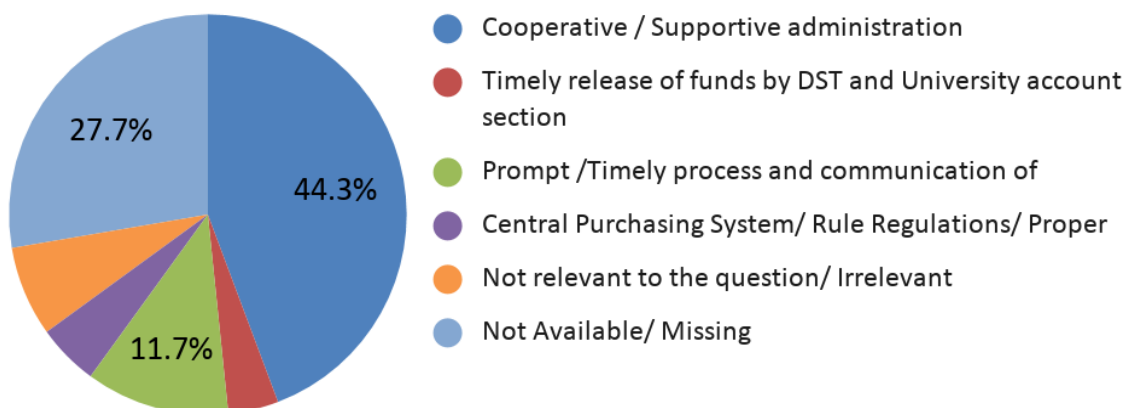
**Fig 7.13: Suggestion based on Utilization of Fund (N=294)**



**Table 7.14: Positive response on Administrative support**

Item*	E&NE N (%)
Cooperative / Supportive administration	152(44.30)
Timely release of funds by DST and University account section	14(4.10)
Prompt /Timely process and communication of administration	40(11.70)
Central Purchasing System/ Rule Regulations/ Proper utilisation of funds	17(5)
No Positive point / Nil / No suggestion/ None	0(0)
Not relevant to the question/ Irrelevant	25(7.30)
Not Available/ Missing	95(27.70)
Total	343

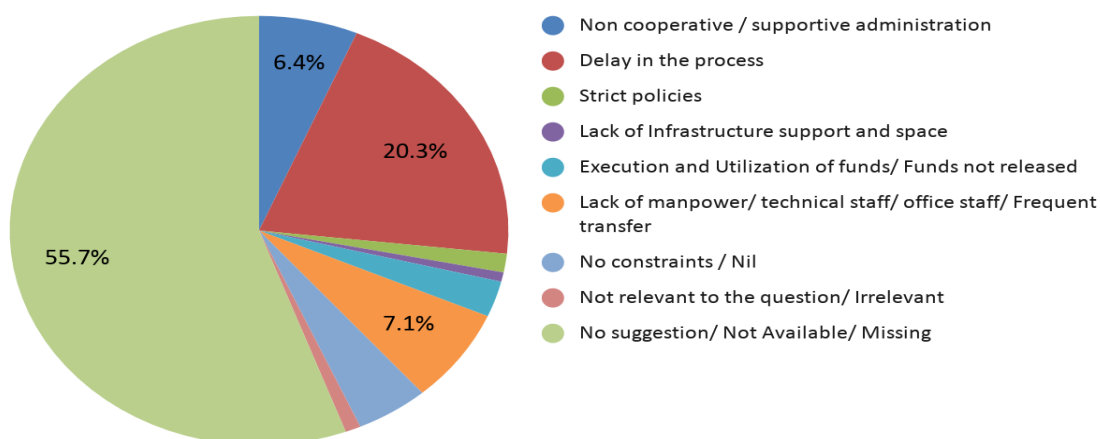
**Fig 7.14: Positive response on Administrative support**



**Table 7.15: Constrained faced on Administrative support**

Item*	E&NE N (%)
Non cooperative / supportive administration	19(6.40)
Delay in the process	60(20.30)
Strict policies	4(1.40)
Lack of Infrastructure support and space	2(0.70)
Execution and Utilization of funds/ Funds not released	8(2.70)
Lack of manpower/ technical staff/ office staff/ Frequent transfer	21(7.10)
No constraints / Nil	14(4.70)
Not relevant to the question/ Irrelevant	3(1)
No suggestion/ Not Available/ Missing	164(55.60)
Total	295

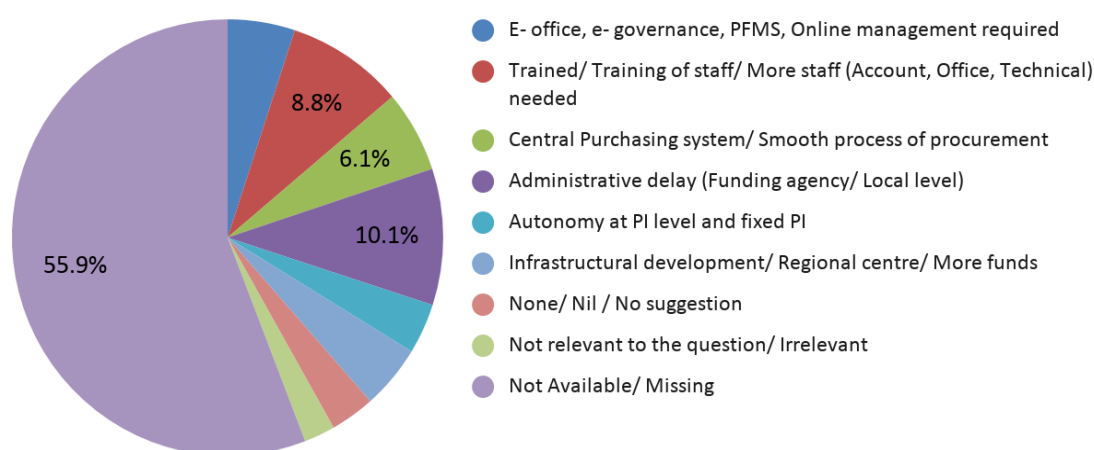
**Fig 7.15: Constrained faced on Administrative support**



**Table 7.16: Suggestion based on Administrative support**

Item*	E&NE N (%)
E- office, e- governance, PFMS, Online management required	15(5)
Trained/ Training of staff/ More staff (Account, Office, Technical) needed	26(8.7)
Central Purchasing system/ Smooth process of procurement	18(6)
Administrative delay (Funding agency/ Local level)	30(10)
Autonomy at PI level and fixed PI	11(3.7)
Evaluation on half yearly basis / Timely assessment	3(1)
Infrastructural development/ Regional centre/ More funds	14(4.7)
None/ Nil / No suggestion	10(3.3)
Not relevant to the question/ Irrelevant	7(2.3)
Not Available/ Missing	166(55.3)
Total	300

**Fig 7.16: Suggestion based on Administrative support**



## Chapter 9

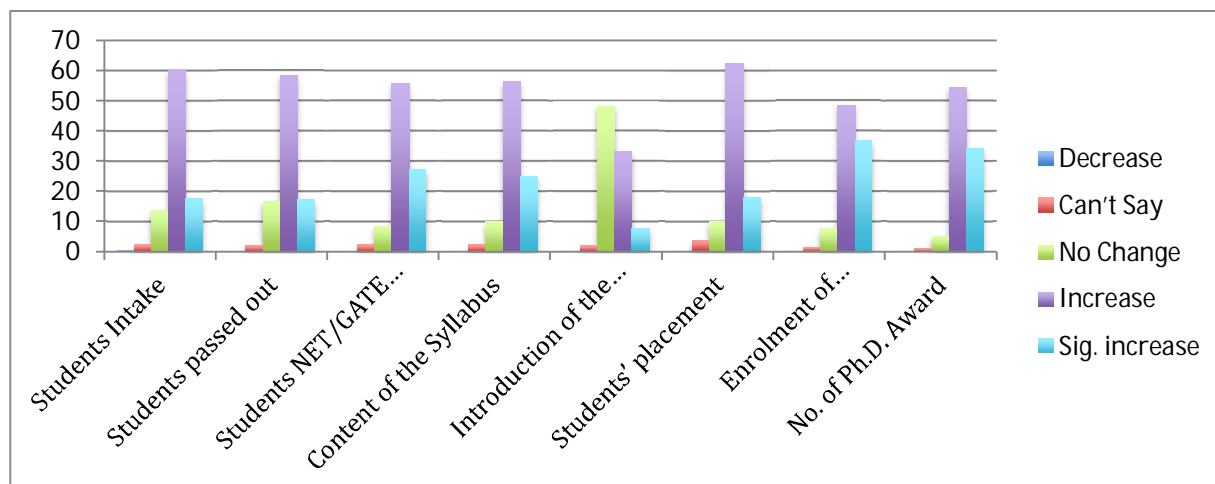
### Overall impact of DST-FIST support: Qualitative assessment

**Table 9.1: Overall Impact of DST-FIST Support**

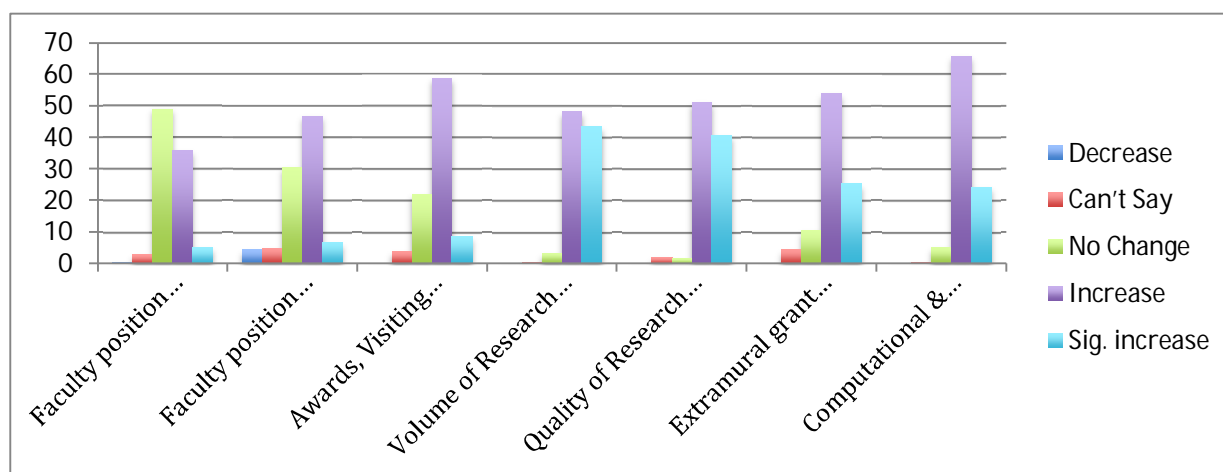
Items	Decrease (%)	Can't Say (%)	No Change (%)	Increase (%)	Sig. increase (%)
Students Intake	1(0.50)	5(2.40)	29(13.80)	126(60)	37(17.60)
Students passed out	0(0)	4(1.90)	35(16.70)	123(58.60)	36(17.10)
Students NET/GATE etc. Result	0(0)	5(2.40)	18(8.60)	117(55.70)	57(27.10)
Content of the Syllabus	0(0)	5(2.40)	21(10)	118(56.20)	52(24.80)
Introduction of the New PG Program, if any	0(0)	4(1.90)	101(48.10)	70(33.30)	16(7.60)
Students' placement	0(0)	8(3.80)	21(10)	131(62.40)	38(18.10)
Enrolment of Research Students	0(0)	3(1.40)	16(7.60)	102(48.60)	77(36.70)
No. of Ph.D. Award	0(0)	2(1)	11(5.20)	114(54.30)	72(34.30)
Faculty position (Sanctioned)	1(0.50)	6(2.90)	103(49)	75(35.70)	11(5.20)
Faculty position (Filled)	9(4.30)	10(4.80)	64(30.50)	98(46.70)	14(6.70)
Awards, Visiting assignments, PDF assignments	0(0)	8(3.80)	46(21.90)	123(58.60)	18(8.60)
Volume of Research Publications by Faculty/ Scientists	0(0)	1(0.50)	7(3.30)	101(48.10)	91(43.30)
Quality of Research Publications by Faculty/ Scientists	0(0)	4(1.90)	3(1.40)	107(51)	85(40.50)
Extramural grant received	1(0.50)	9(4.30)	22(10.50)	113(53.80)	53(25.20)
Computational & Major Equip. facilities in the department	0(0)	1(0.50)	11(5.20)	138(65.70)	51(24.30)
Departmental Library facilities	0(0)	6(2.90)	59(28.10)	101(48.10)	29(13.80)
Accreditation level by the NAAC/NBA/UGC/MCI peer review team	0(0)	14(6.70)	24(11.40)	113(53.80)	43(20.50)
Academic reputation and visibility	0(0)	2(1)	3(1.40)	141(67.10)	54(25.70)
Community/ outreach program	0(0)	17(8.10)	43(20.50)	114(54.30)	23(11)
Attracting talent to organization	1(0.50)	13(6.20)	26(12.40)	133(63.30)	25(11.90)
Visitors from abroad/ reputed institutes	0(0)	4(1.90)	29(13.80)	140(66.70)	26(12.40)
Quality of Teaching	0(0)	2(1)	7(3.30)	137(65.20)	54(25.70)
Research Environment	0(0)	1(0.50)	0(0)	108(51.40)	91(43.30)



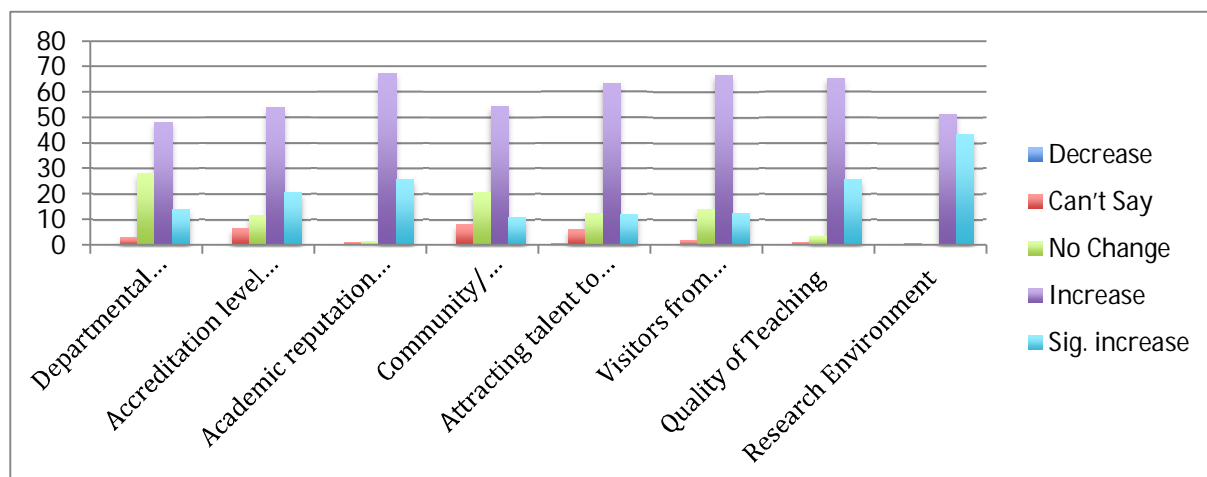
**Fig 9.1: Impact of DST-FIST on students and their performance**



**Fig 9.2: Impact of DST-FIST on faculty and their performance**



**Fig 9.3: Impact of DST-FIST on output and recognition**



**Table 9.2: Suggestions for improvement**

<b>Issues</b>	<b>East &amp; North East N (%)</b>
Technical staff for handling Equipment	6 (1.30)
Timely release of funds (Research, Infrastructure, teaching, Equipment, manpower)	19 (4.20)
Research Improvement/Development/ Environment of university/ Education policy/collaborations	52 (11.60)
Administrative Problem	4 (0.90)
Skill Development (Science & Technology)/Institutional Development	3 (0.70)
Improvements in labs/teaching/networking facility advanced laboratory at college level	0 (0)
Infrastructure/Equipment addition and maintenance	6 (1.30)
Computational facility	1 (0.20)
Not Sufficient faculty members	0 (0)
Continuous support of DST/Annual monitoring of projects	30 (6.70)
More Funds/AMC/Grants for technicians/funds for school level	54 (12.10)
Additional support for UG &PG Students	2 (0.40)
Evaluation of DST FIST is to be made after completion of project	2 (0.40)
No/nil/null/none/no suggestion/no response	254 (56.70)
Not relevant to question /irrelevant	15 (3.30)
NA/ Not applicable	0 (0)