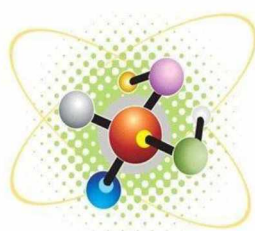


**Directory of Completed Sericulture Projects and  
Sericulture Experts of India**

Part I

**Directory of Sericulture Projects**

Sponsored by



**NSTMIS DIVISION**

**Department of Science and Technology,  
Government of India, New Delhi**

Principal Investigator

**MUNIRAJU E**



**KARNATAKA STATE SERICULTURE RESEARCH AND  
DEVELOPMENT INSTITUTE**

Thalaghattapura, Bangalore-560 062

**July 2008**

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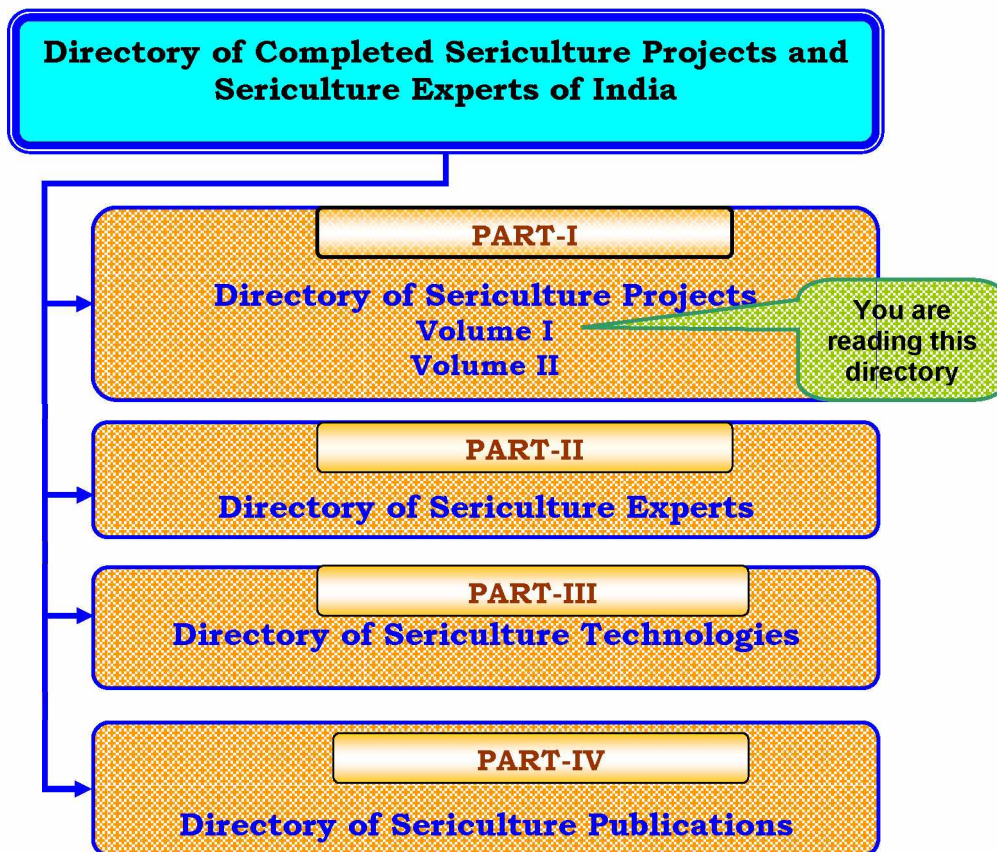
I thank all the Nodal Project Coordinators for their timely efforts and specially Mr. Abdul Hameed MJ, Miss. Archana Mahendrakar, Miss. Arundhuthi Bhattacharya, Mr. Bedojit Vordulai, Mr. Diruodotta Borah, Mr. Mohan B, Mr. Murugesh KA, Mr. Orville Singh C, Mr. Safur Rahman SA, Mr. Sainath SB, Miss. Sakiba Saleem, Mr. Sampath Kumar, Mr. Sanjeev M. Hullur, Mr. Srinivasa P, Mrs. Shoba Rani, Dr. Swati Chakrabarty, Dr. Tikader, Mr. Venkatesh Kumar, Mr. Zia-ul-Haque Rufaie and office assistants Mr. Ramesha BS and Mr. Krishna Kumar HN who have worked day and night through the stipulated period of the project.

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**E. Muniraju**

# FLOW CHART OF THE DIRECTORIES



## EXECUTIVE SUMMARY

A Project entitled, '*Preparation of Directory of Completed Sericulture Projects and Sericulture experts of India*', sponsored by Department of Science and Technology, Government of India, New Delhi, was implemented at Karnataka State Sericulture Research and Development Institute, Thalaghattapura, Bangalore during 2005-2008 with an objective to bring out comprehensive directories on the Sericulture Research Projects implemented, Experts working in the field of Sericulture, Technologies Developed and Publications brought out. Periodical guidelines were sought from the Local Project Advisory Committee (LPAC) during the project period in addition to a mid term appraisal workshop. The brief outcome of the resourced information is given below.

As envisaged in the project the directories are brought out in four parts, namely ;

Part I : Directory of Sericulture Projects (Vol.I & II)

Part II : Directory of Sericulture Experts

Part III : Directory of Sericulture Technologies and

Part IV : Directory of Sericulture Publications.

### **Part I : Directory of Sericulture Projects**

- The Directory of Sericulture Projects contains the resourced information of completed R & D sericulture projects of India of more than 60 years (1944-2006) and in 2 volumes.
- Information from 56 organizations (20 R & D Institutes, 29 universities and colleges, 2 NGOs and 1 financing institution (NABARD)) totaling to 4716 projects have been documented in this directory.
- The directory provides the information of Project title, Name of the Organization, Personnel involved, Project period, Objectives, Results/Recommendations, Project outcome (if available) and Source of information.
- The directory also gives subject and author index at the end.
- Mulberry silkworm has been extensively studied in as many as 2243 projects followed by the work on the food plant, mulberry in 1409 projects. Non-mulberry sericulture research was carried out in 400 projects followed by the studies o silk technology (396) and sericulture extension (253).
- This directory also provides the information on the projects which were incomplete as additional information at the end of respective organizations.
- Among the institutes, CSR&TI, Mysore rank the top position with 2223 projects followed by KSSRDI, Bangalore (361) and CSR&TI, Pampore (327) and CSR&TI, Berhampore (306).
- Universities initiated R & D projects from 1980 onwards and their priorities on sericulture R & D have been lowered at present.
- Scientists those who have initiated work on socioeconomic issues of sericulture industry have discontinued taking up sericulture related projects.

## CHAPTER I

### INDIAN SERICULTURE AND RESEARCH - AN OVERVIEW

The origin of silk is as mystique as silk itself. Various documents indicate that the silk originated in China during 2800 BC. In the Vedic period, dating back to about 5000 BC, the silk and silk garments were known to the Indian people. Dr. Varthak opines that the great epic war of Mahabharatha was started on 16th October 5561 BC and the epic was written during 5480 BC. In Mahabharatha, there is vivid description about silk and silk garments. Lord Krishna was described as always clad in Kashi Pitambara (silk of Banaras). There are sporadic references to Kashmir silk and Bengal silk. The survey of Indian Silk Industry in India was carried out by Prof. H M Lefroy during 1915-16, and Later by Mr. R C Rawlley (1919). Lefroy describes that, "Silk was produced in India before Christian era. During this period the silkworm was referred to as Indian worm, indicating the presence of silk producing industry in India. If the Christian authors of the 4th and the following centuries derived their knowledge of silkworm from Indian worm, it is possible that India was the principal source from which the migration of silkworm commenced during the early centuries of the Christian era." Ad-Damiri (1341-1405) in the document "Hayat-al-Hayawan" (a zoological lexicon), describes that "As to the silkworm, it is called Indian worm, is one of the most wonderful creatures". It is supposed that Arabs obtained the silkworm from India during early years of Christian era. Two monks who lived for some time in India, learnt the art of silkworm rearing and silk reeling, introduced the technique to Constantinople (the then Byzantium) during 553 AD.

India is the only country which has all the four kinds of silk namely, domesticated mulberry silk (*Bombyx mori*), semi domesticated eri silk (*Philosamia ricini*), wild tasar silk (*Antheraea mylitta*) and exclusive wild golden muga silk (*Antheraea assama*).

Among the mulberry silks, Banaras silk, Kashmir silk and Mysore silk were the three geographical indicator silk categories which are famous even today. Historians and researchers believe that these are the three places which are epicenters of origin of silk industry in India. Mr. M Giraud, in "Les Origines de la soie", indicates that silk was first introduced to Kotan (part of North-Eastern India) by a princess, by concealing in her head-dress during 140 BC. Later it spread to Kashmir and other Northern India. In 1710, East India Company introduced a new variety of mulberry silkworm in Bengal. This is the first record of research and development of sericulture in India. In 1769, East India Company introduced a new improved method of silk reeling in Bengal. In 1771, Bengal Government obtained new silkworm breeds and varieties of mulberry from China. In 1772, first filature was established in Murshidabad of West Bengal by British.

The "Tiger of Mysore" Tippu Sultan is the father of Mysore silk. In 1785, he sent people to Bengal to learn sericulture and to establish the same in Mysore Kingdom. He wanted 'Mysore to be the foremost among silk producing nations'. The dream of this great ruler became true during the later period. In 1860, a filature was established in Bangalore by an Italian industrialist. During this period, many types of cross breed layings were produced by the filature between Indian and Italian or Chinese or Japanese varieties. This was the most difficult period for sericulture all over the world. Due to the outbreak of pebrine disease, the industry almost collapsed. In Bengal and Kashmir, the industry was completely wiped out. But in Mysore the industry subsisted. As a consequence, most of the exotic varieties were perished. But the local race, Pure Mysore remained stable through this period even till today.

Mysore sericulture industry was of considerable importance because, sericulture industry in Bengal was decreasing due to fall in prices of raw silk, excessive rent charged for mulberry land, disease of silkworm, competition from other crops and withdrawal of European firms from silk trade with India. The industry had almost died out by about 1866 and was temporarily helped by import of seed from Japan. But the Mysore race of silkworms held its own position till

the end. The Industry began to revive about 1890 but again declined during about 1914-15. The depression and uneconomic competition from outside since 1929, hit the industry very hard.

In 1896, the great industrialist Sir J.N.Tata established a Silk Farm in Bangalore with a filature attached to it in Japanese pattern with the help of Sri. K. Sheshadri Ayyar, the Diwan of Mysore. He got the technical expertise from a Japanese couple Mr.and Mrs. Odzou, who gave scientific outlook for the sericulture industry. Mr. Odzu trained Sri. V.M.Appadhorai Mudaliar and Sri. Lutchman Rao for a period of one year in this farm.

In 1912, Mysore recognized the need for organizing seed supply on the modern lines of Pasteur's system. The Architect of Mysore, Sir M.Vishveshwaraiah, gave much importance to sericulture in rural development. He hired the services of Signor Washington Mari from Italy to organize and develop silk industry in Mysore in 1913. He made available 12 varieties of pure European and Chinese silkworms to conduct experiments in Mysore (now Karnataka). Under the guidance of Signor Mari, Appadhorai Mudaliar conducted native environment breeding experiments in Channapatna (70 km from Bangalore). They successfully developed many cross breed combinations between females of Mysore Local (Pure Mysore) and European and Chinese races, which were far superior to their parents.

Research for improvement of cocoons has been carried on since 1913. European, Chinese and Japanese univoltine and bivoltine races of silkworm and hybrids between Mysore race and these foreign races have been tried on an extensive scale. In 1914, Signor Mari shifted the headquarters to Bangalore, and Mr Mudaliar continued to carry out the breeding program in Channapatna Farm. At the same time, the Department of Sericulture was established in Mysore state (now part of Karnataka) and Signor Washington Mari became the first Director of Sericulture in 1916.

In 1919, Mysore state employed a Japanese expert who conducted experiments and found that multivoltines could not stand economic competition against univoltines and bivoltines and further the univoltines and bivoltines could not be acclimatized to tropical climate for industrial rearing. He had also found that a cross between the multivoltines or bivoltines gave superior results compared to UV or BV. A number of foreign races were brought from Japan in 1923 and in 1930, by two officers of Sericulture Dept deputed to Japan. The Govt. of Mysore established a Spun silk Factory in Channapatna in 1936.

In 1940, All India Sericulture Conference was held at Luknow, under the auspices of the Imperial Sericultural Committee. It was resolved in the conference that a Central Sericultural Research Institute should be started immediately and to be located in the State of Mysore. Accordingly, the Central Silk Board was constituted by an Act of Parliament on 9<sup>th</sup> April, 1949. The research projects envisaged in the conference were,

#### I. Moriculture :

- Investigation on alternative silkworm feed
- Manorial pot and plot experiments.
- Study on spacing of plants.
- Comparative study on various topiary practices and cultivation.
- Study on rooting in different varieties, manorial conditions, systems of planting.
- Study on methods of preservation and transport of mulberry leaves.
- Water requirement of several varieties of mulberry.

#### 2. Sericulture :

- Comparative efficiency of various foreign races for crossing with Mysore race.
- Study on factors influencing degeneration of foreign races.

- Breeding vigorous and high yielding hybrids adaptable to local environment.
- Improvement of local races by selection.
- Effect of mulberry leaves of different ages, varieties etc on silkworm.
- Study on spacing in different races, hybrids to seasonal conditions.
- Study on methods of feeding, chopped leaf, shoots, branches.
- Study on conditions influencing simultaneous hatching of eggs.
- Influence of temperature, humidity, oxygen and carbon dioxide on the development of worms.
- Determination of nutritive value of different varieties of mulberry leaf.
- Study on spacing in cocoonages for different races.
- Different types of cocoonages.
- Determination of optimum period for harvesting of cocoons.

3. Engineering and Reeling

4. Grainage Section

5. Biochemistry

6. Plant Physiology and Genetics

7. Insect Physiology and Animal Genetics and

8. Pathology.

In 1951 (14<sup>th</sup> to 18<sup>th</sup> June), the Government of Mysore (now Karnataka), held a second Seminar on Sericulture at Nandi Hills (60 kms from Bangalore). The deliberations in the seminar gave a big boost to the research and development in sericulture. The research objectives outlined in the seminar were,

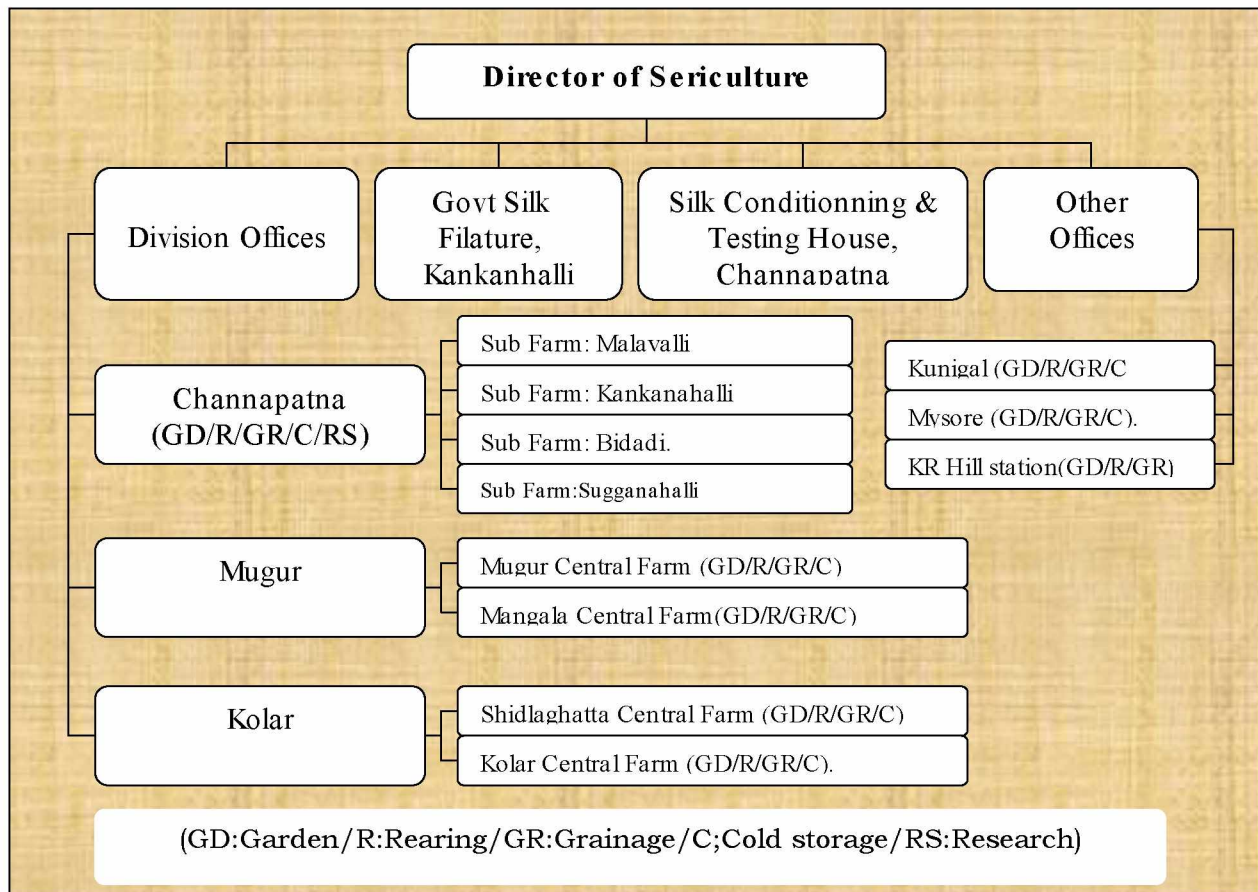
- Improvement of mulberry both in respect of quality and cost by increasing the yield of leaf per acre.
- Producing cocoons that yield higher quantity.
- Producing better quality silk by inventing machinery which would produce high grade silk at reduced costs.

The outcome of the research activities across the country from 1944 to 2006 has been recorded in this directory.

The Mulberry silk Industry was widely distributed in Mysore, Madras (Kollegal Taluk), Jammu & Kashmir, West Bengal, Bihar, Assam, Uttar Pradesh, Himachal Pradesh and Coorg. In Non-mulberry sector, Assam (Eri and Muga), Bihar (Eri and Tassar), Madhya Pradesh (Tassar), Orissa (Tasar) and West Bengal (Eri and Tasar) practiced sericulture. (Names of the Places and States indicated here were the names in vogue during the reference period).



Organization of Department of Sericulture during 1951 in Mysore State was,



In addition to the Government set up, 133 aided grainages, 7 sericulture co-operative societies, 12 sericulture associations, 7 filatures and about 5000 charakas were established.

In Madras State, sericulture was practiced in Kollegal and Tlawadi firka in Coimbatore district and in Hosur. There is a Hill station in Coonoor and Nilgiris for the purpose of raising basic univoltine seed of the silkworm.

West Bengal (WB) : In 19th century, West Bengal exported large quantities of silk to foreign countries. Malda, Murshidabad, Birbhum, Bankura, Midnapur, Naida and 24 Parganas practiced sericulture. Sericulture was declining due to fall in prices and foreign competition. The races reared were,

- Nistari : 15 April to 15 October,
- Nistid and Nismo : 16 October to 14 April,
- Barapolu (Indigenous univoltine) : February and March.

Burma : Along with Bengal sericulture in Burma flourished but had greatly declined owing to the competition of large imports of superior raw silk. The burmese silkworm was *Bombyx arracanensis*, a multivoltine giving white and yellow cocoons.

Jammu and Kashmir : Mirza Haider's report "Tarik-i-Rashidi" (~1550) indicates that mulberry trees were cultivated for feeding silkworm and it was among the wonders of Kashmir. Abul-Fazal, in "Ain-i-Akbari" an administration report and statistical returns of Akbar's Govt. (1590).describes that ' Mulberry was little eaten in Kashmir, its leaves were reserved for silkworm, the silkworm eggs were brought form Gilgit and little Tibet'. However, during the 17th to 18th century, the history of Kashmir silk was unknown. The focus of silk industry in India

shifted to Bengal. In Jammu, Sericulture was reintroduced in 1909. Univoltine race is reared in commercial scale. Tree mulberry was cultivated instead of bush. All the mulberry trees were planted by the Government.

Assam : The basic seed of univoltine (UV) and bivoltine (BV) was raised in the hill stations at Shillong and multiplied in Jawai and Shillong Silk Farms. The system closely followed Mysore System.

East Punjab : Was a univoltine area.

Uttar Pradesh (UP) : Introduced sericulture in 1948 in Dehra Dun District.

Himachal Pradesh : Introduced sericulture in 1951.

Bihar : Sericulture was practiced in bordering districts of Malda of West Bengal, in about 150 acres of mulberry.

Bombay : Sericulture was introduced in 1823 and died in 1843. In 1941, Sri Ramnath of Mysore was employed by Govt. of Bombay to revive silk industry.

Madhya Pradesh (MP) : Based on the reports of Mr. N. Rama Rao sericulture was introduced in 1949-50. The seed was obtained from Mysore and Madras.

Andhra Pradesh : Hyderabad state started sericulture in 1948 in Hindupur and Chittur.

Manipur : It is claimed that sericulture was very old to Manipur.

Coorg : Govt. of Coorg started sericulture in Kudgi during 1948.

## CHAPTER II

### INTRODUCTION

Sericulture' is an art and science of rearing of silkworms to produce cocoons and silk. This activity, apart from the rearing of silkworms, also involves growing of mulberry leaf the only feed for silkworms, reeling of silk yarn from cocoons, weaving the silk yarn and further processing it to produce the silk fabric. There are many more ancillary activities encompassing the sericulture activity such as silkworm egg production, fabrication of rearing appliances, production of organic manures, development of irrigation methods, fabrication of garden machineries, waste silk units, byproduct utilization units etc. Silk is the natural textile fiber and accounts for 0.2% of the textiles in the world. Though accounting for a meager quantity in textile sector, silk attracts the user by its glamour, elegance, richness and beauty. The production of raw silk and silk fabrics are limited to only a few countries in the world of which China occupies the first place and India, the second. Other countries such as Japan, Russia and countries of former USSR, Korea, Iran, Thailand, Vietnam, Brazil, Turkey, Bulgaria, Yugoslavia, also contribute to the world silk production. Silk goods from India are exported to major countries like USA, Germany, UK, Italy, France, Spain, Canada, Australia, Switzerland, Greece, Netherlands, UAE, Belgium, Denmark, Austria, Portugal and few others. There has been a strong market for the silk and silk goods in the International level. The demand for silk goods is expected to exist as long as the human race appreciates its wearing.

Sericulture is an important means for the socio-economic development of the rural masses and provides an ideal opportunity for developing countries having a major rural sector. It is a highly labour intensive, profit oriented, low input indoor activity that gives frequent periodicity of economic returns. It is also well suited for the women folk of rural sector. An acre of irrigated mulberry provides employment to 5 persons throughout the year and earns net returns of around Rs.60,000 per year which is substantial compared to other similar crops. It also provides major occupation for the moisture deficit tracts of rainfed agriculture in the tropics.

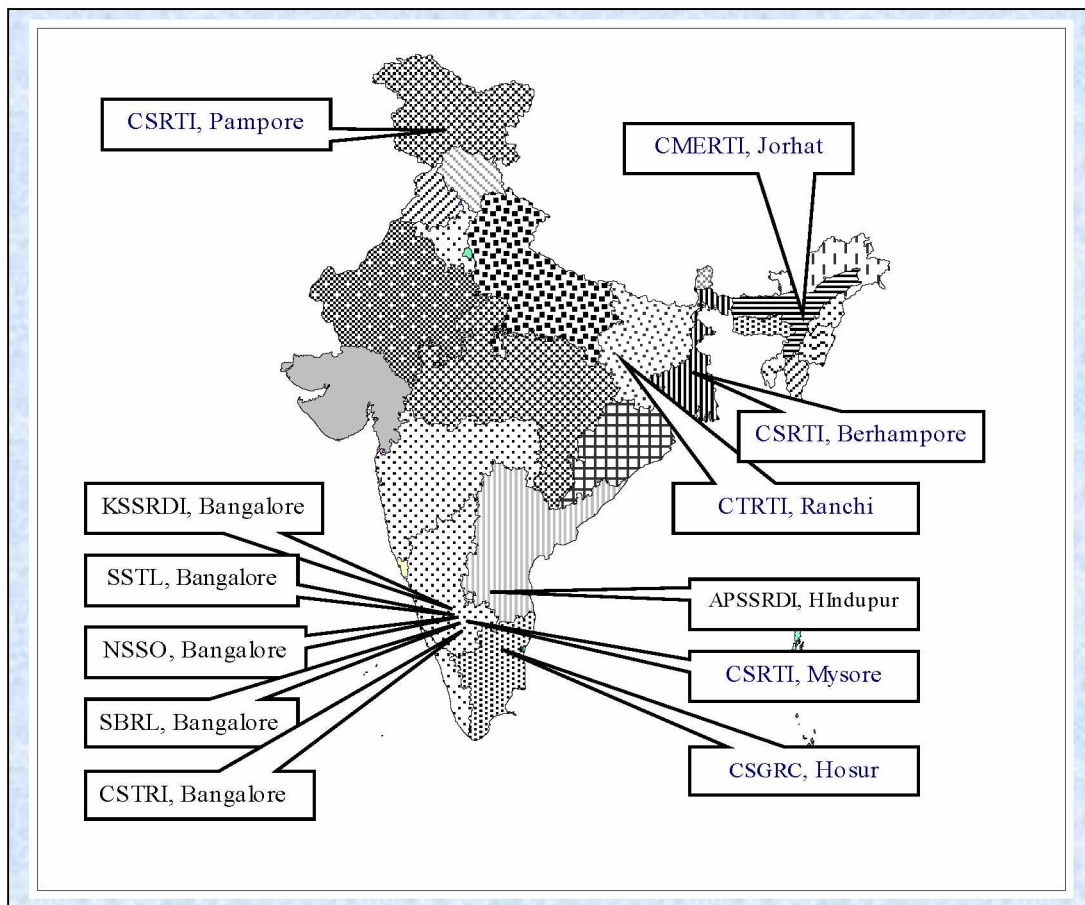
**Indian sericulture industry :** Sericulture in India is unique by itself producing all the four varieties of silk namely Mulberry and Vanya (Tasar, Eri and Muga) silks. Of the four varieties of silk, mulberry silk accounts for 91% and the balance is shared by other varieties. Mulberry raw silk is produced mainly in the States of Karnataka, Andhra Pradesh, Tamil Nadu in the tropical zone and West Bengal and Jammu and Kashmir in the sub-tropical and temperate zones and these are called the traditional states. These five states account for nearly 98.7% of the total mulberry raw silk production of the country. Out of the five traditional States producing mulberry raw silk, Karnataka is in the forefront contributing 56.8% to the raw silk production of the country. The second position is occupied by the state of Andhra Pradesh contributing 28.9% of the raw silk.

India is producing about 15,000 metric tonnes of raw silk annually creating employment to over 6 million people directly and indirectly. India is again unique in silk consumption process. About 80% of the total production is consumed locally. The traditional pattern of dress, weaving and the raw silk consumption for manufacture of these fabrics contribute for the bulk utilization. Hence there is sufficient domestic market for the silk produced in the country. India is earning foreign exchange of over Rs. 2000 crores annually. Further efforts are being made to produce bivoltine raw silk of export quality for transaction in the International raw silk market.

It is to be mentioned here that at the Global level, India is the only country which is steadily increasing its production of raw silk year by year. Other countries have recorded a declining trend. With this situation, the demand and supply gap will increase and thus India has a good

opportunity to expand the Industry and produce more and more silk to reduce this gap and to make a dent in the world raw silk market.

### Sericulture Research Network of India



**Indian sericulture research :** Research is a basic requirement and is a continuous process for the development of any industry and it is so for sericulture. Central and State sector Research Institutes (Fig 1) have largely contributed for sericultural development through several technologies evolved during the last few decades.

Major focus of research is given to labor reduction, yield and quality improvement programs in mulberry leaf production, silkworm rearing and post cocoon sectors. Continuous efforts in research have contributed for developing few high yielding mulberry varieties with improved nutrition. High productive bivoltine and multivoltine silkworm races have also been evolved to replace the old low yielding local races. Technologies related to mulberry cultivation, silkworm rearing and disease and pest management have also been vital for increased production.

Despite implementation of many research projects in sericulture, there is no compiled information on the projects and findings is lacking at the State or at the Central Govt. level as a document. This is a drawback for further planning and development of the industry. The present project is aimed at documentation of these projects details in well compiled form and hence the proposal.

A number of research and extension projects have been implemented for the development of sericulture industry in India. The research findings have contributed a great deal for sericulture

development in the form of higher productivity and quality. Over the past three decades the production of cocoons/unit quantity of seed has tripled while the mulberry leaf production per hectare has doubled. All these have been made possible due to technological inputs resulted from intensive research and extension programmes/projects implemented in the country.

The progress achieved over the years in sericulture is the collective effort of the personnel working in the industry. The involvement of the personnel has been at different levels and their individual contributions are worth considering. Scientists in the R & D sector have been mainly involved in developing appropriate and need based technologies to meet the specific requirement of the industry. In addition, many people have been involved in different capacities in sericulture extension, planning, project implementation and in administration of the sericulture industry.

In addition to state and Central Government organizations various voluntary and co-operative groups, non-governmental organizations (NGO's), self help groups, corporate sectors and multinational organizations have been actively involved in sericulture related developmental programmes during the last two decades. The proposed document will be useful for such organizations to get the state of the art technical know-how from the concerned subject experts.

**The need of the project :** A number of Research, Development and Extension related projects have so far been implemented in India. These research findings have contributed a great deal for the development of Sericulture Industry in India and elsewhere towards the improvement in quality and productivity. However, the details of these projects in a compiled form are not available either at the regional level or at the national level. Hence the project was envisaged.

**About the project :** The Karnataka State Sericulture Research and Development Institute, Bangalore has implemented the project, "*Preparation of Directory of Completed Sericulture Projects and Sericulture Experts of India*", with the financial support from National Science and Technology Management Information System (NSTMIS), Department of Science and Technology, Government of India.

**Objectives :**

- I. To compile and bring out a consolidated directory of completed sericulture projects in India with relevant details (Part-I);
- II. To bring out a consolidated profile of Planners, Scientists and Extension personnel involved in the national progress of sericulture industry (Part-II);
- III. To compile and bring out a consolidated report on the sericulture technologies evolved in India (Part-III);
- IV. To bring out a consolidated information on the literature published on the sericulture related research work carried out in India, in the form of a directory (Part IV);
- V. To bring out the directory in the form of book (hard copy), in CD (soft copy) and to launch the directory in the internet (e-copy).

## CHAPTER III METHODOLOGY

**Identification of Nodal Project Coordinators** : Based on the suggestions of the first Local Project Advisory Committee meeting, 26 Nodal Project Coordinators were identified with the help of the Heads of the Organizations/Departments, to resource the information from different Institutes/Universities throughout the country. The list of the Nodal Project Coordinators and their place of work are given in Annexure-2.

**Mid term appraisal workshop** : To incorporate the view points of experts in the field for strengthening the project implementation, a one day Mid-term Appraisal workshop was organized on 15th February 2007, by inviting about 50 senior executives from the participating Institutes, Department of Sericulture experts, Professors and others from selected Universities. Dr. R.K. Datta, Director (Retd.) CSRTI, Mysore chaired the session. The outcome of the deliberations and the suggestions offered in the workshop lead to quantum improvement in resourcing the information.

**Project implementation** : To collect the information on completed sericulture projects, questionnaire (Form 1, Annexure-II) was developed based on the suggestions of the Local Project Advisory Committee (LPAC), approved by the DST. The Principal Investigator of the project toured extensively throughout the country to appraise about the project, to identify Nodal Project Coordinators and to educate them on the formats for resourcing information in the respective Institutions. In addition, the printed formats for collection of data were despatched to all the agencies involved in sericulture research, along with the covering letter explaining the objective and scope of the directory with a request to return the completed format to the Investigator and to circulate the format among colleagues. Since the response was very poor in the initial stage, the formats were sent thrice to the non-respondents at an interval of 3 months in between. During his visits, the Principal Investigator met the Heads of organizations and requested them to give consent to their subordinates to send the required information. The format was made available in the KSSRDI official web-site [www.kssrdi.org](http://www.kssrdi.org). The PI, while attending sericulture related workshops and seminars, distributed pamphlets about the project with a request to provide the required information. This was followed-up through regular phone calls and email contacts.

**Source of information** : The information was resourced from

- Central Sericulture Agencies : The CSB, and its Mulberry silk and VANYA silk related Institutes
- State Sericulture Agencies : State Research Institutes like APSSRDI, KSSRDI and KRSRAC
- Financing Agencies : Swiss Agency for Development and Co-operation, NABARD, PSFA-Govt. of Karnataka, DST, DBT and World Bank
- Universities and colleges and
- NGO's.

**Type of Data** :

i) Primary data : The data collected through following sources was classified as Primary data :

- Interaction with the Institutes,
- Down loading from websites, and
- Personal interaction.

ii) Secondary data : The secondary data was collected from

- Annual reports of research organizations,

- Project completion reports, and
- Published literature.

### Classification of data :

**1. Based on organizations :** The collected data were classified based on the organizations like,

- Research Institutes (National and State) and
- NGOs and others.

The information has been grouped under 56 organizations as indicated in the following Table.

Sl. No.	Organizations/Institutes/Universities	Projects Documented
1	Agro-Economic Research Centre, Jorhat, Assam	2
2	Andhra Pradesh State Sericulture Research & Development Institute, Andhra Pradesh	7
3	Assam Agricultural University, Assam	36
4	Avinashilingam Institute for Home Science and Higher Education, Coimbatore	1
5	AVVM Sri Pushpam College, Poondi	1
6	Bangalore University, Bangalore	177
7	Bapuji Institute of Engineering Technology, Davanagere	5
8	Bharathidasan University, Tamil Nadu	18
9	Bharatiya Agro Industries Foundation, Tiptur	3
10	Bhartiyar University, Tamil Nadu	1
11	C.P. College of Agriculture, Sardar Krushinagar Dantiwada College, Banakantha	1
12	Central Muga Eri Research and Training Institute, Assam	85
13	Central Sericultural Germplasm Resources Centre, Hosur	69
14	Central Sericultural Research & Training Institute, Berhampore	306
15	Central Sericultural Research & Training Institute, Mysore	2220
	JICA, Mysore	3
16	Central Sericultural Research & Training Institute, Pampore	327
17	Central Silk Technological Research Institute, Bangalore	121
18	Central Tasar Research and Training Institute, Ranchi	210
19	College of Home Science, G.B. Pant University of Agriculture & Technology, Pantnagar	4
20	Dayanandasagar College of Engineering, Bangalore	3
21	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	1
22	Government College of Engineering & Textile Technology, Hoogly	7
23	Govt. Sri Krishnarajendra Silver Jubilee Technological Institute, Bangalore	102
24	Guwahati University, Guwahati	13
25	Holy Cross College (Autonomous), Tiruchirapalli	16
26	Indian Institute of Management, Bangalore	1
27	Indian Institute of Science, Bangalore	11
28	Institute for Social and Economic Change, Bangalore	54
29	Institute of Advance Studies in Science & Technology, Assam	3
30	Jayaprakash Social and Economic Change, Kolkata	4
31	Kakatiya University, Warangal	13
32	Karnatak University, Dharwad	9
33	Karnataka State Remote Sensing Applications Centre, Bangalore	2
34	Karnataka State Sericulture Research and Development Institute, Bangalore	361
35	Madras Institute of Magnetobiology, Chennai	2

36	Maharani's Arts college for women, Bangalore	3
37	Nagpur University, Nagpur	4
38	National Bank for Agriculture and Rural Development, Bangalore	2
39	N.M. College of Agriculture, Navsari Agricultural University, Navsari	2
40	Punjab Agricultural University, Ludhiana	2
41	Rani Anna Govt. College, Tamil Nadu	1
42	Regional Research Laboratory, Assam	5
43	School of Life Sciences, Pondicherry	2
44	Seri-biotech Research Laboratory, Kodathi, Bangalore	10
45	Sher-e-Kashmir University of Agricultural Sciences and Technology, Srinagar	31
46	Silkworm Seed Technology Laboratory, Kodathi, Bangalore	91
47	Sri Krishnadevaraya University, Anantapur	17
48	Sri Padmavati Mahila University, Tirupati	6
49	Sri Venkateswara University, Tirupati	9
50	Tamil Nadu Agricultural University, Coimbatore	30
51	University of Agricultural Sciences, Bangalore	200
52	University of Agricultural Sciences, Dharwad	29
53	University of Delhi, South Campus, New Delhi	3
54	University of Jammu, Jammu	3
55	University of Mysore, Mysore	66
56	Viswabharati University, Santiniketan	1
	Total	4716

2. **Based on subjects** : The classification of project information based on the subjects is indicated in the following table :

Sl. No.	Mulberry	Silkworm	Silk Technology	Non Mulberry	Extension	Others
1	Breeding & Genetics	Breeding & Genetics	Silk Reeling	Tasar	----	----
2	Agronomy	Rearing Technology	Chemical Processing	Eri	----	----
3	Soil Science	Physiology	Silk Weaving	Muga	----	----
4	Physiology	Seed Technology	By-product utilization	----	----	----
5	Pathology	Pathology	----	----	----	----
6	----	Entomology	----	----	----	----



## CHAPTER IV ABOUT THE DIRECTORY

The directory is a repository or database of information. A directory, as opposed to a conventional database, is heavily optimized for reading.

### **Definitions :**

**Directory** : The directory is the reservoir of information about a particular subject that generally would not be considered harmful or an invasion of privacy or loss if disclosed otherwise it should be useful to a community (www.wikipedia.com).

**The Project** : An undertaking that encompasses a set of tasks or activities having a definable starting point and well defined objectives. Usually each task has a planned completion data (due date) and assigned resources. (www.wikipedia.com)

The word “project” comes from the Latin word "projectum" from “projicere”, to throw something forwards which in turn comes from "pro", which denotes something that precedes the action of the next part of the word in time and “jicere”, to throw. The word “project” thus actually originally meant “something that comes before anything else is done”. When the word was initially adopted, it referred to a plan of something, not to the act of actually carrying this plan out. Something performed in accordance with a project was called an object. This use of “project” changed in the 1950s when several techniques for project management were introduced. With this advent, the word slightly changed meaning to cover both projects and objects. However, in certain projects there may still exist so called objects and object leaders.

The directory under this project “Preparation of Directory of Completed Sericulture Projects and Sericulture Experts of India”, is brought out in four parts, namely,

- Part-I: Directory of Completed Sericulture Projects (Vol. I & II)
- Part-II: Directory of Sericulture Experts
- Part-III: Directory of Sericulture Technologies and
- Part-IV: Directory of Sericulture Publications

**How to use the directory** : The directory delineates each Institution with clear titles and contact details followed by sub contents with page numbers wherever appropriate. The resourced project information has been classified and documented under respective subject headings with project numbers. The layout of the information is given in Fig.1.

### **Fig.1. Lay-out of sample data of a record:**

**Project No** : KSSB 47

**Organization** : Karnataka State Sericulture Research and Development Institute.

**Project Title** : Studies on intercropping in mulberry.

**Personnel** : Bongale UD, Veeresh M, Shivaprakash RM

**Project Period** : 1992-1994

**Funding Resources** : Department of Science & Technology, New Delhi

**Objectives** : To standardize soyabean : mulberry cropping system.

### **Results/Recommendations :**

- Intercropping of soybean in mulberry could be adopted with 2-3 rows of soybean for increased nitrogen recovery and profitability without affecting the yield and quality of mulberry.
- This technology has been advocated and demonstrated to the sericulturists during the field visits in TOT program of the institute.

- It is also recommended to the DOS in different workshops and training programmes.

**Project Outcome** : Standard package for soyabean intercropping in mulberry garden.

**Source of Information** : Annual Report : 1994-95

Individual project information is called a field. It starts with a sub-heading. Fields are numbered 1 to 10 as shown in Fig.1. These 10 fields together represent one record or one project.

#### **Explanation to the Fields of a record:**

1. *Project No* : This is the identification number of each record.
2. *Organization* : Name of the organization. This field is omitted in the directory (hard copy) to avoid redundancy, because the records are classified subject-wise and organization-wise. But this field is available in the internet and CD versions.
3. *Project Title* : Running title of the project.
4. *Personnel* : All the names of the Project Investigators are given in a single line. The modern format of names is adopted. e.g., Samson, M.V. is written as Samson MV. The names are separated by a "Comma", the "and" is omitted between last two names.
5. *Project Period* : Project initiation and project completion years are given.
6. *Funding Source* : Reads the financial source for the project implementation.
7. *Objectives* : Objectives of the project investigated.
8. *Results/Recommendations* : Results and recommendations of the project investigated.
9. *Project outcome* : Gives the outcome of the project investigated.
10. *Source of information* : The source from where the information is collected for this directory is given.
11. *End of the Record* : Line indicates end of each record.

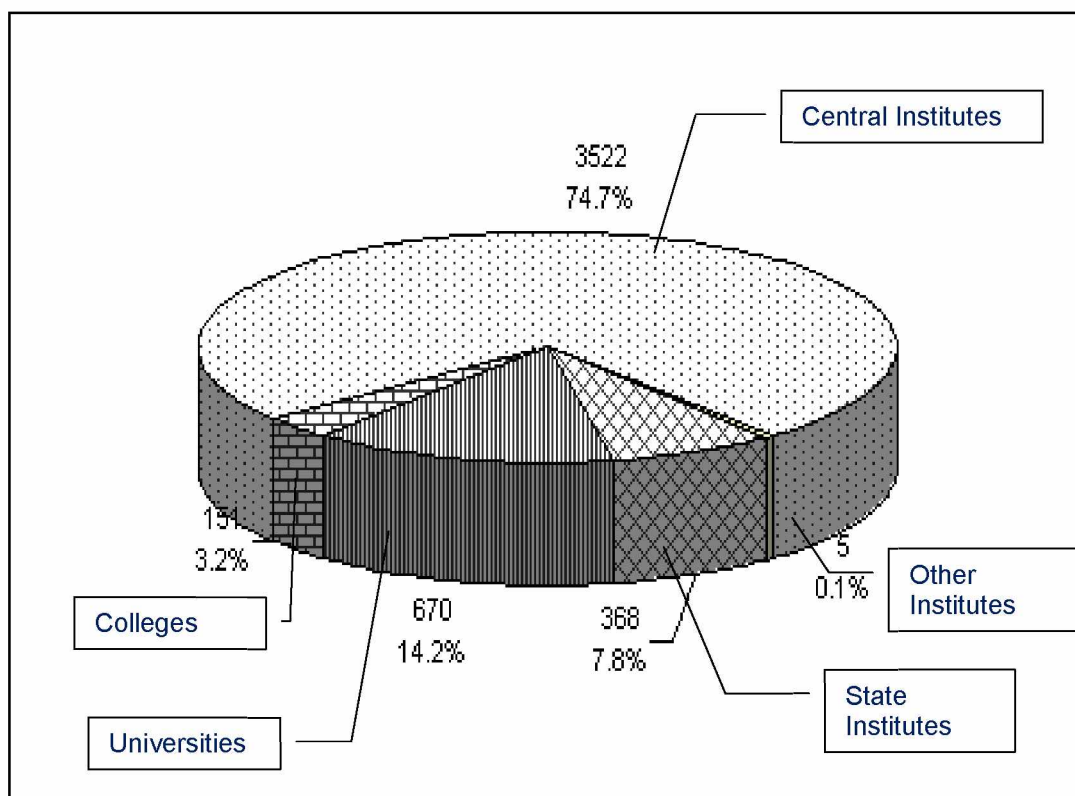
The alphabetical list of project personnel is given at the end of the directory along with the page numbers where it appears in the directory. This index will also help the user to locate if the name is known. A list of abbreviations used in the directory is also given.

#### **Analysis :**

The information resourced and classified as in chapter III has been analyzed under different categories and presented in this section.

1. **Institution-wise Classification** : The directory contains the information on completed R & D sericulture projects of over 62 years (1945-2006) in India. This information has been resourced from 56 organizations (17 Central Institutes, 21 Universities, 14 colleges, 1 NGO and 3 State Institutes) (Fig.1). A total of 4716 projects are documented in the directory.

Fig-1 : Organizational share of the completed sericulture projects



This data represents the collected information from all sources as indicated in chapter II. At the end of this chapter, a detailed list of different classes of Institutions and the number of projects they have completed is given in the Table-11. Out of 4716 projects, 3522 (74.7%) projects have been undertaken by 17 Central Institutions like CSRTI, Mysore. 21 universities have undertaken 670 projects (14.2%). There are only 3 state level research institutes (APSSRDI, Andhra Pradesh and KSSRDI, Karnataka and KRSAC, Karnataka) which have taken up 368 (7.8%) projects. 14 colleges have worked on 151 (3.2%) projects while two NGOs have undertaken 5 (0.1%) projects.

**2. State-wise implementation of sericulture projects :** A diagrammatic representation of number of sericulture projects undertaken in different states of India. is given in Fig.1. The details of the states, number of Institutions and aggregate number of projects undertaken in those states are presented in Table 1.

Fig-2: Projects undertaken in different States

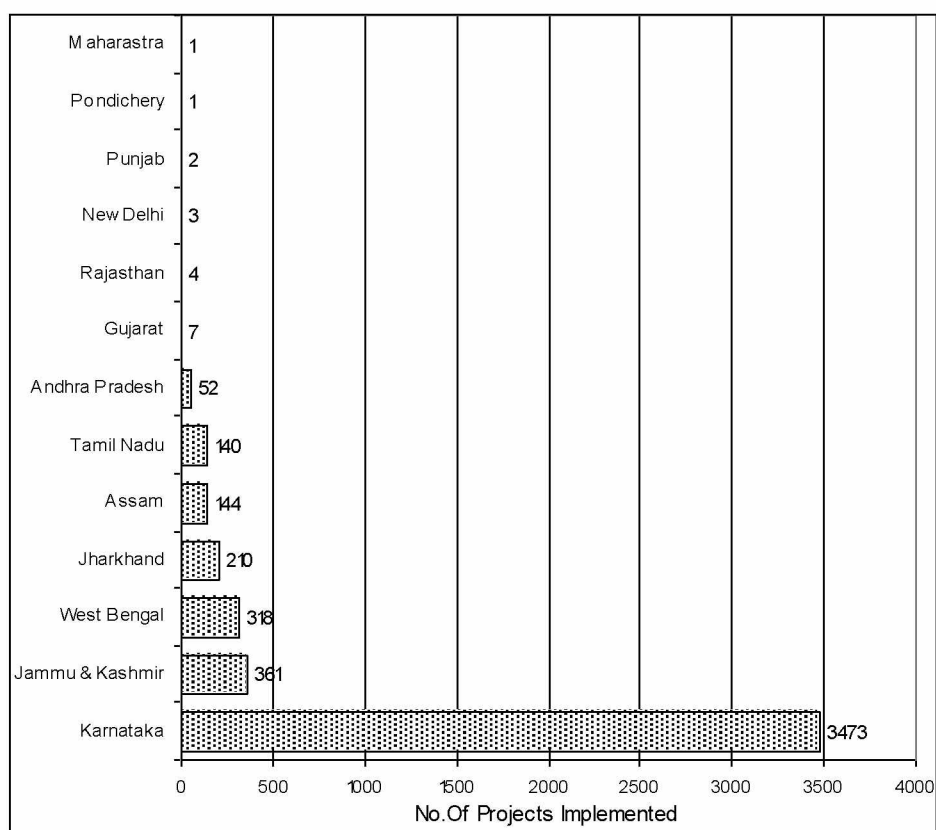


Table-1 : Projects implemented in different states

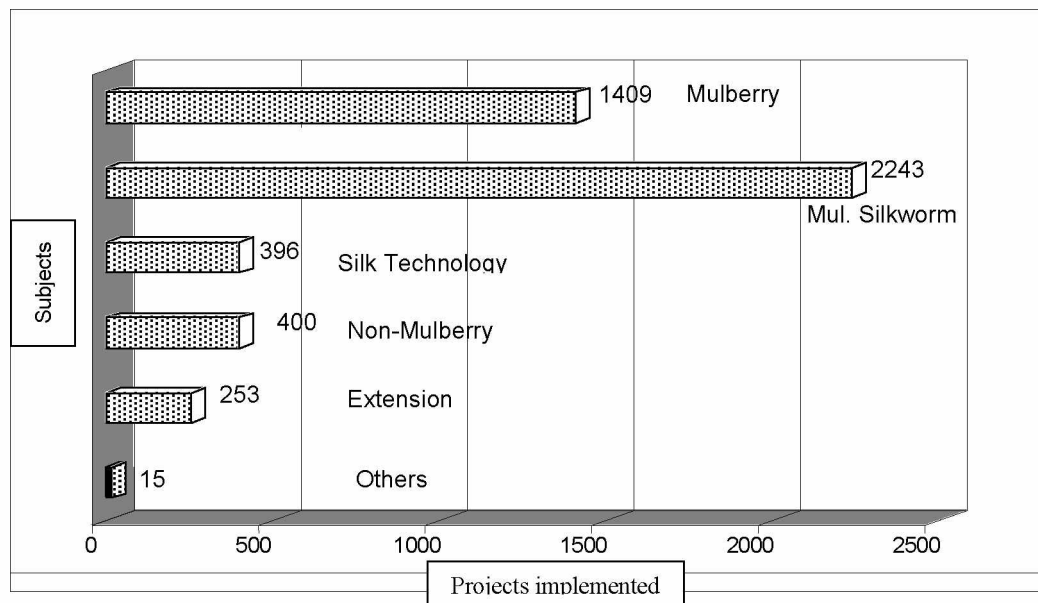
Sl. No.	State	No. of Institutes	No. of Projects	%
1	Andhra Pradesh	5	52	1.10
2	Assam	6	144	3.05
3	Gujarat	3	7	0.15
4	Jammu & Kashmir	3	361	7.65
5	Jharkhand	1	210	4.45
6	Karnataka	21	3473	73.64
7	Maharashtra	1	1	0.02
8	New Delhi	1	3	0.06
9	Pondicherry	1	1	0.02
10	Punjab	1	2	0.04
11	Rajasthan	1	4	0.08
12	Tamil Nadu	9	140	2.97
13	West Bengal	4	318	6.74
	<b>Total</b>	<b>57</b>	<b>4716</b>	<b>100</b>

As indicated in Table 1, 13 States have been engaged in sericulture research. The research activities are mainly concentrated in Karnataka which has 21 Central/State/Universities and NGOs and has implemented 3473 projects (73.64%). Jammu & Kashmir with 3 institutes has carried out 361 (7.65%) projects. West Bengal with 4 institutions has carried out 318 (6.74%)

research projects. Jharkhand with 1 institution has taken up 210 (4.45%) research projects. Assam with 6 institutions has implemented 144 (3.05%) research projects. Tamil Nadu with 9 institutes handled 140 (2.97%) research projects. Andhra Pradesh with 5 institutions implemented 52 (1.10%) research projects. Rest of the six states were implemented less than 1% of research projects each.

**3. Subject-wise implementation of sericulture projects :** Fig-3 gives the details of the projects implemented under different subjects. Most of the work (2243 projects, 47.56%) was carried out on the mulberry silkworm followed by that on mulberry (1409 projects, 29.08%).

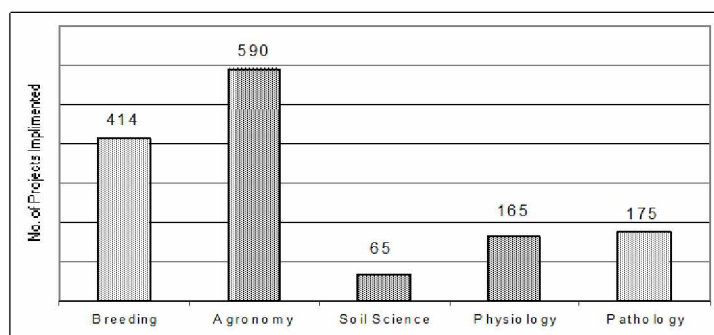
Fig-3: Projects implemented under different subjects



In Non-mulberry subject 400 projects (8.48%), in Silk Technology subject 396 projects (8.40%), in Extension subject 253 projects (5.36%) and in other aspects 15 projects (0.32 %) have been undertaken.

a. Implementation of projects on mulberry : A total of 1409 projects have been implemented on mulberry. Discipline-wise break-up is given in Fig.4. Further, discipline-wise as well as Institute wise break-up is given in the Table. 2.

Fig-4: Projects implemented under different disciplines of mulberry



As seen from the figure, most of the work was carried out in the field of Mulberry Agronomy, wherein 590 projects (41.87%) have been implemented. Next extensively worked out field was Mulberry Breeding and Genetics in which, 414 projects (29.38%) have been implemented. In Mulberry Pathology and Mulberry Physiology, 175 (12.42%) and 165 (11.71%) projects have

been implemented, respectively. In Soil Science 65 (4.61%) projects have been implemented. As seen in the Table. 2, 23 Institutions were involved in implementing these projects.

Table-2. Institute wise projects undertaken under different disciplines of mulberry

Sl. No.	Institute/Organization	Mulberry projects (No.)					
		MBG	Agro	Soil. Sci.	Phy	Path	Total
1	Assam Agriculture University, Jorhat	---	3	---	---	---	3
2	AVVM Pushpam College, Poondi	---	1	---	---	---	1
3	Bangalore University,	17	11	---	23	7	58
4	Bharathidasan University, Tiruchirapally	3	1	---	5	---	9
5	CMER&TI, Jorhat	1	1	---	---	---	2
6	CSGRC, Hosur	35	---	---	---	---	35
7	CSR&TI, Berhampore	22	86	---	15	13	136
8	CSR&TI, Mysore	210	293	40	74	112	729
9	CSR&TI, Pampore	59	93	---	5	7	164
10	Dr. Babasaheb Ambedkar Marathwada University, Aurangabad	---	1	---	---	---	1
11	KRSRAC, Bangalore	2	---	---	---	---	2
12	KSSRDI, Bangalore	36	40	25	30	21	152
13	Rani Anna College, Coimbatore	---	---	---	---	---	---
14	S.K. University, Srinagar	3	4	---	1	5	13
15	School of Life Science, Pondichery	---	---	---	1	---	1
16	Sri Krishnadevaraya University, Ananthapur	2	---	---	3	1	6
17	Sri Padmavati Mahila University, Tirupati	1	---	---	---	1	2
18	Tamil Nadu Agriculture University, Coimbatore	---	8	---	1	3	12
19	UAS, Dharwad	2	8	---	1	---	11
20	UAS, Bangalore	11	35	---	2	1	49
21	University of Delhi, South Campus, New Delhi	3	---	---	---	---	3
22	University of Mysore, Mysore	7	5	---	4	3	19
23	Viswabharati University, Santiniketan	---	---	---	---	1	1
	Total	414	590	65	165	175	1409
	%	29.38	41.87	4.61	11.7	12.42	100

b. Projects on mulberry silkworm : Under the Mulberry Silkworm subject, 2243 projects have been implemented. Discipline-wise break-up is given in the Fig-5. As seen from the figure, utmost importance is given to the field of Silkworm Breeding, wherein 641 projects (28.6%) have been implemented. Rearing Technology is the next extensively worked field, in which, 402 projects (17.9%) have been implemented. In Silkworm Physiology 318 (14.2%) projects have been implemented. In seed Technology, 240 (10.7%) projects have been implemented. In Silkworm Pathology, 376 (16.8%) projects have been implemented while in Entomology, 266 (11.9%) projects have been implemented. Table-4, lists the 33 Institutions where 2243 projects were implemented.

Fig-5 : Projects undertaken in different disciplines of mulberry silkworm

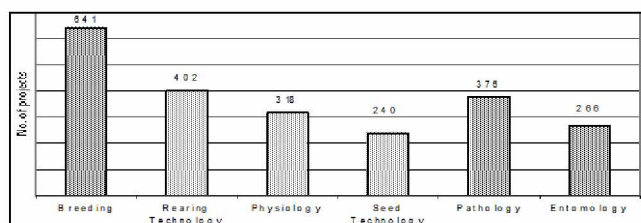


Table-4. Institute and discipline wise projects implemented on mulberry silkworm

Sl. No.	Institute/Organization	Mulberry Silkworm Projects (No.)						
		SBG	SWR	Phy	ST	Pat	Ent	Total
1	APSSRDI, Hindupur	4	---	---	---	3	---	7
2	Assam Agriculture University, Assam	2	2	1	1	2	---	8
3	Avinashilingam Institute for Higher Education, Coimbatore	---	---	1	---	---	---	1
4	Bangalore University, Bangalore	1	6	30	4	6	23	70
5	Bharathidasan University, Tiruchirapally	---	---	7	---	---	---	7
6	Bhartiyar University, Tamil Nadu	---	---	1	---	---	---	1
7	CMER&TI, Assam	1	---	2	---	---	3	6
8	CSGRC, Hosur	32	---	---	---	---	---	32
9	CSR&TI, Berhampore	11	46	7	6	50	31	151
10	CSR&TI, Mysore	421	239	166	95	190	155	1266
11	CSR&TI, Pampore	88	25	3	14	6	12	148
12	Holy Cross College, Tiruchirapalli	---	---	16	---	---	---	16
13	Indian Institute of Science, Bangalore	3	---	4	---	4	---	11
14	Kakatiya University, Warangal	---	1	6	---	1	---	8
15	Karnatak University, Dharwad	---	---	6	---	2	1	9
16	KSSRDI, Bangalore	34	42	8	15	58	17	174
17	Madras Institute of Magnetobiology, Chennai	---	---	2	---	---	---	2
18	Nagpur University, Nagpur	---	3	---	---	---	---	3
18	Navsari Agriculture University, Navsari	---	---	2	---	---	---	2
19	Punjab Agriculture University, Ludhiana	---	---	1	---	---	---	1
20	Rani Anna College	---	---	1	---	---	---	1
21	S.K. University, Srinagar	6	9	2	---	1	---	18
22	SBRL, Bangalore	2	---	---	---	8	---	10
23	School of Life Science, Pondichery	---	---	1	---	---	---	1
24	Sri Krishnadevaraya University, Ananthapur	---	2	7	---	---	---	9
25	Sri. Padmavati Mahila University, Tirupati	---	1	2	---	---	---	3
26	Sri.Venkateswara University, Tirupati	---	1	6	---	---	---	7
27	SSTL, Bangalore	---	---	---	88	---	---	88
28	Tamil Nadu Agriculture University, Coimbatore	1	1	2	---	4	5	13
29	University of Agricultural Science, Bangalore	17	13	16	13	36	16	111
30	University of Agricultural Science, Dharwad	1	7	6	---	---	---	14
31	University of Jammu, Jammu	1	---	1	---	---	1	3
32	University of Mysore, Mysore	16	4	11	4	5	2	42
	<b>Total</b>	<b>641</b>	<b>402</b>	<b>318</b>	<b>240</b>	<b>376</b>	<b>266</b>	<b>2243</b>
	<b>%</b>	<b>28.6</b>	<b>17.9</b>	<b>14.2</b>	<b>10.7</b>	<b>16.8</b>	<b>11.9</b>	<b>100</b>

(SBG: Silkworm Breeding and Genetics, SWR: Silkworm Rearing Technology, Phy: Physiology, ST: Seed Technology, Path: Pathology and Entom: Entomology)

c. Projects in Silk Technology : Under Silk technology, 396 projects have been implemented. Discipline-wise break-up is given in the Fig-6. Discipline-wise as well as Institute-wise break-up is given in the Table- 5.

Fig-6: Projects undertaken in different disciplines of silk technology

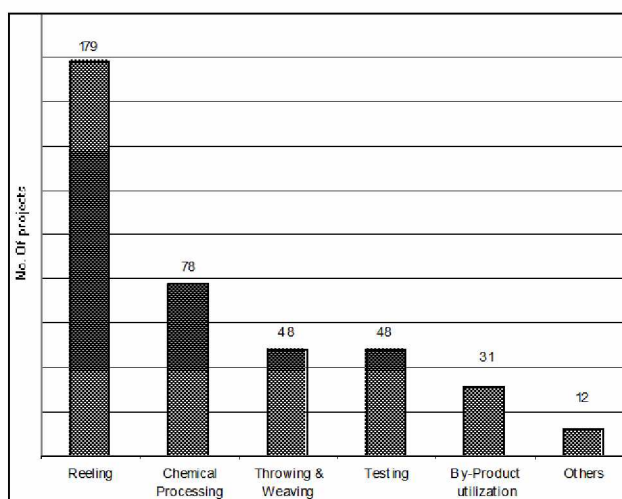


Table-5. Institute and discipline wise projects implemented under different disciplines of Silk Technology

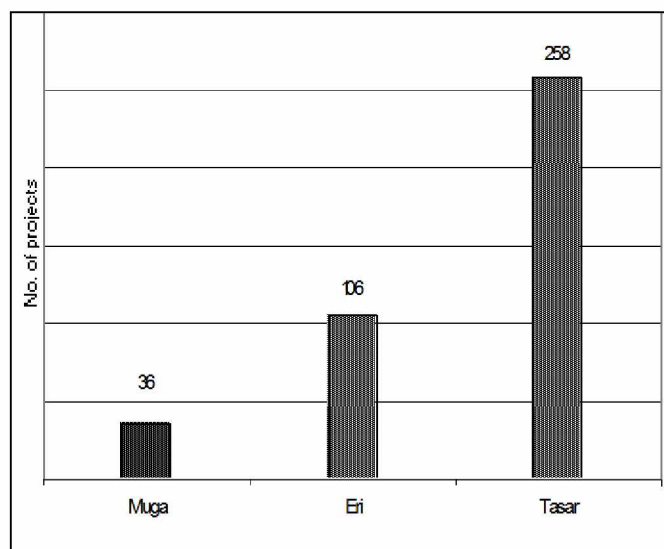
Sl. No.	Institute/Organization	Silk Technology Projects (No.)						Total
		Reel	Chem	Throw	Test	By-pro	Others	
1	Bangalore University, Bangalore	1	8	3	---	1	---	13
2	Bapuji Institute of Engineering Technology, Davanagere	1	1	3	---	---	---	5
3	CSR&TI, Berhampore	11	---	---	---	---	---	11
4	CSR&TI, Mysore	66	4	---	4	5	---	79
5	CSR&TI, Pampore	1	---	---	---	---	---	1
6	CSTRI, Bangalore	62	11	16	19	10	---	118
7	Govt. College of Engineering & Textile Technology, Hoogly	---	4	---	3	---	---	7
8	GSKSJTI, Bangalore	10	33	21	22	4	12	102
9	GBPUA&T, Pantnagar	---	4	---	---	---	---	4
10	KSSRDI, Bangalore	11	13	5	---	6	---	35
11	UAS, Bangalore	15	---	---	---	5	---	20
12	University of Mysore, Mysore	1	---	---	---	---	---	1
	Total	179	78	48	48	31	12	396
	%	45.2	19.7	12.1	12.1	7.8	3	100

Most of the work was done in the Silk Reeling field where 179 projects (45.2%) have been implemented. In Chemical Processing 78 projects (19.7%) have been implemented. In Silk Throwing and Silk Testing fields 48 projects (12.1%) each have been implemented. In By-product utilization 3 projects (7.8%) were carried out. 'Other' category (12 projects, 3%) includes the projects implemented under Post-cocoon aspects but not grouped under the above described fields. Altogether 12 Institutions were involved in implementing these 396 projects.

d. Projects in non-mulberry sector : In Non-Mulberry sector, 400 projects have been implemented. Discipline-wise break-up is given in the Fig-7. Discipline-wise as well as Institute-wise break-up is given in the Table- 6.



Fig-7: Graph showing the number of projects undertaken under different disciplines of non-mulberry



Non-Mulberry comprises three disciplines namely Tasar-culture, Eri-culture and Muga-culture. Most of the work has been carried out in the discipline of Tasar culture, wherein 258 projects (64.5%) have been implemented. In Eri-culture, 106 projects (26.5%) have been implemented. In the discipline of Muga-culture, 36 projects (9%) have been implemented. 17 Institutions were involved in implementing these projects (Table 6). In Southern India, most of the non-mulberry work was in the discipline of Eri-culture. Since Muga is restricted to Assam, projects related to Muga was carried out by the Institutions in Assam, except one project on post-cocoon technology which was conducted by CSTRI, Bangalore.

Table-6. Institute-wise projects implemented under different non-mulberry disciplines.

Sl. No	Institute/Organization	Non-Mulberry Projects (No.)			
		Tasar	Eri	Muga	Total
1	Assam Agricultural University, Jorhat	---	13	12	25
2	Bangalore University, Bangalore	3	5	4	12
3	CMER&TI, Jorhat	34	40	1	75
4	CSR&TI, Mysore	---	20	---	20
5	CSTRI, Bangalore	2	---	1	3
6	CTRTI, Ranchi	211	---	---	211
7	Guwahati University, Guwahati	---	2	11	13
8	Institute of Advance Studies in Science & Technology, Jorhat	---	1	2	3
9	Kakatiya University, Warangal	5	---	---	5
10	Nagpur University, Nagpur	1	---	---	1
11	Regional Research Laboratory, Assam	---	---	5	5
12	Sardar Krushinagar Dantiwada Agricultural University, Gujarat	---	1	---	1
13	Sri Krishnadevaraya University, Ananthapur	1	---	---	1
14	Tamil Nadu Agricultural University, Coimbatore	---	1	---	1
15	UAS, Dharwad	1	2	---	3
16	UAS, Bangalore	---	18	---	18
	Total	258	103	36	390
	%	65.5	25.5	9	100

e. Projects in Extension sector :

Majority of the sericulture development institutes are involved in Extension activities. 22 Institutions have implemented 253 extension related projects. Table-7 lists institutions and the number of projects carried out by them. Most of the Extension work was carried out by CSRTI Mysore (116), followed by ISEC, Bangalore (55). Bangalore University has undertaken 24 extension projects and CSRTI, Pampore has undertaken 14 projects. Rest of the Institutes handled a few extension related projects.

Table-7. Institute wise projects implemented under extension sector

Sl. No.	Institute/Organization	Extension Projects (No.)
1	Agro-Economic Research Centre for N-E India, Jorhat	2
2	BAIF Institute for Rural Development, Tiptur	3
3	Bangalore University, Bangalore	24
4	Bharathidasan University, Tiruchirapalli	2
5	CMER&TI, Assam	2
6	CSR&TI, Berhampore	8
7	CSR&TI, Mysore	116
8	CSR&TI, Pampore	14
9	Indian Institute of Management, Bangalore	1
10	Institute for Social and Economic Change, Bangalore	55
11	Jayaprakash Institute for Social and Economic Change, Kolkata	4
12	Maharani's Arts College for Women, Bangalore	3
13	NABARD, Bangalore	2
14	Punjab Agricultural University, Ludhiana	1
15	Sri Krishnadevaraya University, Anantapur	1
16	Sri Padmavati Mahila University, Tirupati	1
17	Sri Venkateswara University, Tirupati	2
18	SSTL, Kodathi, Bangalore	1
19	Tamil Nadu Agricultural University, Coimbatore	4
20	University of Agricultural Sciences, Dharwad	1
21	University of Agricultural Sciences, Bangalore	2
22	University of Mysore, Mysore	4
Total		253

f. Projects under 'Other' fields :

As indicated in the Table-8, 15 research projects were undertaken by three institutes.

Table-8: Other projects implemented by the institutions

No.	Institute/Organization	Other Projects (No.)
1	CSGRC, Hosur	2
2	CSR&TI, Mysore	10
3	Dayananda Sagar College of Engineering, Bangalore	3
Total		15

3. Projects without names of the investigators : Generally projects have Principal Investigator and Co-Investigators. In some Institutes during their early phase of research activities, projects were conducted in the name of the Institutes only. In such cases, particular name of the investigator is not available for such projects. Fig-8 gives the details of such projects. Out of 4716 projects, 3958 projects (83.9%) have the names of the Investigators and 758 projects (16.1%) are in the names of the parent Institutes.

Fig-8: Projects with and without names of investigators

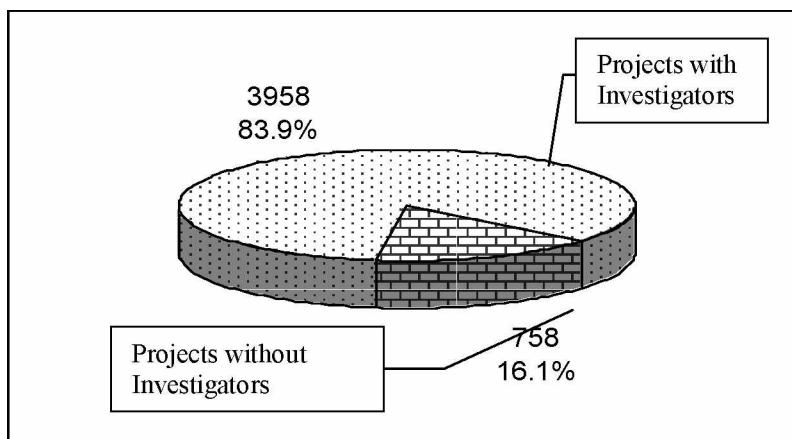


Table-9 gives the list of institutions and the number of projects carried out in the name of Institution.

Table-9: Institution wise list of projects without names of authors

Sl. No.	Institution	Projects (No.)
1	CSRTI, Mysore	442
2	CSRTI, Berhampore	36
3	CSRTI, Pampore	120
4	CMERTI, Assam	11
5	CSGRC, Hosur	1
6	CSTRI, Bangalore	88
7	CTRTI, Ranchi	42
8	ISEC, Bangalore	15
9	JICA, Mysore	3
	Total	758

### 5. Unconcluded projects :

This directory documents the details of the completed sericulture projects. In some Institutes, through some projects have been initiated and work has been carried out, they are neither concluded nor continued. Since, these projects are not on-going and some work has been carried out under these projects, the details of these unconcluded projects also are incorporated in this directory. Fig-9 gives the diagrammatic representation of the projects which were not concluded or complete information is not available. Out of 4716 projects documented, 184 projects (~4%) were discontinued.

Fig-9 : Completed projects and un-concluded projects.

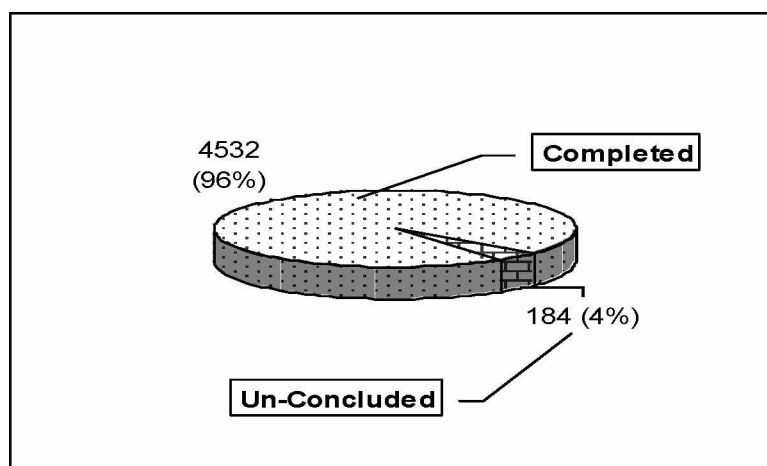


Table-10: Institute wise list of incomplete projects

Sl. No.	Institute/Organization	M	MS	ST	NM	Ext	Total
1	Bangalore University, Bangalore	---	---	--	---	1	1
2	CMER&TI, Assam	---	---	--	1	---	1
3	CSR&TI, Berhampore	4	3	---	---	--	7
4	CSR&TI, Mysore	40	53	3	3	---	99
5	CSR&TI, Pampore	14	2	---	---	--	16
6	CSTRI, Bangalore	---	---	7	---	---	7
7	Govt. Sri KR Silver Jubilee Tech. Instt, Bangalore.	---	---	2	---	---	2
8	Guwahati University, Assam	---	---	--	2	---	2
9	KSSRDI, Bangalore	7	27	---	---	--	34
10	Maharani's Arts College for Women, Bangalore	---	---	--	---	1	1
11	Nagpur University, Nagpur	---	3	---	---	--	3
12	Sri Krishnadevaraya University, Anantapur	---	2	---	---	--	2
13	Sri. Padmavati Mahila University, Tirupati	---	1	---	---	--	1
14	SSTL, Kodathi, Bangalore	---	2	---	---	--	2
15	ISEC, Bangalore	---	---	---	---	1	1
16	CTRTI, Ranchi	---	---	---	1	---	1
17	University of Mysore, Mysore	---	4	---	---	--	4
<b>Total</b>		<b>65</b>	<b>97</b>	<b>12</b>	<b>7</b>	<b>3</b>	<b>184</b>

M=Mulberry, MS=Mulberry Silkworm, ST=Silk Technology, NM= Non-Mulberry, Ext= Extension.

Table-10 gives the details of the institutes as well as the number of projects that were not formally concluded. Table-11 gives the details of the institutions as well as the total number of projects that were implemented. In 17 institutes, 65 projects under Mulberry, 97 projects under Mulberry silkworm, 12 projects in Silk Technology, 7 projects in Non-Mulberry and in Extension sector 3 projects were discontinued without formal conclusions. One of the reasons for such deviation from the objectives may be the advice of the Research Advisory Committees of these institutes which review the projects and advise the next course of action to be taken for each project.

**Limitations** : There were many limitations in compiling the heterogeneous data to a common format. While doing so, some modifications were introduced without changing the content of the data. The difficulties faced were :

- Non/poor response from the Organizational Heads/Project Investigators.
- Non-availability of complete information in respective libraries.
- Change of project title, objective, personnel, during the course of project implementation.
- Non-availability of uniform data as per the format.
- Non-availability of project completion report in the respective organizations.
- Non-availability of the project details after the transfer/retirement/death of the Project personnel, in the respective organizations.

### **An Appeal**

The Investigating team is very glad to place on record their sincere gratitude to all those who co-operated and provided the information to make this Directory meaningful. In spite of the Herculean task by the investigating team, by a conservative estimate, the information resourced is not complete with the total work done in the field of Sericulture. Still there is a scope for incorporating the information in the subsequent updates of the data. To be able to do so, the co-operation of the scientists/researchers is required. Any person who feels that some more information can be added or the available information be edited, please visit the web site [www.kssrdi.org](http://www.kssrdi.org), download the Format and send the completed information to the Principal Investigator through e-mail ([emuniraju@yahoo.com](mailto:emuniraju@yahoo.com)) giving the details. Kindly quote the project number, in case the information printed in this book is to be edited.

### **LIST OF ABBREVIATIONS**

a.i.	: Active Ingredient
AAT	: Aspartate Amino Transferase
ABA	: Abscissic Acid
AcP	: Acid phosphatase
AD	: Approximate Digestibility
AGR	: Absolute Growth Rate
AICEM	: All India Coordinated Experiments on Mulberry
AIMSGEP	: All India Mulberry and Silkworm Germplasm Evaluation Programme
ALAT	: Alanine Amino Transferase
ANOVA	: Analysis of Variance
AP	: Andhra Pradesh
ARBD	: Augmented Randomized Block Design
ARCJ	: Agro-Economic Research Centre for N-E India, Jorhat
ASD	: Anti Streptococcal Protein
BAIF	: Bharatiya Agro-Industry Foundation
BBF	: Bacterial Biofertilizer
BC	: Bursa Copulatrix
BF	: Biofertilizer
BFT	: Biomass Filled Trench

BHC	:	Benzene Hexa Chloride
BIS	:	Bureau of Indian Standards
BITRA	:	Bombay Institute of Textile Research Association
BmCPV	:	<i>Bombyx mori</i> Cytoplasmic Polyhedrosis Virus
BMD	:	Biomass duration
BmDNV	:	<i>Bombyx mori</i> Denso Nucleo Virus
BPE	:	6,7, Epoxy bakychial propyl ether
BSA	:	Bovin Serum Albumin
BSMTC	:	Basic Seed Multiplication and Training Centre
BV	:	Bivoltine
CAN	:	Calcium Ammonium Nitrate
CB	:	Crossbreeds
CCC	:	2 Chloro trimethyl Ammonium Chloride
CDFD	:	Centre for DNA Finger printing and Diagnosis
CDP	:	Catalytic Development Programme
CGR	:	Crop Growth Rate
CI	:	Consumption Index
CIAS	:	Computerized Image Analysis System
CPE	:	Cumulative Pan Evaporation
CPH	:	Controlled Pollinated Hybrid
CRC	:	Chawki Rearing Centre
CSGRC	:	Central Sericultural Germplasm Resource Centre
CSP	:	Count Strength Project
CSR&TI	:	Central Sericultural Research and Training Institute
CSTRI	:	Central Silk Technological Research Institute
Daba TV	:	Daba Trivoltine
DAP	:	Diammonium Phosphate
DBT	:	Department of Bio-technology
DDVP	:	Dichloro Diphenyl Venyl Phosphate
DFB	:	Diflubenzuron
DMD	:	Dry Matter Digestibility
DOS	:	Department of Sericulture
DpNPV	:	<i>Diaphania pulverulentalis</i> Nuclear Polyhedrosis Virus
DPP	:	Double Phase Planting
DST	:	Department of Science and Technology
DTE	:	Drought Tolerance Efficiency
EAG	:	Electro Antennogram
EC	:	Effective Concentration/Electrical Conductivity
ECD	:	Efficiency of Conversion of Digesta
ECI	:	Efficiency of Conversion of Ingesta
EI	:	Evaluation Index
ELISA	:	Enzyme Linked Immuno Sorbant Assay
EMS	:	Ethyl Methane Sulphonate
ERR	:	Effective Rate of Rearing
EW	:	Epicuticular wax
FAA	:	Free Amino Acid
FW	:	Fresh Weight
FYT	:	Final Yield Trial
GA	:	Gibberlic Acid

GC	:	Gas Chromatography
GCA	:	General Combining Ability
GC-MS	:	Gas Chromatography and Mass Spectrophotometer
GDH	:	Glutamate Dehydrogenase
GOT	:	Glutamate Oxaloacetate Transaminase
GPB	:	Germplasm Bank
GPL	:	Grams per litre
GR	:	Growth Rate
GSF	:	Government Silk Farm
GSM	:	Grams per Square Metre
HM	:	Hosa Mysore
HPLC	:	High Pressure Liquid Chromatography
HPTLC	:	High Pressure Thin Layer Chromatography
HSP	:	Heat Shock Protein
HYV	:	High Yielding Variety
IAA	:	Indole Acetic Acid
IARI	:	India Agriculture Research Institute
IBA	:	Indole Butyric Acid
ICAR	:	Indian Council for Agriculture Research
IDM	:	Integrated Disease Management
IGR	:	Insect Growth Regulator
IHTP	:	Integrated Handloom Training Programme
INM	:	Integrated Nutrient Management
NGO	:	Non-Government Organization
IPA	:	Isolated Pupal Abdomen
IPR	:	Integrated Package for Rearing
ISEC	:	Institute for Social and Economic Change
ISSR	:	Inter Simple Sequence Repeats
ITK	:	Indigenous Technology Know-how
ITP	:	Integrated Technology Package
JH	:	Juvenile Hormone
JICA	:	Japanese International Co-operation Agency
JISC	:	Jayaprakash Institute for Social and Economic Change
KVIC	:	Khadi Village Industries Cooperation
LAD	:	Leaf Area Dimension
LAI	:	Leaf Area Index
LCIC	:	Low Cost Incubation Chamber
LSCR	:	Leaf Shell Conversion Rate
LSP	:	Licensed Seed Producer
LWC	:	Leaf Water Content
STCR	:	Soil Test Crop Response
TSC	:	Technical Service Centre
LWR	:	Leaf Water Retention
MDH	:	Maltase Dehydrogenase
MGIS	:	Mulberry Germplasm Information System
MLT	:	Multilocational Trial
MRC	:	Moisture Retaining Capacity
MRS	:	Main Research Station
MSC	:	Mysore Seed Cocoons

MT	:	Metric Tonnes
NAA	:	Naphthalene Acetic Acid
NABARD	:	National Bank for Agriculture and Rural Development
NHDC	:	National Handloom Development Corporation
NILs	:	Near Isogenic Lines
NOC	:	Neem Oil Cake
NPV	:	Nuclear Polyhedrosis Virus
NRA	:	Nitrate Reductase Activity
NSC	:	Neurosecretory Cell
NSP	:	National Sericulture Project
NSSO	:	National Silkworm Seed Organization
NSSP	:	National Silkworm Seed Project
NTC	:	National Textile Corporation
OC	:	Ordinary Chilling
OFT	:	On Farm Trial
OPH	:	Open Pollinated Hybrid
PBS	:	Phosphate Buffer Saline
PCR	:	Polymerase Chain Reaction
PDC	:	Percent Disease Control
PDI	:	Percent Disease Index
PEG	:	Poly Ethylene Glycol
PM	:	Pure Mysore
PMB	:	Pink Mealy bug
PPP	:	Percent Pest Population
PPPBST	:	Promotion of Popularizing the Practical Bivoltine Sericulture Technology
PRAP	:	Preliminary Race Authorization Programme
PSFA	:	Price Stabilization Fund Agency
PSM	:	Phosphate Solubilizing Microorganisms
PTD	:	Participated Technology Development
PV	:	Polyvoltine
CDFD	:	Centre for DNA Fingerprinting and Diagnostics
PVA	:	Poly Vinyl Alcohol
PYT	:	Primary Yield Trial
QTL	:	Quantitative Trait Loci
RAPD	:	Random Amplified Polymorphic DNA
RBD	:	Randomized Block Design
REC	:	Research Extension Centre
RFLP	:	Restriction Fragment Length Polymorphism
RFP	:	Red Fluorescent Protein
RKO	:	Reshamkeet Oushad
RSRS	:	Regional Sericultural Research Station
RWC	:	Relative Water Content
SA	:	Sodium Salicylate
SBRL	:	Seri Biotechnology Research Laboratory
SDC	:	Swiss Development Agency for Institutional Cooperation
SDH	:	Sorbitol Dehydrogenase
SERIFED	:	Sericulture Federation
SGIS	:	Silkworm Germplasm Information System
SGSY	:	Swarna Jayanthi Grameena Swarojgar Yojana



SPP	:	Single Phase Planting
SSR	:	Simple Sequence Repeats
SSTL	:	Silkworm Seed Technology Laboratory
STC	:	Short Term Chilling
TIBA	:	Triodo Benzoic acid
TITS	:	Triturated Inorganic Tissue Salt
TNAU	:	Tamil Nadu Agricultural University
TOT	:	Transfer of Technology
TPI	:	Turns per Inch
TSI	:	Tissue Somatic Index
TSC	:	Technical Service Centre
UNDP	:	United Nations Development Programme
UP	:	Uttar Pradesh
w/v	:	Weight per Volume
WAXS	:	Wide Angle X-ray Scattering
WB	:	West Bengal
WPEW	:	Women Para Extension Workers
WSC	:	Weavers' Service Centre
WTO	:	World Trade Organization
WUE	:	Water Use Efficiency

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