

Foreword

A Quinquennial Review Team (QRT) was constituted by the DG of ICAR in 2011 for reviewing performance of NIRJAFT during the period 2007-2012 and recommending steps for improvement taking into account the rapidly changing socio-economic milieu in which such an institute has to function in modern times. This report embodies the outcome of a sustained and painstaking exercise carried out by members of the QRT over a period of about five months through series of meetings with diverse groups of people directly or indirectly involved in functioning and/or outcome of NIRJAFT and processing volumes of document that were either made available on request or those that resulted out of such meetings. A close and continuous dialogue during this period between members of the QRT contributed to objectively analyzing the complex multidimensional profile of NIRJAFT and converging to specific inferences. I take great pleasure and pride in acknowledging the spontaneous cooperation of all members of QRT in rising to the occasion and providing their honest and best input for an important cause.

NIRJAFT was established in 1938 and scientists working in this institute have since then made notable contributions in science and technology of jute and allied fibres. During this period a cultural ethos was simultaneously cultivated and nurtured that shaped the working ambience of this institute and provided broad functional guidelines. Over the past two decades however sweeping changes have been taking place in our country affecting each and every individual and organization. Market forces are rapidly intruding even into spheres once considered as exclusive reserve of high abstraction and this mighty wheel of change demands that the scientists and their co-workers at NIRJAFT also follow suit. It is hoped that the recommendations of QRT, if implemented in letter and spirit, would provide useful guidance to NIRJAFT through this period of transition.

May, 2012

Dr.-Ing. P K Banerjee
Chairman, QRT

Acknowledgement

We the members of QRT would like to put on record our sense of gratitude to the DG of ICAR for assigning us this task of considerable importance. The guidance provided by the DDG and the ADG of ICAR during preliminary meetings were invaluable in charting our course of action.

We would also like to express our deep appreciation of the cooperation extended to us by Dr. K. K. Satapathy, Director of NIRJAFT, throughout our review exercise that stretched over many months. At no time did we sense any sign of irritation or unhappiness with the demands that we made on his time and also at times on his patience.

Dr. S. N. Chattopadhyay, Member-Secretary appointed for smooth functioning of this team, played a central role in execution of our course of action. Without his tireless efforts and valuable inputs it would have been impossible for us to carry out the review.

The overall cooperation and friendliness of all the employees of NIRJAFT contributed significantly to a congenial atmosphere which was very conducive for the review process.

Dr.-Ing. P K Banerjee
Chairman, QRT

Dr. T K Guha Roy
Member

Dr. D Sur
Member

Dr K Chakrabarti
Member

Dr P G Patil
Member

Dr S N Chattopadhyay
Member Secretary

1. Introduction

1.1 Composition of the QRT

As per officer order no F.No. 2-18/2009-IA-II (AE), dated 22nd September, 2011, the Director General, ICAR constituted a Quinquennial Review Team (QRT) to review the work of NIRJAFT, Kolkata for the period 1 April, 2007 to 31 March, 2012. The composition of QRT is given below.

Dr. Prabir Kumar Banerjee	Ex-Professor, Indian Institute of Technology, Delhi & Ex-Director, Indian Jute Industries' Research Association (IJIRA), Kolkata	Chairman
Dr. T K Guha Roy	Ex-Deputy Director & Head, Chemical Processing Division, IJIRA, Kolkata	Member
Dr. D Sur	Ex-Senior Deputy Director & Head, Physics Division, IJIRA, Kolkata	Member
Dr. K Chakrabarti	Associate Professor, Agricultural Chemistry and Soil Science, Institute of Agricultural Science, University of Calcutta	Member
Dr. P G Patil	Head, Transfer of Technology Division, CIRCOT, Mumbai	Member
Dr. S N Chattopadhyay	Principal Scientist, NIRJAFT	Member-Secretary

1.2 Terms of Reference of the QRT

1.2.1 Research Achievements and their Impact

- To examine and identify the research achievements of the Institute, Projects/KVKs its Regional Stations and Sub-Stations, AICRPs operated by them vis-à-vis sectoral programmes since the previous QR and critically evaluate them. Commensurate with the objectives, mandates and resources of the organization, the socio-economic impact of research on farmers/beneficiaries and transferability of results to farmers through extension should be critically reviewed.
- The research and its impact should be brought out in quantifiable benchmarks wherever possible.
- To know the value for money, QRT should assess and bring out the physical outputs and outcomes vis-à-vis the budget spent during the period under review. If the likely outcomes are going to take considerable times, the projected outcomes should be indicated.

- The socio-economic impact of research on farmers/beneficiaries and transferability of results to farmers being an important aspect of research outcome the transferability should be mandatory for major research projects.

1.2.2 Research Relevance and Budget allocation

To examine the objectives, scope and relevance of the research programmes and budget of the Institute for the next 5 years in relation to overall/state/regional national plans, policies and long and short-term priorities. The Committee may also draw its attention to the EFC/SFC Memo in relation to recommendations of the previous QRT and also the Perspective Plan and Vision 2020 document of the Institution.

1.2.3 Policies, Priorities and Strategies

To examine the policies, priorities, strategies and procedures adopted by the Institute and the system in relation to Perspective Plan in arriving at these decisions particularly the effectiveness of working of the Staff Research Council, RAC and the Management Committee as well as the Consultative machineries like Grievance Cell and Joint Staff Council.

1.2.4 Relationship / Collaboration with SAUs and other Stakeholders

Whether the research programmes of the past and proposal for future are in harmony with the Vision of ICAR (HQ) and the programmes of related centres of research and Agricultural Universities, state government, private sector and IARCs.

1.2.5 Linkages with Clients / End users

To examine the kinds of linkage established with the clients and end users of research results, i.e., farmers/fishermen and the extent of interest displayed in conducting "on farm research", on farmers fields and in organizing demonstrations / training courses for the transfer of technology to extension agencies.

1.2.6 Proposed changes in Organization Programmes and Budget

To examine whether any changes in the organizational setup are called for, and draw attention to any imbalances in the staffing pattern consistent with the scientific, technical and administrative needs as well as the allocation of research funds towards capital works, establishment and research contingencies. Further the Committee may also examine the resources generation efforts and assess the problems and prospects of the same. The progress and problem of implementing Project Based Budgeting may also be highlighted. While proposing major changes in organization and functioning, their feasibility in relation to ICAR's rules, autonomy, resources etc. need to be kept in view.

1.2.7 Organization and Management

Whether the organizational structure of the Institute is conducive to efficient functional/working autonomy, decentralization and delegation of authority in day-to-day routine working and whether the Director and senior staff are interested in promoting a collegiate and co-operate method of administration is to be assessed. The Committee may

also critically examine the status of implementation of O&M reforms as introduced by the Council from time to time and suggest ways and means to implement them at the Institute level. They may also suggest further reforms to be considered by the Council. The suggested staff ratio by the Council may have to be kept in view while reviewing the staff position in the Institute.

1.2.8 Constraints

Examine constraints hindering the Institute in achievement of its objectives and implementation of its program and goals and to recommend ways and means of minimizing or eliminating them.

1.2.9 Looking forward

To look into any other points considered relevant by the Committee or referred to it by the ICAR, the Institute Director or the Management Committee, in respect of future project development, research prioritization and management changes.

The above terms of reference may be modified at the suggestion of Director of Institute/Project/Management Committee of Institute/Project/ICAR Headquarters/GB keeping in view any specific problems of the Institute.

2. Brief Account of Review Process followed

After the first introductory meeting held in New Delhi on 29th July, 2011 in the office of Dr. M. M. Pandey, DDG (Engg), several meetings were held in the premises of NIRJAFT on the following dates.

1. 9 Dec, 2011 – Planning meeting
2. 31 Jan, 2012 – Meeting with the scientists of Mechanical Processing Division and Transfer of Technology Division of NIRJAFT
3. 9 Feb, 2012 – Meeting with the scientists of Quality Evaluation and Improvement Division and Chemical & Biochemical Processing Division of NIRJAFT
4. 1 Mar, 2012 – Meeting with representatives from jute decentralized sector and with officials from different govt. agencies dealing with jute
5. 3 Mar, 2012 – Interaction with RAC members, interaction with different level of staffs of NIRJAFT and meeting with representatives from jute organized sector

2.1 Introductory Meeting

Dr. M. M. Pandey, DDG (Engg) held a meeting in his office with the newly appointed chairman of the QRT of NIRJAFT, Dr. P. K. Banerjee on 29 July, 2011. Dr. K. K. Singh, ADG (PE) and Dr. K. K. Satapathy, Director, NIRJAFT were also present. DDG elaborated on the scope, purpose and focus of QRT review under ICAR system. He informed that the current exercise may be viewed as joint venture of ICAR Head Quarter and the concerned institute. It is expected that QRT would review past achievement of NIRJAFT and problem faced during the said period and recommend strategies and plans for the next five years. The process of composition of QRT was initiated and the same was officially constituted on 22 September, 2011.

2.2 Planning Meeting

The planning meeting of QRT was held on 9 December, 2011 at NIRJAFT and was attended by the Chairman, all the members of QRT, DDG (Eng), ADG (PE), Director, NIRJAFT and senior officials of NIRJAFT. At the outset, Dr. M. M. Pandey, DDG (Engg) welcomed the chairman and all the members of the QRT.

Dr. Pandey in his introductory remark reiterated the purpose of the Quinquennial Review of an ICAR institute and underlined the importance that ICAR attaches to recommendations of the QRT for formulating future research activities and changes if any in the management and organizational structure of the institute. Dr. P. K. Banerjee, Chairman of QRT, mentioned that from available documents it would appear that the

institute has been registering a healthy growth during the past five years in spite of a steady decline in staff strength. He stated that objective identification and prioritization of stakeholders would be the key issue governing future activities of the institute. Dr. K. K. Satapathy, Director, NIRJAFT, presented the background information on the institute and listed the actions taken on recommendations of the previous QRT. Dr. K. K. Singh, ADG (PE) of ICAR stressed upon the need to transform this institute to a world class facility. At the end Dr. Pandey instructed the member secretary of QRT, Dr. S. N. Chattapadhyay to prepare a schedule for the QRT-meetings in consultation with the Chairman and members of QRT well ahead of time.

2.3 Meetings with Scientists of different Divisions

The first review meeting of QRT was held on 31 January, 2012 at NIRJAFT, Kolkata. In the forenoon session interaction was carried out with scientists of Mechanical Processing Division (see Annexure – I).

Dr. G. Bose, Head, Mechanical Processing Division presented achievements and linkages with stakeholders over previous five years for his Division. The Chairman remarked that the developmental work on geotextiles and activities in design and development of instruments are commendable. He underlined the need to introduce project based budgeting and quantitative benchmarking in each and every project. It was also pointed out that every new product should be judiciously characterized as per the intended end use and appropriate stakeholders should be associated with every developmental work related to new product/technology. Dr. D. Sur, QRT Member, stated that some basic research should be carried out at NIRJAFT to fill up some important knowledge gaps with regard to processing of jute and allied fibres as well as product development, like blend ratio optimization, optimization of process parameters, compatibility among blend components etc. Large scale industrial trials of developed technologies are also absolutely necessary. Then Dr. Bose presented the future projects pertaining to XIIth five year plan period. The Chairman suggested that 10-15 R&D projects should be identified for the next five years (2012-17) and their associated stakeholders should be actively involved from the formulation stage of the projects. Analysis of social impact of each project concerned with development of technology/product should be given due importance. Activities pertaining to development of nonwoven products should be strengthened.

In the afternoon session Dr. D. Nag, Head, Transfer of Technology Division, presented achievements during the XIth plan period and future plan for the XIIth plan period for the Division. After the deliberation, the Chairman suggested that a structural change was needed in the manner in which transfer of technology and business development activities were being carried out during the immediate past. For instance, the system should among others permit incubating product/technology developed in-house by allowing a group of scientists to link up with potential entrepreneurs whom they could provide complete business plan proposal and guide them in new venture. Dr. P. G. Patil, QRT Member,

stated that a proactive interaction with trainees on continuous basis and keeping track of their progress in respective industry should be given high priority. Dr. D. Nag then presented the future plan of the Division for 2012-17. The Chairman remarked that some marketing strategies beyond participation in fairs / exhibitions have to be adopted. Dr. Patil, QRT Member, stressed upon the need of wide and aggressive publicity of marketable technologies.

The second meeting was held on 9 February, 2012 at NIRJAFT to review achievements and future plans of Quality Evaluation & Improvement Division in the forenoon session (see Annexure – I). Dr. S. K. Bhaduri, Head, Quality Evaluation & Improvement Division, presented achievements and enumerated linkages established with stakeholders over the previous five years. After the presentation and a prolonged deliberation, the Chairman reiterated the need of project based budgeting, quantitative benchmarking and establishment of formal collaborative linkages with other institutions involving proper sharing of work and resources and identification as also association of stakeholders for a meaningful execution of projects. Feedback in quantified form for developments such as retting technology is an absolute requirement for judging the extent of progress and the need of further fine tuning. He asked the scientists to form a task force for designing a conceptually new ribboner, by joining hands with established design laboratories. Dr. Bhaduri then presented the proposed activities under XIIth Plan. Dr. K. Chakraborti, QRT member, emphasized that jute retting culture has to be tested in various water bodies in different areas. He suggested that NIRJAFT fungal culture should be deposited at NCIM, Pune and similar other institutes for posterity. Moreover a physico-chemical, chemical and microbial mapping of water bodies for jute retting purpose throughout the state needs to be carried out. Similarly an estimation of green house gas emission during accelerated retting should invariably be undertaken. NIRJAFT should also concentrate on research activities on allied-fibres under XIIth Plan.

In the afternoon session, Dr. A. K. Roy, Head, Chemical & Biochemical Processing Division, presented achievements and linkages established with stakeholders over the past five year period for his Division. After the deliberation, the Chairman pointed out that standard test methods need to be followed for developing products and product / process certification should be obtained from reliable sources. Dr. T. K. Guha Roy, QRT Member, commented that low temperature catalyst in pigment printing of jute may be used where curing facilities are not available. He suggested that a manual for vegetable dyes along with relevant shade cards using jute fabrics needs to be urgently prepared for transferring the technology to decentralized sector. Any research undertaken in this field should be need based and as per requirements of stakeholders. He indicated that techno-economic feasibility report for medium density particle board needs to be prepared. Dr. K. Chakraborty, QRT Member, pointed out that issues of storage, transportation and seasonal availability of whole jute plant for making particle board has to be addressed. Dr. T. K. Guha Roy, QRT Member, suggested that in-house developed gums and resins may be used for development of particle board and fibre board. Moreover, lignolytic enzyme may be used for pulp and paper making and bioprocessing of jute. The Chairman

expressed the need to undertake R&D work on chemical processing of allied fibres like ramie, sisal, banana, etc. It was pointed out that in this entire endeavour, eco-friendliness of processes for ensuring environmental protection needs to be assigned the central importance.

After reviewing achievements and proposed future plans of respective Divisions, the QRT visited selected facilities of each Division.

2.4 Meeting with RAC Members, Representatives of Jute Sector and Institute's Administrative Staff

During the forenoon session of the next QRT meeting, held on 1 March, 2012 at NIRJAFT, Dr. C. J. Thampi, CCPI, NAIP-II made a presentation on need for establishment of a centre of NIRJAFT at Alleppy, Kerala for research on coconut fibre. This was followed by a presentation by Dr. G. Bose, Head, Mechanical Processing Division on the topic of "value chain for coconut fibre and its byproducts" highlighting manufacture of diversified products of higher value and better marketability from coconut fibres for enhancing the economic returns of farmers. Members of QRT felt that in view of extensive cultivation of this plant along the entire coastal belt of our country and poor commercial exploitation of this natural fibre, a vigorous R&D thrust pertaining to this fibre should prove beneficial to the nation. However, QRT desired that ICAR should decide the necessity of setting up a separate laboratory for coconut fibre processing at Alleppy after due consideration of a comprehensive plan of R&D work and related extension activities.

The forenoon session continued with an interactive discussion involving representatives of decentralized sectors, scientists of NIRJAFT and members of QRT (see Annexure – I). After an informal introduction amongst the participants, Dr. D. Nag, Head, Transfer of Technology Division, presented marketable technologies developed at NIRJAFT and the proposed future programmes. During the ensuing deliberations, the Chairman emphasized the need of industry and institute to join hands for mutual benefit. Industry representatives opined that complete clarity on commercial and economic viability of the developed products/technologies is essential in the present scenario. Costing of the developed product should be worked out during the bulk scale trial and techno-commercial viability of developed process needs to be established before transferring the technology. Interest was expressed for collaborative development in areas such as low cost moulded furniture, handloom weaving machines and jute diversified products. It was also suggested that NIRJAFT should act as a "solution-provider" to the entrepreneurs in JDP sector. Moreover development of flame retardency on fibres and development of union / blended jute-based fabrics with less surface hairs would open up new markets for JDPs.

In the afternoon session, QRT met with officials from different government agencies and IJT representative involved in the area of jute development (see Annexure – I). Dr. M.

K. Basak, PS and In-charge, PME Cell, presented achievements during the XIth Plan period and priority areas of research proposed for the XIIth Plan. After a considerable amount of animated discussion, representatives from Government agencies expressed that reduction of energy consumption in jute mills should be considered a priority area. Moreover the concept of total quality management needs to be actively cultivated in industry and suitable training programmes need to be conducted jointly with MSME and NIRJAFT. The Chairman strongly advocated a close collaboration with the Directorate of Jute Development for undertaking investigations on dry retting of jute. The IJT representative mentioned that even undertaking fundamental research at NIRJAFT in frontier areas such as nanotechnology can be justified if a strong collaborative mechanism with partners having established reputation in the relevant field is first put in place.

The QRT met members of RAC on the forenoon of 3 March, 2012 at NIRJAFT, Kolkata (see Annexure – I). Dr. P. K. Banerjee, Chairman, QRT, presented some of the major recommendations – arising out of deliberations till date – pertaining to formulation and execution of R&D projects, space crunch and man power shortage at NIRJAFT and thrust areas for the XIIth Plan. It was pointed out that a meaningful pre-project exercise with identification and association of stakeholder should be an important requirement for floating R&D project proposals. Similarly an extensive detailing of each project incorporating quantitative benchmarking and proper budgeting along with identification of meaningful collaborators should become a matter of regular practice. The space crunch may be reduced by discarding old and obsolete equipment and manpower shortage can be overcome by recruiting project based contractual services. He elaborated on the thrust areas, viz. creation of a taskforce for a conceptually novel ribboner, extensive R&D program on coconut, banana and pineapple fibres, research programme on agro textiles and nonwoven technical textiles, improved business incubation practices as also proactive interaction and utilization of modern tools for publicity and transfer of technologies. Dr. B. C. Mitra, Chairman, RAC, welcomed the recommendations of QRT and stressed on the need of monitoring the implementation of recommendations. He emphasized on the need of strong R&D programmes on development of ecofriendly processing and eco-labeling of jute products, improvement of compatibility between jute fibre and polymer matrix in fibre reinforced plastics and felt that transfer of wrapped yarn technology and digital instruments to concerned stakeholders should form priority areas of activity.

The forenoon session was continued with a meeting of QRT members with the officers of Administrative and Finance sections, the Library In-Charge and representative from Institute Joint Council (see Annexure – I). The QRT members felt that some technical manpower in library may be recruited on the basis of contractual service system for carrying out specific developmental works such as digitization, cataloging etc. There is a need to preserve old and rare books and their listing needs to be taken up and proper space needs to be urgently provided to this facility. It was agreed that laboratories and offices should have efficient fire fighting system and vehicle hiring is a better option than

maintaining institute's own fleet of vehicles. The Chief Administrative Officer pointed to the need of rectifying an imbalance in the ratio of technical staff for laboratory and workshop while the Asst. Finance & Accounts Officer stressed on the need for computerisation in financial operation.

In the afternoon session, QRT members had a meeting with representatives of organized jute mill sector (see Annexure – I). Dr. K. K. Satapathy, Director, NIRJAFT, welcomed all the members to the meeting and expressed the importance of this gathering. QRT Chairman addressed the gathering underlining the importance of participation of the stakeholders in the R&D programmes of the institute. Dr. G. Bose, Head, Mechanical Processing Division, presented research achievements of the institute over the XIth five year Plan period. Afterwards, he presented future research programme of the institute for the year 2012-17. The industry representatives informed that they require machines for regular production of uniform jute yarns, for which the development of an improved drafting zone for spinning of fine jute yarn is a necessity. At the same time, technology for control of wastage at every stage is also a need of the hour. Development of suitable mechanized material handling systems for jute mills would provide considerable relief to mills. They opined that there is a need for research on energy conservation in chemical processes and development of computer colour matching system for shade matching in the jute dyeing sector. They felt that regular visit of scientists to the industry would improve their understanding of the needs of industry. They agreed to the need of carrying out some basic research to bridge existing knowledge gaps.

3. Organization and Management

3.1 Historical Background

The institute was established in 1938 as Jute Technological Research Laboratories under the auspices of the Indian Central Jute Committee in the present premises at Kolkata. Later on in 1965, it was integrated to the Indian Council of Agricultural Research as a constituent unit. During the long period of seven decades the institute had flourished with multifarious disciplines and carved a niche as a centre of excellence for research on jute and allied fibre technology catering to the farm community and the industry.

The institute is located on the southern fringe of the metropolis of Kolkata known as Tollygunge with a total plot area measuring around 17,628.67 sq.m which includes the laboratory campus of 13,671.67 sq.m and the staff quarter campus measuring around 3957 sq.m. The institute is adequately equipped with the state of the art laboratories having sophisticated instruments, testing and other equipments, machinery, workshop, library, museum, ARIS cell, pilot plant, generator house along with a guest house in the adjoining campus of staffquarters.

3.2 Mandate

- To carry out basic and technological research on jute and allied fibres
- To promote production of good quality fibres
- To upgrade the fibre and the product quality
- To find diversified uses of plant fibres, their agricultural by-products and industrial wastes in large scale and decentralized sectors
- To act as a repository of scientific and technological information on jute and allied fibres
- To act as a centre of human resource development in relation to jute & allied fibres and establish linkages among different scientific and industrial organizations through exchange of scientific and technological knowledge

3.3 Organization and Structure

The institute functions under the Director who is responsible for all matters related to institute including day to day function, liaison with ICAR and other institutes and government bodies. He also supervises the research divisions as well as service sections and coordinates with various committees. The staff position as on 31.3.2012 is given in the following table which shows that of the total sanctioned staff of 184, only 140 is filled. In case of scientific staff, of total sanctioned strength of 44, only 21 are filled.

Staff position as on 31 March, 2012

Sl No	Category	Sanctioned	Filled	Vacant
1.	Research Management	1	1	-
2.	Scientific	44	21	23
3.	Technical	59	52	7
4.	Administrative	35	28	7
5.	Skilled supporting	41	34	7
6.	Auxiliary	4	4	-
	Total	184	140	44

The institute organogram is given in Annexure – II. Discipline-wise break-up of scientists in position, including Director, at NIRJAFT is given below :

SN	Discipline	No. of Scientists
1.	Agricultural Engineering / Science / Economics	6
2.	Textile Manufacture	6
3.	Textile Chemistry	4
4.	Organic Chemistry	3
5.	Microbiology (Plant Science)	2
6.	Computer Application	1
	Total	22

A list of scientists including Director is given in Annexure – III.

The general management comprises Institute Management Committee (IMC), Institute Joint Council (IJC) and Grievance Cell (GC) while the research is monitored by Research Advisory Committee (RAC) and Institute Research Committee (IRC). There are four research divisions and four sections / cell besides finance and administrative departments.

3.3.1 Management

Indian Council of Agricultural Research has developed excellent system for ensuring good research, administration and financial management for its institutes. The QRT looked into the recommendations of Research Advisory Committee and Institute Management Committee.

3.3.2 Administration

The administration of NIRJAFT is managed by the full time Director. The management committee of NIRJAFT advises the Director from time to time. The following committees assist the Director :

- Institute Management Committee
- Institute Research Committee
- Research Advisory Committee
- Institute Joint Staff Council

Institute Management Committee (IMC)

NIRJAFT has a management committee constituted by the Indian Council of Agricultural Research. IMC of NIRJAFT meets periodically as per prescribed rules and instructions and decides on issues arising from time to time. By and large the suggestion and recommendations are implemented in compliance with ICAR's policies and decisions.

Institute Research Committee (IRC)

The institute research committee meetings are held every six month and new projects and progress in ongoing projects are discussed in the forum.

Research Advisory Committee (RAC)

The RAC constituted for NIRJAFT by the ICAR meets once every year and discusses the progress in R&D activities of the institute and suggest modifications and improvements / new programmes wherever necessary in tune with NIRJAFT mandates.

Institute Joint Staff Council (IJSC)

The Joint Council Scheme of ICAR was established in 1979 with the objective of promoting harmonious relations and securing greatest measures of cooperation between ICAR and its employees in matters of common concerns and for increasing efficiency of service. There is a council at the ICAR level, called the Central Joint Staff Council and an Institute Joint Staff Council in each institute of ICAR. Institute Joint Staff Council of NIRJAFT is running smoothly benefitting all employees of NIRJAFT except Class-I officers.

3.3.3 R&D Divisions & Service Sections

The R&D programmes and extension activities of the institute are implemented through the following four full fledged divisions and some sections :

Quality Evaluation & Improvement Division deals with fibre quality improvement through basic and technological research on extraction of jute and allied fibres, study of their physico-chemical properties, modifications for diversified end-uses, exploring useful chemicals from fibre plants and enrichment of NIRJAFT culture bank.

Mechanical Processing Division mainly carries out basic and applied research on production of textiles based on jute and allied fibres for traditional and diversified applications including development of efficient machines and instruments.

Chemical & Bio-Chemical Processing Division renders researches towards utilization of agricultural resources of jute and allied fibres for conservation of energy and preparation of value added products such as pulp and paper, composites and particle board and fabrics (through bleaching, dyeing and finishing processes).

Transfer of Technology Division looks after transfer of institute-developed technology and entrepreneurship development, Information Technology, and HRD.

Specialized services to the institute are provided by the following sections :

- Testing section provides facilities for physical testing of fibres & yarns.
- Grading section undertakes the services for grading of jute and training on raw jute grading.
- Design, Development & Maintenance section is equipped with the workshop facility for mechanical design, development and fabrication of instruments, equipments and small machinery.
- ARIS cell provides agricultural research information services and infrastructural support for computer system.
- Scientific Coordination Unit renamed as Prioritization Monitoring & Evaluation Cell keeps and maintains records and information relating to R&D projects & various reports.
- Director's Cell interacts with all the Divisions for overall coordination in implementing the institute R&D programmes.
- The Institute Technology Management Unit deals with I P Management and Technology Transfer/Commercialization for the institute in accordance with the guideline for I P Management in ICAR system.
- The library of the institute acts as a centre of repository for scientific and technological information on jute & allied fibres by maintaining a wide collection of reference books, periodicals, journals, monographs, reports, reviews etc. relevant to jute and other scientific topics. Apart from this, the institute houses a specialized Jute Museum which displays a wide range of jute items starting from raw jute to various end products.

3.4 Budget and Finance

Head	Budget Provision (Rs. in Lakh)	Actual Expenditure (Rs. in Lakh)
2007 – 2008		
Institute Non-Plan	503.00	498.82
Institute Plan	100.00	95.48
AP Cess Scheme	6.80	4.20
2008 – 2009		
Institute Non-Plan	693.68	667.81
Institute Plan	120.00	119.59
AP Cess Scheme	2.42	2.42
2009 – 2010		
Institute Non-Plan	943.55	943.50
Institute Plan	120.00	119.98
NAIP Projects	270.65	119.07
Planned schemes (ITMU & ZTMC)	28.50	22.20

Head	Budget Provision (Rs. in Lakh)	Actual Expenditure (Rs. in Lakh)
2010 – 2011		
Institute Non-Plan	1075.50	1058.43
Institute Plan	208.00	207.99
NAIP Projects	698.93	307.70
Planned schemes (ITMU & ZTMC)	34.58	28.26
2011 – 2012		
Institute Non-Plan	900.92	900.87
Institute Plan	225.00	225.00
NAIP Projects	224.04	218.55
Planned schemes (ITMU & ZTMC)	23.64	23.64
Grand Total : 2007 – 2012		
Institute Non-Plan	41,16.65	40,69.43
Institute Plan	7,73.00	7,68.04

3.5 R & D Projects during XIth Plan (2007 – 2012)

The summary of all the R & D Projects carried out by NIRJAFT during XIth Plan period (2007-12) is given below :

Year	NIRJAFT Funded		External Fund		JTM sponsored		Total Projects		Yearly Total
	New	Contd.	New	Contd.	New	Contd.	New	Contd.	
2007 – 08	16	19	–	4	–	–	16	23	39
2008 – 09	11	16	2	1	2	–	15	17	32
2009 – 10	4	13	–	3	–	2	4	18	22
2010 – 11	24	5	–	3	2	2	26	10	36
2011 – 12	3	21	2	3	–	3	5	27	32
Grand Total							66	95	161

The details of the R & D Projects have been given in Annexure – IV.

3.6 Action taken on Previous QRT Recommendations for 2001-07

NIRJAFT had tried its best to implement actions on the basis of all the previous QRT recommendations for 2001-07 (see Annexure – IX).

4. Achievements

4.1 Division-wise Research Accomplishments during 2007 – 2012

4.1.1 Quality Evaluation and Improvement Division

- Two Capsularis varieties and one Mesta variety have been identified for release in the year 2007.
- Development of image processing system to evaluate defects of raw Jute.
- Seven bacteria and seven fungi were isolated from retting water samples and their morphological properties were studied.
- Development and fabrication of a tester for measuring thermal insulation property of textile and non-textile materials.
- Frontline demonstrations conducted under Jute Technology Mission elicited the novelty of accelerated retting process over the conventional process for fibre extraction.
- Based on quality character evaluated by the institute and yield performance, two Capsularis, one Olitorious and one Mesta varieties were identified for release in the annual workshop of All India Network Research Project on Jute and Allied Fibres.
- Six fungi isolated from different retting water samples were determined for their enzymatic activity. By mutation technique through UV radiation, one strain DB2-M4 has been developed which perform better than parent strain, DB2.
- For grading of Ramie fibre, two-level grading system are proposed i.e., hand and eye method at producers' level and instrumental method at users' level.
- Extraction of good quality fibres from decorticated Ramie, Pineapple leaf and Banana sheath by the use of a bacterial consortium could be possible.
- Developed computerised software system to provide support for users specific analysis on jute linear density was further upgraded for statistical analysis in quick, easy and efficient manner.
- Development of a prototype bending rigidity tester for rigid/curly fabric as well as testing method in the same instrument.
- Retting residues from water saving retting method was found to be good soil nutrient.
- The lignin fraction extracted from jute plant were characterised and modified for making use in adhesive formulation.

- The fungal dry retting of fibre with fungus *Sclerotium delphinii* showed improvement in fibre quality.
- A need based process control system has been designed and developed using Programmable Logic Controllers (PLC) to run jute processing machines very efficiently. A model system has been installed in pilot plant of the institute for the apron draft spinning system.

4.1.2 Mechanical Processing Division

- Extraction and spinning of Dhaincha fibre in blend with jute for making plied yarns.
- Development of fancy / decorative fabric with jacquard design in cotton handloom using fancy jute covered yarn and knitted products for ladies and gents sweaters.
- Successful application of tubular fabric made from jute and HDPE tape for protection of Mayurakshi river bank in Birbhum District, West Bengal.
- Development of handloom with jacquard facility for weaving jute based fancy / decorative fabric.
- Three types of jute-polyester and cotton blended fabric suitable for making warm outer garments have been developed.
- The study on evaporative cooling effect by jute based wetted pads showed that highest cooling effect and maximum increase in relative humidity were effected by woven jute pad in forced ventilation.
- A prototype handloom has been developed for production of jute based fancy fabric for use as upholstery and decorative fabric.
- Six types of winter fabric from jute-hollow polyester blended and cotton yarns have been developed for making jackets.
- Products like table cover, bedcover, quilt, cushion cover, sofa cover, curtains, apron, etc. were made with the fabric developed from jute-polypropylene blended yarns.
- Development of braided yarns from jute and allied fibres.
- Development of knitted / woven fabrics with different fabric particulars and designs for high value modern home furnishings, draperies, apparel and fashion textiles.
- A complete package of practice for production and utilisation of geotextiles for protection of rainfed river bank from soil erosion has been developed.
- Processing of flax in jute system resulted in the development of finer yarn of linear density 100 tex for apparels.

- Composite structured geotextiles using jute, polypropylene and coconut fibre has been developed.
- Ornamental jute fabrics have been prepared in the developed handloom for value added products and a design bank has been created.
- Raw unretted coconut fibre can be softened chemically to the extent of 50% or more.
- Twisting zone of existing jute spinning machine has been modified to make finer yarn.

4.1.3 Chemical & Biochemical Processing Division

- Studies on combustion of briquettes in gassifier showed the desirable consumption. Thermogravimetric behaviour of jute caddis briquettes was studied by instrumental analysis.
- Development of medium density composite board from blend of whole jute plant and bamboo.
- Dyeing of jute fabric with indigosol and sulphur dyes improves the consumer appeal of the fabric for making diversified products.
- Bio-pretreatment with cellulase and xylanase enzyme showed improvement in absorbency, whiteness, brightness and yellowing properties of jute fabric.
- High permanence paper was obtained from alkaline sulphite pulp of jute by borohydride hydrogen peroxide bleaching method.
- Composite particle board made from date palm leaf, jute stick, saw dust showed better sound absorption property than that of plywood and board made of 100% jute stick.
- Study showed that bleached handmade paper is more susceptible to microbial damage than unbleached handmade paper.
- Writing grade paper was developed by pulping of jute residues in small scale trial.
- Bio-assisted bleached jute fabric showed better optical, absorbency, handle property than the conventional chemically scoured-bleached jute fabric.
- Process for making pulp and handmade paper by utilising Date Palm leaves, as potential raw material, has been developed.
- Development of products viz. writing pad, file cover, carry bag, etc. from the developed handmade paper from Date Palm leaves.

- Process for generating fibres from whole jute plant using disc refiner have been developed, which is the first step of preparing fibre board.
- Application procedure for dyeing of jute fabric with natural dye “Manjistha” has been developed.
- Process for dyeing of bio-processed jute fabric using cold brand reactive dyes have been developed.
- Paper made by ASAM process gives better yield and strength properties compared to kraft and alkaline sulphite process.
- Jute-polyester resin composites have been prepared to study the effect of type and degree of reinforcement.

4.2 Important Products, Processes & Technologies developed

4.2.1 Total Mechanization of the Fibre Extraction process and development of a Universal Mechanical system for extraction of fibres

Front line demonstrations on ribboning of jute by manual ribboner and accelerated retting of jute have been conducted at farmer fields of different districts of West Bengal, Assam, Orissa and Andhra Pradesh. It was observed that retting by NIRJAFT technology yielded better quality of fibre by one or two grades and the yield was also higher by 10-20% over the traditional yield. The demonstrations were organized by the Department of Agriculture, Govt. of West Bengal. The accelerated retting technology was also adopted by Jute Corporation of India under Mini Mission III Programme of Jute Technology Mission. The retting residue was found to be a good soil nutrient.

4.2.2 Water saving Jute Retting technology and Ribboner development

By using this technology, water requirement reduces from 20 l/kg of plant to 1.0 l/kg of plant. Retting period is reduced from 16-21 days to 8-10 days. The yield advantage is around 15% and quality improves by 1-2 grade. A new power ribboner consisting of three working heads have been developed. This enables increase in productivity by 50%. It can process about 1.5 quintal of defoliated green plant to produce about 60 kg of green ribbon per hour.

4.2.3 Creation and maintenance of Culture Bank for jute and allied fibre crops

A bacterial and fungal culture bank for jute and allied fibre crops has been created and being maintained for supply.

4.2.4 Development of a Fabric Rigidity Tester

The first prototype of the instrument to measure the rigidity of semi-rigid or curly fabric has been developed.

4.2.5 Development of a Digital Fibre Fineness Tester for jute

A unique digital air-flow fineness meter has been developed. The whole process is being controlled by the central processor using computerized micro-controller.

4.2.6 Development of a Digital Moisture Meter for jute

A digital instrument has been developed for accurately measuring the moisture content of jute. Dedicated software has also been designed and developed for this purpose. The instrument is portable and can be operated with both 230V, 50 Hz AC supply and the DC supply.

4.2.7 Development of Machinery / Equipments for Jute / Coconut fibre Processing

An automatic process control system for jute industry has been developed. Jute-coconut fibre spinning system (carding, drawing, spinning & plying m/c) has been developed.

4.2.8 Multi-fibre Blended Yarns for Furnishing fabrics

Different types of multi-fibre blended yarns were produced by using acrylic, hollow polyester and polypropylene in blends with jute in conventional jute spinning system. A novel method of structural blending has been developed by partial covering with synthetic staple fibres like polypropylene and hollow polyester. Coloured synthetic fibre can be used to produce coloured yarn without wet processing. The jute content in the yarn can be used as high as 85%. The yarns developed are superior in terms of feel, appearance, strength and extensibility. Fabric samples have been prepared with different weave and colour effect for decorative and furnishing application. Such textiles show better aesthetic, physical and mechanical properties. This has resulted in cheaper decorative yarn and fabric compared to the commercial counterpart available in the market.

4.2.9 Development of a Handloom for weaving Jute-based Decorative and Ornamental fabrics

It was possible to develop a manually operated weaving machine with jacquard shedding facility to produce decorative and ornamental fabric not only from 100% jute yarn but also jute-blended yarns. The salient feature of the development made in the machine consists of double beam let-off, automatic take-up arrangement to wind the fabric automatically in cloth roller, larger shuttle box for accommodating larger shuttle to hold 400% more amount of weft yarn and adjustment of cloth roller inside the machine to hold longer length (approximately 60 meters of as high 450 g/m² area density) of fabric. Apart from jute, 100% cotton, 100% synthetic and jute/cotton union or jute/synthetic union fabrics may also be produced in the same machine. The machine was fabricated with the help of local craftsmen like traditional weaver, carpenter, blacksmith, and fitter with the technical support and constant supervision from NIRJAFT scientists. The jute based fabrics developed in the machine are elegant, ornamental and excellent in texture with natural look. The fabrics showed good tenacity, air permeability, and flexural properties.

The maximum shrinkage in any direction (even in boiling water up to 30 min) is 1.5%, which is well within permissible limit of 5%. The study of market potential revealed that the fabrics and products made therefrom have good potential for export as well as in domestic market. Designing is an important aspect for the production of decorative and ornamental fabric. To eliminate tedious traditional designing process, the use of Textile Computer Aided Design Software has been introduced for designing jute based decorative and ornamental fabric. A design bank for ornamental fabric has been formed and a total of 150 designs for ornamental jute fabrics have been kept stored in this design bank.

4.2.10 Design and development of application-based Geotextiles and their method of use

Composite structured geotextiles consisting of jute, coconut fibre and polypropylene have been designed to suit specific geotechnical parameters. Performance of geotextiles has been evaluated through field trials for protection of embankment of rivers Mayurakshi and Bramhani.

4.2.11 Development of Knitted Warm Garments from Jute-based Spun-wrapped Yarn

Using existing jute spinning machines, spun-wrapped yarns with jute (100%) and jute-polyester (75/25) blended core and textured polyester multifilament on cover were developed. The spun-wrapped yarns so produced show a reduction in hairiness up to 86%, improvement in specific work of rupture up to 10% and specific flexural rigidity up to 24% over ordinary jute or jute-polyester blended yarn. The knitted swatch produced out of these spun-wrapped yarn using 7 gauge and 9 gauge needle in both single jersey and double jersey knitting machines showed very good dimensional stability even after three washing. The two-ply and three-ply yarns produced from single spun-wrapped yarn can be easily used in knitting machines and also in hand-knitting for the production of sweaters. The thermal insulation value of the sweaters produced from spun-wrapped yarn is comparable with thermal insulation value of sweaters made from 100% acrylic and 100% wool. However, the hand-knitted sweaters showed higher thermal insulation value than the machine-knitted sweaters due to less packing of yarn in hand knitted structure as compared to machine knitting.

4.2.12 Jute-Polyester blended fabric for making Jacket

Jute-polyester blended yarn has been developed for making winter fabric for producing jacket and other outer garments. Winter fabric has been made on handloom. The thermal insulation property of jacket fabric is much superior as compared to that of commercial jacket fabrics although jacket fabric is lighter in weight with lower thickness.

4.2.13 Development of Home textiles from Jute-based blended yarn and its evaluation

Fabric has been developed from jute-polypropylene blended yarns for utilizing in upholstery, furnishing and bedding material.

4.2.14 Medium density Composite Board from Jute Whole Plant and Bamboo as substitute for plywood and wood – A new application of jute crop

A technology for producing medium density lingo-cellulosic composites (particle boards), using jute whole plant, bamboo and adhesive resin as raw materials, has been developed. Both interior and exterior grade panel materials have been developed. The properties of the particle boards meet the requirement of BIS specification for such materials (BIS:3087-1985). The technology for producing particle boards of commercial size (8ft x 4ft) has been standardized and industrial trials have been conducted successfully to produce boards of commercial size. Particles generated from jute whole plant is the major component of the developed material, while bamboo particles and adhesive resin are the minor components. Furnitures of different types have been fabricated out of such boards and the furniture have been successfully laminated with veneers for aesthetic appeal.

4.2.15 Development of Pulp and Paper from Date Palm (*Phoenix dactylifera*-L) leaves

Date Palm leaf (sustainable agro-residue) is an excellent raw material for making pulp and paper of various grades due to the presence of high alpha-cellulose, hemi-cellulose and longer ultimate fibre length. The presence of high amount of hemi-cellulose in the pulp is found to be effective in beating operation and formation of bonds between the fibres in the paper sheet. Hemi-cellulose and alpha-cellulose contribute immensely towards tensile strength, bursting strength and folding endurance to the paper sheet without using any natural and synthetic polymer or any additive. NIRJAFT has developed a new technology for production of pulp and paper by mechanical pulping process (chemical free) from Date Palm leaf and different products viz. file-cover, carry bag, writing pad etc. therefrom. The technology can be transferred to rural sectors at low capital investment.

4.3 Collaboration with Other Institutes / Agencies

SN	Name of the institute	Type of linkages
With National Institutes / Agricultural Universities / Agencies		
1.	Bengal Engineering and Science University, West Bengal	Two collaborative research projects funded by DST on instrumentation
2.	CIRCOT, Mumbai	Collaborative work under National Agricultural Innovation Project (NAIP) on Value Chain on Coconut Fibre
3.	Indian Rubber Manufacturing Research Association, Thane, Maharastra	Collaborative work under NAIP on Value Chain on Coconut Fibre
4.	TMNRRDC, Kerala	Collaborative work under NAIP on Value Chain on Coconut Fibre
5.	Rubber Park India Pvt Ltd., Kerala	Collaborative work under NAIP on Value Chain on Coconut Fibre
6.	CRIJAF, West Bengal	Work under All India Network Project (AINP) on Jute
7.	CIAE, Bhopal	Development of Jute Ribboner
8.	BCKV, West Bengal	Field trial on Agrotextile
9.	UBKV, West Bengal	Work under NAIP on Sustainable rural livelihood empowerment project for northern disadvantaged districts of West Bengal
10.	NABARD	Sponsoring of different NIRJAFT developed training programmes for unemployed youths
With Local Institutions		
1.	Institute of Jute Technology, Kolkata	Quality evaluation of fancy yarns, bleached & dyed jute fabrics, geotextiles, etc.
With International Institutions		
1.	ICRISAT, Hyderabad	Acting as mentor for the Business Planning and Development Unit of NIRJAFT
With Extension and Development agencies		
1.	KVIC	Training programme for rural upliftment
2.	Federation of Small and Medium Industries	Collaboration for entrepreneurship development programme
3.	Marg Darshak Development Services (NGO), Uttar Pradesh	Organisation of joint training programmes on Ecofriendly bleaching and dyeing of jute
4.	Small Farmers Agribusiness Consortium (SFAC), Dept of Agriculture and Cooperation, Min. of Agriculture	Agribusiness funding opportunity through SFAC venture capital scheme for agribusiness development
5.	Development Commissioner (Handicrafts), Min. of Textiles, GOI	Collaborative training programme on jute handicrafts
6.	Manosri Tarun Bani Mandir (NGO), West Bengal	Field trial of advanced retting technologies of NIRJAFT

4.4 Patent granted / application filed

4.4.1 Patent granted after April, 2007

SN	Title	Inventors	Patent No. & Date of Grant
1.	Method of degumming of decorticated ramie fibre by recycling of degumming liquor	Dr. S K Bhaduri, Dr. P K Ganguly	Patent No. 220787 Date of Grant - 06.05.2008
2.	Union fabric of glass yarns and jute yarns or yarns of fibres allied to jute and method of preparing composite from the same	Dr. P K Ganguly	Patent No. 236761 Date of Grant - 30.12.2009
3.	An electrically operated portable device for in-field testing of jute fibre bundle strength	Dr. G Roy, Mr. G K Bhattacharya, Dr. M K Mukhopadhyay	Patent No. 246007 Date of Grant - 09.02.2011
4.	A closed-loop measurement system regulating flyer's speed of a spinning machine	Dr. G Roy, Mr. G K Bhattacharya, Dr. S K Bhattacharya	Patent No. 247513 Date of Grant - 13.04.2011
5.	A composite system for measuring hairiness of coarser and finer jute yarns	Dr. S N Ghosh, Dr. M K Naskar Dr. S K Bhattacharyya	Patent No. 247684 Date of Grant - 02.05.2011

4.4.2 Applied for Patent after April, 2007

SN	Title (Application No.)	Inventors	Date of publication & Journal No
1.	A pineapple leaf fibre decorticator assembly (2334/DEL/2007)	Dr. D. Nag, Dr. S. Debnath	P.D. 19.6.2009 J. No. 25/2009
2.	Technology for wrapping jute yarn for improving the extension and reducing hairiness (1188/KOL/2008)	Dr. A. N. Roy, Dr. G. Basu, Mr. G. K. Bhattacharya	P.D. 15.1.2010 J.No. 3/2010
3.	A method for producing jute-hollow polyester blended yarn, union fabric of said yarn and method of preparing said union fabric and shawl from the said yarn (1187/KOL/2008)	Dr. S. Debnath, Dr. S. Sengupta, Mr. U. S. Singh	P.D. 15.1.2010 J.No. 3/2010
4.	A retting composition for water saving process of retting jute ribbons for extraction of fibre (441/KOL/2009)	Dr. S.K. Bhaduri, Mr. M Mukhopadhyay	P.D.21.1.2011 J.No.03/2011
5.	A blanket from jute-hollow polyester blended bulk yarn and method of preparing the same (1102/KOL/2009)	Dr. S. Debnath, Mr. G. K. Bhattacharyya, Mr. U. S. Singh	Application not yet published
6.	A device and a process for measurement of moisture content in jute and allied natural fibre products (59/KOL/2010)	Dr. G. Roy, Mr. G. K. Bhattacharyya	Application not yet published
7.	Method of chemical retting of coconut fibres and preparing yarns from said fibres (330/KOL/2011)	Dr. G Bose, Ms. L Mishra, Mr. R Chakroborty, Dr. Md. Jhaseer Abbas	This is a complete application
8.	Electronic Fineness Tester of Jute & Allied Fibres (354/KOL/2012)	Dr. G Roy, Dr. S C Saha, Dr. K K Satapathy	This is a complete application
9.	Integrated Grading System of jute (355/KOL/2012)	Dr. G Roy	This is a provisional application

4.5 Publication

The publications made by NIRJAFT scientists during 2007-12 can be summarized as follows :

Year	Research Papers in Journals			Conf. Papers	Popular Articles	Books & Others	Year-wise Total
	Inter-national	National (Major)	National (Ordinary)				
2007-08	8	8	6	19	5	4	50
2008-09	5	11	2	11	5	6	40
2009-10	4	11	4	26	8	3	56
2010-11	2	10	6	12	1	2	33
2011-12	4	7	1	8	2	3	25
Total	23	47	19	76	21	18	204

A detailed list of all the publications, during 2007-12, has been furnished as Annexure – V.

4.6 Transfer of Technologies and Training

4.6.1 Transfer of NIRJAFT Technologies

The following technologies, developed by NIRJAFT, were transferred to seven (7) entrepreneurs during 2007-12 (see Annexure – VI) :

- Particle Board from Jute Stick / Jute and Agro-residue
- Jute Composite
- Mini Jute Spinning Mill
- Jute Diversified Products

4.6.2 Training conducted on NIRJAFT Technologies

A summary of training programmes (see Annexure – VI), conducted by NIRJAFT during 2007-12, on various jute-related topics is given below:

Year	Topics of Training	No. of Participants
2007-08	Accelerated retting & Ribboning, Bleaching & Dyeing	35
2008-09	Bleaching & Dyeing, Handmade Paper, Mushroom Cultivation	74
2009-10	Mushroom Cultivation, Quality improvement of jute fibre	74
2010-11	Bleaching & Dyeing, Handmade Paper, Jute stick particle Board, Handloom Weaving of jute-based ornamental fabrics, Improved Jute Retting	92
2011-12	Handloom Weaving/Designing of jute-based ornamental fabrics, Eco-friendly bleaching and dyeing, EDP on jute stick particle board/ handmade paper, Improved technologies for production and quality management of jute fibres, Extraction and utilization of Banana fibre	221
Total		496

4.7 Infrastructure and Physical facilities developed during 2007 – 12

Machine / Equipment in Pilot Plant / Workshop – Procured	
Jute Spinning, Weaving and Chemical processing	Ring spinning machine, Automatic Rapier machine, Circular loom, Sewing machine, Calender, Hank dyeing machine, Stroboscope
Processing facility for Jute-Coir blended yarn	Coir dehusking machine, Coir drawing machine, Coir rope making machine
Handloom Unit with jacquard (as ornamental fabric development facility)	Jacquard machine with CAD software, Computerised card punching machine, Motorised card lacing machine
Non-woven Unit	Adhesive bonded non-woven machine, Needle punched nonwoven machine, Thermal bonding unit
Paper and Pulp Unit	Paper sheet drying unit, Motorised sheet former, Semi-automatic hand sheet former, Beater, Auto vat, Digester
Particle Board Unit	Impregnator, Pellet making machine, Hydraulic hot press, Blender machine for composite, Hammer Mill, Temperature controlled hot plate, Hot air oven, Hydraulic press, Trimmer machine. Hammer mill, Sieving machine, Blender, Mat former, Moulds, Autoclave, Electrical Hot press, Impregnator blender, Guillotine, Jute cutter and chopper machine
Instrumentation laboratory	Desoldering – soldering SMD rework, Cathode ray oscilloscopes
Workshop	Universal milling machine, Radial Drill Machine, Lathe machine, Band saw machine, Portable machine tools, Measuring instruments and tools
Energy Laboratory	Thermal gassifier plant (50 kg/hr)
Microbiology and Chemistry Laboratory	BOD incubator, Refrigerated centrifuge, Spin coater, Langmuir Blogett film deposition unit, Membrane filtration unit
Testing Equipment – Procured	
Physical & Chemical Testing	Yarn Appearance Board Winder, Wrap Reel (motorized), Electronic Twist tester, Fabric Stiffness tester, Air-permeability tester, Abrasion Resistance tester, Pilling tester, Brightness tester, Reed and Pick checking instrument, GSM tester, Bursting Strength tester, Flammability tester, Fabric Drape meter, Impact Strength tester, Rubbing Fastness tester, Crease Recovery tester, Optical Microscope with digital camera attachment, Projection Microscope, Travelling Microscope, Cross section cutter, Rheometer, Electronic Precision Balance, Humidifier, Soil Moisture meter, Soil Thermometer, Kjeldhal instrument, Bomb Calorimeter, Combustion Gas Analyser
Paper Testing	Tensile Strength tester, Bursting Strength tester, Tearing Strength tester, Fold Endurance tester

Sophisticated Equipments available
<ol style="list-style-type: none"> 1. Atomic Absorption Spectrophotometer 2. Gas Chromatography 3. Mass Spectrophotometer 4. Image Analyser 5. UV-VIS Spectrophotometer 6. Fourier Transmission Infrared Spectrophotometer (FTIR) 7. Computer Colour Matching system 8. INSTRON Tensile Tester
Machines / Instruments developed by NIRJAFT
<ol style="list-style-type: none"> 1. Manually operated Weaving machine with jacquard design facility exclusively for jute 2. A system to increase twist in existing apron draft machine 3. PLC based Speed Control in apron draft jute spinning machine 4. Carding, Drawing, Spinning, and Twisting machines for jute-coir system 5. Electronic Jute Fibre Bundle Strength tester 6. Digital Jute Fibre Fineness tester 7. Digital Moisture meter for jute 8. Instrument for measuring Frictional Resistance of fibre 9. Instrument for measuring Bending Rigidity of semi-rigid or curly fabric 10. Electronic Thermal Insulation Value tester

Library Facility

The library of the institute acts as a centre of scientific and technological information on jute and allied fibres by maintaining a wide collection of reference books, periodicals, journals, monographs, reports, reviews etc. relevant to jute and other scientific topics. The library caters to the services of scientists and technologists apart from rendering services to outside researchers, academicians, students and people from various organizations.

Major improvements of Library during 2007-12

1. e-Journal

a) We are members of CeRA (Consortium e-Resource in Agriculture). It contains 2000+ e-Journals in agricultural sciences. It is single point access and users may download. Required journals have been included in CeRA according to our scientists' requirements.

b) We have been subscribing "World Textile Abstract (On-line)" since 2011. Users may procure abstracts provided with bibliographical references and download as and when required.

c) **Journal of Industrial Textile:** Another e-Journal subscribed during 2011.

Many users enjoy on-line facilities regarding e-journal in our library specially CeRA.

2. Procurement of Books

At present, total nos. of books are approx. 18,000. During last five years we have purchased approx. 2000 books on different subjects such as composites, natural fibres, nanotechnology, polymer science, textile etc. Textbooks, monographs, handbooks, standards and encyclopedia have been purchased on the above mentioned subjects. Encyclopedia on science & technology, polymer science and encyclopedia in Hindi are notable.

3. Procurement of Journals

During last five years, Library section has subscribed on an average 45 Indian and 8 foreign journals. In 2011-12, Library section has been subscribing 56 Indian journals and 14 foreign journals.

4. Connectivity with other Libraries

We keep in contact with reputed Institutes and libraries for exchange of articles and information through internet.

5. Abstracting Service

Different types of abstracts have been compiled pertaining to different subjects to fulfil the users' requirements as mentioned below.

SN	Abstract compiled on	Compilation Period
1.	World Jute and Allied Fibres	2006 – 2009
2.	Indian Jute and Allied Fibres (Vol. 1)	2010
3.	Sisal	1970 – 2009
4.	Pineapple leaf fibre	1970 – 2009
5.	Kenaf	1970 – 2009
6.	Abaca	1970 – 2009
7.	Natural Fibre Composite	1970 – 2009

Future Plan for the Library

1. Library digitization through Libsys software

Partial digitization has been completed. Approx.1,300 entries of books made in the computer and it is continuing.

Users may find out the books if they search by the name of the author, title, subject and accession nos. through computer. After completion of digitization, issue and return service may be provided from library section through computer.

2. Digitization of damaged Documents

It is observed that some valuable old and rare books are in damaged condition. Those books may be digitized for preservation.

3. Subscription of e-Journal

Library section may subscribe more e-journals in future if require.

4. Purchase of e-Book

Library section may purchase e-book according to users' need due to limitation of space and On-line facility.

5. Current Awareness Service

Library section may provide current awareness service. Current contents of journals available in the library may be scanned and sent through e-mail to the users. Service may be provided bi-annually.

6. Abstracting Service

Library section may provide abstracting service to the users to fulfill their needs.

4.8 Human Resource Development during 2007 – 12

Human resource development efforts by NIRJAFT for different categories of staff have been enumerated below.

Subject	Venue	Date	Participant(s)
2007 - 2008			
Purchase Procedure	ISTM, New Delhi	14– 16 May, 2007	Sri S. Sardar Sri P. B. Mitra
Advances in Agricultural Research Project Management	NAARM, Hyderabad	21 Jun–11 Jul, 2007	Dr. S. Debnath
Agribusiness, Market Intelligence and IT	NAARM, Hyderabad	7– 27 Aug, 2007	Dr. L. K. Nayak
E-Learning	NAARM, Hyderabad	20– 25 Aug, 2007	Dr. G. Roy
Intelligent Reporting System	IASRI, New Delhi	10–11 Sep, 2007	Dr. A. K. Jain as nodal officer Shri B. Chatterjee as data enterer
Spatial and Non-spatial Information Manager and Mining in Agriculture	IASRI, New Delhi	13 Nov– 3 Dec, 2007	Sri S. Das
Management Development Programme on Managerial Effectiveness	IIM, Kolkata	26–30 Nov, 2007	Sri G. Sinha

Subject	Venue	Date	Participant
2007 – 2008 (Contd.)			
Administrative and Establishment Rules	ISERA, New Delhi	6–8 Dec, 2007	Sri U. B. Dastidar
Different Soft Computing Techniques	Bengal Engineering and Science University, Howrah	7– 8 Jan, 2008	Dr. S. Debnath
Neural Network & Genetic Algorithm in Material Science & Engineering	School of Material Sc & Engg, Bengal Engg & Science University, Howrah	7–8 Jan, 2008	Dr. S. Sengupta
Intellectual Property Protection and Technology Licensing in Agriculture	NAARM, Hyderabad	15–17 Feb, 2008	Sri D. Paul
2008 - 2009			
Post-Harvest Technology of Jute & Allied Fibres	NIRJAFT, Kolkata	7–11 Apr, 2008	Dr. M. K. Basak
Improving effectiveness of Private Secretaries and Personal Assistants	National Productivity Council, Bhubaneswar	23–25 Sep, 2008	Sri U B Dastidar Sri B Chatterjee
IP and Technology Management (organized by Indian Council of Agricultural Research)	CIFE, Kolkata Centre	16–18 Oct, 2008	Dr. M. K. Basak Dr. G. Basu Dr A. N. Roy Dr. S. Sengupta
Bleaching & Dyeing of Jute Fabric	NIRJAFT, Kolkata	5–14 Jan, 2009	Dr. S. Debnath Sri S. Das
Science and Law	Administrative Staff College of India, Hyderabad	23–27 Feb, 2009	Dr. P. K. Ganguly
Handmade Paper from Jute residues	NIRJAFT, Kolkata	2–11 Mar, 2009	Dr. S. Debnath Dr. L. K. Nayak Sri S. Das
2009 – 2010			
Multi-skill training for Group ‘D’ (Non-Matric/Non-ITI) staff	NIRJAFT, Kolkata	18–30 May, 2009	33 Employees
Vigilance Administration and Management	NAARM, Hyderabad	25–27 May, 2009	Dr. M. K. Basak
Patent Search	National Institute for IP Management, Nagpur	9–10 Jul, 2009	Dr. P. K. Ganguly
Patenting in the field of General Engineering and Technology	National Institute for IP Management, Nagpur	13–17 Jul, 2009	Dr. P. K. Ganguly
Hindi Noting & Drafting	NIRJAFT	15 Sep, 2009	18 Employees
Procurement related matters and Financial Management	CIFRI, Barrackpore	12–13 Oct, 2009	Dr A. K. Roy Dr. A. N. Roy Dr S. N. Chattopadhyay

Subject	Venue	Date	Participant
2009 – 2010 (Contd.)			
Decision making in Agriculture using Data Mining.	NCAP, New Delhi	27 Oct–16 Nov, 2009	Sri S. Das
IT-based Decision Support Systems for Multimedia Content Development	NAARM, Hyderabad	17–27 Nov, 2009	Dr. U. Sen Sri H. Sengupta
Knowledge Discovery in Databases - Data, Information & Knowledge	ISI, Kolkata	11–15 Jan, 2010	Sri S. Das
Management of Creativity & Innovation	IIM, Kolkata	15–19 Feb, 2010	Dr. A. K. Roy
IT-based Decision Support Systems for Multimedia Content Development	NAARM, Hyderabad	17–27 Mar 2010	Sri K. Mitra
2010 – 2011			
Applied Multivariate Analysis	CTCRI, Bhubaneswar	28 Jun–2 Jul, 2010	Dr. L. K. Nayak
Property Management and Technology Transfer	Michigan State University, USA	10–14 Jul, 2010	Dr. S. B. Roy
Computer training in Hindi	National Power Training Institute, Faridabad	6–10 Dec, 2010	Sri R. D. Sharma
Data analysis using SAS	DWM, Bhubaneswar	13–18 Dec, 2010	Sri S. Das
Results Framework Documents	ICAR/ DARE, New Delhi	10–15 Mar, 2011	Dr. D. P. Ray Smt. P. R. Ghatak
2011 – 2012			
Hyperspectral Remote Sensing for Agriculture	IARI, New Delhi	2 – 11 Aug, 2011	Dr. B. Saha
Testing and Evaluation of Packaging materials & Packages	Indian Institute of Packaging, Kolkata	19–23 Sep, 2011	Dr. A. K. Roy Dr. L. K. Nayak
Business Incubation	National Business Incubation Assoc., Ohio, USA	3–6 Oct, 2011	Dr. D. Nag
Agricultural Research Management	NAARM, Hyderabad	3–23 Nov, 2011	Dr. D. P. Roy
Research Project Proposal Development	NAARM, Hyderabad	20–23 Feb, 2012	L. Ammayappan
Jute Mill Maintenance	Institute of Jute Technology, Kolkata	9 Jan–9 Apr, 2012	Sri Sourav Pal

From the above, according to QRT, there does not appear to be much emphasis on continuous upgrading of scientific knowledge-base, although summer and winter schools abound in prestigious Indian Institutes on topics of current interest. Such schools not only expose scientists to latest knowledge, equipment and practices but also brings them close to experts with whom collaborative works can then blossom.

5. Analysis of the Prevailing Scenario

5.1 SWOT Analysis

In the process of SWOT analysis, QRT has identified the following major key elements as regards Strength, Weakness, Opportunities and Threats for NIRJAFT :

STRENGTH

- Experienced scientific manpower
- Equipped with advanced scientific equipment / machinery
- Mandate of NIRJAFT is fairly broad based
- There is a strong knowledge-base on allied lignocellulosic fibres such as Ramie, Sisal, Banana, Pineapple and Sunhemp
- Established infrastructure and facilities for converting agro-residues and wastes into wealth
- Equipped with modern guest house, trainee's hostel for boys and girls, modern communication facilities

WEAKNESS

- Shortage of scientific manpower
- Shortage for available space for expansion
- Lack of suitable administrative structure for commercialization of R&D efforts
- Lack of adequate linkage with potential end users

OPPORTUNITIES

- Importance of jute sector in the economy of the country in general and the eastern region in particular
- Increasing global concern in favour of natural fibre products
- Usage of jute packaging material in large quantity for storage of food grains, due to its several advantages
- Increase in demands for jute diversified products e.g. carry bags, soft luggages, slippers, handicrafts, etc.
- Potential of jute in technical textiles

THREATS

- Prevalence of the challenge from synthetic fibres till date
- Limited availability of global bodies actively involved in promoting the cause of jute and allied fibres through focused R&D efforts, thereby creating an academic vacuum which promotes mediocrity

5.2 A Critical Diagnosis of NIRJAFT's Performance in 2007 – 2012

QRT has been able to identify some issues of concern that need to be addressed at the earliest in order to improve the functioning of NIRJAFT so as to make it a “centre of excellence” in the field of jute and allied fibres. A critical survey by QRT of the net output of the previous five years of work by a group of dedicated scientists has yielded a scenario that a fairly good amount of process technologies and products have been developed by NIRJAFT during last five years, but its effort for successful technology transfer for the benefit of stakeholders and thereby the society at large has been found wanting. A number of the NIRJAFT's R&D projects were not formulated on the basis of prevailing/emerging technological needs as well as market demands in both organized and decentralized jute sectors. This has resulted from scientists' inadequate demand assessment and linkages with stakeholders in jute sector. The thrust on basic research during the review period was somewhat inadequate. During the last five years, the infrastructural development at the institute is however found commendable.

It is expected that the functioning of the IRC and RAC should be more effective towards monitoring and guidance of the performance of scientific workforce. There is serious need for having more representation of the stakeholders in these committees for better research output in a commercial sense. A critical look at the manner of constitution and relevance of these committees is also urgently necessary.

Similar dissection of the other dimensions of NIRJAFT's creative impact on society, such as papers published in reputed journals and presented in important conferences, and also receiving prestigious national and international awards etc. lead to very similar conclusions. For example, if only one good publication per year per scientist is laid down as the criterion, then twenty scientists over a period of five years should have published more number of good quality papers (during 2007-12, 70 nos. of research papers were published in international and reputed national journals). This is a medium that advertises the existence of scientific capabilities and good work culture of a R&D Institute.

For elevating this Institute to a level of national excellence, QRT felt the need of some hard decisions to be taken over a period of time to promote professionalism and accountability. Just as Rome was not built in a day, so would it be a day dream to effect a radical cultural transformation within a short period of time. Keeping this sentiment in view, the QRT after very careful deliberations has prepared a package of “Recommendations”, enumerated in the next section, for the coming five year period.

5.3 Performance Rating for NIRJAFT for 2007-12

For the purpose of objective evaluation of NIRJAFT's performance during 2007-12, QRT has considered the following areas of activities, with different weightages according to importance and having some key sub-components :

1. **R & D Output (Weightage = 50%)**
(Improvement of Basic Knowledge-base, Patent / Research Papers, Improved / New Processing Technology Development, Product Development & the benefits accrued, Need-based Testing Instrument Development, Impact of Technology / Product Development on beneficiaries / user industry)
2. **Technology Transfer (Weightage = 20%)**
(Linkages Established with Users of Technology / Research Results, Absorption by Stakeholders, Dissemination thro' Training, Exhibition, etc., Publication of Technical Booklets)
3. **Infrastructure developed (Weightage = 10%)**
(Facility for Small-scale Processing trials, Facility for Modern Testing)
4. **Human Resource (Weightage = 10%)**
(Present Scientific Staff against sanctioned strength, Present Technical Staff against sanctioned strength, Quality of Scientific Staff)
5. **Administration (Weightage = 5%)**
(Present staff against sanctioned strength, Computerisation in Administration)
6. **Institute's Promotion (Weightage = 5%)**
(Website Management, Institute's Newsletter)

The overall rating of NIRJAFT's performance, as evaluated by QRT on the basis of all the above performance criteria, is **GOOD**.

6. Recommendations

6.1 General

- 6.1.1 A paradigm shift in formulation and execution of R&D projects is absolutely necessary for proper utilization of resources of NIRJAFT and living up to its mandate. Basically, the institute as a whole and the scientists as individuals should develop a sense of accountability to the society in carrying out R & D.
- 6.1.2 Some additional basic research, arising out of the necessity of advancing technological developments in specific well defined and relevant domains, should also be carried out simultaneously.
- 6.1.3 Need-based contractual appointment of qualified personnel for execution of time bound projects, both scientific and administrative in nature, is strongly recommended. Similarly inculcation of the culture of meaningful collaboration, involving sharing of responsibilities and resources, needs to be actively promoted.
- 6.1.4 Regular deputation of scientists to industry sites – both in organized and decentralized sectors – as also to Institutes of repute – both in India and abroad – for attending summer and winter schools, seminars and conferences, would keep this workforce updated and in touch with ground realities. Separate budgetary provisions for such activities should be clearly earmarked.
- 6.1.5 For effective implementation of QRT recommendations, one QRT member should be made a member of RAC and Institute Management Committee over the following five year period for providing active guidance.

6.2 Project Formulation & Approval

- 6.2.1 Before formulation of a new R&D project, a select committee should critically assess the results of a short pre-project exercise carried out in the Institute on the proposed topic. Such an exercise should preferably contain results of some preliminary experiments in addition to the objectives and scope. Only upon receiving approval of the select committee the detailed project formulation should be taken up.
- 6.2.2 Each R&D project needs to be written down unambiguously in terms of broad objectives, scope, targeted outcome in the form of quantified benchmarks, brief overview of the related peer reviewed literature, proposed methodology and required infrastructural support, detailed annual breakup of related budget in terms of manpower, hardware and software, travels etc. as also a tentative time schedule for each component of work elements.
- 6.2.3 Stakeholder(s), in the form of specific individual or organization, to whom the outcome of the approved developmental work could be passed on for up scaling / commercialization, need to be identified during the project formulation stage

itself. The stakeholder(s) should be associated with related work right from the beginning and throughout the duration of each project.

- 6.2.4 Keeping in view the interdisciplinary nature of any cutting edge R&D work of modern times, identifying suitable collaborators from other academic and research institutions and sharing critical elements of work as also budgetary supports should form an important component of such project formulation.
- 6.2.5 Instead of planning to undertake a large number of projects during the coming five years (2012-2017) thus spreading the resources very thin, it is strongly recommended that attempts be made at identifying a limited number of well defined research projects with high probabilities of success followed up by adopting the recommended project formulation and execution methodologies (A tentative list of suggested R&D projects is appended as Annexure – VII)

6.3 Project Monitoring & Documentation

- 6.3.1 Once a new R&D project takes off, a Standing Research Committee (SRC), constituted for each discipline concerned with the project, should be in-charge of monitoring and guiding related work. Members of SRC could be drawn from the RAC or even co-opted suitably. The suggested detailed project write-up would form the baseline document for SRC. The PI should report to the standing committee once in three months.
- 6.3.2 After completion of each project, within a month, total documentation on the project (inclusive of published papers / seminar presentation) should be prepared and archived.

6.4 Transfer of Technology

A. Direction

- 6.4.1 As and when the targeted benchmarks of a project work are achieved, a dedicated team consisting of the concerned PI, the stakeholder(s) and staff from the Technology Transfer Division should be formed for undertaking a structured up scaling / commercialization. Devising a suitable structure for this key exercise is critical to the success of technology transfer.
- 6.4.2 Techno-economic feasibility studies, inclusive of IRR (internal rate of return), should be carried out for every product / technology deemed ready for commercialization.
- 6.4.3 A strong IPR management system needs to be in place for providing suitable guidelines pertaining to patenting.
- 6.4.4 Analysis of social impact of each project concerned with development of technology / product should be undertaken as a matter of course. Strong emphasis needs to be laid on issues related to energy, environment and living systems.

- 6.4.5 Before claiming success in any developmental project meant for industry, large-scale industrial trials should be conducted whenever possible.
- 6.4.6 In general, standard test methods should be followed while developing new products. Product/process certifications pertaining to techno-economic viability of such developments should be obtained from stakeholders vis-à-vis the actual end users.

B. Functioning of Transfer of Technology Division

- 6.4.7. A structural change in the manner in which Transfer of Technology and Business development activities are carried out is called for. The recommended R&D project formulation and execution strategies would go some way towards positively linking up the activities of this Division with those of other Divisions of the Institute. The system should encourage incubation of product / technology developed in-house by allowing relevant scientists in association with staff members of this Division to provide potential entrepreneurs complete business plan proposal and guide them in a new venture, based on NIRJAFT-developed product / technology. It is suggested that the concerned scientists may be relieved from routine work for a period of time so that they can devote themselves wholeheartedly to such critical activities.
- 6.4.8. Proactive interaction with trainees / new entrepreneurs on continuous basis and keeping track of their progress in respective ventures should be given high priority.
- 6.4.9. Some marketing strategies beyond participation in fairs and exhibitions need to be adopted for reaching out to the discerning modern entrepreneur. For example wide publicity of marketable technologies / products through telecommunication network including television, internet and newspaper articles and advertisements should be given a serious thought. The present Website of NIRJAFT should be much improved in terms of textual and visual contents.
- 6.4.10. Business Planning and Development (BPD) should continue as an important activity.

6.5 Resource Management

- 6.5.1 In view of the space crunch as also shortage of trained scientific manpower, the Institute should aggressively start discarding old and obsolete equipment for releasing blocked space and venturing into joint collaborative work with reputed academic and research Institutes for accessing equipment and expert manpower. Such collaborations would involve sharing project funds for which a structural change may be called for.
- 6.5.2 The large shortfall in trained scientific manpower prevailing in the Institute coupled with the forthcoming retirement of some senior members poses a serious

administrative challenge that calls for measures like granting extension to deserving superannuating scientists, offering project based contract appointment to local applicants, etc.

6.6 R & D on Jute : Areas & Direction of Work

A. Quality Evaluation & Improvement Division

- 6.6.1 As the success of ribbon retting depends primarily on availability of a commercially viable ribboning machine it is suggested that a taskforce be constituted for designing a conceptually new ribboner. Once a new concept is found promising in terms of targeted benchmarks, one should join hands with reputed machine design laboratories for actual fabrication and follow up actions.
- 6.6.2 Jute retting cultures should be tested for both jute bundles and ribbons in various water bodies in different areas. Simultaneously the physico-chemical, chemical and microbiological mapping of water bodies employed for the purpose of jute retting should be carried out systematically. Feedback in quantified form on any development in retting process should be obtained, analyzed and recorded properly.
- 6.6.3 Measurement of organic carbon content as well as nutrient content in retting waste and retting water and estimation of green house gas emission during retting should form a standard part of the protocol.
- 6.6.4 Cultures developed at NIRJAFT should be deposited at NCIM, Pune and/or similar national institutes for posterity.
- 6.6.5 There is a felt need for improving automation of existing testing equipment as also development of portable testing instruments for ligno-cellulosic fibres with digital display of results.

B. Mechanical Processing Division

- 6.6.6 Development of agro-textiles based on jute and allied fibres should be a priority area as our agrarian economy can immensely benefit from suitable developments in this field and the ICAR umbrella can be used to advantage for extended field trials. Similarly development of new products based on nonwoven technology should be targeted more aggressively as technical textiles can be conveniently engineered using this route and NIRJAFT has the necessary basic infrastructure which may be upgraded suitably from time to time.
- 6.6.7 For projects related to processing of jute & allied fibres as well as product development, basic ground work needs to be carried out more thoroughly. For example, while developing a new blend of different types of fibres, the theoretical analysis pertaining to blend ratio optimization should be undertaken first before designing the experiments. Similar systematic approaches need to be adopted

while optimizing process parameters or determining compatibility among blend-components etc.

- 6.6.8 Every product should be judiciously tested and evaluated keeping the intended specific end use in view. For example a newly developed fabric for winter garment (a jacket for example) needs to be tested for comfort properties or fabrics developed for curtains and furnishings need to be tested for drape and abrasion resistance respectively. Similarly a new jute-based knitted fabric needs to be tested for recovery from deformation. In the absence of such critical tests the entire effort loses significance.

C. Chemical & Bio-chemical Processing Division

- 6.6.9 A manual of vegetable dyes incorporating relevant shade cards with jute fabrics should be developed for transferring the technology to entrepreneurs.
- 6.6.10 Each new project for process development in case of bleaching, dyeing & printing should be designed on the basis of present demand of end-users as well as their infrastructural limitations, and also of the eco-friendliness of the proposed process.
- 6.6.11 Moist curing, dry curing and other low temperature cross-linking processes should be adopted in case of crease resistant finishing of jute fabric or low temperature catalyst in pigment printing of jute should be used where curing facilities are not available. Similarly environment-friendly fixer should be used in pigment printing instead of melamine formaldehyde. Indeed ecofriendly processing methods should always be adopted for preventing any damage to the environment.
- 6.6.12 Lignolytic enzyme may be used for pulp and paper making and bio-processing of jute.
- 6.6.13 In-house developed gums and resins as also Lac and other natural resins should be tried out for development of particleboard and fiberboards. Techno-economic feasibility reports for the so developed medium density particleboards should be worked out while publicizing the results.
- 6.6.14 Treatment of whole jute plant for making particleboards can offer a lucrative outlet for the farmers. However the central issues of storage, transportation and seasonal availability of whole jute plant should be addressed in all its detail.

6.7 R & D on Allied Fibres

- 6.7.1 A greater emphasis needs to be assigned during the coming years to undertaking major research activities on allied natural fibres such as coconut fibre, Banana fibre and Pineapple fibres which are available nationally in a sufficiently large quantity.

- 6.7.2 Undertaking of R&D work on chemical processing of allied fibres like Banana, Coconut fibre, etc. and commercial products made from these fibres should be assigned greater importance.

6.8 Infrastructural Development

- 6.8.1 A Master Plan for the Institute's infrastructural development should be prepared at the earliest, keeping in view the requirements for upgradation of buildings, electrical cable network, sanitation system, etc. New laboratory buildings should be constructed, while small structures constructed in unplanned manner are to be demolished, for proper installation of all the equipments to be newly procured and also creating working space as deemed necessary.
- 6.8.2 Modern machines and testing instruments, necessary for R&D to be carried out in the coming years should be procured and installed (see Annexure – VIII). Before embarking on purchasing new sophisticated instruments, a list of personnel in the institute to operate such instruments should be prepared.
- 6.8.3 The Institute Library needs to be provided with a more spacious location. In addition to housing books and journals of current interest, a special section devoted to back volumes, old and rare books as also archived documents may be suitably created. A sufficient number of terminals with internet linkages should be available to the reader for easy access of digitized information.
- 6.8.4 Efficient fire fighting systems in offices and laboratories of NIRJAFT should be installed at the earliest.

6.9 HRD Need

- 6.9.1 A few individual scientific staff may be trained for acquiring specialized knowledge in the following areas :
- a. Value-chain Analysis and Modeling
 - b. Business Incubation
 - c. TQM and ISO-14000
 - d. Relevant refresher courses in allied subjects
 - e. Any other specific area, as deemed essential for any R&D project
- 6.9.2 A few administrative staff may be trained in (a) Computer-based Accounting, (b) Computer-based Store Management, and (c) Modern Fire Fighting Systems.
- 6.9.3 All employees should be acquainted with modern systems of hazardous material handling and hazardous waste disposal so that suitable safety protocols are worked out and implemented.

6.10 Staff & Administration

- 6.10.1 The present structure governing the technical staff needs to be rationalized.
- 6.10.2 There is a strong need to preserve old and rare books available in institute library with an updated cataloging of the entire corpus of literature. Similarly library digitization and computerization needs to be assigned a high priority. For such additional work, some technical manpower may be recruited for Library on contractual basis.
- 6.10.3 The financial operation of Institute should be computerized at the earliest.

6.11 Structural Reorganisation

- 6.11.1 Keeping in view the limited number of scientists – sanctioned as well as actually in place – working in NIRJAFT during the recent past, as also interdisciplinary nature of most research problems of current importance, there is a strong case for doing away with the four separate research divisions existing as on date in NIRJAFT and creating a common pool of all the scientists, from which required personnel would be drawn from time to time for different research project and related activities as per requirements of the concerned PIs. In such a system the different identities and loyalties of scientists associated with the concept of divisions disappears and usefulness to different project activities becomes the sole criterion which in turn promotes multitasking and self learning. In such a system the PIs of different activities, who are expected to work closely with the concerned SRC and stakeholders, would report to a “Head of Research” or a “Deputy Director”, whose responsibility would be the overall coordination of all research related activities (such as formation of SRCs and conducting regular meetings, ensuring efficient utilization of the pool of scientists, procurement of necessary equipment etc.) in the Institute. The “Head of Research” or the “Deputy Director” would be nominated by the Director from among the pool of senior scientists for a maximum term of 3 to 5 years, renewable every year. The “Head of Research” or a “Deputy Director” would report to the Director and would officiate as Director during his/her absence. The matter of administering the laboratories may be left to designated and relevant scientists, who would additionally function as lab-in-charges and report to “Head of Research” or the “Deputy Director” on matters pertaining to their laboratories.
In nutshell then the proposed reorganization envisages abolition of four separate divisions in NIRJAFT, creation of a common pool of all the scientists, rotational nomination of a “Head of Research” or a “Deputy Director” from among the senior scientists for a specific term and appointment of lab-in-charges for administering the laboratories. This step is expected to provide greater thrust to undertaking and successfully executing socially important and meaningful projects.

6.12 New Disciplines for Scientists' Recruitment

- 6.12.1 There is considerable vacancy in scientific category for which the Institute is significantly handicapped. Immediate recruitment of scientific staff in these vacant posts particularly in the applied and basic science disciplines is a must for fulfilling the mandate of the Institute. The disciplines, like Physics, Fibre Science & Technology, Textile Manufacture, Textile Chemistry, Chemical Engg., Mechanical Engg., Electrical Engg., are essential for multidisciplinary research approach by NIRJAFT. ICAR at its highest level should take care of this vital issue by implementing actions as deemed fit for the purpose. Out of 44 sanctioned strength for scientific staff at present, about 20% should be from basic sciences, 50% from disciplines of textile manufacture and textile chemistry, 20% from engineering disciplines, and balance 10% from other disciplines relevant for activities of NIRJAFT.

List of Participants in different QRT meetings

SN	Name & Designation	Organisation
Introductory Meeting, 29 July, 2011 at the room of DDG(Engg), ICAR		
1.	Dr M M Pandey, DDG(Engg)	ICAR
2.	Dr K K Singh, ADG(PE)	ICAR
3.	Dr K K Satapathy, Director	NIRJAFT
4.	Dr P K Banerjee, Chairman	QRT
Planning Meeting, 9 December, 2011 at NIRJAFT		
1.	Dr M M Pandey, DDG(Engg)	ICAR
2.	Dr K K Singh, ADG(PE)	ICAR
3.	Dr K K Satapathy, Director	NIRJAFT
4.	Dr P K Banerjee, Chairman	QRT
5.	Dr D Sur, Member	QRT
6.	Dr T K Guha Roy, Member	QRT
7.	Dr K Chakravarti, Member	QRT
8.	Dr D Nag, Head, Transfer of Technology Division	NIRJAFT
9.	Dr A K Roy, Head, Chem. & Biochem. Processing Division	
10.	Dr S K Bhaduri, Head, Quality Evaluation & Imp. Division	
11.	Dr G Basu, Head, Mechanical Processing Division	
12.	Dr P K Ganguly, In-charge, Design Dev. & Maint. Section	
13.	Dr M K Basak, In-charge PME Cell	
14.	Dr S N Chattopadhyay, P. Scientist & Member Secretary	NIRJAFT & QRT
QRT Meeting with MP Division, 31 January, 2012 (Forenoon)		
1.	Dr K K Satapathy, Director	NIRJAFT
2.	Dr P K Banerjee, Chairman	QRT
3.	Dr D Sur, Member	QRT
4.	Dr P G Patil, Member	QRT
5.	Dr D Nag, Head, Transfer of Technology Division,	NIRJAFT
6.	Dr A K Roy, Head, Chem. & Biochem. Processing Division	
7.	Dr S K Bhaduri, Head, Quality Evaluation & Imp. Division	
8.	Dr G Basu, Head, Mechanical Processing Division	
9.	Dr P K Ganguly, In-charge, Design Dev. & Maint. Section	
10.	Dr M K Basak, In-charge, PME Cell	
11.	Dr S N Chattopadhyay, P. Scientist & Member Secretary	NIRJAFT & QRT
12.	Dr A N Roy, P. Scientist	Mechanical Processing Division, NIRJAFT
13.	Dr S Sengupta, S. Scientist	
14.	Dr S Debnath, S. Scientist	
15.	Dr P Verma, Scientist	
16.	Dr N Kundu, Scientist	
17.	Dr G Roy, P. Scientist	QE&I Division, NIRJAFT

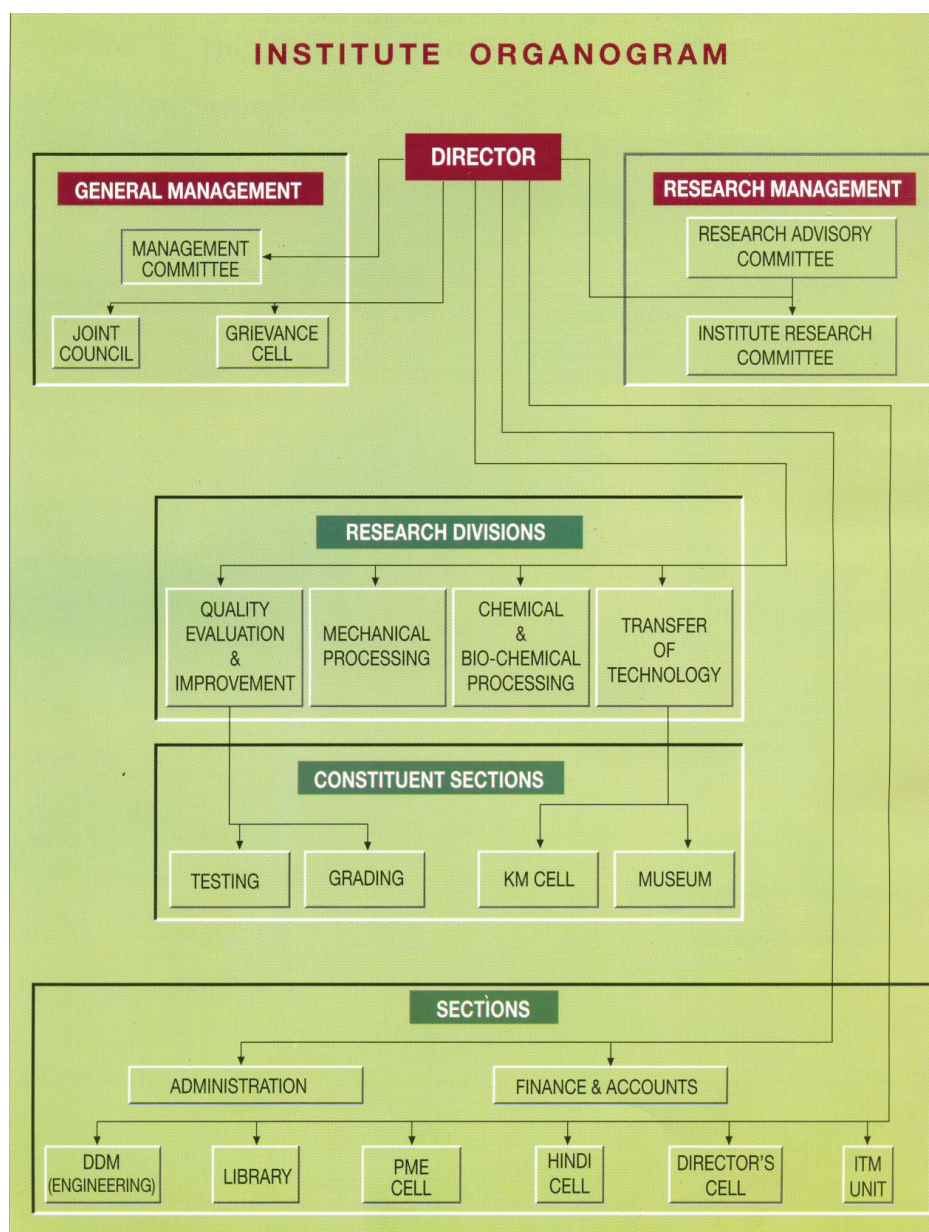
SN	Name & Designation	Organisation
QRT Meeting with ToT Division, 31 January, 2012 (Afternoon)		
1.	Dr K K Satapathy, Director	NIRJAFT
2.	Dr P K Banerjee, Chairman	QRT
3.	Dr D Sur, Member	QRT
4.	Dr P G Patil, Member	QRT
5.	Dr D Nag, Head, Transfer of Technology Division,	NIRJAFT
6.	Dr A K Roy, Head, Chem. & Biochem. Processing Division	
7.	Dr S K Bhaduri, Head, Quality Evaluation & Imp. Division	
8.	Dr G Basu, Head, Mechanical Processing Division	
9.	Dr P K Ganguly, In-charge, Design Dev. & Maint. Section	
10.	Dr M K Basak, In-charge, PME Cell	
11.	Dr S N Chattopadhyay, P. Scientist & Member Secretary	NIRJAFT & QRT
12.	Dr B Saha, Principal Scientist	Transfer of Technology Division , NIRJAFT
13.	Dr L K Nayak, Senior Scientist	
14.	Dr S B Roy, Senior Scientist	
15.	Mr Sujai Das, Scientist,	
QRT Meeting with QE&I Division, 9 February, 2012 (Forenoon)		
1.	Dr K K Satapathy, Director	NIRJAFT
2.	Dr P K Banerjee, Chairman	QRT
3.	Dr T K Guha Roy, Member	QRT
4.	Dr K Chakravarti, Member	QRT
5.	Dr S K Bhaduri, Head, Quality Evaluation & Imp. Division	NIRJAFT
6.	Dr D Nag, Head, Transfer of Technology Division,	
7.	Dr A K Roy, Head, Chem. & Biochem. Processing Division	
8.	Dr G Basu, Head, Mechanical Processing Division	
9.	Dr P K Ganguly, In-charge, Design Dev. & Maint. Section	
10.	Dr S N Chattopadhyay, P. Scientist & Member Secretary	NIRJAFT & QRT
11.	Dr M K Basak, P. Scientist & In-charge PME Cell	Quality Evaluation & Improvement Division, NIRJAFT
12.	Dr S Banik, Principal Scientist	
13.	Dr G Roy, Principal Scientist	
14.	Dr D P Roy, Senior Scientist	
QRT Meeting with C&BC Division, 9 February, 2012 (Afternoon)		
1.	Dr K K Satapathy, Director	NIRJAFT
2.	Dr P K Banerjee, Chairman	QRT
3.	Dr T K Guha Roy, Member	QRT
4.	Dr K Chakrabarti, Member	QRT
5.	Dr A K Roy, Head, Chem. & Biochem. Processing Division	NIRJAFT
6.	Dr S K Bhaduri, Head, Quality Evaluation & Imp. Division	
7.	Dr G Basu, Head, Mechanical Processing Division	
8.	Dr D Nag, Head, Transfer Of Technology Division	
9.	Dr M K Basak, In-charge, PME Cell	

SN	Name & Designation	Organisation
QRT Meeting with C&BC Division, 9 February, 2012 (Afternoon) – Contd.		
10.	Dr P K Ganguly, In-charge, DD&M Section & P. Scientist	Chemical & Biochemical Processing Division, NIRJAFT
11.	Dr S N Chattopadhyay, P. Scientist & M. Secretary, QRT	
12.	Dr N C Pan, P. Scientist	
13.	Dr L Amayyapan, S. Scientist	
QRT Meeting with JDP sector, 1 March, 2012 (Forenoon)		
1.	Dr K K Satapathy, Director	NIRJAFT
2.	Dr P K Banerjee, Chairman	QRT
3.	Dr D Sur, Member	QRT
4.	Dr T K Guha Roy, Member	QRT
5.	Dr K Chakrabarti, Member	QRT
6.	Dr P G Patil, Member	QRT
7.	Mr. O.P. Prahladka	Hitaishi- K K
8.	Mr. Soumen K Neogi, President	Cottage & Small Scale Ind. Assoc.
9.	Mr. G K Ray Chaudhuri, Secretary	Jute Prod. Dev. & Exp. Prom. Council
10.	Mr Ashim Kar, Director	Ashim Kar & Industries Pvt. Ltd.
11.	Mr. Sunil K. Goel	Sunil Enterprises
12.	Mr. Sanjoy Todi, Director	Madhva Textile Processors Pvt. Ltd.
13.	Mr Deepak Sarkar, Director	Jutee Handicrafts
14.	Dr D Nag, Head, Transfer of Technology Division	NIRJAFT
15.	Dr A K Roy, Head, Chem. & Biochem. Processing Division	
16.	Dr S K Bhaduri, Head, Quality Evaluation & Imp. Division	
17.	Dr G Basu, Head, Mechanical Processing Division	
18.	Dr P K Ganguly, In-charge, Design Dev. & Maint. Section	
19.	Dr M K Basak, In-charge, PME Cell	
20.	Dr S N Chattopadhyay, P. Scientist & Member Secretary	NIRJAFT & QRT
QRT Meeting with Govt. sector, 1 March, 2012 (Afternoon)		
1.	Dr K K Satapathy, Director	NIRJAFT
2.	Dr P K Banerjee, Chairman	QRT
3.	Dr D Sur, Member	QRT
4.	Dr T K Guha Roy, Member	QRT
5.	Dr K Chakrabarti, Member	QRT
6.	Dr P G Patil, Member	QRT
7.	Dr. S. K. Biswas, Director	Directorate of Jute Dev., MoA, GOI
8.	Mr. Ujal Sen, Advisor	National Jute Board
9.	Mr. Mahadev Dutta	National Jute Board
10.	Mr. Arijit Mitra	National Jute Board
11.	Mr. B. N. Bansali, Chief Marketing Manager	Jute Corp. of India

SN	Name & Designation	Organisation
QRT Meeting with Govt. sector, 1 March, 2012 (Afternoon) – Contd.		
12.	Mr. D Mitra, Asst Director	MSME, GOI
13.	Mr. S N Das, Asst Director	MSME, GOI
14.	Mr. R P Ghosh, Asstt. Director of Agriculture (Jute	DoA, GOWB
15.	Prof. S. K. Sett, Head	Dept. of Jute & Fibre Tech., IJT, CU
16.	Dr D Nag, Head, Transfer of Technology Division	NIRJAFT
17.	Dr A K Roy, Head, Chem. & Biochem. Processing Division	
18.	Dr S K Bhaduri, Head, Quality Evaluation & Imp. Division	
19.	Dr G Basu, Head, Mechanical Processing Division	
20.	Dr P K Ganguly, In-charge, Design Dev. & Maint. Section	
21.	Dr M K Basak, In-charge, PME Cell	
22.	Dr S N Chattopadhyay, P. Scientist & Member Secretary	NIRJAFT & QRT
QRT Meeting with RAC, 3 March, 2012 (Forenoon)		
1.	Dr K K Satapathy, Director	NIRJAFT
2.	Dr P K Banerjee, Chairman	QRT
3.	Dr D Sur, Member	QRT
4.	Dr T K Guha Roy, Member	QRT
5.	Dr K Chakrabarti, Member	QRT
6.	Dr B C Mitra, Chairman	RAC
7.	Prof. A K Samanta, Member	RAC
8.	Dr S Srinivasan, Member	RAC
9.	Dr. S M Chatterjee, Member	RAC
10.	Dr. (Mrs) S Chanda, Member	RAC
11.	Dr A J Shaikh, Director	CIRCOT
12.	Dr D Nag, Head, Transfer of Technology Division	NIRJAFT
13.	Dr A K Roy, Head, Chem. & Biochem. Processing Division	
14.	Dr S K Bhaduri, Head, Quality Evaluation & Imp. Division	
15.	Dr G Basu, Head, Mechanical Processing Division	
16.	Dr P K Ganguly, In-charge, Design Dev. & Maint. Section	
17.	Dr M K Basak, In-charge, PME Cell	
18.	Dr S N Chattopadhyay, P. Scientist & Member Secretary	NIRJAFT & QRT
QRT Meeting with Adm. Staff, 3 March, 2012 (Forenoon)		
1.	Dr K K Satapathy, Director	NIRJAFT
2.	Dr P K Banerjee, Chairman	QRT
3.	Dr D Sur, Member	QRT
4.	Dr T K Guha Roy, Member	QRT
5.	Dr K Chakrabarti, Member	QRT
6.	Mr R. Lal, Chief Administrative Officer	NIRJAFT
7.	Mr R K Ghosh, Finance and Accounts Officer	NIRJAFT

SN	Name & Designation	Organisation
QRT Meeting with Adm. Staff, 3 March, 2012 (Forenoon) – Contd.		
8.	Mr B Kabi, AAO(Adm-I)	NIRJAFT
9.	Mrs L Ghosh , AAO(Adm-II)	
10.	Mr S Chakraborty, AAO (Stores)	
11.	Mr M Pal, AAO (Audit)	
12.	Mr S Sardar, Member IJC and Representative to CJSC	
13.	Dr R Naiya, Library In-Charge	
14.	Dr S N Chattopadhyay, P. Scientist & Member Secretary	NIRJAFT & QRT
QRT Meeting with Organised Sector, 3 March, 2012 (Afternoon)		
1.	Dr K K Satapathy, Director	NIRJAFT
2.	Dr P K Banerjee, Chairman	QRT
3.	Dr D Sur, Member	QRT
4.	Dr T K Guha Roy, Member	QRT
5.	Dr K Chakrabarti, Member	QRT
6.	Mr. Pulakesh Chatterjee, Secretary General	IJMA
7.	Mr. S K Chandra, Chief Executive	Hukumchand Mill
8.	Mr. S. N. Paul, President (Mill)	Dalhousi Mill
9.	Mr. I.J. Sharma, Consultant,	Gloster Mills Ltd.
10.	Mr Alok Kumar	Rameshwara Mill
11.	Mr C L Bhandari	Calcutta Laminating
12.	Mr. S Palit, Ex-Head, Mech. Proc. Division	IJIRA
13.	Mr. P Bandyopadhyay, Ex-Chief Engineer	Lagan Mach. Ltd
14.	Dr S N Chattopadhyay, P. Scientist & Member Secretary	NIRJAFT & QRT
15.	Dr D Nag, Head, Transfer of Technology Division	NIRJAFT
16.	Dr A K Roy, Head, Chem. & Biochem. Processing Division	
17.	Dr S K Bhaduri, Head, Quality Evaluation & Imp. Division	
18.	Dr G Basu, Head, Mechanical Processing Division	
19.	Dr P K Ganguly, In-charge, Design Dev. & Maint. Section	
20.	Dr M K Basak, In-charge, PME Cell	

Organogram of NIRJAFT



List of Scientists (including Director)

SN	Name of the Scientist	Designation	Discipline
1	Dr. Krishna Kishore Satapathy	Director	Soil & Water Conservation Engineering
2	Dr. Debasis Nag	Principal Scientist & HOD	Agriculture Structure & Process Engineering
3	Dr. Ashim Kumar Roy	Principal Scientist & HOD	Organic Chemistry
4	Dr. Gautam Basu	Principal Scientist & HOD	Textile Manufacture
5	Dr. Swapan Kumar Bhaduri	Principal Scientist & HOD	Organic Chemistry
6	Dr. Prasanta Kumar Ganguly	Principal Scientist	Textile Chemistry
7	Dr. Mantu Kumar Basak	Principal Scientist	Microbiology (Plant Science)
8	Dr. Shyamal Banik	Principal Scientist	Microbiology (Plant Science)
9	Dr. Biplab Saha	Principal Scientist	Agricultural Physics
10	Dr. Nimai Chandra Pan	Principal Scientist	Textile Chemistry
11	Dr. Sambhu Nath Chattopadhyay	Principal Scientist	Textile Chemistry
12	Dr. Gautam Roy	Principal Scientist	Computer Application
13	Dr. Alok Nath Roy	Principal Scientist	Textile Manufacture
14	Dr. Surajit Sengupta	Senior Scientist	Textile Manufacture
15	Dr. Sanjoy Debnath	Senior Scientist	Textile Manufacture
16	Dr. Samir Baran Roy	Senior Scientist	Agricultural Economics
17	Dr. Laxmikanta Nayak	Senior Scientist	Agriculture Structure & Process Engineering
18	Dr. Ammayappan Lakshmanan	Senior Scientist	Textile Chemistry
19	Dr. Deb Prasad Ray	Senior Scientist	Organic Chemistry
20	Sri Sujai Das	Scientist (Senior Scale)	Computer Application in Agriculture
21	Sri Prashant Y Verma	Scientist	Textile Manufacture
22	Sri Nilamani Kundu	Scientist	Textile Manufacture

R & D Programme carried out during 2007 – 2012

Code	Project Title
2007 – 2008	
Major Programme I :Extraction & Quality Improvement of Fibres & Evaluation of Fibre Properties	
1.01	Quality evaluation of jute and allied fibres under various agricultural trials (All India Network Research Project on Jute & Allied Fibres)
1.10	Creation and maintenance of culture bank for jute and allied fibre crops
1.22	Development of an instrument for measuring thermal insulation value of textile and non-textile materials
1.31	Development of a Digital Moisture Meter
1.33	Development & standardization of extraction and mechanical processing of Dhaincha fibre for producing value added diversified products
1.34	Computerised fault recording and analysis of non-productive time of machines using RF coding-decoding technique for Management Information System of the textile and jute mills (New)
1.35	Finding relative significance of different quality parameters of ramie fibre for chalking out a grading system (New)
1.36	Mass culture of <i>Selerotium rolfsii</i> for dry retting of jute (New)
1.37	Structural study of minor constituents of hemicelluloses in jute fibre (New)
1.38	Transfer of NIRJAFT technology for retting of jute and its assessment for adoption by farmers through field demonstration (New)
Major Programme II: Development of Technologies for Diversification of Jute Products (Woven/ Knitted)	
2.28	Utilization of jute in the field of fashion textiles
2.29	Development of jute covered yarn based decorative / fancy fabrics to be used for upholstery & garments
2.30	Application of jute based union fabric as reinforcing materials

Code	Project Title
	2007 – 2008 (Contd.)
2.31	Development of a handloom with jacquard facility for weaving jute based fancy/decorative fabric (New)
2.32	Development of winter fabric to make jacket from jute-polyester blends (New)
2.33	Development of home textiles from jute based blended yarn and its evaluation (New)
2.34	Development of braided yarn from jute and allied fibres (New)
Major Programme III : Development of Diversified Value Added Nonwoven Products	
3.13	Evaluation of jute fibre based wetted pads in evaporative cooling operation
Major Programme IV : Utilisation of Agricultural Resources of Jute & Allied Fibres for Conservation of Energy & Preparation of Value Added Products	
4.22	Biomass energy from jute waste and agro residues by briquetting and gasification
4.28	Development of medium density composite board from whole jute plant and bamboo
4.29	Development of appropriate method of dyeing of jute fabric using Indigosol and Sulphur dyes
4.33	Study on the properties of jute composites on atmospheric exposure
4.34	Durable adhesives from kraft lignin for preparing medium density composite boards
4.35	Biopretreatment of jute fabric for improved performance (New)
4.36	Development of high permanence paper from jute (New)
4.37	Study on acoustic and thermal insulation properties of particle boards from Date Palm Leaf and its blends (New)
4.38	Study on microorganisms responsible for damage of paper made from jute agro and industrial residue (New)
4.39	Writing grade paper from jute residues by handmade process (New)
Major Programme V: Transfer of Technology	
5.01	To organize training programme on technologies developed in the institute

Code	Project Title
2007 – 2008 (Contd.)	
5.02	To organize participation in exhibition, trade fair and marketing of products
5.03	Fabrication of instrument, equipment & machinery for commercialisation
5.05	Documentation and mass communication of the institute activities
5.12	Price analysis of jute hessian with variation of the price determining factors
5.13	Establishment and maintenance of liaison with entrepreneurs (New)
5.14	Development of interactive data resource management system on jute and allied fibres (New)
Externally Funded Projects	
AP Cess-13	Development of blanket from jute and polyester (PET) hollow fibre
AP Cess-14	Setting up and maintenance of culture bank for jute and allied fibre crops
AP Cess-15	Modified flush door shutter solid core type for special use as toilet door and commercial door having higher protection using jute skin as face, jute stick/wood particle board as filler
C-DOCT	Development of an appropriate technology of spinning jute-coconut fibre blended yarn and production of diversified jute-coconut fibre products in rural sector
2008 – 2009	
Major Programme I : Extraction & Quality Improvement of Fibres & Evaluation of Fibre Properties	
1.01	Quality evaluation of jute and allied fibres under various agricultural trials (All India Network Research Project on Jute & Allied Fibres
1.10	Creation and maintenance of culture bank for jute and allied fibres
1.38	Transfer of NIRJAFT technology for retting of jute and its assessment for adoption by farmers through field demonstration
1.39	Development of a computerized system for analyzing variability of linear density of jute yarn (New)

Code	Project Title
2008 – 2009 (Contd.)	
1.40	Mass culture of fungi used in jute processing (New)
1.41	Quality evaluation of ramie fibre for introduction of a grading system (New)
1.42	Development of instrument and method for testing bending rigidity for semi-rigid fabrics/curly fabrics (New)
Major Programme II: Development of Technologies for Diversification of Jute Products (Woven/ Knitted)	
2.31	Development of a handloom with jacquard facility for weaving jute based fancy/decorative fabric
2.32	Development of winter fabric to make jacket from jute-polyester blends
2.33	Development of home textiles from jute based blended yarn and its evaluation
2.34	Development of braided yarn from jute and allied fibres
2.35	Development of jute based lifestyle products from spun-wrapped yarn, woven and knitted (New)
2.36	Development of jute based woven geotextile fabrics for erosion control and soil stabilization (New)
Major Programme IV : Utilisation of Agricultural Resources of Jute & Allied Fibres for Conservation of Energy & Preparation of Value Added Products	
4.35	Biopretreatment of jute fabric for improved performance
4.36	Development of high permanence paper from jute
4.40	Study on the pulping characteristics of date palm leaves (<i>Phoenix doctylfera</i> L.) (New)
4.41	Development of integrated finishing processes for jute diversified products for improving the feel and dimensional stability (New)
4.42	Evaluation of jute plant ribbon as a raw material for making composite (New)
4.43	Application of resins from natural sources for making paper from jute residues (New)
4.44	Development of lignin-based adhesives (New)

Code	Project Title
2008 – 2009 (Contd.)	
Major Programme V: Transfer of Technology	
5.01	To organize training programme on technologies developed in the institute
5.02	To organize participation in exhibition, trade fair and marketing of products
5.03	Fabrication of instrument, equipment & machinery for commercialisation
5.05	Documentation and mass communication of the institute activities.
5.13	Establishment and maintenance of liaison with entrepreneurs
5.14	Development of interactive data resource management system on jute and allied fibres
5.15	Status of jute diversification in handicrafts (New)
Externally Funded Projects	
AP Cess-14	Setting up and maintenance of culture bank for jute and allied fibre crops
JTM-1.2	Evaluation and selection of improved jute variety for finer quality fibre (New)
JTM-1.7	Improvement of fibre quality through microbial enzymatic and chemical treatment in jute (New)
NAIP, Comp-2	A value chain on coconut fibre and its byproducts: Manufacture of Diversified Products of Higher Value and Better Marketability to Enhance the Economic Returns of Farmers (New)
NAIP, Comp-3	Sustainable rural livelihood empowerment project for northern disadvantaged districts of West Bengal (New)
2009 – 2010	
Major Programme I : Extraction & Quality Improvement of Fibres & Evaluation of Fibre Properties	
1.01	Quality evaluation of jute and allied fibres under various agricultural trials (All India Network Research Project on Jute & Allied Fibres)
1.10	Creation and maintenance of culture bank for jute and allied fibres

Code	Project Title
2009 – 2010 (Contd.)	
1.39	Development of a computerized system for analyzing variability of linear density of jute yarn
1.42	Development of instrument and method for testing bending rigidity for semi-rigid fabrics/curly fabrics
1.43	Investigation into the role of chemical accelerator and utilization potential of retting residue in the accelerated jute retting technology and its assessment for adoption through field demonstrations (New)
1.44	Development of a digital fibre fineness measuring instrument for jute (New)
Major Programme II: Development of Technologies for Diversification of Jute Products (Woven/ Knitted)	
2.36	Development of jute based woven geotextile fabrics for erosion control and soil stabilization
2.37	Development of appropriate processing technology for apparels from flax/jute (New)
Major Programme III : Development of Diversified Value Added Nonwoven Products	
3.14	Performance evaluation of jute fibre based pads in evaporatively cooled storage structure.
Major Programme IV : Utilisation of Agricultural Resources of Jute & Allied Fibres for Conservation of Energy & Preparation of Value Added Products	
4.40	Study on the pulping characteristics of date palm leaves (<i>Phoenix doctylfera</i> L.)
4.41	Development of integrated finishing processes for jute diversified products for improving the feel and dimensional stability
4.45	Briquetting of jute caddies suitable for thermo-chemical conversion and utilization (New)
Major Programme V: Transfer of Technology	
5.01	To organise training programme on technologies developed in the institute
5.02	To organize participation in exhibition, trade fair and marketing of products
5.03	Fabrication of instrument, equipment & machinery for commercialisation

Code	Project Title
2009 – 2010 (Contd.)	
5.05	Documentation and mass communication of the institute activities
5.13	Establishment and maintenance of liaison with entrepreneurs
Externally Funded Projects	
JTM-1.2	Evaluation and selection of improved jute variety for finer quality fibre
JTM-1.7	Improvement of fibre quality through microbial enzymatic and chemical treatment in jute
NAIP, Comp-1	Zonal technology management and business planning and development (BPD) unit at NIRJAFT, Kolkata
NAIP, Comp-2	A value chain on coconut fibre and its byproducts: Manufacture of Diversified Products of Higher Value and Better Marketability to Enhance the Economic Returns of Farmers
NAIP, Comp-3	Sustainable rural livelihood empowerment project for northern disadvantaged districts of West Bengal
2010 – 2011	
Quality Evaluation and Improvement Division	
1.10	Creation and maintenance of culture bank for jute and allied fibres
1.43	Investigation into the role of chemical accelerator and utilization potential of retting residue in the accelerated jute retting technology and its assessment for adoption through field demonstrations.
QEI-1	Development of bio-adhesives from cell-wall polymers of jute and ramie fibre crops (New)
QEI-2	An interactive web-based database application for jute fibre quality.
QEI-3	Improvement in processibility of jute fibre by application of pectinolytic microbial culture on jute piles (New)
QEI-4	Standardization of fungal retting by dry fermentation procedure for water economy (New)

Code	Project Title
2010 – 2011 (Contd.)	
QEI-5	Development of an image processing system to find the quality of jute fibre (New)
QEI-6	Development of a PLC based process control system for jute industries (New)
QEI-7	Development of a user-friendly jute grading system (New)
Mechanical Processing Division	
2.37	Development of appropriate processing technology for apparels from flax/jute
MP-1	Development of natural fibre-based geotextiles and placement system for protection of river-bank and improvement of soil stabilization (New)
MP-2	Enhancing the figuring capacity of developed handloom and study of its weaving performance for speciality fabric production and product development therefrom (New)
MP-3	Processing of natural fibres like banana and linseed in jute spinning system and development of value added products (New)
MP-4	Development of jute-based winter garments (New)
MP-5	Modification of jute spinning machinery (New)
MP-6	Development of composite yarns for technical textiles from natural fibres based on friction spinning technology (New)
MP-7	Study on bending, frictional and electrical behaviour of jute materials (New)
Chemical & Biochemical Processing Division	
3.14	Performance evaluation of jute fibre based pads in evaporatively cooled storage structure
CBP-1	A comparative study of different pulping methods on jute and allied fibres for making value added handmade paper (New)
CBP-2	Development of fibre-board from jute plant (New)
CBP-3	Development of jute based composites for industrial application (New)
CBP-4	Dyeing of jute fabric using natural dyes with improved fastness properties (New)
CBP-5	Application of biotechnology in the colouration of jute fabric (New)

Code	Project Title
2010 – 2011 (Contd.)	
CBP-6	Energy from jute and agro-residue biomass (New)
Transfer of Technology Division	
4.40	Study on the pulping characteristics of date palm leaves (<i>Phoenix doctylfera</i> L.)
TOT-1	Development of portal for jute (New)
TOT-2	Analysis of Information dissemination techniques in transfer of jute and allied fibre technology through training, exhibitions and demonstration for rural development (New)
TOT-3	Role of jute on farm household income and food security in West Bengal (New)
TOT-4	Environmental impact analysis of production of jute and geo-textiles in view of carbon balance (New)
Externally Funded Projects	
JTM-1.2	Evaluation and selection of improved jute variety for finer quality fibre
JTM-1.7	Improvement of fibre quality through microbial enzymatic and chemical treatment in jute.
JTM-7.1/3	Development of new range of jute fabric including newer multi fibre weave (New)
JTM-7.1/5	Development of low cost dense jute non-woven fabric (New)
NAIP, Comp-1	Zonal technology management and business planning and development (BPD) unit at NIRJAFT, Kolkata
NAIP, Comp-2	A value chain on coconut fibre and its byproducts: Manufacture of Diversified Products of Higher Value and Better Marketability to Enhance the Economic Returns of Farmers.
NAIP, Comp-3	Sustainable rural livelihood empowerment project for northern disadvantaged districts of West Bengal

Code	Project Title
2011 – 2012	
Quality Evaluation and Improvement Division	
1.43	Investigation into the role of chemical accelerator and utilization potential of retting residue in the accelerated jute retting technology and its assessment for adoption through field demonstrations
QEI-1	Development of bioadhesives from cell-wall polymers of jute and ramie fibre crops
QEI-4	Standardization of fungal retting by dry fermentation procedure for water economy
QEI-6	Development of a PLC based process control system for jute industries
QEI-7	Development of a user-friendly jute grading system
QEI-8	Development of technology for extraction and characterization of useful phytochemicals from jute (<i>Corchorus</i> sp.) and Dhaincha (<i>Sesbania</i> sp.) seeds (New)
QEI-9	To study the effectiveness of fungal retting by <i>sclerotium</i> sp. at farmer's field (New)
QEI-10	Online moisture measurement system for lignocellulosic fibre processing system (New)
Mechanical Processing Division	
MP-1	Development of natural fibre-based geotextiles and placement system for protection of river-bank and improvement of soil stabilization
MP-2	Enhancing the figuring capacity of developed handloom and study of its weaving performance for speciality fabric production and product development therefrom.
MP-3	Processing of natural fibres like banana and linseed in jute spinning system and development of value added products.
MP-4	Development of jute-based winter garments.
MP-5	Modification of jute spinning machinery.
MP-6	Development of composite yarns for technical textiles from natural fibres based on friction spinning technology.
MP-7	Study on bending, frictional and electrical behaviour of jute materials.

Code	Project Title
2011 – 2012 (contd.)	
Chemical & Biochemical Processing Division	
CBP-1	A comparative study of different pulping methods on jute and allied fibres for making value added handmade paper.
CBP-2	Development of fibre-board from jute plant
CBP-3	Development of jute based composites for industrial application
CBP-4	Dyeing of jute fabric using natural dyes with improved fastness properties
CBP-5	Application of biotechnology in the colouration of jute fabric
CBP-6	Energy from jute and agro-residue biomass
Transfer of Technology Division	
TOT-1	Development of portal for jute
TOT-2	Analysis of Information dissemination techniques in transfer of jute and allied fiber technology through training, exhibitions and demonstration for rural development
TOT-4	Environmental impact analysis of jute and jute products in view of carbon balance.
Externally Funded Projects	
JTM-1.2	Evaluation and selection of improved jute variety for finer quality fibre
JTM-7.1/3	Development of new range of jute fabric including newer multi fibre weave
JTM-7.1/5	Development of low cost dense jute non-woven fabric.
NJB-6.2	Development of electronic and microprocessor based integrated instrumentation for jute grading system (New)
DC(H), MoT, GoI	Training through established institutions (New)

Code	Project Title
2011 – 2012 (Contd.)	
Externally Funded Projects (contd.)	
NAIP, Comp-1	Zonal technology management and business planning and development (BPD) unit at NIRJAFT, Kolkata
NAIP, Comp-2	A value chain on coconut fibre and its byproducts: Manufacture of Diversified Products of Higher Value and Better Marketability to Enhance the Economic Returns of Farmers
NAIP, Comp-3	Sustainable rural livelihood empowerment project for northern disadvantaged districts of West Bengal.

List of Publications during 2007 – 2012**A. Research Papers Published****2007 – 2008**

1. Banik S, Basak M K and Sil S C. Effect of inoculation of pectinolytic mixed bacterial culture on improvement of ribbon retting of jute and kenaf, *Journal of Natural Fibers* (Poland), 2007, 4(2), p.33
2. Banik, S, Ghosh, S N and Bhattacharyya, S K., Microorganisms associated with piling of jute, *Journal of Mycopathological Research*, 2007, 45(1), p.76
3. Basu, G, Roy, A N. Blending of jute with different other natural fibers, *Journal of Natural Fibers* (Poland), 2007, 4(4), p.13
4. Basu, G, Samanta, A K & Ghosh, P. Effect of glycol and acrylamide treatments of jute fibre on its processibility, *Journal of Natural Fibers* (Poland), 2008, 5(1), p.19
5. Bhaduri, S K & Mukhopadhyay, M K. Innovative post-harvest technology for retting of jute and mesta, *Indian Farming*, 2007, 57(4), p.37
6. Day, A, Chattopadhyay, S N, Ghosh, I N and Bhaduri, S K. Cellulose derivatives from jute sticks, an agrowaste, *IPPTA Journal*, 2007, 19(3), p.145
7. Debnath, S and Madhusoothanan, M. Compression behaviour of jute-polypropylene blended needle punched non-woven fabrics, *Indian Journal of Fibre and Textile Research*, 2007, 32(4), p.427
8. Debnath, S, Nag, D, De, S S, Ganguly, P K & Ghosh, S, K. Tensile Creep behaviour of Light Weight Jute Non-woven, *Man- made Textiles in India*, 2007, 50(4), p.133
9. Debnath, S, Sengupta, S, Singh, U S. Comparative Study on the Physical Properties of Jute, Jute-viscose and Jute-polyester (hollow) Blended Yarns, *Journal of The Institution of Engineers (India)*, 2007, 88(1), p.5
10. Ghosh, I N, Khatua, P, Day, A and Roy, A K. Jute as reinforcement in composites using euphorbia latex as matrix, *Textile Asia (Hong Kong)*, 2008, 46(02-03), p.55
11. Ghosh, S K, Nayak, L K, Day, A & Bhattacharya, S K. Manufacture of particle board from date palm leaves – A new technology product, *Indian Journal of Agricultural Research*, 2007, 41 (2), p.132
12. Majumdar, A K, Bhattacharyya, S K, Bhattacharyya, S, Sanyal, D & Goswami, K. Cross laid jute based non wovens for technical textiles, *Textile Trends*, 2007, p.50
13. Majumdar, A K, Bhattacharyya, S K, Sanyal, D and Goswami, K. Soil management with jute based agrotexiles, *Textile Trends*, 2007, p.31
14. Pan, N C, Chattopadhyay, S N & Day A. Dyeing of biotreated jute fabric, *Journal of Natural Fibres* (Poland), 2007, 4(2), p.67

15. Pan, N C, Chattopadhyay, S N, Roy, A K & Patra, K. Pigment printing of jute fabric, *Textile Asia (Hong Kong)*, 2008, 38 (12), p.56
16. Roy, A K & Chattopadhyay, S N. A comparative study of ageing characteristics of jute based paper, *Inpaper India*, 2007, 30(6), p.50
17. Roy, A K & Chattopadhyay, S N. Effect of accelerated ageing on conventional and ambient temperature bleached jute fabric, *Textile Asia (Hong Kong)*, 2007, 44 (02-03), p.57
18. Roy, A K & Chattopadhyay, S N. High permanence paper from jute, *IPPTA Journal*, 2008, 20(1), p.137
19. Roy, G. Measurement and Control of jute spinning frame adopting infrared sensor, *Journal of The Textile Association*, 2007, Sept-Oct, p.140
20. Sarkel, J, Chattopadhyay, S N, Bhaduri, S K, Deb, T, Pandey, K & Saha, M. Synthesis and application of 2-nitro 2'4 dihydroxyazobenzene, 4-nitro 2'4 dihydroxyazobenzene and 2-carboxy 2 hydroxy azonaphthol for dyeing of jute fabric, *Journal of Indian Chemical Society*, 2007, 84(10), p.1020
21. Sengupta, S, Chattopadhyay, S N, Samajpati, S & Day, A. Use of needle punched non-woven fabric as reinforcement in composite, *Indian Journal of Fibre & Textile Research*, 2008, 33(1), p.37
22. Sengupta, S, Debnath, S & Bhattacharyya, G K. Development of handloom for jute based diversified fabrics modifying traditional cotton handloom, *Indian Journal of Traditional Knowledge*, 2008, 7(1), p.204

2008 – 2009

1. Banik, S and Ghosh, S N. Pectinolytic activity of microorganisms in pilling of jute, *Indian Journal of Fibre and Textile Research*, 2008, 33, p.151
2. Basu, G, Samanta, A K & Ghosh, P. Enzyme and silicone treatments on jute fibre, Part II: Effect on process performance during yarn making and yarn properties, *Journal of The Textile Institute (UK)*. 2008, 99(4), p.307
3. Basu, G., De, S S & Samanta, A K. Effect of bio-friendly conditioning agents on jute fibre spinning, *Industrial Crops and Product (UK)*. 2009, 29, p.281
4. Chattopadhyay, S N, Pan, N C, Day, A, Mondal, S B & Khan, A. Colouration of jute fabric using vat dyes. *International Dyer (UK)*. 2008, 193(10), p.32
5. Chattopadhyay, S N, Pan, N C, Roy, A K & Khan, A. Dyeing of jute fabric using indigosol dyes, *Journal of Natural Fibres (Poland)*, 2009, 6(1), p.98
6. Chattopadhyay, S N, Pan, N C & Roy, A K. Dyeing of jute fabric for value added products, *New Cloth Market Journal*, 2009, 23(3), p.47
7. Debnath, S & Madhusoothanan, M. Modeling of compression properties of needle-punched nonwoven fabrics using artificial neural network. *Indian Journal of Fibre & Textile Research*. 2008, 33(4), p.392

8. Debnath, S & Madhusoothanan, M. Studies on Compression Behaviour of Polypropylene Needle Punched Non-woven Fabrics. *Journal of The Institution of Engineers (India)*, 2009, 89(2), p.34
9. Debnath, S & Sengupta, S. Effect of linear density, twist and blend proportion on some physical properties of jute and hollow polyester blended yarn, *Indian Journal of Fibre & Textile Research*. 2009, 34(1), p.11
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8. Bhattacharyya, S K, *An overview of technological research on jute and allied fibres*, International Symposium of Jute and Allied Fibres, CRIJAF, NIRJAFT and IFS, 9-12 Jan, 2008
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7. Roy, A K & Chattopadhyay, S N. *Preparation and preservation of paper made from jute*, National Seminar on Non-conventional application of textiles, IFS and CIRCOT, CIRCOT, 11 Dec, 2010
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- Saha, S C and Bhaduri, S K. *Handbook on grading of jute*, NIRJAFT Publication, 2008
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- Roy, A N & Basu, G. *Do it yourself – Weaving of Jute-based Ornamental fabric - Part 1*, (in English, Oriya and Hindi), NIRJAFT Publication, 2011
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Technology Transfer and Training during 2007 – 2012**A. Transfer of NIRJAFT Technologies**

SN	Entrepreneurs	Technology Transferred
1.	Trishna Jute Private Limited Vill. Ghoramara, P.O. Kazipara, Jalangi, Murshidabad, W. Bengal, PIN: 742306,	Particle Board from Jute and Agro-residue
2.	Diganta Jute Enterprise Private Limited Vill. Nawdapara, P.O. Kaliganj, Murshidanad, W. Bengal, PIN: 742305	Mini Jute Spinning Mill
3.	Modern Constructions B/31, Sonali Park, Kolkata-700 070	Jute Composite
4.	BKC Enterprise Vill. Nawdapara, P.O. Kaliganj, Murshidanad, W. Bengal, PIN: 742305	Jute Stick Particle Board
5.	Dhubi Gram Unnayan Samiti P.O. Dhubi Nagadi, Nakashipara, Nadia, W. Bengal, PIN: 741137	Jute Stick particle Board
6.	Marg Darshak Development Service B 905 CID Coloney, Mahanagar, Lucknow-226006, Uttar Pradesh	Jute related products and Technologies
7.	Nature Board P.O- Dhubi Nagadi, Nakashipara, Nadia, W. Bengal, PIN: 741137	Jute Stick particle Board

B. Training conducted on NIRJAFT technologies

SN	Training programme	Duration	No of Participants
2007-2008			
1	Accelerated retting of jute and ribboning	17-19 Jul, 2007	26
2	Bleaching and dyeing of jute	10-15 Mar, 2008	09
2008-2009			
1	Mushroom Cultivation from jute waste	23-28 Jun, 2008	10
2	Handmade Paper from Jute	22-28 July, 2008	08
3	Bleaching and dyeing of jute	20-25 Oct, 2008	08
4	Handmade Paper from agrowaste	15-20 Dec, 2008	14
5	Bleaching and dyeing of jute fabric	5-14 Jan, 2009	13
6	Handmade Paper from Jute	2-11 Mar, 2009	10
7	Reactive dyeing of jute fabric	23-28 Mar, 2009	06
8	Eco-friendly reactive dyeing of jute fabric	23-30 Mar, 2009	05

SN	Training Programme	Duration	No. of Participants
2009-2010			
1	Mushroom cultivation	22-27 Jun, 2009	12
2	Quality improvement of jute fibre	26-28 Aug, 2009	33
3	Quality improvement of jute fibre	15-17 Sep, 2009	31
2010-2011			
1	Handmade Paper from Jute	23-28 Aug, 2010	18
2	Bleaching and dyeing of jute fabric	27 Sep – 4 Oct, 2010	07
3	Jute stick particle board	22-27 Nov, 2010	10
4	Jute stick particle board	29 Nov – 4 Dec, 2010	15
5	Improved Jute Retting Technology	26-30 Jul, 2010	20
6	Weaving of jute based ornamental fabrics in handloom	27 Sep – 1 Oct, 2010	22
2011-2012			
1.	Weaving of jute based ornamental fabric in handloom (in West Bengal)	3-7 May, 2011	23
2	Weaving of jute based ornamental fabric in handloom (in Auranachal Pradesh).	20-24 Jun, 2011	20
3	Extraction and utilization of Banana fibre	27 Jun – 2 Jul, 2011	30
4	Improved technologies for production and quality management of jute fibres	25-30 Jul, 2011	18
5	Jute-based entrepreneur development on jute stick particle board production	1-6 Aug, 2011	11
6	Weaving of jute based ornamental fabric in handloom	23-29 Aug, 2011	21
7	Jute based entrepreneur development on handmade paper from jute waste	5-9 Sep, 2011	19
8	Ecofriendly bleaching and dyeing of jute	17-21 Oct, 2011	17
9	Weaving of ornamental jute fabric on handloom (in village Kutey, Ranchi)	16-20 Nov, 2011	20
10	Weaving of ornamental jute fabric on handloom (in village Jagannathpur, Orissa)	20-24 Dec, 2011	20
11	Designing of ornamental jute fabric	26-30 Mar, 2012	22

Recommended Projects for 2012 – 2017

1. Design and fabrication of a conceptually new Ribboner
2. Development of Agrotextiles from durable natural fibres
3. Development of suitable Spinning systems for production of finer and more uniform Jute and Coir yarns
4. Fungal Retting of Jute plant and Coconut husk
5. Improved automation and portability of testing equipments for Ligno-cellulosic materials
6. Development and adaptation of Material Handling systems in jute mills
7. Value addition to Coconut, Pineapple and Banana fibres
8. Development of “Green” Composites
9. Development of Energy saving Sizing, Bleaching and Dyeing processes
10. Technology for high quality and high Colour Fast Dyeing of Jute
11. Appropriate technology for Effluent treatment of Jute processing
12. Moulded Packaging material from Agro-waste
13. Eco-friendly Wet processing technology for Jute and Allied fibres
14. Study of Causes of Sliver Irregularity in Jute Carding and Drawing
15. Study of Causes of Irregularity and Imperfections in Jute Yarns
16. Study of Causes for Loss of Efficiency in Shuttleless Jute Weaving
17. Prediction of Yarn Quality from Fibre and Process parameters using Artificial Neural Network
18. Development of Lightweight and Strong Hessian fabric
19. Development of some need-based Nonwoven products from Jute and Allied fibres
20. Cost effective Degumming process for Ramie
21. Development of Fine Jute-Ramie blended Yarns and Fabrics
22. Development of Electronic Jute Yarn Irregularity & Imperfection Tester

Recommended Major Equipment for 2012 – 2017

Central Facility

1. Universal Material Testing Machine (UMTM) with Accessories for fibres, yarns, fabrics, rubber, plastic, composites etc.
2. UV - Visible Spectrophotometer.
3. Precision Microscope with Image Analyzer
4. Thermal Conductivity Tester
5. Fourier Transform Infra Red Spectrophotometer (FTIR) with accessories
6. High Performance Liquid Chromatograph
7. Atomic absorption spectrophotometer
8. Gas Chromatograph-mass spectrophotometer

Bio-Composite Laboratory

1. Impact Strength Testing Machine for Izod, Charpy and Falling Ball Tests
2. Hot Air Circulating and Ventilating Oven with Digital Temp. ($\pm 0.1^{\circ}\text{C}$) Control
3. Laboratory Precision Refiner (Imported)
4. Pultrusion Unit
5. Compression Moulding Unit with moulds
6. Impregnator with vertical & horizontal driers

Quality Evaluation & Improvement Division

1. Polymerase Chain Reaction (PCR) with different accessories

Mechanical Processing Division

1. Stitch bonding machine
2. Laminating machine
3. Circular Weaving machine
4. Shuttleless Loom (sample loom)
5. Jute Spreader machine
6. Teaser Card

Textile Testing Laboratory

1. Single yarn strength Tester (Electronic)
2. Yarn Evenness Tester (USTER)
3. Yarn Hairiness Tester (USTER)
4. Strength Tester (Electronic) for Geotextiles
5. Gas Permeability Tester
6. Water vapour Permeability Tester

7. Apparent Opening Size Tester
8. California Bearing Ratio Tester for Geotextiles
9. Puncture Tester
10. Micro-balance

Chemical & Biochemical Processing Division

1. Vat for tissue paper
2. Fibre classifier for pulp
3. Cylinder mould vat for making boards from jute stick and jute caddies
4. Porosity & smoothness tester
5. Lab scale pad-dry cure machine (Imported)
6. Lab scale dyeing machine
7. Lab scale IR dyeing machine
8. Lab scale hydro extractor
9. Plasma treatment plant
10. Analytical Balance
11. Grey scales and blue wool standards

Transfer of Technology Division

1. Geographical Information System Software
2. Office automation & ARIS Cell upgradation

Actions taken on Previous QRT Report for 2001 – 2007

SN	Recommendations	Actions taken
1.	To correct the imbalance in the discipline wise distribution of scientists in the institute	Discipline wise distribution of scientists has already been revised as per ICAR recommendation.
2.	Capacity of presently available ribboning machine to be increased.	NIRJAFT has developed a ribboner machine with multiple working heads resulting in higher productivity such that about 1200 plants can be processed per hour.
3.	Extensive field trials to be conducted with geotextiles. Collaboration with Road Research Institute and National Highways Authority of India to be considered.	Extensive field trial has already been conducted with geotextiles for rural road construction and river bank protection with jilla parishads. A linkage has already been established with Central Road Research Institute. A network project in this regard has been submitted to ICAR
4.	Introduction of DREF (Patented Friction Spinning System) technology facility in the Institute.	The manufacturer was contacted regarding procurement of the machine but the company has discontinued their production.
5.	Establishment of biotechnology and nano technology laboratories in the institute.	Different instruments / equipments required for establishment of biotechnology and nanotechnology laboratories has been proposed in the SFC for the XII five year plan period.
6.	More emphasis on transfer of technology, field training and participation in exhibitions.	NIRJAFT is already carrying out field level demonstration of the technologies developed in the institute, training the stake holders and participating in various melas & exhibitions throughout the countries.
7.	To start a Business Development Cell headed by a marketing person.	NIRJAFT has already started BPD (Business Planning & Development) unit under NAIP Scheme of ICAR. A Business Manager having Marketing background has been appointed.
8.	To take up all India Network Projects on Geotextiles and Composites.	All India Network Project on Geotextiles and Composites has been proposed in SFC for XII five year plan period.

SN	Recommendations	Actions taken
9.	To start periodic calibration of testing equipments.	As per recommendation, this issue has been taken up by the institute. At present the testing equipments are calibrated on regular basis.
10.	To fill up vacant post of scientists.	Efforts are being made by the council to fill up the vacant positions of scientists expeditiously.
11.	To increase collaboration with institution and industry.	NIRJAFT is already having technical collaboration with institutes like CIRCOT, CIAE, CIPHET, CTCRI, CRIJAF, IJT, IJIRA, SAUs, National Jute Board, JCI and international institutes like ICRISAT, IJSG, etc. NIRJAFT is having good linkage with different jute mills.
12.	To get NABL accreditation.	Initiative has been taken in this regard.