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JUTE RESEARCH AND DEVELOPMENT

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INDIA

Technical report: Fourth mission report*

Prepared for the Government of India
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of R.R. Atkinson
Technical Co-ordinator

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United Nations Industrial Development Organization
Vienna

* This document has not been edited.

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Indian Jute Industries Research Association

November 1988

This report gives and account of the progress which has been made in the project since the third mission by the Technical Co-ordinator in March 1988.

CONTENTS

SUMMARY

During the mission the first Tripartite Review Meeting was held at which a revised budget was presented. While the total budget was left unaffected funds are to be taken from the Experts budget and the Sub-contracts budget and added to the Training and Equipment budgets. These changes were made to improve the overall balance of the project and to offer means for better technology transfer.

All the essential items of equipment have been bought or are in the course of purchase and are planned to arrive during 1989. Out of a provision of $ 1,355,822 for equipment some $150,000 remain for any additional purchases which may arise during the rest of the project.

Two experts were fielded during 1988 and four more visits are fixed for 1989 but there are still 6 experts to identify. These posts must be filled during the next few months if their consultancies are to have meaningful impact on the project.

Ten Fellowships remain to be arranged and, again, early confirmation of the candidates and/or locations is necessary.

The study tour for the Head of the Biology Division is being arranged for 1989, leaving only those of the Head, Physics Division, and the Head, Centre for Machine Design and Development, to be settled as soon as possible.

It is now a matter of urgency that the building work for the project laboratory and the mill pilot plants be put in hand as early as possible. The pilot plants, in particular, should start to arrive in the middle of 1989 by which time 24 months

of the project's life will have passed and so the buildings must be ready to receive them otherwise the development programme may be impaired. Likewise, the full potential of the new laboratory equipment, most of which is at IJIRA now, cannot be realised unless the planned laboratory space is provided.

Work is in progress in the areas of chemical and biological softening of low-grade fibre, fabrication of mill instruments, and commendable developments are going ahead with decorative fabrics. It is foreseen that the pace of this work will accelerate from now on as the project matures.

A revised Work Plan has been drawn up to take account of the changes made and current progress.

SUBCONTRACTS

(a) Jute reinforced plastics

This contract will be executed at Harwell Laboratories, Oxfordshire, UK and will start in the first weeks of January 1989. The duration of the contract is 9 months and its cost is £ 30 000 sterling ($ 54 000 at today's rate). At the end of the nine-month period a meeting will be held at Harwell to decide the future course of action. A figure of $ 125 000 has been allocated to this activity in the project document so there are funds for further work if the first phase holds promise.

(b) Fabric engineering and blending

It proved to be difficult to arrive at terms of reference for the proposed sub-contract on these subjects of sufficient precision for the Contracts Committee's purposes and, moreover, it was felt that technology transfer would be better served if the work which is envisaged is carried out by IJIRA Fellows. Consequently, it was agreed at this contract should be abandoned and substituted by 36 man-months of Fellowship. Six Fellows would undergo training for six months each, the location being Clemson University, South Carolina, USA. The authorities at Clemson have yet to be informed of this proposal but their representitive, Dr Goswami, will visit IJIRA in January at which time the matter will be placed before him.

EQUIPMENT

The equipment bought, under negotiation or planned is as follows. The prices are firm where they are known or close estimates for the items not yet invoiced.

ITEM	THOUSAND USD
Electrographic system	11
Liquid fermentor	47
Rotoviscometer	30
HP liquid chromatograph	48
Liquid scien analyser	24
Ultracentifuge	41
UV/VIS spectrophotometer	15
Lyophiliser freeze dryer (2)	13
X-ray microanalyser	81
x-ray diffraction system	66
Ultracart	37
Cold shuttle press	10
Min. materials microscope	15
Microprocessor emulator	30
Lab bleaching machine	10
Package dyer	185
Cheese/cone winder	20
Jigger	71
Intersecting gill-box	128
Hydraulic press	6
Stenter	70
Padding mangle	70
Shuttleless loom	120
Lab thermal analysis system	50
Total	$ 1198

Thus out of a budget of $ 1,355,822 (revised figure) almost 90% has been spent or allocated for payment by 1989, i.e. on target in the revised budget.

EXPERTS

Careful consideration was given to the composition of the list of Experts and the man-months allocated to them. It proved possible to reduce this input without jeopardising the project from 98 to 78 man-months. Some of the original times allotted to each discipline were longer than necessary and would prove difficult to fulfil. Most of the Experts were from the academic sphere and could not attend IJIRA for the length of time originally specified and so, to make their participation more practicable, the duration of their stay was reduced in some cases.

The major changes were:

- to combine the three marketing posts (11-06,11-07,11-08) into one since it was felt that there was an overlap in the nature of the three posts and one person could undertake all the marketing duties.

  A Job Description for this combined post has been written (see Appendix)

- to eliminate post 11-11, maintenance engineer, because there was no clear need for this in the jute mills. The industry may not be following the best lines of maintenance in all the mills but they certainly knew what procedures they should be following.

- to dispense with the post of industrial designer, 11-15, because, again, it was not clear exactly what such a person would do.

- to add a tufting technologist to advise on the work to be undertaken with wrap-spun yarns for primary carpet backing.

These and the other minor changes are shown in the following Table.

EXPERTS MAN- MONTHS

P = Previous figure R = Revised figure

	Total		1987		1988		1989		1990		1991	
	P	R	P	R	P	R	P	R	P	R	P	R
11-01 Co-ordinator	12	12	2	2	2	2	2	2½	3	2½	3	3
11-02 Enzyme expert	6	6	-	-	2	-	2	2	2	2	-	2
11-03 Chem. softener	6	6	-	-	2	1	2	2	2	2	-	1
11-04 Inst. designer	6	4	-	-	2	-	2	1	2	2	-	1
11-05 Fabric engineer	6	4	-	-	-	1	2	2	2	1	2	-
11-06 Market researcher	3	-		-	-	-	1	-	2	-	-	-
11-07 Market planner	6	6		-	-	-	2	2	2	2	2	2
11-08 Intl. jute market exp.	3	-			-	-	2	-	1	-	-	-
11-09 Plastics engineer	6	6	-	-	-	-	2	-	2	3	2	3
11-10 Ind. Engineer	6	4	-	-	2	-	2	1	2	2	-	1
11-11 Maintenance Eng.	6	-	-	-	-	-	3	-	2	-	1	-
11-12 Textile tech.	6	4	-	-	-	-	2	1	2	2	2	1
11-13 Textile chemist	6	6	-	-	2	1	2	2	-	2	2	1
11-14 Packaging designer	8	8	-	-	-	-	3	2	3	3	2	3
11-15 Industrial designer	6	-	-	-	-	-	2	-	2	-	2	-
11-16 Tufting technoligist	-	4	-	-	-	-	-	1	-	2	-	1
11-50 Short-term consultant	6	8	-	-	2	-	2	3	2	2	-	3
Total months	98	78	2	-	14	5	33	21½	31	27½	18	22

The candidates who have already been fielded or who have been identified for these posts are:

11-01	R R Atkinson
11-02	Dr Niyogi, Oak Ridge Labs
11-03	Dr Chatterjee, Personal Products Inc
11-05	Dr Goswami, Clemson University
11-09	Mr Bowen (or colleague), Harwell Labs
11-10	Mr Blyth, Scottish College of Textiles
11-12	Dr Goswami (or colleague), Clemson U.
11-13	Dr Miles, UMIST

It is essential that candidates for the remainder of the posts be selected and approved within the next 6 months

FELLOWSHIPS

A major change in the Fellowship programme was recommended at the Tripartite Review Meeting concerning the work to be done at Clemson University. It was planned that an R&D contract be awarded to Clemson to cover work on fabric engineering and blending of jute with other fibres. As part of this contract Fellowship training for two staff members was envisaged. On their study tour the NPD and the Head, Mechanical Processing Division, had visited Clemson but no clear Terms of Reference for such a contract emerged from these meetings. To try to arrive at TOR which would have sufficient clarity to satisfy the requirements of the Contracts Committee of UNIDO the Technical Co-ordinator visited Clemson in September 1988 but was really unable to advance the matter in a significant way. A major problem was the transfer of technology from Clemson to Indian conditions. It has been seem many, many times in the jute industry that experiments carried out in the "rarefied" atmosphere of a college or an R&D institution are dismissed by mill executives as too theoretical for serious attention. Consequently, it was suggested that technology transfer would be much simpler if the IJIRA staff were more intimately involved not only at IJIRA and Clemson but in the mills themselves.

The recommendation therefore, which is yet to be ratified by GOI/UNDP/UNIDO and accepted by Clemson is that, in place of an R&D contract, Clemson be asked to support 36 man-months of Fellowship during which an Expert will come to IJIRA to advise upon a Work Plan, supervise work in India and guide the Fellows during their time in Clemson. The basic elements of the work will remain the same as was foreseen in the sub-contract.It is

proposed that six members of IJIRA's staff be exposed to such training so that, on their return to India, they may be better able to introduce some degree of diversification into the industry.

Assuming that such an arrangement can be worked out with Clemson the Fellowship Programme is shown in the following Table.

FELLOWSHIP PROGRAMME AS AT DECEMBER 1988.

Subject	Name	Months	Location
Microbiology	Sinha	6, V-IX,1989	Colorado U. & Oak Ridge Labs, USA
Bio-softening	Chakhraborty	6 I-VI,1990	Colorado U., USA
Fabric engineering	Dutta	6	Clemson U., USA ┐
Fabric engineering		6	Clemson U.,USA ├ Subject to approval
Fabric engineering		6	Clemson U.,USA ├ from Clemson U.
Blending	Chattopadhyay	6	Clemson U.,USA ├
Blending		6	Clemson U.,USA ├
Blending		6	Clemson U.,USA ┘
Instrumentation	Mukherjee	3	N.C.State U./Clemson U. USA/Napier Coll.,UK
Instrumentation	Bandhypadhya	3	N.C.State U./Clemson U. USA/Napier Coll.,UK
Chemical softening	Das	3	Personal Products Inc. & N.C.State U.,USA
Jute/plastic resins	Pal	6,I-VI,1989	Harwell Labs, UK
Bleaching/dyeing	Guha Roy	3,IX-XII, 1988	UMIST, UK
Wrap-spin/tufting		2	Mackie,UK/Suessen, FRG
Wrap-spinning		2	Mackie,UK/Suessen, FRG
Shuttleless weaving		2	Dornier,FRG/Sulzer,Switzerland/ ??
Shuttleless weaving		2	Dornier,FRG/Sulzer,Switzerland/ ??
Industrial engineering		6	????
Marketing		6	????
TOTAL		86 months	

It is clear that there are substantial gaps both in the candidates names and the location of training. It is essential that these be filled during the next six months. By that time the project will be approaching the half-way stage, leaving little time for the benefits of training to contribute to the success of the project. The target, therefore, should be to place, or better send, Fellows to their training centres before March 1989.

BUDGET REVISION

A revised budget for the project was established which takes into account the changes in some of the inputs and rescheduling of others. The revision was presented at the First Tripartite Review meeting for submission to the Ministry of Textiles, GOI, UNDP and UNIDO. At the time of writing this report it is assumed that the proposed alterations will be accepted by these three parties.

The budget revision is shown in the following Table

PROPOSED BUDGET REVISION

US DOLLARS

COMPONENT	TOTAL	PREVIOUS YEARS	1988	1989	1990	1991
19-99 Personnel	597,428	15,155	38,073	158,800	223.000	162,000
21-99 Subcontracts	150,000	-	-	75,000	50,000	25,000
39-99 Training	309,900	16,873	8,457	140,127	120,000	24,443
49-99 Equipment	1,355,822	410,000	578,615	269,000	68,435	29,772
59-99 Misc costs	25,000	2,256	839	5,000	7,000	9,905
99-99 Total	2,438,150	444,284	625,984	647,927	468,435	251,520

The budgetary implications of the reductions in the Expert man-months and the change from the Clemson sub-contract to more Fellowship input are shown below.

Component	Original	Revised	Change
Personnel	714,200	597,428	(-) 116,772
Sub-contracts	300,000	150,000	(-) 150,000
Training	159,900	309,900	(+) 150,000
Equipment	1,239,050	1,355.822	(+) 116,772
Total	2,438,150	2,438,150	-

The proportion of the total budget for training and equipment has gone up from 58% to 69%

OUTPUT 1

Fibre preparation processes

1.Enzyme softening

(a) Equipment

The pilot-scale plant for producing the enzymes which improve the softening of low-grade fibre will be based upon the recommendations of the Central Food Technology Research Institute (CFTRI), Mysore, and the successful trials subsequently carried out by IJIRA in that Institute. An equipment list is available with neutral specifications for each item. To simplify the installation of the plant at Kinnison Jute Mill, IJIRA are trying to locate a contractor who will bid on a turnkey basis. Tenders have been floated to five contractors and their bids will be submitted by the second half of December 1988. The equipment and the suppliers will be vetted by IJIRA then the satisfactory tenders submitted to PAC,UNIDO with a request to make a local purchase for the whole amount. It is likely that the total will be between $110000 and $130000. In view of this method of procurement it is unlikely that the plant will be commissioned much before August/September 1989.

The laboratory equipment has been received and is partially in use.

(b) Buildings

Plans have been drawn for the premises in which the enzyme plant will be housed and it is now essential that planning permission (if required) be sought and tenders for the work put

out for bidding. Allowing a lead time of 6 months for its construction would mean that the site would be ready just a

few weeks before the installation of the plant. Delays must be kept to a minimum if the plant is to be operational by August//September of next year.

The absence of the planned laboratory space is not really hindering research work but, at the same time , the full potential of the new laboratory equipment is not being realised.

(c) Study Tour

Dr B L Ghosh, Head, Biology Division, is arranging his study tour now and will notify UNDP/UNIDO when it is formalised. He plans to leave in mid-April 1989 for a period of about 23 days, visiting

Oak Ridge National Laboratory,USA
Pennsylvania State University, USA
Napier College, Edinburgh, UK
Institute of Bio-technolgy, London, UK
Colorado State University, USA

Dr Ghosh is contacting these institutions himself to confirm the availability of the persons he wishes to meet.

(d) Fellowships

Dr Sinha attends Colorado State U. for 2 weeks then goes to Oak Ridge Labs. for 24 weeks, commencing during the last week of May 1989. En route, a 2-day visit to Braun Diessel Bio-tech in W. Germany has been requested but no confirmation was

received during the mission. Dr Chakhrabarty will be at Colorado State U. for 26 weeks, commencing January 1990

(e) Experts.

Dr Niyogi, Oak Ridge Laboratories, USA, will come to IJIRA after the pilot plant has been commissioned and operating for a time - probably January 1990.

(f) Comments on the activity

While some mill-scale work is in progress, it is unlikely that any volume of development work with the enzymes in the mills can be expected before the end of 1989. But by that time the laboratory work into the generation of new strains of enzymes by mutational techniques and manipulation of the enzyme culture should be well-advanced.

2. Chemical softening

(a) Equipment

In place of an NMR spectrometer which was to be ordered it has been decided to indent for a thermal analysis system and a neutral specification has been prepared for PAC to this effect. All other items are received and in use.

Due to the ill-health of Dr Bhattacharyay who was working in the mill on this output work has been disrupted slightly but the mill personnel are continuingwith the work he initiated.

(b) Fellowship

Dr Bhattacharyay's serious illness necessitated the selection of a new candidate for the Fellowship with Personal Products (Johnson & Johnson) New Jersey, USA and NC State University.. The replacement Fellow will be Dr N N Das; his Nomform is being processed now.

(c) Expert.

Dr P K Chatterjee, Personal Products, Johnson & Johnson, USA completed his first month's assignment in November. He surveyed the work already done in this field and has made certain recommendations for the future and laid down a plan which the IJIRA scientists should follow. He is available for a return visit in June/July 1989.

(d)Comments on the activity.

Progress is being made and the suggestions of the Expert should contribute to the successful implementation of chemical softening.

OUTPUT 2

Product design and development

1. Traditional jute products

Field trials are underway with 50kg grain packs and the work on 30kg rice bags has been dropped since much of this work has been done under IJIRA's own R&D programme. Geo-jute has been added in place of the 30kg rice bag and tests are being carried out on 500g and 800g fabric for erosion control and for agricultural mulching. This rate of work will accelerate when the Clemson Fellowships are awarded for fabric engineering (see below).

A modification of an existing jute product, primary carpet backing, has been included in the project. The intention is to use wrap-spun yarns to make tufted carpet backing which, at one time, all jute based but, with the advent of synthetic backing, the market has been lost. It is thought that with these new yarns some share of the market may be recovered . IJIRA has already done some work in this direction and has ordered two more wrap-spinners which will be put into mills and from which larger samples may be made for trial. To achieve this end a modern shuttleless loom is needed and this will be purchased from project funds.

1.1 (a) Equipment

No progress has been made with an attempt to automate the process of bag-making. One manufacturer of a possible system produced costs for such a unit but these were so high that it would have been completely uneconomic to pursue the subject with him. The Technical Co-ordinator will try to source such equipment in Europe or elsewhere.

Mr Khatua, Centre for Machine Development and Design, is investigating the types of shuttleless loom which would be best suited to weaving primary backing from wrap-spun yarns and will prepare neutral specifications in due course for submission to PAC.

2. New high-value products.

2.1 Blending

2.1 (a) Equipment

The intersecting gill-box from James Mackie is expected to arrive in March 1989 and a site in the mill of Birla Jute and Industries Ltd is ready for it.

2.1 (b) Fellowships

In the original Project Document it was planned to have a sub-contract for work on jute blending and fabric engineering and Clemson University was selected as the site. As part of the contract there was to be provision for 2 x 3 man- months of

Fellowship, however it proved difficult to arrive at satisfactory terms of reference and so it was agreed at the Tri-Partite Review meeting that a better way to handle this aspect of the project would be to operate the whole R&D work as Fellowships. This, it is felt, will make the transfer of the development work much more effective. It is proposed therefore that 6 x 6 man- months of Fellowship be awarded and a programme of work of similar nature to the research contract envisaged earlier would be followed. The Fellows would do part of the work in Calcutta, at IJIRA and/or in the mills and part of the work at Clemson. Dr Goswami of Clemson has not been appraised of this change yet but will visit IJIRA in January when the proposal will be put before him.

2.1 (c) Comments on the activity

The project staff have made a good start to work on jute decorative fabrics for upholstery and curtains. Samples of various designs in cotton, cotton mixtures and synthetics have been collected and analysed. On the basis of these, different types of jute, jute blends have been made at Birla Jute and Industries. The yarns have been successfully woven by the handloom sector and it looks as though all-jute weft can be used as an alternative to cotton and offering a 15% saving in cost. Dyeing and printing has been carried out at several factories and some test-marketing has already begun with encouraging results in the form of trial orders being placed. The marketing officer on the project is working closely with the technologists and this close link is to encouraged. The writer visited the Handloom Development Centre in Calcutta where he was shown dozens of samples made from jute and cotton, none of which had been commercially successful through a lack of real marketing effort. It is his view that the industry has

failed to diversify into more profitable fabrics, not through technical deficiencies, but through poor marketing.

Some of these handloom wefts have been 100% jute and are within the capabilities of many mills without any need for new equipment or blending fibres. These should not be lost sight of when the more technically-interesting blending work progresses.

3.Jute reinforced plastics

The main area under investigation is that of rigid packaging. A suitable jute reinforced plastic (JRP) is being used as a substitute for wood panels for apple-boxes and for plywood in tea chests. 2000 apple boxes are out on trial and an assessment of their performance will be made shortly. In a similar manner JRP tea-chests are being evaluated in S.India. Contact has been made with the Institute of Packaging in Bombay where there is a complete range of equipment for testing boxes, cartons and the like.

3.1 Equipment

The only piece of equipment still to come in is a hydraulic press (purchase Requisition 8/88)

3.2 Fellowship

Mr P K Pal is expected to leave for his 6-month Fellowship at Harwell Laboratories, UK in January 1989.

3.3 Sub-contract

An R&D contract is under negotiation with Harwell Laboratories, UK of 9 months' duration. Terms of Reference have been agreed and only the formalities remain to be settled. The commencement date is expected to be 1st January 1989.

3.4 Comments on the activity.

The work done so far gives encouraging signs for the use of jute as a substitute for ply-wood in the Indian market. At present the government of India subsidises the cost of apple boxes but JRP offers a cheaper alternative and, moreover, one which ecologically superior to wood. The Harwell contract will explore this avenue in depth.

4. Bleaching and dyeing

(a) Equipment

The equipment which had been ordered at the start of the mission was a cone/cheese winder and a jigger. In consultation with the Expert Dr L W C Miles an Indian-made package dyer was identified and requisitioned from PAC. The project staff wished to purchase an American automatic bleaching machine but, on the advice of the Expert, it was agreed that this purchase should be held in abeyance because the machine was untried and no practical experience had been reported with it. A lab-scale unit will be bought ($10 000) for bench tests before a decision is reached about the full-size machine.

The cone winder and package dyer will be sited at Birla Jute and Industries for yarn and loose stock dyeing and the jigger at Anglo-India Jute Mills for fabric work.

Anglo-India have a can-drying machine for full width fabric from the jigger but it is not in terribly good condition. The Expert recommended that a padding mangle and a short stenter should be acquired so that not only could the stenter be used for drying the fabric from the jigger but also for curing polymers padded into the cloth on the mangle. Neutral specifications are being compiled for PAC.

Delivery times for these items are around 4-6 months so they may be expected to arrive over the period June to August 1989.

(b) Buildings

There is plenty of space at Anglo-India Jute Mill for the jigger, stenter and padding mangle. Steam, power, water and drainage are conveniently at hand. Machine dimensions and service connection points should be had from the suppliers immediately and detailed floor-plans draw up so that work may begin within the next few weeks on site preparations.

At Birla Jute a new dyehouse has to be built. A level site adjacent to the existing dyehouse for their synthetic operation had been selected to give an area of about 360 m with ample head room. Again it is absolutely essential that the dimensions and the service point locations be ascertained before building begins. Although Birla is outside the zone of the Calcutta planning authorities and no formal planning application is needed, it will still take 4 - 6 months to construct the new dyehouse so no time must be lost if it to be ready when the machine arrives.

Space within the mill area has been reserved for the cone winder.

(c) Fellowship

A 3-month Fellowship was completed in early December by Dr T K Guha Roy in bleaching and dyeing at UMIST, UK. His report shows that he acquired useful experience during it. This is the only Fellowship for this activity.

(d) Expert

The first mission of the Expert in bleaching and dyeing, Dr L W C Miles of UMIST, UK, started on 23 November. During the first days of his mission he visited Anglo-India and Birla to inspect the sites for the pilot-plants and to have discussions with the mill personnel. He made most useful contributions to the selection of the equipment. He will return to UK on 23 December after leaving a work programme for the project staff.

(e) Comments on the activity

The capacity of the package dyer is around 300kg/shift so since the project is to follow a planned scheme of development the machinery should be operated on day shift while the conditions for operation are being optimised. Even of that basis there will be sufficient yarn to make about 100 m of fabric (of 300g/m) per day - more than enough one would have thought for test marketing and testing.

It seems to the Co-ordinator that the problems of semi-industrial scale production should not be under-estimated. Even the manufacture of cones of the right density for package dyeing can be difficult. Unless uniformity of spool density can be guaranteed there is no chance of an even shade developing in the dyeing machine. It is not too early, therefore, to start to consider such practical factors as

- -is the mill prepared to write off several thousand kilos of yarn while the process is being evaluated?

-are there plans to dispose of faulty shades, over-dried yarn or 'stripey' spools?

-what plans have been made for sequential segregation of dye lots?

- who is responsible for colour matching and how will differences of opinion between the mill and the project be resolved?

At a meeting with the Birla management on 22 November it was agreed that one, or at the most two, Birla staff members be nominated to supervise the construction of the new dyehouse and the installation of the plant and to be the link-men with IJIRA. On 1st December a very fruitful meeting took place in IJIRA on 1st December with the project staff, Dr A K Mukherjee and Dr T K Guha Roy, and these Birla-designated gentlemen, Mr Sunil Paul (industrial engineer) and Mr R C Roy (asst dyer). The writer left that meeting confident that the Birla counterparts will provide a very competent link with IJIRA.

In Anglo-India, the general manager is committed to progress and should be the official link with IJIRA.

The overall impression therefore is that this activity is beginning well but the next 6 months will be critical. Pressure must be kept up on the building programme.

OUTPUT 3

INSTRUMENTATION

(a) Equipment.

The necessary equipment is in place and a start has been made to manufacture card auto-levellers for the mills.

(b) Buildings

The existing physics labs are being used to fabricate the instruments and a temporary workshop has been made also for use until the laboratory space above the project office is ready.

(c) Fellowships

Training Branch has been in touch with Clemson and North Carolina Universities to provide facilities and the Divisional Head awaits details of thei. current programme to determine which establishment would be the better choice. The Co-ordinator has also contacted Napier College, Edinburgh, UK who have had previous UNIDO Fellowships in this field and will submit his report after he makes a visit to Napier shortly.

(d) Study Tour

The Divisional Head has not indicated yet which establishments he would wish to visit on his Tour.

OUTPUT 4

PRODUCTIVITY SERVICE AND MILL CONSULTANCY

It was hoped to field the Expert for this Output in December 1988 but because of personal reasons he was unable to come at that time. His visit has been re-scheduled for July 1989. This late start will not impede the activities. The Technical Co-ordinator has arranged to have a meeting with the Expert, Mr D Blyth, in February to brief him on the project and to discuss his assignment.

OUTPUT 5

MARKET RESEARCH AND EVALUATION UNIT

A marketing officer has been appointed and is giving active assistance to the technologists involved with decorative fabrics as well as collating information which will be of value to the diversified product developments later in the project.

In the Project Document there was provision for three marketing Experts but it was agreed that these posts should be combined into one and a new Job Description is given in Appendix 1 for this post. The original three posts showed considerable overlapping of duties and it would have been difficult to identify suitable candidates.Moreover, it should benefit the project to have one Expert with an overall awareness of its needs.

VISITS

During the mission visits were made to -

Anglo India Jute Mills Ltd
Birla Jute and Industries Ltd
Handloom Weavers Development Centre
Indian Institute of Packaging
Hastings Jute Mills Ltd
Reliance Jute Mills Ltd

PERSONNEL

Discussions were held with the following:

J McCowan,Vice Pres. Belton Industries USA (geo-jute importers)
C Hart, Pres. " " "
A K Biswas, Secy, JMDC
L V Saptharishi, Joint Secy, Ministry of Textiles, GOI
S C Mahajan, GM, Hasting Jute Mill
S K Ray, Manager, Associated Textile Engineers
R J Barrow, Calcutta Co, Australia
V M P Nair, DGM, Shipping Corp. of India
B Lynn, Australian Woolpack Delegation to India
R Lister, " " "
W G Macqueen, " "
G D Dadoo, Pres(Works), Birla Jute and Industries Ltd
S N Ghosh, Director, " "
B N Kochar, GM, Anglo India Jute Mills Ltd
A Mitra, SCQ, " "
P V Narayanan, Additional Dir, Indian Inst. of Packaging

JOB DESCRIPTION

Consultant in Marketing , 11 - 06

POST TITLE	: Marketing Consultant, 11-06
DURATION	: 6 man months
DATES REQUIRED	: 1989, 1990 and 1991
DUTY STATION	: Calcutta, India, with possible national and international travel.
PURPOSE OF PROJECT	: Strengthening the capability of the Indian Jute Research Association (IJIRA) to assist the Indian industry by identifying and developing markets for new, diversified jute or jute-based products developed by IJIRA.
DUTIES	: The consultant shall

(i) familiarise himself with new products developed by IJIRA

(ii) examine the marketing methods used so far to promote new product

(iii) analyse the needs of the markets at which these new products are aimed and then recommend proceedures by which these needs may be satisfied by new jute or jute-based products.

(iv) liaise with IJIRA staff and mill executives on market analysis, promotion and development.

(v) prepare full reports at the end of each mission in which future lines of work will be recommended.

QUALIFICATION	: University Degreee and/or qualifications in marketing, textile experience would be desirable.
LANGUAGE	: English.

APPENDIX 2

REVISED WORK PLAN, NOV,1988

OUTPUTS	TARGET COMPLETION DATE
1. Fibre preparation process	
1.1 A Pilot plant for enzyme production established.	DEC 1989
1.2 Technical reports or manuals on enzyme production process	NOV 1990
1.3 Technical report or manuals on enzyme softening process of low grade fibre jute	DEC 1990
1.4 10-15 more mills inducted in enzyme softening process	MAR 1991
1.5 All operating mills inducted in enzyme softening process	JUNE 1991
1.6 Technical reports or manuals on chemical processing of hard jute cuttings	JUNE 1991
2. Products design and development	
2.1 A manual on each of all traditional jute products(sacking and bags and hessian cloths) with revised specifications and standards including:	
- product design specification	
- manufacturing data and information	
- cost analysis	
- test parameters	
Products include :	
50 kg grain bag	JAN 1991
50 kg cement bag(less than 450 grams, presently 531 grams)	JAN 1991
Secondary carpet backing(less than 150 gr/m^2, presently 188 gr/m^2)	JAN 1991
Hessian/Cotton bale cover(less than 3,000 gr, presently 3,700 gr.)	JAN 1991
Geo-Jute	JAN 1991

2.2 Revised products standards enacted by Indian Standards Organisation — JAN 1991

2.3 Application for International Standards recognition/certification — JAN 1991

2.4 A manual on 50 kg grain bags including: — JAN 1991

- Product design and standards
- manufacturing data and information
- materials and productivity data
- cost analysis
- Test parameters

2.5 New/High value products :

Technical reports with full design specification, test parameters, manufacturing process data including, if applicable chemical finishing and treatment and cost analysis, market demand projection for :

- Rigid packaging consisting of reinforced jute cloth — DEC 1990
- At least four jute reinforced plastic articles such as boat hulls, furniture parts, low-cost housing elements,etc. — MAR 1991
- jute blends fabrics possibly suitable for domestic/household uses — JAN 1991
- Any other products identified by the market research and/or the marketing unit (wall covering with low light sensitivity, fibre-resistant jute cloth etc.) — FEB 1991

3. Instrumentation :

3.1 A workshop for fabrication and distribution of Testing and Control instruments and Instrumentation systems and their components developed by IJIRA R & D — SEPT 1989

3.2 Instruments and control systems manufactured and installed in the mills — NOV 1990

4. Productivity and consultancy service to mills

- A functional division including the use of a mini computer at IJIRA to assist the industry in-plant productivity analysis and consultancy with emphasis on man/machine productivity	DEC 1990
- Industry will also get in-plant assistance to introduce new methods of production and in start up production of new products	DEC 1990

5. Established market research and information Unit

- Jute market and products Bulletins(bi-monthly)	JUNE 1991

2. Project Activities

2.1 For Outputs 1

Overseas training of microbiologist/technologist on enzymatic softening	JULY 1989
Expert will study present facilities and recommend eqpt.facilities (1 m/m)	JUNE 1989
Establish pilot-scale facilities for enzymatic treatment of jute	DEC 1989
Research and generation of different strains of enzymes by applying mutational techniques and manipulation of the enzyme cultures	NOV 1990
Pilot-scale trials applying the different strains to jute under different process parameters and detailed testing of results	JUNE 1991
Produce selected strains of enzymes for large scale field(plant)testing	JUNE 1991
Training of mills personnel in enzymes softening, and consultancy services/on-site advisory services	MAY 1991
Chemical technologist is trained in foreign research institute	DEC 1989
Expert will study available facilities and specify equipment and other needs	JUNE 1989
Establish pilot scale facilities for chemical softening of low grade jute fibre etc.	DEC 1989
Experiment with treatment of the jute with different chemicals under different conditions	DEC 1990
Propose detailed reports on the results of the various experiments, publish these	JUNE 1991
Organise meetings with and training on the personnel of the industry where the findings will be presented	MAY 1991

For Outputs 2

Study tour of IJIRA Director and textile physicist/technologist to institutes abroad (for instance, Clemson University,Georgia Institute of Technology or North Carolina State University) which are specified in "fabric engineering"	DEC 1987
Training of textile physicist/technologists in selected institute in fabric engineering	DEC 1990
Selection of expertise, probably by the study tour to assist during experimenting and testing of modified fabrics	NOV 1987
By varying the yarn count and characteristics of fabric construction, generate at least five different fabrics for bagging, secondary carpet backing, "geo-jute" and cotton bale covers each and test these to required standards for each application. IJIRA staff will perform these experiements with assistance and under the guidance of a foreign institute under sub-contract	DEC 1990
Prepare detailed report on each fabric selected, including manufacturing and fabric characteristics	JUNE 1991
For each new product planned, 3-5 prototypes will be made with different specifications	JAN 1991
The prototypes will be tested and ~~xxx~~ discussed with both manufacturers, as well as potential buyers(the marketing unit will be responsible for market testing)	JAN 1991
Organize meetings with, and training of personnel of the industry in the manufacturing processes of these new products	JAN 1991
Propose and publish reports with detailed description of the production technology, characteristics and test findings for the selected products	JAN 1991
Provide extension service to assist manufacture to set up full-scale production of the new products	JAN 1991
Analyse the present status of R&D, both in the institutes involved with IJIRA in the past,as well as in other institutes in the areas of jute reinforced plastics. This will include study tours/ fellowships of IJIRA officials to selected institutes in the USA, Europe and Japan	DEC 1990

The IJIRA Director will undertake the study tour with IJIRA scientists/technologists responsible for these products	DEC 1987
Discussions with organizations concerned on selecting products and technologies with the best chance of commercial success	DEC 1987
Training of 1 IJIRA staff members on fibre-reinforced products (6 m/m)	JULY 1989
Training of 2 IJIRA staff members on fibre-blending technology(total 6 m/m)	JUNE 1990

For Outputs 3

Training of instrumentation engineers design and use of process control systems in textile industries	AUG 1989
Design improved production and process control system	DEC 1990
Develpp instrumentation for systems above	
Install in-plant, optimize systems/instruments above	DEC 1990
Training of mills mp personnel in operation, maintenance of above	JUNE 1991

For Outputs 4

Setting up of the Jute Production Information and Consultancy Service	NOV 1990
Fellowship training for industrial engineering in productivity analysis in textile mills	DEC 1989
The existing programme of inter-firm performance comparison will be expanded to include weaving. Detailed description of methodology will be prepared	DEC 1990
Methodology will be applied to at least ten mills and results published. For these first ten, an international expert(Industrial Engineer) will work together with IJIRA staff	MAR 1990
During above analysis, the methodology for analysis will be computerized	DEC 1990
Consultancy to the mills and training of their personnel in man/machine productivity issues	JUNE 1991
Preparation and distribution of bi-monthly bulletin on Indian jute manufacturing productivity	DEC 1990

For Outputs 5

Setting up of the Jute Market Research, Planning and Promotion Service	JUNE 1991
Training(in house and abroad) of market research officers, international marketing officer	DEC 1990
Studies of internal and international jute markets	DEC 1989
Computerized linkage with the Productivity Information and Consultancy Service	MAR 1991
Linkage with other national, foreign and international sources of information on jute markets and marketing	FEB 1991
Publication of a Jute Market bulletin(bi-monthly)	AUG 1991
Assistance to the industries in market promotion strategy and market testing of specific products	JUNE 1991

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