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JUTE RESEARCH AND DEVELOPMENT
(DEVELOPMENT AND PROMOTION OF DIVERSIFIED END-USES OF JUTE)

INDIAN JUTE INDUSTRIES RESEARCH ASSOCIATION (IJIRA), CALCUTTA

DP/IND/86/037/11-01

INDIA

Technical report: Review of project activities and revision of work programme (1st mission)*

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,
Chief Technical Adviser

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United Nations Industrial Development Organization
Vienna

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INTRODUCTION

This report is based on the first of five missions to be made by the Chief Technical Adviser/Technical Co-ordinator to the Indian Jute Industries Research Association (IJIRA). The project was scheduled to start in April 1987 but the first activities did not commence until July 1987 and this report covers the period from 3 August to 30 August 1987.

To recapitulate, the immediate objective is to strengthen IJIRA so that it may

- reduce production costs in the industry by 10% or more
- increase the share of high-value and new products from the present level of 5% of the total out-put to 10-15%
- improve existing and introduce new technologies
- expand inter-firm comparisons of productivity and provide improved technical consultancy for the mills.
- establish market research and promotional activities

I. CONCLUSIONS

1. Under the leadership of the National Project Director (NPD) the project has started well. The Divisional Heads of IJIRA show a positive approach to the project.

2. There are inconsistencies in the Project Document especially in regard to inputs. These have been corrected as far as possible.

3. The decision to locate the pilot plants in selected mills is sound but it must be noted that project management will be made more complicated as a result.

4. In two areas - automated bag conversion and enzyme preparation - the proposed pilot plants are untested for jute. Careful trials are required before any decision about purchase is made. Full use of the advice of Experts should be taken at a very early stage.

5. The automated bag plant is not related to any stated activity or output. The ProDoc requires to be amended accordingly.

6. The first Purchase Requisitions (approx $400000) for laboratory equipment have been sent to Purchasing and Contracts UNIDO.

7. The recruitment of project staff is almost complete.

8. The project would benefit in its day-to-day operations if a National Project Co-ordinator were to be appointed.

9. The majority of locations for Fellowships and Study Tours have been selected. Some re-allocation of these has been required (while still keeping them within the project's framework).

10. It may prove hard to identify all the Experts desired (15) and in some cases their expertise will not be related to jute. Job descriptions for Posts 11-06, 11-07, 11-08 (see page 19 of the ProDoc) required classification.

11. Draft terms of reference for the sub-contracts have been written.

12. A work-plan has been drawn up.

II. RECOMMENDATIONS

1. The next visit of the CTA should be made in November 1987.

2. The NPD and Divisional Heads should clarify their needs for equipment, especially their pilot plants and neutral specifications prepared in time for the next CTA visit.

3. Floor plans of the sites for the pilot plants and all the service arrangements should be agreed with the mills as early as possible.

4. The NPD should consider the appointment of a National Project Co-ordinator.

5. A formal agreement between IJIRA and the mills selected to house the pilot plants should be made stating the terms under which the plant is provided. A draft is given in Annex 1.

6. Before making the study tour to view the enzyme fermentor discussions should be held with local/international Experts to ensure that the best possible advice is taken before settling on one particular machine.

7. At an early opportunity Outputs and Activities should be prepared for the automated bag-making facility. Drafts are given later in this report.

8. During the November visit of the CTA all drafts should be finalised.

9. Internal monthly progress meetings should be instigated.

The remainder of this report gives the details upon which these Conclusions and Recommendations were based.

III. PROJECT MANAGEMENT

1. Administration

A Project Advisory Committee has been set up to oversee progress and to lay down policy. Under the Chairmanship of the Jute Commissioner it comprises representitives from

Ministry of Textiles
Indian Jute Mills Association
Ministry of Finance
UNDP and UNIDO
IJIRA

Meetings are held at intervals deemed necessary and so far three meetings have taken place.

2. National Technical Co-ordinator

Since the National Project Director has total responsibility for IJIRA as well as his project duites his time is at a premium. Moreover, his IJIRA function demands very frequent visits of two or more days to Delhi. Neither will the Divisional Heads, who are in charge of the various inputs/activities/outputs, be full-time on the project.

In view of this and the spread of activities (both quantitative and geographical) some thought should be given to the appointment of a National Project Co-ordinator of a status similar to that of a Divisional Head. Such a person would be able to give general assistance to the NPD and to liaise with the Divisional Heads of IJIRA to aid communications between the project and UNDP/UNIDO.

3. Monthly meeting

It is felt that a monthly progress meeting would be of benefit to the smooth runnind of the project. These would be held between the NPD, Divisional Heads and others as required. At these meetings each Divisional Head would submit a brief report on the activities under his jurisdiction. Such meetings would help to keep up the momentum and provide a useful "diary" which will make project evaluations easier. Hopefully, they would also help the staff to view the project as a whole and avoid an insular attitude in their own field.

4. Project responsibilities

Those with responsibility for the outputs/activities/inputs of the project are :-

Output 1.	Fibre softening by enzymes	Head, Biology Div. Dr B L Ghosh
	Chemical softening of jute	Head, Appl.Chem.Div. Dr A K Mukherjee
Output 2.	Jute reinforced plastic	NPD Dr S R Ranganathan
	Blends and new fabrics	Head, Mech. Process. Div. Mr S Palit

	Fabric engineering	Head, Mech Process. Div. Mr S Palit
	Wet processing	Head. App. Chem.Div. Dr A K Mukherjee
	Automated bag-making (new output)	Head, Mech Proc Div Mr S Palit
Output 3.	Instrumentation	Head, Physics Div. Dr U Mukhopadhyay
Output 4.	Productivity and consultancy	Head, Mecn.Proc.Div. Mr S Palit
Output 5.	Marketing	NPD Dr S R Ranganathan

IV. STUDY TOURS

In consultation with the NPD, some re-allocation of study tours was made while still keeping the total of six man-months undisturbed.

The revised list is now:-

NPD	2 man-months (completed)
Head, Biology	4 weeks
Head, App Chem	3 weeks
Head, Mecn Process.	6 weeks
Head, Physics	3 weeks

During these visits the main consideration is to visit the sources of the pilot plants and, where applicable, see them operating on jute. These study tours now give a more balanced input to the project.

V. FELLOWSHIPS

In a similar manner, the duration and assignments of the Fellowships were re-allocated to reflect more closely the needs of the project. The total of 57 man-months is retained.

The programme now reads:-

Output 1.	Fibre softening	
	Microbiologist	3 m/m
	Biochemist/technologist	3
	Applied chemist	2
Output 2.	Product development	
	Plastics technologist	6
	Fabric engineer/technologist	3
	Packaging design	3
	Industrial/decorative design	3
	Blending technologist	2x3
Output 3.	Instrumentation	
	Instrument engineer	2x3
Output 4.	Productivity/consultancy	3
Output 5.	Marketing	3x3
	TOTAL	50 m/m

This leaves a balance of 7 m/m compared to the 57 shwon in the ProDoc. These are kept in reserve to be used later if they are needed.

VI. ACCOMMODATION

A new project office is being created at IJIKA. In addition to the normal facilities it will have rooms for the CTA and visiting Experts, a room for the NPD and a small conference room .

As an addition to the present laboratories, two more are being created which will add a useful 570 m^2 to the facility. There is also provision for more lab space if it is needed later in the project.

Below the new office floor is an 800m^2 storage area which may be used for some pilot plant at the end of the project.

All these areas are scheduled for completion by the end of December 1987.

VII. PILOT PLANTS

The pilot plants being provided by UNDP/UNIDO will be located at selected jute mills. The reasons for this are two-fold.

1. It brings the project into close contact with the industry at a very early stage. This should give a greater opportunity for the results of the project to be integrated more quickly into a commercial environment. In addition pre- and post-mill services and machinery are on hand to transfer pilot-stage experience into full-scale manufacture operation at the appropriate time.

2. There was insufficient space on the IJIRA site to accommodate all the plant.

The concept behind the decision to locate these plants in the mills is sound but its weakness is that it will make the logistics and control of these plants more difficult. The geographical spread is quite wide and, in some cases, it is impracticable for staff to travel to and fro daily. In these mills staff will have to reside at the mills with the attendant problems this may raise. It also means a lot of travel for the Divisional Heads who will be expected to visit the plants at least once every 10 days or so. The calibre of

the man selected to have day-to-day control of the plant will have a great bearing on the achievement of the desired outputs at each location.

The man selected to have daily control of each pilot plant should have all the back-up he requires from the NPD and his Divisional Heads otherwise he may find himself over-ruled by the mill personnel. The mills must clearly understand that the programme of work will be laid down by the project staff. It is realised that close co-operation between the mill and the project staff is vital, so tact and understanding will be needed on both sides if the pilot plants are to be used to the best advantage.

The selected mills are:-

Angio-India Jute Mills	Decorative fabrics Blends Fabric dyeing
Champdany Industries	Automated bag-making
J K Jute Mills Ltd	Chemical softening
Birla Jute & Industries	Blends Decoratives Yarn dyeing
Kanoria Jute	Fabric engineering Geo-jute
Reliance Jute & Industries	Chemical softening
NJMC (BJEL)	Jute/plastics
Ganges Mfg. Co.Ltd.	Jute/plastics
India Jute Co. Ltd.	Yarn bleaching Yarn dyeing
Kinnison Jute Ltd.	Enzyme softening

Two items of pilot plant require discussion, namely the automated bag plant and the enzyme plant.

Automated bag-making plant

In the ProDoc two items of equipment relate to similar functions, i.e. the automation in whole or in part of the bag-making process (see Item C, Annex V, UNDP inputs). There is no further reference to this in the whole of the ProDoc and this needs to be rectified.

If such automation were to be successful, it would have very big impact on conversion costs in the industry where bag-making accounts for about 15% of the total cost of converting fibre into sacks and bags. In this respect the project would make a major contribution to the industry and it is unfortunate that this has not been identified as an important output.

Currently there is no effective production line for this activity for jute. There is an automatic bag plant made in Japan for polyproplyene. Representitives of this company have visited IJIRA but shown little interest in modifying it to work with jute. The NPD, during his recent study tour, discussed automated bag-making with two companies in Germany. One makes automatic cut/fold/hem machines for towels, bed-covers, pillows etc. The other was Union Special, a company well known to the jute trade for their heavy-duty sewing machines. Union Special were of the opinion that, with their jute-type sewing machines added to the cut/fold/hem machine, an automatic bag plant would be feasible. IJIRA have sent samples of bags and cloth to Germany and the Head of the Mechanical Processing Division will visit there during his study tour.

The project document should be altered to include an output and activities for this important aspect of the project.

Output: To develop automatic bag-making equipment and analyse its implications on costs.

Activities:

1. Study tour to investigate the prospects of success for this plant.

2. Supply samples for trails.

3. Co-operate with the makers to produce a satisfactory prototype.

4. Prepare a comprehensive report on the operation of such a machine and make a full analysis of its cost-effectiveness.

2. Enzyme production plant

The fermentor which has been identified by IJIRA is made by a French company, Institut National de Recherche Chimique Appliquee. It has not been established that this machine can produce the required type of enzyme needed to soften and upgrade low qualities of jute fibre and they have indicated that some $8000 are needed to conduct trials to establish its suitability for this particular enzyme. The Head of the Biology Division intends to visit IRCHA to see his own culture medium being used in the plant. However, before doing so, it would be wise to seek as much Expert advice as possible to see whether there is not some other fermentor on the market. If there is not, then the preliminary trials at IRCHA will have to be covered by a sub-contract, for which there is no provision at the present time.

VII. WORK PLAN

administration

1987	July	NPD study tour
	Aug	CTA visit (1m/m) Proj. Adv. Comm. meeting Recruit staff Identify pilot plant sites Prepare new accommodation
	Sept	Requisition venicles
	Nov	CTA visit (1 m/m) Backstopping officer visit (2-3 days) Proj. Adv. Comm. meeting
	Dec	All project staff in place
1988	Jan	Vehicles on site Office accommodation ready Office functioning
	July	1st internal review 1st tripartite review CTA visit (2 m/m)
1989	March	CTA visit (2m/m)
	July	2nd tripartite review
1990	March	CTA visit (3 m/m)
	July	2nd internal evaluation 3rd tripartite review
1991	May	Last CTA visit (3m/m)
	June	Terminal review

NOTE: The Project Advisory Committee shall meet at intervals deemed neceesary during the life of the project.

Fibre softening by chemicals

1987	Sept	Submit Tour and Fellows nominations
		All lab equipment specified
	Oct	Study tour
	Dec	Identify Expert, submit CV to UNIDO
1988	March	Receive and install lab equipment Fellowship begins (2m/m)
	April/ Dec	Lab and mill trials in progress
	June	Expert's visit (3 m/m)
1989	Jan/Dec	Extension of mill trials Full cost analysis
	June	Expert's visit (3m/m)
1990	Jan/Dec	Consolidation of mill use of chemicals Seminars held working methods given to mills

Softening jute by enzymes

1987	Aug	Specify lab equipment Study tour nomination to Govt
	Sept	Consult with fellow microbiologists/ Expert on fermentors Study tour
	Nov	Identify Expert, submit CV to UNIDO
		Specify pilot plant
	Dec	All staff on site
1988	Jan	First arrivals lab equipment
	Feb	Expert's mission (3m/m) Fellows Nom Forms to Govt
	March	All lab equipment installed Prepare site for pilot plant
	May	Fellowships begin (2x3 m/m)
	Aug	Pilot plant installed Expert's mission (3 m/m)
	Sep/Dec	Lab R&D, pilot plant commissioned
1989	Jan/Dec	Pilot plant operating Mill trials in progress Costings prepared
1990	Jan/Dec	Seminars on process Extend use to more mills Prepare plant operating instructions for mills

Automatic bag-making

1987	Sep/Oct	Study tour and feasibility study
	Dec	Further trials with jute cloth Specify plant (if suitable)
1988	Jan	Project staff on site Prepare site for plant
	Feb	Pilot plant location ready
	July/Aug	Pilot plant installed
	Sep/Dec	First pilot trials of plant
1989	Jan/July	Bulk trials with plant
	July	Pilot plant fully operational
	Aug/Dec	Demonstrations to industry
1990	Jan/Dec	Larger scale use of plant and full cost analysis made.

Fabric engineering

1987	Sept	Study tour nominations to Govt
	Oct/Nov	Study tour Fellows nominations to Govt Expert identified, CV to UNIDO Sub-contract finalised
	Dec	Staff in place
1988	Jan	R&D on new constructions and lab testing
	Feb	Sub-contract begins
	March	Expert's visit (3 m/m)
	May	Fellowships begin
	Dec	Finalisation of new constructions for sacks and bags

1989	Jan	Expert's second visit (3 m/m)
	March	Finalise construction for geo-jute, 50 kg and 30 kg bags
	May	Field trials on new products Full cost analysis
	June/Dec	Introduce new products to industry
1990	Jan onwards	Market promotion of new products

Fibre blends

1987	Sept	Study Tour nomination to Govt
	Oct/Nov	Study tour Fellows nominated to Govt
	Nov	Pilot plant specified Expert identified and CV to UNIDO Sub-contracts finalised
	Dec	Staff on site
1988	Jan	Pilot plant sites ready
	Feb	Fellowships begin (3 m/m)
	May	Sub-contract begins Expert's first visit
	July/Aug	Pilot plant installed
	Sep	Pilot plant commissioned
	Oct/Dec	Preparation of yarns and fabrics
1989	Jan/Dec	Further blend trials Selection of most promising items Expert's second visit

1989	Jan/Dec	Finalisation of promising products Second visit by Expert Full cost analyses Full product profiles prepared Market promotion
1990	Jan/Dec	Market promotion

Jute reinforced plastics

1987	Sept	Fellowship nomination to Govt
	Nov	Sub-contract terms of reference finalised Pilot plant specified
	Dec	Project staff in place Expert identified and CV to UNIDO
1988	Jan	Pilot plant selected and site prepared Fellowship + sub-contract begin (6 m/m)
	Feb	Lab scale R&D and testing
	July	Pilot plant on site
	Aug	Pilot plant commissioned
	Sept	Expert's visit (3 m/m)
1989	Jan/Dec	Continued lab and pilot scale trials and test marketing Cost analyses
1990	Jan/Dec	Bulk production of JRP products Market promotion

Instrumentation

1987	Nov	Lab equipment finalised and ordered
	Dec	Study tour nomination to Govt

1988	Jan	Fellows nominated to Govt
	Feb	Study tour
	March	Fellowships begin
	April	All equipment on site
	May	Expert's visit Lab work on instrument design
	June/Dec	Lab work
1989	Jan/June	Production of prototypes of instruments
	July/Dec	Protoypes under trial in mills
1990	Jan	Instrument designs finalised and manufacture for mills begins
	June	Promotion of the instruments in the mills Seminars Demonstrations

Productivity and consultancy

1987	Oct	Selection of equipment finalised
	Dec	Fellow nominated to Govt
1988	Jan/Dec	Computer programmes developed to cover productivity measurement up to weaving
	June	Fellowship
1989	Jan/Dec	De-bugging programmes and first industry-wide runs Scope of Technical Consultancy work widened as required
1990	Jan/Dec	Extension of productivity measurement Seminars Reports circulated to mills

Market research and information services

1987	Nov	Identify Experts (3) and submit CV'S to UNIDO
	Dec	Fellowship nomination to Govt
1988	March/ June	Experts visits
	June/ Dec	Detailed programme prepared for marketing unit
	Aug	Fellowships
1989	Jan onwards	Liaise with other Divisions for market promotion of all outputs. Determine market strategy for new products and services of IJIRA in conjunction with the industry

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ANNEX I

PERSONAL CONTACTS AND VISITS

In addition to the IJIRA personnel the following gentlemen were met.

Mr S K Ghosh	Technical Director, Birla Jute and Industries Ltd.
Mr S N Ghosh	Project Head, Jute Agriculture Project
Mr B N Kochhar	General manager, Anglo-India Jute Ltd
Mr G Sivaraman	Director, Anglo-India Jute Mills Ltd and Chairman, IJIRA
Mr D Gupta	Director, New Central Jute Mills Ltd and vice-chairman IJIRA
Mr B R Basu	Jute Commissioner, Govt of India
Mr R N Agarwal	Marketing Director, Anglo-India Jute Mills Ltd
Mr M S Mukherjee	Jt.Secy., Ministry of Finance
Mr s Krishnaamoorty	Director (Finance), Ministry of Textiles
Dr K Hussein	SIDFA, UNIDO, Delhi
Mr M Ramachanran	Programme Officer, UNDP, Delhi

Visits were made to:-

Head Office Birla Jute and Industries to meet and have discussions with Mr D Gupta, Technical Director.

Birla Jute and Industries' mill to see the proposed site for pilot plant and to inspect the mill.

Anglo-India Jute Mill to see the proposed pilot plant site and to inspect the mill

Jute agriculture extension project to inspect jute crop.

ANNEX II

DRAFT OF AGREEMENT BETWEEN IJIRA AND MILLS ON PILOT PLANTS

In order to make the IJIRA/UNIDO/UNDP project as effective as possible it has been agreed that the pilot plants which are to be an integral part of the project should be installed in selected jute mills. This will give, as far as possible, an industrial environment for the plant and the staff who are assigned to it. Additionally, it is hoped, that it will make the transfer of technology to full-scale use simpler. While the essence of this agreement is co-operation and mutual assistance between the mill and the project it would seem to be of advantage to all concerned to have a written statement governing the conditions under which the pilot plants are installed at the mills.

1. As part of the IJIRA/UNIDO/UNDP Project DP/IND/86/037 the following items of equipment will be installed at..... ....

   ..... Serial no. .....

   ....

2. The cost of installation will be shared equally between ..... and the project.

3. This equipment is provided from UNDP/UNIDO funds and remains the property of UNDP/UNIDO until the project is officially ended. At that time the equipment reverts to the Government of India who will determine its future.

4. The equipment is under the control of the National Project Director of the project and it shall be operated according to the programme laid down by him.

5. An appropriate number of project staff will be assigned to the pilot plant for operational purposes and a senior member of this staff shall be is charge of the day-to-day operation and maintenance of the plant.

6. The mill will provide a suitable site for the equipment, prepared to the satisfaction of the Nationl Project Director and his staff. In addition, all necessary services shall be provided at the mill's expense.

7. In consultation with National Project Director the mill shall provide raw materials and staff as mutually agreed so that the research programme may be expedited.

8. With the agreement of the National Project Director the mill may use the pilot plant for their own materials and products provided such use is within the scope of the project and any information about its operation and samples of its products are made freely available to the project. The Mill Manager-in-charge will be expected to co-operate fully with the project staff and vice versa.

9. The plant shall be open for inspection by any member of the industry subject to prior approval of the National Project Director and the Mill Manager-in-charge. Such visits shall be made only between 0900 hours and 1800 hours.

10. Where project staff must stay overnight at the mill. the mill will provide suitable accommodation for them without charge.

ANNEX III

SUB-CONTRACT - JUTE/RESIN COMPOSITES

1. Location

This sub-contract should be implemented at the Atomic Energy Research Establishment, Harwell. U.K. This agency, although set up originally for the U.K. atomic energy programme, now engages in contract research work for industry.

The Establishment has already undertaken two research programmes for IJIRA under British Government sponorship which have given them experience of working with jute/resin composites. This research was just at the point of having a commercial impact when it had to be stopped through lack of funds.

TERMS OF REFERENCE

The objective of the sub-contract is to assist the Indian Jute Research Association to

- develop treated jute intermediate products of suitable form for jute reinforced plastics.
- develop industrial mouiding techniques suited to jute.
- develop jute-based rigid packaging using reinforced plastic technology.

The contract is expected to begin in the first quarter of 1988 and to last 24 months.

The sub-contractor shall

1. Generate basic techniques for preparing jute intermediates by chemical and/or physical means and suggest forms of jute intermediates best suited to mouldings.

2. Formulate design and moulding methods for jute reinforced plastics. These should include structural materials for buildings, furniture parts, etc.

3. Generate designs and moulding methods for rigid containers, e.g tea-chests, boxes, bins etc.

4. Carry out all tests necessary to evaluate such products and advise on appropriate field trials.

5. Prepare technical and commercial information which will help to establish viable markets for these products.

6. Give a report (5 copies) on the sub-contract and make recommendations for future work within 4 weeks of the end of the contract.

Training

A member of the project staff should be accepted for training, under the UN Fellowship Scheme, in the design, application, moulding and testing of jute/resin products for a period of 6 months. Travel and subsistence will be provided by the UNited Nations Industrial Development Organisation.

Technology transfer

To ensure the maximum benefit from the sub-contract and Expert from the Establishment should visit India for two periods of three months to assist the project staff under local conditions. A job description is attached. Travel and subsistence costs will be met by the United Nations industrial Development Organisation.

NOTE

The costs of training and the Expert's service should be shown separately from those of the sub-contract.

NOTE: The job description is given on p7 of Annexure II and refers to Post 11-09

ANNEX IV

SUB-CONTRACT FOR JUTE BLENDS

1. The objective of the sub-contract is to assist the Indian Jute Industries Research Association in the application of fibre blending technology so as to develop products which have a higher value and which would allow jute to enter new markets.

2. The sub-contractor shall

   i. review the work already done by the Research Association in this field and make recommendations as to the products most likely to have success in this area.

   ii. generate methods for blending jute and other fibres and produce at least 4 blended textile products, to include furnishing fabrics, drapes, lugguage cloth along with any others which have potential.

   iv. test and evaluate these products and suggest appropriate field trial methods.

   v. prepare a full product profile for the manufacture and specifications of these products.

   vi. assist in market promotional activities for these products

   vii. give technical guidance on the selection of machinery for blending.

The duration of the sub-contract will be 36 months, to start in 1988. A report (5 copies) shall be submitted within 4 weeks of the end of the contract.

Training

The sub-contractor shall accept two trainees for a period of three months to be up-dated in their knowledge of blending and product assessment.

Technology transfer

To assist the project staff to implement further blending work at the Research Association and at the pilot plants one Expert shall visit India for two three-month periods to strengthen the project's activities. Personal contacts with research and mill personnel will be made along with participation in seminars, demonstrations etc in order to ensure that blending technology is tranferred to the industry. The Expert will be expected to co-operate with the Marketing Unit in market promotional activities for blended jute products.

The Expert's job description is given on p 10 of the ProDoc under Post 11-12.

NOTE

The fee for the Expert and the costs related to training should be itemised separately from the rest of the sub-contract. All travel and subsistence costs will be met from the funds of the United Nations Industrial Development Organisation.

ANNEX VII

SUB-CONTRACT FOR FABRIC ENGINEERING

The objective of the sub-contract is to produce fabrics which are lighter than those in use at present but which are of equal strength and have an acceptable cover.

The sub-contractor shall

i. use only all-jute yarns of normal commercial quality although yarn counts and twists may be non-standard.

ii. generate new constructions to reduce the weights of the following products while, at the same time retaining sufficient strength and cover for them to be commercially acceptable. These constructions must be cheaper than those in use now.

	Present weight	Target weight
100 kg sugar bag	1190 g	1100 g
100 kg grain bag	1020	800
50 kg cement bag	531	450
Carpet backing cloth	188 g/m^2	150 g/m^2
Cotton bale cover	3700	3000

iii. study and optimise constructions for geo-jute (jute fabric for civil engineering purposes)

iv. optimise the design, manufacture and economics of 50 kg grain bags and 30 kg rice bags

v. carry out such tests necessary to evaluate these products and to advise on appropriate field trials.

vi. prepare a product profile and specification for each product.

viii. assist the project staff to implement these new products in the industry by means of personal contact, seminars, reports and any other appropriate manner. In addition, the sub-contractor shall co-operate with the Research Association's Marketing Unit so that commercial exploitation of these new products may be implemented.

ix. present a report on the sub-contract (5 copies) within 4 weeks of the its termination.

Training

The sub-contractor shall accept for training in fabric engineering one project staff member for a period of three months.

Technology transfer

The sub-contractor shall provide one Expert who will visit India for two three-month periods to assist the staff of the Research Association to produce bulk samples of these new products and to introduce them to the industry by means of personal visits, seminars and other appropriate avenues.

The job description of the Expert is attached (see p 5 of the ProDoc. Post 11-05).

NOTE

The costs of training and the Expert's fee should be shown seprately. All the costs of travel and subsistence will be met by the United Nations Industrial Development Organisation.

ANNEX IX

JOB DESCRIPTIONS

Post title (11-14) : Consultant in the design of flexible packaging

Duration : Two missions of three months

Date required : First mission 2nd quarter 1988, second in mid-1989

Duty station : Calcutta with travel in India.

Purpose of visit : To strengthen the capability of the Indian Jute Industries Research Association (IJIRA) by the redesign/improvement of jute sacks and other containers/wrappers.

Duties : The Expert will

- Prepare a work plan for implementing the activities for reducing the costs of existing products and widening the market by introducing new packaging products.
- study the facilities available and make recommendations for improvement.
- guide and assist IJIRA technologists in improving the technical and economic parameters of jute packaging.
- maitain close liaison with the related subjects of fabric engineering and marketing.
- make a report on each visit and at the end of the last visit make a

final report (5 copies) within 4 weeks covering all aspects of his work and making recommendations for future work at IJIRA.

Qualification : Degree/diploma in packaging and extensive experience of textile packaging materials. Experience of technology transfer with an international agency would be advantageous.

Language : English

.....

Post title : Textile design consultant
(no number in Prodoc)

Duration : Two three-month periods

Date required : April 1988, mid 1989

Duty station : Calcutta

Purpose of visit : To strengthen the Indian Jute Industries Research Association (IJIRA) to enable it to widen the scope for jute and jute-blended yarns and fabrics in the decorative and domestic textile markets.

Duties : The Expert will assist IJIRA technologists by

- preparing a work plan for his visits
- reviewing IJIRA'S facilities and suggesting means for improvement.
- assisting and guiding IJIRA staff in the design and manufacture of selected textile products.

- maintain close relations with the related activities of wet-processing.

- liaise with the IJIRA Marketing Unit so that these new products may be brought to the market effectively.

- help to introduce these products to the industry, via pilot-scale production.

- present a report (5 copies) within 4 weeks of leaving the duty station.

Qualifications : Degree/diploma in textile design along with extensive experience of textile manufacture and marketing. Experience with jute or flax and tenure of posts of responibility for bring new products to the market would be advantageous.

Language : English