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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
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13 February 1989
ORIGINAL: ENGLISH

RESEARCH AND DEVELOPMENT ON VARIOUS METHODS OF SPINNING SHORT STAPLE COTTON

DP/VIE/86/014/11-01

VIET NAM

Technical report: First mission of the Chief Technical Adviser*

Prepared for the Government of the Socialist Republic of Viet Nam
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of Roy Nield,
Chief Technical Adviser

Backstopping officer: Antero Eräneva, Agro-based Industries Branch

United Nations Industrial Development Organization
Vienna

* This document has not been edited.

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ABBREVIATIONS

CTA	Chief Technical Adviser
Est	Estimate
EH2	Expert Hanoi, Post 11-02, etc.
ES2	Expert Ho Chi Minh City, Post 11-02, etc.
F/H1	Fellowship Hanoi No. 1, etc.
F/S1	Fellowship Ho Chi Minh City No. 1, etc.
JD	Job Description
MOLI	Ministry of Light Industries
N/A	Not available
NPD	National Project Director
Prodoc	Project Document
REQ/XX	Requisition No. XX
ST/H1	Study Tour Hanoi No. 1, etc.
ST/S1	Study Tour Ho Chi Minh City No. 1, etc.
TRI	Textile Research Institute, Hanoi
TRSI	Textile Research Sub-Institute, Ho Chi Minh City
TRM	Tri-Partite Review Meeting
TTRM	Terminal Tri-Partite Review Meeting
UTE	Union of Textile Enterprises

I EXECUTIVE SUMMARY

This first mission by the CTA took place within the period 13 November 1988 to 13 January 1989.

Equipment presented most problems since the latest estimate was nearly $720,000 as compared with the budget of $551,900. As MOLI indicated that no additional funds could be made available at this time, the most essential items were ordered, further information was requested on some major items and all items not yet ordered were grouped into priorities 1, 2 and 3. Since all the equipment requested is important to the fulfilment of the objectives of the project, some difficult decisions will have to be taken when all the information is available.

One study tour has been completed. Nomination forms for the second study tour and the five fellowship groups were completed and submitted to MOLI for signature. Unsigned copies were given to Ms B. Tassew of the UNIDO Training Section who will follow them up when she visits Hanoi in February.

Job descriptions for the five experts were agreed with the NPD.

A revised Work Plan was agreed with the NPD.

A programme of work to be carried out by the NPD in the absence of the CTA was provided.

II INTRODUCTION

The main objective of the project is to increase the availability of cotton textiles for domestic consumption which is in line with the Government's development plan for the period 1986-90 which emphasizes the need to expand the production of consumer goods, especially clothing, by means of increased utilization of indigenous raw materials.

The immediate objective of the project is to strengthen the Textile Research Institute's capability of conducting cotton fibre evaluation and spinning development work, with particular emphasis on the use of short staple cotton. This will enable the Institute to advise spinning mills on optimum processing conditions when using such cottons and to develop an improved hand spinning technology for use in remote rural areas.

The textile industry in Vietnam comprises about 880,000 spindles and 11,000 looms, roughly equally divided between the North and the South and generally operating at 50 per cent of installed capacity. Yarn production increased from 31,000 tons in 1981 to 51,000 tons in 1985 and fabric production from 116 million metres in 1981 to 203 million metres in 1985 (= 3,4 metres per capita). It is the intention of the Government to increase the fabric availability to 8 metres per capita by the year 2000. Assuming a population increase from the present 60 million to 70 million by the year 2000 this would mean a fibre raw material requirement of about 150,000 tons of which 100,000 would be cotton. The present cotton consumption is 60,000 tons per year - virtually all of it imported.

Of the 100,000 ton cotton requirement in the year 2000 the Government plans to cover 30,000 tons through local production - half of it plantation cotton* and the other half smallholder cotton**. This latter variety is the "short fibre cotton" to which the title of this project refers. It is grown on small plots mainly in the northern part of the country by villagers who convert it into coarse yarn and fabric using extremely primitive hand spinning and weaving techniques. The present production is limited to about 1,000 tons of lint cotton per year - roughly equivalent to 1,5 metres per capita among the northern hill tribes who grow and process it for their own use.

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* Hirsutum, 25-30 mm

** Arboreum, 16-25 mm

The stated goal of the Government to have 15,000 tons of this smallholder cotton available to the mill sector by the year 2000 is ambitious but not unrealistic. The Government intends to pursue it by increasing the area under cotton cultivation and the yield per hectare and by making available to the rural population improved methods and equipment for ginning and spinning part of the cotton for local use.

At present, the area under cotton cultivation in the rural areas is about 20,000 ha and the yield some 150 kg/ha. Assuming that the yield can be increased to 500 kg/ha - which would still be only about one third of a normal plantation yield - the area under cotton cultivation should be increased five-fold to 100,000 ha by the year 2000 in order to produce 17,000 - 18,000 tons of lint cotton per year. The rural communities would process 2,000 - 3,000 tons of this for their own use and the rest - 15,000 tons - would be available for the mill sector.

For the northern hill tribes, with a population of some 3 million, 2,000 - 3,000 tons of short fibre lint cotton would mean about 3,3 metres per capita of coarse cloth - twice their current consumption and sufficient to cover their need for that type of fabric.

Increasing the area under cotton cultivation five-fold should not present a problem, provided the farmers have an incentive for substituting cotton for other cash crops such as ground nuts, tapioca and beans. Also, it should be possible to increase the yield to about 500 kg/ha, provided that measures are taken to make available to the farmers suitable seed, fertilizer and insecticides. An FAO project* is addressing this issue.

The extremely short fibre length of smallholder cotton causes problems at all stages of the spinning process and, as stated, commercially available production equipment is normally not intended for this type of raw material, it is necessary to adjust and, in some cases, modify it to accommodate the short fibre. It will be the task of the Textile Research Institute to advise the textile mills on how to adjust and modify their production processes, and to be ready for this task when smallholder cotton is available for mill consumption in significant quantities. The Institute must start developing that knowledge now. To enable it to do so, external assistance is needed to provide the necessary laboratory and pilot plant equipment,

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*DP/VIE/84/001 - Cotton Research Extension and Development (Phase II)

expertize and training of the Institute's staff.

The sections which require updating to enable the Institute to carry out research on the use of short staple cotton are the spinning department and the testing sections associated with it - the cotton fibre and yarn testing laboratories and the miniature spinning sections. At present the spinning department possesses a range of equipment of Eastern European and Chinese origin covering the processing stages from carding through to ring spinning. This should be augmented by an integrated blow-room that would enable the opening up raw cotton and making it into laps suitable for feeding into cards. This will make it possible to transform raw cotton into yarn at the Institute without having to have the opening stages carried out elsewhere - a practice which would not only be inconvenient but also impractical when dealing with the relatively small quantities of raw cotton usually available for research purposes. Also, in most instances, the performance data from the blowroom is important to the investigation and this can only be obtained when the experiment is carried out on site. The proposed range of machines in the blowroom is the minimum possible and it is recommended that the cotton is passed through it twice to achieve the necessary degree of opening and cleaning. In addition, the Institute requires equipment for a technique, more suitable for spinning very short staple cotton than the ringframes they now possess; a small-sized open-end rotor machine.

Both the fibre testing and yarn laboratories are equipped for slow, manual testing methods which restrict the amount of testing that can be carried out and consequently limit the lines of research that can be pursued. In the fibre test laboratories this can be overcome by installing rapid methods for measuring fibre length (Digital Fibrograph), fibre fineness and maturity (IIC/Shirley Maturity Meter) and strength (Pressley). A Shirley Analyser (or its equivalent) will be provided so that the trash content of cotton can also be measured and, in addition, a Micronaire instrument with its associated equipment so that the Micronaire value can be determined. (Micronaire value is a measure, obtained by an airflow method, in which values of fibre fineness and maturity are combined. Its virtues are that it is an easy measurement to make and its significance is widely understood by spinners.)

The yarn testing section will be equipped for rapid tests for single yarn strength and its variability (Uster Dynamat) and for measuring yarn irregularity, fault level and cleanliness on the Uster Evenness Tester. These last

two instruments enable detailed analyses to be made of the effect of changes in the processing conditions at any stage along the yarn production sequence.

A miniature spinning plant will permit the spinning of sufficient yarn from a 42 g sample of cotton to enable measurements of count and a visual assessment of its appearance to be made. From this information it is possible to determine the commercial spinning limit of a cotton and the quality of the yarn which will be produced. The equipment can also be used to prepare slivers suitable for feeding to the open-end spinning machine, thus enabling miniature tests to be carried out also on this novel system both quickly and from very small quantities of fibre.

At the other end of the scale, processing of small-holder cotton into coarse count yarns and fabrics for farm work clothing will continue in the northern rural communities where it is grown. If the present, primitive and totally inadequate methods and equipment for ginning, opening and spinning could be improved, it would provide an added incentive for these farmers to increase their cotton cultivation. The present equipment productivity is so low that increasing it ten-fold or more should present few technical problems. It is largely a question of choosing from the various available technologies and equipment one that could be easily adapted to the conditions in these villages and manufactured at the lowest possible cost.

The Textile Research Institute has already started work in this area and produced a few prototypes of ginning, opening and spinning equipment with improved productivity compared with the equipment currently used in the villages. However, further development work is necessary to perfect these and to experiment with alternative techniques. For this the Institute needs external assistance to give it access to potential sources of appropriate technology and to guide its staff in the development work.

III RECOMMENDATIONS

1. The study tour should take place as soon as possible so that the senior staff will be back in time to receive the equipment and experts.

2. Training should follow the sequence - fellowship, installation and commissioning of equipment, working with experts.

3. The Purchasing Department of UNIDO should follow up the recommendations in Annex 1.

4. UNIDO should initiate recruitment of the Experts.

5. The NPD should follow the programme outlined in Annex 5 and try to implement the Revised Project Work Plan (Annex 4) as closely as possible.

6. The NPD should see that the formalities for the appointment of the CTA for the remainder of the project are completed as soon as possible.

7. The CTA should prepare for future missions keeping in mind the need to write reports for and to participate in important meetings, e.g. TRM's and the mid term cluster evaluation of UNDP assisted projects in the textile sub-sector.

8. UNDP should settle the dates of TRM's etc. as soon as possible.

9. Where a number of items of equipment are being supplied by the same firm, they should be packed together as one consignment and sent by sea freight to economise on shipping costs.

IV ACTIVITIES AND OUTPUTS

Purpose of the Mission

The main objectives of the mission were:-

- to review the equipment list and finalize the technical specifications in order to facilitate procurement as early as possible.

- to finalize the training programmes and assist in completion of the nomination forms.

- to revise the project work plan taking account of events since the Prodoc was written.

- to prepare a work programme for the NPD in the absence of the CTA.

- to prepare a report and make recommendations of the action to be taken to expedite implementation of the project.

Programme

This mission was combined with another mission to the TRI's Sub-Institute in Ho Chi Minh City, which is receiving assistance through a UNIDO project DP/VIE/86/015 (see separate report). The dates of the combined mission were 13 November 1988 to 13 January 1989, inclusive.

Although there are two separate UNIDO projects, they are so interlinked on the Vietnamese side that it seems only reasonable to consider them concurrently, with a view to achieving maximum coordination.

Counterparts

The NDP is Dr. Tran Quoc Thinh, Vice-Director of the TRI. The Director of the TRI is Dr. Pham Hoang Ninh.

Communication

Discussions were conducted in English or French, usually through an interpreter. This report (in draft form) and all other important documents were translated into Vietnamese and copies given to the NPD.

Buildings

The existing physical and chemical laboratories will be adequate to house the new equipment. The building for the pilot plant is virtually completed.

Equipment

This presented the most problems. Some items are no longer available whilst, in many cases, the actual prices quoted by suppliers far exceed the original budgetary estimates. The latest estimate for all available equipment is $719,838 compared with the budget of $551,900.

All the items of equipment requested are important for the fulfilment of the project activities, but as MOLI indicated that no additional funds could be made available at this time, the following action was taken:

- essential items were ordered to the value of $117,226.
- UNIDO were requested to obtain further information on some major items.
- the items not yet ordered were grouped into priorities 1, 2 and 3 according to the assessment of the situation by the TRI who now regard the blowroom as top priority.

Full details are given in Annex 1.

When all the information is received it will be necessary to make some final, difficult decisions regarding the equipment.

Training

The first Study Tour (4 persons x 1.25 m/m) has been completed and was a great success.

Nomination forms for the second Study Tour (5 persons x 1 month) and the 5 Fellowship groups (16 persons for a total of 33 m/m) have been completed and submitted to MOLI for signature. Details are given in Annex 2. In the meantime, unsigned copies have been given to Ms B. Tassew, a senior member of the Training Section of UNIDO, who plans to visit Hanoi in February to expedite implementation of the UNIDO training programmes and who has promised to follow up on our applications.

It is proposed to combine F/H1 with F/S1 of Project DP/VIE/86/015 thus making a single group of 7 persons which may be easier to organize and more cost effective. The title of F/H1 has been slightly altered and the duration reduced to 3 months to coincide with F/S1.

Experts

Job descriptions for the 5 experts were prepared in conjunction with the NPD. They are:

EH1	CTA
EH2	Fibre testing expert
EH3	Blowroom technician
EH4	Open-end spinning expert
EH5	Appropriate spinning technology adviser

It is proposed that the CTA (EH1) should be the same person as ES1 of DP/VIE/86/015 and that the Fibre testing expert (EH2) should be the same person as ES2 and that they should have split missions.

Copies of the JD's are attached as Annex 3.

Work Plan

A revised Work Plan was agreed with the NPD. A copy is attached to this report as Annex 4, which also includes the Work Plan for Project DP/VIE/86/015 since the two programmes are interlinked and need to be co-ordinated.

Programme of Work for the NPD

A work programme covering equipment, training, experts, etc., was prepared for the guidance of the NPD in the absence of the CTA. A copy is attached as Annex 5.

Seminars by the CTA

The CTA gave a seminar on "Textile Technology" to the staff of the TRI and a seminar on "Project Implementation" to senior staff of the TRI and MOLI.

Mill Visits

Visits were made to the Hanoi Spinning Mill and to the Central Sericulture Research Centre where there is an FAO project in progress.

V CONCLUSIONS

Considerable progress was made during this first short mission in connection with the training programme and identification of the particular areas of expertise required by the experts.

A substantial amount of equipment has already been ordered but there are still some important decisions to be taken, especially as regards the blowing room, open-end spinning and hand spinning equipment. The information required for decision making has been requested.

The next mission of the CTA should be not later than the fourth quarter of 1989 with possibly a short visit in April/May 1989 to keep up the momentum.

The staff of the Institute, from the Director downwards, are enthusiastic about the project and the work that will be carried out by the TRI when the project is completed. The textile mills are looking forward to increased co-operation with the TRI.

Provided that a satisfactory solution can be worked out for the equipment, the project should be a great success.

VI ACKNOWLEDGEMENTS

The CTA wishes to thank all those in Government, UNDP and UNIDO who participated in this mission for their willing co-operation, advice and hospitality, and in particular:

Dr. Dang Vu Chu, Vice-Minister of Light Industry
Mr. Nguyen Hieu, Director of International Cooperation Dept of MOLI
Dr. Pham Hoang Ninh, Director of the TRI
Dr. Tran Quoc Thinh, NPD
Mr. David Smith, Res. Rep. UNDP
Mr Jean Marc Bonnamy, SIDFA
Mr. Phan Duc Thang, Programme Officer, UNDP

ANNEX 1

UNIDO ONUDI
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
ORGANISATION DES NATIONS UNIES POUR LE DEVELOPPEMENT INDUSTRIEL

INTEROFFICE MEMORANDUM — MEMORANDUM INTERIEUR

Eräneva/Nield/em

TO/A: Mr. R. Logan, Chief, DA/GS/PUR — Date: 12 January 1989
Attn: Mr. Yamashita
Through: Mr. J. Lequien, Head, IO/T/AGRO
FROM/DE: A. Eräneva, ADV

SUBJECT/OBJET: VIETNAM: DP/VIE/86/014

This supersedes my IOM of 21 November 1988. The CTA, Dr. Roy Nield, has now further discussed the equipment offers with the project authorities and advises on all items as follows:

Req. 88/2/7 - Microscope

Recommendation: Defer requisition. This is regarded as a priority 3 item.

Req. 88/2/8 - Analytical balance

Recommendation: Defer requisition. This is regarded as a priority 3 item.

Req. 88/4/1 - Set of miniature spinning machines

Recommendation: This item would appear to be no longer available. Take no action pending the completion of study tour ST/H2 which may throw light on this matter.

Req. 88/4/2 - Blowroom line

The blowroom equipment is regarded by the TRI as top priority since without it they feel that they will not be able to carry out their work programme. At present they have to acquire scutcher laps from the factories in order to feed their three cards.

Three quotations have been received:

Rieter	$ 222.878
Hergeth	$ 331.685
Truetzschler	$ 659.194

Rieter is cheapest but does not include a scutcher, which is essential as there are three cards to feed, and so does not meet the specification. The cost of a scutcher is approximately $ 100.000.

Hergeth's offer is high and does not include a full filter plant for the dust extracted.

Truetzschler's offer is very high but includes many items that are not required. The Project Document calls for the shortest possible line which we believe to consist of:

- Opening and Cleaning Line comprising Super Bale Opener 1000, Step Cleaner SR56 and Cleaner RN;
- Scutcher Line comprising Condenser LVS, Pneumafeeder FS and Scutcher SME;
- fans, control panel and simplest effective filter system (Note: the machines will only run for short periods of time);
- manual waste collection from machines to facilitate quantitative measurements;
- manual lap doffing (if available);
- means to remove cotton from the pneumafeeder and return it to the feed lattice by hand for a second passage if necessary (as foreseen in the ProDoc).

Based on Truetzschler's quotation it is estimated that the cost of the above should be approximately $ 320.000 FOB.

N.B.: The estimated C+F charges by the three suppliers vary considerably. In practice, they should all be about the same. Therefore it is better to work on FOB prices.

Recommendation: Please check with Truetzschler (Mr. Koch) that the above proposal is feasible and establish the exact price. However, do not place the order yet. We question the need for this particular machine and have written to the RR about it. We will revert upon receipt of his reply.

Req. 88/5/1 - Laboratory-scale open-end spinning machine

The original specification said "with BD rotors". This is no longer a requirement.

This item is very important as rotor spinning could prove to be an ideal system for Vietnamese cotton.

Recommendation:
1. Request Rieter Machine Works, Winterthur, Switzerland to quote for a six-spindle "Spintrainer";
2. Request Spindelfabrik Suessen, Schirr, Stahlecker + Grill GmbH, 7334 Suessen, FRG to quote for a four-spindle machine;
3. Request W. Schlafhorst + Co., D-4050 Mönchengladbach 1, FRG to quote for the shortest length "Autocoro type SRZ" with spare parts including one additionasl set of combing rollers, one additional set of rotors and one additional set of navels.

Req. 88/5/2 - Small can drawframe to be used with Item 1 of Req. 88/5

Recommendation: Defer consideration until Item 1 of Req. 88/5 is resolved.

Req. 88/6 - Set of hand-spinning machines

No quotations have been received. On the other hand, this equipment is essential for the implementation of one part of the project. This matter will be considered by the members of study tour ST/H2 on "Appropriate Spinning Technology".

Recommendation: Reconsider at a later date, in the light of the report by ST/H2.

Req. 88/8/1 - Uster Evenness Tester

Recommendation: In view of the very high price quoted for this item please request Zellweger/Uster to quote for their whole range of available models.

Req. 88/8/2 - Uster Dynamat

Recommendation: As item 1 above.

Req. 88/9 - Set of nep counting boards and template

No quotations received.

Recommendation: Delete this item. The equipment can be made locally.

SUMMARY OF THE PRESENT SITUATION AS REGARDS PROJECT EQUIPMENT

EQUIPMENT LIST

REQ.NO.	ITEM	SUPPLIER	ACTUAL PRICE OR EST.($)
	FUNDS COMMITTED IN 1988		
88/2/1	Digital Fibrograph	SDL	36.752
88/2/2	Fibre Opener Blender	SDL	6.022
88/2/3	Pressley	Baer	6.154
88/2/4	Micronaire	Baer	
88/2/5	Fibre Maturity	SDL	21.174
88/2/6	Laboratory roller gin	Lummus	6.491
	Vehicle and spares		16.704
	Books		3.000
88/3	Air-conditioning Units (2)	York	19.391
88/7	Plain paper copier	Kwan	1.538
Sub-total			117.226
	PRIORITY 1 ITEMS		
88/4/2	Blowroom line	Truetzschler	320.000 Est.
88/8/1	Uster Evenness tester	Uster	75.112
Sub-total			395.112
	PRIORITY 2 ITEMS		
88/5	Rotor spinner (lab.scale not available)	Schlafhorst	125.000 Est.
88/8/2	Uster dynomat	Uster	74.000
Sub-total			199.000

SUMMARY OF THE PRESENT SITUATION AS REGARDS PROJECT EQUIPMENT

EQUIPMENT LIST (continued)

REQ.NO.	ITEM	SUPPLIER	ACTUAL PRICE OR EST.($)
	PRIORITY 3 ITEMS		
88/2/7	Microscope		4.500 Est.
88/2/8	Analytical balance		2.000 Est.
88/6	Hand-spinning machines		2.000 Est.
88/9	Nep counting boards	Make locally	-
88/4/1	Miniature spinning plant	Not available	-
88/5/2	Small can drawframe	May not be needed	-
Sub-total			8.500 Est.

SUMMARY OF EQUIPMENT COSTS

Funds committed in 1988		$ 117.226
Items not yet ordered		
- Priority 1 items	$ 395.112	
- Priority 2 items	$ 199.000	
- Priority 3 items	$ 8.500	$ 602.612
		$ 719.838
Equipment budget in Project Document		$ 551.900

cc.: NPD, Dr. Tran Quoc Thinh
Dr. Nield

ANNEX 2

SUMMARY OF STUDY TOURS AND FELLOWSHIPS

Study Tours

ST/H1 — Cotton R & D and spinning technology
4 x 1.25m = 5m/m
ITMA + Europe
Completed

ST/H2 — Appropriate spinning technology
5 x 1m = 5m/m
India + Australia

Fellowships

F/H1 — Cotton fibre testing + miniature spinning
4 x 3m = 12m/m
UK (Combine with F/S1 of VIE/86/015)

F/H2 — Blowroom installation and maintenance
3 x 1m = 3m/m
Supplier

F/H3 — Spinning technology
2 x 3m = 6m/m
W. Germany

F/H4 — Appropriate technology
5 x 2m = 10m/m
India

F/H5 — Uster equipment
2 x 1m = 2m/m
Switzerland (Zellweger/Uster)

ANNEX 3

January 1989

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

Job Description
DP/VIE/86/014/11-01/J13102

Post title	**Chief Technical Adviser**
Duration	**12 months (split missions; initial mission two months)**
Date required	**October 1989**
Duty station	**Hanoi**
Purpose of project	**The development objective of the project is to increase the availability of cotton textiles for domestic consumption. This objective is included in the III UNDP Country Programme for Viet Nam, Paragraph 50, and is in line with the Government's development plan for the period 1986-90 which emphasizes the need to expand the production of consumer goods, especially clothing, by means of increased utilization of indigenous raw materials.** **The immediate objective of the project is to strengthen the Textile Research Institute's capability of conducting cotton fibre evaluation and spinning development work, with particular emphasis on the use of short staple cotton. This will enable the Institute to advise spinning mills on optimum processing conditions when using such cottons and to develop an improved hand spinning technology for use in remote rural areas.**

Duties

- **Design of programme of research work which will enable the Institute to determine how to process local short staple cotton on various spinning machines and to develop a suitable system of hand spinning.**
- **Commission the pilot spinning plant and oversee the installation of new and existing spinning equipment.**
- **Co-ordinate the work of the other experts in commissioning equipment and training staff.**
- **Train local staff in experimental techniques and supervise their activities in the research programme.**

Qualifications	**Textile degree or diploma. At least five years practical spinning experience and two years involvement of research or development work.**
Language	**English**

Background and Justification

The textile industry in Viet Nam comprises about 880,000 spindles and 11,000 looms, roughly equally divided between the North and the South and generally operating at 50 per cent of installed capacity. Yarn production increased from 31,000 tons in 1981 to 51,000 tons in 1985 and fabric production from 116 million metres in 1981 to 203 million metres in 1985 (= 3,4 metres per capita). It is the intention of the Government to increase the fabric availability to 8 metres per capita by the year 2000. Assuming a population increase from the present 60 million to 70 million by the year 2000 this would mean a fibre raw material requirement of about 150,000 tons of which 100,000 would be cotton. The present cotton consumption is 60,000 tons per year - virtually all of it imported.

Of the 100,000 ton cotton requirement in the year 2000 the Government plans to cover 30,000 tons through local production - half of it plantation cotton* and the other half smallholder cotton**. This latter variety is the "short fibre cotton" to which the title of this project refers. It is grown on small plots mainly in the northern part of the country by villagers who convert it into coarse yarn and fabric using extremely primitive hand spinning and weaving techniques. The present production is limited to about 1000 tons of lint cotton per year - roughly equivalent to 1,5 metres per capita among the northern hill tribes who grow and process it for their own use.

The stated goal of the Government to have 15,000 tons of this smallholder cotton available to the mill sector by the year 2000 is ambitious but not unrealistic. The Government intends to pursue it by increasing the area under cotton cultivation and the yield per hectare and by making available to the rural population improved methods and equipment for ginning and spinning part of the cotton for local use.

At present, the area under cotton cultivation in the rural areas is about 20,000 ha and the yield some 150 kg/ha. Assuming that the yield can be increased to 500 kg/ha - which would still be only about one third of a normal plantation yield - the area under cotton cultivation

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For the northern hill tribes, with a population of some 3 million, 2,000 - 3,000 tons of short fibre lint cotton would mean about 3,3 metres per capita of coarse cloth - twice their currrent consumption and sufficient to cover their need for that type of fabric.

Increasing the area under cotton cultivation five-fold should not present a problem, provided the farmers have an incentive for substituting cotton for other cash crops such as ground nuts, tapioca and beans. Also, it should be possible to increase the yield to about 500 kg/ha, provided that measures are taken to make available to the farmers suitable seed, fertilizer and insecticides. An FAO project* is addressing this issue.

The extremely short fibre length of smallholder cotton causes problems at all stages of the spinning process and, as standard, commercially available production equipment is normally not intended for this type of raw material, it is necessary to adjust and, in some cases, modify it to accommodate the short fibre. It will be the task of the Textile Research Institute to advise the textile mills on how to adjust and modify their production processes, and to be ready for this task when smallholder cotton is available for mill consumption in significant quantities. The Institute must start developing that knowledge now. To enable it to do so external assistance is needed to provide the necessary laboratory and pilot plant equipment, expertize and training of the Institute's staff.

The sections which require updating to enable the institute to carry out reseach on the use of short staple cotton are the spinning department and the testing sections associated with it - the cotton fibre and yarn testing laboratories and the miniature spinning sections. At present the spinning department possesses a range of equipment of Eastern European and Chinese origin covering the processing stages from carding through to ring spinning. This should be augmented by an integrated blow-room that would enable the opening up raw cotton and

*DP/VIE/84/001 - Cotton Research Extension and Development (Phase II)

making it into laps suitable for feeding into cards. This will make it possible to transform raw cotton into yarn at the Institute without having to have the opening stages carried out elsewhere - a practice which would not only be inconvenient but also impratical when dealing with the relatively small quantities of raw cotton usually available for research purposes. Also, in most instances, the performance data from the blowroom is important to the investigation and this can only be obtained when the experiment is carried out on site. The proposed range of machines in the blowroom is the minimum possible and it is recommended that the cotton is passed through it twice to achieve the necessary degree of opening and cleaning. In addition, the Institute requires equipment for a technique, more suitable for spinning very short staple cotton than the ringframes they now possess; a small-sized open-end rotor machine.

Both the fibre testing and yarn laboratories are equipped for slow, manual testing methods which restrict the amount of testing that can be carried out and consequently limit the lines of research that can be pursued. In the fibre test laboratories this can be overcome by installing rapid methods for measuring fibre length (Digital Fibrograph), fibre fineness and maturity (IIC/Shirley Maturity Meter) and strength (Pressley). A Shirley Analyser (or its equivalent) will be provided so that the trash content of cotton can also be measured and, in addition, a Micronaire instrument with its associated equipment so that the Micronaire value can be determined. (Micronaire value is a measure, obtained by an airflow method, in which values of fibre fineness and maturity are combined. Its virtues are that it is an easy measurement to make and its significance is widely understood by spinners).

The yarn testing section will be equipped for rapid tests for single yarn strength and its variability (Uster Dynamat) and for measuring yarn irregularity, fault level and cleanliness on the Uster Evenness Tester. These last two instruments enable detailed analysis to be made of the effect of changes in the processing conditions at any stage along the yarn production sequence.

A miniature spinning plant will permit the spinning of sufficient yarn from a 42 g sample of cotton to enable measurements of count and a visual assessment of its appearance to be made. From this information it is possible to determine the commercial spinning limit of a cotton and the quality of the yarn which will be produced. The equipment can also be used to prepare slivers suitable for feeding to the open-end spinning machine, thus enabling miniature tests to be carried out also on this novel system both quickly and from very small quantities of fibre.

At the other end of the scale, processing of smallholder cotton into coarse count yarns and fabrics for farm work clothing will continue in the northern rural communities where it is grown. If the present, primitive and totally inadequate methods and equipment for ginning, opening and spinning could be improved, it would provide an added incentive for these farmers to increase their cotton cultivation. The present equipment productivity is so low that increasing it ten-fold or more should present few technical problems. It is largely a question of choosing from the various available technologies and equipment one that could be easily adapted to the conditions in these villages and manufactured at the lowest possible cost.

The Textile Research Institute has already started work in this area and produced a few prototypes of ginning, opening and spinning equipment with improved productivity compared with the equipment currently used in the villages. However, further development work is necessary to perfect these and to experiment with alternative techniques. For this the Institute needs external assistance to give it access to potential sources of appropriate technology and to guide its staff in the development work.

January 1989

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

Job Description
DP/VIE/86/014/11-02/J13102

Post title	**Fibre testing and miniature spinning expert**
Duration	**3.0 months (split missions)**
Date required	**November 1989 and October 1990**
Duty station	**Hanoi, with possibility of travel within the country**
Purpose of project	**To strengthen the Textile Research Institute's capability of conducting cotton fibre evaluation and spinning development work, with particular emphasis on the use of short-staple cotton. This will enable the Institute to advise spinning mills on optimum processing conditions when using such cottons and to develop an improved hand-spinning technology for use in rural areas.**
Duties	**The expert will work in co-operation with counterpart personnel and under the leadership of the Chief Technical Adviser (CTA) and will specifically be excpected to assist the national staff to** **1. establish testing routines in line with the best international standards;** **2. evaluate Vietnamese and imported cottons;** **3. evaluate Vietnamese produced and imported cotton and blended yarns and fabrics;** **4. develop, systemise and introduce state standards, regional standards and branch standards for Vietnamese cottons and yarn properties based on experience statistics;** **5. establish quality assurance and certification procedures for imported cottons and imported and exported yarns;** **6. advise textile mills on problems relating to textile testing and quality control.**
Qualifications	**At least 10 years experience in fibre, yarn and fabric testing and quality control and certification for export. Wide knowledge of quality standards expected in importing countries.**
Language	**English**
Background Information	**As in job description for post 11-01.**

January 1989

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

Job Description
DP/VIE/86/014/11-03/J13102

Post title	**Blowroom technician**
Duration	**One month**
Date required	**Late 1990, after delivery of the equipment**
Duty station	**Hanoi**
Purpose of project	**To strengthen the Textile Research Institute's capability of conducting cotton fibre evaluation and spinning development work, with particular emphasis on the use of short-staple cotton. This will enable the Institute to advise spinning mills on optimum processing conditions when using such cottons and to develop an improved hand-spinning technology for use in rural areas.**
Duties	**The technician will work in co-operation with counterpart personnel and under the leadership of the Chief Technical Adviser (CTA), and will specifically be expected to:** **1. demonstrate the full potential of the blowing room line;** **2. train the local staff in operation, adjustment and maintenance of the equipment;** **3. assist in organizing and implementing processing trials.**
Qualifications	**Several years experience as fitter/machine erector with the supplier. Ability to demonstrate equipment and assist with experiments.**
Language	**English**
Background Information	**As in job description for post 11-01.**

January 1989

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

Job Description
DP/VIE/86/014/11-04/J13102

Post title	**OE spinning technician**
Duration	**One month**
Date required	**August 1990, after delivery of the equipment**
Duty station	**Hanoi**
Purpose of project	**To strengthen the Textile Research Institute's capability of conducting cotton fibre evaluation and spinning development work, with particular emphasis on the use of short-staple cotton. This will enable the Institute to advise spinning mills on optimum processing conditions when using such cottons and to develop an improved hand-spinning technology for use in rural areas.**
Duties	**The technician will work in co-operation with counterpart personnel and under the leadership of the Chief Technical Adviser (CTA), and will specifically be expected to:** **1. demonstrate the full potential of the OE spinning equipment;** **2. train the local staff in operation, adjustment and maintenance of the equipment;** **3. assist in organizing and implementing processing trials.**
Qualifications	**Several years experience as fitter/machine erector with the supplier. Ability to demonstrate equipment and assist with experiments.**
Language	**English**
Background Information	As in job description for post 11-01.

January 1989

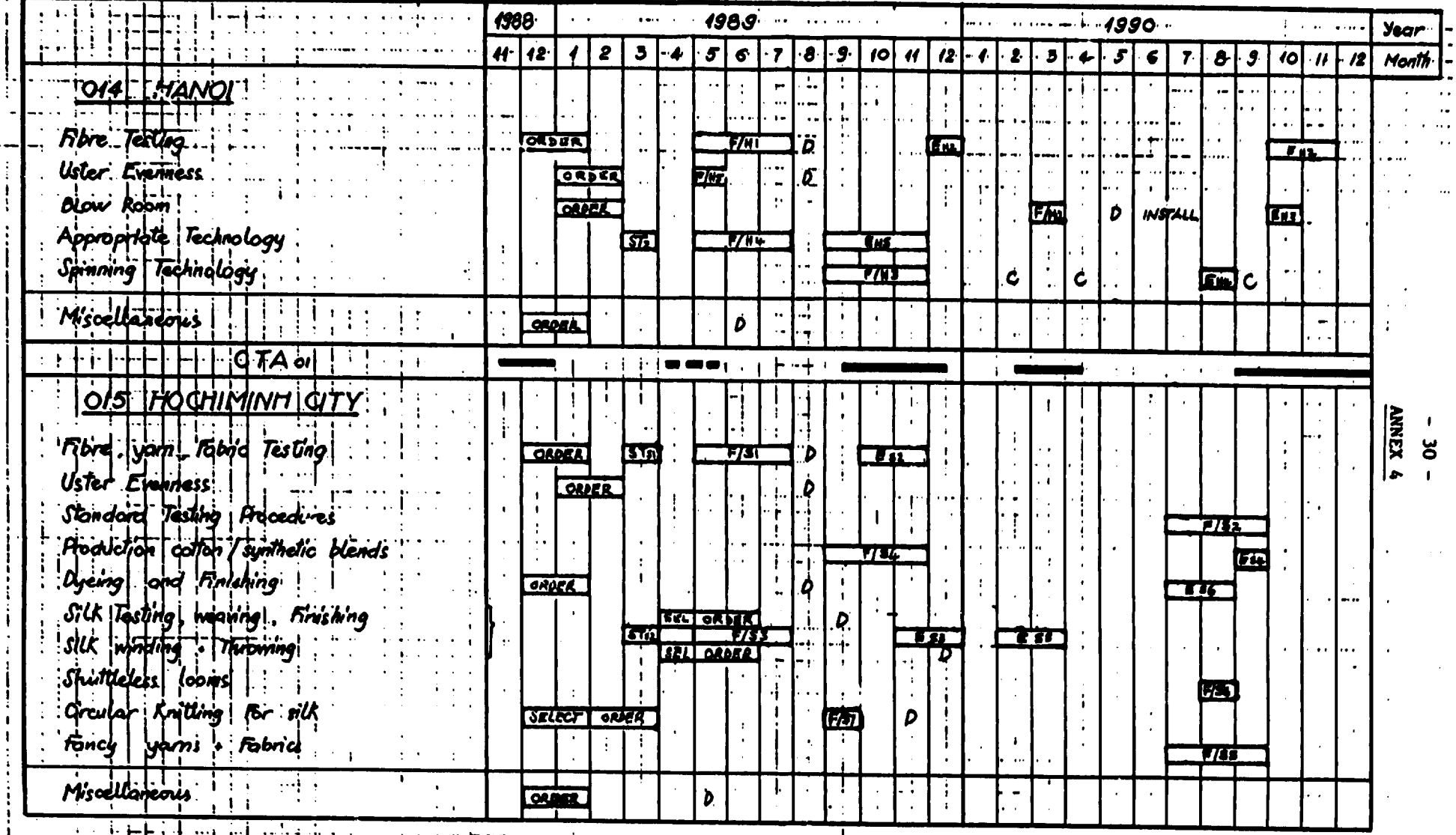
UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
UNIDO

Job Description
DP/VIE/86/014/11-05/J13102

Post title	Expert in appropriate spinning technology
Duration	Three months
Date required	September 1989
Duty station	Hanoi, with travel within the country
Purpose of project	To strengthen the Textile Research Institute's capability of conducting cotton fibre evaluation and spinning development work, with particular emphasis on the use of short-staple cotton. This will enable the Institute to advise spinning mills on optimum processing conditions when using such cottons and to develop an improved hand-spinning technology for use in rural areas.
Duties	The expert will work in co-operation with counterpart personnel and under the leadership of the Chief Technical Adviser (CTA), and will specifically be expected to: - train local staff in the operation of hand-operated equipment for ginning, carding, drawing and spinning cotton; - review the work already carried out by the TRI in this field; - participate in the development of entirely new hand operated machines; - assist in drawing up specifications and designs; - assist in the manufacture and testing of prototypes.
Qualifications	Wide experience of the use of hand spinning equipment including ginning, opening and cleaning, carding, drawing and spinning. Knowledge of the latest developments in this field possibly including low technology, low cost open end spinning.
Language	English
Background Information	As in job description for post 11-01.

REVISED WORK PLANS FOR PROJECTS 014 AND 015



ST = Study Tour
F = Fellowship
E = Expert

SEL = Select Equipment
D = Delivery of Equipment
C = Consultant

ANNEX 5

WORK PROGRAMMES FOR NPDs IN ABSENCE OF THE CTA

As the CTA will only be present for split missions, the NPDs are requested to carry out the following in his absence.

Equipment

Selection and ordering:

- Submit specifications for the remaining items of equipment to UNIDO (via UNDP). It is a good idea to write the specifications in some detail and then say "e.g. Model XYZ from maker ABCD".

- Select circular knitting machine from quotations received from UNIDO.

- Reply to any queries from UNIDO promptly.

Delivery

- Take delivery of each item as it arrives and check that it is in good condition. If so, sign Page 9 of the Purchase Order and send it to UNIDO for the attention of PAC (through UNDP). File Section 5.

- If there is any damage, report to UNIDO immediately.

Installation

- See that each item is installed correctly in a suitable location.

Vehicles

- Take delivery of vehicles.

- Appoint a well-trained driver for each vehicle who should:

  - drive correctly (e.g. changing gear at proper times)

  - wash the vehicle every day and clean the insides.

- carry out simple maintenance tasks as specified in Toyota handbook.

- ensure that the vehicle is correctly serviced at intervals specified in Toyota handbook.

- be polite and helpful at all times.

- Have maintenance and servicing instructions translated into Vietnamese for the driver's information.

- Ensure that the vehicle is safely garaged.

Study Tours

- Check that Nomination Forms are fully and correctly completed and signed.

- Forward forms to MOLI for signature.

- Check that forms are then delivered to UNDP (Hanoi).

- UNDP will then forward them to UNIDO for processing.

- Assist (if necessary) in obtaining passports, visas, health certificates, etc.

Fellowships

Nomination Forms

- Check that nomination forms are fully and correctly completed (at least 4 copies).

- Check that forms are signed by candidates on each copy (NOT PHOTO-COPY OF SIGNATURE).

- Check that forms are signed by doctor on each copy.

- Obtain signature of TRI official on each copy.

- Ensure language certificate is attached.

- Deliver forms to MOLI for signature on page 1.

- Check that completed and signed forms (3 copies) are taken to UNDP for signature.

- UNDP will then forward them to UNIDO.

N.B. Until signed forms are received by UNIDO, UNIDO will not take any definite action, so it is very important to complete the above mentioned formalities as soon as possible.

Travel

- Assist (if necessary) in obtaining passports, visas, health certificates, etc.

Briefing

- Give each candidate a detailed briefing prior to departure including a list of:

  - countries and institutes to be visited
  - people to contact
  - specific equipment and/or processes to be studied
  - skills to be acquired
  - details of information to be brought back
  - kind of work candidate will be expected to do on return

- Remind candidates they will be expected to write a report for UNIDO when they return.

Debriefing

- Discuss details of programmes carried out and benefits derived.

- Ensure that returned candidates write full reports.

- Send reports to UNIDO.

Experts

CTA

- Folow up request to MOLI to appoint CTA for remainder of projects 014 and 015.

- N.B. MOLI should write officially to UNDP who will then telex UNIDO.

- This should be done as soon as possible as otherwise the CTA may not be available on the specific dates required.

Other Experts

Selection

- Review CV's provided by UNIDO in conjunction with MOLI. Select preferred candidate.

  N.B. If none is suitable, write to UNIDO explaining why and requesting CV's of more candidates.

- Give UNDP name of selected candidate and approximate date required.

- UNDP will then request UNIDO to recruit selected candidate. This could take several months.

On Arrival

- Help expert to complete all formalities quickly.

- Introduce expert to counterparts.

- Discuss work programme.

- Check progress from time to time.

- Provide secretarial assistance, etc.

Any Other Matters that may Arise

- Many other problems will arise during the implementation of these projects. Try to solve these problems as they occur. Otherwise record them for discussion with the CTA during his next mission.

Reporting

- Keep files of all documents and correspondence relating to the projects.

- Make a "note for the file" of every important decision and the action taken for the information of the CTA and for inclusion in the Final Report.