

5. Quality control system is not fully carried out

5. Improve awareness and concern for quality control

Implement training in quality control

(B) Nonmill Sector (Group B)

Problems

(hindering factors)

1. Foundations of industrial management are weak

2. Equipment is getting out of date

3. Defects in the quality of the weaver's beam

4. Defective quality of produced fabric

5. Technical levels are low

Countermeasures

(recommended proposals)

1. Promote greater concentration or cooperative management between firms

2. Promote investment to modernize equipment (particularly for a changeover to shuttleless looms)
Undertake the renovation of equipment (attaching of stop motion devices for yarn breakage)

3. Improvement and replacement of equipment in the preparing shops
- replace the warping creels (replace with H models)
- attach automatic stop devices for end breakages
Provide instruction in warping and sizing technology to warping firms
Improve the quality of the softening agent (oil)
Improve the packing and transport methods for grey yarn and beam

4. Implement maintenance of looms
Employ accessory parts of good quality
Implement appropriate inspections of manufactured fabric and establish a system of production management based on the inspection results
Set up common inspection centres

5. Reinforce the technical guidance to mills and firms by means of establishing instructional and training institutes.

2-1-4. Knitwear Sector

Problems

(hindering factors)

(1) Knitting process

1. Defective quality of grey yarn

2. Limited types of grey yarn available

3. No quality control for knitted fabric

4. Shortage of knitting engineers

(2) Dyeing Processing

1. Low quality of the finished product

- considerable shrinkage rate at washing
- insufficient chroma
- no luster usually typical of cotton

Countermeasures

(recommended proposals)

1. Improve the packing methods for the cheese
 - use packing cases for carriage to prevent damage to yarn and paper tube
 - set up and diffuse standards of grey yarn to be used for knitting

2. Request the spinning sector a supply of high grade yarn :
 - fine count yarn (above 30^S)
 - double twisted yarn (40^S/2, 60^S/2), etc.Use of yarn-dyed fabric and installation of yarn-dyeing equipment

3. Perform appropriate inspection of knitted fabrics and take corrective actions in the knitting process upon the inspection results.

4. Reinforce the training facilities and train up knitting engineers

1. Change dyeing machinery and dyeing methods (dyeing at conditions of low tension)
 - jet dyeing machine rather than wince dyeing machine
 - changeover of the drying method (to correct the stretch deformation occurring in the dyeing)
 - either tumbler (batch system) or net conveyor dryer is commended
 - a heat setter is needed for mixed cotton polyester blended fabrics

Employ spinning mercerization

Either soften the water for dyeing use or use deionizer

2. Dyeing stains and uneven dyeing

2. Improve the basic technology for dyeing (knowledge of the various dyeing-finishing methods)

Improve production technology (including the control of the conditions of production such as temperature, concentration, flow rate, pressure, etc.)

Upgrade servicing and maintenance technology for the dyeing-finishing equipment

3. Shortage of dyeing engineers

3. Strengthen training facilities and train up dyeing engineers (basic training could be carried out in common with courses for dyeing technology for woven fabrics)

4. Quality control system is fully not implemented

4. Implement inspections of dyed fabrics and take actions to improve processing on the basis of inspection results.

(3) Sewing Process

The same problems and countermeasures as seen in 2-1-6 Garment Sector.

2-1-5. Dyeing Sector

Problems

(hindering factors)

1. The dyeing-finishing equipment (in particular the cloth piece dyeing equipment) is out of date and deteriorated

2. Product quality levels are low

- uneven dyeing and disparities in dyeing between lots frequently occur
- colours have no lustre

Countermeasures

(recommended proposals)

1. Carry out a reexamination of dyeing facilities and promote investment aimed at modernization of automation of the important parts of the processing equipment (temperature control, processing time, chemical inputs, etc.)

2. Upgrade the scouring technology

Render the control of dyes and chemicals more appropriate

- employ qualified dyes and chemicals
- improve the colour adjusting technology

- Implement systems for preliminary inspection of materials (fabrics)
 - Improve the water used for processing (installation of pre-processing equipment)
 - Employ the mercerization
 - Improve and reinforce inspection methods for finished product
 - implement a constant dimensional control (length, width)
 - implement a grading system for output on a defect point system
 - Implement tests of product quality (to test shrinkage, fastness, etc.)

- 3. Equipment management is insufficient

- 4. Need for upgrading of technical and managerial levels of dyeing engineers

- 5. Quality control system is not fully implemented

- 6. Working environment is poor

- 3. Upgrade maintenance technology for machinery and facilities and systematize it.
 - Implement regular interval cleaning of equipment

- 4. Retrain mid-ranking engineers and executives
 - Give emphasis to acquisition of technical expertise in the job
 - Set up training systems for recruited engineers

- 5. Improve awareness regarding quality control
 - Implement training in quality control

- 6. Improve awareness of importance of tidiness and order in the workplace
 - Improve the handling of raw materials, in-process goods, and finished products
 - Improve the facility layout (relocate existing equipment when investment for modernization is implemented)

2-1-6. Garment Sector

Problems

(hindering factors)

1. Mass production technology is not established

2. Product quality levels are low

3. Maintenance of equipment is insufficient

Countermeasures

(recommended proposals)

1. Standardize operations and manufacture product of even quality

Carry out appropriate process design and equipment layout on the basis of process analysis, ordering of process steps, and measurements of standard times for each product line

Improve and standardize processing on the basis of analysis of operations

Implement training of operators to increase their understanding and interest in the finished product

2. Upgrade the basic production technology of patterning, cutting, sewing and finishing

Use materials of a high quality

Increase the variety of materials

- woven cloths of fine count, piece dyed cloths, etc.

- brightly coloured materials

Use accessory items (buttons, linings, etc.) of good quality

Encourage and increase exchanges and contacts with overseas bodies concerning design and technology

3. Implement daily inspection of equipment and servicing operations

Sewing machines:

- check against loose belts, defects along yarn guide, adjustment of bobbin cases, removal of waste yarn from the shuttle feed dog

- removal of trash from the oil tank and oil level check

- cleaning of the sewing machine upper body and table

Cutters:

- grinding of cutting edge
- checks for loose screws, cutting edge rotation, damage to cutting table and oil stains.

Steam irons:

- check for nozzle clogging
- appropriate temperature maintenance and control
- checks for soiling of the iron boards

4. Shortage of personnel who well trained in technology or management

4. Train engineers who can plan process design and production planning

Train engineers for designing patterns, grading and marking

Train skilled foremen who can provide technical guidance to the sewing operators, and strengthen in-house training systems

< Example of in-house training >

Adjusting technology of the upper and lower threads of sewing machine, and of thread line of interlock sewing machine.

[Reference VI-01]

A. Quality Control (General)

1. Problem Consciousness

For there to be any improvements made in the existing state of affairs such as upgrading of product quality or operating rates, it is first necessary that there should be consciousness of the deficiencies or problems of the status quo. Obviously, if it is judged that the status quo is satisfactory then problem points will pass unidentified. In actual fact however excellent a factory is, there are always some deficiencies or problems, and new problems arise daily.

Generally speaking, this consciousness over the product quality can arise on functioning of a principle: the product price and the manufacturer's profit vary with actual product quality evaluations which comprise users' and consumers' demands and appreciation and appraisal made by markets.

If pricing showed little difference irrespective of product quality, sales remained constant, and no influence was felt due to the increase or decrease of clients then there would be no need for the upgrading of product quality. Leaving aside the domestic situation in Pakistan, such a state of affairs obviously does not hold on international markets. Therefore, in order to overcome international competition and assure an increased value added through upgrading of output, it is essential to undertake product quality control.

2. Product Quality

In its narrow sense the term "product quality" refers to the quality of finished products, but in its wider acceptance the term encompasses all aspects of the factory or workplace such as the quality, capacity, efficiency of equipment and machinery, temperature and humidity control, operator attendance rates, etc. All of the above are susceptible to Statistical Quality Control (SQC) and so form aspects concerned by quality control.

2-1. Dispersion of quality

When discussing the quality the two concepts of production quality (quality of each step of production activity) and design quality (a designed quality level designated by the management) are employed.

The first step in SQC is to reduce dispersion in the product quality so as to assure a stable situation of production in line with the upgrading of the production quality. Subsequently the improvement of design quality is the next objective, that is the increase or decrease of average of particular characteristic value of the product. This average value and the degree of dispersion is a comprehensive gauge of the technical and control capacity of a given factory. The smaller the dispersion the greater the capability of the factory in technology and control.

For instance,

In the case of machinery operating efficiency; the higher the result the better.

In the case of defective product; the lower the result the better.

In cases where a certain factor is low one day and then high the next, this indicates a lack of stability in processing and reveals that there is some cause for the dispersion in the processing itself.

2-2. Standardization

In order to reduce dispersion in production the following conditions and measures must be maintained:

- (1) in production lines such as spinning where a number of similar machines are installed, it is necessary to ensure that the machines are all to the same uniform settings (for revolution, fitting dimensions, timing conditions, etc.);
- (2) the quality of raw materials supplied are as uniform as possible;
- (3) operating methods, actual operations and procedures are consistent; and
- (4) surrounding conditions such as humidity or temperature are kept uniform.

Standardization is therefore the establishment of uniform criteria based on which operations are effected. Although this sounds quite simple, it is not easy to put into practise.

Generally speaking, standardization is achieved taking account of the three factors of stability, product quality and operating efficiency. However, as soon as superior conditions or methods are discovered during implementation, then adjustments will need to be made to incorporate these. The standardized conditions and methods for production need to be codified and procedures for an amendment need to be decided upon.

Standardization is a precondition for quality control, and at the very least needs to be carried out concurrently with the latter. It will be impossible to reduce the dispersion in production quality without standardization.

2-3. Decision of Control Items and Control Points

Problems and troubles are to be handled in order of their gravity and the most pressing to be tackled first.

2-4. Giving Numerical Form to Concerned Data

It is necessary to prepare data for items concerned by quality control in a numerical form. There are two forms:

continuous values : data of measurements of temperature, humidity, strength, length, etc.

discrete values: data in numerical form such as defect rate, failure rate, defects per unit (yarn breakage, etc.)

2-5. Stratification and Data Sampling

It will be necessary to decide how to sample proper data when some specific control item requires investigation. For example, in order to obtain data which indicate differences between machines and differences in morning and afternoon conditions, measurements by machines and by time are required. The preparation of such data is called stratification.

2-6. Graph Presentations

Presentation of data in a graph form is an aid to clear and rapid understanding of difference among the data. It will be necessary to select the most appropriate form of graph for a specific kind of data, so that histograms, cumulative frequency diagrams, segment line graphs, pie charts, scatter diagrams, etc. will be used as appropriate.

2-7. Control Charts, etc.

The drawing up of control charts using the SQC method is a basic step of quality control.

In analysing problems and troubles, statistical methods are useful, depending on the problem. Those are data analysis such as determining the average value or variance differences and correlation analysis for investigating mutual relations between two factors such as humidity and yarn breakage, for example.

2-8. Data Feedback

In order to reduce defects, causes of the defects must be identified using data and then these must be reported back to former processing stages so that the necessary action to remove the root causes can be taken. After action has been taken, it is obviously necessary to confirm whether the problem has been solved or not.

Quality control consists of the constant repetition of the "plan, do, see" activities outlined above, and the statistical approach and methods of SQC are to be applied to the fluctuating variance of production quality. Carrying out inspections will provide data in the form of measurements which give a numerical form to the aspects of product quality under examination, but it must be remembered that this collection of data forms only a part of "do" portion of the overall work to be done.

Reference works available in English

(1) Introduction to Quality Control

by Kaoru Ishikawa, Union of Japanese Scientists and Engineers, Japan

(2) Guide to Quality Control and Company Standardiation

Japanese Standards Association, Japan

B. An Example of Quality Control in Practise (Weaving)

In principle with fabric inspection, the 100% inspection is to be performed (though a sampling inspection is also used occasionally in special circumstances). In order to achieve an improvement in product quality, it is first of all necessary to ensure that the inspections are appropriate and have been correctly carried out. The concrete details of the methods for inspecting fabric are omitted here (these are outlined for example in the TIRDC textbook).

The following explanation focuses on the example of heavy and light filling bars which are frequently encountered problem impairing product quality.

1. Identifying the Root Cause

The separate sheet indicates the typical reasons for the occurrence of heavy and light filling bars of fabric on the shuttle. Diagrams which show the various causes of a given result are known as characteristic diagrams, and individual factories should draw up such diagrams. Such diagrams will differ slightly from factory to factory according to the type and model of machinery employed, but such diagrams should be made as detailed and concrete as possible with all concerned pooling their opinions when drawing these up.

2. Survey of Defective Products and Problem Machinery

The existence of problems should be verified by examining data of cloth inspection and visual inspection of finished fabric. Where it is supposed that a problem exists the machinery should be investigated.

The higher the rank of a manager the more he will tend to rely solely on tables and data in his judgments but it is extremely important to undertake his direct visual inspection of the actual defective product or machine.

Once the defective factor has been identified, repair work must be made and the results confirmed. Data accumulation must be continuously practised and records of actual cases increased so that the situation of machinery (including of machine inspection records) is readily available on record.

3. Implementation of Systematic Maintenance of All Textile Machinery

The systematic maintenance of all machinery is to be carried out on the basis of the data gathered concerning the condition of each individual unit of machinery.

(1) Replacement of worn parts, and remodelling of parts if required

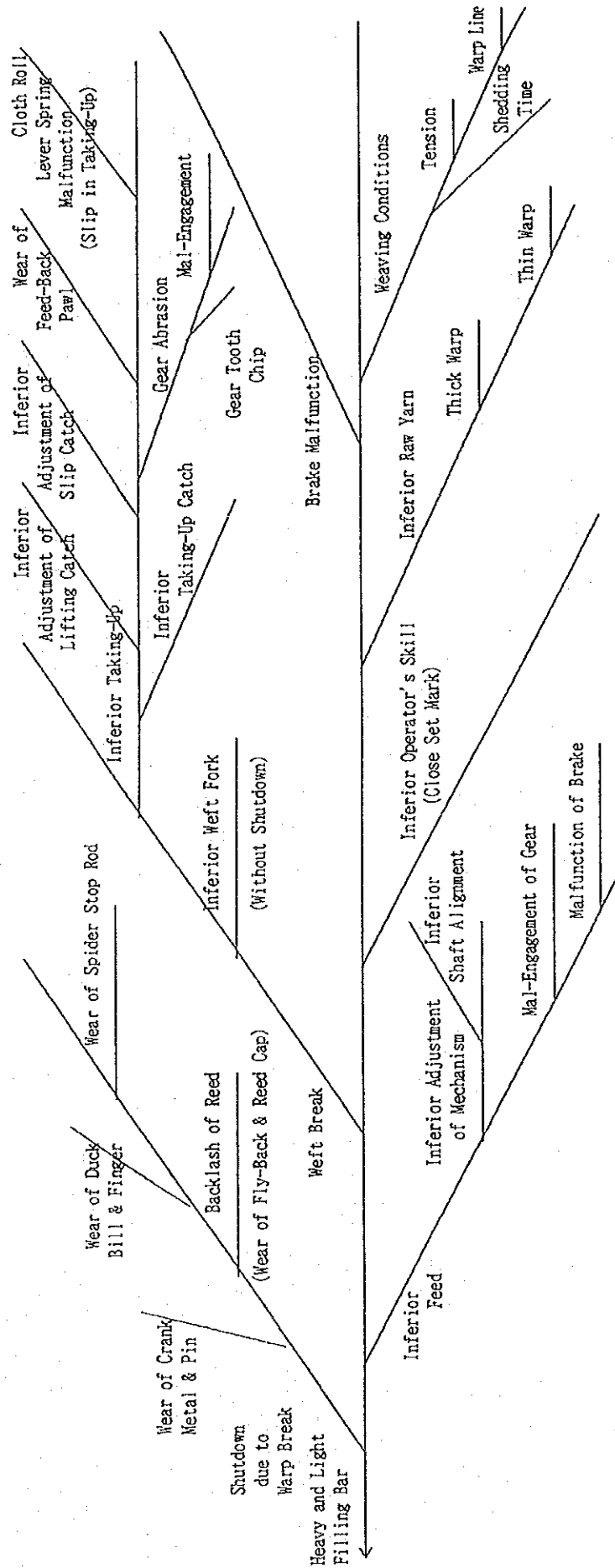
(2) Rectification of incorrectly adjusted parts, improvement of operating methods, operator training, etc.

4. Verification of Results and Preventive Maintenance

Maintenance results are to be verified. If any performance storage or deficiency is found in these results then other reasons for this is to be followed up.

If abrasion or wear of parts is found to be the cause of defects then a schedule for regular inspections and parts replacement is to be established. Quality control also involves the prevention of troubles before these occur through the application of Preventative Maintenance.

CHARACTERISTIC DIAGRAM (HEAVY AND LIGHT FILLING BARS IN A SHUTTLE LOOM)



[Reference VI-02]

Maintenance Control Points of Carding Machine

1. Control Points of Production Process

- 1) Short fibre contents of sliver
- 2) Quality and quantity of waste cotton yarn
- 3) Degree of parallelization of sliver
- 4) Unevenness of web
- 5) Nep and trash
- 6) Quality and quantity of flat strip
- 7) Productivity
- 8) Fly waste
- 9) Unevenness of sliver

2. Routine Inspection Points

- 1) Carding Machine needle height and needle sharpness
- 2) Cylinder, doffer and taker-in roller needle sharpness
- 3) Maintenance of grinder
- 4) Accuracy of gauge setting
- 5) Web quality
- 6) Quality and quantity of flat strip
- 7) Quality and quantity of waste cotton yarn
- 8) Defect of sliver
- 9) Cleaning, needle polishing schedule, weight of sliver, etc.

2-2. Policies Recommended

(1) Intensified allocation of resources to mid and downstream sectors

As aforementioned, it is presumed that the fiscal policy has largely been responsible for the relatively more rapid progress of the spinning sector. If one of the major reasons why the development of the spinning sector outstripped that of the weaving and processing sectors could be traced back in the fiscal policy, the management of fiscal measures in the textile industry policy should be critical.

From this point of view, the policy maker should analyze and assess the impact of the fiscal measures adopted in the past upon each subsector in the textile industry and find proper direction in policy formulation so that the target subsector should become economically attractive enough for the investors. Consequently, the future policy for the development of the textile industry has to be the one that will intensify allocation of the resources to the midstream (weaving and processing) and downstream (garment) sectors.

(2) Improvement in import environment for raw materials

Most fabrics and some garment parts are currently classified as import negative items. The RMR scheme for the negative items should be improved and the bonded import systems for the raw materials should be streamlined as the temporary measure before the import liberalization is implemented. Imports of these goods should be liberalized at five years' notice. After the imports are liberalized, customs duties levied on these goods should be reduced gradually.

(3) Liberalization of garment imports

It is recommended that the import of garments, currently classified as the import negative items, be liberalized as soon as possible and that the import duty which is currently as high as 90%, be reduced stage-by-stage.

(4) Import system for machinery and parts

Reductions in imports duties on machinery and their parts should be considered.

Commercial importers are currently prohibited from importing more than 20 million rupees' worth of machinery per year. This restriction should be abolished.

(5) Tax exemption on export income

The government currently grants tax exemption of 25% of the income earned by firms from the export of cotton yarn. Such incentives should be discontinued.

(6) Central Excise Duty (CED)

The CED on the cotton yarn for the domestic sales should be allowed to be paid after the shipment from the factory instead of before the shipment.

(7) Adoption of Incentives for Supporting Industries

The government should provide supporting industries--i.e., those firms engaged in dyeing and finishing, processing, and material and parts supply--with incentives such as a refund of duties paid on imported raw materials and exemption from the domestic sales tax.

(8) Investment environment

(8-1) The system and its administration

All federal, provincial and municipal regulations to be cleared before starting up a new business should be examined and streamlined with the view that they do not hinder investment. It is also important to ensure that all bodies charged with implementing government policy and regulations are notified of changes and faithfully carry them into effect.

(8-2) Information supply

There is a need to confer one of the relevant government organization on the function of gathering rules and regulations relating to investment and trade for the benefit of the potential investors. A new comprehensive investment handbook should be compiled. The information compiled in it should be practical and updated as changes are made to the various rules and regulations.

(8-3) Investment promotion by commercial counsellors

Establishing investment promotion corners in the Pakistan embassies overseas for the perusal of potential foreign investors should be studied.

(8-4) Establishment of dollar shops

Establishing private-sector dollar shops under the control of the Government should be examined with the view to improvement of the investment environment.

(9) Finance system

It seems necessary to provide low-interest financing for investment in plant and equipment particularly for

dyeing and the powerloom sector. Establishing of such organizations like Credit Guaranty Association and Credit Insurance Corporation should be studied.

(10) Textile policy planning unit

It is recommended that a vertical textile policy unit to be established within the Ministry of Industries in Islamabad.

(11) Reorganization and Strengthening of Links Between Organizations Involved with Standardization and Quality Control

Plans to form a Pakistan Standards & Quality Control Authority (PSQCA) should be implemented as soon as possible, and cooperation with TIRDC strengthened.

(12) Promotion of Raw Cotton Grading and Establishment of a Graded Price Structure

PCSI's grading and grade-based pricing systems should be promoted nationwide to provide incentive for raising the quality of raw cotton.

(13) Standardization of Product Specifications and Inspection Criteria

Although introducing compulsory quality standardization would be premature at this stage, a uniform series of inspection standards should be established and promoted as early as possible. In formulating appropriate measures the experiences of other countries should be studied.

(14) Effective Approach to R&D

For the time being efforts should focus on strengthening the R&D division of TIRDC with a view to its contributing to the improvement of industry-wide technical standards.

(15) Directions for Human Resource Development

In order to increase numbers of engineers and middle managers and lift the skill levels of general workers, it is necessary that appropriate numbers of teachers are retained by educational and training institutions and that facilities and equipment are augmented.

(16) Environment Programme

Concerning waste water treatment specific guidelines should be established based on international standards and efforts made to promote their adoption. Concerning environmental problems, the accumulation of related

expertise through ties with other countries is essential to the industry's future development.

2-3. Promotion Programmes

2-3-1. Details and Frameworks of the Promotion Programmes

Briefly, the biggest problem encountered by the textile industry of Pakistan is the low level of quality of products in all sectors from the upper stream to down stream sector. The main reason for this low level, as has already been pointed out, is the absolute shortage of the engineers and technicians who form the backbone of factories, and their poor level of existing expertise for basic technology, production technology and management. In order to remedy the above, a systematic reinforcement of technical instruction and personnel training needs to be undertaken by cooperation between the government and the industry in order to support the general efforts undertaken on an industrial basis.

Moreover the delay in modernization of the weaving and dyeing-finishing sectors acts to block the supply of materials necessary for upgrading of the garment industry, and so creates an obstacle to the balanced development of the textile industry. Therefore an important task to be carried out in conjunction with government policy, is the modernization of facilities and reinforcement of the industrial base of the independent weaving and dyeing-finishing units in the Nonmill Sector.

Further, the promotion of standardization is needed in order to achieve an improved quality and upgrading of finished products, which is needed in turn to help raise the international standing of Pakistani products.

In view of the above, the following concrete programmes are proposed.

(1) Reinforcement of Systems for Technical Instruction and Personnel Training

(1-1) Technical Upgrading Supporting Programme for Textile Upstream and Midstream Sectors

(1-2) Technical Upgrading Supporting Programme for Small and Medium Scale Textile Industries in Punjab Area

(1-3) Technical Upgrading Supporting Programme for Garment Sector

(2) Modernization of Facilities and Structural Reform in the Nonmill Sector

(2-1) Financing Scheme for Modernization of Textile Industry

(2-2) Financing scheme for Groupings in Textile Industry

(3) Promotion of Standardization for Quality Improvement of Finished Products

(3-1) Standardization of Inspection Programme

Table VI-2-2 indicates the outlines of the promotion programmes with preconditions for implementation and organizational frameworks involved. The following are details of the individual programmes.

(1) Reinforcement of Systems for Technical Instruction and Personnel Training

In order to overcome the various problems encountered by individual firms, the reinforcement of technical instruction and personnel training are requirement at the root. The efforts of individual firms are very important. However, since there are obvious limits to what individual firms can actually achieve in this direction it is necessary to strengthen or found supporting bodies to further strengthen personnel training. In terms of importance the following three measures need to be undertaken to reinforce existing systems.

- A. Upgrading of engineers and technicians working in the spinning, weaving and dyeing-finishing industries.
- B. Technical training for the Nonmill Sector weaving firms and related processing industries.
- C. Technical development for the garment industry.

While an overall improvement in the technical levels of the upstream and midstream sectors, that is spinning, weaving and dyeing-finishing, needs to be carried out, particular attention to the upgrading of dyeing-finishing technology is required with a view to supporting the technical advancement of the garment industry. The TIRDC already exists as a public institution responsible for providing training and education for the upstream and midstream sectors, and it has carried out activities on a national scale with great energy and efficacy. It is therefore considered appropriate to make use of the facilities and services of the TIRDC to support the upgrading of the technical expertise of the upstream and midstream sectors. However, since still the facilities and personnel line up of the TIRDC are considered insufficient in a number of areas in terms of the technical range and efficacy of the training to be given, it will be necessary to undertake modernization of its facilities and reorganization of personnel so as to reinforce and expand training functions.

In the weaving sector, the independent small and medium scale businesses are more numerous and play a much more important role than in the weaving section of the integrated mill sector. Nevertheless, the technical levels of these small and medium scale businesses and their related processing sectors (such as for dyeing-finishing, sizing, etc.) are extremely backward. Despite this fact there is little provision for guidance or training directed to these firms. Training and guidance of a different type from that made applicable to the mill sector needs to be provided. Such training and guidance requires to be tailored to the actual technical situation of these sectors concerned, and the regional nature of their sites. However, the TIRDC is concerned with providing guidance and training to the mill sector and is intrinsically not conforming in some respects to the needs of these small and medium scale firms. Further, since these small and medium scale units are largely concentrat-

ed in the Faisalabad region there are geographical problems posed to their use of the TIRDC which is located in Karachi. In view of the above reason, it is considered necessary to establish a new institute for technical guidance to serve the small and medium scale firms and their related subcontract processing sectors located in the Punjab region centering around Faisalabad.

The garment and knitwear sectors are similar to assembly processing industries and so differ slightly in technical nature compared to yarn and fabrics sectors. These sectors have shown development recently in Pakistan and most output is for export. The biggest task facing these sectors is how to upgrade the export items, and this entails the problem of how to nurture personnel with the basic technical expertise needed to achieve this. Since the textile industry is labour intensive it is advisable to have operator training carried out largely on an in-house system, but to create in house staff equipped with the basic expertise of garment production needed to direct operations a specialized training institute is required. The existing training centres are to technical high school level and NCTE and TIRDC put emphasis on the technical expertise needed for production of yarn and fabrics. In view of the actual situation and nature of the garment industries the establishment of an independent training institute to undertake personnel training for this sector is desirable.

Table VI-2-2 SUMMARY OF PROGRAMMES (1/4)

| Programme Task | Programme | Programme Outline | Preconditions for Implementation | Organizational Framework |
|--|--|---|---|---|
| <p>(1) Reinforcement of systems for technical instruction and personnel training</p> | <p>(1-1) Technical Upgrading Supporting Programme for Textile Up- & Mid-stream Sectors</p> | <p>To expand and upgrade the public services such as technical guidance, testing and dissemination of improved technology provided to the industries by TIRDC so as to upgrade technological standards and product quality in general. Training functions addressed to engineers, in particular, are to be reinforced and thereby improvement of production technology of firms is to be supported. While aiming at strengthening the training functions for spinning, weaving, knitting and dyeing-finishing sectors, emphasis will be given to the dyeing-finishing sector. Retraining of currently employed engineers will be the main job. Supplementary equipment for training as necessary shall be installed in addition to the existing facilities.</p> | <ol style="list-style-type: none"> 1. To increase in the number of instructors in TIRDC. 2. To secure running budget to support continued training activities. 3. Industrial associations are to be involved in coordination and implementation of the Programme. | <ol style="list-style-type: none"> 1. The existing organization, structure and facilities of TIRDC are to be used. 2. Coordination and monitoring of the Programme: To be done by the Textile Policy Planning Unit in MOI. 3. Programme implementation: TIRDC shall be in charge. |
| <p>(1-2) Technical Upgrading Supporting Programme for Small & Medium Scale Textile Industries in Punjab Area</p> | | <p>To establish a new institute in Faisalabad, where independent weaving mills and ancillary industries are concentrated, to undertake technical guidance and training for the Non-mill sector. The capacity to supply raw materials for Garment sector shall be strengthened through providing guidance for modernization of production which matches the actual situation of the firms in this area. Training will be focused on weaving and dyeing-finishing. Major trainees should be factory managers, engineers</p> | <ol style="list-style-type: none"> 1. To undertake a survey on the status quo of the Non-mill sector and clarify the priorities for training programmes based on the expected effects. 2. To integrate the views and policies of the related industrial organizations in implementing the programme 3. To clarify the role of NCTE, the division of functions and relative positions of TIRDC and the envisaged institute. | <ol style="list-style-type: none"> 1. Running of the institute is to be trusted with a joint body consisting of members from the MOI, NCTE and the related industrial organs. 2. Coordination and monitoring of the Programme: To be done by the Textile Policy Planning Unit in MOI. 3. Programme implementation: The envisaged institute will be the implementing body. The executive body |

Table VI-2-2 SUMMARY OF PROGRAMMES (2/4)

| | | | | |
|---|--|---|--|--|
| | | <p>and technicians of Non-mill sector. The institute shall be located in the premises of NCTE so that close cooperation with the college could be achieved and college staffs and facilities could effectively be made use of.</p> | | <p>should be formed as soon as possible.</p> |
| | <p>(1-3) Technical Upgrading Supporting Programme for Garment Sector</p> | <p>To establish a Garment Technology Training Centre to undertake systematic training of engineers and technicians for Garment Industry. The Centre will be equipped with a model factory where practical training as well as basic training is performed. Students who have finished secondary or high school or completed two year college education will be the major trainees. Training will consist of sewing, the pattern making, production control, sales management, a.s.o. (Subsequently the training of fashion designers is envisaged.)</p> | <ol style="list-style-type: none"> 1. To establish the interior organizational structure of the relevant industrial association which is to be the implementing body 2. To recruit and train the instructors for the training and educational courses. At beginning, in particular, assistance from foreign experts shall be utilized. 3. To secure enough budget to meet the running cost and expenditures for equipment maintenance so that training activities could be continued. | <ol style="list-style-type: none"> 1. Coordination and monitoring: The Textile Policy Planning Unit in MOI shall be responsible. 2. Programme implementation: A particular industrial organization whom MOI will trust to run the Centre shall be executing body. Promotion of the Programme shall start after the co-operational system between MOI and the industrial organization is established. |
| <p>(2) Modernization of facilities and structural reform in the Non-Mill Sector</p> | <p>(2-1) Financing Scheme for Modernization of Textile Industry</p> | <p>To provide a low interest financing in order to promote investment for modernization by the small & medium scale textile related firms, in particular those in the weaving sector where modernization is related, and promote new investment and investment for modernization in the Dyeing-finishing sector as well.</p> | <ol style="list-style-type: none"> 1. To conduct special surveys on the status-quo of the industry, requirement for fund, possibility of raising fund a.s.o. 2. To select a public financing body which has enough experience and expertise in financing small & medium scale firms as a conduit. | <ol style="list-style-type: none"> 1. Financing comes under the jurisdiction of the Finance Ministry, but since this program is a part of promotion policies for the textile industry a joint coordination team consisted of the Treasury and the Textile Policy Planning Unit in MOI should be established to promote the project. 2. Coordination & monitoring: The joint team mentioned |

Table VI-2-2 SUMMARY OF PROGRAMMES (3/4)

| | | | | |
|---|---|---|--|--|
| | | | | <p>above shall be responsible. 3. Implementing body: An appropriate DFI is to be nominated (A possible option is IDBP.)</p> |
| | <p>(2-2) Financing Scheme for Groupings in the Textile Industry</p> | <p>To provide a low interest and long-term financing to help promoting cooperation, joint operation, grouping of factories among the small and medium scale firms of the same kind of business including related processing firms engaged in weaving, knitting, dyeing-finishing and ancillary industries in order to strengthen the corporate structure and promote their modernization and structural reform.</p> | <ol style="list-style-type: none"> 1. To conduct special surveys on the status-quo of the industry, requirement for fund, possibility of raising fund a.s.o. 2. To select a public financing body which has enough experience and expertise in financing small & medium scale firms as a conduit. 3. To activate the movement for groupings and joint operation among the firms in the Non-mill sector. | <ol style="list-style-type: none"> 1. Financing comes under the jurisdiction of the Finance Ministry, but since this program is a part of promotion policies or the textile industry a joint coordination team consisted of the Treasury and the Textile Policy Planning Unit in MOI should be established to promote the project. 2. Coordination and monitoring: The joint team mentioned above shall be responsible. 3. Implementing body: An appropriate DFI is to be chosen (a possible option is IDBP). |
| <p>(3) Promotion of standardization for serve quality improvement of finished products.</p> | <p>Standardization of Inspection Programme</p> | <p>Reinforcement of standards and promotion amongst firms for the inspection methods so as to upgrade the international evaluation of Pakistan's finished textile products and enhance exports thereof. Activities will be directed at securing an accurate picture of the quality levels throughout Pakistan and encouraging greater consciousness of the</p> | <ol style="list-style-type: none"> 1. Collection and analysis of data relating to the international rating of textile products, survey to identify the current position of Pakistan's textile industry in the world context. 2. Establishment of a policy of industrial guidelines for standardization and inspection | <ol style="list-style-type: none"> 1. Furthering and monitoring of the Program; to be carried out by the Textile Policy Planning Unit in MOI 2. Programme implementation: PSI to act as the central executing body. |

Table VI-2-2 SUMMARY OF PROGRAMMES (4/4)

| | | | | |
|--|--|--|-----------------|--|
| | | <p>need to increase product quality. Promotion and diffusion of standardization to be carried out under guidance from overseas experts so as to assimilate the experience and expertise possessed by the developed nations.</p> | <p>systems.</p> | |
|--|--|--|-----------------|--|

(1-1) Technical Upgrading Supporting Programme for Textile Upstream and Midstream Sectors

A. Objectives

The present programme will carry out an upgrading of technical expertise in the industry through the training or retraining of the mid ranking engineers and technicians of upstream and midstream firms. This will contribute to improving the production technology of the industry and so support the overall upgrading of technology levels in the textile industry.

Emphasis will be given to strengthening the dyeing-finishing sectors. More specialization will be given to the training relating to production technology for the spinning and weaving sectors.

B. Site

The site will be that of TIRDC in Karachi. However, since there is a plan to move TIRDC from its present site within Karachi city construction of the buildings for this present programme will proceed on the assumption of TIRDC relocation plan to a new candidate site.

C. Details

TIRDC with its record of short term training achievements to date is to be employed as the implementing institute for the retraining or training of industrial engineers and technicians. Reinforcement and installation of training equipment and staff reinforcements are to be carried out in order to strengthen TIRDC's training capacity.

C-1. Trainees envisaged

Personnel of the following levels are envisaged as candidate trainees;

- engineers and technicians currently engaged in production activities in factories, etc.
- candidates with at least technical college education and working experience
- personnel recommended by firms

C-2. Details of Training

Since the present programme is designed for personnel with industrial experience and with the objective of improving the level of production technology currently wanting in Pakistan's textile industry, training which will contribute directly to production is above all necessary. However, since there are limits to approximating actual factory or shop production facilities and conditions it will be necessary to determine the main points of training so as to make the most of the conditions given at TIRDC. Detail Plan VI-11 gives an outline of training details designed with the above in mind.

C-3. Training Courses

Examples of envisaged training courses are shown in Detail Plan VI-12. Other courses could be set up as appropriate and in accordance with the needs and requests of industry.

C-4. Training Equipment

Reinforcement and modernization of training equipment for all sectors of spinning, weaving (knitting), and dyeing is to be undertaken. Equipment required for training is shown in Detail Plan VI-13.

C-5. Staff Programme and Visiting Experts

Training staff for each sector are to be increased and the personnel organization reinforced. Detail Plan VI-14 shows the staff numbers required for implementation of the project.

Experts are to be invited from overseas to supervise technical instruction of the specialist staff. Detail Plan VI-15 gives a rough outline of residence of the overseas experts to be hosted.

D. Building Area and Facilities Plan

TIRDC plans to move from its present location. The present project has been designed on the assumption of this transfer, and so supposes that a transfer site will be obtained and construction of buildings be completed. Detail Plan VI-16 shows the plan for facilities based on the details of the training programmes envisaged as in the above. The required building area is approximately 4,000 square metres.

E. Estimate of Required Capital

| | |
|-------------------------|--|
| Building | approx. US\$ 0.8 Million (approx. Rs. 20 Million) |
| Machinery and equipment | approx. US\$ 4.5 Million (approx. JY. 580 Million) |
| Furniture and fixture | approx. US\$ 0.4 Million |

F. Organizational Framework and Monitoring System

The progress and monitoring of the present programme is to be carried out by the textile policy units in the Ministry of Industries (MOI) which will be assigned with these activities. Implementation of the programme will largely be carried out by TIRDC under the guidance of MOI. It is desirable to position specialist staff for the purposes of implementation.

In order to ensure that the progress and implementation reflects the needs of the industrial sectors to be served the cooperation of the various industrial bodies should be secured and representatives of the industrial sector should be consulted.

G. Schedule

Total Implementation (from go ahead decision) : about 3 years
Recruitment and training of teaching staff : about 1.5 years
Construction of buildings and facilities : about 1.5 years
Purchase, installation and transfer of
materials, equipment and auxiliary items : about 2 years

H. Aspects of Programme Furtherance needing Consideration

Even if there is a latent demand for personnel training in the textile industry, the present programme will not succeed unless the trainee candidates are enlisted and first class instructors made available. It is therefore necessary to establish the prospects for programme success beforehand by obtaining the participation and cooperation of industrial organizations and carrying out a survey on the number of personnel which individual companies would like to have participate in the training courses.

A necessary condition for the success of the programme is the provision of first class instructors. Therefore it is necessary to verify that such instructors will be definitely forthcoming to assure the prospects of programme success.

In order to assure that there is no halt to projected activities, maintenance or machinery replacement because of a lack in running expenses, it is necessary to ensure the continuous availability of a budget to meet necessary running costs through securing an income met by the beneficiaries in the form of training fee income and contributions from the industry, or as Government subsidies.

[Detail Plan VI-11]

Details of TIRDC Training

The TIRDC already holds training courses and implements technical instruction. Acting to reinforce existing courses, the new courses to be established under the present programme should give special emphasis to upgrading the technical levels of the dyeing finishing sector. In addition to this training should be accorded to maintenance technology of the spinning sector, to changing over to shuttleless looms in the weaving sector, and to knitting technology in the knitwear sector. Courses will consist of practical training and lectures but there will be cases where it is not practical to use the actual production machinery of factories and training will need to be carried out using equipment appropriate for providing the basic experience necessary.

Spinning

(1) Maintenance practise for spinning machines

- Carding machine maintenance
- Comber maintenance
- General maintenance technology

(2) Production management

- Quality control and standardization
- Processwise production calculation method
- Yarn defects and testing/inspection
- Training of operator and safety management

Weaving

(1) Technology of weaving and weaving machines

- Grey yarn and textile weave
- Thickening agent, size mixing and wakening
- Warping and sizing technology
- Heald hook and loom component parts

(2) Weaving practise

Mixing and production of sizing agent
Warping and sizing
Heald hook
Overhaul practise of a loom
Weaving (on shuttle loom, or shuttleless loom)

(3) Production management

Quality control and standardization
Processwise production calculation method
Textile defects and testing/inspection
Instruction for operator and safety management
Mechanism of looms

Knitting

(1) Knitting technology

Knitting technology and knit structure
Principle of knitting and knitting machines
Grey yarn for knitting
Knit design

(2) Knitting practise

Adjustment of knitting machine
Knitting practise
Quality control and production control of knitting
Knit defects and testing inspection

Dyeing-finishing

(1) Basic technology

Dye test for each materials
Dyeing method for each materials
Printing (dye, pigment)

Piece dyeing (continuous, batch)
Fastness test to washing, daylight
Rubbing test

(2) Applied technology

Desizing, scouring, breaching for cotton, polyester/cotton, polyester/viscose
Mercerizing
Shrink proofing of textiles
Resin finishing, sanforizing
Pilling proofing

(3) Production management

Procurement and preparation of dyestuff and chemicals
Colour (lightness, chroma) control
Dyed textiles

[Detail Plan VI-12]

TIRDC Training Course

Spinning Section

Spinning Equipment Maintenance Technology Course

- Training of maintenance technology required for spinning engineers

Qualified trainee : Engineers experienced in maintenance and production for five years or more in spinning mill

Number of trainee and training period : 10 persons per course;
30 days per course

Spinning Mill Production Control Course

- Training of production control required for production engineers is spinning mill

Qualified trainee : Engineers experienced in production for five years or more in spinning mill

Number of trainee and training period : 20 persons per course;
14 days per course

Weaving Section

Weaving Preparation Technology Course

- Training of basic technology required for weaving preparation engineers

Qualified trainee : Middle class engineers experienced in production for three years or more in weaving mill

Number of trainee and training period : 10 persons per course;
20 days per course

Weaving Technology Course

- Training of technology required for weaving engineers

Qualified trainee : Middle class engineers experienced in production for three years or more in weaving mill

Number of trainee and training period : 10 persons per course;
20 days per course

Weaving Equipment Maintenance Technology Course

- Training of maintenance technology required for maintenance and production engineers in weaving mill

Qualified trainee : Middle class engineers experienced in production for five years or more in weaving mill

Number of trainee and training period : 10 persons per course;
20 days per course

Weaving Mill Production Control Course

- Training of production technology required for production engineers in weaving mill

| | | |
|---------------------------------------|---|---|
| Qualified trainee | : | Middle class engineers experienced in production for five years or more in weaving mill |
| Number of trainee and training period | : | 10 persons per course; 14 days per course |

Knitting Section

Knitting Technology Course

- Training of knitting and production technology required for production engineers in knitting factory

| | | |
|---------------------------------------|---|---|
| Qualified trainee | : | Middle class engineers experienced in production for three years or more in knitting mill |
| Number of trainee and training period | : | 10 persons per course; 20 days per course |

Dyeing-finishing Section

Basic Dyeing-finishing Technology Course

- Training of basic technology required for dyeing engineers

| | | |
|---------------------------------------|---|---|
| Qualified trainee | : | Middle class engineers experienced in production for five years or more in dyeing factory |
| Number of trainee and training period | : | 10 persons per course; 20 days per course |

Dyeing-finishing Production Technology Course

- Training of production technology required for production engineers in dyeing-finishing factory

- Qualified trainee : Engineers and technicians experienced in production for five years or more in dyeing factory
- Number of trainee and training period : 10 persons per course; 20 days per course

Dyeing-finishing Production Control Course

- Training of production control technology required for production engineers in dyeing-finishing factory

- Qualified trainee : Engineers and technicians experienced in production for five years or more in dyeing-finishing factory
- Number of trainee and training period : 10 persons per course; 20 days per course

[Detail Plan VI-13]

TIRDC EQUIPMENT LIST

Spinning

(1) Card maintenance equipment

- A Grinder for card
- | | |
|---|---|
| Flat grinding machines (on carding engine) | 2 |
| Flat grinding machine (long roller system, cup grinding system) | 2 |
| Traverse grinder (cylinder, doffer) | 1 |
| Bare surface grinder (cylinder, doffer) | 1 |
| Diamond grinder for grinding stone | 1 |
- B Wire mounting machine
- | | |
|--|---|
| Mounting apparatus for cylinder doffer mcc | 1 |
| Mounting & grinding machine for licker-in roller | 1 |
| Flat clipping machine | 1 |

| | | |
|-----|--|---|
| C | Others | |
| | Flat glazing apparatus | 1 |
| | Flat milling machine | 1 |
| | Dynamic balancer for cylinder | 1 |
| | Burnishing roller | 1 |
| | Stripping roller | 1 |
| | Side scope for wire | 1 |
| | Gauge plates | 1 |
| (2) | Top roller maintenance equipment | |
| | Treatment machine for roller cot (H_2SO_4) | 1 |
| | Treatment machine for roller cot (ultraviolet-lay) | 1 |
| | Grinding machine for roller cot | 1 |
| | Eccentricity tester for top roller | 1 |
| | Assembling machine for top roller | 1 |
| | Hardness tester for top roller | 1 |
| | Roller presser tester for roving & ring spinning | 1 |
| (3) | Machinery and equipment | |
| | Carding machine | 1 |
| | Sliver lap machine | 1 |
| | Ribbon lap machine | 1 |
| | Comber | 1 |
| | Drawing frame | 1 |
| | Simplex fly frame | 1 |
| | Ring spinning frame | 1 |
| | Automatic cone winder | 1 |
| (4) | Testing equipments | |
| | Fibrograph | 1 |
| | Portable moisture meter | 1 |
| | Yarn evenness tester | 1 |
| | Fluff inspector | 1 |
| | Twist tester (Electric drive) | 1 |
| | Package density tester | 1 |
| | Length measuring apparatus | 1 |
| | Lea strength tester | 1 |
| | Wrap reel | 1 |

Weaving

(1) Lab preparation machinery

| | | |
|-------------------|---|------------------------------|
| Size cooker | 1 | 200l, electric heater |
| Single yarn sizer | 1 | creel, sizing, flyer, winder |
| Sample warper | 1 | warp length 60m |

(2) Looms and relative facilities

| | | |
|--------------------------|---|--|
| Air jet loom | 1 | reed width, 190cm, tappet type, with 2 each of beam and cloth roller |
| Projectile loom | 1 | reed width, 190cm, tappet type, with 2 each of beam and cloth roller |
| Warp tying machine | 1 | flame width 220cm |
| Reaching machine | 1 | flame width 220cm |
| Beam and heald carrier | 1 | battery type |
| Cloth inspecting machine | 1 | |
| Pirn winder | 1 | 4 spindles |

(3) Testing equipment and instruments

| | | |
|---------------------------------|---|----------|
| Cloth strength tester | 1 | |
| Bursting strength tester | 1 | |
| Thickness meter | 1 | |
| Micro balance | 1 | |
| Refractometer | 1 | for size |
| Viscosity meter (Spindle type) | 1 | |
| Stroboscope | 1 | |
| Electrostatic charge eliminator | 1 | |

The following machines existing in TIRDC are utilized for the programme

Automatic cop change loom
Narrow loom (Ribbon weaver)
Laboratory type sizing machine (Shirley type)
Tachometer

Moisture meter (Shirley)

Knitting

| | | |
|-----------------------------------|---|-------------------------|
| Circular knitting machine | 1 | 26 inch dia., 20 gauge |
| Rib knitting machine | 1 | 16 inch dia., 18 gauge |
| Single jersey knitting machine | 1 | 30 inch dia., 20 gauge |
| Interlock knitting machine | 1 | 30 inch dia., 20 gauge |
| Single testing machine | 1 | 3.5 inch dia., 20 gauge |
| Flat knitting machine | 1 | 40 inch dia., 7 gauge |
| Knitting cloth inspection machine | 7 | Double sided |

Dyeing-finishing

(1) Machinery and equipment for labouratory

| | | |
|---|---|--------------------------|
| High temperature pot dyeing machine | 1 | |
| Laboratory piece dyeing machine for rope type | 1 | 140°C cloth capacity 5kg |
| Mangle for continuous machine | 1 | |
| Dryer | 1 | |
| Washing machine | 1 | |

(2) Testing equipment and instruments

| | | |
|--------------------------------|-------|------------|
| Fede-o meter | 1 | xenon lump |
| Landan meter | 1 | |
| Fixo test meter | 1 | |
| Pilling test | 1 | |
| Crease recovery tester | 1 | |
| Flammability tester | 1 | |
| Viscosity meter (spindle type) | 1 | |
| Gray scale | 1 set | |
| PH meter (digital) | 2 | |
| Moisture meter (digital) | 1 | |

The follows equipment existing in TIRDC are utilized for the programme.

Cheese dyeing machine
Winch for laboratory
Jigger for laboratory

Laboratory padder
 Heat setting machine
 Color matching machine
 Rubbing fastness tester

[Detail Plan VI-14]

Manning Plan of TIRDC Personnel (Instructor)

Current staff of TIRDC is 17 persons. The following personnel reinforcing plan has been envisaged intending an expansion of its capacity. The planned size of personnel is the prerequisite for implementing the Programme.

| | <u>Spinning Section</u> | <u>Weaving/ Knitting Section</u> | <u>Dyeing/ Finishing Section</u> | <u>QC/IE^{*1)} Section</u> | <u>Marketing Section</u> |
|------------------------------|-----------------------------|--|--|--|------------------------------|
| Department Head | 1 | 1 | 1 | 2 | 1 |
| Senior Development Officer | 2 | 2 | 2 | 3 | - |
| Research Development Officer | 3 | 2 | 2 | 4 | 2 |
| Development Assistant | 2 | 2 | 2 | 1 | 2 |
| Subtotal | 8 | 7 | 7 | 10 | 5 |

Administration

Secretary 1
 Clerk Several
 Supporting Staff Several

Total Number of Personnel

Approx. 50 persons

*1) Quality Control and Industrial Engineering

[Detail Plan VI-15]

Foreign Experts to be Hosted

Spinning Maintenance Engineer

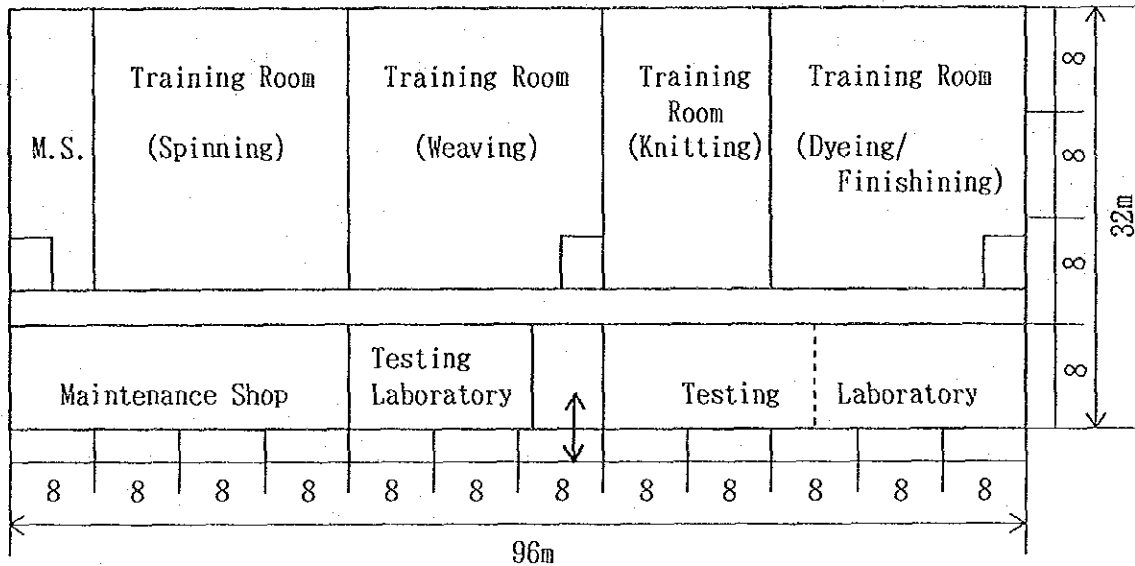
Weaving Engineer

Knitting Engineer

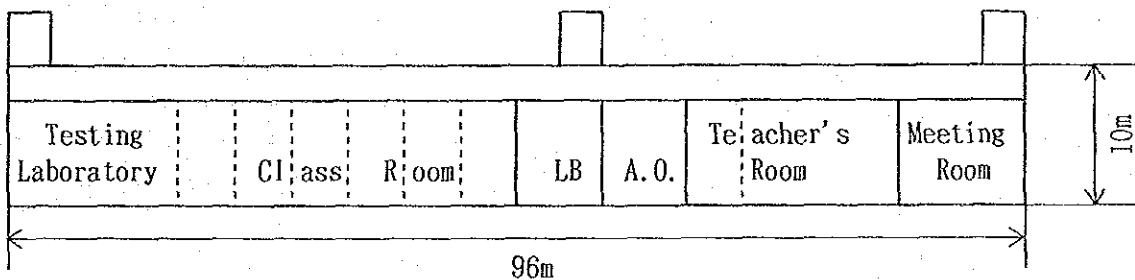
Dyeing-finishing Engineer

[Detail Plan VI-16]

TIRDC BUILDING PLAN



Ground Floor



1st Floor

A.O. : Administration Office

LB : Library

Ground Floor $96\text{m} \times 32\text{m} = 3,072\text{m}^2$

1st Floor $96\text{m} \times 10\text{m} = 960\text{m}^2$

4,032m²

(1-2) Technical Upgrading Supporting Programme for Small and Medium Scale Textile Industries in Punjab Area

A. Objectives

To carry out training of the engineers and technicians of independent weaving industries of the Non-Mill Sector and of the related dyeing-finishing firms which are concentrated around the region of Faisalabad. In this way the technical levels of these sectors will be upgraded and the quality and supplying capacity for garment materials be improved.

Instruction to modernize production technology is to be provided keeping in mind the industrial and regional situation and giving emphasis to weaving and dyeing-finishing technology.

B. Site

To be located in the Faisalabad region since the independent weaving firms (loom shops) and related dyeing-finishing firms are concentrated here. With a view to making use of the existing facilities and staff of NCTE it is assumed that the training centre will be established on the grounds of this College.

C. Details

A new Weaving Technology Centre is to be founded to carry out training tailored to the particularities of the firms and region concerned, and to provide technical training and instruction for engineers of the independent weaving shops and managers of small industries who have not enjoyed the chance to acquire a systematic technical education. This centre will be set up within the groups of NCTE and administered by this, making use of existing specialist staff and equipment of NCTE. Training will be carried out on commission from firms for a set fee. Further, it should be considered whether the facilities can be made accessible for use in the in-house training carried out by firms in so far as this does not interfere with the Centre's own training programmes.

C-1. Trainees envisaged

The candidate trainees will be engineers and technicians working in the independent weaving firms and related dyeing-finishing firms. Such personnel do not enjoy the same opportunities for technical guidance and instruction enjoyed by their counterparts in the mill sector. Managerial staff of small scale businesses should also be considered as possible trainees.

C-2. Details of Training

Since the programme is to be conceived with the Nonmill sector of the independent weaving firms and related dyeing-finishing shops in mind, the training programme will need to provide basic technological expertise and

training which will help meet the actual technical problems encountered by such firms. Detail Plan VI-21 shows a sample outline of a training programme drawn up with the above in mind.

C-3. Training Courses

An example of envisaged training courses is shown in the Detail Plan VI-22. Other appropriate courses could be added in response to the actual situation.

C-4. Training Equipment

Provisions for equipment are to be made with an emphasis on the weaving and dyeing sectors. Detail Plan VI-23 shows the equipment which will be required for envisaged training.

It is desirable to make as much use of the equipment and facilities of NCTE as possible as long as this does not interfere with the experimentation and training of the College students proper. Nevertheless, equipment considered necessary to realize the objectives of the present programme should be newly installed for use by the training centre outlined here.

C-5. Staff Programme and Visiting Experts

It is essential to secure the auxiliary staff required for the training centre under consideration. Detail Plan VI-24 indicates the staff numbers which will be necessary to implement this programme. In addition to the staff specially recruited, a certain number of the teaching staff of NCTE could also undertake teaching duties concurrently in this centre.

Technical guidance for the staff itself could be carried out by overseas experts invited for that purpose for a certain period of residence. An outline of such experts to be hosted is given in Detail Plan VI-25.

D. Building Area and Facilities Plan

The training centre under consideration should be accorded status as an independent department located on the campus grounds of NCTE of Faisalabad. Detail Plan VI-26 is an outline plan for the centre buildings on the basis of the above training details. The building area required would be about 2,000 square metres (ground floor 1,500 square metres and 1st floor 500 square metres).

E. Estimate of Required Capital

| | |
|-------------------------|--|
| Building approx. | approx. US\$ 0.4 Million (approx. Rs. 10 Million) |
| Machinery and equipment | approx. US\$ 1.5 Million (approx. JY. 190 Million) |
| Furniture and fixture | approx. US\$ 0.2 Million |

F. Organizational Framework and Monitoring System

Running of the centre is to be delegated to a joint managing board consisting of members from MOI, NCTE and related industrial organizations.

The progress and monitoring of the present programme is to be carried out by the textile policy unit of MOI. NCTE will be the executing body carrying out actual implementation of the programme.

In order to ensure that the progress and implementation reflects the needs of the industrial sectors to be served, it should be ensured that sufficient consultation is made with the various industrial bodies concerned to ensure that their views and wishes are adequately integrated.

G. Schedule

Total Implementation (from go ahead decision) : about 2.5 years
recruitment and training of teaching staff: about 1 year
construction of buildings and facilities : about 1.5 years
purchase, installation and transfer of
materials, equipment and auxiliary items : about 2 years

H. Aspects of Programme Furtherance needing Consideration

In order to ensure the present programme produces positive results a preliminary survey of the nonmill sector which will be concerned by the programme is to be undertaken in order to forecast the programme results and clarify the main emphases for instruction. On the basis of the survey results the instruction policies to be adopted for the related industrial sector will be determined and it will also be necessary to conduct a survey to identify the position of the various industrial bodies and the numbers of candidates from individual companies who will be able to take part in the actual training.

As regards implementation and running of the programme NETC will be responsible for the actual implementation. It will therefore need to consider ways to realize the optimum benefits as a training institute giving special attention to the differing roles and functions of the training to be accorded to students on the one hand and to engineers on the other. Further, the position of TIRDC is to be clarified to assure that there is no waste in the running of the project.

Measures will need to be taken to forecast and arrange for beneficiaries to contribute to costs in the form of income from training fees and contributions from the industry so that training activities can be continued and maintained, while the budget of NCTE will need to be increased to meet costs for maintenance and replacement of equipment.

[Detail Plan VI-21]

Training Courses of the Textile Technology Training Centre

The courses of the present programme are designed with the actual situation and modernization of the Nonmill sector in mind. Emphasis is to be given to practical training relating to shuttle looms (fully or semi automated) in the weaving sector. Training with shuttleless looms is to be carried out using models which are easily introduced and handled in the power loom sector. Emphasis is also to be placed on weaving preparation. Course curricula are to put emphasis on piece dyeing as dyeing-finishing technology. Equipment needed for such training is to be made available and the infrequently used equipment of the NCTE also employed.

Weaving

(1) Weaving technology and knowledge of weaving machine

- Grey yarn and woven fabric structure
- Warping and sizing technology
- Sizing agent, mixing, production of sizing agent
- Heald hook and loom component parts
- Variety of looms and their structure

(2) Preparatory weaving technology training

- Mixing and production of sizing agent
- Warping and sizing with sample warper and warping

(3) Weaving technology training

- Disassembling/reassembling of loom (shuttle loom)
- Weaving (with shuttle loom and shuttleless loom)
- Heald hook

(4) Production control training

- Quality control
- Inspection of woven fabric
- Instruction for operation and work safety control

Dyeing-finishing

(1) Basic technology and production technology

Basic technology and production technology

Dyeing technology of various woven fabrics

- Dyeing (batch dyeing and continuous dyeing)

Colour fastness tests (Colour fastness tests to washing, daylight and rubbing)

Desizing and scouring (cotton and cotton-polyester blended fabric)

Finishing works of woven fabric

- Shrink resistant finish, crease resistant finish and softening

(2) Production control of mill

Procurement of dye-stuffs and reagents

Control of hue (lightness and chromaticness)

Quality control and standardization

Woven fabric testing after dyeing and finishing

[Detail Plan VI-22]

Training Course for Textile Technology Training Centre

Weaving Section

Weaving Preparation Technology Course :

- Training of weaving preparation technology required for textile engineers

Qualified Trainee : Middle class engineers and leader class technician experienced in weaving production for three years or more in weaving preparation mill

Number of trainee and training period : 10 persons per course; 20 days per course

Weaving Technology Course :

- Training of basic weaving technology required for textile engineers

Qualified Trainee : Middle class engineers and leader class technician experienced in production for three years or more in weaving mill

Number of trainee and training period : 10 persons per course; 20 days per course

Dyeing/Finishing Section

Dyeing Basic/Production Technology Course :

- Training of basic and production technology required for dyeing engineers

Qualified Trainee : Middle class engineers experienced in production in dyeing factory for three years or more in dyeing factory

Number of trainee and training period : 10 persons per course; 20 days per course

Dyeing Production Technology and Production Technology Course :

- Training of production technology and control technology required for dyeing factory engineers

Qualified Trainee : Engineers and technicians experienced in production for five years or more in dyeing factory

Number of trainee and training period : 10 persons per course; three weeks per course

[Detail Plan VI-23]

Equipment List for Textile Training Centre

Weaving Section

(1) Lab preparation machinery

| | | |
|-------------------|---|------------------------------|
| Size cooker | 1 | 200l, electric beater |
| Single yarn sizer | 1 | creel, sizing, flyer, winder |
| Sample warper | 1 | warp, length 60m |

(2) Looms and related facilities

| | | |
|---------------------------|---|--|
| Rapier loom | 1 | reed width 170cm, with 2 beams |
| Automatic cop change loom | 2 | reed width 170cm |
| Ordinary power loom | 4 | rccd width 170cm, with automatic stoppage |
| RT winder | 1 | |
| Pirn winder | 1 | |
| Reaching machine | 1 | |
| Cloth inspection machine | 1 | |

(3) Testing instrument and others

| | | |
|---------------------|-------|--|
| Testing instruments | 1 set | |
| Beam carrier | 1 | |
| Cloth carrier | 1 | |

Dyeing-finishing Section

(1) Machinery and equipment for laboratory

| | | |
|---|---|--------------------------|
| High temperature pot dyeing machine | 1 | |
| Laboratory piece dyeing machine for rope type | 1 | 140°C cloth capacity 5kg |
| Dryer | 1 | |
| Washing machine | 1 | |
| Laboratory padder and dryer | 1 | |
| Blending machine for paste preparation | 1 | |

(2) Testing equipment and instrument

| | |
|--------------------------------|---|
| Balance (digital) | 1 |
| pH meter | 2 |
| Viscosity meter (spindle type) | 1 |
| Landan meter | 1 |
| Fede-o meter | 1 |
| Rubbing fastness meter | 1 |
| Grey scale | 1 |

The machinery and equipment listed below are utilized the equipment installed in NCTE.

Screen printing tester
Heat setter
Wincc for laboratory
Pin tester for laboratory
Open width continuous dyeing tester

[Detail Plan VI-24]

Personnel Plan (for Instructors) for the Textile Technology Training Centre

As shown below the present staff of the NCTE which is to form the main implementing body of the present programme totals 80 members, with 23 teaching staff (professors, associate professors, assistant professors, lecturers), 42 supervisors (responsible for the operation, maintenance, supervision and practical instruction using the training equipment), as well as 15 general staff.

| | <u>Spinning dept.</u> | <u>Weaving dept.</u> | <u>Textile processing dept.</u> | <u>Laboratory</u> | <u>Others</u> |
|---|---------------------------|--------------------------|-------------------------------------|-------------------|---------------|
| teaching staff (professors, assistant professors, lecturers) | 5 | 2 | 2 | 2 | 12 |
| supervisors (technical, trainign staff) | 10 | 10 | 9 | 4 | 9 |

These staff members not only undertake the education of students but at present also provided technical advice to firms, and it is believed that it would be possible for them to devote time to the present programme. For the present programme it would be necessary to recruit a Director of the Centre, a small administrative staff, as well as three full time instructors for the weaving sector and three for the dyeing sector (preferably with actual experience in firms), while lectures could be given by NCTE staff concurrently with their NCTE duties.

[Detail Plan VI-25]

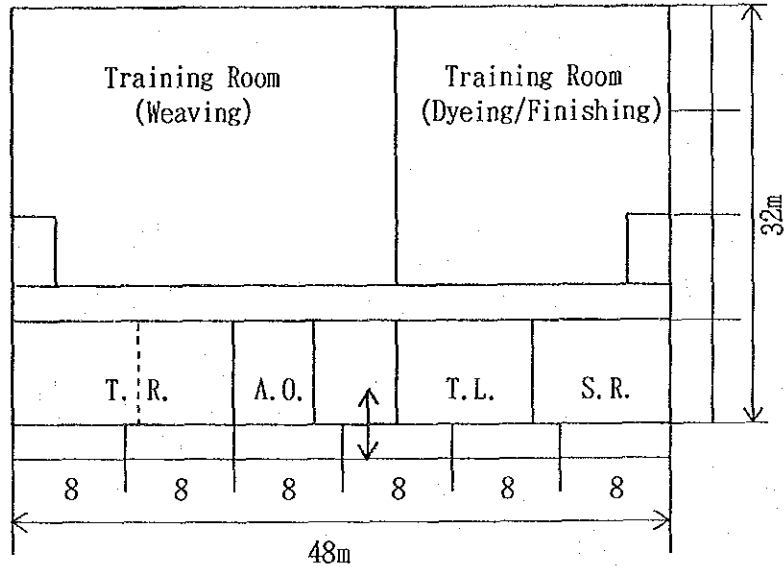
Experts to be Hosted

Weaving engineer (an engineer with actual working experience in the weaving industry)

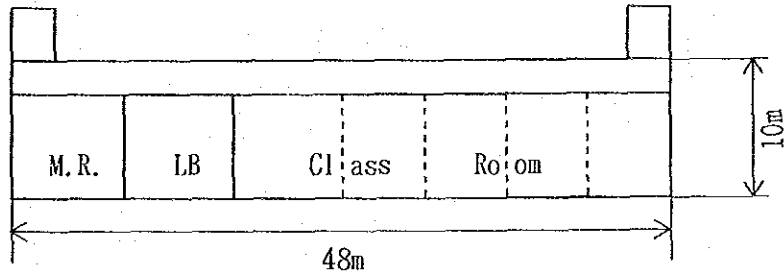
Dyeing engineer (an engineer with actual working experience in the dyeing industry)

[Detail Plan VI-26]

The Textile Technology Training Centre Building Plan



Ground Floor



1st Floor

S. R. : Stock Room A. O. : Administration Office
 T. L. : Testing Laboratory T. R. : Teacher's Room
 LB : Library

Ground Floor 48m x 32m = 1,536m²

1st Floor 48m x 10m = 480m²

2,016m²

(1-3) Technical Upgrading Supporting Programme for the Garment Sector

A. Objectives

Development and nurture of personnel resources in order to upgrade Pakistan's sewed articles to a level equivalent or better to the Western markets for general, cheap articles, and also so as to realize an expansion and strengthening of the production of sewed articles.

B. Site

The training centre is to be located either in Karachi or its suburbs, since the capital acts as Pakistan's international gateway, possesses plentiful labour, and is the focus for the main concentration of the country's garment industry.

C. Details

A Training Centre for Garment Technology is to be set up under the control of the Ministry of Industries (MOI) working in cooperation with related industry.

The following gives an outline of the envisaged Training Centre.

C-1. Trainees envisaged

Candidates eligible to be trainees are graduates of secondary school, high school and two year colleges who intend to go on to become sewing engineers, technicians or managers. It would also be possible to undertake retraining of technicians already working in the industry, but the main emphasis will be placed on the nurture of new personnel resources intending to enter into the industry.

C-2. Details of Training

Training of the present programme is to be carried out in the basic technology in the garment industry for sewing, pattern making, production control, sales management, etc. to be given to trainees who have completed their school education. Detail Plan VI-31 gives an example of the training details.

C-3. Training Courses

An example of the training courses to be implemented in the present programme is shown in Detail Plan VI-32. Since a designing course can only be set up once the other basic training courses are operating smoothly it is considered advisable to confirm the necessity of initiating such a course to a later date when this precondition has been realized.

C-4. Training Equipment

The main pieces of equipment which will be required for training are shown in Detail Plan VI-33. Distinct from the training equipment a model production line should be set up so that educational training concerning production technology and production control can be carried out through actual production activities.

C-5. Staff Programme and Visiting Experts

Recruitment and training of teaching staff will be necessary for the implementation of the training programme. Detail Plan VI-34 is an outline of the staff numbers considered necessary for the running of the present Centre. It will be necessary to carry out the training of the recruited teaching staff before the beginning of the centre's training courses. Foreign experts will be invited and carry out guidance. Detail Plan VI-35 shows the experts to be hosted.

D. Building Area and Facilities Plan

Detail Plan VI-36 shows the plan for facilities based on the assumption of the above training details being adopted for the programme. The required building space would be approximately 2,600 square metres. (training zone 1,440 square metres, two storeys; model production zone 1,150 square metres, one storey)

E. Estimate of Required Capital

| | |
|-----------------------|--|
| Building | approx. US\$ 0.5 Million (approx. Rs. 12 Million) |
| Machinery | approx. US\$ 1.4 Million (approx. JY. 180 Million) |
| Furniture and fixture | approx. US\$ 0.2 Million |

F. Organizational Framework and Monitoring System

In principle, running of the envisaged Centre would be under the supervision of MOI, while actual running would be accorded to a related industrial organization whom MOI chosen for that purpose.

The textiel policy unit of MOI would carry out the furthering and monitoring of the programme. Implementation of the programme would be carried out by the industrial body mentioned above.

G. Schedule

Total Implementation (from go ahead decision up to commencement of training) : about 3 years
recruitment and training of teaching staff : about 1.5 years

construction of buildings and facilities : about 1.5 years
purchase of equipment and auxiliary items
and their installation : about 2 years

H. Aspects of Programme Furtherance needing Consideration

In order to make the present programme a success the industrial bodies which coordinate the individual firms and play the central role in programme furthering and implementation will need to devote their full enthusiasm and energies. Moreover the instructors who are to carry out the training, education and instruction will need to be recruited and actual training initiated.

In addition to the income received in the form of trainees fees, financial assistance from industry and government subsidies need to be obtained in order to assure that the anticipated costs for integrating trainees who have completed training in the present centre, and to maintain the on going activities of this centre.

Details of Courses of the Garment Technology Training Centre

Basic instruction in the technology of garment manufacture and training on industrial production using a model production line are to be given with the aim of training technicians and engineers who will serve as the backbone of the Garment Manufacturing Industry. Basic training will give emphasis to sewing technology (use of sewing machines), general technical training in sewing, production management for garments, and other training required of technicians and managers in the garment business and garment factories. Practical experience in sewing is to be provided on the model production line. Courses in fashion design are to be started once the above initial courses in basic training are running smoothly, and will be directed to trainees who have completed the above courses.

(1) Basic skill

- Knowledge of textiles for garment
- Training of basic sewing technology
- Training of stitching of parts
- Training of sewing various garments
- Maintenance of sewing equipment

(2) Sewing skill training

- Industrial pattern making (patterning, grading and marking)
- Spreading, cutting, sewing and finishing
- Knowledge of tools for sewing (button, fastener, interlining cloth, sewing thread, etc.)

(3) Garment production control

- Process analysis and drawing up a specification sheet
- Production process design
- Quality control

(4) Garment business

- History of dresses and garments
- Knowledge of merchandise
- Fashion trend
- Marketing
- Quality control

(5) Design technology

Fashion design

Fashion illustration

Colour image

Fashion drawing

[Detail Plan VI-32]

Training Course for Garment Technology Training Centre

| | |
|---|--|
| Garment Technician Bringing-up Course | : Bringing-up garment production technician |
| Qualified Trainee | : Graduate of eight-year education (junior high school graduate) or higher |
| Training period | : Day time course one year, 36 hrs. per week Night time Course one year, 15 hrs. per week |
| Garment Mill Engineers Bringing-up Course | : Bringing-up engineers for over-all garment production technology |
| Qualified Trainee | : Graduate of ten-year education (high school graduate) or higher |
| Training period | : Day time course one year, 36 hrs. per week |
| Production Control and Business Course | : Bringing-up production control engineers and sales managers |
| Qualified Trainee | : Graduate of 12-year education (2 year college graduate) or higher |
| Training period | : Day time course two years |

The following course should be commenced after steady operation of the Centre (minimum two years later):

| | |
|-----------------------|---|
| Fashion Design Course | : Bringing-up Fashion designers |
| Qualified Trainee | : Graduate of the Garment Mill Engineers Bringing-up Course |
| Training period | : Two years |

[Detail Plan VI-33]

**GARMENT TRAINING CENTRE
MACHINERY AND EQUIPMENT LIST**

Training Section

| | |
|---|----|
| (1) Stitching machines | 24 |
| 1-Needle lockstitch machine with automatic thread trimmer | 10 |
| 2-Needle safety stitch machine | 2 |
| Blindstitch machine | 2 |
| Bartacking machine | 2 |
| Automatic pocket welting machine | 1 |
| Eyelet buttonhole bartacking machine | 1 |
| Buttonholing machine | 1 |
| Eyelet buttonholing machine | 1 |
| Chainstitch button attaching machine | 1 |
| Belt-loop making machine | 1 |
| Bartacking machine for belt-loop attaching | 1 |
| 1-Needle double chainstitch sewing machine | 1 |
| (2) Finishing machines and others | |
| Finishing machine | 1 |
| Steam iron | 2 |
| Electric iron | 2 |
| Vacuum board | 4 |

| | | |
|-----|--|-------|
| (3) | Industrial pattern making system (CAD) | 1 set |
| | Computer set, digitizer, plotter | |
| | Application programme (pattern making, grading making) | |

MODEL PRODUCTION LINE

| | | |
|-----|---|----|
| (1) | Spreading and cutting machinery | |
| | Cloth inspecting machine | 1 |
| | Spreading table | 1 |
| | Spreading machine | 1 |
| | Electric cutting machine | 2 |
| | Fusing machine | 1 |
| (2) | Industrial stitching machines | 60 |
| | 1-Needle lockstitch machine with automatic Thread Trimmer | 30 |
| | 1-Needle over lock machine | 3 |
| | 2-Needle safety stitch machine | 2 |
| | Blindstitch machine | 5 |
| | Bartacking machine | 5 |
| | Automatic pocket welting machine | 3 |
| | Eyelet buttonhole bartacking machine | 2 |
| | 2-Needle lockstitch machine | 2 |
| | Eyelet buttonholing machine | 1 |
| | Lockstitch button attaching machine | 2 |
| | Belt-loop making machine | 1 |
| | Automatic belt-loop attaching machine | 2 |
| | 1-Needle double chainstitch sewing machine | 1 |
| | 2-Needle double chainstitch sewing machine | 1 |
| (3) | Finishing machines | |
| | Steam irons | 4 |
| | Electric irons | 4 |
| | Vacuum boards | 8 |
| | Press machines | 2 |
| | Carriers | 8 |

[Detail Plan VI-34]

Personnel Plan (for Instructors) of the Garment Technology Training Centre

The estimated number of instructors who will be required for the present programme is shown below. In addition to these, a small number of general administrative staff for general administration and accounting as well as a Director of the Centre will need to be recruited in addition to the instructors. Either engineers or others with industrial responsibilities or candidates who are graduates from technical colleges and are earnestly motivated to instructing work should be chosen as instructors, and sent for further training either in Pakistan or abroad. Eventually the future instructors would be trained from among their ranks. On the model line full time operators should be posted (including supervisors) and the instructors take responsibility for overall administration of the model line as well.

Training Section

| | <u>Basic Sewing Technology</u> | <u>Pattern Making Technology</u> | <u>Production Technology</u> | <u>Business</u> | <u>Total</u> |
|----------------------|--|--|----------------------------------|-----------------|--------------|
| Trainer | 4 | 2 | 1 | 1 | 8 |
| Assistant Trainer | 6 | 2 | 1 | 1 | 10 |
| Subtotal | 10 | 7 | 7 | 2 | 18 |

Model Production Line

| | |
|--|----|
| Inspection of fabrics, spreading and cutting | 5 |
| Sewing | 50 |
| Inspection of product | 10 |
| Finishing and Packaging | 10 |
| Subtotal | 75 |

[Detail Plan VI-35]

EXPERTS TO BE HOSTED

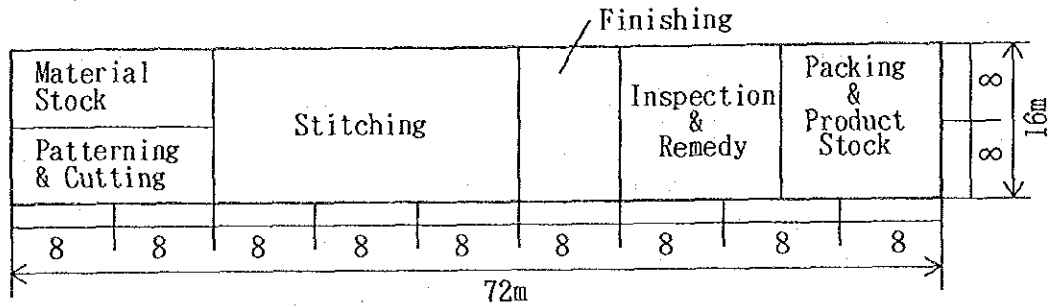
Garment Production Engineer (with equipment maintenance and process analysis technology)

Pattern Fabrication Engineers (with CAD technology)

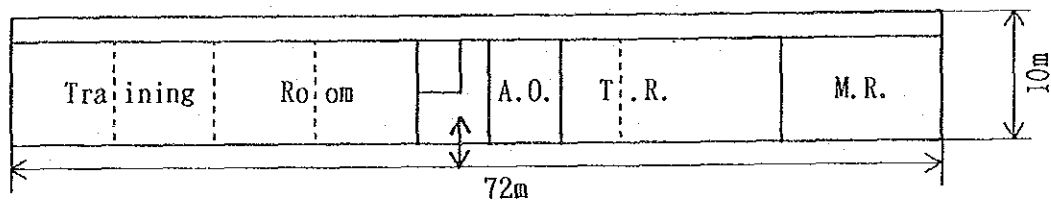
[Detail Plan VI-36]

GARMENT TRAINING CENTRE BUILDING PLAN

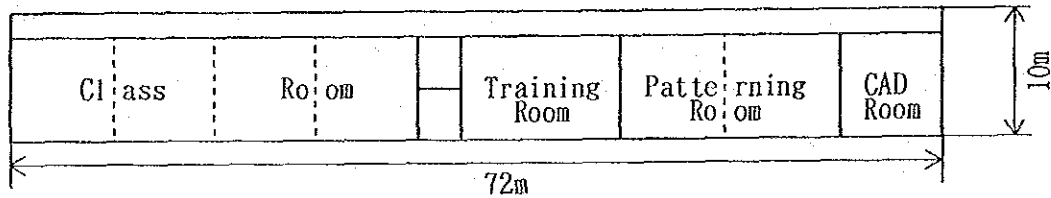
Model Production Zone



Training Zone



Ground Floor



1st Floor

- A.O. : Administration Office
- T.R. : Teaching Room
- M.R. : Meeting Room

Model Production Zone (One Storay)
72m x 16m = 1,152m²

Training Zone
Ground Floor 72m x 10m = 720m²
1st Floor 72m x 10m = 720m²

1,440m²

(2) Modernization of facilities and structural reform in the Nonmill Sector

Independent weaving firms in the weaving sector, especially those in the Nonmill Sector, are in a position to supply materials to the garment sector while at the same time meeting most of the domestic demand and exporting as well. Most of these firms are small and medium-sized enterprises, however, and are unable to fully meet the requirements of the garment sector with their current low levels of technology, low productivity and outdated facilities. Insufficient capacity and outdated facilities in the processing (dyeing and finishing) sector, the rectification of which is essential for diversification and upgrading of the garment sector, are also impeding development of the garment sector.

Introduction of modern facilities and improving quality and productivity are of primary importance for small and medium enterprises to cut production costs, strengthen their competitiveness and stabilize their operations. However, they are generally weaker in credit standing and fund-raising than big enterprises. They find it difficult to introduce modern facilities because of the financial restraints, which lead to the gap between their productivity and that of larger enterprises. The way is open for these firms to get fixed finance from government-affiliated financial institutions, but some small and medium enterprises find it difficult to meet lending requirements.

Also, most of the independent weaving firms and their vendors are currently located in congested urban areas where they face technological problems, such as flaws on warp produced while transporting beams from sizing plants to weaving mills. In addition, there are various other problems such as detrimental effects on production efficiency, noise and pollution. These small and medium-sized mills scattered in urban areas should be gathered into groups on suburban sites suitable for locating plants, thereby freeing themselves from various impediments. At the same time, they can increase their strength through joint manufacturing processes, joint facilities and other cooperative activities in planned industrial parks.

The following special finance system should be set up to achieve these ends. In advance of drawing up the action plans or implementation of them, an in-depth study on the current situation of the industries, demand for loan fund and possibility of procurement of the fund must be conducted.

(2-1) Financing Scheme for Modernization of the Textile Industry

A. Objective

A special low-interest-rate financing scheme for equipment modernization should be set up for small and medium-sized textile enterprises, especially those in the "weaving sector," which notably lag behind in the modernization of equipment. The loans should also promote new investment, and investment for expansion and modernization of the "processing sector," which is expected to be expanded and modernized further.

B. Lending system (A suggestion)

1) Conduit institutions

The Industrial Development Bank of Pakistan (IDBP) or government-affiliated commercial banks should be appointed as "lending windows."

2) Enterprises qualified

Small and medium-sized enterprises (companies or individuals whose fixed assets amount to no more than 20 million rupees) engaged independently in manufacturing or processing fabrics or knit products and enterprises belonging to ancillary industries should qualify for loans.

Other requirements:

- [1] Outdated equipment should be abandoned.
- [2] Recommendations should be obtained from industry organizations to which the applying enterprises belong.
- [3] Applicants should be enterprises whose ability to borrow normal funds from DFIs or commercial banks is deemed to be difficult.
- [4] Large firms should not contribute more than a half of the total investment capital of the enterprises applying for loans.

3) Facilities qualified for loans

Facilities qualified for loans should be designated as necessary by the Minister of Industries for each industry sector and should also meet the following conditions. Land and buildings should not qualify.

- [1] The facilities should be new and excellent in performance.
- [2] Contracts for their purchase should be made in the same fiscal year in which the loan is to be made.

4) Lending limit and ratio

Lending should be limited to 30 million rupees for each enterprise. The ratio of the loan to the total funds necessary should not exceed 70 percent.

5) Interest rate and term of repayment

The interest rate should be fixed taking into account interest rates and commissions on foreign loans, if any, as well as the cost and margin of the executing financial institutions. It should not exceed 70 percent of the open market rate, however. The term of repayment should be five years (seven years in the case of pollution control

equipment) after a one-year grace period. Repayment should be made in yearly or half-yearly installments after the one-year grace period.

6) Collateral/Credit guarantee

Lending institutions should require physical collateral or credit guarantee by a credit guarantee association (not yet established at present)*)

*) Establishment of a credit guarantee association and a credit insurance corp. are necessary. In view of the insufficient credit standing and ability to borrow of small and medium enterprises, introduction of an official credit reinforcing system should be considered to support them. This matter was touched on previously in "2-2. Recommended Policies".

7) Procedure for applying for loans/consulting

Applications for loans should be submitted to the executing financial institutions. Upon presentation with a loan application, the financial institutions should evaluate or diagnose the operational performance of the enterprises concerned and offer guidance as required. If the lending institution's diagnosis of the plant and equipment investment plan is positive and it is considered to be appropriate to raise funds through this system, the loan will be granted.

8) Time of lending

The actual loan is made when an L/C is opened for importation of the equipment.

(2-2) Financing Scheme for Groupings in the Textile Industry

A. Objective

To promote modernization and structural reinforcement in small and medium-sized enterprises in weaving and knitting sectors, related sectors thereto and in the processing sector, long-term low-interest loans should be made available for the purpose of assisting joint operations, grouping of mills and construction of joint facilities (*).

(*) The All Pakistan Cotton Power Looms Association (APC-PLA) feels that groupings, collaboration and joint operation is possible for small and medium enterprises belonging to the same product category. Collaboration and joint operation involving ancillary industries (warping, sizing etc.) is also believed possible.

In Japan, textile manufacturers in the Enshu region set up a cooperative business association called "Export Fabric Marketing and Utilization Association Limited Eikyusha" in 1923 to establish joint facilities for sizing, processing and trial weaving, and to venture into joint sales promotions. Such moves were influenced by the "Industrial Association Law," which permitted joint purchases of raw materials, joint operations, joint marketing and other cooperative activities. At Fukuda in the Enshu region, another cooperative business association called the "Velveteen and Corduroy Marketing and Utilization Association Tenryusha" was established, and in southern Osaka prefecture there were moves to set up joint sizing mills and warehouses in every county.

Unlike the "guilds" (associations mainly for export inspection), the "industrial associations" initially were not permitted to conduct inspections. The above-mentioned "Eikyusha" and other industry associations petitioned the authorities to allow them to perform inspections, resulting in the 1925 "Important Export Products Industrial Association Law" which permitted the establishment of new industrial associations that could both operate jointly and conduct inspections. By 1927 eight textile-related industrial associations of this type had been formed for the purpose of joint sizing, processing, warehousing, purchasing, marketing and inspection.

As reviewed above, in the 1920s the industry took the initiative to carry out joint business activities, contributing to its modernization and rationalization. Accordingly, we believe similar results will be achieved by small and medium weaving sector enterprises in Pakistan through the "collaboration fund lending programme" proposed here.

B. Lending system (A suggestion)

1) Conduit institutions

The Industrial Development Bank of Pakistan (IDBP) and government-affiliated commercial banks should be made windows for lending.

2) Concept of the Scheme

The system would lend the following funds to small and medium-sized enterprises to modernize and rationalize their businesses by forming cooperative business associations (*) and by moving their mills to industrial parks under the factory group formation plans worked out by these associations.

- Funds necessary for cooperative business associations to acquire land and construct buildings for the operations of association members.
- Funds necessary for members of cooperative business associations to acquire land or construct buildings to conduct their businesses

(*) Cooperative associations formed by small and medium enterprises with a view to securing fair opportunities for economic activities and to improving their economic position by conducting cooperative business in the spirit of mutual aid should be regarded as cooperative business associations. Cooperative business associations conduct the following activities in an effort to rationalize the operations of small and medium enterprises and improve their opportunities for business.

- [1] Joint operations in production, processing, purchasing, marketing, transportation and storage
- [2] Establishing welfare facilities, extending working loans to members and other activities necessary to improve the economic standing of members

3) Group formation plans

The group formation plans should meet the following conditions.

- [1] Groupings should be made in accordance with the grouping plans drawn up by the cooperative business associations which are mainly comprised of small and medium enterprises.
- [2] There should be at least 20 small and medium enterprises in a group.
- [3] All group members should belong to the same or directly-related industries. If several cooperative associations belonging to the same or directly-related industries form a federation, the number of small and medium enterprises referred to in [2] above should be no less than 10 per association.
- [4] Pertinent joint business activities should be conducted in industrial parks.
- [5] Industrial parks should be located in areas suitable for the establishment of mills.
- [6] Factory buildings should be sufficiently safe and durable.

4) Associations and enterprises qualified for loans

4-1) Associations qualified

Cooperative business associations should meet the following conditions:

- [1] The associations should be composed of members belonging to the fabric manufacturing, knit products manufacturing, and processing industries and their ancillaries.
- [2] At least two thirds of the members should be enterprises or individuals whose fixed assets amount to no more than 20 million rupees.

4-2) Enterprises qualified

Enterprises should be members of cooperative business associations that draw up group formation plans and small and medium enterprises who would set up mills or business establishments in an industrial park.

5) Facilities that qualify for loans

Facilities qualified for loans should meet the requirements below and be one of those that are necessary for the implementation of the group formation plans. In principle, land should be acquired or construction work started within the same fiscal year that the loan is made.

- [1] Land acquisition: In case cooperative business associations acquire land to create industrial parks, the cost of the acquisition.
- [2] Joint facilities: Cost of constructing joint facilities such as buildings, including their machinery and equipment etc., set up by cooperative business associations in an effort to rationalize members' operations. (For example, joint facilities for production, processing, testing and research, inspection, storage, transportation, feeding and lodging, shopping areas, garages, water supply and draining systems, etc.)
- [3] Factory buildings: In case the following factory buildings need to be constructed, the cost of construction.
 - (a) Factory buildings constructed by cooperative business associations for use by their members.
 - (b) Factory buildings constructed individually by association members.

6) Limit and ratio of lending

A limit should be set on the amount of loans for each facility. No limits should be set for joint facilities, however. The fixed limit multiplied by the lending ratio should become the amount of the loan. The limit on the amount of lending should determine the scope of the lending and should not obstruct further acquisition of land or construction of buildings.

[1] Fixed limit on scope of lending

| [Item] | [Amount] | [Area] |
|------------------|--|--|
| Land | <ul style="list-style-type: none"> •Before creation: Up to X rupees per sq.m. •Already created: Up to X rupees per sq.m. | <ul style="list-style-type: none"> •Up to X sq.m. per enterprise (In case removal is made by the whole, up to double the size of the currently-owned site.) |
| Factory Building | <ul style="list-style-type: none"> •Cost of creation of land: Up to X rupees per sq.m. •Cost of construction: Up to X rupees per sq.m. | <ul style="list-style-type: none"> •Up to X sq.m. per enterprise (In case the removal is made by the whole, up to double the size of the currently-owned buildings.) |
| Joint facilities | (No limits) | (No limits) |

[2] Lending ratio: 75 percent of necessary investment

7) Interest rate and terms of repayment

[1] Interest rate:

The interest rate of the loan should be fixed by taking the interest rate and commission of foreign loans, if any, and costs and margins of the executing financial institutions into consideration. It should not exceed 70 percent of the open market interest rate, however.

[2] Terms of repayment:

The repayment term should be about five years after a one-year grace period. Repayment should be made in yearly or half-yearly installments after the one year's grace.

8) Collateral/Credit guarantee

Lending institutions should require physical collateral or credit guarantee by a credit guarantee association (not yet established).

9) Procedure for applying for lending/examination and consultation

Loan applications should be submitted to the administrative unit in charge of the textile industry of the Ministry of Industries. After consulting with the section in charge of the government of the province where the planned industrial park is located, the unit in charge of the textile industry should examine the appropriateness of the plan, and, after offering guidance as the situation requires, authorize the loan. Financial institutions should make loans available to the applicants with the authorization of the Ministry of Industries.

10) Time of lending

Loans should be made only when contracts for the construction or installation of facilities have been concluded and payment of the sum excluding the amount of the loan has been settled.

11) Consulting organs

In advance of developing group formation plans, enterprises and business associations should consult the unit in charge of the textile industries of the Ministry of Industries, divisions and sections in charge of the provincial governments and the conduit financial institutions.

(3) Promotion of standardization for quality improvement of finished products

(3-1) Standardization of Inspection Programme

The overall technical level of Pakistan's textile industry remains quite low. Further there is considerable difference between technical levels of individual firms, and attitudes to product quality of the small number of firms at the top level has nothing in common with the thinking concerning this aspect among firms at the lower end of technical competence. While upgrading of the technical level of individual firms is the basis for any overall upgrading, it is also important for the Government of Pakistan to carry out supporting activities and consider methods which will improve the overall national level of product quality bearing in mind current international evaluations of Pakistan's textile products so as to identify ways to improve the international rating given to its textile exports. One approach is to reorganize the existing institutes and bodies concerned with standardization and quality control and if their activities can be linked with those of related industries to create a coordinated system then it would be possible to undertake much more active and vigorous action for the diffusion of standardization and upgrading of quality levels. The invitation of foreign experts to give guidance on the achievements and expertise of the developed countries would provide an effective support to measures for standardization of inspection methods and compilation of uniform evaluation results for products.

On the basis of the above thinking the following activities for diffusion of standardization and inspection methods are to be furthered.

A. Objectives

To establish standards necessary for quality evaluation of textile products, and diffuse inspection methods suited to these standards throughout the textile industry. To clarify the problem points hindering the quality improvement and upgrading of Pakistan's textile products by compiling uniform government level data on the quality levels of export items. To promote exports through improved quality consciousness.

B. Details

To determine and diffuse the inspection procedures of products and grasp quality of textile products by means of uniform inspection. This is to be carried out through the following uniform measures:

- Establishment of criteria of the inspection methods used to apply standards
- Standardization of actual inspection methods and improvement of inspection technology
- Comparative evaluation of the product quality of individual firms using the uniform inspection methods elaborated.

Also concurrently with the above measures evaluation of export markets and comparisons with products of competitor countries is to be carried out to clarify points for improvement of product quality and help the

setting of product quality targets.

B-1. Implementing Body

The central driving force for the project is to be the Pakistan Standards Institution (PSI). If the planned merger of PSI with the Central Testing Laboratories (CTL) is effected to establish a Pakistan Standards and Quality Control Authority (PSQCA) then this organization could carry out implementation.

B-2. Action Programme

- Creation of Criteria for Inspection Methods

The PSI has already set 403 standards relating to textiles standardization. These standards are largely according to the British Standards. Also the number of firms which have installed new inspection devices is increasing as the importance of product quality is gaining more recognition. Such firms are especially numerous in the spinning sector, but are limited to a section of the weaving and dyeing-finishing sector firms. In order to grasp how Pakistan's textile products are rated by users both at home and abroad it is important to have inspection results concerning the diameter of yarn (with classimat inspection results), and grey cloth and dyed fabric. However such results are not generally accorded importance and are not usually carried out. Moreover little testing of the fastness of dyed fabrics (washing and sunlight fastness) is carried out. It is necessary to emphasize the application of such evaluation methods in order to further the improvement and upgrading of product quality. The application of methods which are outside the range of established standards but which are widely implemented internationally should also be carried out and industrial standards set up in cooperation with the textile industry.

Standardization of Actual Inspection Methods and Upgrading of Inspection Technology

In order to carry out actual inspections training of inspection personnel in the handling of inspection devices, the making of samples, the setting of evaluation criteria, etc. will be necessary. At present instruction is received from the manufacturers of inspection devices and technical guidance is provided by overseas customers. Further training in inspection methods is carried out through the training course in quality control given at the TIRDC. In order to obtain uniform evaluation results on a national level it is important to ensure that a given sample or product will produce the same results irrespective of who carries out the inspection or where it is done. If differing inspection procedures or evaluation criteria are employed depending on who carries out an inspection then mistakes may arise when claims arise against a given product, and it will be impossible to adopt the necessary countermeasures.

In order to standardize the inspection methods and technology used in the various institutes and factories inspectors of the various inspecting boards and bodies need to be gathered together and inspection technology coordinated through the present programme. The cooperation of PSQCA (that is PSI and CTL) and TIRDC

will be needed to effect this in Pakistan. Regular comparisons of inspection methods and technology will also need to be carried out.

Comparative Evaluation of Product Quality of Individual Firms using Uniform Inspection Methods

Just setting standards in itself will not result in any upgrading of product quality. Nor will inspection of products alone necessarily entail any upgrading of product quality levels. When setting targets for upgrading of product quality it is important for a firm to have comprehensive information concerning the evaluation and position accorded to its products both domestically and overseas. From the national point of view it is essential to secure an evaluation of the quality of the products of all individual firms on a uniform basis. PSQCA working in cooperation with industrial organizations should regularly evaluate product quality of the various firms simultaneously. Of course care should be taken to avoid publication of individual company names in connection with the evaluation results, but guidelines concerning the improvement targets decided upon should be fed back to the individual firms. It would be possible to commission the implementation of inspections to a neutral inspection board independent from the various industrial organizations rather than having inspections carried out by a government body which could simply have a checking function. Although there may be some reluctance or hindrance encountered concerning actual implementation of such inspection it is important to gain the understanding and cooperation of industrial organizations and individual firms since these activities to diffuse standardization will help to upgrade the international evaluation of the country's textile products.

B-3. Inspection Equipment and Personnel

The equipment and personnel of PSQCA (or CTL) and of TIRDC are to be employed for inspection purposes. At present modernization of the inspection equipment and technical guidance is being undertaken at CTL with support from the United Nations (UNIDO). TIRDC also possesses relatively modern equipment for evaluating finished products and capable inspecting personnel. Personnel responsible for planning and implementation of the overall programme could be attached to PSQCA (or PSI) and the above mentioned equipment and personnel be employed for diffusion of actual inspection activities.

B-4. Invitation of Overseas Experts

In order to standardize the inspection methods of public institutes and of private companies it will be necessary to develop the technical and instructional expertise of the staff drawing up the implementation plan for the programme and of the inspectors who will carry this out. To this end the invitation of foreign experts to provide guidance is considered an effective way of assimilating the experience and know how of the developed nations.

The overseas experts with as follows functions are to be invited:

- To draw up a uniform inspection system
- To standardize inspection methods,

To provide guidance in inspection technology

B-5. Costs

The government will meet the personnel costs for the staff in charge of the envisaged programme. Inspection and other costs etc. involved in the actual standardization of inspection methods, and the costs incurred to prepare the documents of evaluation results for distribution are to be met by the industry itself. Government funding will meet the costs of maintenance and replacement of inspection equipment.

C. Organizational Framework

The existing organizations of PSI and CTL (or of PSQCA) are to be employed. The textile policy unit of MOI is to be put in charge of the furthering and monitoring of the programme. The main implementing body is to be PSI (or PSQCA).

D. Schedule

It is expected that about three years will be necessary from the time of decision to go ahead with the programme is made before activities are smoothly underway always on the assumption that preparatory work (including aspects such as the establishment of objectives and the systems framework shown in section E below) is begun promptly.

E. Preconditions of Programme Implementation

The vigorous leadership of the Government and cooperation of related industrial sectors are essential to the progress and realization of the present programme. To ensure these clarification of the programme objectives and provision of an organizational framework are required.

It is necessary to make the main objectives of this programme quite specific by means of collecting and analysing data and information concerning the international evaluation of Pakistan's textile products, and to obtain a clear vision of the present position and placement of Pakistan's textile products.

The guidelines for industry relating to standardization and inspection systems should be established, and governmental bodies such as PSI, CTL (or PSQCA), TIRDC, etc. should furnish the organizational framework for the programme.

2-3-2. Evaluation of Programme Priorities

(1) Criteria for evaluating priorities

Programme priorities are to be evaluated in terms of their promotion of the following objectives or their effectiveness in countering problems which must be overcome in implementation.

A. Contribution to Attaining the Envisaged Objectives (Objective benefit and effectiveness)

The appropriateness of a given priority is measured by the extent to which this is expected to favour or effectively promote an objective. Priorities which will make the greatest contribution are to be given precedence in the programme. In view of the objectives of the present survey contribution to the following aspects are to be considered.

a. Effectiveness in Improving Technology

Comparative evaluation in terms of the degree to which a priority is effective in improving the quality of products, in upgrading technical levels, or in improving productivity.

b. Effectiveness in Promoting Exports

Comparative evaluation in terms of the degree to which a priority is effective in promoting exports and securing foreign exchange.

c. Effectiveness in Reinforcing the Industrial Base

Comparative evaluation in terms of the contribution to the balanced overall development of the industry through resolution of structural bottlenecks in the industry or reinforcement of individual firm's structure, etc.

d. Indirect Benefits to the Economy or Society

Evaluation of the effectiveness in providing indirect benefits to the economy or society, for example an expansion of the national economy, expansion of employment opportunities, development of working places for women, etc.

B. Problems facing Programme Implementation needing Consideration

The existence, degree and difficulty of problems which may be encountered in the programme implementation must be considered and the programme with the minimum of problems offering the line of least difficulty should be chosen. The following outlines the types of problem which may be encountered.

a. Social and Environmental Problems

It will be necessary to evaluate whether there is any problem of compatibility of the programme with the existing social customs and legal system of Pakistan. Also compatibility with other national government programmes needs to be assessed.

b. Financial Problems

An evaluation to ascertain whether there are any problems relating to the size and distribution of cost burdens, to feasibility of expenditure configurations, etc.

c. Organizational Problems

Evaluation of problems relating to the selection of implementing and managing bodies, the establishment of their organizational systems, the recruitment of personnel, etc.

d. Timing Problems

A comparison of the possibility of a prompt handling of works, and of the length of time involved from operational commencement to the realization of concrete effects and benefits.

(2) Evaluation of Programme Priorities

Table VI-2-3 summarizes the results of an evaluation of priorities for the promotion programme to be carried out using the above criteria.

(3) Implementation Schedule

As reference, Table VI-2-4 indicates an outline of an implementation schedule for the programme taking account of the results of the evaluation of the programme priorities. If considerable time is needed before a programme can be implemented, then it will be necessary to undertake a certain extent of review at the time of the programme initiation to take account of any contextual changes in markets, the raw material situation, etc. and to accommodate changes in the national economy, industrial policy or industrial trends which may have arisen in the meantime.

Table VI-2-3 PROGRAMME PRIORITIES

| Programme | A. Contribution to Attaining the Envisaged Objectives | | | | B. Problems facing Programme Implementation needing Consideration | | | | Priority |
|---|---|------------------------------------|--|---|---|--------------------|-------------------------|-----------------|----------|
| | Effectiveness in Improving Technology | Effectiveness in Promoting Exports | Effectiveness in Reinforcing the Industrial Base | Indirect Benefits to the Economy or Society | Social and Environmental Problems | Financial Problems | Organizational Problems | Timing Problems | |
| (1-1) Technical Upgrading Supporting Programme for Textile Up- & Mid-stream Sectors | A | B | B | B | A | B | B | B | 5 |
| (1-2) Technical Upgrading Supporting Programme for Small & Medium Scale Textile Industries in Punjab Area | A | A | B | B | A | A | A | A | 2 |
| (1-3) Technical Upgrading Supporting Programme for Garment Sector | A | A | B | A | A | B | B | B | 1 |
| (2-1) Financing Scheme for Modernization of Textile Industry | B | B | A | A | A | C | B | B | 3 |
| (2-2) Financing Scheme for Groupings in Textile Industry | B | B | A | A | A | C | B | B | 3 |
| (3) Standardization of Inspection Programme | B | B | B | B | A | A | A | A | 6 |

Table VI-2-4 IMPLEMENTATION SCHEDULE OF PROGRAMME

| Programme | 1st Year | 2nd Year | 3rd Year | 4th Year | 5th Year | 6th Year | 7th Year | 8th Year |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| (1-1) Technical Upgrading Supporting Programme for Textile Up- & Mid-stream Sectors | | | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning |
| (1-2) Technical Upgrading Supporting Programme for Small & Medium Scale Textile Industries in Punjab Area | | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning |
| (1-3) Technical Upgrading Supporting Programme for Garment Sector | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning |
| (2-1) Financing Scheme for Modernization of Textile Industry | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning |
| (2-2) Financing Scheme for Groupings in Textile Industry | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning |
| (3) Standardization of Inspection Programme | | | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning | Preparation and Planning |

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