

Except for the auxiliary equipment, all the requested items of equipment are to be installed in the training block. Some of the existing items of equipment, which are no longer usable, will be stored and/or displayed for educational purposes in another existing buildings.

(3) Electricity

The college's maximum permissible limit of electricity is 189 kW. Over the past few years, the college's maximum electric power consumption has been 30 kW. Electricity is supplied to the college from the Water Power Development Agency (WAPDA). Electric power is received at the college at a voltage of 11 KV, which is reduced to AC440V single phase, 50 Hz. The voltage fluctuates within the range of  $\pm 5\%$ . In Faisalabad where the college is located, load shedding of power supply are carried out periodically due to the insufficient capacity of the electric power generation and distribution, which is a serious setback to practical training at the college. For this reason, a stand-by power generator is included in the requested equipment.

(4) Water

The college has a tube-well water supply facility of its own. The water supply facility is capable of supplying 72,000 gallons (about 270 tons) of water a day, which is adequate for practical training at the college. The quality of the water is judged to be good for the equipment and processing.

3-3-4 Outline of the Planned Equipment

The following are brief descriptions of the equipment judged appropriate to this project.

1) Equipment for Spinning Department

CODE NO.	EQUIPMENT	USE	SYLLABI
SP-1	Blow Room Machines	Machines used for mixing different types of raw cotton and removing dust through beating so as to render raw cotton uniform in overall property, as well as for making laps of certain thickness	TE-306: Spinning Preparatory Processes TE-405: Spinning Preparatory Processes TE-407: Spinning Calculations
SP-2	Carding Machine	A machine used for making uniform slivers by removing a multitude of tangles, impurities, fibres not suited for spinning, short fibres and fibres lumps	TE-201: Spinning TE-306: Spinning Preparatory Processes TE-406: Yarn Planning & Production TE-407: Spinning Calculations
SP-3	High Speed Drawing Frame	A machine used for making uniform slivers by removing unevenness in lap thickness and making individual fibres run in a desired direction	TE-201: Spinning TE-306: Spinning Preparatory Processes TE-405: Spinning Preparatory Processes TE-407: Spinning Calculations
SP-4	Simplex Fly Frame	A machine used for making uniform slivers of a thickness suited for spinning by the spinning machine by making slivers thinner and increasing the parallel alignment of individual fibres	TE-201: Spinning TE-307: Yarn Production TE-406: Yarn Planning & Production TE-407: Spinning Calculations
SP-5	Ring Spinning Frame	A machine used for rending roving to a predetermined thickness (yarn count) and for winding it around the cop SP-5(b) Ring Spinning Frame without Link Corner - Deleted	TE-307: Weaving Theory & Practice TE-406: Yarn Planning & Production TE-407: Spinning Calculations
SP-6	Automatic Cone Winder	A machine used for winding up the cop of an appropriate size and a predetermined length by removing threads over the predetermined range of thickness or those with impurities	TE-410: Weaving Theory & Practice

1) Equipment for Spinning Department

CODE NO.	EQUIPMENT	USE	SYLLABI
SP-7	Assembly Winder	Deleted	-
SP-8	Two-For-One Twister	Deleted	-
SP-9	Yarn Classimat with Winder	A testing instrument used for classifying, checking and recoding thick and thin threads and impurities	Through out of Spinning process
SP-10	Lea Strength Tester	An instrument used for measuring the strength of threads under the twisted form (80 threads, 120 yards)	Through out Spinning process
SP-11	Open-end Spinning Machine	A spinning machine with a spinning mechanism different from an ordinary ring spinning machine (this machine ensures high productivity)	TE-408: Advance Spinning Studies
SP-12	Metallic Wire Mounting Machine for Card	Deleted	-

2) Equipment for Weaving Department

CODE NO.	EQUIPMENT	USE	SYLLABI
WV-1	Weaving Machine	Machine for weaving from yarn or thread into cloth, by plural kind of shuttleless methods different from ordinary shuttleless method	TE-202: Weaving TE-309: Weaving Mechanism TE-410: Weaving Theory & Practice
WV-2b	Wefit Knitting Machine	A machine used for making cloth using a continuous loop of one or two threads (machine types vary widely according to the cloth type)	TE-202: Weaving TE-308: Fabric Structure & Designing TE-309: Weaving Mechanism
WV-2c	Flat Knitting Machine	WV-2 a) Warp Knitting Machine - Deleted	
WV-3	Brading Machine	A machine used for making string-shaped cloth	TE-202: Weaving
WV-4	Needle Loom	A machine used for making ribbon-shaped cloth of single breadth (this machine can create a wide variety of structures of cloth)	TE-202: Weaving TE-309: Weaving Mechanism
WV-5	Testing Equipment	Testers and measuring instruments	Throughout Weaving course
WV-6	Interlock Knitting Machine	A machine used for knitting double jerseys	TE-202: Weaving TE-308: Fabric Structure & Designing TE-309: Weaving Mechanism
WV-7	Single Jersey Knitting Machine	A machine used for knitting single jerseys	TE-202: Weaving TE-308: Fabric Structure & Designing TE-309: Weaving Mechanism

2) Equipment for Weaving Department

CODE NO.	EQUIPMENT	USE	SYLLABI
WV-8	Single Testing Machine	A testing machine used for knitting with a single cheese	TE-202: Weaving TE-308: Fabric Structure & Designing TE-309: Weaving Mechanism
WV-9	High Speed Rib Socks Knitting Machine	A machine used for knitting socks and stockings	TE-202: Weaving TE-308: Fabric Structure & Designing TE-309: Weaving Mechanism
WV-10	Dial Linking Machine	Deleted	-
WV-11	Fully Fashioned Flat Knitting Machine	A machine for making knit cloth resembling the form of end product	TE-202: Weaving TE-208: Engineering Design TE-309: Weaving Mechanism
WV-12	Hand Drive Flat Knitting Machine	Deleted	-
WV-13	Tension Meter	Deleted	-

3) Equipment for Textile Processing Department

CODE NO.	EQUIPMENT	USE	SYLLABI
PR-1	Colour Difference Measuring System	An instrument used for the measurement of the difference in hue between dyed cloth and its standard sample	TE-311: Bleaching & Dyeing TE-415: Dyestuff Chemistry
PR-2	Auto-Screen Printing Machine	A testing machine used for testing screen prints on various woven fabrics and knitted fabrics (it also examines the conditions for Direct Printing, Discharge, Printing, and Resist Printing)	TE-417: Textile Printing
PR-3	Heat Setting Machine	A testing machine used for testing the drying and heat treatment of various fabrics (this machine is used for testing of heat treatment after the finishing agent was applied to the fabrics)	TE-203: Textile Chemistry TE-310: Textile Finishing
PR-4	Winch for Laboratory	A testing machine used for testing the plain dyeing of woven fabrics or knitted fabrics (made of natural fibers regenerated cellulose fibres)	TE-203: Textile Chemistry TE-311: Bleaching & Dyeing TE-416: Bleaching & Dyeing
PR-5	Calendering Machine for Laboratory	A testing machine suited for testing the method of physical fabrics finish processing	TE-203: Textile Chemistry TE-310: Textile Finishing
PR-6	High Temperature 12 Colour Pot Dyeing Machine	A testing machine used mainly for testing the dyeing polyester fabrics and cellulose/polyester mixed spun fabrics	TE-415: Dyestuff Chemistry TE-416: Bleaching & Dyeing

3) Equipment for Textile Processing Department

CODE NO.	EQUIPMENT	USE	SYLLABI
PR-7	Motor Driven Yarn Reel	A Yarn Reel Machine used for testing physical properties of threads or yarn dyeing	TE-303: Textile Testing TE-311: Bleaching & Dyeing
PR-8	Continuous Pad Drying Machine	A dryer used for testing the dipping, padding and drying of finishing agents or liquid of dyes	TE-310: Textile Finishing TE-416: Bleaching & Dyeing
PR-9	High Pressure Steamer	A testing machine used for testing the fixing of dyes to printed portions	TE-417: Textile Printing
PR-10	Over Feed Pin Tenter	A testing machine used for testing the continuous heat treatment of synthetic fabrics and the heat treatment of finish processed cloth	TE-203: Textile Chemistry TE-310: Textile Finishing TE-416: Bleaching & Dyeing
PR-11	Open Width Continuous Dyeing Machine	A testing machine used for testing the continuous coloring, thermofixation and washing treatment of dye solution-impregnated cloth	TE-203: Textile Chemistry TE-311: Bleaching & Dyeing TE-416: Bleaching & Dyeing
PR-12	Blending and Mixture for Paste Preparation	A machine used for dispersion or dissolving dyes and chemicals	General Purpose
PR-13	Electric Oven for Dyeing	Used for heating various solutions	General Purpose

3) Equipment for Textile Processing Department

CODE NO.	EQUIPMENT	USE	SYLLABI
PR-14	Ball Mill Grinder for Pigment	Used for crushing grains or mixing different types of powder	General Purpose
PR-15	Digital PH Meter	Used for the measurement of the hydrogen ion concentration	General Purpose
PR-16	Digital Thermometer	Used for the measurement of the temperature of surfaces, liquids and gases	General Purpose
PR-17	Single Pan Electric Balance	Used for the measurement of weight	General Purpose
PR-18	Viscosity Meter	Used for the measurement of the viscosity of liquids or paste	General Purpose
PR-19	Sample Cutter for Fabrics	Used for the preparation of sample books	Throughout Processing
PR-20	Extruder for Spinning	Used for examining the spinning conditions for synthetic fibres and spinning testing	TE-312: Polymer Chemistry



3) Equipment for Textile Processing Department

CODE NO.	EQUIPMENT	USE	SYLLABI
PR-21	Refrigerator for Engraving Material	Used for storing chemicals for use in print screen engraving	TE-417: Textile Printing
PR-22	High Temperature Dyeing Machine for Rope form	A testing machine used mainly for testing the low liquor ratio dyeing of polyester fabrics and cellulose/polyester mixed-spun fabrics	TE-311: Bleaching & Dyeing TE-415: Dyestuff Chemistry TE-416: Bleaching & Dyeing
PR-23	Automatic Pressure Jigger	A testing machine used for testing the high-temperature dyeing of polyester fabrics or mixed-spun fabrics in the open form and the dyeing of other fabrics	TE-203: Textile Chemistry TE-311: Bleaching & Dyeing TE-416: Bleaching & Dyeing
PR-24	Laboratory Padder	A testing machine used for testing the finish treatment and the pad of liquid of dyes	TE-203: Textile Chemistry TE-310: Textile Finishing TE-416: Bleaching & Dyeing
PR-25	Laboratory Rotary Screen Printing Machine	Printing machine for printing fabric by rotary screen	TE-417: Textile Printing
PR-26	Laboratory Rotary Screen	Rotary screens engraved for use in testing	TE-417: Textile Printing

3) Equipment for Textile Processing Department

CODE NO.	EQUIPMENT	USE	SYLLABI
PR-27	Hot Plate with Stirrer	Used for dissolving powder or solids	Throughout Processing
PR-28	Launder-o-Meter	Testing machines used for the comparative evaluation by type of dye of colour fastness and the quality of dyed textile products	TE-303: Textile Testing TE-416: Bleaching & Dyeing
PR-29	Fade-o-meter	Testing machines used for the comparative evaluation by type of dye of colour fastness and the quality of dyed textile products	TE-303: Textile Testing TE-416: Bleaching & Dyeing
PR-30	Rubbing Fastness Tester	Testing machines used for the comparative evaluation by type of dye of colour fastness and the quality of dyed textile products	TE-303: Textile Testing TE-416: Bleaching & Dyeing

4) Equipment for Testing Laboratory

CODE NO.	EQUIPMENT	USE	SYLLABI
T-1	Fineness and Maturity Tester	A testing machine used for the measurement of the thickness and degree of maturity of raw cotton	Throughout practicals
T-2	Yarn Count Analysis System	A device used for the measurement of yarn count and the calculation of its deviation value	Throughout practicals
T-3	Hairyness Tester	A testing machine used for the measurement of the extent to which fibres bulge out of threads	Throughout practicals
T-4	Wrap Reel	An instrument used for the measurement of thread length	Throughout practicals
T-5	Cloth Strength Tester	A testing machine used for testing fibre processing conditions, changes in fibre strength and the quality of textile products	Throughout practicals
T-6	Elemendorf's Textile Tearing Tester	A testing machine used for the measurement of the tensile strength of cloth	Throughout practicals
T-7	Portable Cloth Balance with Separate Cutter for Circular Fabric	A testing machine used for the measurement of unit weight of cloth	Throughout practicals

4) Equipment for Testing Laboratory

CODE NO.	EQUIPMENT	USE	SYLLABI
T-8	Filling Tester	A testing machine used for testing fibre processing conditions, changes in fiber strength and the quality of textile products	Throughout practicals
T-9	Multi-purpose Abration Tester	A testing machine used for testing fiber processing conditions, changes in fiber strength and the quality of textile products	Throughout practicals

5) Auxiliary Equipment

CODE NO.	EQUIPMENT	USE	SYLLABI
OA-1	Overhead Projector	Supplementary educational devices for use in classes (1 unit x 4 classrooms)	Throughout theoretical studies
OA-2	Videodeck Display and Videocamera for Education	Used for the production of audio-visual teaching materials	Throughout theoretical studies
OA-3	Electric Laboratory Equipment	Basic instruments necessary in teaching subjects in the area of electrical engineering	TE-209: Electrical Engineering I TE-302: Electrical Engineering II
OA-4	Photo Copy Machine	Used for the production of reference materials and teaching materials (1 unit each for the library and the teaching staff's room)	Throughout theoretical studies
OA-5	Generator	Used as a stand-by power generator	Throughout theoretical studies
OA-6	Interphone	Used for interdepartmental communications	Throughout theoretical studies
OA-7	Air Conditioning Unit for Testing Material	For keeping testing material in the Testing Laboratory	Throughout theoretical studies

5) Auxiliary Equipment

CODE NO.	EQUIPMENT	USE	SYLLABI
OA-8	Compressed Air System for AJL	A device supplementary to the knitting machine	
OA-9	Personal Computer	For educational use	TE-302: Electrical Engineering II

### 3-3-5 Maintenance and Management Plan

#### (1) Maintenance and Management

A grant aid program is effective only when the equipment and machines are maintained and managed properly after those are handed over to the recipient county. In order to maintain those, it is necessary to have the organisation and enough technical staff as well as funds. For the supplies of those equipment, operation manual, maintenance manual must be provided with equipment.

#### (2) Maintenance and Management System

A system for maintenance and management of equipment has already been developed by college instructors and technical officers, and there is no need to form a new system specifically for the equipment to be installed under this project. The college technical officers will largely be responsible for operation and maintenance of the equipment provided under this project. Their organization for the operation and management of the equipment consists of foremen, supervisors, machinemen and electricians. The fact that college equipment has been well managed over the past thirty years is considered as positive proof of the high efficiency of the present system for the operation and maintenance of its equipment.

For periodic maintenance and emergency repairs of the equipment after the completion of this project, it is considered advisable to utilize the local services network of manufacturer's representatives and sales offices since many are located near to the college. If the college technical officers receive in-service training at local textile mills or other training centers available, this would further improve their technical capabilities, which in turn will contribute to further

improve the college maintenance and management system for equipment provided under this project.

(3) Operation and Maintenance Costs

The equipment operation and maintenance costs after completion of this project are estimated as follows.

1) Annual personnel expenses

The college has no plans to expand its teaching and technical staff after the completion of this project. In other words, the equipment provided under this project is to be operated and maintained with existing staff. Accordingly, the implementation of this project will not entail any increase of the college's personnel expenses. Such expenses are to be covered by the college's current annual budgetary appropriations.

2) Operation and maintenance costs

The equipment operation and maintenance costs after completion of this project is mainly the cost of utility and material, reagents costs for practicals, and it is estimated as follows.

Utility expenses	37,000 rupees
Material and reagents	86,000 rupees
<u>costs for practicals</u>	
Total	123,000 rupees

In light of recent trends in the college budget and expenditure, it is concluded that the above increases (about 2 percent of the budget) will not require any special budgetary provision. (Ref. to Table 2-12)



### 3-4 Examination of the Necessity of Technical Cooperation

This project aims to improve and expand the functions of the National College of Textile Engineering, Faisalabad and thereby help the college to provide the country's textile industry with competent textile engineers more effectively and efficiently. The grant aid from the Government of Japan only covers improvements in the college's equipment, not in the college's manpower development program or improvements in the college's ability to carry out and manage its educational and consulting service activities.

The Government of Pakistan unofficially sounded the Government of Japan on the possibility of technical cooperation. An outline of the technical cooperation unofficially requested by the Government of Pakistan is shown below.

#### 3-4-1 Training

Textile engineering	1 person (doctoral course: 3 years; master's course: 1 to 2 years)
Engineering:	1 person (doctoral course: 3 years; master's course: 1 to 2 years)
Applied chemistry	2 persons (3 to 6 months)
Computer science	2 persons (3 to 6 months)

#### 3-4-2 Dispatch of Japanese Experts

Spinning	1 person (about one and a half years)
Weaving	1 person (about one and a half years)

Textile processing      1 person (about one and a half years)

The need for the above-mentioned technical cooperation is keenly felt on the Pakistan side because, if carried out, it would most likely contribute to an improvement of college functions generally.

However, in view of the fact that this project is basically one aimed at improving the college's equipment through Japanese grant aid it is considered advisable to implement such technical cooperation only within the limits of maintenance of the equipment provided.

In concrete terms, it will be advisable to train the college's selected instructors or technical officers in operating the automatic cone winder, the flat knitting machine and the colour difference measuring system, as well as in method of their maintenance at the manufacturers' facilities, during implementation of the project.

Accordingly, it is considered reasonable for one technical officer from the Spinning Department, Weaving Department and Textile Processing Department respectively to receive in-service training in line with the above indications for 2 to 3 months.

# **CHAPTER 4 BASIC DESIGN**



## CHAPTER 4 BASIC DESIGN

### 4-1 Guidelines for the Basic Specifications of Equipment

In the process of designing of the equipment as described in Chapter 3 3. (4), the following design guidelines were worked out and details of the individual items of equipment were examined with reference to these guidelines.

The National College of Textile Engineering, Faisalabad plays an important role in developing human resources which contribute to the textile industry, one of the country's key industries, and also to the development of Pakistan economy at large. At present, however, the college is still unable to fully meet the demand of the textile industry by training the students in the practical aspects of textile engineering, although its theoretical education in textile engineering is substantial in content. The following design guidelines were therefore determined in view of the present situation of the college and the objective of this grant aid program on equipment plan was developed on the basis of these guidelines.

- 1) In order to upgrade the technical education of the college to select such equipment as is urgently needed and expected to be in frequent use
- 2) To select practical equipment useful to the college in giving guidance to, and interaction with the textile industry
- 3) To select equipment which can be fully utilized within the present scale and technical level of the college technical staff
- 4) To select equipment which don't require advanced skills for operation, maintenance and management

## 4-2 Designing Conditions

### 4-2-1 Natural Conditions

#### (1) Ambient temperature

The range of outside temperature and relative humidity is 40°C and 86% max, 2°C and 35% min. respectively. The temperature and relative humidity in the air conditioned rooms is 28°C, 65% max and 16°C, 45% min.

Only the Testing Laboratory and the computer room, where personal computers are to be installed, require air-conditioning. While the air-conditioner to be installed in the Testing Laboratory is included in the Auxiliary Equipment, the air-conditioner to be installed in the computer room is to be obtained by the College at its own expense.

### 4-2-2 Buildings and Utilities

#### (1) Buildings

The requested equipment is to be installed in an arrangement which makes it possible parallel use with existing items of equipment.

#### (2) Power source

In and around the college scheduled load shedding occur, but it is possible to cope with these using the stand-by power generator.

Both 3-phase AC440V or single-phase AC220V are available. However, equipment which require differing voltage from the above will require proper transformers.

In the case of equipment which requires a voltage fluctuation within the range of  $\pm 5\%$ , it is necessary to attach an automatic voltage regulator.

(3) Water

Water will be supplied from tube-well.

4-3 Basic Plan

4-3-1 Equipment Plan

The basic design work was conducted on the basis of the design guidelines as mentioned in 4-1 of this chapter, and close attention was paid to the following points in calculating the required number of items of equipment and in preparing the basic specifications.

- (1) As major three departments of the college are closely related to the textile manufacturing processes, individual equipment should be selected to make possible practical training in each section of a process. Since the college training laboratories are not for mass production of textile products, supplementary equipment placed between machines for continuous operation do not need to be included.
- (2) The number of experimental devices and measuring instruments should be minimized.
- (3) The personal computers for use in training should be programmed to make possible training using readily available application software.
- (4) The basic specifications of the equipment are based on those manufactured in Japan.

4-3-2 List of Planned Equipment

The number and the basic specifications of requested equipment is shown in the table on the following pages.

Basic Plan on Equipment/Machines (1)

1. Equipment for Spinning Department

Code-No.	Equipment/Machine	Quantity	Short Specifications
SP-1	Blow Room Machines	1	<ol style="list-style-type: none"> <li>1. Bale opener with Feed Lattice</li> <li>2. Step Cleaner</li> <li>3. Porcupine Beater</li> <li>4. Fan Condenser</li> <li>5. Step Cleaner</li> <li>6. Kirschner Beater</li> <li>7. Fan Condenser</li> <li>8. Pneuma feeder</li> <li>9. Scutcher (Kirschner) with auto-doffer and Auto-Lap scale               <ul style="list-style-type: none"> <li>- Metal Elimination System</li> <li>- Materials of Duct Piping</li> <li>- Electric wiring Material</li> <li>- Air Compressor</li> <li>- Centralised Electric Control Panel</li> <li>- Voltage stabilizer</li> <li>- Dust Filter</li> <li>- By-Pass System for Synthetic Fiber (1 → 7)</li> </ul> </li> </ol>
SP-2	Carding Machine	1	<ul style="list-style-type: none"> <li>- Lap Feeding System</li> <li>- Auto-leveller (Electric type, Long Term)</li> <li>- Roller Doffing System</li> <li>- No. of Flat=106 pcs.</li> <li>- Sliver can size=508 mm dia. x 1067 mm</li> <li>- Individual Waste Collecting System</li> </ul>



Basic Plan on Equipment/Machines (2)

SP-3	High Speed Drawing Frame	1	<ul style="list-style-type: none"> <li>- Number of Deliveries per Frame: 2 deliveries</li> <li>- Number of Feeding Slivers per Delivery: 8 Slivers</li> <li>- Feeding Can size: 508 mm dia. x 1067 mm H</li> <li>- Delivery Can size: 508 mm dia. x 1067 mm H</li> <li>- Drafting System: 5 over 4 with Pressure Bar</li> <li>- Auto-leveller (Electronic type)</li> <li>- Automatic can changing (small magazine size)</li> </ul>
SP-4	Simplex Fly Frame	1	<ul style="list-style-type: none"> <li>- Inverter Speed Change System</li> <li>- Number of Spindles per machine: 40 - 48 Spindles</li> <li>- Lift: 406 mm</li> <li>- Nominal Full Bobbin diameter: 152 mm'</li> <li>- Staff: 520 mm</li> <li>- Drafting System: 4 roller double Apron</li> <li>- Feeding Can size: 508 mm dia. x 1067 mm H</li> </ul>
SP-5	(a) Ring Spinning Frame with Link Coner	1	<ul style="list-style-type: none"> <li>- Inverter speed change system</li> <li>- Number of Spindels per machine: 120 - 168 spdls.</li> <li>- Spindle Gauge: 75 mm</li> <li>- Lift: 205 mm.</li> <li>- Inside Dia. of Ring: 45 mm.</li> <li>- Drafting System: 3 line, 2 Zone, double apron</li> <li>- Pendulum Arm: Both side PK-225</li> <li>- With Stationary Auto doffer</li> </ul>

Link Coner

Basic Plan on Equipment/Machines (3)

		<ul style="list-style-type: none"><li>- Number of Drums per Machine: 8 drums</li><li>- Take-up package: 152 mm Traverse x 5° 57' cone</li><li>- Air Splicer Knottor: Individual type</li><li>- Individual Compressed Air System</li><li>- Yarn length counter: MM type</li><li>- Electronic yarn Clearer</li><li>- Continuous Bobbin Feeder</li><li>- Auto Doffer</li></ul>
		Deleted
		<ul style="list-style-type: none"><li>- No. of Drums per Machine : 5 Drums</li><li>- Take-up package: 152 mm Traverse x variable 5° 57' and 9° - 15' cone angles</li><li>- Supply package No.A Machine: Ring Spinning Bobbin No.B Machine: Baby cone Cheese</li><li>- Individual Knoter type No.A Machine: Mechanical Knottor No.B Machine: mach Splicer</li><li>- Electornic Yarn Clearer No.A is different from No.B type</li><li>- Including Equipment * Air Compressor and Dust Blowing Device * Waxing Device * Package Brake * Yarn length counter</li></ul>
		2
	(b) Ring Spinnign Frame without Link Coner	
SP-6	Automatic Cone Winder	

Basic Plan on Equipment/Machines (4)

SP-7	Assembly Winder (Doublier)		Deleted
SP-8	Two-for-one Twister		Deleted
SP-9	Yarn Classimat with Winder	1	<ul style="list-style-type: none"> <li>- Yarn Fault Classifying System for short Thick places, long places and thin places</li> <li>- Reserve Material.....1 lot</li> <li>- Winder (6 drums/Frame).....1 set</li> </ul>
SP-10	Lea Strength Tester	1	<ul style="list-style-type: none"> <li>- Capacity: 0-100 kg in 0.5 kg and 0 - 200 kg in 1 kg.</li> <li>- Pulling Speed: 300 mm/min.</li> <li>- Restroing Speed: 600 mm/min.</li> <li>- Elongation Scale: 0 - 150 mm and 0 - 22%</li> </ul>
SP-11	Open-end Spinning Machine	1	<ul style="list-style-type: none"> <li>- No. of Spinning Unit: 24</li> <li>- Gauge of Spinning Unit: 230 mm</li> <li>- Take-up Package: 152 mm Width x Parallel cheese</li> <li>- Sliver can size: 508 mm dia. x 1067 mm H</li> <li>- Automatic Piecer</li> <li>- Automatic Doffer</li> <li>- Mini Winder</li> <li>- Machine Stop at Pre-set package dia.</li> </ul>
SP-12	Metallic Wire mounting machine for card		Deleted

Basic Plan on Equipment/Machines (5)

2. Equipment for Weaving Department		Quantity	Short Specifications
Code-No.	Equipment/Machine		
WV-1	Weaving Machine (a) Rapier Loom	1	<ul style="list-style-type: none"> <li>- Flexible Band System</li> <li>- RS: 140cm</li> <li>- Weft Colour: 4 - 6 Electronic System for Feeder</li> <li>- Shedding: 16-shaft Dobby Shedding electronic System</li> <li>- Selvege formation: Leno System</li> <li>- Automatic Centenalized Oiling System</li> </ul>
	(b) Projectile Loom	1	<ul style="list-style-type: none"> <li>- RS: 190cm or under</li> <li>- Weft Colour: Single Colour</li> <li>- Shedding: Tappet Shedding available twill, sating, velvet, corduroy</li> <li>- Selvege Formation: Tuck-in</li> <li>- Electronic Feeder System</li> </ul>
	(c) Air Jet Loom	1	<ul style="list-style-type: none"> <li>- RS: 150cm</li> <li>- Shedding: Cam Shedding</li> <li>- Selvege Formation: Leno System</li> <li>- With Compressor</li> </ul>
WV-2	Knitting Machine (a) Warp Knitting Machine		Deleted

Basic Plan on Equipment/Machines (6)

	(b) Weft Circular Knitting Machine	1	<ul style="list-style-type: none"> <li>- Diameter: 26"</li> <li>- Needle Gauge: 22</li> <li>- Feeder: 78 nos Electronic Feeder</li> </ul>
	(c) Flat Knitting Machine	1	<ul style="list-style-type: none"> <li>- Needle Bed Width: 72"</li> <li>- Gauge: 7</li> <li>- Lacquard Device: Computer Control</li> <li>- 4-colour Yarn change Device</li> </ul>
WV-3	Braiding Machine	1	<ul style="list-style-type: none"> <li>- Horn Gear: 4' dia.</li> <li>- Capacity: 24 carriers</li> <li>- Double head type: One Head for circular and One Head for Flat</li> </ul>
WV-4	Needle Loom	1	<ul style="list-style-type: none"> <li>- Shedding: Chain Dobby</li> <li>- Weaving Head: 2</li> <li>- Reed width: Max. 65mm</li> </ul>
WV-5	Testing Equipment		
	(a) Warp Tension Meter	1	<ul style="list-style-type: none"> <li>- Measuring Range: 0 - 9 kg/cm of screen</li> </ul>
	(b) Machine Checker	1	<ul style="list-style-type: none"> <li>- Portable Type</li> <li>- Digital Display System</li> </ul>

Basic Plan on Equipment/Machines (T)

(c) Hygro Meter	1	<ul style="list-style-type: none"> <li>- Portable Type</li> <li>- Measuring Range Temperature: 20 - 60°C</li> <li>Humidity : 30 - 100% R.H.</li> </ul>
(d) Tachometer	1	<ul style="list-style-type: none"> <li>- Non-Touch Type</li> <li>- Digital Type</li> <li>- Measuring Range: 0 - 30,000 r.p.m.</li> </ul>
(e) Refractometer	1	<ul style="list-style-type: none"> <li>- Refractive Index Range: 1.3000</li> <li>1.7000 nD (Brix)</li> <li>- Brix Percentage Range : 0 - 95%</li> </ul>
(f) Viscosity Meter	1	<ul style="list-style-type: none"> <li>- Measuring Range: 2 - 33 mpa.s.</li> <li>15 - 50 mpa.s.</li> <li>50 - 330 mpa.s.</li> <li>- Accuracy: 3%</li> </ul>
(i) Hardness Tester for Cheese and Beam	1	<ul style="list-style-type: none"> <li>- Measuring Range: 0 - 100 degree</li> <li>- Graduation: 2 degree</li> </ul>
(j) Microscope Projector Type	1	<ul style="list-style-type: none"> <li>- Magnification of Projection lens: 5 x .10 x .20 x</li> <li>- Screen dia.: 508 mm</li> </ul>

Basic Plan on Equipment/Machines (8)

WV-6	Rib Machine	1	<ul style="list-style-type: none"> <li>- Diameter: 16" ~ 30" (16")</li> <li>- Needle gauge: 12 ~ 20(18)</li> <li>- Feeder: 323 ~ 60(32)</li> </ul>
WV-7	Single Jersey Knitting Machine	1	<ul style="list-style-type: none"> <li>- Diameter: 24" ~ 38" (30")</li> <li>- Needle Gauge: 14 ~ 36(20)</li> <li>- Feeder: 3F/inch(90)</li> </ul>
WV-8	Single Testing Machine	1	<ul style="list-style-type: none"> <li>- Diameter: 3 1/2"</li> <li>- Needle Gauge: 20</li> <li>- Feeder: 1</li> </ul>
WV-9	High Speed Rib Socks Knitting Machine	1	<ul style="list-style-type: none"> <li>- Dia.: 4'</li> <li>- No. of Needles: 144</li> <li>- Needle gauge: 24</li> <li>- Computer Control</li> </ul>
WV-10	Dial Linking Machine		Deleted
WV-11	Inter-Lock Machine	1	<ul style="list-style-type: none"> <li>- Diameter: 26" ~ 30" (30")</li> <li>- Needle Gauge: 14 ~ 36(20)</li> <li>- Feeder: 60</li> </ul>

Basic Plan on Equipment/Machines (9)

WV-12	Hand Driven Flat Knitting Machine	Deleted
WV-13	Tension Meter	Deleted



Basic Plan on Equipment/Machines (10)

3. Equipment for Textile Processing Department

Code-No.	Machine/Equipment	Quantity	Short Specifications
PR-1	Colour Difference Measuring System	1	- a) Colour & Colour Difference Meter Sensor Unit, Measuring Unit b) Graphic Printer
PR-2	Auto-screen Printing Machine	1	Working Width: 300 mm Repeat Length: Max 350 mm Speed of Squeegee: 0 - 18 m/min.
PR-3	Heat Setting Machine	1	- Width of test cloth: 400 x 450 m/m - Processign Zone: Overall Length 1,000 mm - Max Temperature : 230°C - Electric Heating
PR-4	Winch for Laboratory	1	- Capacity of Dyeing Bath: 100 liter - Working Width: 300 mm.
PR-5	Multi Purpose Calendering Machine for Laboratory:	1	- Size of Paper Bowl: 250 mm(D) x 350 mm (W) - Size of chilled Iron Heating Bowl: 125 mm(D) x 360 mm(W) - Size of Schreiner Iron Heating Bowl: 125 mm(D) x 360 mm(W) - Max. Pressure: 2000 kg
PR-6	High Temperature 12 Colour Pot Dyeing	1	

Basic Plan on Equipment/Machines (11)

Machine			
PR-7	Motor Driven Yarn Reel for Cotton or Metric Numbering	1	<ul style="list-style-type: none"> <li>- Dyeing Pot: 300cc x 12 Pots</li> <li>- Max. Temperature: 145°C</li> <li>- Cloth Weight: 3 - 10 gm</li> <li>- No. of cones: 5 - 10 Ends</li> </ul>
PR-8	Continuous Pad Drying Machine	1	<ul style="list-style-type: none"> <li>- Working Width: 410 mm</li> <li>- Padding Unit, Non Touch Pre-Heating Unit and Hot air Drying Unit</li> </ul>
PR-9	High Pressure Steamer	1	<ul style="list-style-type: none"> <li>- Size of Cylinder: 300 mm D x 600 mm H</li> <li>- Max. Pressure 3 kg/cm<sup>2</sup></li> </ul>
PR-10	Over Feed Pin Tenter	1	<ul style="list-style-type: none"> <li>- Working Width: max 450 mm</li> <li>- Oven Feed: 0 - 20%</li> <li>- Set Zone: 1800 mm</li> <li>- Max. Temperature: 230°C</li> <li>- Cloth Timing: 30 sec. - 6 min.</li> </ul>
PR-11	Open Width Continuous Dyeing Machine	1	<ul style="list-style-type: none"> <li>- Working Width: 250 mm</li> <li>- Thermofixation Unit: max. temperature 230°C</li> <li>- Steamer Max. Temperature: 104°C</li> <li>- Processing Time: 25 sec. - 100 sec.</li> </ul>

Basic Plan on Equipment/Machines (12)

PR-12	Blending and Mixture for Paste Preparation	1	<ul style="list-style-type: none"> <li>- Chemical Padding Unit, Steaming Unit</li> <li>- Washing Unit and Thermofixation Unit</li> <li>- (Home Mixer)</li> <li>- Capacity : 1 - 20 liters</li> </ul>
PR-13	Electric Oven for Dyeing	1	<ul style="list-style-type: none"> <li>- Power source: AC 200 V, 50 HZ, 600 W</li> <li>- Dimensions: 1 ft(W) x 1 ft(D) x 1 ft(H) Approx.</li> </ul>
PR-14	Ball Mill Grinder for Pigment	1	<ul style="list-style-type: none"> <li>- Steel Pot: Capacity: 1.4 liters, 3 Pots</li> <li>- Ceramic Ball: Standard Specification(More than 300 Nos)</li> </ul>
PR-15	Digital PH Meter	1	<ul style="list-style-type: none"> <li>- Range: 0 - 14 pH</li> <li>with Standard Accessories and Carrying Case</li> </ul>
PR-16	Digital Thermometer	1	<ul style="list-style-type: none"> <li>- Temperature 0 - 300°C</li> </ul>
PR-17	Single Pan Electric Balance	1	<ul style="list-style-type: none"> <li>- Capacity: 200 g</li> <li>- Read Ability: 0.1 mg</li> </ul>
PR-18	Viscosity Meter	1	<ul style="list-style-type: none"> <li>- Revolution of Rotor: 20 RPM</li> </ul>

Basic Plan on Equipment/Machines (13)

PR-19	Sample Cutter for Fabrics	1	- 300 mm Hand-driven Textile Clipping Machine
PR-20	Extruder for Spinning	1	Standard Specifications
PR-21	Refrigerator for Engraving Materilas	1	Capacity: 487 liters
PR-22	High Temperature Dyeing Machine for Rope Form	1	Cloth Capacity: 5kg Max. Temperature: 140°C Max. Pressrue: 5 kg/cm2
PR-23	Automatic Pressure Jigger	1	- Working Width: 450 mm - Cloth Capacity: 3.5 m - Max. Presure: 2 kg/cm2 - Max. Temperature: 140°C
PR-24	Laboratory Padder	1	- Roller Size: 250 mm D x 450 mm W - Rubber Hardness: Shore 80 - 85° - Vertical Type, pneumatic pressure
PR-25	Laboratory Rotary Screen Printing Machine	1	- Standard Labratory Model (One Rotary Screen) - Stork Type - Additional Accesory: 2 Rotary Squeegees and standard accessories

Basic Plan on Equipment/Machines (14)

PR-26	Laboratory Rotary Screen	1	- Rotary Screen
PR-27	Hot Plate with Stirrer	1	- Bimetal Standard Type (Hot Magnetic Mixer) - Temperature: 50 - 300 °C - Capacity 1 - 2 liters
PR-28	Launder-O-Meter	1	- 8 Testing Bottles Standard Specification with perspiration plate
PR-29	Fade-O-Meter	1	- Light Source: Xenon Lamp - Standard model with Light Matching Cabinet (3 kinds of light)
PR-30	Rubbing Fastness Tester for Fabrics	1	- 6 pics. Gakushin Type

Basic Plan on Equipment/Machines (15)

4. Equipment for Testing Laboratory		Short Specifications	
Code-No.	Machine/Equipment	Quantity	
T-1	Fineness and Maturity Tester	1	<ul style="list-style-type: none"> <li>- Complete Fiber Fineness Tester</li> <li>- Reading</li> <li>- Built-in Air Supply</li> <li>- Built-in Balance</li> <li>- With Calculator</li> </ul>
T-2	Yarn Count Analysis System	1	<ul style="list-style-type: none"> <li>- Data Processor</li> <li>Processing Capacity: Max 999 Single Value for series of Measurements</li> <li>- Balance</li> <li>Maximum Load: 220 gm</li> <li>Balance Range: 0 - 220 gm</li> <li>Testing Range: 0 - 220 gm</li> <li>Resolution : 0.001 g</li> </ul>
T-3	Hairyness Tester	1	<ul style="list-style-type: none"> <li>- Measuring speed: 25, 50, 100, 200, 400 m/min.</li> <li>- Statistical Value :                             <ul style="list-style-type: none"> <li>(a) Average Value</li> <li>(b) Standard Deviation or Coefficient of variation (selectable)</li> <li>(c) 95% confidence Range</li> </ul> </li> </ul>
T-4	Wrap Reel	1	<ul style="list-style-type: none"> <li>- Driving System: Motor Driven</li> </ul>

Basic Plan on Equipment/Machines (16)

T-5	Cloth Strength Tester	1	<ul style="list-style-type: none"> <li>- Reeling Skein: One Meter</li> <li>- Reeling Speed: 200 r.p.m.</li> <li>- Automatic Stop Motion: at Appointed position by Pre-set Counter</li> <li>- Bobbin stand: 5 pcs.</li> </ul>
T-6	Elemdorf's Textile Tearing Tester	1	<ul style="list-style-type: none"> <li>- Tens ometer Type</li> <li>- Range of 500 n x 1 n and 500 n x 0.1 n</li> </ul> <p>Capacity: 0 - 1600 g  0 - 3200 g (with Weight)  0 - 6400 g (with Weight)</p>
T-7	Portable Colth Balance with Separate Cutter for Circular Fabric.	1	<ul style="list-style-type: none"> <li>- Direct Reading Type</li> <li>- With Sample Cutter</li> </ul>
T-8	Pilling Tester	1	<ul style="list-style-type: none"> <li>- ICI Type</li> </ul>
T-9	Multi-purpose Abration Tester	1	<ul style="list-style-type: none"> <li>- Stroke of Table: 25.4 mm</li> <li>- Stroke - speed of Table: 125 times/min.</li> <li>- Load Capacity: Pressing Load: 0 - 75 Lbs  Stretch Load : 0.5 - 7.0 Lbs</li> <li>- For Flat, Flex and Edge.</li> </ul>

Basic Plan on Equipment/Machines (17)

5. Auxiliary Equipment		Short Specifications
Code-No.	Machine/Equipment	Quantity
OA-1	Overhead Projector	4
OA-2	Videodeck Display and Videocamera for Education	1
OA-3	a) Electric Laboratory Equipment 1) Oscilloscope b) Basic of Electronics 1) Digital Multimeter (Portable) 2) Digital Tachometer 3) Digital Voltmeter, Ammeter, Wattmeter 4) Sine-Square Generator 5) Multivibrator 6) Variable Resistance and Capacitance Boxes 7) Power Supplies 8) Power Supplies 9) Power Supplies 10) Digital Heat Contoroller	4  4 2 10 2 2 10 7 4 2 3



Basic Plan on Equipment/Machines (18)

	c) Component and Instruments			
	1) Testing Bench	1	Electronics Components	
	2) Testing Bench	1	AC and DC Motors	
	3) Lab. Cut View Madels	1		
		1	- AC generator, DC Generators	
		1	- DC series, shunt and compound motors	
		1	- AC induction, repulsion, series and universal motors	
	d) Electronic Circuits & Devises	2	Basic Electronic circuit and devices	
	1) Testing Bench			
	e) Industrial Circuite & Electornics	1	Industrial circuits	
	Testing		Education	
	1) Testing Bench		- With display boards for all OA-3 items	
	2) Electronics Circuit Kit			
OA-4	Photo Copy Machine	2		
			- Upto A3 size	
			- Enlargement, reduction function	
			- Transparencies to be copied	
OA-5	Generator with Automatic change over	2		
			- 60 - 70 KVA, 440 V, 50 Hz	
			- Diesel Engine operated, 2000 - 3000 r.p.m.	
OA-6	Interphone (Conference Type)	12		
OA-7	Air-Con Unit for Testing Material	1		

Basic Plan on Equipment/Machines (19)

0A-8	Compressed Air System for AJL	1	<ul style="list-style-type: none"> <li>- Split type, 30,000 BTU (2.5 Tons)</li> <li>- with Humidifier (Separate or attached)</li> <li>- small type</li> <li>- to be selected in consonance with Knitting Machines</li> </ul>
0A-9	Personal Computer (1) Personal Computer (a)	1	<ul style="list-style-type: none"> <li>- Zero Wait state</li> <li>- 2 MB main Memory</li> <li>- 1.22 MB Flappy Disk (5 1/4")</li> <li>- 1.44 MB Floppy Disk (3.5)</li> <li>- 160 MB Hard Disk</li> <li>- EGA Coloured 14" Display</li> <li>- Key Board 101</li> <li>- Scanner</li> <li>- Built in Parallel and Serial Port:</li> <li>- Mouse( M/S) with Card and Software</li> </ul>
	(2) Personal Computer (b)	4	<ul style="list-style-type: none"> <li>- Zero wait state</li> <li>- 2 MB Main Memory</li> <li>- 1.22 MB Floppy Disk (5 1/4") Spinning=1</li> <li>- 80 MB Hard Disk Weaving=1</li> <li>- EGA Colured 14" Display Processing=1</li> <li>- Key Board 101</li> <li>- Built in Parallel &amp; Serial Engg. Port</li> <li>- Scanner</li> </ul>

Basic Plan on Equipment/Machines (20)

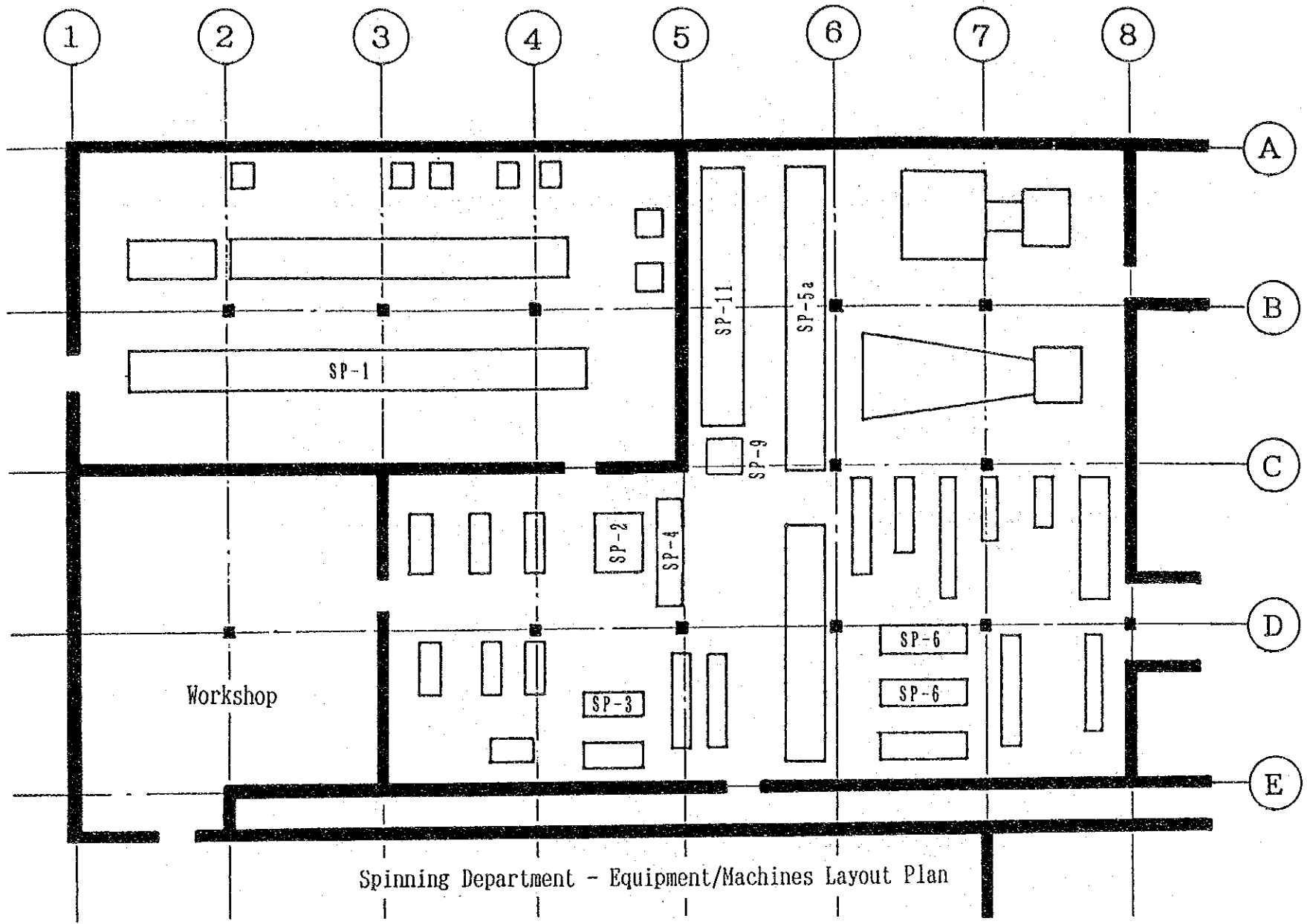
(3) Personal Computer (c)	20	<ul style="list-style-type: none"> <li>- Mouse (M/S) with Card &amp; Software</li> <li>- Zero Wait State</li> <li>- 1 MB Main Memory</li> <li>- 1.22 MB Floppy Disk (5 1/4)</li> <li>- 40 MB Hard Disk (at Controller)</li> <li>- Monochrome 14" Dual Figure adaptor</li> <li>- Key Board 101</li> <li>- Built in Parallel &amp; serial port</li> <li>- Network Apparatus</li> </ul>
(4) Printers	1	<ul style="list-style-type: none"> <li>- 12" Carriage, 250 - 300 CPS (24pin)</li> </ul>
1) Dot Matrix Printer (a)	10	<ul style="list-style-type: none"> <li>- 10" Carriage, 250 - 300 CPS</li> </ul>
2) Dot Matrix Printer (b)	1	<ul style="list-style-type: none"> <li>- 10" Carriage, Letter quality</li> </ul>
3) Daisy Wheel Printer	1	<ul style="list-style-type: none"> <li>- Truck : 9</li> </ul>
(5) Tape-Back up Unit	1	<ul style="list-style-type: none"> <li>- 1 KVA back-up time 15 min.</li> </ul>
(6) UPS to cover for (1) and (3)	1	<ul style="list-style-type: none"> <li>Lotus</li> <li>DBBASE-IV</li> <li>Microsoft Word</li> </ul>
(7) Software	1	

Basic Plan on Equipment/Machines (21)

			Fortran Pascal Basic Auto Cad Latest Release Ventura Latest Release
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#### 4-4 Equipment Layout Plan

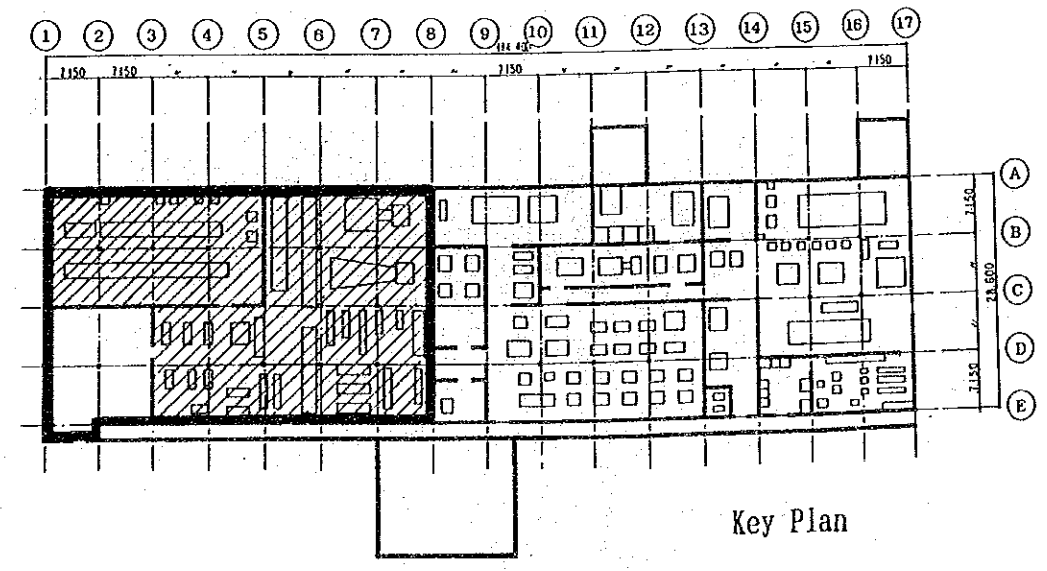
Major equipment planned are shown in the following Fig. 4-1a, Fig. 4-1b and Fig. 4-1c.



Spinning Department - Equipment/Machines Layout Plan

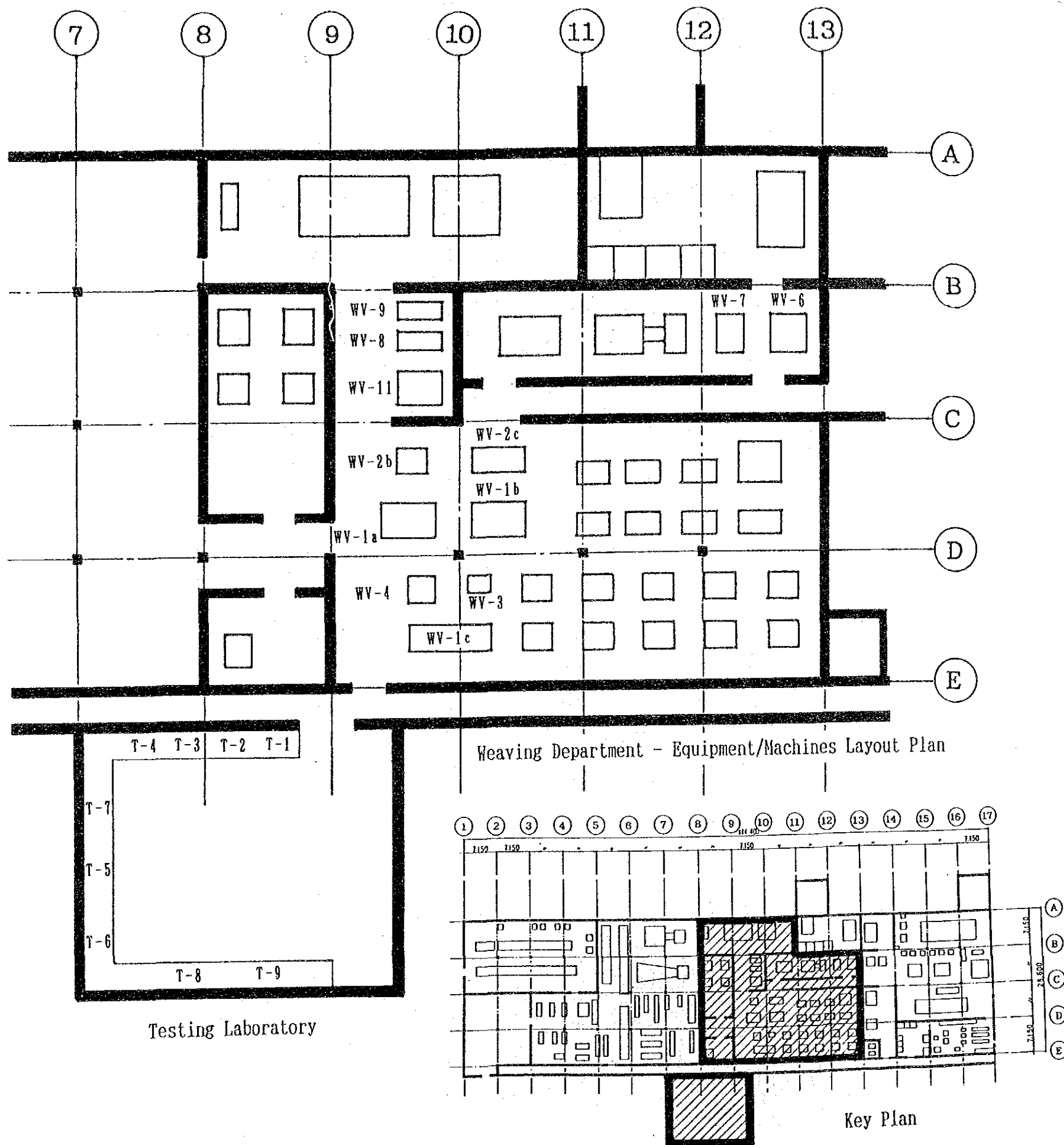
1. Spinning Department

Code-No.	Machine/Equipment	Quantity
SP-1	Blow Room Machinery	1
SP-2	Carding Machine	1
SP-3	High Speed Drawing Frame	1
SP-4	Simplex Fly Frame	1
SP-5a	Ring Spinning Frame with Link Coner	1
SP-5b	Ring Spinning Frame without Link Coner	1
SP-6	Automatic Cone Winder	2
SP-7	Assembly Winder (Doubler)	1
SP-8	Two-for-one Twister	1
SP-9	Yarn Classimat with Winder	1
SP-10	Lea Strength Tester	1
SP-11	Open-end Spinning Machine	1
SP-12	Metallic Wire Mounting Machine for Card	1



Key Plan

Figure 4-1a Layout Plan



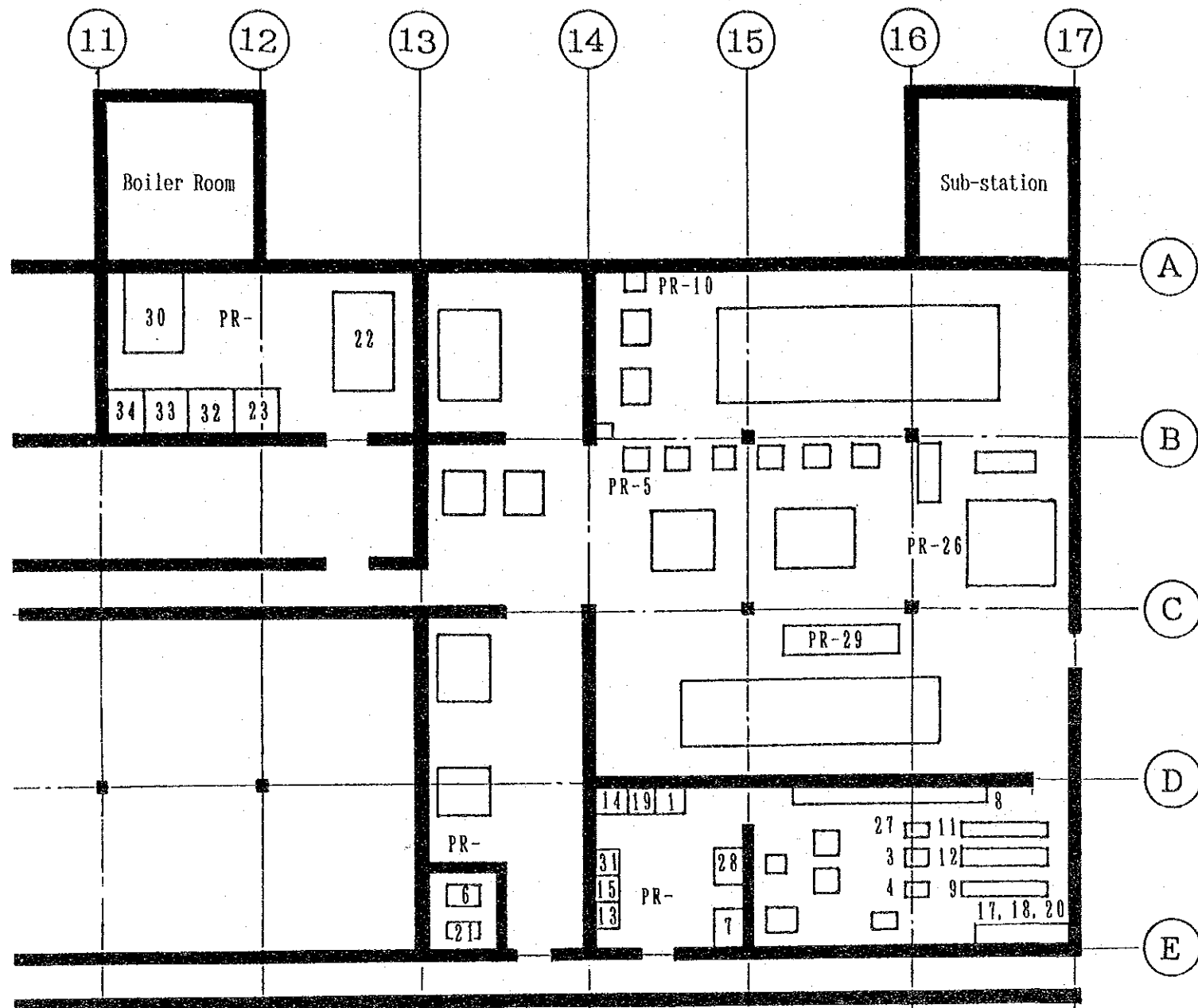
2. Weaving Department

Code-No.	Machine/Equipment	Quantity
WV-1	Weaving Machine a) Rapier Loom	1
	b) Projectile Looms	1
	c) Air Jet Looms	1
WV-2	Knitting Machine a) Warp Knitting Machine (Deleted)	
	b) Weft Knitting Machine	1
	c) Flat Knitting Machine	1
WV-3	Braiding Machine	1
WV-4	Needle Loom	1
WV-5	Testing Equipment	
WV-6	Interlock Knitting Machine	1
WV-7	Single Jersey Knitting Machine	1
WV-8	Single Testing Machine	
WV-9	High Speed Rib Socks Knitting Machine	1
WV-10	Dial Linking Machine (Deleted)	
WV-11	Fully Fashioned Flat Knitting Machine	1
WV-12	Hand Drive Flat Knitting Machine (Deleted)	
WV-13	Tension Meter (Deleted)	

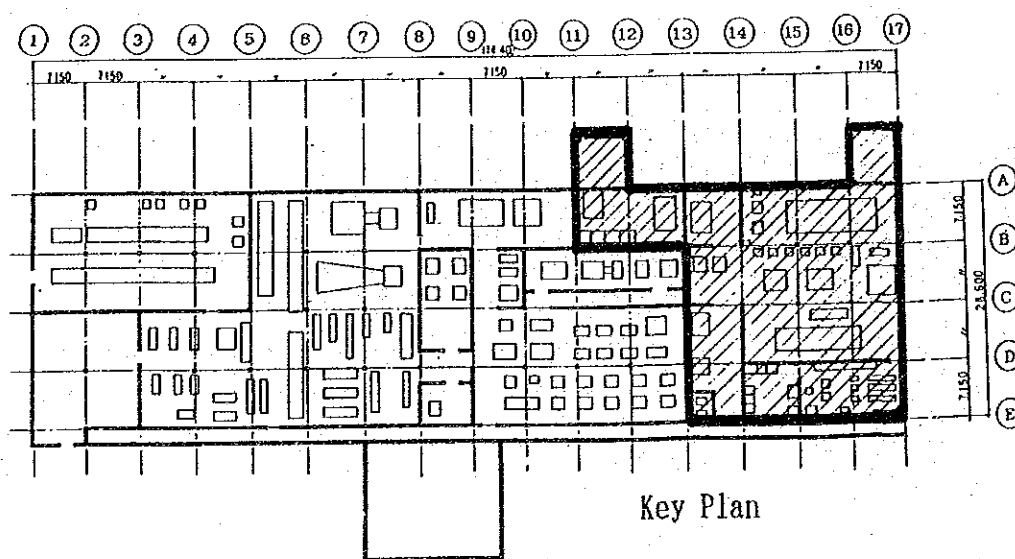
4. Testing Laboratory

Code-No.	Machine/Equipment	Quantity
T-1	Fineness and Maturity Tester	1
T-2	Yarn Count Analysis System	1
T-3	Hairyness Tester	1
T-4	Wrap Reel	1
T-5	Cloth Strength Tester	1
T-6	Elemendorf's Testile Tearing Tester	1
T-7	Portable Colth Balance with Separate Cutter for Circular Fabric	1
T-8	Pilling Tester	1
T-9	Multi-purpose Abration Tester	1

Figure 4-1b Layout Plan



Processing Department - Equipment/Machines Layout Plan



Key Plan

3. Processing Department

Code-No.	Machine/Equipment	Quantity
PR-1	Colour Difference Measuring System	1
PR-2	Auto-screen Printing Machine	1
PR-3	Heat Setting Machine	1
PR-4	Winch for Laboratory	1
PR-5	Calendering Machine for Laboratory	1
PR-6	High Temperature 12 Colour Pot Dyeing Machine	1
PR-7	Motor Driven Yarn Reel	1
PR-8	Continuous Pad Drying Machine	1
PR-9	High Pressure Steamer	1
PR-10	Over Feed Pin Tenter	1
PR-11	Open Width Continuous Dyeing Machine	1
PR-12	Blending and Mixture for Paste Preparation	1
PR-13	Electric Oven for Dyeing	1
PR-14	Ball Mill Grinder for Pigment	1
PR-15	Digital PH Meter	1
PR-16	Digital Thermometer	1
PR-17	Single Pan Electric Balance	1
PR-18	Viscosity Meter	1
PR-19	Sample Cutter for Fabrics	1
PR-20	Extruder for Spinning	1
PR-21	Refrigerator for Engraving Materilas	1
PR-22	High Temperature Dyeing Machine for Rope Form	1
PR-23	Automatic Pressure Jigger	1
PR-24	Laboratory Padder	1
PR-25	Laboratory Rotary Screen, Printing Machine	1
PR-26	Laboratory Rotary Screen, Engraved	1
PR-27	Hot Plate with Stirrer	1
PR-28	Launder meter	1
PR-29	Feder meter	1
PR-30	Rubbing Fastnedd Tester	1

Figure 4-1c Layout Plan





#### 4-5 Project Implementation Plan

##### 4-5-1 Project Implementation Policy

The basic policy for the implementation of this project is to secure equipment satisfactorily functioning to the detailed specifications of the basic design plan.

As it will take quite a long time to manufacture some items of equipment it is necessary to implement this project giving due consideration to the institutional framework of grant aid cooperation.

Close attention should be paid to the timing for the dispatch of Japanese experts to give guidance on the installation and operation of individual equipment to the technical officers of the college.

##### 4-5-2 Project Implementation System

National College of Textile Engineering, Faisalabad will be responsible for implementation of this project. Accordingly, the college Principal will take charge of all the procedures for concluding contracts with a consultant firm and a contractor, as well as for a banking arrangement.

##### 4-5-3 Project Supervision Plan

In accordance with the Government of Japan's policy on grant aid cooperation, the consultant to the project prepare the detail design based on the basic design, prepare the tender documents, issue the public notice of tender invitation, give the advice during contract negotiations and witness the contract. During installation work, the consultant coordinates the work to make sure that the works are completed within the time set satisfactorilly.

The project supervisor of the consultant firm should also ascertain that the work within the scope of Pakistan side is done by the time the equipment arrive and advise the project implementing organization on necessary corrective measures, if any. Particularly noteworthy of this project is that major items of equipment provided under this project are to be used for experimental production of textile products. For this reason, engineers proficient in mechanism of the equipment for spinning, weaving and processing should serve as on-the-job supervising engineers.

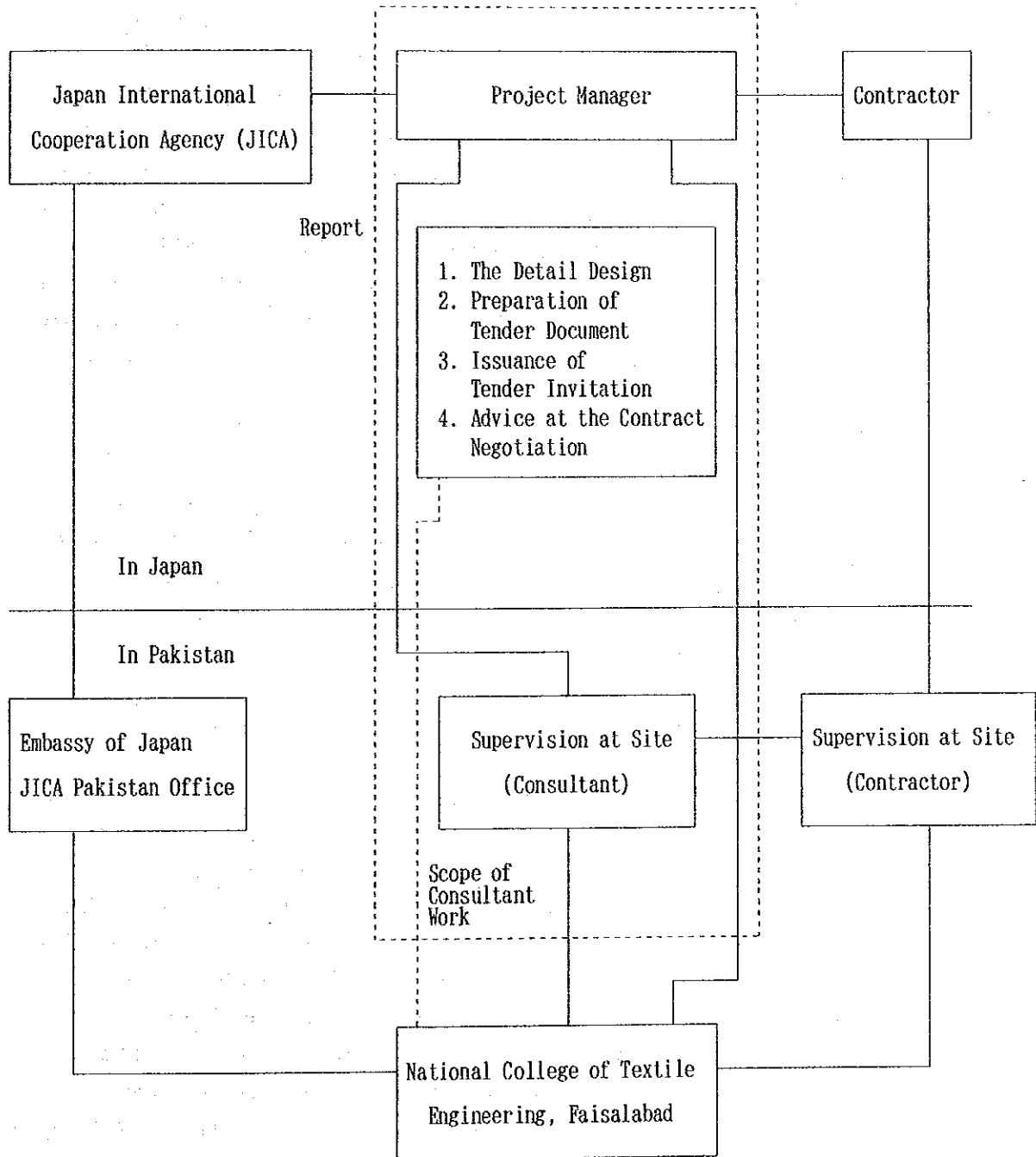
Fig. 4-2 shows an outline of the implementation system of this project.

#### 4-5-4 Equipment Procurement Plan

In view of the present situation of the Pakistan textile industry, it is expected that almost all the requested equipment will be Japanese-made except personal computers which can be procured locally since maintenance system and training program are well established in Pakistan.

Those items of equipment which are to be imported from Japan will be transported overland to Faisalabad via Karachi.

Figure 4-2 Project Implementation System



#### 4-5-5 Project Implementation Schedule

After the signing of the Exchange of Notes (E/N), the project will be implemented as follows:

(1) Detail Design

The detailed specifications of the equipment to be provided under this project will be decided on the basis of the basic design study report, and at the same time the tender documents will be prepared and approved by the authorities concerned. It will take 3 months to complete these procedures including tendering for the project.

(2) Manufacturing and Installation of Equipment

The contractor will prepare equipment design drawings for approval and manufacture the equipment, and ship them to Pakistan. The contractor will be responsible for unloading, transporting, installing and test running of the equipment in Pakistan.

(3) Completion of the Equipment Installation Work

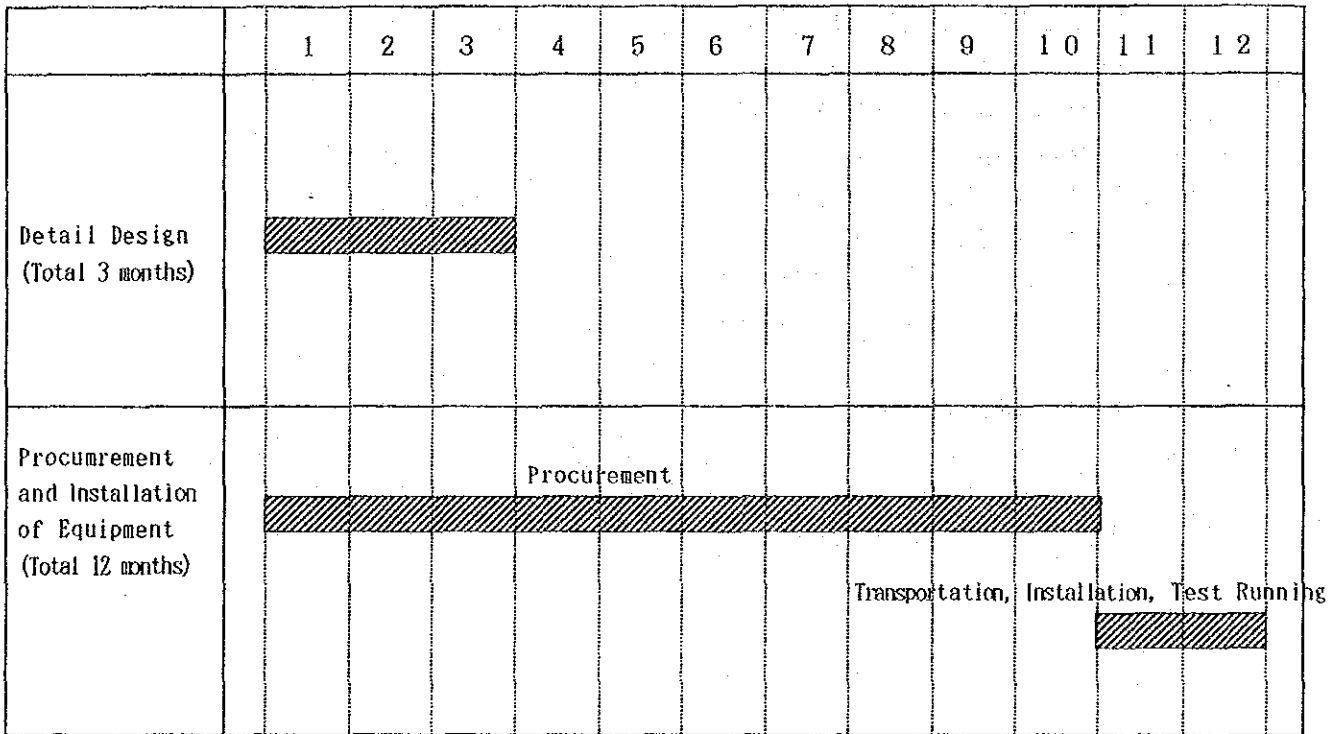
Each item of equipment installed in the college will be subjected to a test running to examine their compliance with the specifications, which will be attended by representatives of the college, the consultant and the other persons concerned. When it proves acceptable after the test running, the equipment will be handed over to the Pakistan side and all the works are completed. After the completion of the installation work, the Pakistan side will issue a certificate of completion to the consultant and to the contractor. The time required from the conclusion of the equipment supply contract to the completion of the work is estimated at 12 months on the assumption that all the operations involved will proceed smoothly (see Fig. 4-3).

4-5-6 Estimated Cost on the Pakistan Side

The estimated cost of the works to be carried out by Pakistan side are of the order of approximately Rs. 12,250,000 as detailed below.

(1) Interior remodeling and equipment foundation works	Rs. 3,000,000
(2) Electric wiring works	770,000
(3) Lighting works	154,000
(4) HVAC works	1,380,000
(5) Utensils	1,540,000
(6) Raw materials, reagents and consumables for experiment	2,312,000
(7) Fees	3,000,000
(8) Miscellaneous cost	94,000
	<hr/>
	Rs. 12,250,000

Figure 4-3 Implementation Schedule



# **CHAPTER 5 EXPECTED BENEFITS OF THE PROJECT AND CONCLUSION**





**CHAPTER 5 EXPECTED BENEFITS OF THE PROJECT AND CONCLUSION**

**5-1 Expected Benefits of the Project**

This project is aimed to improve National College of Textile Engineering's existing equipment for practical training and thereby help the college to train textile engineers who will carry over the positive effects of the college's technical education to the country's textile industry. Benefits to be expected from the project in each of the college's three departments in the above context can be summarized as follows.

Present situation and problems	Corrective measures to be taken under the project	Expected benefits of the project and the degree of expected improvement
1. Spinning Department		
a. The college's existing equipment is functionally outdated making it difficult to realise the results of the college's technical education in the country's textile industry.	a. Procurement of equipment with innovative functions	<ul style="list-style-type: none"> <li>- It will be possible to train textile engineer capable of using automated high-speed equipment efficiently. It will also be possible to train students in taking a scientific approach to the development of high-quality textile products.</li> <li>- The students will learn the importance of quality control by using the high-speed equipment provided.</li> </ul>
2. Weaving Department		
2.1 Weaving machines		
a. While modernisation of equipment is well under way in the country's textile industry, practically no innovative equipment has been installed in the college, and this makes it impossible for the college to offer training in sophisticated textile technology.	a. Procurement of state-of-the-art equipment widely used in the country's textile industry	- It will be possible to train textile engineers capable efficiently using equipment with these new functions.

Present situation and problems	Corrective measures to be taken under the project	Expected benefits of the project and the degree of expected improvement
<b>2.2 Knitting machines</b>		
<p>a. Because of the shortage of satisfactory equipment for use in training, the college is incapable of offering technical education aligned with the actual situation of the textile industry.</p>	<p>a. Procurement of knitting machines which match the production system of the industry.</p>	<p>- The content of the college's practical training will be substantially reinforced, and students be able to adopt a scientific approach to the actual situation of the textile industry. A knitting machine is not multi-purpose. Specific types of knitting machines are used in corresponding type of knitting factories. In this connection, the various knitting machines, installed will help train textile engineer in operating any type of knitting machine.</p>
<b>3. Textile Processing Department</b>		
<p>a. The college finds it difficult to offer technical education which matches the actual situation of the textile industry because of the shortage of practical training equipment.</p> <p>b. The college is only equipped with machines for cotton cloth processing, which is not consistent with the college's practical training curriculum.</p> <p>c. At the college, comparative experiments and training cannot be offered for instance, it is impossible to make a comparison of non-continuous and continuous dyeing or of roller screen printing and rotary printing.</p> <p>d. It is impossible to carry out satisfactory checks of the quality of dyed products-for instance, the college is un-equipped with launder-o-meter, fade-o-meter, rubbing fastness tester</p> <p>e. The existing equipment is insufficient for the number of students taking the Textile Processing Course, though the number is increasing</p>	<p>New supply of equipment</p> <p>a. Supply of batch system dyeing equipment</p> <p>b. Supply of continuous dyeing equipment</p> <p>c. Supply of various print testing machine</p> <p>d. Supply of a finish processing testing machine</p> <p>e. Supply of quality testers</p> <p>f. Supply of a synthetic fibre making machine</p>	<p>- It will be possible to improve the facilities through expansion of the scope of practical training.</p> <p>- It will be possible to offer training in which natural and synthetic fibres, as well as mixtures of the two types of fibres, are used.</p> <p>- The students will be able to contribute to the development of textile products with high added-value content by making a scientific approach to dyeing technology.</p> <p>- It will be possible for the college to train manpower which clearly reflects the college's achievements in technical education of textile engineering.</p> <p>- It will be possible to test and evaluate physical properties and Launder-o-metre of dyed textile products.</p> <p>- It will be possible to conduct tests in accordance with the Pakistan codes and standards.</p>

Present situation and problems	Corrective measures to be taken under the project	Expected benefits of the project and the degree of expected improvement
4. Testing Laboratory		
<p>a. The existing testing machines are functionally outdated.</p> <p>b. Some of the existing testing machines have deteriorated in precision.</p> <p>c. The existing equipment is insufficient for the instructors to examine and evaluate the results of practical training.</p>	<p>a. Supply of testing machines in short supply or high-precision testing machines</p> <p>b. Supply of testing machines in short supply</p>	<p>- It will be possible to carry out any exact testing or quality evaluations which may be required in the future market.</p> <p>- It will be possible to conduct sufficient examinations and evaluations of practical training conducted in each course.</p> <p>- It will be possible to collect more precise data on quality.</p>

To sum up the above expected benefits of this project, following overall effects are to be expected from this project.

- (1) Upgrading of the level of college's technical education to meet the needs of the country's textile industry

The proposed replacement and new supply of equipment and the subsequent qualitative and quantitative improvement in the college equipment for practical training will encourage the students to make a more scientific approach to textile engineering. In other words, this project will help improve both theoretical and practical aspects of the college's technical education by using the proposed equipment.

- (2) Strengthening the college's role as an institution giving technical guidance to the country's textile industry

This project is expected to help the college to improve its technical education, particularly in placing more emphasis on a scientific approach to

actual technical problems, and thereby strengthening its role as an institution of higher education which provides technical guidance to the textile industry.

(3) Revitalization of the college's general activities

The proposed replacement and new supply of equipment is expected to upgrade the college's educational activities and thereby revitalize activities of both teaching staff and students.

(4) Expansion of the college's technical service to the country's textile industry

The college is closely associated with the country's textile industry. It provides technical advice and consulting services to the textile industry and trains engineers from private textile mills. As a result of the implementation of this project, the college can expand such services to the textile industry.

## 5-2 Conclusion

As can be understood from the benefits mentioned above, this project aims at improving the college equipment for practical training so that textile engineers to meet the needs of the country's textile industry can be trained more effectively and more efficiently. It is expected that the planned improvement of the college's training equipment will help upgrade the college's functions as an institution of higher education and at the same time raise the level of its technical education. As a result, the college will be better equipped to help resolve the problems of low productivity and low product quality presently facing the textile industry, and further to contribute to national economic development, by providing the textile industry with competent textile engineers and expanding its technical service to the textile industry. In this context, it is considered reasonable to implement this project under grant aid from the Government of Japan. It is important, however, that the college, which is to take charge of the implementation of this project, operates and manages the equipment provided under this project effectively, if this project is to prove effective. To this end, it is necessary to train the college technical officers in the technologies required for the operation and management of the equipment provided under this project at the manufacturers' facilities, as well as at the training centres in Pakistan and the local factories delivering equipment of the same type as that provided under this project.



# APPENDICES





APPENDIX-1 MINUTES OF DISCUSSIONS

- (1) Minutes of Discussions (December 18, 1990)
- (2) Minutes of Discussions (April 4, 1991)

(1) Minutes of Discussions (December 18, 1990)

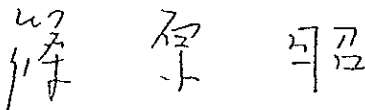
MINITUES OF DISCUSSIONS  
ON  
THE PROJECT FOR UPGRADATION OF TEACHING  
FACILITIES AT THE NATIONAL COLLEGE OF TEXTILE ENGINEERING  
FAISALABAD  
IN  
THE ISLAMIC REPUBLIC OF PAKISTAN

In response to the request of the Government of the Islamic Republic of Pakistan, the Government of Japan has decided to conduct a basic design study on the Project for Upgradation of Teaching Facilities at the National College of Textile Engineering, Faisalabad ( hereinafter referred to as " the Project " ) and Japan International Cooperation Agency (JICA) has sent the Basic Design Study Team headed by Prof. Dr. Akira Shinohara, Dean, Faculty of Textile Science and Technology, Shinshu University from December 10 to December 29, 1990.

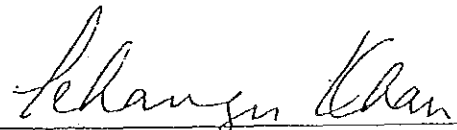
The Team had a series of discussions on the Project with the officials concerned of the Government of the Islamic Republic of Pakistan and conducted a field survey in Faisalabad and Islamabad.

As the result of the discussions and field survey, both parties confirmed the main articles as described on the attached sheets. The Team will proceed with the works and prepare the Basic Design Study Report on the Project based on these articles.

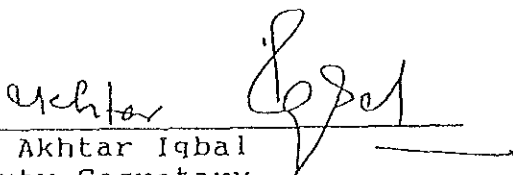
Islamabad, December 18, 1990.



Prof. Dr. Akira Shinohara  
Leader  
Basic Design Study Team  
Japan International  
Cooperation Agency



Mr. Jehangir Khan  
Deputy Secretary  
Ministry of Industries  
Government of the Islamic  
Republic of Pakistan.



Mr. Akhtar Iqbal  
Deputy Secretary  
Economic Affairs Division  
Government of Pakistan  
Republic of Pakistan



Dr. Abdul Majeed  
Principal  
National College of Textile  
Engineering, Faisalabad

ATTACHMENT

## 1. Objective of The Project

The objective of the Project is to assist to upgrade teaching facilities at the National College of Textile Engineering, Faisalabad.

## 2. Sponsoring Agency and Executing Agency

- 1) Ministry of Industries, Government of the Islamic Republic of Pakistan is the sponsoring agency.
- 2) The executing agency for the implementation of the Project is the Executive Committee, National College of Textile Engineering, Faisalabad and is responsible for its operation and maintenance after completion of the Project.

## 3. Equipment/Machines Requested by Pakistan side

The outline of the equipment/machines requested by the Government of the Islamic Republic of Pakistan is shown in Annex I attached.

## 4. Selection Criteria of Equipment/Machines

The following criteria will be taken into account in preparing a draft plan of the equipment/machines.

- 1) To be essential and frequently used in education and training of textile engineering.
- 2) To be basic and practical for fostering manpower to the textile industries.
- 3) To be operated by technical personnel and budget available.
- 4) To be easily maintained and repaired through after service.
- 5) Not to be of commercial production level.
- 6) To meet the minimum needs of the education and training program of the College.
- 7) To be of size and capacity to meet the available space.



5. Grant Aid Program

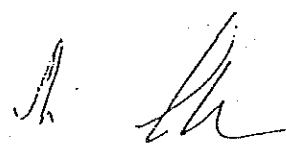
- 1) The Pakistan side understood Japan's Grant Aid System explained by the Team including principle of use of a Japanese consultant firm and Japanese contractor for the implementation of the Project.
- 2) The Government of Pakistan will take necessary measures as shown in Annex II on condition that the Grant Aid by the Government of Japan would be extended to the Project.

6. Schedule of the Study

- 1) JICA will prepare the draft report and dispatch mission to Pakistan in order to finalize the contents of the report around March, 1991.
- 2) In case the contents of the report are accepted in principle by the Pakistan side, JICA will complete the basic Design Study Report and submit it to the Pakistan side by June, 1991.

7. Technical Cooperation

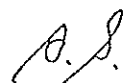
The Team will convey to the Government of Japan that there is a request on technical cooperation which is composed of acceptance of Pakistani trainees, dispatch of Japanese experts and equipment grants in the related field.



OUTLINE OF THE REQUESTED EQUIPMENT/MACHINES

The equipment/machines requested by the Pakistan side are composed of those for:

- 1) Spinning Department,
- 2) Weaving Department,
- 3) Processing Department,
- 4) Testing Laboratory, and
- 5) Auxiliary purpose.



NECESSARY MEASURES TO BE TAKEN BY THE GOVERNMENT OF PAKISTAN

1. To arrange the appropriate building with facilities of electricity, water supply, drainage, etc., before commencement of installation work.
2. To ensure prompt unloading, tax exemption, customs clearance at ports of disembarkation in Pakistan and prompt internal transportation of the equipment provided under the Grant Aid.
3. To bear the following commissions to the Japanese foreign exchange bank for banking services based upon the Banking Arrangement.
  - 1) Advising Commission of Authorization to Pay
  - 2) Payment Commission
4. To exempt Japanese national involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Pakistan with respect to the supply of the equipment/machines and services under the verified contracts.
5. To accord Japanese nationals whose services may be required in connection with the supply of the equipment/machines and the services under the verified contract such facilities as may be necessary for their entry into Pakistan and stay therein for the execution of the Project.
6. To bear all the expenses other than those to be borne by the Grant Aid, necessary for the execution of the Project.
7. To ensure that the necessary budget for proper and effective operation and maintenance of the equipment/machines procured under the Grant Aid Program will be allocated and adequate number of the Pakistan personnel with sufficient knowledge and experience will be assigned.



(2) Minutes of Discussions (April 4, 1991)

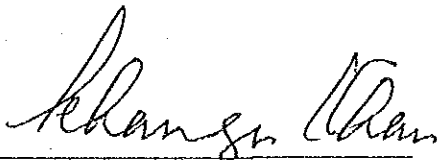
MINUTES OF DISCUSSIONS  
ON  
THE BASIC DESIGN STUDY ON THE PROJECT FOR UPGRADATION OF TEACHING  
FACILITIES AT THE NATIONAL COLLEGE OF TEXTILE ENGINEERING, FAISALABAD  
IN THE ISLAMIC REPUBLIC OF PAKISTAN  
(EXPLANATION OF DRAFT REPORT)

In December, 1990, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched to the Islamic Republic of Pakistan the Basic Design Study Team for the Project for Upgradation of Teaching Facilities at the National College of Textile Engineering, Faisalabad (hereinafter referred to as "the Project"). Through a series of discussions held and a field survey conducted in the Islamic Republic of Pakistan and technical examination in Japan, JICA has designed an appropriate plan for the Project and prepared the Draft Report of the Basic Design Study.

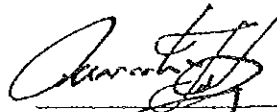
In order to explain and consult with relevant officials of the Islamic Republic of Pakistan on the components of the Draft Report, JICA sent the Report Explanation Team headed by Mr. Masashi Fujita, First Basic Design Study Division, Grant Aid Study and Design Department, JICA, from March 26 to April 6, 1991.

As a result of the discussions, both parties confirmed the main items described on the attached sheets.


Islamabad, April 4, 1991



Mr. Jehangir Khan  
Deputy Secretary,  
Ministry of Industries,  
Government of the Islamic  
Republic of Pakistan



Mr. Masashi Fujita  
Leader,  
Draft Report Explanation Team,  
JICA



Dr. Abdul Majeed  
Principal,  
National College of Textile  
Engineering, Faisalabad



Mr. Akhtar Iqbal  
(AKHTAR IQBAL)  
Deputy Secretary  
Economic Affairs Division,  
Ministry of Finance and Economic  
Affairs, Government of the Islamic  
Republic of Pakistan



ATTACHMENT

1. Components of the Draft Report

The Government of the Islamic Republic of Pakistan has agreed and accepted in principle the components of the Draft Report proposed by the Team.

2. Japan's Grant Aid System

(1) The Government of the Islamic Republic of Pakistan has understood the Japan's Grant Aid System explained by the Team.

(2) The Government of the Islamic Republic of Pakistan will take necessary measures, described in the attached Annex I, to ensure the smooth implementation of the Project on the condition that the Grant Aid by the Government of Japan would be extended to the Project.

3. Further Schedule

The Team will make the Final Report in accordance with the confirmed items and send it to the Government of the Islamic Republic of Pakistan in June, 1991.

\* \* \* \* \*



ANNEX I.

NECESSARY MEASURES TO BE TAKEN BY THE GOVERNMENT  
OF THE ISLAMIC REPUBLIC OF PAKISTAN

1. To arrange the appropriate building with facilities of electricity, water supply, drainage, and other incidental facilities that is necessary to install the equipment/machinery procured under the Grant Aid Program before commencement of installation work
2. To ensure prompt unloading, tax exemption, customs clearance at ports of disembarkation in the Islamic Republic of Pakistan and prompt internal transportation of the equipment/machinery procured under the Grant Aid Program
3. To bear the following commissions to the Japanese foreign exchange bank for banking services based upon the Banking Arrangement
  - 1) Advising Commission of Authorization to pay
  - 2) Payment Commission
4. To exempt Japanese nationals involved in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in the Islamic Republic of Pakistan with respect to the supply of the equipment/machinery and services under the verified contracts
5. To accord Japanese nationals whose services may be required in connection with the supply of the equipment/machinery and the services under the verified contract such facilities as may be necessary for their entry into the Islamic Republic of Pakistan and stay therein for the execution of the Project
6. To bear all the expenses other than those to be borne by the Grant Aid, necessary for the execution of the Project
7. To ensure that the necessary budget for proper and effective operation and maintenance of the equipment/machinery procured under the Grant Aid Program will be allocated and adequate number of the Pakistani personnel with sufficient knowledge and experience will be assigned



APPENDIX-2 MEMBERS OF THE STUDY TEAM

- (1) Basic Design Study Team  
(December 10, 1990 - December 29, 1990)

Team Leader	Prof. Dr. Akira Shinohara Dean, Faculty of Textile Science and Technology Shinshu University
Project Coordination	Mr. Mitsuyoshi Kawasaki First Basic Design Study Division Grant Aid Study & Design Dept. Japan International Cooperation Agency
Expert, Educational Equipment	Mr. Atsushi Kameda UNICO International Corporation
Expert, Textile Equipment (Spinning/Weaving)	Mr. Kyujiro Tanaka UNICO International Corporation
Expert, Layout Plan and Equipment (Processing/Testing)	Mr. Hiroshi Mizuno UNICO International Corporation
Expert, Cost Estimation	Mr. Wataru Shiga UNICO International Corporation

(2) The Report Explanation Team  
(March 26, 1991 - April 6, 1991)

Team Leader                    Mr. Masashi Fujita  
                                  First Basic Design Study Division  
                                  Grant Aid Study Design Dept.  
                                  Japan International Corporation Agency

Expert,  
Educational                    Mr. Atsushi Kameda  
Equipment                      UNICO International Corporation

Expert,  
Textile Equipment              Mr. Kyujiro Tanaka  
(Spinning/Weaving)            UNICO International Corporation

APPENDIX-3 SCHEDULE OF THE BASIC DESIGN STUDY

(1) The Basic Design Study (December 10 - 29, 1990)

1. Dec. 10 (Mon) Leave Tokyo (PK735)  
Arrive in Islamabad (Dr. Shinohara,  
Mr. Kameda, Mr. Tanaka, Mr. Mizuno)
  
2. Dec. 11 (Tue) Islamabad  
Courtesy Meeting with the Additional  
Secretary, Ministry of Industries;  
- Arrangement of Study Schedule  
- Discussion on the Project Background  
  
Meeting at the embassy of Japan with  
JICA Representative;  
- Explanation and Discussion on the  
Schedule and Outline of the Study
  
3. Dec. 12 (Wed) Islamabad  
Meeting at the Ministry of Industries;  
- Explanation on the Inception Report,  
Questionnaire and the Grant Aid System  
of Japan  
- Collection of Information and Data  
relative to the Ministry  
  
Leave Islamabad (PK657)  
Arrive in Faisalabad (Mr. Kameda,  
Mr. Tanaka, Mr. Mizuno,  
Mr. Shiga)
  
4. Dec. 13 (Thu) Leave Islamabad (PK607)  
Arrive in Faisalabad (Dr. Shinohara,  
Mr. Kawasaki)

Faisalabad

Meeting at the National College of Textile Engineering;

- Discussion on the Study Schedule and Present Situation of the College
- Site Survey at the Processing Laboratories

Factory Visit at the Nishat Textile Mills Ltd;

- Site Survey at the Mills
- Interview with the Mill Managers

5. Dec. 14 (Fri) Faisalabad

Meeting among the Team Members

6. Dec. 15 (Sat) Faisalabad

Meeting at the National College of Textile Engineering;

- Discussion on the Contents of the Project
- Discussion on the Necessity and Justification of the Requested Equipment

Factory Visit at the Sitara Textile Mills;

- Site Survey at the Mills
- Interview with the Mill Managers

7. Dec 16 (Sun) Faisalabad

Meeting at National College of Textile Engineering;

- Discussion and Confirmation of the Requested Equipment

Factory Visit at the Kapoor Textile Mills;

- Site Survey at the Mills
- Interview with the Mill Manager

8. Dec. 17 (Mon) Leave Faialabad (PK608)

Arrive in Islamabad (Dr. Shinohara, Mr. Kawasaki, Mr. Kameda)

Meeting at the Ministry of Industries;

- Reporting the Progress of the Study
- Drafting the Minutes of Discussions

Faisalabad

Meeting at the National College of Textile Engineering;

- Site Survey at the Laboratories
- Technical Discussion on the Requested Equipment
- Collection of Data and Information

9. Dec. 18 (Tue) Islamabad

Meeting at the Ministry of Industries;

- Discussion on the Technical Cooperation
- Signing of the Minutes of Discussion among the representatives of the Ministry, College and the Study Team.

Meeting at the Embassy of Japan with JICA representative;

- Reporting of the Progress of the Study and the Minutes of Discussions

Meeting at the Economic Affairs Division;

- Reporting of the Outline of the Study and the Minutes of Discussions

Faisalabad

Meeting at the National College of  
Textile Engineering;

- Technical Discussion on the Requested  
Equipment

10. Dec. 19 (Wed) Leave Islamabad for Japan (PK249/272)  
(Dr. Shinohara, Mr. Kawasaki)

Leave Islamabad (PK607)

Arrive in Faisalabad (Mr. Kameda)

Meeting at the National College of  
Textile Engineering;

- Survey on Utility Services
- Discussions on the /equipment Layout  
Plan and Project Implementation Plan
- Follow up Questionnaire

Meeting at the University of  
Agriculture, Faisalabad;

- Survey of the Computer Laboratory at  
the Math. & Statistics Department
- Interview with the Laboratory Chief

11. Dec. 20 (Thu) Faisalabad  
Meeting at the National College of  
Textile Engineering;

- Discussion on the Equipment Plan
- Site Survey at the Laboratories

12. Dec. 21 (Fri) Faisalabad  
Meeting at the National College of  
Textile Engineering;

- Confirmation on the Contents of Past  
Discussion



Leave Faisalabad (By Road)

Arrive in Lahore (Mr. Kameda,  
Mr. Tanaka, Mr. Mizuno, Mr. Shiga)  
- Data Compilation and Analysis

13. Dec. 22 (Sat) Lahore

Meeting at the University of Engineering  
and Technology, Lahore;  
- Discussion with the Vire-Chancellor on  
the Matters related to the Project  
- Site Survey of a Computer Laboratory

Visit at the Pakistan Industrial  
Technical Assistance Center;

- Survey on Activities, and Operation  
and Maintenance Situation of the  
Equipment Supplied under Japanese  
Technical cooperation Programme

Leave Lahore (PK382)

Arrive in Islamabad

14. Dec. 23 (Sun) Islamabad

Meeting at the Ministry of Industries;  
- Reporting of the Result of the Basic  
Design Study in Faisalabad

Meeting among the Team Members

15. Dec. 24 (Mon) Islamabad

Meeting at the Embassy of Japan with  
JICA representatives;  
- Reporting of the Progress of the  
Basic Design Study

Meeting among the Team Members

16. Dec. 25 (Tue) Leave Islamabad (PK301)  
Arrive in Karachi  
Data Compilation and Analysis
17. Dec. 26 (Wed) Karachi  
Meeting at the Textile Industry Research  
and Development Center;  
- Survey on Activities and Facilities  
- Data Collection
18. Dec. 27 (Thu) Karachi  
Meeting at the All Pakistan Textile  
Mills Association;  
- Survey on Activities  
- Discussion on the Needs of Qualified  
Textile Engineers in the Mill Sector
- Meeting at the Textile Commissioners  
Organization;  
- Survey on Activities  
- Discussions on the Relationship of TCO  
with the College
19. Dec. 28 (Fri) Leave Karachi for Japan (PK762)
20. Dec. 29 (Sat) Arrive in Tokyo
- (2) Draft Report Explanation (March 26 - April 6, 1991)
1. March 26 (Tue) Leave Tokyo (TG507)  
Arrive in Karachi (Mr. Kameda,  
Mr. Tanaka)
2. March 27 (Wed) Leave Karachi (PK308)  
Arrive in Islamabad

3. March 28 (Thu) Islamabad  
Courtesy Meeting with the Additional Secretary, Ministry of Industries;  
- Briefing the draft report  
- Explanation on the schedule  
  
Meeting at the Embassy of Japan with JICA representative;  
- Briefing the draft report  
- Explanation on the schedule  
  
Leave Tokyo (TG507)  
Arrive in Karachi (Mr. Fujita)
4. March 29 (Fri) Islamabad  
Meeting among the team  
  
Leave Karachi (PK308)  
Arrive in Islamabad (Mr. Fujita)
5. March 30 (Sat) Islamabad  
Meeting at the Ministry of Industries;  
- Explanation and discussion about the draft report
6. March 31 (Sun) Leave Islamabad (PK607)  
Arrive in Faisalabad  
  
Faisalabad  
Meeting at the National College of Textile Engineering;  
- Briefing the draft report  
- Discussion on the schedule

7. April 1 (Mon) Faisalabad  
Meeting at the National College of  
Textile Engineering;  
- Discussion on the contents of the  
report
  
8. April 2 (Tue) Faisalabad  
Meeting at the National College of  
Textile Engineering;  
- Discussion on the contents of the  
report  
  
Leave Faisalabad (PK658)  
Arrive in Islamabad
  
9. April 3 (Wed) Islamabad  
Meeting at the Ministry of Industries;  
- Report the outcome from the  
discussion taken place at the  
National College of Textile  
Engineering  
- Drafting the Minutes of Discussion
  
10. April 4 (Thu) Islamabad  
Meeting at the Ministry of Industries;  
- Signing of the Minutes of Discussion  
among the representative of the  
Ministry, College and Draft Report  
Explanation Team
  
11. April 5 (Fri) Leave Islamabad (PK309)  
Arrive in Karachi (Mr. Kameda,  
Mr. Tanaka)
  
12. April 6 (Sat) Leave Karachi (TG640)  
Arrive in Tokyo

APPENDIX-4 LIST OF PERSONS INTERVIEWED

Ministry of Industries

Mr. Viqar Rustam Bakhshi, Additional Secretary  
Mr. Sayid Zafar Ali Naqvi, Joint Secretary (Developing)  
Mr. Jehangir Khan, Deputy Secretary  
Miss. Najma Siddiqui, Deputy Secretary  
Mr. Muhammad Anwar Khan, Chief Research Officer (Projects)

Economic Affairs Division

Mr. Akhtar Iqbal, Deputy Secretary

National College of Textile Engineering, Faisalabad

Dr. Abdul Majeed, Professor, Principal  
Mr. Haq Nawaz Malik, Professor (Tex. Chemistry), Vice-Principal  
Mr. Mubarik Ali Virk, Assist. Professor (Tex. Chemistry)  
Mr. Shaukat Ali Arshad, Associate Prof. (Weaving)  
Mr. Momin Shah Aurakzai, Associate Prof. (Textile Testing)  
Mr. Muhammad Ashraf Pawar, Assist. Prof. (Spinning)  
Dr. Mumtaz Hasan Malik, Assist. Prof. (Spinning)  
Mr. M. Javaid Iqbal, Assist. Prof. (Physics/Engineering)

University of Agriculture, Faisalabad

Dr. M. Idrees Ahmad, Mathematics and Statistics Dept.

University of Engineering & Technology, Lahore

Prof. Dr. Ikram UI Haq Dar, Vice-Chancellor  
Dr. S. Nazir Ahmad, Director Research

Pakistan Industrial Technical Assistance Center

Mr. M.A. Jabbar Khan, General Manager  
Engr. Arshad Javaid

Textile Industry Research & Development Center

Mr. Muhammad Shamim, Director  
Mr. Muhammad Yunus, Head of Spinning Dept.

Textile Commissioner's Organization

Mr. G. N. Khan, Textile Commissioner/Cess Collector  
Mr. Mohammad Idress Ahmed, Director

All Pakistan Textile Mills Association

Mr. S. M. Usman, Secretary General  
Mr. Syed Ali Imam Rizvi, Deputy Secretary

Nishat Mills Ltd.

Mr. Khalid Qadeer Qureshi, Executive Director  
Mr. M. Umar Virk, Executive Director  
Mr. M. Bashir Tariq, General Manager

Sitara Textile Mills

Mr. Anees, Managing Director

Kapoor Textile Mills

Mr. Niaz Ahmed, General Manager

Embassy of Japan

Mr. Ryosuke Haraguchi, First Secretary  
Mr. Yutaka Sumida, First Secretary

JICA Pakistan Office

Mr. Kazuo Tanigawa, Resident Representative  
Mr. Masato Togawa, Assist. Resident Rep.  
Mr. Shoji Nishikawa, Assist. Resident Rep.

APPENDIX-5 EXISTING EQUIPMENT LIST

## List of Existing Machines and Equipment (1)

1. Spinning Department		Quantity	Maker (Country)	Short Specifications	Year of manufacture	Remark
Name of Equipment						
1 Blow Room	1 line	Platt's (U.K.)	Blending Hopper 30" wide SRRL Opener, Shirley wheel 13" dia., T&S Shirley Hopper Opener, Shirley Opener, Hopper Feeder, Scutcher.	1960	Blender to be replaced	
2 T & S Platt's Card	3 F	T&S Platt's (U.K.)	T&S Card and 1 Platt Card have flexible clothing, 1 Platt Card has metallic clothing, Doffer Speed 5-15 rpm	1960	1 F to be removed	
3 High Speed Draw Frame	3 F	- do -	MDF-5 Platt's Draw Frame 2 Nos. One with 3/3 Drafting System and one with 2/3 drafting			
4 Lap Former	1	- do -	T&S A-12 Draw Frame 4/4 16 sliver feeding	1960		
5 Comber	1	Platt's (U.K.)	6-head Hartford Comber, Bicollling, 100 nips/min.	1960		
6 Roving Frame	2	T&S Platt's (U.K.)	T&S Roving Frame 8' lift, 56 Spindles; MS-2 Platt Roving Frame 10' lift, 36 Spindles/machine	1960		
7 Ring Spinning Frame	3	Platt's (U.K.)	Platt MF-3 - 64 Spindles; Platt M-1 - 64 Spindles; Platt REN 72 Spindle.	1960		
8 Twisting Frame	1	Platt's (U.K.)	36 Spindles, 8' Lift. (MD3)	1960		



List of Existing Machines and Equipment (2)

1. Spinning Department Name of Equipment	Quantity	Maker (Country)	Short Specifications	Year of manufacture	Remark
9 O.E. Spinning Machine	1	Bradford University (U.K.)	4 Rotors, Rotor Speed up to 60,000 r.p.m.	1985	
10 Reeling Machine	1	Joseph Stubbs (U.K.)	64 ends, 32 on each side	1960	

List of Existing Machines and Equipment (3)

2. Weaving Department								
Name of Equipment	Quantity	Maker (Country)	Short Specifications	Year of manufacture	Remark			
1 Pirm Winder	3	1) MUSCHAMP (U.K.) 2) SKARER (SWISS) 3) MUSCHAMP (U.K.)	4 Spindles	1961				
2 Warp Winder	1	1) LEESONA HOLT (U.K.) 2) JOSEPH (U.K.)	2 Spindles 4 Spindles 10 Spindles (Double side) 20 Spindles (Double side)	1961 1961 1961 1961	Out of order			
3 High Speed Warper	1	LEESONA HOLT (U.K.)	V-Creel capacity	1961				
4 Sectional Warping M/C	1	HATTERSLEY (U.K.)	Creel 288 ends	1961				
5 Sizing M/C	1	LESSONAHOLT (U.K.)	3 cylinderes, one Sowbox Teir Creel 8 Beams	1961				
6 Small Quill Winder	1	MOORE & AVERY LTD. (U.K.)	2 Spindles	1961				
7 Drawing-in-Arrangement	1	MOORE & AVERY LTD. (U.K.)	90" wide	1961				
8 Reaching-in-M/C	1	MOORE & AVERY LTD. (U.K.)	-	1961				

List of Existing Machines and Equipment (4)

2. Weaving Department							
Name of Equipment	Quantity	Maker (Country)	Short Specifications	Year of manufacture	Remark		
9 Card Punching M/C	1	WALKER (U.K.)	Card Size = 5" max. (12 holes)	Working			
10 Looms	20(6)	BUTTERWORTH HATTERSLEY Northrop	7 looms - 36", 44", 56" 64" R.S. (Semiautomatic)	1961 1961 1962	6 to be removed Butter 2 Bobbins Northrop 4 Bobbins 1 Jacquard Mathersley - 1 Bobbin		
		PECO Siddique Bros. Matterson	11 48", 80" Automatic 1 48" - do - 1 48" 1 2' x 4 Tape Wvt.	1968 1970 1971			

Butterworth = 7 Hattersley = 5  
 Northrop = 11 Matterson = 1  
 Local = 2

## List of Existing Machines and Equipment (5)

3. Processing Department		Quantity	Maker (Country)	Short Specifications	Year of manufacture	Remark
Name of Equipment						
1	Gas Singeing-Cum-Desizing	1	Mather & Platt U.K.	Single Burner, Burner's width 53" Model GM 621960	1960	Working
2	Kier	1	- do -	1/2 ton, vertical with multitubular heater, Model No GM 6213/60	1960	Working
3	Rope Washing M/C	1	- do -	Roller width 39" Model No. GM 6221-2/60	1960	Working
4	Bleaching Cisterns	1	- do -	4' x 4' with two under neath tanks.	1960	Working
5	Cloth Opening and Mangle	1	- do -	Scutcher Model GM 6226/60 width 43", water mangle, roller width 41".	1960	Working
6	Jigger Dyeing M/C	2	Smith with- worth U.K.	Large Jig. dia 46", small Jig 41" dia, Model 654627	1960	Working
7	Pressure Dyeing M/C	2	Longclose U.K.	Large capacity 18 cones, Model 7567, single cone Model 7523/1	1960	Working
8	Hydroextractor	1	Broadbent U.K.	Capacity 60' Model 31580	1960	Working

## List of Existing Machines and Equipment (6)

3. Processing Department		Quantity	Maker (Country)	Short Specifications	Year of manufacture	Remark
Name of Equipment						
9 Chain Type Mercerising M/C	1	Mather & Platt U.K.	Width 60", Model GM 6234/60	1960	Working	
10 Padding Dyeing M/C	1	- do -	Roller width 41" Model No. GM 6247-6/60	1960	Working	
11 Small Roller Printing M/C	1	Wood's Engineers U.K.	Roller width 19" two colour serial No 123, 1960	1960	Working	
12 Padding Mangle for Finishing with Cylinder Drying	1	Mather & Platt U.K.	8 cylinders, steam heated, cylinder width 41", Model GM 6251-53/60	1960	Working	
13 Hot Air Stenter	1	- do -	Working width 60" steam heated single chamber Model GM 6254/60	1960	Working	
14 Three Bowl Calendar	1	- do -	Bowl width 60" steam heated with spur wheel, chasing arrangement	1960	Working	
15 Folding Machine	1	Daniel Foxwell U.K.	Model No. 3201 width single Fold	1960	Working	

List of Existing Machines and Equipment (7)

3. Processing Department		Quantity	Maker (Country)	Short Specifications	Year of manufacture	Remark
Name of Equipment						
16 Distillation Plant	1	Manesty U.K.	Electric type, capacity about 2 litres an hom type OB-00B	1960	Out of order	
(Laboratory) 17 PH Meter	1	Pye U.K.	Scale 0-10, 4-14, with Glass electrode	1967	Out of order	
18 Spectro-Photometer SP600	1	Unicone U.K.	SP 600 series 2, with red + blue cells, wave length 330 - 1000	1967	Working	
19 Viscometer Torsional Type	1	Gallenkamp U.K.	VS-01	1967	Working	
20 Daioniser	1	Elga Products U.K.	Elgastat B 102, Flow rate 15 litres/hom storage tank 2 1/2 litre	1967	Conductivity attachment out of order	
21 Conductibility Meter	1	Evershed & Vignoles, U.K.	Dionic, 5 range, portable	1967	Working	
22 Water-Baths	3	Gallenkamp U.K.	VS-615, VS-670	1967	Working	
23 Electric Balance 'Staton'	1	Unimatic U.K.	Tyoe CL5D single pan	1967	Not working	

List of Existing Machines and Equipment (8)

3. Processing Department Name of Equipment	Quantity	Maker (Country)	Short Specifications	Year of manufacture	Remark
24 Oven	1	Barlow- whitney U.K.	Type 150 304 serial No. 12829	1960	Working
25 Wash Wheel	1	Cahis Printers Association U.K.	Model No. S-8 Machine No 8773	1960	Heating element out of order
26 Small Steamer	1	U.K.	Electrically heated	1960	Working
27 Shirley Fluidity Measuring	12	SDL U.K.	Glass tubes with capillary orifice for drain	1960	Working
28 Apparatus	-	-	Miscellaneous for students practicals		

List of Existing Machines and Equipment (9)

4. Testing Laboratory							
Name of Equipment	Quantity	Maker (Country)	Short Specifications	Year of manufacture	Remark		
1 Beam Comb Sorter	1	Shirley Developments U.K.		Pre 60s	Out of order		
2 W.I.R.A. Fineness Tester	1	- do -	2 - 8 Micronnaire	Pre 60s	In working condition		
3 Quadrant and Torsion Balance	1	Goodbrand & Heal George U.K.	5 mg.	Pre 60s	Out of order O.K.		
4 Microscope	1	Griffin & George U.K.					
5 Micro Projector	1	Flatter & Garnett U.K.		Pre 60s	Not working		
6 Electronic Moisture Meter	1	Shirley Development U.K.		Pre 60s	Working		
7 Precision Sample Drying Equipment	1	Reynold & Banson U.K.		Pre 60s	Working		
8 Yarn Count Determining Equipment	1	Goodbrand U.K.		Pre 60s	Working		



## List of Existing Machines and Equipment (10)

4. Testing Laboratory				Year of manufacture	Remark
Name of Equipment	Quantity	Maker (Country)	Short Specifications		
9 Single Yarn and Lea Strength Tester of CRT Type with Load and Extension Recording Devices	1	Good brand U.K.	200 lbs	Pre 60s	Working
10 Mechanical and Electronic Regularity Testers with Automatic Recording Arrangements	1	Gaydon Fielden Walker U.K.		Pre 60s	Working
11 Yarn and Roving Visual Levelness Tester	1	Good brand U.K.		Pre 60s	Working
12 Very High Capacity Strength Tester	1	Avery Scales U.K.	Capacity 1200 lbs	Pre 60s	Working
13 Fabric Strip Strength Tester	1	Good brand U.K.	300 lbs	Pre 60s	Working
14 Cloth Abrasion Tester	1	James & Heal U.K.			Working
15 Shirley Stiffness Tester	1	Shirley Development U.K.		Pre 60s	Working
16 Shirley Winding Drum	1	Shirley Development U.K.		Pre 60s	Working

## List of Existing Machines and Equipment (11)

4. Tesing Laboratory Name of Equipment	Quantity	Maker (Country)	Short Specifications	Year of manufacture	Remark
17 Shirley Constant Tension Winding Tester	1	Shirley Developments U.K.		Pre 60s	Working
18 Shirley Crimp Tester	1	Shirley Developments U.K.			Not Working
19 Twist Testers	5	Goodbrand 4 James Real 1	1" - 10" and Variable test length	Pre 60s	Working
20 Evenness Tester No.1	1	Uster Zellweger	Full set	1970	Working
21 Micro Projector	1	Flatters & Garnet Ltd.	With four objectives x 5, x 10, x 40, Screen size 2.5 x 4.0"	Pre 60s	

List of Existing Machines and Equipment (12)

5. List of Machinery Imported Under I.D.A. Credit Scheme					
Name of Equipment	Quantity	Maker (Country)	Short Specifications	Year of manufacture	Remark
1 Rotary Vertical Crockmeter	1	U.K.	SDL 238 A	1986	
2 Cot Grinding Machine	1	Peter Wolters U.K.	SM 7	1986	
3 Miniclip Portable Flat Clipping Machine for use with 40 (Flat Irons)	1	U.K.	SB 1444/1	1986	
4 Laboratory Steamer	1	Mathis Switzerland	DHE	1985	
5 Laboratory Jigger	1	Mathis - do -	WJ-350 MM	1985	
6 X-Ray Diffraction System. Photographic Method	1	C.S.L. U.K.	C.S.L.	1986	
7 Tensorapid Automatic Tensile Testing Installation	1	Uster Switzerland	UTR 273-290-01001	1987	
8 Digital Fibrograph System (with Accessories)	1	U.S.A.	530	1985	
9 Laboratory Coting Table with Pin Frame	1	Switzerland	K.S.T.	1986	
10 Fibre Strength Tester	1	Pressley - do -	Type 1360	1985	
11 Precision Torsion Balance	1	- do -	Type 768	1985	

APPENDIX-6 COUNTRY DATA

## 1. Physical Situation

The Islamic Republic of Pakistan lies between 23 and 37 degrees north latitude and 61 and 76 degrees east longitude with its area of 796,095 sq. km. Temperatures and rainfall of year 1988 at major cities are shown on the table below.

	Above Sea Level (m)	Temperature (°C)		Annual Rainfall (mm)
		Mean of Max.	Mean of Min.	
Islamabad	511	29.5	14.9	1,259
<u>Punjab</u>				
Lahore	214	31.9	18.9	815
Faisalabad	184	31.2	16.7	214
<u>Sind</u>				
Karachi	22	32.9	21.4	160
<u>N.W.F.P.</u>				
Peshawar	359	30.5	16.7	367
<u>Baluchistan</u>				
Quetta	1,589	25.9	9.1	259

Source: Pakistan Statistical Yearbook (1989)

Pakistan consists of such physical regions as:

- 1) the western off-shoots of Himalayas which covers its northern and north western parts,

- 2) the Baluchistan Plateau,
- 3) the Pothar Plateau and Salt Range, and
- 4) the Indus Plain.

## 2. Demographic Situation

According to the population census 1981, Pakistan has a population of 84.25 million. The population is estimated to have increased upto 110.36 million in January, 1990.

### Population (Age 10 Years and above)

Census Years	1981	1990
Population (million)	84.254	110.36
Crude Activity Rate (%)	27.57	28.83
Civilian Labor Force (million)	25.78	31.82
Employed Total (million)	24.70	30.82
Age 10 Years and Above:		
Employed		
Agriculture (%)	52.69	51.15
Mining & Manufacturing (%)	14.09	12.84
Labor Force Participation Rate (%)	40.16	43.32
Crude Birth Rate (per 1000 persons)	43.3	43.3
Crude Death Rate (per 1000 persons)	11.8	10.5
Infant Mortality Rate (per 1000 persons)	-	113
Life Expectancy at Birth (Years)		
Male (per 1000 persons)	-	59.3
Female (per 1000 persons)	-	60.7
Compound Growth Rate (%)	3.06	3.10

Source: Economic Survey 1989 - 1990

Province-wise distribution of the population at the population census 1981 is shown on the following table.

	Population in Thousand					Density (Person/km <sup>2</sup> )
	Male	Female	Total	Urban	Rural	
Pakistan	44,232 (52.5%)	40,021 (47.5%)	84,253	23,840 (28.3%)	60,413 (71.7%)	106
Islamabad Federal Area	185 (54.4%)	155 (45.6%)	340	204 (60.0%)	136 (40.0%)	376
Punjab	24,860 (52.6%)	22,432 (47.4%)	47,292	13,051 (27.6%)	34,241 (72.4%)	230
Sind	9,999 (52.5%)	9,030 (47.5%)	19,029	8,243 (43.3%)	10,786 (56.7%)	135
N.W.F.P.	5,761 (52.1%)	5,300 (47.9%)	11,061	1,665 (15.1%)	9,396 (84.9%)	148
Baluchistan	2,284 (52.7%)	2,048 (47.3%)	4,332	677 (15.6%)	3,655 (84.4%)	12
FATA	1,143 (52.0%)	1,056 (48.0%)	2,199	- (0.0%)	2,199 (100.0%)	81

Source: Pakistan Statistical Yearbook (1989)

The population of 10 years and above accounts for 56.34 million, of which 21.92 million or 39.0% are employed, 0.7 million or 1.2% are looking for jobs, 24.06 million or 42.7% are of household, 4.51 million or 8.0% are students, and 5.14 million or 9.1% are classified as others.

Total number of household in Pakistan is 12.59 million, 72% of which are in rural areas. The average number of person per household is 6.7.

## 3. Social Situation

The official language of Pakistan is both Urdu and English, however, other regional languages such as Punjabi, Sindi, Pushtu, Baluchi are also spoken. As to the religion, 97% of the total population are Muslims (Sunni 77%, Shi'ate 20%), 2% are Christians and 1% are others.

The literacy ratio of population (10 years and above) at the population census 1981 is 26.2% with following details.

Literacy Ratio (%)

	Pakistan	Urban	Rural
Total Population (10 years and above)	26.2	47.4	17.2
Male	36.0	56.9	26.6
Female	15.2	35.9	6.8

Source: Pakistan Statistical Yearbook (1989)

By educational attainment, about 45.3% of the total population (10 years and above) are primary school graduates, 22.8% are middle school graduates, 19.5% are high school graduates, 6.7% are intermediate school graduates and certificate/diploma holders, 5.6% are B.A./B.Sc. holders and above, and 0.1% are others.

The number of educational institutions, students, pupils and teachers are shown on the following table.

	Number of Institutions (For Female)	Students/Pupil in Thousand (Female)	Teachers (Female)	Student/ Teacher Ratio
Primary School	90,942 (27,319)	8,595 (2,862)	212,000 (69,000)	40.5
Middle School	7,117 (2,206)	2,402 (667)	68,600 (19,800)	35.0
High School	5,816 (1,725)	816 (218)	99,900 (31,400)	8.2
Secondary Vocational Institution	305 (109)	65 (12)	4,902 (1,069)	13.3
Arts and Science College	592 (187)	429 (137)	27,786 (11,441)	15.4
Professional Collage	99 (8)	83 (22)	4,012 (1,041)	20.7
University	22 (-)	73 (10)	4,304 (638)	17.0

In 1989, there were 9,394 medical facilities, having 65,233 beds, 59,777 registered doctors, all over Pakistan. Number of persons per hospital bed was 1,640, and the number of person per doctor was 1,790.

Following table shows the household economy of Pakistan.



Average Household Size, Monthly Income  
Expenditure and Savings

Household	1986-87		
	Pakistan	Rural	Urban
1. Average size of Household	6.5	6.3	6.8
2. Number of income earner per household	1.7	1.7	1.7
3. Average Monthly income (Rs)	2,062	1,775	2,739
4. Source of income (%)			
1) Wages & salaries	22	14	33
2) Self employed	55	64	41
3) Others	23	22	26
5. Average monthly expenditure (Rs)	1,979	1,711	2,612
6. Composition of expenditure share in total (%)			
1) Food & drinks	46	50	41
2) Apparel, textile & footwear	7	8	7
3) Rent	13	8	18
4) Others	34	34	34
7. Savings as % of income	4.0	3.6	4.6

Source: Economic Survey 1989 - 1990

#### 4. Economic Situation

Following table shows the growth rate of Gross Domestic Products (GDP) in Pakistan.

Sectoral Growth Rates

(% per annum)

	1988-89	1989-90	
	Revised	Target	Estimates
1. Commodity Sector	5.9	6.0	5.5
Agriculture	7.1	5.2	4.0
Manufacturing	4.0	7.4	7.9
(Large scale)	(2.4)	(7.0)	(7.7)
(Small scale)	(8.4)	(8.4)	(8.4)
Mining & Quarrying	2.1	7.3	9.7
Construction	2.3	5.5	3.1
Electricity and Gas Distribution	13.2	5.8	8.3
2. Services Sector	3.7	5.6	4.8
Wholesale & Retail Trade	5.4	5.7	4.9
Transport, Storage and Communication	0.6	5.2	4.7
All others	4.5	5.7	4.8
3. GDP (FC)	4.8	5.8	5.2
4. GNP (FC)	4.0	-	5.0

Source: Economic Survey 1989- 1990

Average annual growth rate in some selected South Asian countries is shown on the table below.

Average Annual Growth Rate in  
Some Selected SAARC Countries during 1980 - 1987

(Growth %)

	Bangla- desh	Sri Lanka	India	Pakistan
Population growth 1980 - 1987	2.8	1.5	2.1	3.1
GDP 1980 - 1987	3.8	4.6	4.6	6.6
Agriculture 1980 - 1987	2.4	3.1	0.8	3.4
Manufacturing 1980 - 1987	2.4	6.2	8.3	8.9
Per capita GNP 1987 in US\$	160	400	300	350

Source: World Development Report 1989

Structural changes in GDP and occupational share by major industrial division are shown on the following tables.

Structural Changes in Gross Domestic Product  
(At constant factor cost of 1980 - 1981)

(%)

Sectors	1980-81	1988-89 (Provisional)
1. Agriculture	<u>30.83</u>	<u>26.02</u>
Major Crops	15.99	12.89
Minor Crops	5.31	4.29
Livestock	8.13	7.58
Fishing	1.09	0.94
Forestry	0.31	0.31
2. Mining & Quarrying	<u>0.42</u>	<u>0.54</u>
3. Manufacturing	<u>15.11</u>	<u>17.25</u>
Large-Scale	11.08	12.53
Small-Scale	4.03	4.72
4. Construction	<u>4.67</u>	<u>4.22</u>
5. Electricity and Gas Distribution	<u>2.39</u>	<u>2.67</u>
6. Transport, Storage & Communication	<u>9.65</u>	<u>10.15</u>
7. Wholesale and Retail Trade	<u>15.06</u>	<u>16.62</u>
8. Banking and Insurance	<u>2.24</u>	<u>2.45</u>
9. Ownership of Dwelling	<u>4.53</u>	<u>5.43</u>
10. Public Administration & Defense	<u>7.77</u>	<u>7.24</u>
11. Services	<u>7.31</u>	<u>7.44</u>
12. Gross Domestic Product (FC)	<u>100.00</u>	<u>100.00</u>

Source: National Account of Pakistan 1988 - 1989

Distribution of Employed Persons of 10 Years Age  
and above by Major Industries Division

	(%)		
	1963-64	1980-81	1989-90 (Estimated)
Agriculture	60.47	52.69	51.15
Mining & Manufacturing	13.60	14.09	12.84
Construction	1.44	4.86	6.38
Electricity & Gas Distribution	0.35	0.91	0.59
Transport	2.04	4.66	4.89
Trade	7.60	11.50	11.93
Other	14.50	11.28	12.12
Total	100.00	100.00	100.00

Source: Economic Survey 1989 - 1990

The budgetary position of Pakistan is shown on the following table. The economic policy of the Government of Pakistan emphasizes the needs to strive for elimination of the repeated budgetary deficit.

Budget at a Glance

	1987-88 Actual	1989-90 Provisional Actual	1989-90 (B.E)
1. Total Expenditure	180.37	200.54	216.63
1) Current	133.64	153.81	160.63
2) Development	46.73	46.73	56.00
2. Total Revenue			
1) Tax	93.46	109.94	121.40
2) Non-Tax	23.56	29.94	34.14
3) Surplus of Autonomous Bodies	5.79	4.37	3.54
4) Disinvestment of share of Public Corporations	-	-	1.50
3. Overall Deficit	-57.56	-56.29	-56.05
4. Overall Deficit as percentage of GDP (MP)	8.5	7.3	6.3

Source: Economic Survey 1989 - 1990

#### 5. Trade & Balance of Payments

Following table shows the trade balance of Pakistan for the past six years. Pakistan faces repeated trade deficit which forms "twin deficits of Pakistan" together with the unbalanced finance.

Trade Balance  
(1984 - 1985 to 1989 - 1990)

(US\$ Million)

	Trade Balance	Exports (FOB)	Imports (FOB)
1984 - 1985	-3,552	2,457	-6,009
1985 - 1986	-3,042	2,942	-5,984
1986 - 1987	-2,294	3,498	-5,792
1987 - 1988	-2,557	4,362	-6,919
1988 - 1989	-2,573	4,634	-7,207
1989 - 1990(E)	-2,459	4,946	-7,405

Source: Economic Survey 1989 - 1990

Balance of Payments

(US\$ Million)

	1988-89	1989-90(E)
1. Current Account:		
1) Trade Balance	-2,573	-2,459
Exports (fob)	4,634	4,946
Imports (fob)	7,207	7,405
2) Services (net)	-1,477	-1,476
3) Private Transfers (net)	2116	2,230
(Workers Remittances)	(1,897)	(1,980)
Current Account Balance	-1,934	-1,705
2. Capital Account:		
1) Long term capital (net)	1,911	1,434
Basic Balance	- 23	-271
2) Short term capital, etc.	-274	155
Overall Balance	-297	-116
3. Monetary Account:		
Net use of Fund Credit, etc.	309	257
Net Charge in Reserves	12	141

Source: Economic Survey 1989 - 1990

External indebtedness of Pakistan by sources is shown on the table below.

Total External Indebtedness of Pakistan  
as on June 30, 1989 (1/2)  
(Payable in Foreign Exchange)

Lending Country/Agency	(US\$ Million)		
	Disbursed	Debt Outstanding Undisbursed	Total
<b>I. Consortium Including Outside Consortium Arrangements</b>			
1. Belgium - Official Aid	22.632	13.727	36.359
- Export Credits	0.087	29.414	29.501
Sub-Total (Belgium)	22.719	43.141	65.860
2. Canada - CIDA Loans	493.113	0.034	493.147
- EDC Credits	17.833	25.839	43.672
Sub-Total (Canada)	510.946	25.873	536.819
3. France - Official Aid and State-cum-Bank/Export Credits	377.888	32.067	409.955
- Financial Institutions	5.689	-	5.689
Sub-Total (France)	383.577	32.067	415.644
4. Germany - Official Aid	980.582	208.189	1188.771
- Supplier's Credits	110.642	78.231	188.873
- Financial Institutions	10.348	-	10.348
Sub-Total (Germany)	1101.572	286.429	1387.992
5. Italy - Capital Aid	168.843	32.816	201.659
- Export Credits	33.658	19.001	52.659
Sub-Total (Italy)	202.501	51.817	254.318
6. Japan - Official Aid	1885.471	799.906	2685.377
- Supplier's Credit	58.363	0.105	58.468
- Financial Institutions	8.422	-	8.422
Sub-Total (Japan)	1952.256	800.011	2752.267
7. Nether-land - Official Aid	167.554	14.995	182.549
- Export Credits	20.473	1.987	22.460
Sub-Total (Netherlands)	188.027	16.982	205.009
8. Norway - Supplier's Credits	1.695	-	1.695
- Financial Institutions	0.280	6.728	7.008
Sub-Total (Norway)	1.975	6.728	8.703



## Appendix-6

Total External Indebtedness of Pakistan  
as on June 30, 1989 (2/2)  
(Payable in Foreign Exchange)

Lending Country/Agency	(US\$ Million)		
	Disbursed	Debt Outstanding Undisbursed	Total
9. Sweden - Financial Institutions	1.865	16.094	17.959
10. U.K. - Export/Supplier's Credits	5.225	-	5.225
- CDFC	1.028	-	1.028
- Financial Institutions	86.486	-	86.486
Sub-Total (U.K.)	92.739	-	92.739
11. U.S.A. - Official Aid	1707.567	63.360	1770.927
- Supplier's Credits	0.079	-	0.079
- Financial Institutions	63.635	-	63.635
- CCC (USA)	219.467	97.650	317.117
- PL480 Title-I (CLCC)	1037.484	0.000	1037.484
Sub-Total (U.S.A.)	3028.232	161.010	3189.242
12. Asian Development Bank	2011.995	2337.615	4349.610
13. IBRD	1171.050	1615.980	2787.030
14. IDA (Including EEC Special Action Loans)	1870.313	1155.550	3025.863
15. IFC	57.165	8.421	65.586
16. IFAD	82.500	57.247	139.747
Sub-Total (Consortium Sources)	12679.432	6614.956	19294.388
II. Non-Consortium Sources:			
Sub-Total (Non-Consortium Sources)	541.906	586.541	1110.447
III. Islamic Countries:			
Sub-Total (Islamic Countries)	782.838	188.381	971.219
IV. IMF (Trust Fund) - Loan	38.995	-	38.995
IMF - SAF - Loan	146.500	-	146.500
Total (All Sources)	14189.671	7371.878	21561.549

Source: Economic Survey 1989 - 1990

Following tables show exports and imports of Pakistan commodity-wise and country-wise.

Major Exports

(US\$ Million)

	1988-89	Share (%)	1989-90 Target	% Change Over 1988-89
1. Primary Commodity	1,233	26.5	996	-29.4
Raw Cotton	929	20.0	566	-47.6
Rice	304	6.5	430	26.0
2. Cotton Manufactured	1,965	42.0	2,276	23.8
Yarn	601	12.9	690	34.4
Cloth	465	10.0	536	17.6
Readymade Garments	335	7.0	380	11.0
Tents & Canvas	41	0.9	45	-36.6
Hosiery	167	3.6	230	65.9
Made-up Articles	347	7.4	395	12.7
3. Other Traditional Items	700	15.0	830	9.7
Leather	243	5.2	300	14.8
Carpets	230	4.9	250	-6.1
Fish & Preparations	110	2.4	140	-22.7
Synthetic Textiles	117	2.5	140	60.7
4. All Others (Inc. P.O.I.)	772	16.5	969	31.3
<hr style="border-top: 1px dashed black;"/>				
Total (C & F)	4,661	100.0	5,071	8.8
Total (F.O.B)	4,634		4,944	6.7

Source: Economic Survey 1989 - 1990

Major Imports

(Million Rp)

	1988/89	Share(%)
Total Imports	135,841	100.0
Machinery (Non-electric)	26,597	19.6
Mineral Fuels, Lubricants and Related Materials	19,596	14.4
Chemicals	13,046	9.6
Edible Oil	8,576	6.3
Grains, Pulse and Flour	8,598	6.3
Transport Equipment	8,403	6.2
Iron and Steel	5,796	4.3
Electric Machinery, Apparatus and appliances	4,962	3.7
Fertilizers	3,534	2.6
Drugs and medicines	3,318	2.4

Source: Statistical Pocket Book of Pakistan 1990

Export to Principal Countries

(Million Rupees)

	1987/88			1988/89		
	Value	Share(%)	Change Over(%)	Value	Share(%)	Change Over(%)
Japan	8,847	11.3	28.6	10,468	11.6	18.3
U.S.A.	8,603	11.0	34.2	10,348	11.5	20.3
U.K.	5,323	6.8	17.6	5,615	6.2	5.5
W. Germany	5,491	7.0	23.3	5,608	6.2	2.1
Hong Kong	2,738	3.5	54.0	5,052	5.6	84.5
Italy	4,522	5.8	23.1	4,120	4.6	-8.9
China	877	1.2	37.6	3,671	4.1	318.6
U.A.E.	2,325	3.0	8.1	3,345	3.7	43.9
Korea	1,933	2.5	-3.8	3,030	3.4	56.8
France	2,513	3.2	19.0	2,580	2.9	2.7
Total	78,445	100.0	23.8	90,183	100.0	15.0

Source: Statistical Pocket Book of Pakistan 1990

Imports from Principal Countries

(Million Rupees)

	1987/88			1988/89		
	Value	Share(%)	Change Over(%)	Value	Share(%)	Change Over(%)
U.S.A.	12,471	11.1	22.3	21,355	15.7	71.2
Japan	16,910	15.0	11.7	18,802	13.8	11.2
Kuwait	9,210	7.1	17.0	11,267	8.3	22.3
W.Germany	8,769	7.8	26.0	9,796	7.2	11.7
U.K.	7,625	6.8	23.5	8,005	5.9	5.0
China	3,942	3.5	42.4	5,944	4.4	50.8
Saudi Arabia	5,622	5.0	14.3	5,541	4.1	-1.4
Malaysia	3,784	3.4	42.4	4,731	3.5	25.0
Korea	3,288	2.9	64.6	4,453	3.3	35.4
Italy	2,698	2.4	6.1	3,957	2.9	46.7
Total	112,551	100.0	20.5	135,841	100.0	20.7

Source: Statistical Pocket Book of Pakistan 1990

## 6. Pakistan - Japan Relationship

Based on the Treaty of Friendship, Commerce and Navigation between Pakistan and Japan concluded in June, 1961, both countries give most-favored-nation treatment each other and their relationship has been growing firmly particularly in the field of trade.

In accordance with the trade statistics of Japan, trade balance for the past five years and major exports and imports of Japan by commodity groups and major commodities are shown on the following tables.

Japan's Export and Import against Pakistan by Year

	(Mill. US\$)				
	1985	1986	1987	1988	1989
Export (FOB)	786	903	936	1,126	1,028
Import (CIF)	382	352	492	552	589
Balance	405	550	444	574	439

Japan's Export to Pakistan by Commodities

	(1,000 US\$)			
	1988	1989		
	Value	Value	Share(%)	Change Over(%)
Total Export	1,125,968	1,027,549	100.0	-8.7
1. Foods	7,317	4,832	0.5	-34.0
2. Raw Material	44,961	24,919	2.4	-44.6
3. Petroleum Crude, Product	435	777	0.1	78.6
4. Industrial Product	1,064,169	991,802	96.5	-6.8
1) Chemical Product	67,249	57,281	5.6	-14.6
2) Machinery	802,302	748,694	72.9	-6.7
General Machinery	340,754	289,620	28.2	-15.0
Electric Machine	111,490	107,892	10.5	-3.2
Transportation Equipment	306,605	325,475	31.7	6.2
Precision Machine	43,453	25,706	2.5	-40.8
3) Textile Product	44,477	40,287	3.9	-9.4
4) Metallic Product	114,678	105,839	10.3	-7.7
5) Non Metallic Product	5,139	6,089	0.6	18.5
6) Raw Materials	16,586	18,040	1.8	8.8
7) Others	13,738	15,572	1.5	13.3
5. Other Special Items	9,086	5,129	0.5	-42.6

## Appendix-6

Japan's Import from Pakistan by Commodities

	(1,000 US\$)			
	1988	1989		
	Value	Value	Share(%)	Change Over(%)
Total Export	552,435	588,686	100.0	6.6
1. Foods	31,609	22,445	3.8	-29.0
2. Raw Material	112,098	103,800	17.6	-7.4
3. Petroleum Grude, Product	2,101	1,785	0.3	-15.0
4. Industrial Product	405,995	459,318	78.0	13.1
1) Chemical Product	198	176	0.0	-11.2
2) Machinery	701	1,426	0.2	103.3
General Machinery	25	9	0.0	-63.6
Electric Machine	28	23	0.0	-18.6
Transportation Equipment	13	5	0.0	-62.1
Precision Machine	636	1,390	0.2	118.5
3) Textile Product	376,521	419,305	71.2	11.4
4) Metallic Product	508	6,490	1.1	13 times
5) Non Metallic Product	3,531	5,079	0.9	43.8
6) Raw Materials	19,506	20,521	3.5	5.2
7) Others	5,030	6,322	1.1	25.7
5. Other Special Items	632	1,338	0.2	111.7

Japan's Major Export Item to Pakistan

		(1,000 US\$)	
		1988	1989
Pre-Spinning Machine	77,834	Truck (Gasoline)	16,015
Car (Gasoline)	71,312	Parts for Automobile	15,614
Reeling Machine, Twisting Machine	53,079	Engine Parts for Car	15,048
Spinning Machine	46,607	Cars: Under 1500	14,875
Truck (Diesel)	35,766	Parts for Boiler	12,785
Diesel Truck (Under 5 Ton Capacity)	31,313	Motor Cycle	12,784
Diesel Truck (Above 20 Ton Capacity)	27,751	Stainless Steel Plate	11,471
Viscose Fibre	25,973	Parts for Textile Machinery	10,906
Reproduction of Synthetic Fiber	21,907	Bulldozer	10,821
Welded Steel Pipe	18,928	Steel, Non-Alloy Plate	9,970
Car (Diesel)	18,633	Chassis with Engine	9,936
Motor Cycle	17,989	Seamless Steel Pile	9,115
Plated Sheet	17,794	Refrigerator	9,069
Cars: Under 1000 cc	16,498	Viscose Fibre	8,732
Cars: Under 1500 cc	15,144	Bus	8,588

## Appendix-6

Japan's Major Import Item from Pakistan

(1,000 US\$)

1988		1989	
Cotton Yarn	332,783	Cotton Yarn	348,169
Raw Cotton	92,100	Raw Cotton	81,411
Shrimp	27,041	Cotton Fabric	25,979
Goat Leather	15,622	Grain	21,080
Grain	15,306	Shrimp	13,556
Toilet Linen	9,423	Toilet Linen	13,471
Cotton Fabric	9,239	Goat Leather	12,705
Wool Yarn	5,093	Steel, Non-Alloy Plate	5,890
Animal Intestines	4,835	Garment (Leather)	5,529
Marble	3,117	Ethyle Alcohol	4,837
Balls	2,389	Horn	4,541
Intermediate Product of Copper	2,207	Animal Intestines	3,940
Volatile Oil	2,039	Wool Yarn	3,831
Horn	1,902	Marble	3,573
Embroided Cloth	1,643	Balls	3,470

## 7. Others

Following table shows the classified companies registered in Pakistan.

Companies in Existence  
(as on 31st March 1990)

Nature of Companies	Punjab*	Sind	Baluchistan	N.W.F.P.	Total
a) Companies Limited by share					
i) Public	667	795	48	85	1,595
ii) Private	9,446	11,099	216	1,043	21,804
b) Companies with Unlimited Liability	1	-	-	-	1
c) Companies Limited by Guarantee and Association not for Profit	97	162	5	6	720
d) Foreign Companies	169	314	2	3	488
<b>Total</b>	<b>10,380</b>	<b>12,370</b>	<b>271</b>	<b>1,137</b>	<b>24,158</b>

\* Including Islamabad



APPENDIX-7 TEXTILE STATISTICS OF PAKISTANTextile Indices

		1988-89	1989-90	Increase Decrease (%)
Production of Raw Cotton	(1,000 Bales)	8,200	8,474	3.34
Consumption of Raw Cotton	(1,000 kg)	809,978	998,447	
Consumption of Man Made Fibre	(1,000 kg)	69,256	71,904	
Total Consumption		879,234	1,070,351	21.74
Production of Cotton Yarn	(1,000 kg)	663,800	801,670	
Production of Blended Yarn	(1,000 kg)	103,634	123,721	
Total Production		767,434	925,382	20.58
Production of Cotton Cloth	(1,000 m2)	220,677	247,616	
Production of Blended Cloth	(1,000 m2)	49,185	47,223	
Total Production		269,826	294,839	9.26
Export of Raw Cotton	(1,000 kg)	840,268	294,519	-64.95
Export of Yarn	(1,000 kg)	291,953	377,376	29.26
Export of Cloth	(1,000 kg)	845,331	1,017,868	20.41
Capacity Installed (as on June 30, 1990)				
Spindle	(1,000 nos.)	4,790	5,270	10.02
Rotor	(1,000 nos.)	66	72	9.09
Loom	(1,000 nos.)	17	16	-5.88
Capacity Worked (Average)				
Spindle	(1,000 nos.)	3,880	4,350	12.11
Rotor	(1,000 nos.)	52	64	23.08
Loom	(1,000 nos.)	9	8	-11.11

Source: Textile Commissioner's Organization, June, 1990

Categorywise Production of Cotton Yarn

Items	(Million kg)	
	1988-89	Share
Coarse Count (1-20)	275.30	(35.9%)
Medium Count (21-34)	349.00	(45.5%)
Fine Count (35-47)	14.94	(1.9%)
Super Fine Count (48-80)	11.17	(1.5%)
Mixed & Hard Waste	13.38	(1.7%)
Man-Made	103.63	(13.5%)
Total	767.43	(100.0%)

Source: Textile Commissioner's Organization

Export of Cotton Group

Items	(Value: Million \$)				
	1985-86	1986-87	1987-88	1988-89	1989-90
<u>Raw Cotton</u>	513.3	446.5	610.0	929.6	443.0
<u>Textile</u>	612.8	868.8	1053.6	1095.9	1438.8
1) Cotton Yarn	279.2	506.1	541.0	600.8	833.7
2) Cotton Thread	3.8	3.3	3.8	3.0	3.0
3) Cotton Cloth	314.8	345.3	485.4	464.8	559.0
4) Cotton Bags	9.5	8.1	12.3	13.5	13.4
5) Tapestry Cloth	-	-	-	-	-
6) Cotton Waste	5.3	5.9	9.2	12.3	27.8
7) Waste Material of Textile Fabrics	0.2	0.1	1.9	1.5	1.9
<u>Clothing</u>	501.6	734.0	832.8	890.6	1095.1
1) Towels	67.5	83.9	117.4	140.4	129.8
2) Made-Up Articles-Bed Sheets, Covers, Napkins, Curtains	142.3	175.0	200.9	206.7	269.0
3) Tents & Canvas	31.1	23.4	30.3	41.1	28.8
4) Readymade Garments (Excl. Leather Garments)	206.1	355.1	349.9	335.5	393.8
5) Hosiery	54.6	96.6	134.3	166.9	273.7
<b>Total</b>	<b>1,627.7</b>	<b>2,049.3</b>	<b>2,496.4</b>	<b>2,916.1</b>	<b>2,976.9</b>

Source: Federal Bureau of Statistics

Unit Value of Major Exports

Items	Unit	(Value in \$/Unit)				
		1985-86	1986-87	1987-88	1988-89	1989-90
Raw Cotton	M.T.	803.9	696.6	1,215.1	1,106.3	1,504.1
Cotton Yarn	kg	1.8	2.0	2.6	2.1	2.2
Cotton Thread	kg	3.1	3.7	3.9	4.2	4.0
Cotton Fabrics	m2	0.4	0.5	0.6	0.6	0.5

Source: Federal Bureau of Statistics

Category Wise Export of Cotton Yarn

Year	Coarse			Medium			Fine		
	QTY.	Value	Unit	QTY.	Value	Unit	QTY.	Value	Unit
	(MKg)	(Million US\$)	Value (\$/Kg)	(MKg)	(Million US\$)	Value (\$/Kg)	(MKg)	(Million US\$)	Value (\$/Kg)
1988-89	130.25	246.86	1.89	160.58	351.07	2.19	0.92	2.47	2.68
	S. Fine			Total					
1988-89	0.20	0.45	2.25	291.95	600.85	2.06			

Source: Federal Bureau of Statistics

Variety Wise Export of Cloth

Item	1988-89	(Share)
Quantity (Million Sq. Meters)		
Grey	418.50	
Bleached	182.18	
Dyed	40.65	
Printed	204.00	
Total	845.33	
Value (Million US\$)		
Grey	180.94	(38.9)
Bleached	123.81	(26.6)
Dyed	23.49	(5.1)
Printed	136.51	(29.4)
Total	464.75	(100.0)

Source: Federal Bureau of Statistics

Destination-Wise Export of Raw Cotton

Countries	Quantity: M. Tonnes (Value: Million \$)					
	1987-88		1988-89		1989-90	
	Quantity	Value	Quantity	Value	Quantity	Value
Hong Kong	76	90.3	144	170.3	36	54.0
China	31	38.7	133	170.2	24	38.0
Japan	61	72.1	89	98.5	21	33.2
Thailand	33	42.6	74	81.6	16	24.2
Indonesia	27	33.3	58	64.0	25	36.4
S. Korea	14	18.0	44	46.6	8	12.0
Italy	44	55.0	35	35.6	20	30.1
Portugal	27	33.3	31	31.1	11	16.9
Spain	21	25.2	21	23.8	9	12.8
Germany (F.R.)	19	22.4	12	12.5	18	27.2
Others	149	179.1	199	195.4	107	158.2
<b>Total</b>	<b>502</b>	<b>610.0</b>	<b>840</b>	<b>929.6</b>	<b>295</b>	<b>443.0</b>

Source: Federal Bureau of Statistics

Destination-Wise Export of Cotton Yarn

Countries	Quantity: Million Kg. (Value: Million \$)					
	1987-88		1988-89		1989-89	
	Quantity	Value	Quantity	Value	Quantity	Value
Japan	121	315.1	145	303.9	123	277.7
S. Korea	27	64.7	36	71.5	39	88.7
Hong Kong	18	41.6	31	59.3	60	116.7
Germany (F.R.)	3	9.0	3	8.2	6	13.3
Canada	3	6.6	3	5.5	4	8.4
Bulgaria	3	8.1	2	3.7	14	28.6
Austria	3	8.5	1	3.5	3	7.6
Sweden	2	5.7	1	1.9	9	20.0
Greece	2	6.5	1	1.3	4	10.2
Others	29	75.2	69	142.0	115	262.5
<b>Total</b>	<b>211</b>	<b>541.0</b>	<b>292</b>	<b>600.8</b>	<b>377</b>	<b>833.7</b>

Source: Federal Bureau of Statistics

Destination-Wise Export of Cotton Fabrics

Countries	Quantity: 1,000 m2 (Value: Million \$)					
	1987-88		1988-89		1989-89	
	Quantity	Value	Quantity	Value	Quantity	Value
U.K.	98	54.2	93	48.1	111	58.5
Australia	60	32.2	69	39.9	48	31.0
U.S.A.	88	44.1	87	32.8	120	53.4
U.S.S.R.	47	32.6	27	20.2	20	13.4
Bangladesh	24	14.9	43	14.5	47	26.5
Canada	24	11.4	23	12.7	21	12.2
Saudi Arabia	49	26.9	15	8.7	24	11.8
France	19	10.2	20	10.9	19	11.4
Italy	27	12.3	34	13.6	23	11.5
Japan	7	5.6	23	16.4	42	29.4
Others	406	241.0	411	247.0	543	299.9
<b>Total</b>	<b>849</b>	<b>485.4</b>	<b>845</b>	<b>464.8</b>	<b>1018</b>	<b>559.0</b>

Source: Federal Bureau of Statistics

Destination-Wise Export of Ready-Made Garments

Countries	(Value: Million \$)		
	1987-88	1988-89	1989-90
U.S.A.	108.9	120.9	114.2
Germany (F.R.)	47.8	54.1	63.9
U.S.S.R.	60.1	45.6	39.7
U.K.	25.8	28.1	33.0
Canada	18.3	21.1	22.5
France	16.0	16.8	22.4
Saudi Arabia	22.8	8.4	18.3
Others	50.2	40.5	79.8
<b>Total</b>	<b>349.9</b>	<b>335.5</b>	<b>393.8</b>

Source: Federal Bureau of Statistics

Destination-Wise Export of Hosiery

Countries	(Value: Million \$)		
	1987-88	1988-89	1989-90
U.S.A.	56.5	83.5	124.3
Germany (F.R.)	24.8	26.9	42.3
U.K.	11.2	12.3	29.2
France	10.2	10.6	20.5
Netherlands	7.8	7.9	12.7
Canada	5.0	8.1	10.5
Dubai	3.0	2.1	3.4
Others	15.8	15.5	30.8
<b>Total</b>	<b>134.3</b>	<b>166.9</b>	<b>273.7</b>

Source: Federal Bureau of Statistics

Destination-Wise Export of Cotton Made-Ups  
(Excl. Towels)

Countries	(Value: Million \$)		
	1987-88	1988-89	1989-90
U.S.A.	41.0	54.0	64.9
U.K.	24.1	22.2	32.2
Germany (F.R.)	25.8	23.9	34.6
Netherlands	22.6	12.1	24.2
France	9.4	9.2	10.7
Belgium	9.8	8.5	8.7
Saudi Arabia	9.9	2.5	4.6
Others	58.3	74.3	89.1
<b>Total</b>	<b>200.9</b>	<b>206.7</b>	<b>269.0</b>

Source: Federal Bureau of Statistics

Destination-Wise Export of Towels

Countries	Quantity: 1,000 kg (Value: Million \$)					
	1987-88		1988-89		1989-90	
	Quantity	Value	Quantity	Value	Quantity	Value
U.S.A.	11368	40.5	10628	38.3	10919	41.0
Japan	1870	6.9	2915	11.4	2878	10.6
Germany (F.R.)	1718	10.1	2013	9.9	2005	10.4
U.K.	1751	7.5	2223	9.4	1924	7.6
France	1421	6.5	1548	6.7	995	3.7
Canada	1516	4.8	1695	6.4	980	4.0
Dubai	604	2.3	1438	5.2	1573	5.6
U.S.S.R.	1661	6.5	819	3.7	906	3.5
Others	7038	32.3	11066	49.4	10093	43.4
<b>Total</b>	<b>28947</b>	<b>117.4</b>	<b>34345</b>	<b>140.4</b>	<b>32273</b>	<b>129.8</b>

Source: Federal Bureau of Statistics

appendix 8    government policy measures to promote industrial  
DEVELOPMENT IN RURAL AREAS

In December 1990, the Ministry of Industries of Pakistan announced a policy package related to the industrial development in the country's rural areas as part of the Ministry's new industrial policy. The contents of the policy measures taken under the new industrial policy and the privileges given under the policy measures are as summarized below.

- Five-years income tax holiday will be available to all industries set up in Rural Areas provided such industries are set up between 1st December, 1990 to 30th June, 1995. These concessions will be applicable only to income generated from that particular industry.
- Imported machinery for Rural industries would be totally exempted from the payment of custom duty, sales tax and import surcharge-provided such machinery is not manufactured locally. Import licence fee has also-been reduced from 6 per cent to 2 per cent for all such industries established in the rural areas.
- Government institutions will acquire necessary technology from abroad for its transmission to the rural entrepreneurs on nominal rates. These institutions will provide required technical assistance and marketing expertise for rural industrial projects.
- No question would be asked about the source of investment, provided L/Cs are established or contracts for local plant and machinery are signed by 30-6-1992. Debt Equity Ratio for all industrial units has been fixed at 70:30 instead of 60:40, in case of projects based on imported machinery. For projects involving local machinery the Debt Equity Ratio of 80:20 has been fixed.



- Creation of power generation by the entrepreneurs of such industries individually or collectively will be encouraged and in case where there is excess of electricity after meeting own demands WAPDA will purchase the same.

Rural Areas in the context of Rural-Industrial Development  
Incentives shall mean all Rural Areas excluding:

- (1) Major Industrial Estates of Hub, Nooriabad, Chunnian, Hattar and Gadoon and areas upto 10 kilometers outside their limits.
- (2) (a) The Municipal limits of Karachi and 40 kilometers areas around these limits.  
  
(b) The Municipal/Cantonment limits of Lahore and 30 kilometers around these limits.  
  
(c) The existing limits of Municipal Corporations and their Cantonment Boards and 10 kilometers areas around these limits.  
  
(d) Areas falling within the limits of all Municipal Committees and Cantonment Boards and Islamabad Capital Territory.

In keeping with the introduction of the above-mentioned new industrial policy, the income tax law was revised. As a result, factories established in Province of Baluchistan (excluding some areas), the North West Frontier Province, the Federally Administered Tribal Areas, the Northern Areas, Azad Kashmir, some areas of Province of Punjab and some areas of Province of Sind will be exempted from income taxes for eight years as a special case. Factories established in other areas will also be exempted from income taxes for three years.

## APPENDIX-9 TEXTILE MACHINERY IMPORT STATISTICS

Item	Quantity (Nos.)		Value (1,000 rupees)	
	Total	Japan	Total	Japan
Sewing Machine (Industrial)	21,944	13,113	242,558	169,633
Sewing Machine (Others)	2,336	113	5,879	1,631
Extruder, etc.	39	8	81,141	30,537
Carding Machine (Cotton)	175	15	103,708	13,940
Carding Machine (Wool)	3	1	10,706	9,333
Comber	16	10	22,721	11,517
Drawing Frame	95	46	85,544	75,463
Preparatory Machine	394	194	415,295	259,371
Spinning Machine (Cotton)	16	8	183,072	147,697
Spinning Machine (Other Material)	646	149	761,759	393,125
Doubler/Twister (Cotton)	15	5	12,327	6,124
Doubler/Twister (Other Material)	66	15	46,436	12,543
Cone Winder	17,652	127	409,180	348,490
Warp Winding Machine	7	7	24,822	24,822
Reeling Machine	4,109	3,881	555,861	458,304
Loom (Cotton)	31	31	335	335
Loom (Others)	1,809	101	742,072	25,658
Circular Knitting Machine	479	25	107,043	11,669
Flat Knitting Machine	123	10	47,914	5,429
Hand Drive Flat Knitting Machine	1,714	1,491	10,443	6,424
Stitch Bending Machine	15	5	3,731	1,157
Finishing Machine	511	399	31,017	467
Reeling/Unread/Folding Machine	52	27	10,404	181
Iron Press Machine	674	184	3,344	1,704
Printing Machine	104	48	116,322	347
Pressing/Bleaching Machine	873	287	55,513	1,935
Parts/Consumables	-	-	1,318,231	312,925
Total	-	-	5,407,378	2,330,761

Source: Foreign Trade Statistics of Pakistan, 1990

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