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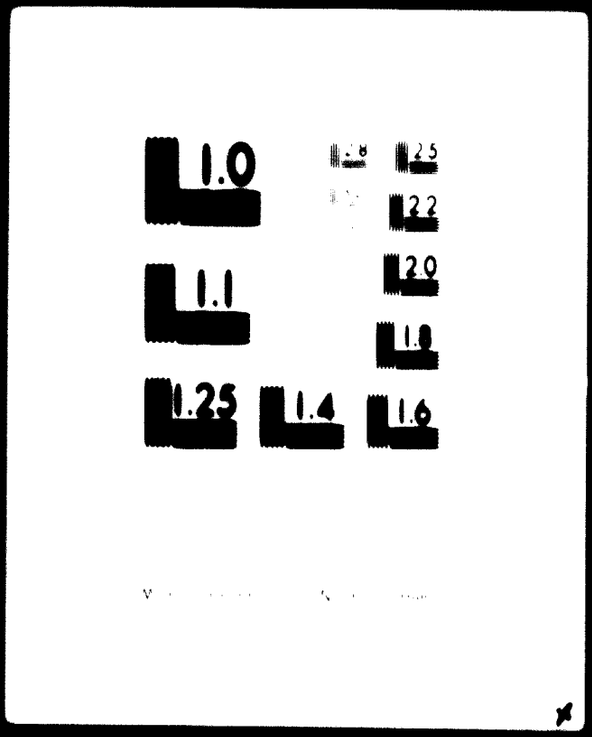

1.0.0 INTRODUCTION

1.1.0 OBJECTIVE

The purpose of this study was to carry out a complete evaluation of the Ecuadorian Textile Industry and to properly identify major problem areas.

Based on the findings, to formulate specific recommendations for a complete reorganization and modernization of the textile industry in order to become competitive with other Latin American countries, in particular those comprising the Andean Market.

1.2.0 S C O P E

1.2.1 Industry Groups

The study included the following industrial sectors:

- Cotton
- Wool
- Synthetic fibers and mixtures (staple and continuous filament)
- Knitting

Within each of the aforesaid sectors the following operations were analyzed:

- Spinning
- Weaving
- Dyeing and Finishing

1.2.2 Operational Sectors

Production

Functional areas in each phase of operation were reviewed, existing con-

ditions evaluated, discussed and compared with the levels of the textile industry in other countries. In greater detail this included the following:

- Supply and utilisation of raw materials
- Analysis of the volume and type of production
- Size and capacity of the plants
- Evaluation of the present state of machinery
- Productivity and Efficiency
- Manpower utilisation and cost
- Distribution of work loads
- Wage structure and other social benefits
- Extent of training
- Redeployment of manpower
- Quality
- Production and management controls

Marketing

The following aspects of the marketing function were evaluated:

- General characteristics of the market
- Existing marketing organization and distribution systems
- The evolution and forecast of the textile market by commodity groups
- Competitive analysis with other countries
- Relation to the Andean Market

1.2.3 Methodology

The following number of companies in each sector were visited by our specialists and a detailed investigation of all operational functions was carried out:

Cotton	-	19
Synthetic Fiber	-	4

Wool	-	10
Knitters	-	14

These companies represent an estimated 60 to 70% of the textile industry.

Interviews were held with:

- Government agencies and institutions
- Key executives of the industry
- Financial institutions
- Suppliers of machinery, dyestuffs and chemicals and raw materials

Available statistical data from various sources was gathered and its reliability evaluated. Reliable information was incorporated into our findings.

The figures given in the body of the report which refer to the evaluation of the specific operational functions of the industry, represent the summary of lengthy tabulations, the details of which, are available in the working files of this assignment.

2.1.0 PRODUCTION

2.1.1 Raw Materials

The major portion of cotton and wool consumed are nationally produced. All synthetic and artificial fibers as well as dyestuffs and some chemicals are imported.

Cotton:
- Price of cotton was found to be 20 - 30% higher than international prices of comparable quality. This differential disappeared with the recent devaluation, but the latest reports indicate a renewed tendency towards internal price increases.
- The quality is irregular and inferior to cotton consumed in all other South American countries.
- The commercialization of cotton does not take into account adequate classification.

It is recommended that:

- Internal cotton prices be maintained at an internationally competitive level.
- The National Cotton Association should implement a proper and effective cotton grading program in order to protect the buyer against misclassified raw materials. This at the same time will bring about an overall improvement in regularity and quality.

Synthetics:- All synthetic and Artificial fibers are presently imported. Both quality and prices are at international levels. Very low import duties place Ecuador in a very advantageous position with respect to its neighbour countries.

Wool

- Prices of nationally produced wool are much higher than international levels and even after freight and duties are considered, Argentine or Uruguayan wool is more competitive.
- The quality is generally inferior to that of the wool proceeding from the above two countries.
- The yield is considered to be approximately 60% of what it could be.
- Commercialization and grading are not unified.

It is recommended that:

- A study prepared by CENDES and covering the wool growing industry be implemented without delay to bring about improved quality, yield and higher output.
- All wool should be washed and graded by a central agency like ANCO, as washing of wool by individual mills is uneconomical and results in poor quality.
- Prices of wool should be brought in line with international levels through the overall improvement of the wool growing techniques and appropriate government action.

2.1.2 Machinery and Equipment:

Condition:

With the exception of a few obsolete installations the equipment of the cotton industry is quite modern and can be considered better than average for South America.
In the synthetic fiber industry the equipment was found to be modern and in the wool industry average.

The knitting industry was found to have modern and up to date equipment. In all the industry sectors very little automation was found. Automation should be introduced slowly and primarily to improve quality.

Utilization:

Considering only the spinning and weaving operations in the Cotton and Synthetic fiber industries, the equipment utilization was found high, corresponding nearly to a full three shift operation.

In the wool industry the utilization in the corresponding two sections and in the knitting industry, machine utilization corresponded to a two shift operation.

Balance:

Most of the mills with the exception of a few of the largest were found unbalanced thus showing a considerably lower machine utilization in Spinning and weaving preparation sections as well as the dyeing and finishing plants. In the case of the smaller mills, due to their size, this is unavoidable and could be remedied only through consolidations and mergers. In the case of the larger mills every effort should be made to trade used equipment through dealers and associations to remedy this situation.

Productivity:

The machine productivity in all industry sectors was found low due to low machine speeds and low efficiencies.
Considering the equipment installed as well as the operating conditions machine productivity was found to be as follows:

	Spinning	Weaving
Cotton	67%	75%
Synthetic	64.5%	68.2%
Wool	63%	59%

2.1.3 Labor and Productivity

The labor productivity (output per man-hour) of the Ecuadorian textile industry on the whole has been found very low. This due to the already low machine productivity as well as low work loads. It was established that under the present conditions the labor productivity could be increased as shown below:

	Spninning	Weaving
Cotton	+ 66%	+ 33%
Synthetic	+ 126%	+ 111%
Wool	+ 104%	+ 198%

This can be achieved first by raising the machine productivity by running the machines at correct speeds and attaining reasonable efficiencies through proper production planning, adequate maintenance and improved processing. Secondly, through industrial engineering methods, correct workloads should be established and superfluous workers dismissed.

There are no formal training programs provided by the textile industry for their operators. Such training programs would inevitably lead to productivity increases, improved quality and consequently lower costs.

Throughout the industry work loads have not been assigned in accordance with work measurement techniques and this results in actual workloads 25% to 50% below accepted levels for South America.

Ecuador has the lowest wage structure for the textile worker in South America which tends to off-set for the present time the low labor productivity. Nevertheless the following table indicates that substantial improvements are possible. The following are labor cost/unit output indices for the cotton industry:

	Spinning	Weaving
Ecuador - present condition	100	100
Ecuador - improved condition	62	74
Peru	224	270
Colombia	60	85
U.S.A.	152	136
Germany	124	169
France	114	155

Similar conditions exist in the synthetic, wool and knitting industries.

2.1.4 Quality

Cotton: - With very few exceptions, the quality of the yarn and cloth produced in Ecuador is below the average level of comparable mills in other South American countries. This is mainly due to low quality of cotton, inadequate selection and blending, lack of in process quality control and adequate supervision and poor machine maintenance.

Synthetics: - In general the quality was found to be up to international standards.

Wool - Pure woolen products are rarely made. Blends with rayon and other fibers used in the manufacture of cloth and blankets are usually of an inferior quality.
Acrylic products have been found to be of a generally high quality.
For worsted cloth generally imported wool is used and these products were found to meet standard quality requirements.

SURVEY OF THE ECUADORIAN TEXTILE INDUSTRY

PREPARED FOR THE UNITED NATIONS'
INDUSTRIAL DEVELOPMENT ORGANIZATION

NOVEMBER 1970

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Knitted goods - These were found to be of good quality in as much as the yarn and knitting are concerned.
Dyeing and finishing were often completely unacceptable.

2.1.5 Production Controls

With a few exceptions Production Controls in all areas were lacking or inadequate. Their importance and significance are not fully understood by management and therefore they are never in a position to know the exact status of their operating results. Thus problem areas are not identifiable and remedial action cannot be taken promptly.

2.1.6 Cost Controls

The majority of mills have an inadequate historical cost system which does not reflect accurately the true product cost. Standard costs have not been developed and hence performance evaluation, investigation of high cost factors and corrective action have not been practiced.

2.1.7 Production Planning and Controls

Adequate production planning and control systems were found in only 11% of the cotton mills and none of the synthetic, wool, or knitting mills. This has been found to be the cause for frequent production changes, resulting in excessive machine downtime and corresponding loss of productivity.

Inventory levels of materials and parts were found to be 15 months of consumption in the Cotton Industry and 6 - 8 months of consumption in the synthetic and wool industries. An acceptable level for Ecuador is considered to be 6 months.
In dyestuffs and chemicals, the inventory levels in the cotton industry were 12 months and in synthetic and wool industries 8 - 9 months. An acceptable level would be 4 - 5 months. These abnormally hich stock levels are due to a complete lack of inventory management techniques.

2.1.8 Supervision

Most supervisors have been promoted to their present positions from the labor force and have had no formal supervisory or technical training. As such, they are not able to assume operational responsibility to manage their sector of operation. Thus the heavy burden of day to day production problems and decisions falls on top management and in many instances these problems are left unresolved.

2.2.0 Marketing

2.2.1 Market Characteristics

The population of Ecuador in accordance with the latest estimates is : 6,177,000 inhabitants. Only 30% of this population is estimated to be economically active. The population is almost equally divided between the coastal tropical zone and the more temperate mountainous region. The Orient (tropical jungle) is practically uninhabited. The average yearly population growth exceeds 3%.

Based on the last available figures only 17% of the economically active population is ranked in the high and medium income groups. As a result the industry should be oriented towards medium and low priced goods.

During the years 1964 to 1967 the gross national product has shown steady gains of close to 5%. During the first half of 1970, the reported growth has been only 0.3%.

2.2.2 The Ecuadorian Textile Market

During the years 1965 to 1968 the apparent per capita consumption has remained almost constant at approximately 1.980 Kgs. Only in 1969 it rose to 2.128 Kgs. In other countries with similar social structures the per capita consumption is generally higher.

During the years1965 to 1969 cotton products have been steadily loosing ground to artificial and synthetic fiber products, while wool products showed a slight gain.

	% Share of the market		% change
	1965	1969	
Cotton	65.6	59.5	- 6.1
Synthetic	22.2	27.4	+ 5.2
Wool	12.2	13.1	+ 0.9

The above figures as well as those quoted in the body of this report have been obtained from official sources and supplemented by our estimates in the areas of unofficial imports and exports.

Based on the production figures obtained during this study the following indices were developed to show the evolution of production and average unit prices between the years 1965 and 1969. Index of 100 corresponds to 1965.

Industry	Production	Ave.unit price
Cotton	150.0	116.0
Artificial & Synthetic	164.0	121.0
Wool	694.0*	70.6
Knitting	160.0	94.5

* The production growth of the wool industry appears exagerated because the largest mill did not report production figures.

While textile production rose 50 to 60% (excluding wool) from 1965 to 1969, textile product consumption increased only 19% during the same period. This is due to a slight reduction of imports but primarily to steadily growing unofficial exports.

For the next five years it is expected that the Ecuadorian Textile market will follow the present trends. The cotton industry while maintaining moderate growth will loose its share of the market further to artificial and synthetic fabrics. It is expected that wool will make modest gains. The market distribution for 1975 is expected to be as follows:

Industry	% share of the market
Cotton	47.7
Synthetic	37.7
Wool	14.6

Total consumption of goods is expected to have the following growth:

	Consumption - tons		% change
	1970	1975	
Cotton	7600	8350	+ 9.9
Synthetic	1800	2550	+ 41.6
Wool	3900	6600	+ 69.2

The growth of the textile industry in itself is most difficult to predict since a great deal depends on future developments with respect to the Andean market or action taken by neighbouring countries.

2.2.3 Marketing Systems of the Textile Companies

Generally we have found that the companies because of their relatively small size, a rather strong demand, and the attitude of management do not apply any specific marketing systems or policies. Sales in most cases are directed by the general manager or owner himself.
Considering the average size of the Ecuadorian textile company and the relatively standard items which they produce, this approach is adequate to cover the immediate needs of the national market. In the future the market will undoubtedly become more competitive and this will require the addoption of progressively more elaborate marketing techniques.

80 to 90% of all textile goods are sold to wholesalers in Quito and Guayaquil who in turn distribute the goods to their own branch stores in other parts of the country or to retailers and small industrial users. The rest of the production is sold directly to retailers or industrial clients. In all cases the wholesalers are non-exclusive and factory distributors are practically non-existent. Under this arrangement, the individual mills known how much of each article they sell but lack the knowledge of their product's territorial coverage.

2.2.4 Import - Export Considerations

A few years ago Ecuador used to receive large quantities of textile products from abroad, Since then the textile industry began to grow and at the same time improve its quality and product mix thus gaining national acceptance for its products. Today the flow has been reversed to the extent of US $ 7.5 million annually in accordance with our estimates.

This fact indicates that the industry in certain areas has reached a state which is at least comparable to those of other neighbouring comuntries.
This is particulary true in the case of synthetic fiber products.

2,3,0 THE ANDEAN MARKET

The Ecuadorian position within the Andean Market is considered advantageous due to special concessions received from the larger countries but the industry will have to act with no delays in order to take advantage of these. An additional competitive advantage is the prevailing low labor cost.

On the other hand low productivity, low product quality and the relatively poor cotton at excessively high prices are items requiring the industry's as well as the government's immediate attention.

2.4.0 INTEGRATION OF THE INDUSTRY

With very few exceptions, the companies belong to one or two owners and have family-type organisations. The Ecuadorian industrialist is very individualistic, to the point that members of the same family have independent and sometimes competing companies. This has produced vertical integration which in most cases resulted in poor utilisation of production facilities, duplication of some services and the inability to afford others on an individual basis.
This ultimately results in higher product costs.

Mergers of companies, in particular the centralisation of dyeing and finishing facilities are highly recommended from both technical and commercial points of view.

Larger operating units would achieve the following benefits:

- better balance and utilisation of equipment
- capability to employ professional management and technical staff which in turn would improve productivity and quality and lower costs.
- greater financial strength
- capability to sustain a marketing organisation which could promote exports.
- improved marketing strength

In the event that mergers could not be realised, the individual industrialists should seek cooperative services for activities too costly on an individual basis. This could very well be channeled through the national textile association and include such activities as:

- testing laboratories
- international marketing organisation
- consulting services on common problems and in non-conflicting areas

The Government should provide the necessary incentives for industrial consolidation.

3.0.0 [redacted]

3.0.0 THE COTTON INDUSTRY

Definition: In this section all those companies are included whose machinery is adapted to spin and weave pure cotton or cotton blends with man made fibers.

In total, 19 companies with 105.316 spindles and 2.073 looms have been visited.

3.0.1 DISTRIBUTION OF COMPANIES BY SIZE

Cotton mills have been divided into two groups:

- Medium size mills, with more than 5.000 spindles and less than 30.000 spindles.
- Small mills with less than 5.000 spindles.

The following illustration shows the distribution of factories by size in Ecuador:

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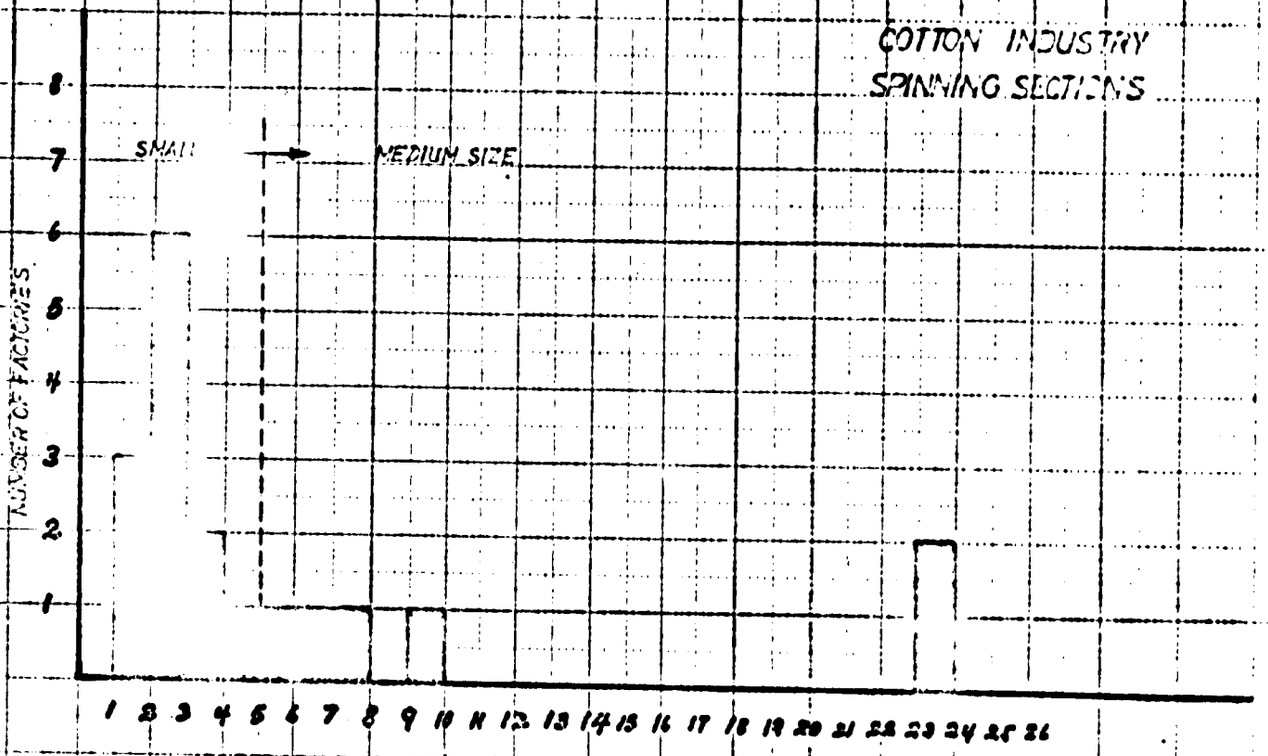
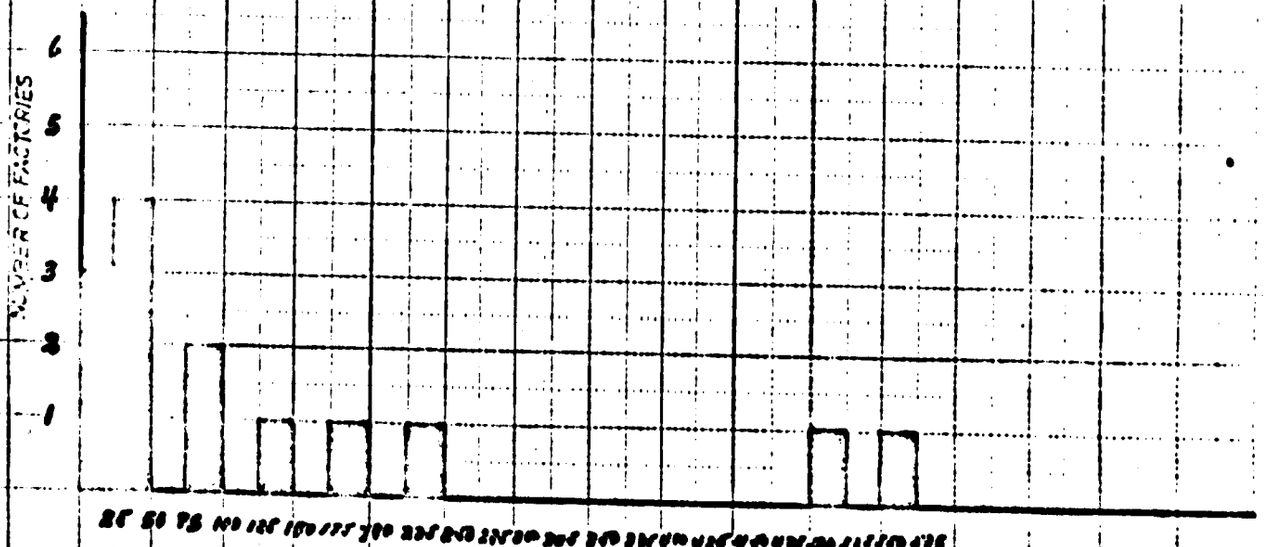
DISTRIBUTION OF FACTORIES BY SIZE

COTTON INDUSTRY
SPINNING SECTIONS



WEAVING SECTIONS



3.0.2. DISTRIBUTION BY TYPE OF INDUSTRY

83% of the medium size mills are integrated spinning, weaving and finishing industries, 17% are spinning industries only.

61% of the small mills are integrated spinning, weaving and finishing industries, 23% have only spinning 8% only weaving and 8% spinning and weaving.

	SMALL	MEDIUM
Spinning, weaving and finishing	61%	83%
Spinning and weaving	8%	-
Spinning	23%	17%
Weaving	8%	-

3.1.0. RAW MATERIAL

3.1.1. COTTON

Findings: Ecuador grows cotton on its central and northern coastal band and this cotton is used exclusively inside the country. The government distributes the cotton according to requirements estipulated yearly by the companies. Only in case of shortage cotton is imported.

The cotton manufacturer buys his cotton from the ginning companies, which get their cotton from the farmers.

Up to now, there does not exist normal dealing of cotton, based on classifications of every lot. Cotton is sold under classifications, which have been made in the past by outside or inside industrial laboratories. The values are then universally applied and nobody is surprised to receive cotton with characteristics far from the ones stated by the ginners. There are only a few major industrials, who can protect themselves by checking the received cotton with their own laboratory equipment and even in the case of inferiority of cotton the possibility of rejecting a lot or getting price deductions are not always given. Also the ginning of the cotton is reported to be defficient and values of 15% trash, foreign matters and invisible loss have been reported.

Recommendations: Guayaquil's National Cotton Association is supposed to control all cotton by next year (1971). This is an absolutely necessary step to protect specially smaller industrials against buying cotton of inferior than stipulated grades and will start a tendency to improve quality of cotton in every aspect. At the moment the possibility of maintaining a homegenous mix from one lot to the other and from one crop to the other is impossible and the standarization of production and quality controls is most difficult.

Cotton Types

Cocker: This is the main type of cotton grown in the country. It is a finer type of cotton, which compares, a bit unfavorably, to the Colombian Delta Pine cotton. The micronaire value varies generally between 3.50 and 3.70, not being abnormal values of 3.00 or 4.30. Strenght is around 74.000 psi on average and values go up to 82.000 in some lots. Cocker cotton generally is offered as strict middling and 1 3/16", being the length most frequently between 1" and 1 1/8" and the grade around SLM.

The production of cocker cotton has been increased in the most recent years at the expense of Criollo Cotton, an inferior type. There are efforts made to improve the quality of this cotton and industrials have received this year already Cocker with 84.000 psi Pressley, 4,5 micronaise value and 1 1/16" - 1 1/8" staple length.

Criollo: This is a yellow inferior grade of cotton, which is grown generally by small farmers. Lots are very different one from another. Micronaire values vary from 5.00 to 5.90, strength is around 80.000 psi and staple length is somewhat below 1", in spite of generally being offered as 1" - 1 1/8".

The area grown with this type of cotton is decreased every year.

Cerro Type: Very little cotton of this type is grown. 1969 crops testing results show micronaire around 3,5, Pressley strength 76.000 and staple length of 1 1/32 - 1 1/8".

Pima Type: Also a type of minor cotton production. 3,2 micronaire value, 94-98.000 Presaley and 1 3/8" - 1 1/2" staple length are results shown in last year's crop. The following tables show the cotton production and importation in the last 4 years.

COTTON PRODUCTION OF LAST 4 YEARS

TYPE OF COTTON	COCKER			CRIOLLO			PIMA/ACALA/CERRO			TOTAL	
AGRICULT. YEAR	CULTIVAT. HECT.	PRODUCTION QU	AV. PRICE S/QU	CULTIVAT. HECT	PRODUCTION QU	AV. PRICE S/QU	CULTIVAT. HECT	PRODUCTION QU	AV. PRICE S/QU	CULTIVAT. HECT.	PRODUC. QU
1969-1970	15.680	313.600	230	6.500	65.000	170	4.000	92.000	230	26.180	470.600
1968-1969	12.000	240.000	230	6.500	65.000	170	800	17.600	230	19.300	322.600
1967-1968	11.000	220.000	205	8.000	80.000	165	1.000	21.500	205	20.000	321.500
1966-1967	9.100	182.000	205	9.000	90.000	165	800	17.600	205	18.900	289.600

The average yield/hectar is 20 QU of Cocker, 10 of Criollo and 22-23 of Pima, Acala or Cerro type. This average yield has not changed in the last 4 years.

Prices correspond to unginned cotton.

Source: Ministerio de Industrias y Comercio.

IMPORTATION OF COTTON

TYPE	COUNTRY OF ORIGEN	TONS IMPORTED 1967/68	1968/69	1969/70	1970 up to now
Beso/Zena	Colombia	1795,3	909,0		
Others	Colombia		372,7		
Pima	Perú	305,4	123,7	63,6	18,2
Tanguis	Perú	127,3	759,0		
Cerro	Perú		232,3		
Total		2227,3	2396,9	63,6	18,2

Use of Ecuadorian Cotton: It is expected that the quality of the Cocker type can be improved further so that it compares with the Colombian type Delta Pine, with grades between LM and M, Pressley between 77-82.000 psi and micronaire values between 4 - 4,5. Superior lots of this cotton can then be used conveniently for carded counts up to 36^s, combed 30 - 40^s and even for blends with polyester. Inferior lots serve for carded 15 - 24^s and cheaper type of fabrics. Criollo cotton would be reserved for carded 8^s - 20^s and cheap type of fabrics.

For the finer combed counts possibly the national production of Pima type cotton would be sufficient or extra long fibers from Perú would have to be imported.

Observation: The use of cabuya for harvesting and packing cotton has to be eliminated, as this causes major problems in spinning.

COTTON PRICES

International Cottons Comparable to Ecuadorian

TYPE	CHARACTERISTICS		PRICE
USA (American Gov't)	LM-SLM 15/16"	75.000 psi	0,195 US$
USA (American Gov't)	LM-SLM 1 1/8"	76.000 psi	0,255 US$
Colombian Delta Pine	LM-SLM 1 1/8"	78.000 psi	0,268 US$

Mexican Cotton prices similar to US ones.

Ecuadorian cottons, before the devaluation, were approximately 20 - 30% more expensive than international price levels. After the devaluation prices were in line. Cocker cotton, for example was sold at US cts. 24,00 per pound. Due to the general price increases and cotton shortage, companies report again that prices reach very high levels, like cocker being offered at over 30 US cts. per pound.

Ecuadorian Government should secure stable cotton prices at international level in order to create competetiveness of Ecuadorian cotton mills.

3.1.2 CHEMICALS AND DYESTUFFS

This section should be considered applicable to all textile industry sectors namely Cotton-Wool Synthetics.

The following items have been considered as Raw Material in dyeing and finishing.

- Dyestuffs
- Auxiliary products for dyeing
- Finishing products
- Chemicals

Prices : The prices vary according to

- Purchasing through direct importation
- Purchasing from local representative's stock.

For direct importation, the minimum order must be of U.S. $ 1.500 and ordering must be done for standard quantities i.e.

Dyestuffs	25 Kgs.
Other	100 - 200 Kgs.

Factory cost comparison between:

- Purchasing through direct importation
- Purchasing from local representative's stock

PRICE CIF GUAYAQUIL	DIRECT IMPORT		LOCAL REPRESENTATIVE			
	IMPORT DUTIES	TOTAL	IMPORT DUTIES	INTERNAL TAXES	EXPENSES	TOTAL
100	30 *	130	30	5	45 **	180

* Import Duties — Variation between 25 and 35%
Average reported 30%

** Expenses

The following items were included

- Inventory
- Transportation
- Service
- Profit
- General Expenses

We estimate that the 50% difference is reduced to 25-30% when the individual company assumes the following expenses:

- Transportation
- Administrative Expenses
- Higher Inventory in Factory

Delivery time

Direct importation	10 - 12 weeks
Local purchasing	0,5-1 week

PRICES OF MATERIALS PURCHSED FROM REPRESENTATIVE'S

PRODUCT		PRICE TO CLIENT U.S. $
Dyestuffs		
Acid dyes		
	Black	2,50
	Yellow	5,75
	Red	5,15
Direct		
	Yellow	12,50
	Navy blue	10,00
	Black	6,10
Reactive		
	Yellow	10,50
	Blue	21,30
	Red	13,00
Fat		
	From	14,00
	To	25,00
Sulphur		
	Black	1,40
Disperse		
	Yellow	6,50
	Blue	10,45
	Black	5,60
Cationic		
	Yellow	9,50
	Blue	6,30
	Black	9,45

.../..

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PRICES OF MATERIALS PURCHASED FROM REPRESENTATIVE'S

PRODUCT			PRICE TO CLIENT U.S. $
Auxiliary Products for Dyeing			
Dispersing Agent			1,10
Retarding Agent			2,50
Leveling Agent			1,40
Sequesting Agent			0,65
Wetting Agent			
		From	0,60
		To	1,30
Finishing Product			
U.F. resin powder			1,45
M.F. resin			1,72
E.U. resin			0,75
Softener		From	0,50
		To	1,40
P.V. acetate			0,65
P.V. alcohol			1,65
Chemicals			
Chlorhydric acid	30%		0,24
Sulphuric acid	66%	Imported	0,34
		National	0,14
Formic Acid	85%		0,40
Acetic Acid	100%		0,38
Caustic Soda	100%		0,12
Sodium Chlorite	80%		0,84
Hydrogene Peroxide	50%		0,37
Calcium Hypochlorite			0,52
Sodium Hydrosulfite	90%		0,70
Sodium Sulfate Anhydrous			0,10
Sodium Carbonate			0,12

Quality

All dyestuffs, auxiliary products and chemicals meet the international standards of quality.

Import Duties and Internal Taxes

Import duties range between 25 and 35%

Internal taxes 5% on sales

Consumption

Estimated yearly consumption U.S. $ 1.500.000 (CIF)

Estimation of consumption by industry and type

- Auxiliary products, finishing products and chemicals		U.S. $	175.000	31,6%
- Dyestuffs		U.S. $	1.025.000	68,4%
	Cotton	U.S. $	625.000	41,5%
	Wool	U.S. $	160.000	10,7%
	Synthetic	U.S. $	240.000	16,2%

Financing

60 - 100 days

Marketing

The following services are offered by the suppliers

- Technical assistance
- Technical literature
- Regular visits at client's office for presenting new products or processes of interest.

Other services as Laboratory trials, Shade Matching, etc. which are normally offered in other countries, are not available in Ecuador.

COMPARISON BETWEEN PRICES OF THE BELGIAN MARKET AND OTHER SOUTH AMERICAN COUNTRIES

PRODUCT	PRICE IN BELGIUM	PRICE IN OTHER COUNTRIES	DIFFERENCE +	-
U.F. Resin	1,45	1,36	+	6,2
U.U. Resin	0,72	0,75	-	4,0
Sodium Chlorite 80%	0,84	0,95	-	10,6
Caustic Soda 100%	0,12	0,147	-	18,3
Hydrogene peroxide 50%	0,37	0,51	-	[illegible]
Sodium Hydrosulfite 90%	0,70	0,67	+	4,3
Sodium Sulfate Anhydrous	0,10	0,10		-
Sulphuric acid 66%	0,14	0,12	+	16,6
Disperse Yellow	6,50	7,30	-	11,0
Blue	10,45	10,80	-	3,3
Black	5,00	5,20	-	3,7
Reactive Yellow	10,50	10,50	-	-
Blue	21,50	20,50	+	3,9
Red	13,00	11,80	+	10,7

3.2.0. MACHINERY AND MACHINE PRODUCTIVITY

3.2.1. APPRAISAL OF MACHINERY

Definition of Terms: In general, all the machinery has been divided up into modern, medium age and obsolete machinery. In cases, where this is possible, modernizable machinery has been grouped into a section "can be modernized".

Under modern machinery is uderstood machinery built in 1960 and more recently, medium age machinery between 1950-1959, and old or obsolete machinery built before 1950.

For major clearness the following observations about the different sections are added:

Opening and Picking: As modernization of this section implies buying new equipment, machinery of this department has not been considered modernizable.

Cards: Only high production cards are considered modern. All cards of good mechanical condition with rigid or flexible wire are considered modernizable.

Roving and Ring Frames: Machines with adequate package size and in reasonable mechanical condition are considered modernizable.

Slasher: Machines of more recent type of construction without controls can be modernized by equipping them with all the controls a modern slasher shows.

In some sections, machines built before 1950 are obsolete due to newer techniques and high speed models developed in the last 20 years. In other sections machines built before 1950 are old, but not obsolete.

Findings

Spinning: The following table shows the findings in the different departments.

APPRAISAL OF MACHINERY IN SPINNING

SECTION	SIZE OF MILL	UNITS				%				TYPE
		MOD	REG	CAN BE MOD	OBS OR OLD	MOD	REG	CAN BE MOD	OBS OR OLD	
Opening/ Picking	Medium	6	4			60	40			SCUTCHERS
	Small	5	2		5	42	16		42	
	Total	11	6		5	50	27		23	
Cards	Medium	16		129R 47F		8		92		CARDS
	Small	8		48R 16F	18	9		71	20	
	Total	24		177R 63F	18	9		85	6	
				R: rigid F: flexible						
Sliver Lappers	Medium	4	1			80	20			MACHINES
	Small	1	2			23	67			
	Total	5	3			62	38			
Ribbon Lappers	Medium	3				100				MACHINES
	Small		2				100			
	Total	3	2			60	40			
Combers	Medium	11	1			92	8			MACHINES
	Small	4	1			80	20			
	Total	15	2			88	12			
Draw Frames	Medium	66	112		40	30	54		18	DELIVERIES
	Small	14	58		101	8	36		56	
	Total	80	170		141	20	44		36	

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Roving frames	Medium	1920	1452	268	52	40	8		SPINDLES
	Small	298	660	2160	10	21	69		
	Total	2200	2112	2428	33	31	36		
Spinning Fr.	Medium	52380	23168		69	31			SPINDLES
	Small	16380	4640	8748	55	16	29		
	Total	68760	27808	8748	65	26	9		
Cone Winders Automatic	Medium	378			100				SPINDLES
	Small								
	Total	378							

CONE WINDERS AND YARN FINISHING

Cone Winders Manual	Medium	1014	804		56	44			SPINDLES
	Small	344	206	712	27	16		57	
	Total	1358	1010	712	44	33		23	
Doublers	Medium								SPINDLES
	Small	42	72	114	18	32		50	
	Total	42	72	114	18	32		50	
Twisters	Medium	2864	1792		62	38			SPINDLES
	Small	4166	828	2238	58	11		31	
	Total	7030	2620	2238	59	22		19	
Hank Winders	Medium								MACHINES
	Small	2	1	5	25	12		63	
	Total	2	1	5	25	12		63	
Hank to Cone Winders	Medium								SPINDLES
	Small	204		100	67			33	
	Total	204		100	67			33	
Singers	Medium								MACHINES
	Small	1			100				
	Total	1			100				

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WEAVING PREPARATION

Section	Size Of Mill	Units Mod.	Units Reg.	Units Can be Mod.	Units Obs. or Old	% Mod.	% Reg.	% Can be Mod.	% Obs. or Old	Type of Units
Pirn Winding	Medium	358	467	-	-	43.3	56.7	-	-	Spindles
	Small	64	126	-	241	14.8	29.3	-	55.9	
	TOTAL	422	593	-	241	33.6	47.2	-	19.2	
Warpers	Medium	2C 2S	9C 2S	- -	1C	25.0	68.7	-	6.3	Warpers
	Small	1S	2C 2S	- -	4C 5S	7.1	28.5	-	64.4	
	TOTAL	2C 3S	11C 4S	- -	5C 5S	16.7	50.0	-	33.3	
Slashers	Medium	2C 2HA	- -	5C 1HA	1HA	36.3	-	54.6	9.1	Slashers
	Small	-	-	2C 1HA	5C 1HA	-	-	33.3	66.7	
	TOTAL	2C 2HA	-	7C 2HA	5C 2HA	20.0	-	45.0	35.0	

Observation - Warpers: C = Continuos type
S = Sectional type

Slashers: C = Cylinder dryer
HA = Hot air dryer

DISTRIBUTION OF LOOMS BY TYPE, W

SIZE OF MILL	TYPE OF LOOM	- 50" MOD.	- 50" REG.	- 50" OLD	- 50" TOT.	51 - 70" MOD.	51 - 70" REG.	51 - 70" OLD	51 - 70" TOT.	MOD.
MEDIUM	Cam	81	162	42	285	436	40	-	476	-
	Dobby	163	100	-	263	244	100	4	348	99
	Jacquard	-	-	-	-	-	-	-	-	-
	TOTAL	244	262	42	548	680	140	4	724	99
SMALL	Cam	9	110	162	281	19	12	-	31	9
	Dobby	49	30	4	83	1	35	6	42	4
	Jacquard	-	-	-	-	-	2	1	3	2
	TOTAL	58	140	166	264	20	49	7	76	15
TOTAL	Cam	90	272	204	566	455	52	-	507	9
	Dobby	212	130	4	346	245	135	10	390	103
	Jacquard	-	-	-	-	-	2	1	3	2
	TOTAL	302	402	208	912	700	189	11	900	114
TOTAL %	Camb				62				56	
	Dobby				38				44	
	Jacquard				-				-	
	TOTAL	33	44	23	100	78	21	1	100	63

SECTION 1

The age of machinery found in Ecuador, with exception of vary few plants, can be considered as slightly above the South American average.

Dyeing - Finishing : The table No. 1 shows, divided by sections, an inventory of the machinery.

In each section, we have classified the machines in 3 groups (*) as follows:

- Modern
- Old
- Obsolete

The results are expressed in percent on the total machines surveyed.

From this table, we can observe:

- A large percentage of rather modern machines
- Very little obsolete equipment
- Excepting one mill, there is no continuous line of manufacturing.
- In most of the companies, the purchasing of new machines is made without any modernization program

(*) Remark

We have not includedin our classification what can be modernized as we consider the dyeing and finishing machines as uneconomical and unrecommendable to modernise.

The basic concepts of most of the machines have changad during the last ten years.

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APPRAISAL OF EXISTING MACHINERY AND EQUIPMENT

Dyeing - Finishing : Cotton

SECTION	MACHINE	Number of Machines	PERCENT Modern %	Old %	Obsolete %
Bleaching - Piece	Singeing	5	80	20	
	Semi-continuos Scouring - Bleaching Open Width	3	100		
	Continuds open width bleaching range	2	100		
	Open Width Washing Machine	6	100		
	Mercerizing Machine - Chainless	4	75	25	
	Can Dryer	11	27	46	27
Dyeing - Piece	Jiggers - Open	32	15,5	59,5	25
	- Closed	19	58	42	
	Dyeing Pad	8	50	50	
	Dyeing Winches	23	4,3	13	82,7
	Semi-continuous Dyeing	1	100		
	Beaming Machines	1	100		
	High Temperature Beam Dyeing	2	100		

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4.2.6 Evaluation of Technical Processes
4.2.7 Recommendations for Repalcement and Modernization
4.2.8 Production of Machinery
4.2.9 Balance of Production
4.2.10 Degre of Utilization
4.2.11 Degree of Productivity
4.2.12 Productivity Rates

4.3.0 LABOUR, LABOUR PRODUCTIVITY AND LABOUR COST

4.3.1 Characteristics of Ecuadorian Labour Cost
4.3.2 Wage Rates
4.3.3 Social Charges and Fringe Benefits
4.3.4 Workloads and Work Assignments
4.3.5 Labour Productivity Rates
4.3.6 Labour Cost

4.4.0 QUALITY OF PRODUCTS

4.5.0 MANUFACTURING CONTROLS

4.5.1 Quality Control
4.5.2 Labour Cost
4.5.3 Control of Machine Efficiencies
4.5.4 Preventive Maintenance
4.5.5 Waste Control

4.6.0 COST CONTROL

4.7.0 PRODUCTION PLANNING AND CONTROL

4.7.1 Coordination Between Sales and Production
4.7.2 Production Planning
4.7.3 Production Control
4.7.4 Inventory Levels
4.7.5 Purchasing

4.8.0 SUPERVISION

5.0.0 THE WOOL INDUSTRY

5.0.1 Distribution of Companies by Type

5.1.0 RAW MATERIALS

5.1.1 Fibers

5.2.0 MACHINERY AND MACHINE PRODUCTIVITY

5.2.1 Appraisal of Existing Machinery
5.2.2 Degree of Automation
5.2.3 Atmospheric Controls

Printing: Printing is a particular area of the dyeing and finishing operations.

The following is a summary of our observations for the whole industry.

APPRAISAL OF EXISTING MACHINERY AND EQUIPMENT

Automatic flat screen printing machines	4 Modern
Rotary screen printing machine	1 Modern
Roller printing machine	1 Obsolete

Auxiliary Equipment .-

- Curing Oven : included in the machine inventory of each section.
- Washer : idem
- Ager

atmospheric ager:	2 modern
preasure ager:	2 modern

Every company owns the equipment for engraving or to make the screens.

3.2.2. DEGREE OF AUTOMATION

Definition of Terms: In spite of existing in any conventional machine, in any process, attachments, which make the machine or part of its functions work automaticaly, the technicians understand as automated machinery such which posesses improvements developed in the last years or machinery with new processing techniques. Commonly automation in cotton textile process consists of the following:

a. Automatic feeding and blending at the opening lines
b. Elimination of scutching and direct feeding to cards
c. Direct feeding from cards to a drawbox with autolevelling control
d. Automatic cleaning and waste removal from cards
e. Automatic transport of roving from staying area to spinning.
f. Automatic doffing at spinning frames
g. Automatic winding
h. Automatic cop feeding at winding
i. Automatic speed controls at slashing
j. Shuttleless weaving at looms

Findings:

a. Automatic feeding by bale pluckers was only found in 5% of the mills
b. Direct feeding to cards does not yet exist in Ecuador
c. Direct feeding from cards to draw frames does not yet exist in Ecuador
d. 9% of the cards are of this type
e. Automatic transport of roving does not exist in Ecuador
f. Automatic doffing at ring frames does not exist in Ecuador
g. 14% of the cone winder spindles are automatic
h. Automatic cop feeding does not yet exist in Ecuador
i. Automatic speed controls at slashers were found in 19% of the slashers installed.
j. 2% of the looms installed in the mills visited are shuttleless

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APPRAISAL OF EXISTING MACHINERY AND EQUIPMENT

Dyeing - Finishing: Cotton

(Cont'd)

SECTION	MACHINE	Number Of Machines	PERCENT Modern %	Old %	Obsolete %
Finishing - Piece	Shearing	4	75	25	
	Finishing Pad	3	67	33	
	Open - Stenter	3		100	
	Back Fill	2	50	50	
	Finishing Range - Pad - Stenter	10	50	10	40
	Curing Oven	5	100		
	Calender	12	50	33	17
	Sanforizing	4	100		
	Napping	10	20	50	30
	Heat - Setting Stenter	2	100		
	Decating	2	100		
	Dryer (various)	2		100	
	Potting	1	100		
	Pressing	1	100		

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APPRAISAL OF EXISTING MACHINERY AND EQUIPMENT

Dyeing - Finishing: Cotton

TABLE 1 (Cont'd)

SECTION	MACHINE	Number Of Machines	PERCENT		
			Modern %	Old %	Obsolete %
Yarn Dyeing	Hydro - Extractors	15	80	20	
	Cheese Dyeing	13	69	31	
	Beam Dyeing	1		100	
	Hank Dyeing	8	63	37	
	Dryer	6	83,5		16,5
	Hank Dryer	3	100		
	Mercerizing	2	100		
	Kier Scouring	1		100	

DISTRIBUTION OF LOOMS BY TYPE, WIDTH AND AGE

	51 - 70"				71 - 90"				91" -				TOTAL			
TOT.	MOD.	REG.	OLD	TOT.	MOD.	REG.	OLD	TOT.	MOD.	REG.	OLD	TOT.	MOD.	REG.	OLD	TOT.
285	436	40	-	476	-	-	-	-	51	2	-	53	568	204	42	814
263	244	100	4	348	99	9	-	108	8	16	-	24	514	225	4	743
-	-	-	-	-	-	4	-	4	-	3	-	3	-	7	-	7
548	680	140	4	724	99	13	-	112	59	21	-	80	1082	436	46	1564
281	19	12	-	31	9	2	3	14	-	-	-	-	37	124	165	326
83	1	35	6	42	4	29	19	52	-	-	-	-	54	94	29	177
-	-	2	1	3	2	-	1	3	-	-	-	-	2	2	2	6
264	20	49	7	76	15	31	23	69	-	-	-	-	93	220	196	509
566	455	52	-	507	9	2	3	14	51	2	-	53	605	328	207	1140
346	245	135	10	390	103	38	19	160	8	16	-	24	568	319	33	920
-	-	2	1	3	2	4	1	7	-	3	-	3	2	9	2	13
912	700	189	11	900	114	44	23	181	59	21	-	80	1175	656	242	2073
62				56				8				66				55
38				44				88				30				44
-				-				4				4				1
100	78	21	1	100	63	24	13	100	74	26	-	100	57	32	11	100

SECTION 2

DISTRIBUTION OF LOOMS BY MANUAL AND AUTOMATIC

MEDIUM SIZE MILLS	Manual Looms	-	0
	Automatic Looms	1.564	100%
	TOTAL	1.564	100%
SMALL MILLS	Manual Looms	175	34%
	Automatic Looms	334	66%
	TOTAL	509	100%
TOTAL	Manual Looms	175	8%
	Automatic Looms	1.898	92%
	TOTAL	2.073	100%

DISTRIBUTION OF LOOMS BY ONE SHUTTLE AND SEVERAL SHUTTLE LOOMS

	- 50"		51-70"		71-90"		90" -		TOTAL		
	1SH	SSH	1SH	SSH	1SH	SSH	1SH	SSH	1SH	SSH	
Medium Size Mills	473	75	781	43	103	9	69	11	1426	138	1563
Small Mills	361	3	37	39	27	42	-	-	425	84	509
TOTAL	834	78	818	82	130	51	69	11	1851	222	2073
%	41	4	39	4	6	2	3	1	89	11	100

1SH = 1 Shuttle Loom

SSH = Several Shuttle Looms

[illegible] and Finishing

Findings: The table 1 shows the degree of automation for various machines.

TABLE 1

SECTION	MACHINE	DEGREE OF AUTOMATION		
		Good %	Medium %	Poor %
Bleaching	Singeing	20	60	20
	Scouring - Bleaching	80	20	
	O.W. Washing	60	40	
	Mercerising		50	50
	Drying	9	18	73
Dyeing	Jiggers-Winches	8,4	21,2	70,4
	Semi-continuous dyeing	100		
	H.T. Beam Dyeing	100		
Finishing	Shearing	75	25	
	Finishing Range	42	25	33
	Curing Oven	60	40	
	Calender	17	50	33
	Sanforising	25	50	25
	Heat Setting Stenter	100		
	Napping	10	10	80
Yarn Dyeing	Whole Equipment	30	55	15

We have observed

- Only modern machines have a reasonably good degree of automation.
- There is in most of the mills, a complete lack of instruments of control
- New yarn dyeing machines are bought with the automatic cycle program

Printing: Flat and Rotary Screen Printing: Good to Excellent

Roller Printing: Poor

3.2.1. ATMOSPHERIC CONTROLS

Definition: Air conditioning systems can provide correct humidity and temperature and control air circulation and purity. This has an important influence over running conditions, and therefore machine productivity specially in some process sections when working synthetic materials and in the case of using more advanced equipment. As the material in the latter case is processed at greater velocities, static as well as fly and dust is increased. The effect on operator efficiency also has to be considered.

Air conditioning does not need to be installed throughout the entire mill, specially if conventional type equipment is used. Humidity control is sufficient in opening and picking and in weaving preparation.

Findings: The fact that only 20% of the medium size mills and none of the small mills use air conditioning, will be one reason of the low efficiencies and productivity rates found.

3.8.4 LAYOUT OF MACHINERY

Definition: A proper layout of machinery should meet the following requirements:

- Optimum Flow of Material
- Maximum Utilisation of Manpower
- Optimum Working Conditions Regarding Safety
- Possibilities of expansion without moving too much machinery.

Findings: The following table shows the findings and layouts in the different spinning, weaving and dyeing - finishing mills visited:

MILL SIZE	SPINNING			WEAVING		
	Good	Fair	Poor	Good	Fair	Poor
Medium	83,3	16,7	-	80,0	20,0	-
Small	58,4	8,3	33,3	22,2	55,6	22,2
TOTAL	66,7	11,1	22,2	26,1	65,1	8,7

Dyeing and Finishing

Findings: Plant Lay-out : In most of the cases, the lay-out is acceptable

Production Flow : In most of the plants, could be improved.

3.2.5. PRODUCTION FLOW, MATERIAL HANDLING EQUIPMENT, STORAGES

Definition:

Flow of Material should

- Be such as to decrease transport between department to the minimum possible
- Be mechanized wherever possible and economically justifiable
- Not allow repeated handling of same material
- Be effected in transport units adapted to the nature and quantity of the material.

Storages should be organized in a way that:

- Location is near to the section, where material is coming from
- Their size allows proper storing by type of article.
- Entrances and exits are of proper size and at the right place
- Controls of incoming and out going materials are facilitated.
- Storing units are adapted to nature and quantity of material and possibly allow material to be stored in same containers in which it arrives.

Findings: Management does not seem to appreciate the importance of proper material handling and storing in terms of quality and savings. In nearly all mills visited minor or major defficiencies were found, what can be appraised in the following table:

MILL SIZE	MATERIAL HANDLING			STORAGES		
	GOOD	FAIR	POOR	GOOD	FAIR	POOR
MEDIUM	20,0%	80,0%	--	20,0%	80,0%	--
SMALL	23,1%	23,1%	53,8%	15,4%	38,5%	46,1%
TOTAL	22,2%	38,9%	38,9%	16,7%	50,0%	33,3%

5.2.4 Lay-Out of Machinery
5.2.5 Production Flow, Material Handling Equipment and Storages
5.2.6 Evaluation of Technical Processes
5.2.7 Recommendations for Replacement and Modernization
5.2.8 Production of Machinery
5.2.9 Balance of Production
5.2.10 Degree of Utilization
5.2.11 Degree of Productivity
5.2.12 Productivity Rates

5.3.0 LABOUR, LABOUR PRODUCTIVITY AND LABOUR COST

5.3.1 Characteristics of Ecuadorian Labour Cost
5.3.2 Wage Rates
5.3.3 Social Charges and Fringe Benefits
5.3.4 Workloads and Work Assignments
5.3.5 Labour Productivity Rates
5.3.6 Labour Cost

5.4.0 QUALITY OF PRODUCTS

5.5.0 MANUFACTURING CONTROLS

5.5.1 Quality Control
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5.6.0 COST CONTROL

5.7.0 PRODUCTION PLANNING AND CONTROL

5.7.1 Coordination Between Sales and Production
5.7.2 Production Planning
5.7.3 Production Control
5.7.4 Inventory Levels
5.7.5 Purchasing

5.8.0 SUPERVISION

6.00 THE KNITTING INDUSTRY

6.0.1 Distribution by Type of Plants

6.1.0 RAW MATERIAL

3.2.6 EVALUATION OF TECHNICAL PROCESS

OPENING AND PICKING

Findings: Only in most of the medium size spinning mills an adequate number of blending feeders were encountered.

Recommendations : Blending feeders are manually fed from a number of cotton bales, usually between 4 and 8, which are placed behind or alongside each blending feed. There should be a minimum of three of these feeding units working onto a common conveyor. A 24 bale mix is considered as normal for adequate blending, being not unusual to mix 36 bales of cotton, which varies in its characteristics. A small waste blending feeder is also incorporated as part of the feeding system.

The selection of the right type and number of beating points in the opening and picking process, their sequence and by-passes to be able to work other type of material in a suitable way, has to be studied carefully considering the type and grade of material to be worked and the trash to be extracted. For conventional equipment the choice of openning beaters can be based on the following guide lines:

- Porcupine beaters have good opening efficiency
- Rigid blade beaters provide good cleaning and eliminate most of the trash.
- Kirschner beaters produce level surfaces and even laps and are recommended for shorter and medium length staples.

In order to minimize fibre breakage and neps and to ensure good blending, the number of striking points should be kept at a minimum. As subtle an opening action as possible should be achieved. Cleaning by the use of air jet cleaners is advocated. Single beater scutchers equipped with kirschner beaters are recommended.

Because of the multiple sources of supply and the problems found in harvesting, ginning and packing, more emphasis must be placed on efficient blending. Moreover the opening equipment must be capable of opening the cotton to adequately small tufts as soon as possible.

CARDING

Findings: The conversion of cards to rigid wire has only slowly taken place in Ecuador and high production units with waste section devices have only been found in 3 industries.

The flexible card wire has been found frequently in bad state, specially referring to sharpness. In spite of being informed of grinding cyclea of correct frequencies, the grinding seems not to be performed at all or to be performed defficiently.

Recommendations: The introduction of metallic card clothing has been one of the most important changes to have taken place in cotton proceasing in the last years. Combined with a pneumatic cleaning and card waste transport to a central collecting area it has increased card production a few times over the production of the old card with flexible wire; maintaining the same quality or even improving it.

Flats with flexible wire should be taken from the card at leaat every few cycles and ground in a flat grinding machine.

Rigid wire should not be ground at all and only in specisl caaes, if some incident hae ocurred or if carding results are getting very bad, given a slight rectifying touch.

Card production ahould be as low as poaaible, based on a proper Mill Balance. In many mills card production haa been found too high aa to achieve thorough carding and little neps.

DRAWING

Findings : Some companies use 1 or 3 drawing passages, others run their high speed draw frames at very low speeds.

Recommendations: In conventionel mills two drawing passages are considered standerd, feeding eight ends up. Two delivery draw frames operate at speeds between 750 - 850 ft/min, . For these high speed operations power creels should be adopted.

For carded material a 4/5 or 4/4 drafting system should be used, for combed and synthetic materials 3/4.

Findings: The conditions of the top rollers in drawing, roving and spinning frames and those of the detaching rollers at combing in many mills have been found defficient.

Recommendations: Correct buffing cycles and the replacement of cots at reaching a certain minimum diameter is an obligation in order to achieve good quality yarns and avoid breakages. Many mills do not have their own buffing and cot replacing equipment or it is unadequate.

COMBING

Findings: As can be seen in the machine utilization figures, combers have been found without use for quite some time.

Recommendations : In these cases it is recommended to store all combs (circular and top combs) separated from the machine, properly lubricated and packed, thus avoiding the forming of oxide on the needles.

ROVING

Findings: Incorrect twist has been found in many mills .

Recommendations: Roving twist should be just as much as to avoid false draft at the break draft field of the ring frames. For the establishment of the correct twist proper laboratory equipment is needed.

SPINNING

Findings : Common faults in this section were badly set pendulum arms, bad state of cops and aprons, wrong travellers used, ring diameter not optimum for count spun, bad working methods of personnel.

GENERAL COMMENT ON SPINNING

Findings: In most of the mills does not exist either a mill balance nor a draft organization, which is shown by the fact that in many mills one or the other preparation department works more shifts than necessary and that in medium size mills:

- 25% of the draft organizations are optimum
- 75% of the draft organizations show defficiencies

In small Mills:

- 17% of the draft organizations are optimum
- 66% of the draft organizations show defficiencies
- 17% of the draft organizations are considered bad.

Recommendations: An optimum use of the equipment in the spinning section must be based on a mill balance, in which it is clearly stated, what normal working condition - speeds, efficiencies - are and how many machines are required and for how many working hours. In accordance with this mill balance a drafting organisation is elaborated, which requires the technical knowledge of drafting systems and its possibilities and

impossibilities.

Mill balance and draft organization have to be watched continuously by the technical personnel, making adjustments at any ocurring change.

WEAVING

SLASHING

Findings: It was observed that the slashing equipment in most mills, regardless of age and conditions, lacked elementary instrumentation like temperature controls, size level controls, stretch controls, moisture content controls or that same were not used.

This is considered to be one of the main reasons of unefficient slashing and the low efficiencies of looms found in nearly all the mills visited.

WEAVING

Findings: In very few mills exists a plan for setting looms, with frequencies and work distribution and it is recommended to be given more importance.

GENERAL COMMENTS ON WEAVING AND PREPARATION .-

In order to organize and plan the production of all sections properly, a general description of every article is needed, containing the counts used, the way it is warped, slashed and woven. This does not exist in the great majority of the mills.

3.2.7 RECOMMENDATIONS FOR REPLACEMENT AND MODERNIZATION OF MACHINERY

Based on the machinery and conditions, like raw material used and kind of manpower supply found, the following recommendations are given:

OPENING AND PICKING :

3 to 4 blending feeders are needed to get a proper mix. Mills with less than these number of feeders should acquire the lacking number of feeders in spite of not needing the full capacity.

Replace crighton and other cotton damaging beaters by step and air stream cleaners.

CARDS :

Convert all cards from flexible to rigid wire and introduce high production cards with automatic suction and cleaning devices crosrols.

DRAW FRAMES:

Replace low speed draw frames with small can sizes to high speed drawframes, use 4/5 drafting system for carded, 3/4 drafting system for combed stock.

ROVING FRAMES:

Modernize old frames to double apron drafting system, if package size is of major size (10 x 5" and more).

The recommended package size for new roving frames for carded coarse counts is 14 x 7", for finer counts 12 x 6".

SPINNING FRAMES:

Modernize old frames by changing spindles, tin rollers, rings, and drafting system to double apron system

Ring Size:	45^{s}	-	60^{s}	45 mm (13/4)
	34^{s}	-	40^{s}	48 mm (17/8)
	24^{s}	-	30^{s}	51 mm (2)
	16^{s}	-	20^{s}	57 mm (2 1/4)

Winding: Replace manual by automatic winders

Quillers: (if found economic) : Convert to fully automatic ones

Warpers: Use exchangeable creels with stop motions.

Slashers : Implant automatic moisture content and stretch controls.

Looms : Replace manual looms by automatic ones. Equip looms with unifil.

3.2.8 PRODUCTION OF ECUADORIAN COTTON MILLS

SPINNING

The following figures show the yarn production in 1969 supplied by 17 of the 19 companies visited which has been taken as a base for the calculation of the degree of productivity

Carded Cotton Yarn Count 6 and coarser	292.261	Kgs.
" " " " 7 -8	245.066	"
" " " " 9-12	595.638	"
" " " " 13-15	820.425	"
" " " " 16-19	117.163	"
" " " " 20	492.964	
" " " " 21-24	752.206	"
" " " " 30	1.410.893	"
" " " " 36	72.961	
" " " " 40	198.945	
	4.998.522	Kgs.
Carded Cotton + 25 - 50% Rayon Yarns:		
Count 8	48.100	Kgs.
10	44.100	"
13	14.100	"
16-19	55.909	"
20	142.718	"
24	278.800	"
28	174.300	"
30	101.623	"
36	14.400	"
	874.130	Kgs.

Rayon Yarns : Count below	6	15.985	Kgs.
	11	56.502	"
	15	116.893	"
	16	3.422	"
	22	2.702	
	25	19.673	
	30	25.382	
		240.559	Kgs.
Combed Cotton Yarns:			
Count	30	872	Kgs.
	36-38	77.200	"
	40	123.110	"
	50	73.933	
		275.135	Kgs.
Cotton/Polyester Blends (33/67):			
Count	20	5.249	Kgs.
	27	37.333	"
	36	10.605	"
	45	138.514	"
		191.701	Kgs.
Rayon/Polyester Blends (45/55):			
Count	24	66.800	Kgs.
	40	140.000	"
		206.800	Kgs.
Acrilic Short Staple Spun		118.400	"
TOTAL YARN PRODUCTION:		6.905.247	Kgs.
AVERAGE COUNT:		23.8	

WEAVING

Weaving production in 1969 supplied by 12 of the 13 companies with weaving sections is the following:

Poplins	4.452.742 M.
Flannels	1.139.494
Narrow drills and gabardines	1.853.449
Wider drills and gabardines	48.325
Printed Cloth	3.581.214
Lienzo	2.311.323
Sheetings	1.435.481
Sateens	462.161
Matresses	427.560
Upholstery cloth	338.000
Blankets	295.128
Towels	106.755
Gaze	728.000
Cotton Suiting	219.360
Polyester/rayon	219.360
Diapers	229.221
Vichy	554.617
Others	11.185.853
TOTAL PRODUCTION 1969	29.508.043 M.

Also these figures have been used for the calculation of the degree of productivity.

6.2.0 MACHINERY AND MACHINE PRODUCTIVITY

- 6.2.1 Appraisal of Existing Machinery
- 6.2.2 Degree of Automation
- 6.2.3 Atmospheric Controls
- 6.2.4 Lay-Out of Machinery and Production Flow
- 6.2.5 Recommendation for Machine Replacements and Future Expansion
- 6.2.6 Production
- 6.2.7 Balance of Production
- 6.2.8 Degree of Utilization
- 6.2.9 Degree of Productivity and Productivity Rates

6.3.0 LABOUR AND LABOUR PRODUCTIVITY

- 6.3.1 Characteristics of Ecuadorian Labour Force
- 6.3.2 Wage Rates
- 6.3.3 Social Charges and Fringe Benefits
- 6.3.4 Workloads and Work Assignments
- 6.3.5 Labour Productivity and Comparison with International Standards.

6.4.0 QUALITY OF PRODUCTS

6.5.0 MANUFACTURING CONTROLS

- 6.5.1 Quality Control
- 6.5.2 Labour Cost Control
- 6.5.3 Machine Efficiencies
- 6.5.4 Preventive Maintenance
- 6.5.5 Waste Control

6.6.0 COST CONTROL

6.7.0 PRODUCTION PLANNING AND CONTROL

6.8.0 SUPERVISION

6.9.0 GENERAL OBSERVATIONS

3.2.9 BALANCE OF PRODUCTION

Definition of Terms:

A mill is considered balanced, when standard output of all sections in the same period is approximately the same.

Findings:

Only 2% of the medium size mills and none of the small mills visited run in balance (total average 6%)

This means, that part of the capacity installed cannot be utilised and overheads are higher than should be.

Recommendations

While in the medium size plants a balance could be achieved by producing the right articles and spinning the right counts, basing it in proper mill balancing and draft organizations, in the smaller mills the running out of balance is due to the fact that in very small mills a balance is nearly impossible.

When purchasing new equipment emphasis should be put into proper balancing of production sections.

Dyeing and Finishing

We have been unable to calculate a balance of production as in most of the mills, specific production data is unavailable.

This is a significant indication that most of the mills work without any planning.

A balance of production would provide management with the following informations:

- Determination of the necessary machine hours for a projected production.
- Determination of the labour force.

- To pin point well in advance, the possible bottlenecks.
- To complete a production program according to the machinery time still available.
- Eventually to accept commission work.

3.2.10 DEGREE OF UTILIZATION

Definition of Terms:

Under utilization of a machine is understood the percentage of the time the machine has been utilised for production purposes.

A machine has an utilisation of 100% if it has worked for 3 shifts/day throughout the year. The number of hours worked per year on a 3 shift basis has been considered to be 6.072 that is to say 46 weeks of 132 hours. Six weeks have been deducted for vacations and national holidays. Equivalent, 2 shifts work would be 4.048 hours and 1 shift work 2.024 hours of production.

Findings: The average utilisation of machinery in the different departments of cotton are the following:

.../.

DEPARTMENT	Units	MEDIUM SIZE FACT. No. Units	MEDIUM SIZE FACT. % Utili.	SMALL FACTORIES No. Units	SMALL FACTORIES % Util.	O V E R A L L No. Units	O V E R A L L % Util.
Opening	Scutchers	9	73	13	33	22	50
Carding	Cards	131	90	90	77	221	83
Sliver Lap Machine	Machine	3	60	3	33	6	47
Ribbon Lap Machine	Machine	2	60	2	50	4	53
Combers	Machine	7	77	5	40	12	60
Draw Frames	Deliv.	114	87	175	73	289	80
Roving Frames	Spindles	2.146	87	2.978	63	5.124	73
Spinning Frames	Spindles	46.072	93	29.768	83	75.840	90
Winding Frames	Spindles	1.500	87	1.332	83	2.832	53
Hank Winding Frames	Machine	-	-	5	47	5	47
Hank to Cone Winding	Spindles	-	-	264	53	264	53
Doublers	Spindles	-	-	114	53	114	53
Twisters	Spindles	3.156	83	6.334	73	9.488	77
Warpers	Machine	9	63	14	43	23	53
Slashers	Machine	7	63	8	37	15	50
Quillers	Spindles	464	90	431	53	895	73
Manual Looms	Looms	-	-	179	42	179	42
Aut. Looms - 50"	Looms	516	93	182	83	698	90
Aut. Looms - 51" - 70"	Looms	447	90	70	67	517	87
Aut. Looms - 71" - 90"	Looms	13	100	66	83	79	87
Aut. Looms - 91" - more	Looms	67	100	-	-	67	100

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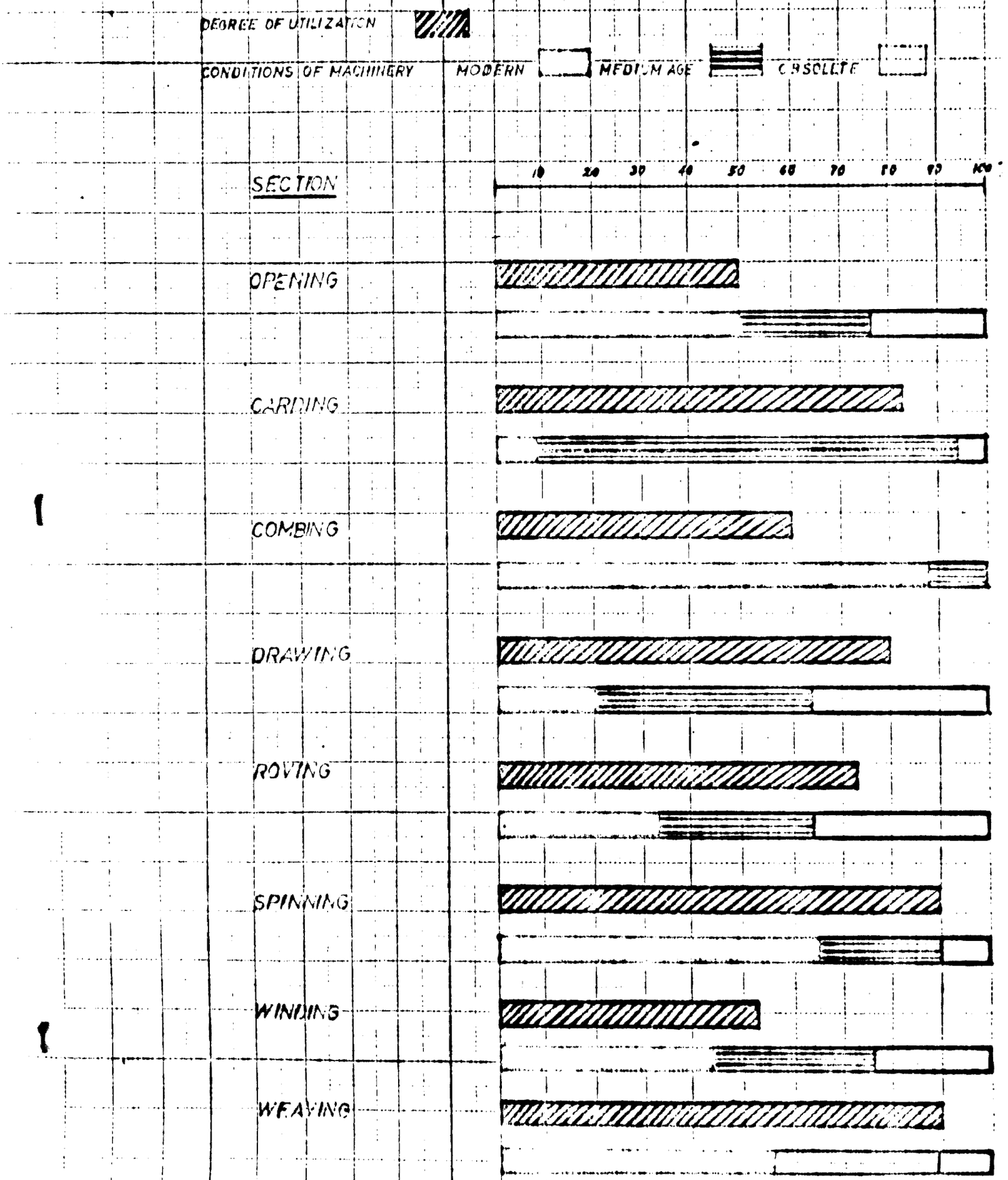
DEGREE OF UTILIZATION VERSUS CONDITIONS OF MACHINERY



It is noticeable that specially in the smaller mills the utilization of spinning and weaving preparation machinery is very low. This is due to unbalance of equipment described under 3.2.7

Dyeing and Finishing

The table No. 2 shows the degree of utilization

We have observed:

- The majority of the equipment is utilized more than 50%.
- Most of the plants operate 2 shifts
- There is a surplus of available capacity.

In Europe and United States, the dyeing and finishing equipment is normally utilized 3 shifts.

DEGREE OF UTILIZATION

Dyeing - Finishing : Cotton

(TABLE 2)

SECTION	MACHINE	No. Of Machines	Degree Of Utilization %
Bleaching - Piece	Singeing	5	71
	Semi-continuous O-W Scouring-Bleaching	3	83
	Continuos Open Width Bleaching	2	88
	OW Washing Machine	6	71
	Mercerizing Machine	4	71
	Can Dryer	11	62,5

..../

DEGREE OF UTILIZATION

Dyeing - Finishing: Cotton

TABLE 2 (Cont'd)

SECTION	MACHINE	No. Of Machines	Degree Of Utilization %
Dyeing - Piece	Jiggers	51	78
	Dyeing Pad	8	65,5
	Dyeing Winches	23	52,5
	Semi-Continuous Dyeing	1	100
	Beaming Machines	1	66,5
	High Temperature Beam Dyeing	2	88
Finishing - Piece	Shearing	4	78
	Finishing Pad	3	66,5
	Open Stenter	3	33,5
	Back Fill	2	33,5
	Finishing Range	10	66,5
	Curing Oven	5	58
	Calender	12	53,3
	Sanforizing	4	71
	Napping	10	58,5
	Heat -Setting Stenter	2	88
	Decating	2	33,5
	Dryer	2	88
	Potting	1	33,5
	Pressing	1	33,5

..../...

DEGREE OF UTILIZATION

Dyeing - Finishing: Cotton

TABLE 2 (Cont'd)

SECTION	MACHINE	No. Of Machines	Degree of Utilization %
Yarn Dyeing	Hydro Extractors	15	55,5
	Cheese Dyeing	13	60
	Beam Dyeing	1	60
	Hank Dyeing	8	48,3
	Dryer	6	60
	Hank Dryer	3	100
	Mercerising	2	33,5
	Kier Scouring	1	33,5
Printing			75

3.2.11 DEGREE OF PRODUCTIVITY

Definition of Terms: Every machine considering age, model and mechanical conditions, has a standard production, which should be achieved during the time the machine is used for production. The percentage of actual production related to this standard production is called the degree of machine productivity. During the study, for every machine existing, standard production rates have been elaborated, based on normal speeds and efficiencies at the given working time. The resulting yearly standard production has been compared with the actual production of machinery in the year 1969 to establish the degree of the machine productivity in every case.

Findings : The results of calculations of the Degree of Productivity are shown in the following table:

DEPARTMENT	TYPE OF UNITS	MEDIUM SIZE MILLS		SMALL MILLS		OVERALL	
		Units	% Prod	Units	% Prod	Units	% Prod.
Opening	Scutchers	9	58	13	55	22	57
Carding	Cards	131	57	90	78	221	66
Combers	Machines	7	43	4	18	11	34
Drawing	Deliveries	114	57	165	67	279	63
Roving	Spindles	2.146	64	2.525	61	4.671	62
Spinning	"	46.072	62	28.896	75	74.968	67
Winding	"	1.500	70	1.244	65	2.744	68
Looms	Loom	1.43	76	484	74	1.527	75

Note: The difference in number of machines considered in the appraisal of machinery and degree of utilisation and productivity is due to the fact, that a few companies did not supply the necessary data to calculate utilisation and productivity figures.

The difference in number of machines considered between degrees of utilization and productivity is due to some mills having some machines stopped permanently, therefore utilization being equal to zero.

Productivity of the remaining departments in the yarn finishing and weaving preparation cannot be calculated as the conditions in these section are too varying as to arrive at correct figures.

3.2.12 MACHINE PRODUCTIVITY RATES AND COMPARISON WITH INTERNATIONAL STANDARDS

SPINNING .-

Definition : Spinning productivity figures are generally expressed in grams/spindle hour and for comparison purposes the average count spun has to be mentioned.

The productivity rates for every mill have been based on March and April figures of the year 1970, given to us by the companies visited.

Findings: The spinning productivities of medium size mills under actual conditions can be improved by 38% on the average, those of small mills by 40%, and the total average by 39% .

Recommendations: Increased rates can be achieved by raising speeds to normal and by reaching normal efficiencies.

Observation: Also with the augmented productivity rates the spinning machine productivity remains below the international standard for modern machinery, but would reach South American averages like those of Argentina, Chile and most Colombian mills.

The following graph shows Ecuadorian spinning machine productivity for all the mills, where the necessary data could be obtained.

7.0.0 THE ECUADORIAN TEXTILE MARKET

7.1.0 INTRODUCTION

7.2.0 ECONOMIC EVOLUTION

7.3.0 THE ECUADORIAN TEXTILE COMPANIES

7.4.0 THE ECUADORIAN TEXTILE INDUSTRY BY COMMODITY GROUPS

- 7.4.1 The Cotton Commodity Group
- 7.4.2 The Wool Commodity Group
- 7.4.3 The artificial and Synthetic Fiber Commodity Group
- 7.4.4 Knitting Group
- 7.4.5 Acrylic Yarn
- 7.4.6 The Whole Textile Industry

7.5.0 APPARENT TEXTILE FINISHED PRODUCT CONSUMPTION

7.6.0 FIVE YEAR MARKET PROJECTION - 1970/75

8.0.0 MARKET AND DISTRIBUTION SYSTEMS OF THE ECUADORIAN TEXTILE COMPANIES

8.1.0 INTRODUCTION

8.2.0 EXPECTED MARKET EVOLUTION

8.3.0 MARKET SYSTEMS OF THE TEXTILE COMPANIES

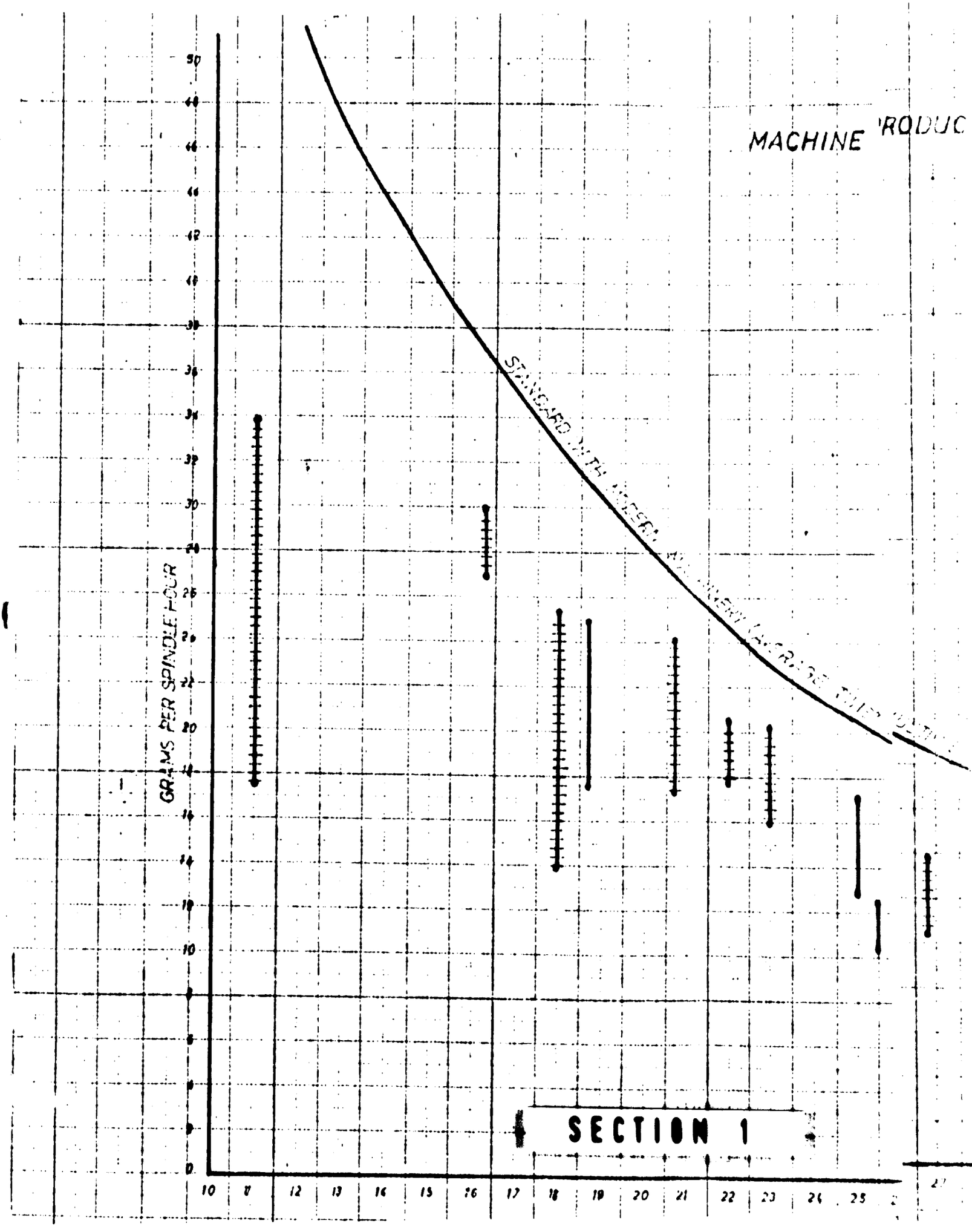
8.4.0 DISTRIBUTION SYSTEMS BY COMMODITY GROUP AND TYPES OF CUSTOMERS

- 8.4.1 The Cotton Commodity Group
- 8.4.2 The Wool Commodity Group
- 8.4.3 The Artificial and Synthetic Fiber Commodity Group
- 8.4.4 The knitted Products Commodity Group

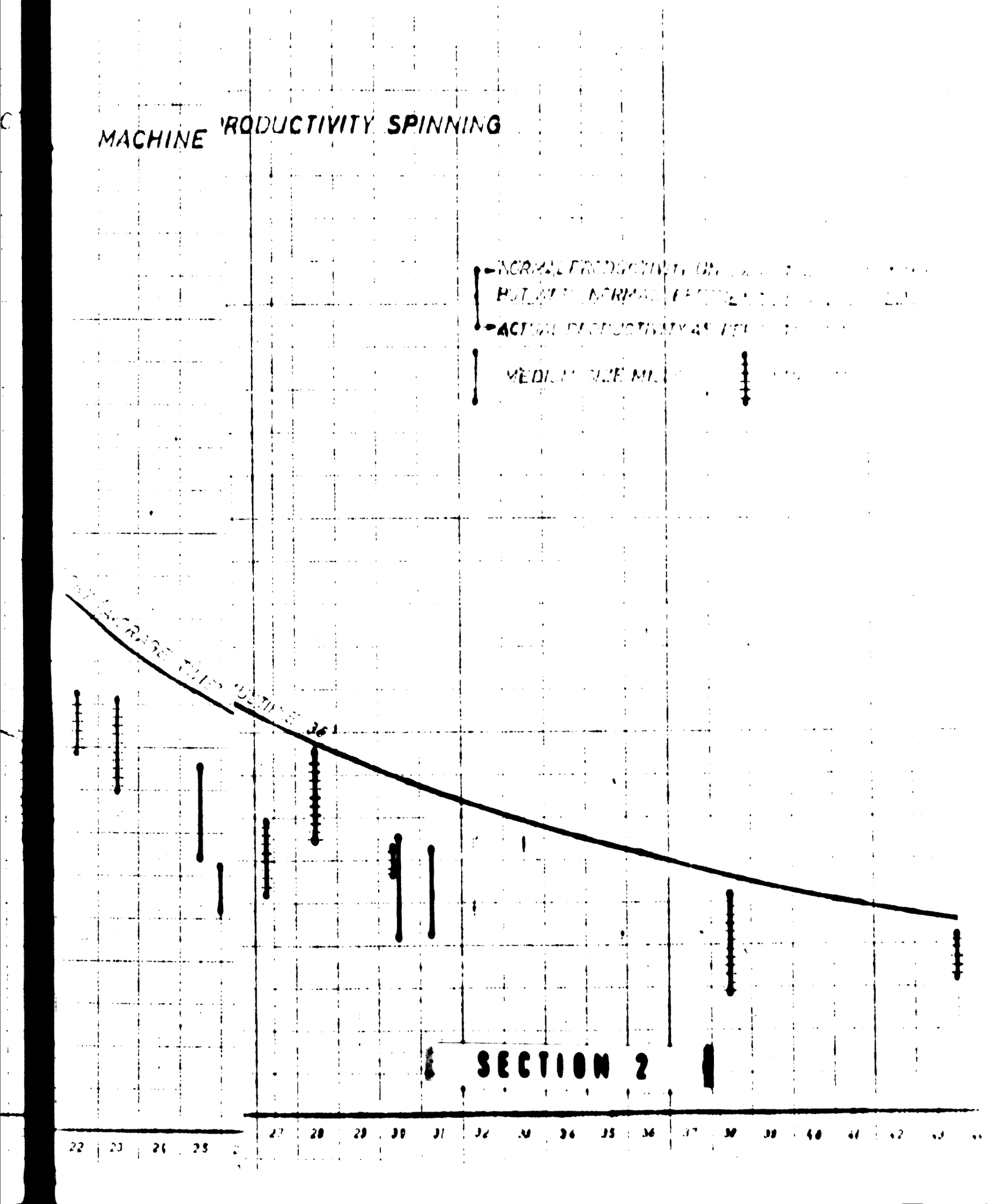
8.5.0 MARKET CHARACTERISTICS

- 8.5.1 Consumer Breakdown by income Groups

8.6.0 EXPORT - IMPORT CONSIDERATIONS


MACHINE PRODUC
GRAMS PER SPINDLE HOUR
SECTION 1

MACHINE PRODUCTIVITY SPINNING



WEAVING .-

Definition: Weaving machine productivity is expressed in various forms, like linear or square yards/loom hour. In these cases the construction of the cloth woven has to be mentioned for comparison purposes.

The following table shows international standards for identical cloth, average construction:

SHEETING	USA	9,20	Square yards/ loom hour
	Europe	8,75	" " " "
	East Asia	8,82	" " " "
	South America	7,60	" " " "
SHIRTING	USA	5,15	" " " "
	Europe	3,90	" " " "
	East Asia	4,43	" " " "
	South America	3,33	" " " "

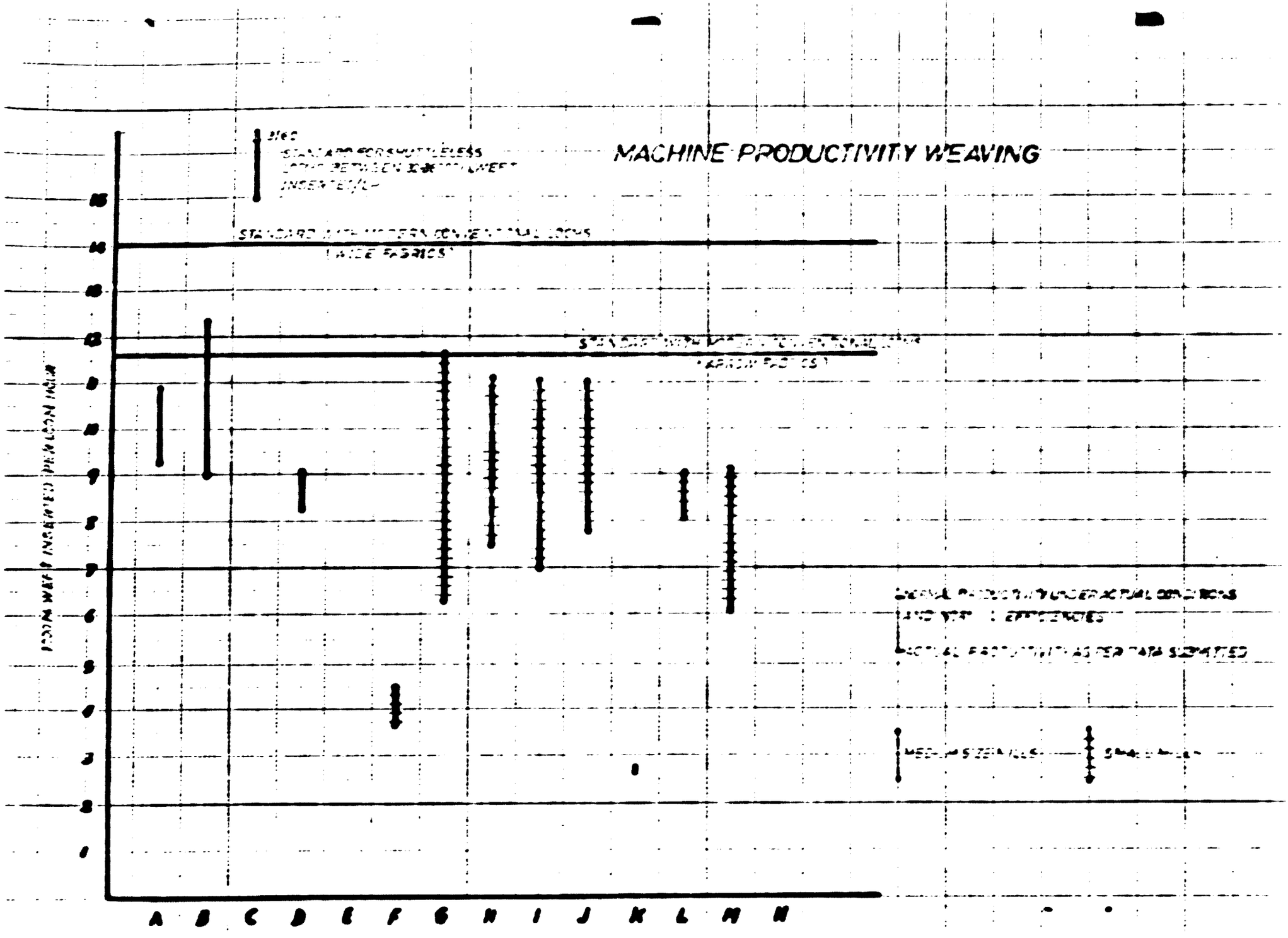
As the production of Ecuadorian Companies covers a very wide range of loom types and any little mill produces many different types of cloth, the machine productivity unit selected has been "thousand meters weft inserted/loom hour". This makes it possible to compare different mills of an approximate level. It has to be mentioned, however, that mills with wider looms generally reach higher figures than mills with narrower looms due to the fact, that loom speeds do not decrease in the same magnitude as width does.

Findings: The weaving machine productivity rates of Ecuadorian medium size mills, in the actual condition, can be improved on the average by 42%, those of the small mills by 37% and the total average by 39%.

Recommendations: Weaving efficiencies have been found very low and improvements should be made by:

- Improving quality of yarn
- Improving quality of slashing by installation of proper controls and using the right size formulas
- Installing better loom maintenance, putting emphasis on loom adjustments.
- Improving supervision in weaving preparation and weaving.
- Training weavers and mechanics to achieve proper working methods.

A comparison of the loom productivity rates of the Ecuadorian textile industries with standards for modern machinery are shown in the following graph:


MACHINE PRODUCTIVITY WEAVING
A B C D E F G H I J K L M N

Dyeing and Finishing

Findings: We have estimated that through proper planning and scheduling of the machine production in the dyeing - finishing sections, a 20% increase in machine productivity could be achieved.

3.3.0 LABOUR AND PRODUCTIVITY

3.3.1 CHARACTERISTICS OF ECUADORIAN LABOUR FORCE

Supply of Labour

Findings: Unskilled labour is plentiful in Ecuador, however the supply of skilled labour required by industry is limited. Nearly all industries employ male workers for all the job classifications with exception of cloth revising, where frequently female workers were found. The age of the workers varies generally between 18 and 50, being the number of workers with age over 50 reported only 26 and under 18 only 32. The total number of workers in the companies visited and where figures available was 1995 in spinning and weaving.

Degree of Training

Findings: The hiring of new personnel is generally done by the Mill Superintendent, in smaller mills by the manager. No mill has a personnel department, were modern personnel selection techniques are applied.

After hiring, the training of personnelfor their future task is still very informal. The method used normally is to assign learners to qualified operators, who while performing their own duties, train the learners and the trainee is therefore inheriting all the defficiencies of the qualified operative.

It is not surprising that degree of training and working methods used in most of the mills are below south american standard.

Training and retraining programs established by a proper department exist only in 10% of the companies visited.

	TRAINING PROGRAM		RETRAINING PROGRAM	
	Exists	Does not Exist	Exists	Does not exist
Medium Size Mills	17	83	17	83
Small Mills	8	92	8	92
Total	10	90	10	90

Recomendations: Training programs for all machine operators are carried out under training instructors and a training department head in charge of the program. The trainee, after getting sufficient technical background so to understand machine functions and operator responsibility learns all his functions through a set of programmed exercises. Complicated operations are divided up in several easy parts, and only after mastering every part the operator excercises the whole operation. Mechanical workers like loom mechanics are trained in analysing the reasons of defficient performance of looms in such a way, that in future no time is lost to fix any kind of defficiencies.

For this purpose, a separate department is needed, where sample machines are installed. Only after sufficient knowledge of his functions the trainee will pass on to production, where he slowly and still under the supervision of his instructor, reaches the normal work assignation. Then he is incorporated into a production department.

Defficient operators are selected for a retraining period where the instructor has to analyse the reasons of the defficiencies encountered and correct them by passing the retrainee through the corresponding exercises.

The following advantages will be covered by a training and retraining program:

- No necessity of skilled labour
- Short learning time
- Correct working methods
- Better quality
- Higher productivity
- Decreased waste
- Better psychological conditions between workers and supervisors
- Reduced labour turn-over

Training programs are usually developed by training specialists. In some of the larger countries like Mexico, Argentina and Colombia, since a few years ago, exist formal and scientific schemes for hiring and training operators.

In a small country like Ecuador with many small industries, a central training department for textile workers would be recommendable as it would not be economical for every mill to have its own training facilities and machinery. Possibly the help of the Statal CECAP could be required. The function of this institution should be:

Prepare a selection manual for hiring personnel in the textile industry based on a point system to test.

- Mental ability
- Manual ability
- Perception test
- General knowledge

A proper evaluation should be made to classify the tested person and assign her to the right job classification.

- Instruct personnel managers of textile mills the use of the above techniques.
- Develop training programs for all machine operators and mechanics.
- Establish the need of personnel for all companies.
- Establish the need for retraining for all companies.
- Assist companies in selecting training supervisors and instructors from their experienced operators.
- Teach the instructors and supervisors all the training methods to be employed.
- Assist in the implementation of training programs and evaluation of results.

Training programs to be fully effective and to achieve quick results should be carried out on a full time basis in training centers away from the production areas up to the point where the trainee has mastered all the exercises. Subsequently the incorporation of the trainee into production functions is carried out under the training center guidance and supervision.

As mentioned earlier, most of the companies in Ecuador cannot on their own justify independent training facilities nor their own training staff due to their size. For this reason it is suggested that an organization like CEDAP, with the backing of the textile industry set-up training centers in the principal textile manufacturing areas and based on each individual company's requirements establish the necessary training programs.

9.0.0 THE ANDEAN SUB-REGIONAL INTEGRATION AGREEMENT

9.1.0 SUMMARY

9.2.0 INTRODUCTION

9.3.0 THE ECUADORIAN SITUATION IN A.S.I.A. SEEN FROM THE TEXTILE INDUSTRY VIEWPOINT

9.4.0 AGENCIES OF THE A.S.I.A.

9.5.0 TREATY IMPLEMENTATION

9.6.0 SITUATION OF THE TEXTILE INDUSTRY IN ECUADOR

9.6.1 Recommended Preliminary Action for the Textile Industrialist in the Andean Market

9.6.2 Main Draw-backs of the Ecuadorian Textile Industry

9.7.0 TENTATIVE ACTION PLAN FOR THE TEXTILE INDUSTRY

9.8.0 TENTATIVE ACTION PLAN FOR THE GOVERNMENT

9.9.0 COMPLEMENTARY ACTION

10.0.0 EXPORT POSSIBILITIES

10.1.0 INTRODUCTION

10.2.0 EXPORT REQUIREMENTS

10.3.0 EXPORT SITUATION OF ECUADOR

10.3.1 Product adaptability
10.3.2 Quantity
10.3.3 Quality
10.3.4 Price

Werner Associates Inc. has installed such training programs for several large textile mills in Argentina, Brasil and Colombia and experience has shown that the highest priority for training and retraining is for weavers and loom-fixers. Typical training duration for the above two functions is 8 and 16 weeks respectively, starting with trainees without previous textile experience.

Once the programs for these two functions are established programs for spinners, winders, etc. can be installed.

Absenteeism and Labour Turnover

Findings: The average percentage of absenteeism was found to be around 3%. As no statistics are kept to control it, it is possible that this value is not too exact. This low figure could be explained by the high punishment consisting of elimination of Sunday and Saturday pay, if workers are absent.

The yearly labour turnover is anywhere between 1 and 10% and depends on the working conditions of each mill. The average was found to be about 4%.

Working Time

Working time in Ecuadorian textile mills is 44 hours weekly, for male and female workers.

3.3.2 WAGE RATES

Findings: The minimum wage for textile machine workers in Ecuador is 25 sucres ($ 1 US) per day of 8 hours of work, for textile workers without machines 20 sucres (80 US Cents) per 8 hours.

Workers of other industries have a minimum of 20 sucres/day, if not specialized. The base for payments to the workers has been found to be the following:

	Piece Rates	Basic Wage + incentives	Basic Wage only
	%	%	%
Medium Size Mills	17	33	50
Small Mills	27	27	46
TOTAL	24	29	47

Piece rates and incentives in nearly all the mills are not well detailed and defined through industrial engineering methods. Generally they were established in agreement with the worker's unions and do not consider exact work-loads.

The hourly wages for the same job classification vary considerably from mill to mill.

The average wage in the small mills was found to be 3,9 sucres/ hour, in medium size mills 6,0 and the total average 5,4 sucres/ hour (21,6 US Cents). The average in spinning has been 4,3 sucres/hour or 17,2 US Cents and the average in weaving 6,3 sucres/hour or 25,2 US Cents. The higher wages in medium size mills are mainly due to incorrect wage rates set in the past.

The following table compares prevailing wage rates in Ecuador for the main job classifications encountered in a textile industry with those of Peru, Mexico, Brazil, Colombia, Argentina and Chile. The values for Mexico, Brazil, Colombia, Argentina and Chile are taken out of a wage structure study done by Werner Ass. Inc. in 1967 and the ones from Peru from the study of Peruvian textile industry, effected in 1969.

COMPARISON OF HOURLY EARNINGS IN U.S. CENTS PER J[OB] CLASSIFICAT[ION]

ARGENTINA, COL[OMBIA] AND CHIL[E]

JOB CLASSIFICATION	ECUADOR U.S. Cents			PERU U.S. Cents		MEX[ICO] U.S. [Cents]		
	AVERAGE	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MA[XIMUM]
PREPARATION								
Blow Room Tender	16.80	24.40	12.00	71.11	26.06	46.24	-	
Blow Room Feeder	13.34	15.00	12.12	41.06	33.95	35.76	-	
Blow Room Helper	-	-	-	63.92	26.06	33.38	-	
Card Tender	16.25	30.40	12.00	88.62	26.06	48.34	-	
Card Mechanic	-	-	-	87.72	49.89	35.76	-	
Card Grinder	-	-	-	41.70	34.25	35.76	-	
Draw Frame Tender	16.10	-	-	82.36	26.06	50.72	-	
Precombing Tender	20.90	27.52	16.80	-	-	46.32	-	
Comber Tender	20.90	27.52	16.80	71.46	37.60	48.24	-	
Comber Mechanic	-	-	-	-	-	48.24	-	
Draw Frame Tender	16.10	20.00	12.00	-	-	50.72	-	
Roving Frame Tender	17.60	34.80	12.00	76.18	26.06	50.32	-	
Roving Frame Doffer	11.00	-	-	57.56	26.06	35.34	-	
Roving Frame Transporter	12.52	15.00	10.00	49.29	20.47	35.30	-	
Roving Frame Oiler	12.52	15.00	10.00	37.23	31.65	40.96	-	
Roving Frame Sweeper	10.00	11.52	8.00	40.96	26.06	35.04	-	
SPINNING								
Ring Frame Tender	20.90	31.20	12.00	86.48	26.06	52.80	-	
Ring Frame Doffer	12.12	14.50	11.00	-	-	44.24	-	
Ring Frame Oiler	12.52	15.00	10.00	37.24	25.74	40.96	-	
Ring Frame Scourer	12.52	15.00	10.00	70.33	29.05	39.20	-	
Ring Frame Sweeper	10.00	11.52	8.00	63.48	23.83	35.04	-	
Ring Frame Mechanic	32.50	-	-	66.28	49.89	65.36	-	
Ring Frame Overseer	25.10	31.00	16.40	-	-	-	-	

...TS PER J... CLASSIFICATION IN ECUADOR, PERU, MEXICO, BRAZIL,
...INA, COL... BIA AND CHILE

M E X ...CO U.S. ...nts		B R A Z I L U.S. Cents		ARGENTINA U.S. Cents		COLOMBIA U.S. Cents		CHILE U.S. Cents	
MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM
46.24	-	30.74	24.82	43.43	42.86	22.52	16.07	37.22	20.52
35.76	-	27.78	24.82	43.43	42.86	22.52	16.07	37.22	29.22
33.38	-	25.93	24.08	38.57	37.14	22.52	16.07	34.78	28.69
48.34	-	33.15	24.82	49.71	44.00	22.52	19.39	39.48	37.22
35.76	-	46.30	24.82	49.71	44.00	33.99	27.55	37.22	34.28
35.76	-	35.19	27.78	49.14	44.00	25.46	17.61	37.22	24.78
50.72	-	40.74	25.93	55.71	46.28	22.02	15.34	38.95	37.22
46.32	-	40.74	27.22	55.71	44.00	22.02	15.95	38.95	37.22
48.24	-	40.74	27.12	45.71	37.14	22.02	16.07	38.95	37.22
48.24	-	42.60	27.78	51.43	50.00	35.71	29.82	38.95	37.22
50.72	-	40.74	27.22	55.71	40.00	22.02	16.97	38.95	37.22
50.32	-	42.60	25.93	53.71	46.28	23.01	16.07	41.39	37.22
35.34	-	32.97	20.74	43.43	40.00	23.07	16.07	37.22	33.04
35.30	-	27.78	20.74	41.41	41.41	33.99	29.82	33.04	24.35
40.96	-	42.60	16.30	40.00	37.14	23.07	16.87	26.96	23.13
35.04	-	27.78	16.30	36.00	33.71	20.98	13.80	23.48	20.52
52.80	-	42.60	34.26	55.71	49.14	23.07	16.07	58.60	37.04
44.24	-	33.24	17.04	42.00	39.43	23.62	16.87	34.30	31.30
40.96	-	26.11	23.34	43.14	37.14	23.07	16.87	26.96	20.52
39.20	-	40.74	20.37	40.00	36.28	22.02	21.47	33.74	26.18
35.04	-	21.67	16.30	-	-	20.98	13.80	23.48	20.52
65.36	-	70.38	51.86	-	-	-	-	-	-
-	-	-	-	-	-	69.82	34.36	-	-

...../.

SECTION 2

.../.. (Cont'd)

COMPARISON OF HOURLY EARNINGS IN U.S. CENTS PER JOB CLASSIFICATION IN LCUS

JOB CLASSIFICATION	ECUADOR US Cents			PERU US Cents		MEXICO U.S.	COLOMBIA Cents	
	AVERAGE	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
WINDING AND TWISTING								
Cone Winder	15.60	30.80	8.00	67.02	26.06	49.84	-	42.
Hank Winder	8.00	-	-	50.25	32.38	49.84	-	42.
Quill Winder	16.50	24.30	8.00	55.08	31.65	46.00	-	30.
Doubler Tender	38.00	-	-	41.70	31.65	49.84	-	-
Twister Tender	14.50	31.60	8.00	71.23	31.65	52.80	-	40.
Twister Oiler	12.52	15.00	10.00	38.92	26.06	40.96	-	26.
Twister Sweeperr	10.00	11.52	8.00	30.02	24.20	35.04	-	16.
Twister Mechanic	25.40	60.00	12.50	66.28	34.25	65.36	-	-
WARPING AND SLASHING								
Warper Tender	26.65	40.00	12.40	118.31	33.86	52.64	-	33.
Warper Helper	23.68	24.80	12.50	46.85	26.06	41.84	-	23.
Slasher Tender	23.30	34.90	12.50	119.16	41.70	63.84	-	40.
Slasher Helper	14.14	30.00	8.00	64.72	26.06	38.24	-	35.
Size Preparing	-	-	-	53.80	45.95	38.24	-	35.
Drawing in	16.96	31.55	8.00	85.07	38.36	56.88	-	25.
Helper Drawing in	16.96	31.55	8.00	56.12	26.06	38.24	-	23.
Hand Knotter	-	-	-	-	-	-	-	20.
Machine Knotter	21.90	28.00	11.00	122.70	28.77	56.88	-	34.
Mechanic	40.00	68.40	14.23	94.02	61.43	-	-	-
WEAVING								
Weave	35.15	62.00	16.00	97.58	50.28	61.60	-	39.
Warp Manger	-	-	-	-	-	35.36	-	33.
Warp Helper	-	-	-	-	-	33.20	-	33.
Smash Hand	-	-	-	66.06	33.51	54.72	-	34.
Battery Hand	15.35	30.00	10.00	61.91	26.06	39.84	-	25.
Cloth Doffer	13.60	-	-	34.25	26.02	34.08	-	21.
Cloth Revision	16.60	17.60	8.40	70.75	30.91	61.36	-	34.
Oiler	15.15	15.47	14.80	43.15	25.32	40.96	-	26.
Sweeper	10.00	11.52	8.00	36.89	25.32	35.20	-	21.
Mechanic	40.00	68.40	14.23	39.98	40.69	68.80	-	-

SECTION 1

CLASSI[illegible] CA[illegible]ON IN ECUADOR, PERU, MEXICO, BRAZIL, ARGENTINA, COLOMBIA AND CHILE

MEX U.S. [illegible]	C O nts MINIMUM	B R A Z I L U.S. Cents MAXIMUM	MINIMUM	ARGENTINA U.S. Cents MAXIMUM	MINIMUM	C O L O M B I A U.S. Cents MAXIMUM	MINIMUM	CHILE U.S. Cents MAXIMUM	MINIMUM
49.84	-	42.60	24.68	50.00	46.28	22.02	16.07	41.39	25.74
49.84	-	42.60	24.08	42.86	38.57	22.52	16.07	41.39	22.26
46.00	-	30.48	12.32	37.14	36.00	22.02	16.07	34.78	25.74
49.84	-	-	-	46.28	39.71	-	-	-	-
52.80	-	40.74	23.34	44.00	39.71	23.07	16.07	40.00	37.04
40.96	-	26.11	23.34	36.81	34.28	23.07	16.87	26.96	20.52
35.04	-	16.30	35.71	35.74	34.28	20.98	13.80	23.48	20.52
65.36	-	-	-	-	-	-	-	-	-
52.64	-	33.34	24.45	46.85	37.43	24.17	19.20	39.13	28.52
41.84	-	23.34	20.00	35.71	-	23.07	16.07	23.65	20.54
63.84	[redacted]	40.74	28.34	42.28	38.00	31.17	24.54	36.00	32.35
38.24	-	35.74	25.37	42.28	38.00	23.07	19.94	26.96	-
38.24	-	35.74	22.59	38.00	-	25.82	19.94	26.96	-
56.88	-	25.00	19.26	40.28	38.00	32.33	16.87	26.09	20.52
38.24	-	23.89	18.52	40.28	38.00	24.11	16.07	26.09	20.52
-	-	20.00	-	-	-	-	-	-	-
56.88	-	34.26	21.48	40.28	38.00	24.72	-	33.91	24.00
-	-	-	-	-	-	-	-	-	-
61.60	-	39.45	36.70	44.28	40.00	25.77	17.61	45.21	33.70
35.36	-	33.34	20.74	39.43	37.71	24.72	23.80	-	-
33.20	-	33.34	20.74	39.43	37.71	-	-	34.78	19.80
54.72	-	34.45	33.34	-	-	22.52	21.47	24.35	-
39.84	-	25.00	11.11	37.14	35.71	21.53	15.34	26.43	-
34.08	-	21.67	16.30	35.71	-	22.02	16.97	32.69	-
61.36	-	34.45	32.60	36.28	-	23.62	16.07	26.96	-
40.96	-	26.11	16.30	36.57	-	23.07	16.87	26.96	-
35.20	[redacted]	21.67	16.30	36.00	-	20.98	13.80	32.48	-
68.80	-	-	-	50.85	43.43	40.86	35.28	-	-

SECTION 2

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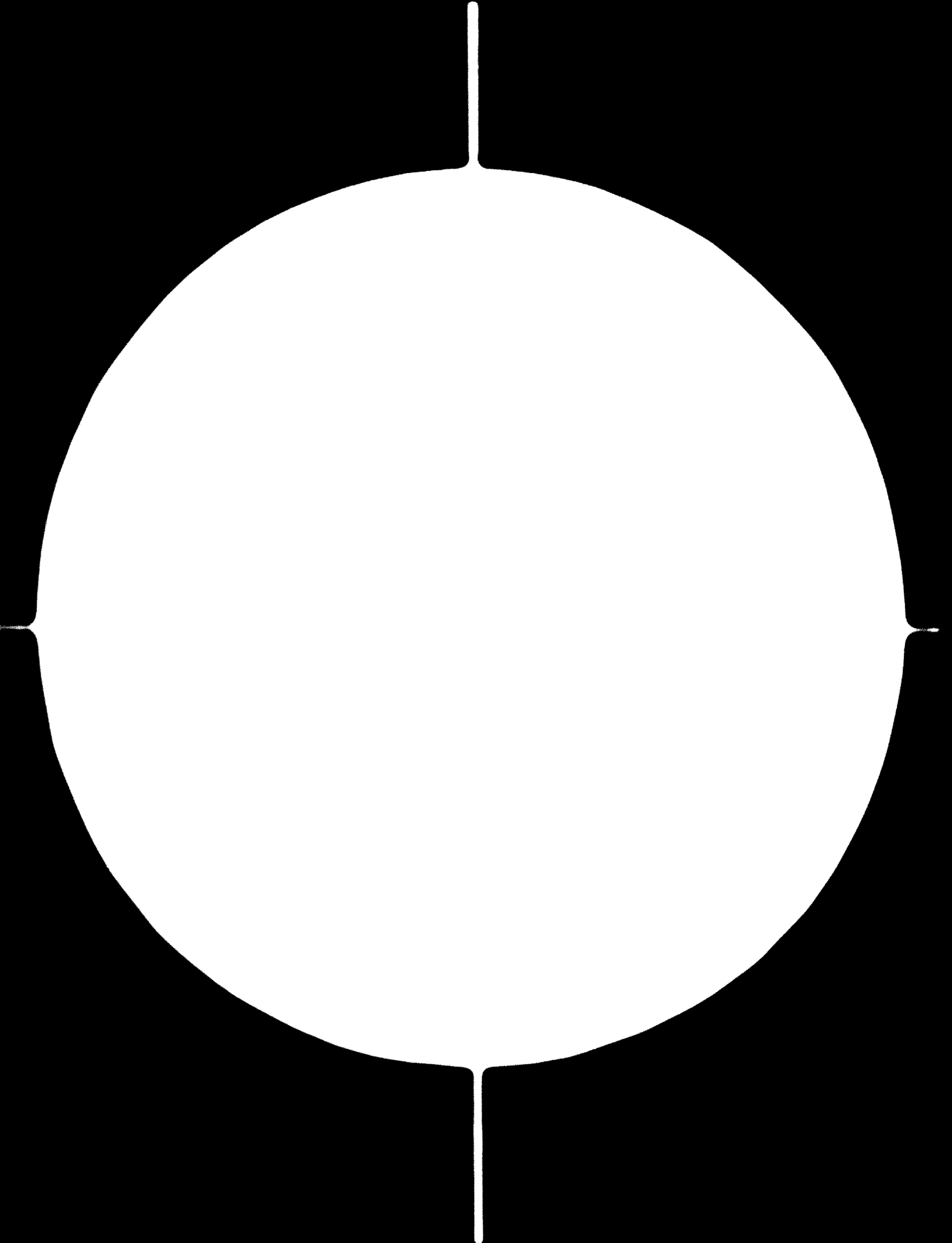

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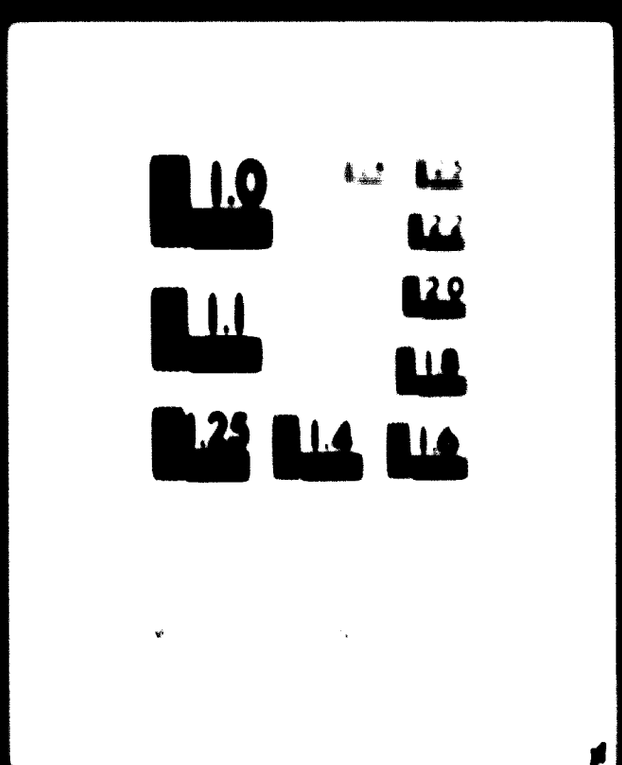

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Workloads

Findings: During the visits in every company a labour complement has been established. These labour complements have been compared with standard workloads throughout South America always considering the local conditions encountered. The result is shown by the following table:

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COMPARISON OF ACTUAL AND STANDARD NUMBER OF OPERATORS

	SPINNING						WEAVING						TOTAL					
	ACTUAL			STANDARD			ACTUAL			STANDARD			ACTUAL			STANDARD		
	DIR.	IND.	TOT.	DIR.	IND.	TOT.	DIR.	IND.	TOT.	DIR.	IND.	TOT.	DIR.	IND.	TOT.	DIR.	IND.	TOT.
Medium Size	416	204	620	290	197	487	476	280	756	318	268	586	892	484	1376	608	465	1073
Small	428	127	555	233	120	353	255	76	331	168	76	244	683	203	886	401	196	597
TOTAL	844	331	1175	523	317	840	731	356	1087	486	344	830	1575	687	2262	1009	661	1670

% Reduction in Personnel

	SPINNING			WEAVING			TOTAL		
	DIR.	IND.	TOT.	DIR.	IND.	TOT.	DIR.	IND.	TOT.
Medium Size	30	3	21	33	4	23	32	4	22
Small	46	6	36	34	-	26	41	3	32
TOTAL	38	4	29	34	3	24	36	4	26

It is noticeable that specially direct machine operators have lower work loads than indirect personnel and that frequently there was a lack of supervision, controls and mechanical maintenance staff.

The average workload has been the following:

	SPINNING	WEAVING	TOTAL
	%	%	%
Medium Size Mills	70	77	78
Small Size Mills	60	70	68
TOTAL	71	76	78

Dyeing and Finishing

Workloads are presently assigned by the Manager of the dyeing finishing plant based on observations and his own experience.

We have not found companies making use of the industrial engineering techniques in this area.

8.8.5 LABOUR PRODUCTIVITY RATES AND COMPARISON WITH INTERNATIONAL STANDARDS

Spinning

Definition: Spinning labour productivity is generally expressed in kgs/operator hour. Production considered is that of the cone winders and personnel considered is all direct and indirect production personnel from bale warehouse to cone winding.

For comparison purposes, apart of production per operator hour the average count has to be mentioned, as standard production per operator hour declines with growing average count.

Findings: As an arithmetical average of the corresponding companies labour productivity can be improved by 6% in medium size mills, 9% in small mills and 8% on total average, under actual conditions.

If mill size is taken into consideration and the possible improvements are weighted by production figures, productivity rates can be bettered under actual conditions by:

- 10% in medium size mills
- 8% in small size mills
- 8% on total averages

The total average productivity rate of all Rwandese cotton industries is 2,00 kgs/operator hour for an average count 23.8.

Recommendations: The productivity could be increased to 4,00 kgs/operator hour by:

- Increased machine speeds to normal
- Improved efficiencies

- [illegible] standardized production, working only the time necessary
- Decreased personnel by achieving normal workloads

The following graphic illustrations compare ecuadorian productivity rates with international ones.

Weaving

Definition: Weaving labour productivity has been expressed in thousand meters weft inserted per operator hour. The personnel included is that of warping, slashing, quilling, drawing-in, weaving and cloth warehouse.

Findings: Under actual conditions productivity rates can be improved by 61% in medium size mills, 82% in small mills and 82% on average (arithmetical average).

Recommendations: Again improvements can be achieved by:

- Better weaving efficiencies
- Decrease personnel to standard by achieving normal workloads

Findings: If mill size is considered and improvements are weighted by production figures given by the individual mills, above figures change to:

- 39.6% improvement possible in medium size mills
- 67.6% improvement possible in small mills
- 33.7% improvement possible on total average

Weighted productivity figures are:

- 63,8 x 1.000 meters weft inserted per operator hour actual in medium mills
- 36,7 x 1.000 meters weft inserted per operator hour actual in small mills

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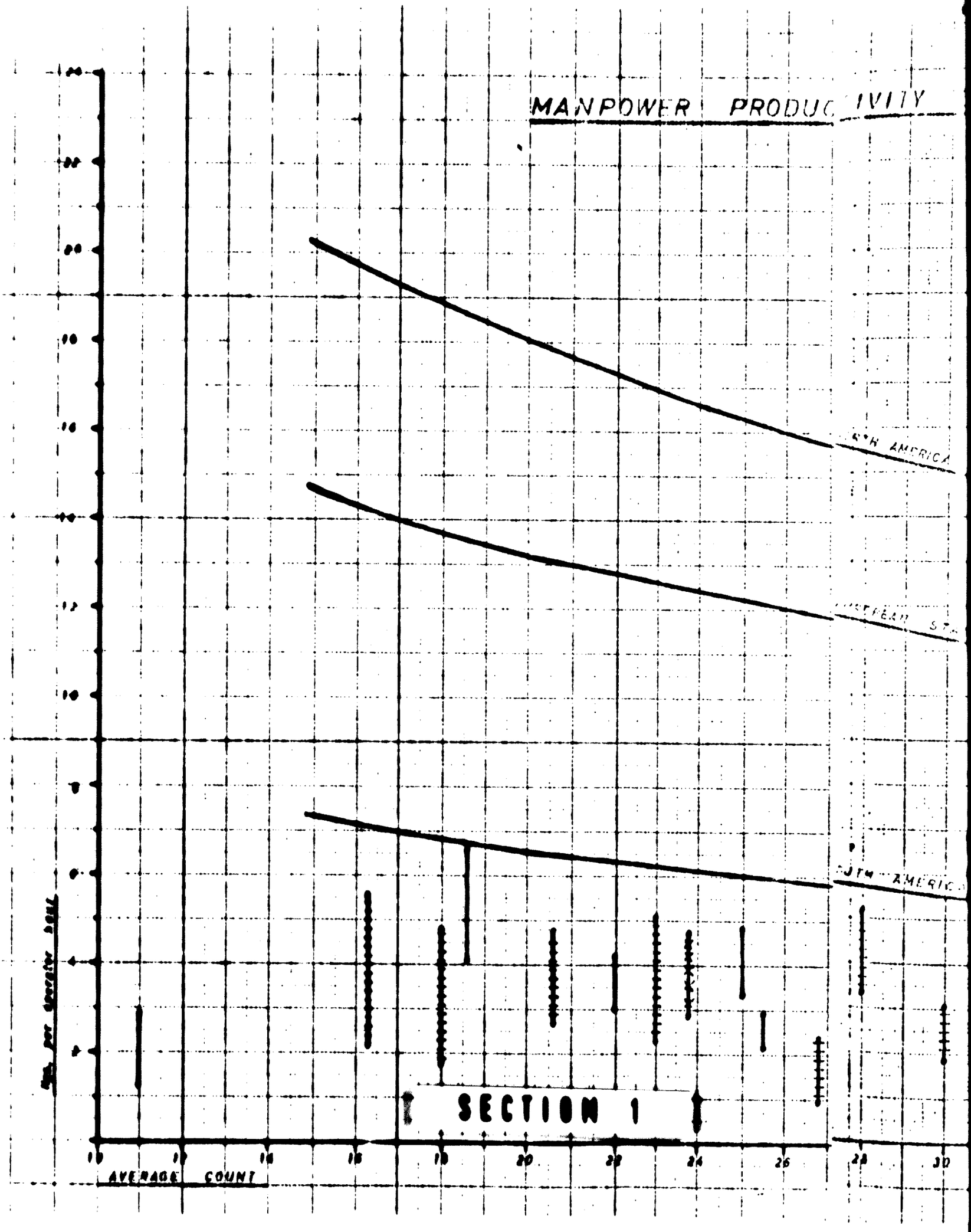
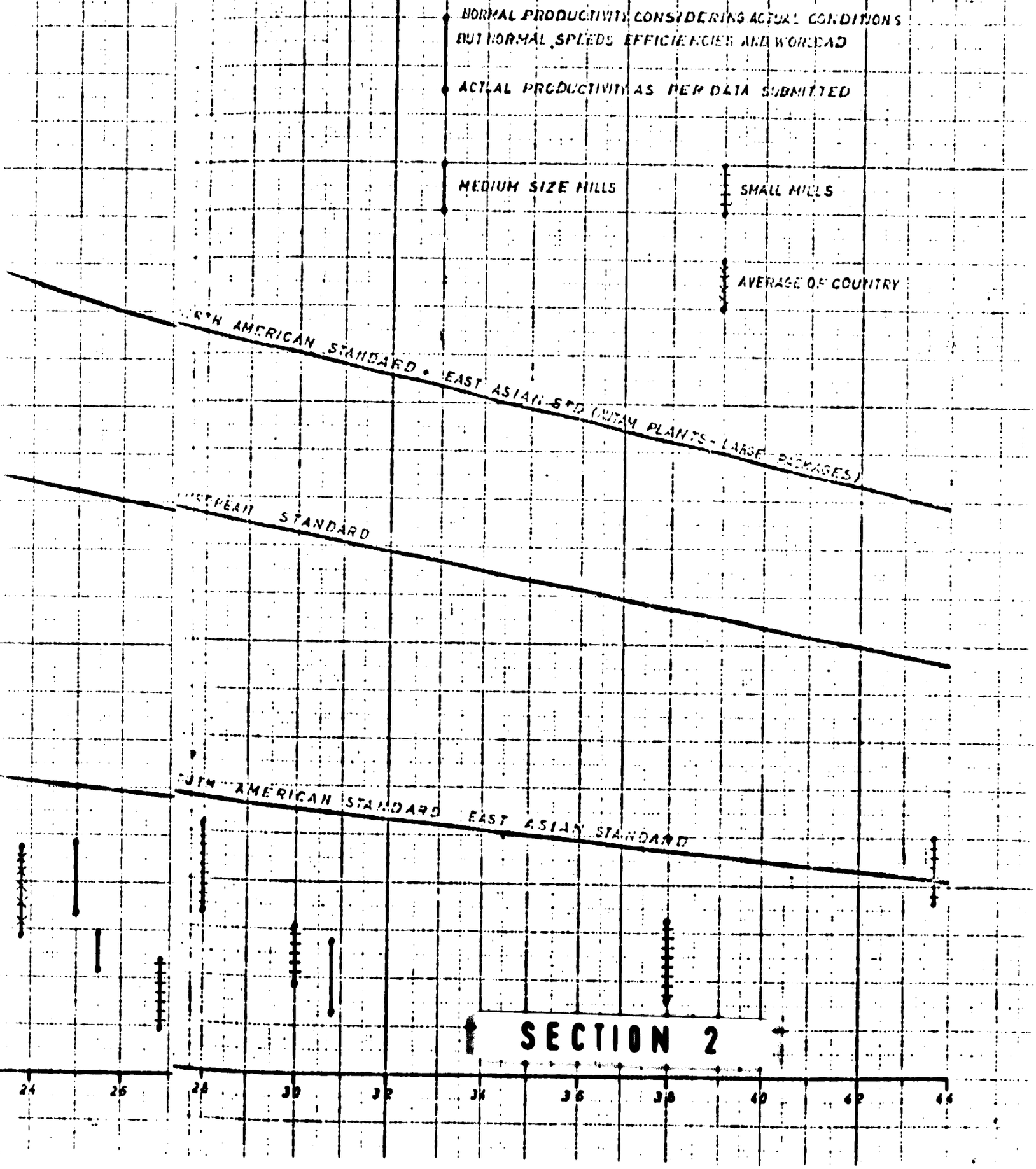

MANPOWER PRODUCTIVITY
SECTION 1
AVERAGE COUNT

R PRODUCTIVITY SPINNING



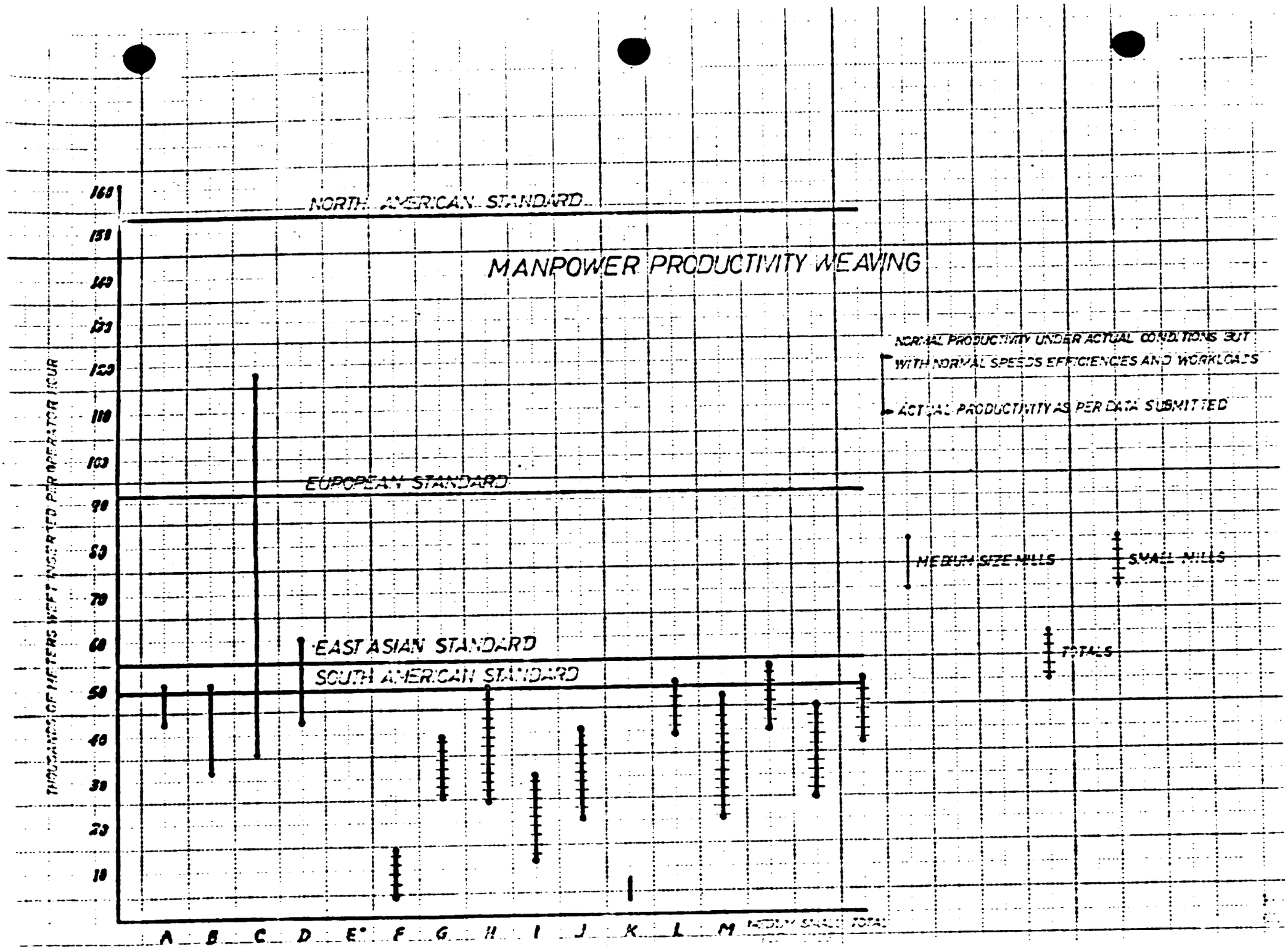
38,0 x 1.000 meters weft inserted per operator hour actual on total average

The enormous difference between arithmetical and weighted average is due to the extremely low productivity of few mills.

The following table shows manpower productivity of Ecuadorian cotton weaving mills with international standards.

Dyeing and Finishing

There is little attention given to manpower productivity in the dyeing finishing operations because in many cases the operator only stands-by to monitor the process.


MANPOWER PRODUCTIVITY WEAVING
NORTH AMERICAN STANDARD
EUROPEAN STANDARD
EAST ASIAN STANDARD
SOUTH AMERICAN STANDARD
NORMAL PRODUCTIVITY UNDER ACTUAL CONDITIONS BUT WITH NORMAL SPEEDS EFFICIENCIES AND WORKLOADS
ACTUAL PRODUCTIVITY AS PER DATA SUBMITTED
MEDIUM SIZE MILLS
SMALL MILLS
TOTALS
THOUSANDS OF METERS WEFT INSERTED PER OPERATOR HOUR
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
A B C D E F G H I J K L M
MEDIUM SMALL TOTAL

3.3.6 LABOUR COST AND COMPARISON WITH INTERNATIONAL STANDARDS

Findings

Spinning: Average labour productivity rate in spinning is 2,9 kgs/operator hour at an average count of 23.8. This corresponds to approximately 3.5 kgs/operator hour at count 20. At an average pay of 4.3 sucres/hour or US Cents 17,20 the labour cost in spinning is 4,92 US Cents/kg (count 20).

Adding social charges this increases to 8,95 US Cents/kg.

The following table compares this figure with international figures.

COUNTRY	AVERAGE PAY HOURS U.S. CENTS	PRODUCTIVITY KGS/OP. HOUR 20s CARDED	LABOUR COST US ¢./KGS. 20s CARDED	COMPARISON ECUADOR ACTUAL=100
Ecuador	31.3	3.5	8.95	100
Ecuador Improv.cond.	31.3	5.67	5.51	62
Peru	78	3.9	20.00	224
Colombia	51	9.6	5.33	60
U.S.A.	242	17.9	13.58	152
Europe:				
Germany	132	10.6	12.45	124
France	98	9.6	10.21	114

The differenciation between medium size and small mills has not been done, because being very different the average count spun. Trying to bring them to a common factor would be arbitrary.

Dyeing and Finishing

Findings: One of the large mills has not supplied us with their labour complement and for that reason our figures are not complete.

SECTION	WORKERS PER SECTION		TOTAL	AVERAGE WAGE $/. PER HOUR
	Direct	Indirect ◆		◆◆
Bleaching - Piece	20			5.03
Dyeing - Piece	76			4.55
Finishing Piece	100			4.36
Yarn	17			3.72
TOTAL D.F. COTTON INDUSTRY	221	57	278	4.46

◆ The indirect labour could not be classified by section

◆◆ Excluding social welfare and fringe benefits.

Minimum wage paid: per hour 2.00

Maximum wage paid: per hour 8.55

Average wage paid: per hour 4.46

Job Evaluations:

Findings: No company has been found which considers proper job evaluations for paying the different job classifications. There exists only a certain tendency to pay tenders more than helpers, and to those more than to sweepers cleaners or transporters. Also weaving section workers are generally higher paid than spinning and preparation workers. This increases the trend found in most of the companies to hire new

Weaving: Labour cost in weaving, considering only basic wages is:

	Act. Productivity 1.000 m weft/op.hour	Average pay US ¢./hour	Labour Cost US ¢/1000 weft	Labour Cost US ¢./ 1000 in weft (Improved condition.
Medium Size	42.6	28	0.66	0.53
Small	26.2	18.2	0.70	0.41
TOTAL	38.0	25.2	0.66	0.50

Labour cost including social charges is shown in the following table:

	Productivity 1000 m/op. hour	Average pay including S. Charges	Labour cost US Cents/ 1000 m.	Labour cost US Cents/1000 m. (Improved conditions)
Medium Size Mills	42.6	50.90	1.19	0.96
Small Size	26.2	33.10	1.26	0.75
TOTAL	38.0	45.80	1.21	0.90

The comparison of Ecuadorian labour cost in weaving with international standards gives the following picture:

COUNTRY	Average pay hour US Cents	Productivity 1000 m/op. hour	Labour Cost US Cents/1000 m. weft	Comparison Ecuador actual=100
Ecuador actual	45.80	38	1.21	100
Ecuador improv.cond.	45.80	50.8	0.90	74
Peru	92	28.23	3.26	270
Colombia	55	53.3	1.03	85
U.S.A.	258	156.00	1.65	136
Europe:				
Germany	139	68.0	2.04	169
France	100	53.2	1.88	155

Observation: Two companies with a total capacity of 29.476 spindles and 515 looms did not provide the production data required. Out of this reason, these companies are excluded from all the chapters dedicated to Production and Productivity.

3.4.0 QUALITY OF PRODUCTS

Findings: With very few exceptions, the quality of the yarns and cloth produced in Ecuador is below the average level of comparable mills in other South American countries. This is due to the following points:

Low quality of cotton used for higher quality products, as industrials are obliged to buy ecuadorian cotton

Lack of technical knowledge and adequate equipment in cotton selecting and blending

Lack of quality control in process

Lack of supervision on technicians' and supervisors' level

Poor machine maintenance

Poor material handling and storing

Recommendations: Although it is recognized that the major portion of the textile market is of low quality, it is essential to put more attention towards quality, as the consumer gets more and more quality conscious and as competition of other countries (Andean Market) with better quality of products may enter the market.

On the other hand the demand for higher quality products is steadily increasing in South America and the achievement of these products can only be performed in Ecuador with a substantial change of mind by top management.

9.5.0 MANUFACTURING CONTROLS

Definition: A company is functioning well, when it produces as many as possible of high quality products at the lowest cost. In order to know how many products and at what cost can be produced, standards have to be set, which act as a guide line against which performance can be measured. Setting of standards for production and costs is generally done by an Industrial Engineering department.

Findings: An Industrial Engineering department does only exist in one company in all Ecuador.

Recommendations: Only after having set standards a control is of use.

Each control has a specific purpose and the totality of controls have to assure a continuous checking of production, quality and cost in all process departments, giving the management a tool to recognize off standard conditions or improvements in performance.

As with all manufacturing costs, the costs of controls should be kept as low as possible, always guaranteeing the desired degree of control. It has been proved many times, that on the introduction of such controls the implementation and maintenance costs have been recovered several times over.

Any industrial engineering function is a staff function.

It is of great importance, that all the controls described in the chapter are performed by personnel, which depends of management and not of production leaders. Only so an impartial performance can be guaranteed.

In smaller mills all control functions can be done by one person, meanwhile larger mills need a more formal organization like an industrial engineering department.

General Observation: There is a serious lack of clearly defined and systematic manufacturing controls in the ecuadorian cotton mills. Even in larger firms, where generally some type of controls exist, the methods do not cover all areas and are not adequately coordinated. Without such coordination benefits are only scarce.

Main points, which have to be controlled, are:

- In-process quality of products
- Quality of products entering the mill
- Quality of final products produced by the company

} Quality control

- Productivity of machinery
- Productivity of man power
- Labour cost and utilization
- Raw materials and waste
- Maintenance of machinery

This chapter describes all recommended controls and the actual conditions found in cotton industries.

3.5.1 QUALITY CONTROL

Findings: Only 10% of the surveyed industries have an efficient quality control system and only 16% have the necessary equipment to effect quality control. In all other industries quality control is either defficient or non existing, which can be appreciated in the following table:

	LABORATORY EQUIPMENT		QUALITY CONTROL		
	COMPLETE	INCOMPLETE	EFFICIENT	DEFFICIENT	NOT EXIST.
Medium Size mills	33	67	34	33	33
Small mills	8	92	-	23	77
TOTAL	16	84	10	27	63

Most spinning mills only perform count and strength tests and these are done in many mills with a frequency which does not guarantee statistical confidence. Mechanical cloth tests are not done in any mill.

Recommendation: Obviously, not the same quality standards will be applied for low and high quality products. However, some controls need to be exercised for all types of products and the cost of any test should always be correlated with the realized benefits.

A complete quality control program comprises the following points:

Raw material controls:
- Grade
- Fineness
- Strength
- Staple length
- Moisture content

In process control in spinning:

- Control of weight of	- picker laps, card sliver, comber sliver, drawing sliver, roving and yarns
- Evenness tests	- Lap (yard by yard), Slivers, roving, yarns
- Spectrographic	- Slivers, roving, yarn
- Nep tests	- Picker, cards
- Waste controls	- Cards, combers
- Staple tests	- Cards, combers
- Strength (single and lea)	- Yarns
- Twist in yarn	- Single and double yarns
- Appearance	- Yarns
- Breaking tests	- Roving, ring frames, twisters, cone winders

Weaving preparation and weaving:

- Breaking tests	- Warpers, looms
- Moisture content	- Slashed yarn
- Stretch	- Slashers
- Size pick up	- Slashers
- Strength	- Cloth (includes tearing and abrasion strength)

Apart of these points, a quality control department is generally in charge of controlling some or all of the following points:

- Machine speeds
- Machine settings
- Package sizes
- Cleanliness of machines

In a complete quality control system standards have been set for all the tests and testing frequencies and sample sizes are selected in such a manner, that results are statistically assured. Any off standard result of tests has to be reported immediately so that correction can take place in the shortest interval possible.

Dyeing and Finishing:

From our survey, we have observed the following:

- No complete quality control system exists in any of the mills
- In most of the mills, there is no quality control at all
- Only a few plants have an inspection department
- Some mills have a spot checking quality control
- Statistic data regarding the level of quality (percent of second quality and reprocessing) is not available
- There is no control of the manufacturing conditions

In Process Quality Control

The purpose of the In Process Quality Control system is to achieve the following benefits:

- Consistency of quality
- To achieve and maintain the highest quality standards
- To minimize the amount of second quality goods
- To minimize the amount of reprocessed goods

We can summarize the purpose and scope of an "In Process Quality Control system" as a means to put all operations on a scientific and uniform basis to obtain consistency of quality.

Only one company has a well equiped chemical laboratory.

The chemical laboratory should perform the following tasks:

- To implement and maintain In Process Quality Controls
- To provide technical assistance
- To control chemicals and dyestuffs
- To set up new processes and recipes
- To study new developments and techniques
- To evaluate the processing cost
- To investigate clients' complaints.

3.5.2 LABOR COST CONTROL

Definition: Labor cost control covers the introduction of measured work assignments and the subsequent follow-up, to ensure that actual labor performance is kept in line with the established standards.

Findings: In none of the mills visited exists a complete labor cost control system per section with established standards and only in 21% of the mills some type of control exists.

	LABOR COST CONTROL		
	COMPLETE	DEFFICIENT	NOT EXISTING
Medium Size Mills	-	33	67
Small Mills	-	15	85
TOTAL	-	21	79

Recommendations: The determination of work assignments is normally achieved through time studies but only after operation conditions and methods have been analyzed, simplified and standardized.

Once a sufficient number of time studies has been done and normal time for each work element has been determined, the frequencies of every element established, the job loads are calculated.

According to work assignments a standard labor complement is obtained, through which standard operator hours and standard labor cost per production unit can be developed. For obtaining readily analyzable results it is necessary to calculate these figures for every production department. The standards established are then compared periodically with the actual figures of the period and any variance should be analyzed.

personal only for jobs like cleaners, sweepers and oilers and replace machine operators by helpers and mechanics by machine operators. This method does normally not result in getting the right man at the right place.

Recommendations: A more cientific approach, selecting personnel according to its capacities by tests and performance statistics, is recommended. This technique should be incorporated in the personnel selection manual described under 3.3.1.

Job evaluation exists already in some Latin American countries like Mexico and Argentina and consists in a point classification, which considers.

- Physical efforts to be done by operator on the job.
- Psychical efforts to be done by operator on the job
- Knowledge required
- Manual ability
- Working conditions

Only a correct evaluation can be the necessary incentive for the worker to learn more and to try to get higher level positions.

3.5.3 MACHINE EFFICIENCIES

While the control of machine speeds is generally included in the Quality Control Program, machine efficiencies, the other factor affecting machine productivity, have to be controlled separately.

Findings: Only 22% of the companies visited control efficiencies in all the sections and 26% do it partially.

	COMPLETE	INCOMPLETE	NOT EXISTING
	%	%	%
Medium Size Mills	34	33	33
Small Mills	15	23	62
TOTAL	22	26	52

Recommendation: Machine efficiencies not only affect production, but also reflect running conditions, bad quality, work loads, and technical direction informed periodically (weekly) about them, can draw the necessary conclusions to take steps to improve off standard conditions.

Also for efficiencies, standards have to be set in every production department and under any operating conditions. Generally the industrial engineering department prepares periodically graphic illustrations of actual efficiencies, compared with standards.

3.5.4 PREVENTIVE MAINTENANCE

Definition: Preventive maintenance is a periodic cleaning, lubricating, checking, adjusting, and exchanging of worn parts. The frequency of each maintenance work to be done generally is established by machine producers.

A maintenance program includes:

- Machine, in which maintenance has to be performed
- Kind of work to be done
- Working method
- Frequency or cycle
- Person to do maintenance work

Conveniently different maintenance cycles for work with equal frequency will be established and a type of calendar for every maintenance mechanic is determined.

Findings: Only 16% of the mills visited have such a maintenance program and 37% do some partial preventive maintenance. All other companies have only cleaning and lubricating cycles and repair work.

	COMPLETE	INCOMPLETE	NOT EXISTING
	%	%	%
Medium Size Mills	33	50	17
Small Mills	7	31	62
TOTAL	16	37	47

Preventive maintenance, carried out periodically and according to instructions:

- Increases life of machinery
- Decreases machine downtime and increases efficiency
- Decreases spare part consumption
- Improves quality of products

3.5.5 WASTE CONTROL

Definition: A waste control program includes:

- Separation of reprocessable and irreprocessable waste by type and section
- Periodical weighing
- Periodical calculation of waste percentages
- Comparison with standards

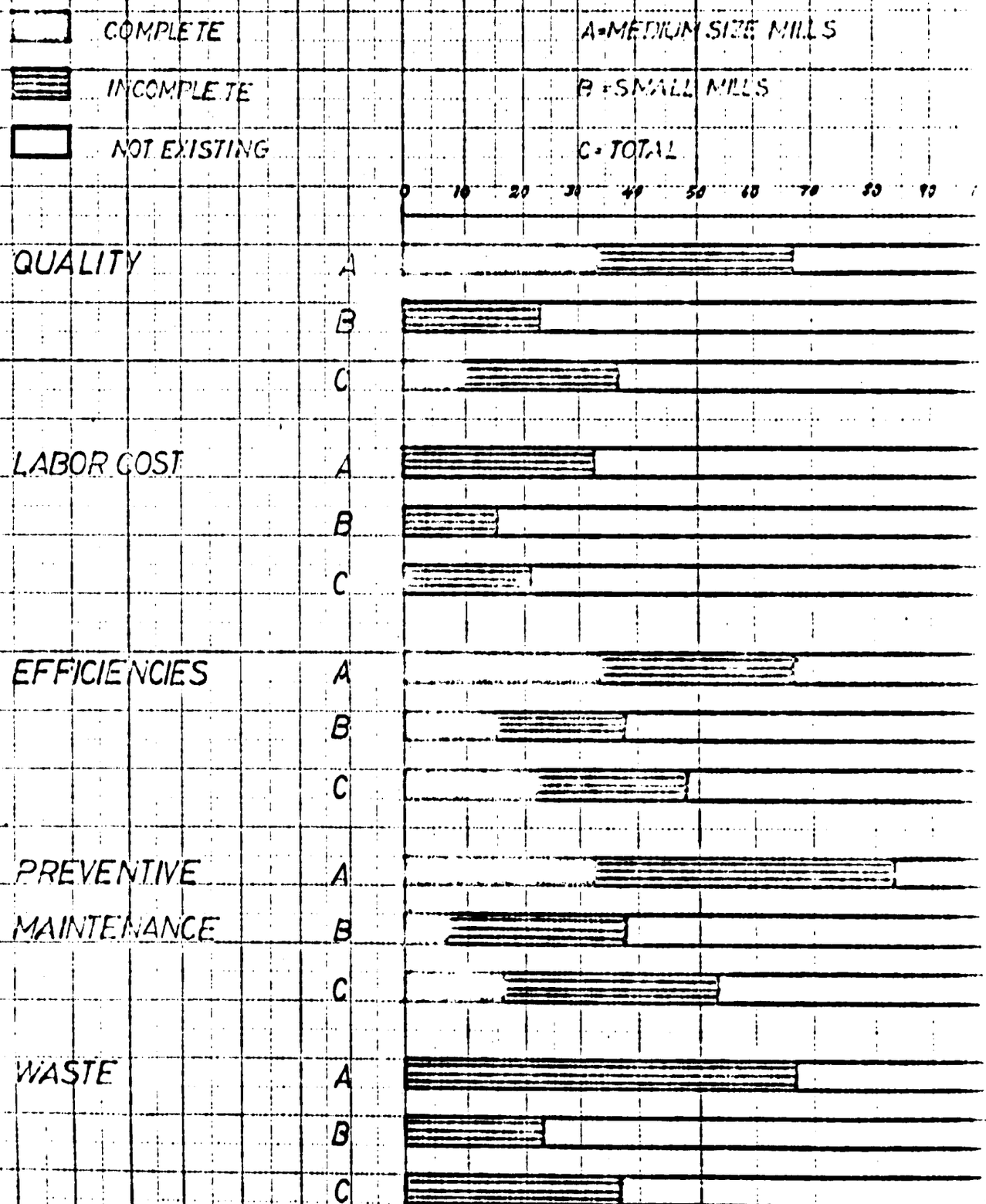
Findings: No mill does this control in a complete way and only 37% do some waste control, or only weighing of irrecuperable waste for the purpose of selling.

	COMPLETE	INCOMPLETE	NOT EXISTING
	%	%	%
Medium Size Mills	-	67	33
Small Mills	-	23	77
TOTAL	-	37	63

Recommendations: Since raw material constitutes the main item in the finished product cost, the exercise of a good control over waste can considerably influence the profitability of a cotton mill.

It is essential to control not only the irrecuperable waste, which is sold, but also the waste which is being returned to the process to be

MANUFACTURING CONTROLS SUMMARY



reworked. An excessive quantity of waste being reprocessed is detrimental to the processing performance of the mix and to quality of the products.

3.6.0 COSTING SYSTEMS AND COST CONTROL

Findings: Many mills consider their costing systems still as a secret and many difficulties were found to obtain information on this matter.

Specially in the smaller mills costing per processing department is not done and there exist in general as the only cost centers "spinning", "weaving" and "dyeing and finishing". The different products elaborated in these sections are not weighted according to their magnitude. Averages are applied as for example in spinning, where total cost is related to the production, in kilos, indifferent as to count spun.

In the bigger industries some effort of more detailed costing is done. Cost per process is used more frequently and weighting factors are applied to distribute costs occured into the different products.

We have not found any mill, where a correct colaboration exists between the production and the costing and accounting department of the company. Costing does not have the necessary information to distribute costs to cost centers and products in a correct way and production departments do not receive any information about the costs incurred so as to use this as a measuring stick for performance.

The costing system used in the mills, where information was obtained, is a historical absorption cost system, where costs in a more or less refined way are distributed to cost centers and the cost of these absorbed by the different products produced. Generally once or twice a year some

type of analysis is elaborated to compare the correctness of sales prices related to costs ocurred. Some smaller mills were found, which have no costing system at all and sales prices are established with rudimentary estimations or products are sold at same prices as competition does.

The lack of a functional costing system and the negligence of developing one is partially the result of the protected position, in which textile industry still operates and where import taxes avoid the necessity of competing against other than national producers. A higher or lower profit margin exists in any product produced and the necessity of combining mill capacity with market requirements in an optimum way is not yet a condition to survive.

Recommendations: In the future, when the Andean Market will be a reality, the necessity of a proper cost system will appear and companies should start soon to recognize the importance of a proper costing system and controlling methods, because the implantation usually takes a long period.

In the past, the only costing system known was the historical one, called like that, because the cost ocurred in the past are the base for pricing products. This system has the disadvantage, that costing is always behind the actuality and that mill conditions however good or bad they are, are accepted as a fact.

Modern trends, born out of the necessity to compete, to operate with very low profit margins and to implant the "thinking in costs" in all parts of the company, have led to the so-called standard cost system.

This system no more bases pricing of products and accounting of inventories in historical absorption costs, but uses standards for these

purposes. Standards are established under the presumption what "costs should be" and based on standard running conditions and production, which have to be established by the production department.

Any variance between actual cost and standard cost for the period is booked against the profit and loss acount.

With this system it is possible to control performance of every mill department and overseer in an unique way. Periodical information about actual and standard costs given to production overseers permit the effective control of costs and the early recognition of off standard perfomances.

Standard costs allow:

- Proper pricing of individual products
- Predetermining costs of alternative products
- Measurement of efficient operations by department
- Cost control and cost reduction by setting standard cost targets
- Efficient control of raw material usage
- Control of inventory levels
- Recognition of the effects of changes in production methods
- Selectivity in selling
- Advisability of purchases of capital assets
- Analysis of all phases of business

The standard cost system can be divided up into two further systems, the standard absorption and direct standard cost system, which differ in the way the indirect or period costs are considered. In the standard absorption cost system the indirect standard costs are absorbed

by a budgeted production, being distributed by factors to the different products. This has the great disadvantage, that if the budgeted productivity, not only in volume, but in distribution of articles, is not met, the cost situation is distorted. At the same time, it does not permit management to recognize clearly the effects of production volume differences.

The direct standard costing system considers only the direct costs and puts emphasis into the volume of production and sales, which have to cover the period costs in order to achieve profitability of the company. This system characterizes itself by simplicity and clear information for management.

3.7.0 PRODUCTION PLANNING AND CONTROL

Definition: Production planning and control is a system of coordinating and controlling production, based on a thorough analysis of the productive capacity and sales requirements of a company. Production planning lays out the program that the mill will follow. Production control keeps a check and insures proper execution of that program.

Three basic objectives are convered by production planning and control:

- Select the most profitable goods to produce, in coordination with sales department
- Produce the selected goods at the right time
- Produce these products under the most favorable and profitable conditions for the mill

3.7.1 COORDINATION BETWEEN SALES AND PRODUCTION

A company will produce the most profitable goods only if there exists a perfect coordination between marketing or sales department and production. Sales knows of the requirements of the market and the production planning department of the capacity to produce. Based on correct cost studies of every article, marketing and production planning departments establish general lines for production for every coming period ahead.

Communication between these two departments is important at all stages in the operation of a company and the more complex the operation, the more serious is the lack of adequate communication. In a very small operation, like frequently found in Ecuador, the coordination may exist in the limited sense that responsibility for both sales and production are vested in the same person. Larger companies require a formal system of sales and production coordination.

Findings: Lack of communication leads to that, what has been found in many ecuadorian cotton mills:

- Production of less profitable goods
- High inventories of finished goods
- Unbalanced mill capacities
- Low machine utilization and productivity
- Low manpower productivity

Although market conditions were not found to be adverse to cotton manufacturers and mills were producing only at a part of their capacity, stock of finished goods has been found to be 2 months of sales on average, being the stock generally higher in the medium size mills (2,5 months)

than in the smaller mills (1.1 months). However, this might be explained by the fact, that small industries normally do not have the capital to form major inventories and prefer to work at a smaller output level.

23% of the mills work against sales orders only, 12% against stock and 55% against both.

3.7.2 PRODUCTION PLANNING

Findings: 11% of the ecuadorian cotton mills have a complete Production Planning System, which is shown in the following table:

	PRODUCTION PLANNING		
	COMPLETE	INCOMPLETE	NOT EXIST.
	%	%	%
Medium size mills	20	80	-
Small size mills	8	46	46
Total	11	56	33

27% of the mills elaborate production orders every week , 9% every two weeks and 64% monthly.

Recommendations: A significant measure for good production planning is the inventory of in-process stock, which has been found to be on the average around 5 weeks of sales, which for integrated mills is considered excellent, but which is influenced by the small package sizes used and by the aim of small industries to avoid higher inventories of any type.

The basic objective of Production Planning is to integrate and coordinate the use of material, labour and machines to meet sales

3.3.3 [redacted]

Ecuador:

- Semana integral: Working hours of a week are 44. The Company has to pay the lacking 4 hours on Saturday plus 8 hours on Sunday.
- Vacations: 15 days in time. Sundays are included.
- 13th month salary
- 14th month salary
- Profit sharing: 10% of the companies profit has to be paid to workers.
- 5% of the profit has to be paid for children of workers less than 18 years old.
- Social Security: 9 1/2 % of salary has to be paid by the Company.
- Fondo de Reserva: 1 month salary has to be paid every year for every worker with at least one year working time.

Observation: In the following table profit sharing from Ecuador has not been taken into consideration as it is conditioned to the companies' profitability.

The calculation of the percentages has been done based on 2,112 working hours per year.

Vacation	120 hours paid
Sundays	400 hours paid
Saturdays	200 hours paid
Holidays	88 hours paid
13th month salary	240 hours paid
14th month salary	240 hours paid
Fondo de Reserva	240 hours paid

requirements. The methods to achieve this objective can be detailed into the following functions:

- Screen orders coming from sales department and accept only those which can be met
- Program production in such a way that smooth flow of material is guaranteed, machine down time provoked by changes of articles is kept as low as possible and production bottlenecks are avoided
- Establish a system to know at every moment the capacity available in every production department
- Process in optimum lot sizes
- Maintain a balanced ocupation of capacity in all operating departments
- Keep close controls over inventory fluctuations
- Direct sales effort towards slow moving goods and anticipate demand for fast moving goods
- Promote efficient production by clear informations to department heads and relieving them of the necessity of doing their own planning.

Working from actual or forecasted sales requirements, a production plan is produced covering a production period, which may vary from one to six months, according to the type and organization of the mill. The aim should be to reconcile as far as possible customer requirements with economic production runs of the available equipment. Most companies use inventories to balance out the inequalities of demands on productive equipment and to overcome seasonal variations.

Management must establish the policies to guide the organizational structure to carry out the production planning function. With due consideration for these policies the production planning department can then establish a production plan concerning the quantities and time when various products should be available. The requirements for material, labour and equipment can then be established. The data is presented to the various divisions of the company, purchasing, industrial engineering, personnel, inventory control, sales and administration, always presenting them with the information needed by each department and in such a manner that it most effectively synchronizes their contribution to production facilities

Dyeing and Finishing

Findings: None of the mills exercise proper production planning.

8.7.3 PRODUCTION CONTROL

Findings: In 11% of the visited cotton mills exist efficient production controls, 33% have an incomplete system and in 56% production controls do not exist.

	COMPLETE	INCOMPLETE	NOT EXISTING
	%	%	%
Medium size mills	20	40	40
Small size mills	8	21	71
Total	11	33	56

In the mills with existing controls, production is controlled every week in 50% of the cases and every month in the other 50% of the mills.

Recommendations: Production control carries out the follow-up and comparison with the production plan to discover and remedy any deviation of the plan, assuring a correct delivery of finished goods. All deviations from the plan due to interruption and bottlenecks in the production lines or other reasons, and which can not be remedied, should be recognised in advance or at least as fast as possible with all their effects and sales department must be advised.

The production control has to control the sequence of operations, machine loading and scheduling planned, and to supervise availability of raw materials and machine capacity.

Dyeing and Finishing: Only one mill has a complete production control system.

3.7.4 STOCK LEVELS AND CONTROLS

Findings: The stock of all type of inventories is illustrated in a graphical form on the next page.

Stock levels of finished goods and stock in-process have been shown and commented already in the foregoing chapters.

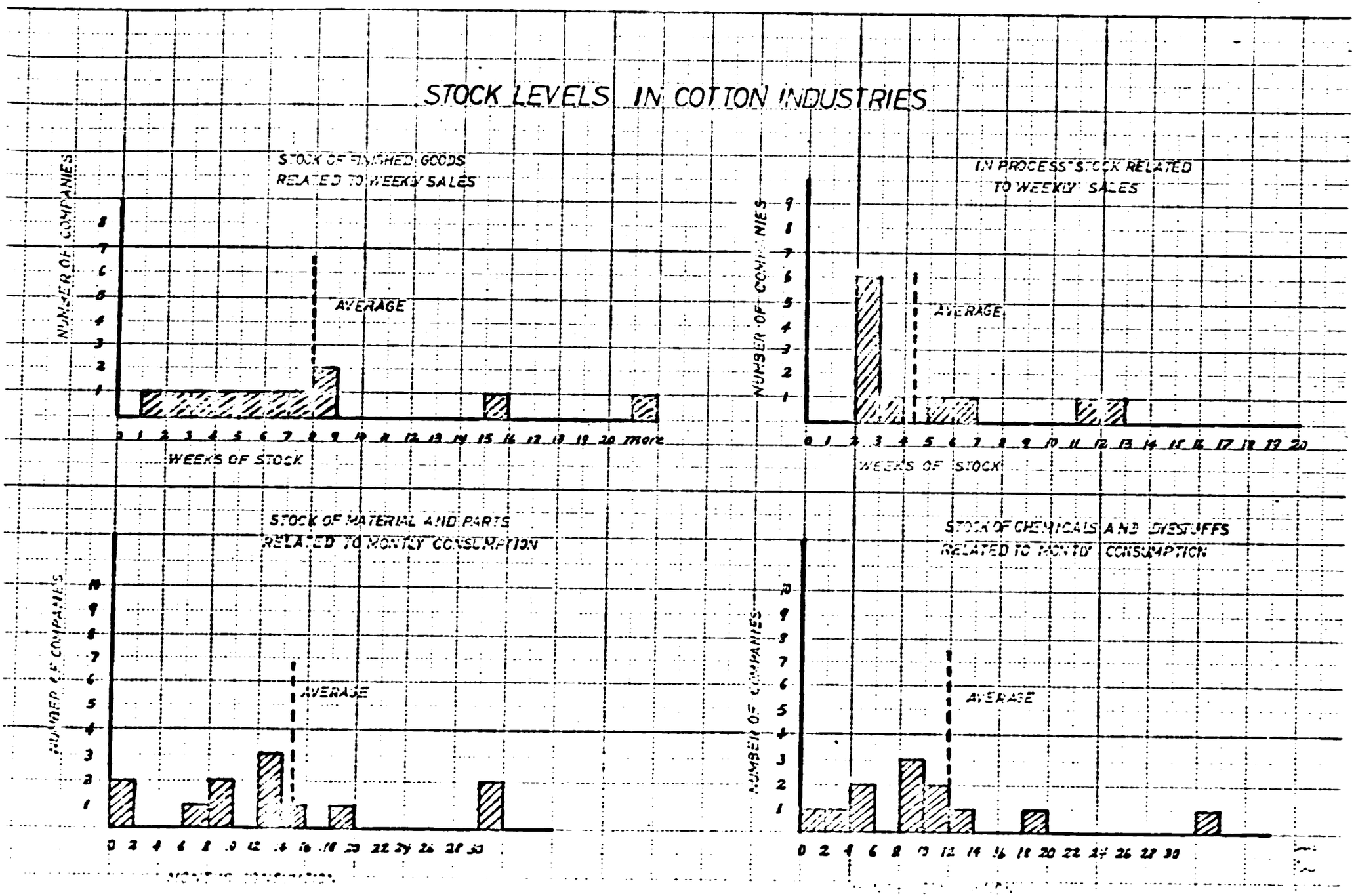
Stock of material and parts has been found to be on the average equivalent to 15,5 months of consumption, which is considered too high. Medium size mills show 18 months of consumption and small mills 14.

In spite of many difficulties from the moment, when spare parts are ordered until they are received and the resulting variance in lead time, a proper inventory control would reduce stocks appreciably.

In almost all the mills (80%) a kardex is used to control stocks, but not all the possibilities of use of a kardex are exploited. Maximum and minimum stock level, reordering points and economic lot sizes are not even known by most of the mills.

Stock of chemicals and dyestuffs: Stock of chemicals and dyestuffs was found to be equivalent to 10 months consumption in medium size mills, 13 months in small mills and 12 months on average. Also this should be considered as exaggerated, specially as there exist sucursals of suppliers of raw materials with some stock at hand. 85% of the mills use a kardex to control stocks, without using control levels.

STOCK LEVELS IN COTTON INDUSTRIES



3.7.5 PURCHASING

Findings: Only 17% of the medium size mills and 11% of the small mills have a purchasing department. 83% of the medium size mills and 50% of the small mills purchase on the basis of competitive bids, and 17% of the medium size and none of the small mills have complete statistics of previous purchases, quality of products delivered, terms of delivery and payments, prices, etc.

	Purchasing Depart.		Competitive Bids		Statistics		
	Yes %	No %	Yes %	No %	Comple-te	Incom-plete	No Exist
Medium size mills	17	83	83	17	17	33	50
Small size mills	11	89	50	50	-	25	75
Total	13	87	64	36	7	27	66

Purchase quantities for locally available items normally correspond to between one weeks and 1 months consumption and imported items to 6 months to one years consumption. In small mills it is generally the manager and in bigger mills the technician who proposes and the manager who buys all needed articles.

Recommendations: The technique of using economic lots and control levels is virtually unknown in Ecuador. An inventory control system, on which purchasing is based, can be developed the following way:

- Establish average consumption rates for every article
- Establish normal lead or reposition times
- Establish importance of every article or the risk of a loss, which could be provoked by an inventory stock-out.

- Establish control levels (minimum, maximum level and re-order points) based on former data
- Calculate economic purchasing quantities

Such an inventory control system has the following advantages:

- Reduces unnecessary stock
- Avoids stock - outs of important articles
- Purchases at the right moment
- Mechanizes and organizes purchasing, so all work involved can be done by relatively low level employees
- Purchases in quantities, which are most economic to the company.

3.8.0 SUPERVISION

Successful and profitable mill operation, anywhere, depends largely upon the quality of supervision.

Findings: It is one of the reasons for poor productivity and quality in Ecuador, that supervision in most of the mills is not adequate. Management does not seem to have a clear idea, in what a degree the profitability of a company can be bettered by good quality and well organized supervision and by technical knowledge and know-how of technical management. Not only small plants have been found technically in the hands of personnel grown out of the ranks of mechanics, operators or office personnel. On the other hand, as functions and authority have not been well defined, supervision cannot carry out all responsibilities it should.

Recommendations: As first step to improve this really unbearable situation it is recommended, that management has a clear organization chart developed. This chart has to show the functions of every supervisor at any level, to whom he has to report and who reports to him. Responsibilities have to be assigned in such a way, that an integrated supervision and control system results. Nobody should report to more than one person. Line and staff functions have to be separated clearly.

Being aware of all the responsibilities, which have to go into the hands of first line supervision, possibly the caliber of these important persons can be improved.

Again it is emphasized, that optimum performance of a company is only possible, when management knows about production possibilities and

costs. This information has to come primarily from technical personnel. Correct cost calculation and correct management decisions are based on these data. At the moment in the great majority of the visited mills most of these data are not correct or do not exist. Pricing of products and the appraisal of production situation by management therefore cannot be correct either.

Management's attitude towards supervision and specially towards first line supervision, has to undergo a change. Supervision must be made to feel that they really are a part of management and that their decisions play an important part in the success of the company. Once this feeling prevails, it should make it easier to encourage supervisors to act with authority, comply with responsibilities and undertake additional training, which is necessary in many cases. Management then can insist that correct information arrive at their tables, regarding all what concerns:

- Production
- Machine and labor productivity
- Efficiencies
- Costs
- Quality

The responsibilities of first line supervision have to include the following points:

- Standardization of all running conditions in all production departments, to the optimum possible
- Control that these conditions are maintained
- Control of raw material, waste

- Control of personnel
- Control of machinery conditions (maintenance)
- Inform about possibilities of production
- Establish production programs
- Control production programs
- Analyze all information regarding off standard condi tions and correct, if possible
- Inform management about performance of the mill, productivity costs, quality, etc.
- Establish correct work loads and piece rates, or incentives
- Give recommendations towards improvements of any kind
- Program modernization or replacements of machinery.

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SOCIAL CHARGES AS PERCENTAGE OF NET EARNINGS

SOCIAL CHARGES	ECUADOR	PERU	BRAZIL	ARGENTINA	COLOMBIA	CHILE
PAID DIRECTLY TO WORKERS						
Sunday Pay	18.94	17.30	18.34	-	10.00	18.20
Saturday Pay	9.47	-	9.17	-	-	-
Prima Textil	-	10.00		-	-	6.35
Vacation Pay	5.68	10.00	8.97	8.95	5.40	5.25
Holiday Pay	4.17	3.60	5.85	3.42	6.20	4.20
Profit Sharing	-	10.00	-	-	-	-
Family Allowance (Through Agency)	-	-	2.28	12.56	5.33	22.00
Sick Leave	-	-	-	3.55	2.55	-
13th Month Wage	11.36		11.70	9.65	10.95	-
14th Month Wage	11.36	-	-	-		-
TOTAL	60.98	51.70	56.31	38.13	49.51	56.20
PAID INDIRECTLY TO WORKERS						
Fondo de Reserva	11.36	-	-	-	-	-
Social Security	9.50	6.00	-	-	12.78	-
Pension (Jubilación)	-	3.00	8.00	18.84	4.30	2.00
Indemnization	-	12.12	22.00	2.70	23.65	-
Fondo Nac. Salud y Reserva Social	-	3.50	-	-	-	-
Stamps (Pro Desocupados)	-	1.00	-	-	-	-

..../..

4.0.0 THE SYNTHETIC FIBER CONSUMING INDUSTRY

4.0.0 THE SYNTHETIC FIBER CONSUMING INDUSTRY

Definition: In this section all those companies are included, whose machinery is adapted to spin and weave pure synthetic fibers.

In total 4 industries of this kind were found, whose capacity installed is 7.424 spindles and 170 looms.

4.0.1 DISTRIBUTION OF COMPANIES BY TYPE

One company was an exclusive spinning mill, another had spinning and minor capacity in weaving and 2 were filament weaving mills. All factories owned some type of yarn or cloth finishing equipment.

4.1.0 RAW MATERIALS

Findings: No artificial or synthetic fiber is produced in Ecuador. All the raw material is obtained through the local representatives of the producers in foreign countries.

The following table shows the importation of synthetic fiber in last years:

TYPE OF FIBER	IMPORTATION IN KGS. 1968/69	1969/70	1970/71	Up to Moment
Rayon Viscose	2.053.855		206.982	
Rayon Acetate	214.678		105.435	
Polyamides	605.282		165.929	
Polyesters	240.016		185.776	
Acrylics	1.223.935		598.000	
Polyacrilics	188.477		52.000	
Polyvinylics			45.000	
TOTAL	4,627,243	7,632,856 *	1,359,122	

SOURCE: Ministerio de Industrias

* Detailed data were not possible to obtain.

The principal countries of origin are:

Polyacrilics	Germany, U.S.A.	In this order
Polyesters	Germany, Japan, U.S.A.	
Acrylics of Rayon	Japan, Germany, U.S.A.	

SOURCE: Ministerio de Industrias y Comercio, and Importers

Not all these fibers are consumed in the industry described in this chapter.

The greatest part of rayon and polyester imported is consumed in staple form by the "Cotton Industry" for blends.

Polyamides are used also in the knitting industry in form of filament, texturized and straight.

Nearly all the acrylic is imported by the spinning industry described in this chapter, in tow form.

Weaving industry uses rayon filament and nylon, texturized and straight.

The import taxes for these fibers are the following:

F I B E R S:

Rayon Viscose Filament	1.20 sucres/kg. net
Rayon Viscose Staple	1.00 sucre /kg. "
Rayon Acetate Filament	1.20 sucres/kg. "
Rayon Acetate Staple	1.00 sucre /kg. "
Polyamides Filament	1.20 sucres/kg. "
Polyamides Staple	1.40 sucres/kg. "
Polyester Filament	1.20 sucres/kg. "
Polyester Staple	1.40 sucres/kg. "
Acrilics tow	1.20 sucres/kg. "
Acrilics Top	1.20 sucres/kg. "

SOURCE: Arancel de Importación.

An additional tax of 20% ad-valorem has been abolished after the recent devaluation of the Ecuadorian sucre.

COMPARISON OF PRICES WITH OTHER COUNTRIES

FIBER	PRICE U.S. DOLLAR/Kg. CIF							
	ECUADOR	PERU	MEXICO	BRAZIL	ARGEN.	COLOM.	CHILE	U.S.A.
Rayon Viscose Staple	0.555	0.705	0.880	0.889	1.287	0.797	1.179	-
Rayon Viscose 150 den. Filament	1.23	2.870	1.996	1.720	2.717	-	2.519	2.05
Rayon Acetate Staple	0.90	1.175	1.040	1.721	1.287	1.414	2.900	-
Rayon Acetate 150 den. Filament	1.25	2.990	2.080	3.497	2.974	2.138	5.575	1.52
Polyester 3 den. Staple	0.90	2.396	2.400	2.701	3.632	2.331	-	1.37
Acrylic Tow	1.12	1.772	2.960	4.114	6.590	-	-	-
Acrylics Top	1.15*	2.161	2.720	3.581	5.590	-	4.690	-
Nylon Filament	1.55	-	-	-	-	-	-	-

* Staple

SOURCE: Perú, Mexico, Brazil, Argentina, Colombia, Chile: Werner, Comparati Study of Werner 1967; Perú 1968

U.S.A.: Rayon Celenase
ECUADOR: Ministerio de Industrias y Comercio.

Recommendations: It is of principal advantage for the Ecuadorian synthetic fiber consuming industry, as can be seen in the foregoing table, that no producer has yet established a factory in Ecuador. This provokes, that Ecuador buys these fibers at international prices and at a high quality level. It has been observed, that synthetic fiber producing companies established in South America cannot produce fibers at international price levels and also quality of products is frequently not comparable to international standard.

It is therefore advisable to maintain these favorable condition for Ecuadorian industries, until there is a fiber producer willing to install in Ecuador and who guarantees quality and prices equal to international standard.

As soon as the Andean Market is realised, Article No. 104 of the "Convenio de Cartagena" applies which says, that: Ecuador as a country of comparably little industrial development starts the reduction of import taxes for imported goods from other Andean cuntries only December 31, 1976 and will reach minimum, December 31, 1985. This definitely puts Ecuador in a very favourable position, when buying raw materials like nylon and polyester at a cheaper price.

4.2.0 [redacted]

4.2.1 [redacted]

Definition of Terms: Also in this branch machinery has been grouped into modern, medium age and old or obsolete machinery, as already described in "The Cotton Industry".

Findings: Spinning and yarn finishing

The following table shows the findings in the different spinning and yarn finishing departments:

DEPARTMENT	UNITS Mod.	Mod.	Can be	Obs.	Tot.	% Mod.	Mod.	Can be	Obs.	Tot.	TYPE OF UNIT
FIBER PREPARATION:											
Converting	4	-	-	-	4	100	-	-	-	100	Machines
Cutters	1	-	-	-	1	100	-	-	-	100	Machines
Cards	1	1	-	-	2	50	50	-	-	100	Cards
Intersectings	11	8	-	-	19	58	42	-	-	100	Deliveries
Finisseurs	122	-	-	-	122	100	-	-	-	100	Heads
Ringframes	7.424	-	-	-	7.424	100	-	-	-	100	Spindles
Cone Winders	220	-	-	112	332	66	-	-	34	100	"
Hank Winders	7	-	-	5	12	58	-	-	42	100	Machines
Hank to Cone Winders	552	-	-	-	552	100	-	-	-	100	Spindles
Twisters	2.520	-	-	-	2.520	100	-	-	-	100	"
WEAVING PREPARATION:											
Quillers	82	64	-	-	146	56	44	-	-	100	spindles
Warpers	1C 2S	1C	-	-	4	75	25	-	-	100	Warpers
Slashers	-	-	2C	-	2	-	-	100	-	100	Slashers

C = Continous Type, S= Sectional Type

C= Cylinder Slasher

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DISTRIBUTION OF LOOMS BY TYPE, WIDTH AND AGE

TYPE OF LOOM	- 50"				51-70"				71-90"				91" -				TOTAL			
	Mod.	M.A.	Old	Tot.	Mod.	M.A.	Old	Tot.	Mod.	M.A.	Old	Tot.	Mod.	M.A.	Old	Tot.	Mod.	M.A.	Old	Tot.
Units																				
Cam	-	-	-	-	-	-	-	-	10	-	-	10	-	-	-	-	19	-	-	10
Dobby	-	18	-	18	48	94	-	142	10	-	-	10	-	-	-	-	58	112	-	170
Jacquard	-	10	-	10	-	-	-	-	-	10	-	10	-	-	-	-	-	20	-	20
TOTAL	-	28	-	28	48	94	-	142	20	10	-	30	-	-	-	-	68	132	-	200
%																				
Cam				-				-				33				-				5
Dobby				64				100				33				-				85
Jacquard				36				-				33				-				10
TOTAL	-	100	-	100	34	66	-	100	67	33	-	100	-	-	-	-	34	66	-	100

Distribution of looms by manual and automatic:

Manual looms: 20= 10%

Automatic : 180= 90%

Distribution of looms by one shuttle and several shuttle looms:

One shuttle looms: 102 = 51%

Several Shuttle looms: 98 = 49%

Observation: The general condition and age of machinery, can be considered as good and comparable to South America averages. As the pure synthetic fiber consuming industry does not exist a long time yet, machinery in general is newer than in the cotton or wool industry

Dyeing and Finishing: The table No. 1 shows, divided by sections, an inventory of the machinery.

In each section, we have classified the machines in 3 groups (*) as follows:

- Modern
- Old
- Obsolete

From the table No. 1 , we observed:

- Small dyeing - finishing sections
- Very good hank dyeing equipment

(*) Refer to the remark made on the cotton industry.

(Cont.)

SOCIAL CHARGES AS PERCENTAGE OF NET EARNINGS

SOCIAL CHARGES	ECUADOR	PERU	BRAZIL	ARGENTINA	COLOMBIA	CHILE
PAID INDIRECTLY TO WORKERS						
Accident Insurance	-	-	1.00	-	-	2.17
SENATI (Training Program)	-	1.00	1.00	1.18	2.66	-
Fondo de Ahorro	-	-	-	-	-	-
Fondo de Garantía (Stribes)	-	-	-	-	-	-
Coalición Obrera	-	-	-	-	-	-
Education	-	-	0.76	-	-	0.75
SESI (Servicio Social de Ind.)	-	-	1.44	-	-	-
Depósito de Reciseo Sem Justa Causa	-	-	1.00	-	-	-
Fondo de Farmacia	-	-	-	0.94	-	-
Others	-	-	2.50	-	3.02	-
TOTAL	20.86	26.62	37.70	23.66	46.35	22.17
TOTAL	81.84	78.32	94.01	61.79	95.86	77.37

SOURCE: ECUADOR AND BRAZIL - CENDES , Quito
Others - WERNER STUDY 1967 and 1970

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APPRAISAL OF EXISTING MACHINERY AND EQUIPMENT

Dyeing - Finishing : Synthetic Fibers

TABLE : 1

SECTION	MACHINE	Number Of Machines	PERCENT Modern	Old	Obsolete
Yarn Dyeing	Hank Dyeing	5	100		
	Hank Dryer	1	100		
	Hydro Extractor	3	66,5	33,5	
Piece Dyeing	Winches	2		100	
	Jiggers	11	72,5		27,5
	High Temperature Beam Dyeing	1	100		
	Beaming Machine	1	100		
	Dyeing Pad	1		100	
Piece Finishing	Finishing Range	1	100		
	Can Dryer	1			100
	Calender	1			100

4.2.2 DEGREE OF AUTOMATION

Definition : Automation includes most of the points already mentioned under "The Cotton Industry" with the exception of the few points exclusively referring to cotton spinning equipment (Blow Room).

Findings: 33% of the intersectings were equipped with autoleveller devices.

No automatic transport system, doffing at ring frames, automatic winding and shuttleless looms exist.

Dyeing and Finishing : The table that follows shows, the degree of automation for various machines.

SECTION	MACHINE	DEGREE OF AUTOMATION		
		Good	Medium	Poor
		%	%	%
Yarn Dyeing	Hank Dyeing	100		
	Hank Dryer	100		
	Hydro Extractor	66,5	33,5	
Piece Dyeing	Winches			100
	Jiggers		72,5	27,5
	High Temperature Beam Dyeing	100		
	Beaming Machine	100		
	Dyeing Pad		100	
Piece Finishing	Finishing Range	100		
	Can Dryer			100
	Calender			100

4.2.3 ATMOSPHERIC CONTROLS

Findings: Atmospheric controls were not found in this industry. Synthetic fibers are in general more propense to static electricity and great difficulties specially in spinning are found if correct humidity is not maintained. As Ecuador climate is never extremely adverse to proper conditions mills have not yet considered the installation of atmospheric controls, which would certainly improve running conditions.

4.2.4 LAY-OUT OF MACHINERY

Findings: The following table shows the findings on lay outs in the different sections:

	GOOD	FAIR	POOR
Spinning	50%	50%	-
Weaving	67%	33%	

Recommendations: Synthetic fiber consuming industry is, equally as knitting, a rapidly growing industry branch and on buying new machinery or erecting new plants lay-outs should be designed in such a manner, that future expansions can be considered. Very small buildings without proper terrain to expand should be abandoned right from the beginning.

4.2.5 PRODUCTION FLOW, MATERIAL HANDLING EQUIPMENT, STORAGES

Findings: Also here in this relatively expensive fibers consuming industry the same defects were encountered as in the Cotton Industry, poor handling without adequate mechanisation and containers, as well as poorly and badly organized storage were the main points observed.

The following table shows the appraisal of material handling and storage:

	MATERIAL HANDLING			STORAGES		
	Good	Fair	Poor	Good	Fair	Poor
Spinning	-	100%	-	-	100%	-
Weaving	-	67%	33%	-	33%	67%

Dyeing and Finishing : Due to the small size of the installations surveyed, we consider the present lay-out and production flows as satisfactory.

4.2.6 EVALUATION OF TECHNICAL PROCESSES

Findings: The spinning industry consuming synthetic fibers uses exclusively acrylics. The spinning system is a worsted type, starting from tows which are cut and produced into sliver in cards. Yarn is dyed on hanks, which is normal in acrylics and notopdyeing was found. Generally 3 passages of interaectings and finisseurs are used as preparation.

The weaving industry uses filament acetate, viscose and nylon, texturized or straight. Processing as in spinning, was encountered efficient, with exception of slashing, which was not adequate due to the age of machinery used.

4.2.7 RECOMMENDATIONS FOR REPLACEMENT AND MODERNIZATION OF MACHINERY

Concerning the age of the machinery no modernization is necessary, with the exception of the slashing departments. The type of equipment found was adequate. In future expansion in spinning the balance of equipment should hold a high priority.

4.2.8 PRODUCTION

The following is the production of the mills visited in the synthetic fiber consuming industry.

Spinning: 800.000 Kgs. of 40^s metric count (acrylics)
Weaving : 1.700.000 m. of acetate, viscose and nylon filament cloth.

Observation: The biggest spinning mill in this sector did not provide us with their production figures.

4.2.9 BALANCE OF PRODUCTION

Findings: 50% of the spinning mills run in balance. The other 50% have too high spinning preparation capacity. Weaving sections have been found balanced with a slight surplus capacity in warping.

Dyeing and Finishing : The necessary data to calculate a balance of production was unavailable.

This is a significant indication that the companies are working without any control and planning.

4.2.10 DEGREE OF UTILIZATION

Findings: The average utilization of machinery in the different departments has been the following:

DEPARTMENT	UNITS	No. OF UNITS CONS.	% OF UTILIZATION
Spinning Prep.:			
Converters	Machines	4	67
Cutters	"	1	67
Cards	"	2	67
Intersecting	Deliveries	37	70
Finisher	Reads	160	83
Ring Frames	Spindles	7.424	90
Cone Winders	"	332	67
Hank Winders	Machines	12	80
Hank to Cone Winders	Spindles	408	67
Twisters	"	2.520	73
Weaving and Pre.:			
Quilters	Spindles	146	83
Warpers	Machines	4	83
Slashers	"	2	50
Manual Looms	Looms	20	33
Autom. "	Looms	180	83

Observation: It has been found, that in the spinning and weaving preparation in some mills the working time was excessive considering the capacity installed and the one required.

Dyeing and Finishing :

Findings : The degree of utilization shown in table No. 2 has been expressed for each type of machine.

We observed:

- The yarn dyeing equipment has a very good degree of utilization.
- Most of the piece dyeing equipment is utilized only one shift

TABLE 2

SECTION		NUMBER OF MACHINES	DEGREE OF UTILIZATION %
Yarn Dyeing	Hank Dyeing	5	100
	Hank Dryer	1	100
	Hydro Extractor	3	77,5
Piece Dyeing	Winches	2	33,5
	Jiggers	11	33,5
	High temperature Beam Dyeing	1	100
	Beaming Machine	1	100
	Dyeing Pad	1	33,5
Piece Finishing	Finishing Range	1	100
	Can Dryer	1	33,5
	Calender	1	33,5

4.2.11 DEGREE OF PRODUCTIVITY

Findings: It was impossible to obtain the necessary data to calculate productivity figures from the biggest spinning mill consuming synthetic fibers.

In the rest of the companies the degree of productivity has been the following:

Intersectings:	70 %
Finisseurs:	30,6%
Ring Frames:	64,5%
Looms:	68,2%

For recommendations compare the following chapter

4.2.12 MACHINE PRODUCTIVITY RATES

SPINNING :

Findings: The average machine productivity rate found was 26,4 grams/spindle hour for an average count of 40^s metric. This rate is only very little below South American Standards.

Recommendations: The correct ring size should be considered in future purchasing of spinning machinery. A ring size of 57 mm. or maximum 60 mm. is appropriate for 40^s metric.

WEAVING :

Findings: The average machine productivity rate, expressed in 1000 m. of weft inserted per loom hour, was 7.0. This productivity, under actual conditions, could be increased by 39%, thus reaching 9,8 x 1000 m/loom hour.

The productivity rates described in this chapter are weighted by the production of the companies.

Recommendations: The reasons for the low productivity rates should be encountered, analysed and remedied. From observations during the visits made it seems very probable, that a proper production planning system could improve overall efficiencies and productivity rates considerably.

3.3.9 FORM OF WORK ASSIGNMENTS AND WORK LOADS

Findings: In 17% of the medium size mills and 8% of the small mills (average 10%) work loads are assigned by Industrial Engineering methods. All the other companies use the experience of their technical staff or just try to increase low appearing work loads by dealings with the unions, without any realistic base. It is of no wonder, that workloads in general are very low and at different levels in the different job classifications.

Recommendations: Industrial Engineering methods, basing themselves on best possible working conditions, time studies and calculations of work loads give management a scientific tool to level workloads and to pay correct piece-rates or incentives.

Average Work Assignments: The following table shows the average work assignments in Ecuadorian cotton mills.

4.3.0 LABOUR

4.3.1 CHARACTERISTICS OF ECUADORIAN LABOUR FORCE

Supply of Labour

Refer to section 3.3.1

Absenteeism and Labour Turnover

Findings: The average percentage of absenteeism was found to be 4.5%. About labour turnover no data could be obtained and it is very probable that figures are in the same range as described under 3.3.1.

Training and Retraining

Findings: No training and retraining program exists in this industry. The recommendations given under 3.3.1 apply in the same way in the synthetic fiber consuming industry.

4.3.2 WAGE RATES

Findings: The average basic wage in spinning was 4.1 sucres/hour or 16.4 U.S. cents, in weaving 6.5 sucres/hour or 26 U.S. cents and in total average 5 sucres/hour or 20 U.S. cents. The wages are therefor very similar to those found in the cotton industry.

The following table shows the basic wage rates by job classification. Comparison of spinning operator wages with international ones can be referred to 5.3.2 . For filament weaving operations a table is added, comparing Ecuadorian wages with those of Perú, México, Brasil, Argentina, Colombia and Chile.

BASIC WAGES IN THE SYNTHETIC FIBER CONSUMING INDUSTRY

JOB CLASSIFICATION	OPERATORS CONSIDERED	HOURLY WAGE SUCRES/HOUR			Hourly Wage US Cents Average
		Max.	Min.	Average	
Converter Tender	4	6.3	3.5	4.9	19.6
Cutter Tender	2	-	-	3.5	14
Card Tender	4	-	-	3.5	14
Intersecting Tender	32	3.5	3.3	3.5	14
Finisseur Tender	9	3.5	3.1	3.4	13.6
Spinner	51	5.6	3.5	3.9	15.6
Cone Winder	12	-	-	3.5	14
Twister Tender	34	3.5	3.1	3.4	13.6
Hank Winder Tender	54	3.7	3.5	3.6	14.4
Hank to Cone Winder	4	-	-	3.5	14
Mechanic	4	-	-	28.4	113.7
Sweeper	4	-	-	3.5	14
TOTAL	214			4.1	16.4
Warper Tender	9	6.6	3.5	4.8	19.2
Warper Helper	2	-	-	3.7	14.8
Slasher Tender	5	7	4.4	6.5	26
Quiller Tender	14	5.7	3.5	4.7	18.8
Quiller Helper	4	-	-	3.7	14.8
Weaver	51	9.1	4.5	7.5	30
Battery Hand	6	-	-	4.6	18.4
Knotter	4	5.7	4.4	5.5	22
Drawing In	10	7.4	3.5	4.2	16.8
Oiler	3	4.6	3.7	4	16
Cleaner	3	-	-	4.6	18.4
Mechanic	13	34.1	7.5	12.4	49.6
Cloth Reviser	7	8	4.4	5.9	23.6
Cloth Buffer	2	-	-	3.5	14
TOTAL	133			6.5	26
TOTAL GENERAL	347			5.0	20

WAGES PAID ON HOURLY BASES IN U.S. CENTS ARTIFICIAL AND SYNTHETIC FILAMENTS WEAVING

	ECUADOR			PERU		MEXICO	BRAZIL		ARGENTINA		COLOMBIA		CHILE	
	Max.	Min.	Av.	Max.	Min.	Std.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Winding and Twisting														
Cone Winding	-	-	-	41.60	28.87	44.96	-	-	38.57	31.43	22.82	18.28	52.17	36.52
Twister Tender	-	-	-	-	-	40.24	-	-	34.28	31.43	22.82	19.45	-	-
Pirn Winder Tender	22.80	14.00	18.80	56.63	33.38	32.00	23.71	20.00	35.71	32.86	22.09	18.90	36.52	32.17
Oiler	-	-	14.00	-	-	29.04	-	-	-	-	20.86	20.55	25.56	-
Sweeper	-	-	14.00	-	-	27.20	-	-	-	-	19.63	17.18	20.52	-
Beaming and Slashing														
Warper Tender	26.40	14.00	19.20	49.92	43.41	50.00	25.93	22.96	45.71	35.71	23.44	22.27	52.17	36.52
Warper Helper	-	-	14.80	-	-	27.20	20.00	-	52.86	-	22.27	18.28	-	-
Slasher Tender	28.00	17.60	26.00	49.55	38.30	52.80	29.62	23.71	50.28	41.71	29.69	23.37	49.56	33.04
Slasher Helper	-	-	-	37.09	32.60	31.20	22.22	20.00	42.86	38.28	25.46	20.00	26.09	-
Size Mixer	-	-	-	37.09	32.60	31.20	22.22	20.00	42.86	-	26.87	24.36	26.09	-
Drawing - in	29.60	14.00	16.80	41.22	30.65	42.88	23.71	20.00	37.14	-	24.97	24.54	36.52	25.22
" " Helper	-	-	14.00	27.62	25.54	27.60	20.00	-	36.28	-	23.80	18.28	26.09	25.22
Knotter	22.80	17.60	22.00	63.84	45.33	49.04	27.78	-	42.86	40.86	26.07	21.72	49.56	36.52
Weaving														
Weaver	36.40	18.00	30.00	66.44	44.76	63.20	48.15	26.67	51.43	40.00	29.14	25.46	69.56	55.66
Tackler	-	-	-	77.98	50.74	42.80	29.63	-	-	-	26.07	20.00	-	-
Tackler Assistant	-	-	-	45.33	38.00	31.20	23.71	-	-	-	-	-	-	-
Smash Hand	-	-	-	39.57	33.79	31.60	23.71	-	-	-	24.36	20.55	-	-
Battery Hand	-	-	18.40	45.33	29.35	28.80	25.93	-	37.14	36.28	22.27	18.90	37.39	20.52
Cloth Carrier	-	-	14.00	24.11	22.98	29.04	20.00	-	26.00	23.80	17.73	21.61	20.52	
Cloth Reviser	32.00	17.60	23.60	31.35	29.35	27.44	25.93	18.52	40.00	-	23.44	20.00	-	-
Oiler	18.40	14.80	16.00	38.38	28.65	29.04	20.00	-	36.28	-	22.82	20.00	25.56	20.52

.../.

(Cont.)

WAGES PAID ON HOURLY BASES IN U.S. CENTS ARTIFICIAL AND SYNTHETIC FILAMENTS WEAVING

	ECUADOR			PERU		MEXICO	BRAZIL		ARGENTINA		COLOMBIA		CHILE	
	Max.	Min.	Av.	Max.	Min.	Std.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Weaving														
Sweeper	-	-	14.00	25.62	25.32	27.20	20.00	-	35.71	-	21.35	16.75	20.52	-
Mechanic	136.00	30.00	49.60	77.98	50.74	-	-	-	-	-	47.79	32.33	65.21	36.52

SOURCE: Wage Structures Werner 1967

Dyeing and Finishing:

Findings: In the three plants we surveyed we found the following labor complement.

Total Direct - Indirect Workers	
D.F Synthetic Fibres Industry	33

Average Wage Paid (*) : S/ per hour : 6.32

Maximum Wage Paid: S/ per hour : 10.00

(*) Excluding social welfare and fringe benefits.

4.3.3 SOCIAL CHARGES AND FRINGE BENEFITS

Refer to 3.3.3

4.3.4 WORKLOADS AND WORK ASSIGNMENTS

Findings: The average workload of spinning operators has been found to be 54%, in weaving 64%. Workloads are assigned by decision of management and no industrial engineering methods are used. Latter would be the only way how to prove scientifically these extremely low workloads and would form a base for conversations with the workers' unions in order to improve present situation.

The following table shows the average workloads encountered:

JOB CLASSIFICATION	OPERATORS CONSIDERED	WORKLOAD ON AVERAGE
Spinning and Yarn Finishing		
Converter Tender	4	1.5 machines/operator
Cutter Tender	2	1 " "
Card Tender	4	1 " "
Intersecting Tender	32	1.2 " "
Finishing Tender	9	32 " "
Ring Frame Tender	51	381 spindles/operator
Ring Frame Doffer	6	1.000 " "
Cone Winder (Manual)	12	32 " "
Twister Tender	14	371 " "
Hank Winder	57	0.5 machines/operator
Weaving		
Warp Tender	11	0.5 machines/operator
Slasher Tender	5	0.5 " "
Quiller Tender	14	21 spindles/operator
Weaver Tender	61	8 looms/operator
Battery Hand	6	91 " "
Oiler	3	60 " "
Mechanic	13	33 " "
Knotter	4	71 " "

4.3.5 LABOUR PRODUCTIVITY RATES

Spinning:

Findings: The average labour productivity rate encountered was 4,6 Kgs/operator hour at an average count of 40^s metric.

This rate, under actual conditions, could be bettered by 126%, reaching 10,4 Kgs. which would almost meet South American Standards.

Recommendations: An Industrial Engineering Department should establish correct workloads and a standard labour complement. The increased productivity rate of 10.4 Kgs/operator hour could then be achieved by reduction of superfluos personnel.

Weaving:

Findings: The actual labour productivity rate was 19,4 x 1000 m. of weft inserted per operator hour.

Under actual conditions this rate should be 41 x 1000 m. per operator hour, therefore 111% higher, but still about 20% below South American Standards.

Recommendations: Increase machine efficiencies by proper production planning, quality control, work organisation and maintenance. Increase workloads to 100%.

4.3.6 LABOUR COST

Findings: The following tables show the labour cost under actual and improved conditions in spinning and weaving.

[illegible]	[illegible]	[illegible]	AVERAGE WAGE SUCRES/HOUR	LABOUR COST SUCRES/Kg. Or /1000m.	OBSERVATIONS
Spinning	4,6	Kgs/op. hour	4.1	0.89	Actual Conditions
Spinning	10,4	" " "	4.1	0.39	Improved Cond.
Weaving	19,6	1000 m./op. hour	6.5	0.34	Actual Conditions
Weaving	41,0	" " " "	6.5	0.16	Improved Cond.
Labour Cost including Social Charges:					
Spinning	4,6	Kgs./op. hour	7.5	1.63	Actual Conditions
Spinning	10.4	" " "	7.5	0.72	Improved Conditions
Weaving	19.4	1000 m./op. hour	11.8	0.61	Actual Conditions
Weaving	41.0	" " "	11.8	0.29	Improved Cond.

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4.4.0 QUALITY OF PRODUCTS

Findings: The quality of products produced by the synthetic fiber consuming industry, in general, has been found to be up to international standards, what spinning and weaving concerns, primarily due to the use of high quality imported raw materials.

4.5.0 MANUFACTURING CONTROLS

4.5.1 QUALITY CONTROL

Findings: A complete and organized quality control program does not exist in any of the visited companies. As in the cotton industry, lack of testing equipment could be stated. In spinning only count tests and some ocasionally executed strength tests and in weaving break tests at looms (in 33% of the mills) are done.

In the following table the conditions respecting quality control can be appreciated:

	LABORATORY EQUIPMENT		QUALITY CONTROL SYSTEM		
	Complete %	Incomplete %	Good %	Incomplete %	Not Exist. %
Spinning	-	100	-	50	50
Weaving	-	100	-	33	67
TOTAL	-	100	-	50	50

Dyeing and Finishing: Refer to "The Cotton Industry"

Recommendations: The same observations and testing program as found under 3.5.1 apply also to the synthetic fiber consuming industry.

4.5.2 LABOUR COST CONTROL

Findings: Only in 25% of the companies a labour cost has been found which, however, does not use standards.

LABOUR COST CONTROL

	COMPLETE	INCOMPLETE	NOT EXISTING
Spinning	-	-	100
Weaving	-	33	67
TOTAL	-	25	75

4.5.3 MACHINE EFFICIENCIES

Findings: The following table shows the findings on the control of machine efficiencies:

CONTROL OF MACHINE EFFICIENCIES

	COMPLETE	INCOMPLETE	NOT EXISTING
Spinning	-	-	100
Weaving	33	33	33
TOTAL	25	25	50

Recommendations: Machine efficiencies should be calculated in all the departments every certain period and compared with standard values.

AVERAGE WORK ASSIGNMENTS IN ECUADORIAN COTTON MILLS

JOB CLASSIFICATION	UNITS	MEDIUM SIZE		SMALL SIZE		TOTAL	
		No. Oper. Considered	Units/ Opert.	No. Oper Considered	Units/ Opert.	No. Oper. Considered	Units/ Opert.
Feeder	Feeders	15	2.9	4	2.3	19	2.4
Blow Room Tender	Aut. Scutchers	5	3.3	1	1	6	2.9
Blow Room Tender	Man. Scutchers	4	1	6	1	10	1
Card Room Tender	High Prod. Cards	12	15	-	-	12	15
Card Room Tender	Low Prod. Cards	21	9	23	5	44	7
Comber Tender	Combers	5	1.6	3	2	8	1.8
Draw Frame Tender	High Sp. Deliveries	18	7.3	9	3.3	27	6
Draw Frame Tender	Low Sp. Deliveries	2	20	10	10	12	11.7
Roving Frame Tender	Spindles	26	241	39	110	65	168
Roving Frame Doffer	Spindles	6	405	-	-	6	405
Ring Frame Tender	Spindles (carded)	110	1.160	90	590	200	891
Ring Frame Tender	Spindles (combed)	8	816	3	2.250	11	1.328
Ring Frame Doffer	Spindles	52	2.574	12	1.374	64	2.350
Cone Winders	Spindles Autom.	24	47	-	-	24	47
Cone Winders	Spindles Manual	93	32	75	34	168	33
Doubler Tender	Spindles Manual	-	-	5	21	5	21
Twister Tender	Spindles	13	602	29	315	42	404
Warper Tender	Warpers	23	1	15	1	38	1
Slasher Tender	Slashers	19	1	10	1	29	1
Quiller Tender	Spindles Autom.	11	56	3	20	14	48
Quiller Tender	Spindles Semiautom.	16	31	9	15	39	27
Quiller Tender	Spindles Manual	-	-	39	15	39	15

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4.5.4 PREVENTIVE MAINTENANCE

Findings: A serious lack of preventive maintenance programs could be stated also in this industry.

PREVENTIVE MAINTENANCE PROGRAM

	COMPLETE	INCOMPLETE	NOT EXISTING
Spinning	-	100	-
Weaving	-	67	33
TOTAL	-	75	25

Recommendations: Refer to 3.5.4

4.5.5 WASTE CONTROL

Findings: The irrecuperable waste is weighed for selling purposes. No periodic waste control program with standards was found

WASTE CONTROL

	COMPLETE	INCOMPLETE	NOT EXISTING
Spinning	-	100	-
Weaving	-	100	-
TOTAL	-	100	-

General Observation: Out of the results shown in this chapter it can be recognized clearly, that the same conditions as in the cotton industry prevail in the aynthetic fiber consuming industry.

Management does not put any value in and does not know of the advantages of proper manufacturing controls. Production sections are practically run by itself without any coordination with the directing part of the company.

4.6.0 COST CONTROLS

Refer to 3.6.0

4.7.0 PRODUCTION PLANNING AND CONTROLS

4.7.1 COORDINATION BETWEEN SALES AND PRODUCTION

The same observations as stated under 3.7.1 apply also to this industry.

4.7.2 PRODUCTION PLANNING

Findings: Production planning in the synthetic fiber consuming industry has the advantage of an even better market than the cotton industry has. All the industry produces against both stock and orders, but the amount of orders at hand is great and the production capacity producing for stock is negligible.

In spite of that, production planning is not well organised and shows defficiencies in many aspects. Production schedules in general, are not elaborated periodically and article changes are decided by management or sales at any moment. Because of that, high machine downtime and no correct planning of raw material supply was found.

25% of the mills give production orders weekly, 25% monthly and 50% elaborate no periodical production orders.

4.7.3 PRODUCTION CONTROLS

Findings: 25% of the visited mills control their production regularly, 25% elaborate information about production, without difference analysis with a production forecast and 50% do not control production at all.

Observations: In the industry described in this chapter a special lack of administrative personnel to do manufacturing controls, production controls and planning has been encountered. The organization in this respect is even worse than the one found in the cotton industry.

4.7.4 INVENTORY LEVELS AND CONTROLS

Findings: Stock of finished goods has been found on the average equivalent to 2-3 weeks of sales, which is little and confirms the good sales demand actually existing in Ecuador for the types of products produced in this industry.

In process stock was equivalent to about two weeks of sales, which also is excellent.

Spare parts and other materials stock was around 6 months consumption, and considered normal under the prevailing conditions.

Stock of chemicals and dyestuffs on the average was found equivalent to 8-9 months consumption, which is more on the high side.

All the mills use a kardex to control their spare parts and chemicals inventory. No control limits are used. Only 29% of the companies use some guide level for the reordering of items.

4.8.0 PURCHASING

Findings: 25% of the mills have a purchasing manager. In all the other industries the general manager himself does all the purchasing. All the companies purchase on the basis of competitive bids. The quantity bought is established in accordance with consumption rates. Purchasing in economic lots is not done in any company. 50% of the mills maintain statistics on previous sales, prices, suppliers, etc.

4.9.0 SUPERVISION

Refer to 3.9.0

General Observation: As to all manufacturing controls, cost and production controls, purchasing and supervision, the same recommendations are valid for the synthetic fiber consuming industries as those already described in the cotton industry.

3.0.0 THE WOOL INDUSTRY

5.0.0 THE WOOL INDUSTRY

Definition: In this section all those companies are included, whose machinery is adapted to spin and weave pure wool or wool blends with man made fiber. The spinning part is subdivided in companies with a woolen or a worsted spinning system.

In total, 10 companies with 16.804 spindles and 322 looms have been visited.

5.0.1 DISTRIBUTION OF COMPANIES BY SIZE

The wool industry in Ecuador is proportionally smaller than the cotton industry. Only two companies which together cover nearly 69% of the total capacity visited, reach really industrial size levels.

The following graphic illustration shows the distribution of companies by size in spinning and weaving.

5.0.2 DISTRIBUTION OF COMPANIES BY TYPE

30% of the companies visited and including the two biggest plants are combined woolen and worsted spinning and weaving plants. 50% of the companies are woolen spinning and weaving and 20% worsted spinning and weaving.

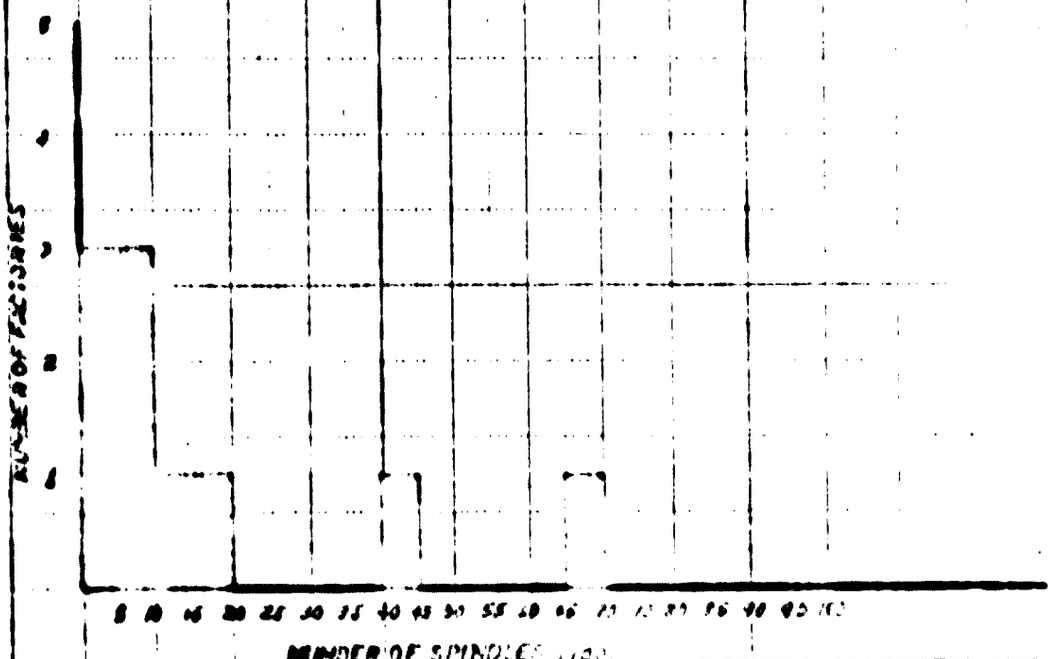
In the case of the companies with woolen and worsted spinning the two sections are considered as seperatd plants.

70% of the wool industries have dyeing and finishing installations.

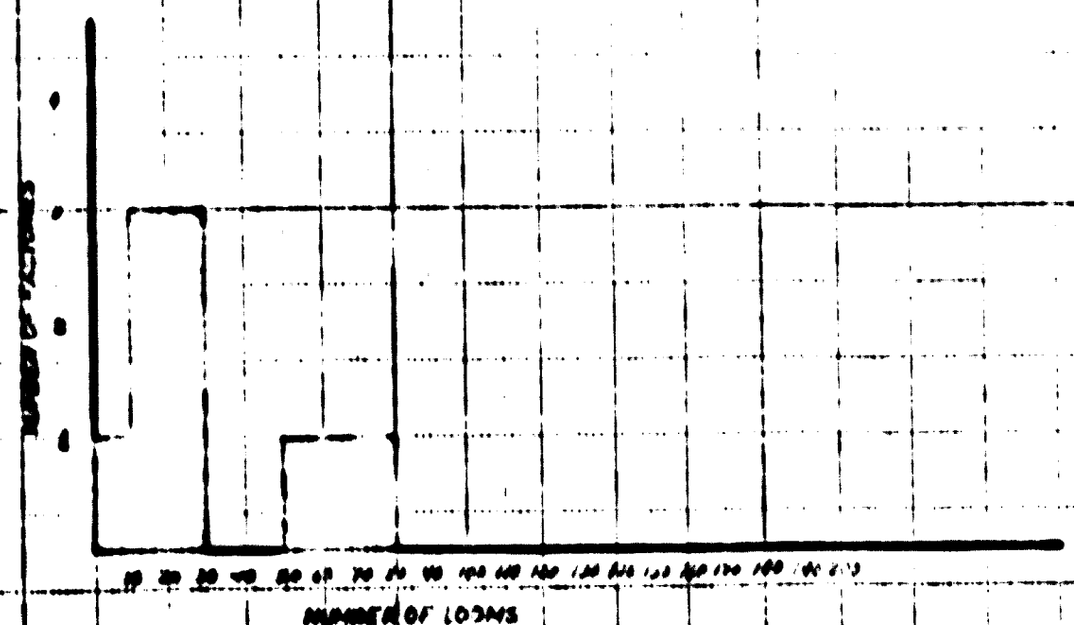
DISTRIBUTION OF FACTORIES BY SIZE

WOOL INDUSTRY

SPINNING SECTIONS



WEAVING SECTIONS



5.1.0 RAW MATERIAL

5.1.1 WOOL

The Ecuadorian Country is geographically divided into three parts, the western part near the Pacific Ocean, called "Costa", the central highland in the Andean Mountains, called "Sierra" and the eastern part, mainly jungle, called "Oriente".

The western part, a highly productive agricultural area is principally dedicated to the growth of bananas, coffee, cacao, rice, fruits, cotton and other products. The eastern part is greatly unexploited jungle and only the main areas of the central highland are, due to their minor agricultural productivity, apt for the production of wool. Nearly 100% of Ecuadorian wool production comes from this part of the country.

The Andean Mountains and valleys are principally populated by indians or population with strong influence of the original inhabitants of the country and who own about 60% of the animals existing. The techniques of exploiting still are very primitive, the right selection of animals and crossing is virtually unknown and the quality and yield of production very low.

According to the estimations of the National Group of Wool Producers, ANCO, the following is the composition of races in Ecuador:

- Criollos type "Churra" 70%
- Crossings of Corriedale and Rambouillet 20%
- Crossings of other races 7%
- Pure Corriedale or Rambouillet 3%

The number of animals existing were estimated in 1'811.000 and the average yield/head yearly around 3 pounds of unwashed (greasy) wool.

The following table shows Ecuador's production of washed wool in 1968 and 1969, by type.

TYPE OF WOOL	1.968	%	1.969	%
Criolla	880	49.7	857	43.2
Corriedale Pure	93	5.3	113	5.7
Corriedale Crossings	372	21.1	447	22.6
Rambouillet Pure	114	6.4	154	7.8
Rambouillet Crossings	285	16.1	384	19.4
Different Others	25	1.4	26	1.3
TOTAL	1.769	100.0	1.981	100.0

The average yield of unwashed wool is approximately 50%.

The above production could be divided into the following classes:

64/58	Special	8,2%
56/50	Special	6,3%
64/58	Good	33,1%
56/50	Good	7,3%
64/58	Fair	3,7%
56/50	Fair	4,2%
Mixed		9,6%
Pieces		14,6%
Criolla		9,7%
Others and defective		3,7%

SOURCE: ANCO

Weaver	Manual Looms	-	-	50	2	50	2
Weaver - 50"	Automatic Looms	103	15	32	10	135	13
Weaver - 50-70"	Automatic Looms	116	11	13	12	129	11
Weaver - 71-90"	Automatic Looms	9	4	23	6	32	5
Weaver - 90"	Automatic Looms	12	5	-	-	12	5
Battery Hands	Automatic Looms	40	55	6	9[illegible]	46	9[illegible]
Beam Mounters	Automatic Looms	9	2[illegible]3	-	-	9	2[illegible]3
Loom Cleaners	Automatic Looms	14	152	3	9[illegible]	17	1[illegible]0
Mechanics	Looms	66	44	16	14	82	3[illegible]

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It is estimated that between 20 and 30% of the national production, nearly all of the Criolle Type, is autoconsumed by the farmers, who with their manual techniques produce coarse yarns and garments, blankets, carpets, etc.

Only 70-80% is consumed by the textile industry, which imports the remainder needed mainly from Uruguay and Argentina.

The following table shows wool importation by type in the last 5 years and up to 1969:

	WOOL WASHED Tons	WASTE Tons	WOOL AND HAIR Tons	TOTAL Tons
1965	61.5	78.9	2.2	142.6
1966	88.8	116.0	1.0	205.8
1967	110.0	175.0	7.5	292.7
1968	128.0	179.9	4.5	312.4
1969	168.9	61.0	5.0	234.9

SOURCE: Estadfeticas del Banco Central 1968

Commercialization: Industrials can buy their national wool through the following channels:

- Directly from big farmers
- Through dealers
- Through ANCO, the national group of wool producers

In the first case industrials buy relatively uniform but unclassified wool. The supply through dealers is irregular in quality and prices. Through ANCO the industry buys wool classified by specialists

and according to the English system. About 10 - 15% of the national production goes presently through latter channel.

Prices of national wool are the following:

CLASS	PRICE/KILO UNWASHED	
	Sucres	U.S. Cents
64/58 Special	19.8	79.2
56/50 Special	19.8	79.2
64/58 Good	17.6	70.4
56/50 Good	17.6	70.4
64/58 Fair	15.4	61.6
66/58 Fair	15.4	61.6
Mixed	13.2	52.8
Criolla	11	44
Pieces	11	44

SOURCE: ANCO 1969

Prices for imported wool (average year 1968):

	Sucres/Kilo		Including	
	F O B	C I F	Import Duties	US Cents
Washed wool, 60 and better	20.78	24.36	34.05	136
Washed wool, 48-60	20.14	22.18	30.36	121.50
Waste	12.38	13.72	21.00	84
Carded or combed tops	24.69	26.87	64.23	257

SOURCE: Reports of CENDES 1968 - Ganaderia Ovina.

Observation: Considering a yield of 50% of washed wool the average price of Ecuadorian wool is much higher than the imported wool, even after paying transport and import duties.

The reason for this discrepancy should be analyzed and remedied. Only then the wool industry can have a future.

Recommendations: Ecuador Development Center (CENDES) has done a detailed study of the wool situation in Ecuador, covering

- Future expansions and cost of them
- Future demand of wool inside and outside the country.
- Method to improve quality of wool
- Method for crossing and selection of animals
- Method to implement expansions and instruction program for farmers.

In this report it is clearly recommended, that textile industry, in general, needs finer fibers and better quality of wool, which can only be produced by proper selection techniques of animals and proper maintaining, shearing periods, etc. This "technical" knowledge has to arrive at the farmers and wool producers through competent advisors. The result of an integrated, well supervised program could augment Ecuador's wool production to 8.000.000 pounds of unwashed wool in 1980 (150% increase over 1968 production) by increasing the quantity of animals to 2.500.000 and the average yield to about 3 pounds/head yearly.

For national industry it could be added, that half statal ANCO, should improve service in the way as to sell the wool

in a washed state and not unwashed like in the actuality. If carbonizing has to be carried out, also this should be done by ANCO.

This would avoid, that every small industry has to wash its wool like actually in mostly primitive baths and with a very poor washing effect. As the production of a continuous wool washer with dryer is so extremely high as well as its price, not even the bigger industries would be able to utilize such a washer for more than a few hours a day and only a central place like ANCO could wash wool economically and quality wise, optimally.

5.2.0 MACHINERY AND MACHINE PRODUCTIVITY

5.2.1 APPRAISAL OF EXISTING MACHINERY

Definition of Terms: Machinery has been divided up into modern, medium age or modernizable and obsolete machinery

Findings: The following tables give a clear picture about age and type of machinery installed in the wool industry:

SPINNING:

SECTION MACHINE	MILLS					%					
	Mod.	Medium Age	Can be Mod.	Obs.	Total	Mod.	Medium Age	Can be Mod.	Obs.	Tot.	TYPE OF UNIT
Washers	-	1	-	5	6	-	17	-	83	100	Washers
Woolen											
Openers	2	2	-	3	7	29	29	-	42	100	Mach.
Cards	2	-	6	2	10	20	-	60	20	100	Cards
Ring Frames	180	-	3.000	280	3.460	5	-	87	8	100	Spindles
Selfacting	-	-	-	1.700	1.700	-	-	-	100	100	"
Worsted Spinning											
Openers	2	1	-	2	5	40	20	-	40	100	Mach.
Cards	2	-	3	3	8	25	-	37	38	100	Cards
Gillboxes	-	-	-	14	14	-	-	-	100	100	Mach.
Intersecting	42	13	-	-	55	76	24	-	-	100	Deliv.
Combers	9	2	-	9	20	45	10	-	45	100	Mach.
Avant Finisseur	-	36	-	88	124	-	29	-	71	100	Heads
Finisseur	20	82	-	82	184	11	44	-	45	100	"
Roving Frames	36	-	-	-	36	100	-	-	-	100	Spindles
Ring Frames	6.840	-	3.776	360	10.976	62	-	35	3	100	"
Selfacting	-	-	-	-	-	-	-	-	-	-	-
Cone Winders	570	120	-	24	714	80	17	-	3	100	Spindles
Doublers	120	136	-	-	256	47	53	-	-	100	Spindles
Twisters	2.830	-	1.750	1.100	5.680	50	-	31	19	100	"
Hank Winders	7	3	-	-	10	70	30	-	-	100	Mach.
Hank to Cone Winders	56	72	-	-	128	44	56	-	-	100	Spindles

.../...

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(Cont.)

SECTION MACHINE	UNITS					%					TYPE OF UNIT
	Mod.	Medium Age	Can Be Mod.	Obs.	Total	Mod.	Medium Age	Can Be Mod.	Obs.	Tot.	
Quillers	98	98	-	160	256	23	23	-	56	100	Spindles
Warpers	1	4	-	6	11	9	36	-	55	100	Mach.
(all sectional)											
Slashers	-	-	1 C 1 HA	-	2	-	-	100	-	100	Mach.

C = Cylinder Slasher, ; HA = Hot Air Slasher

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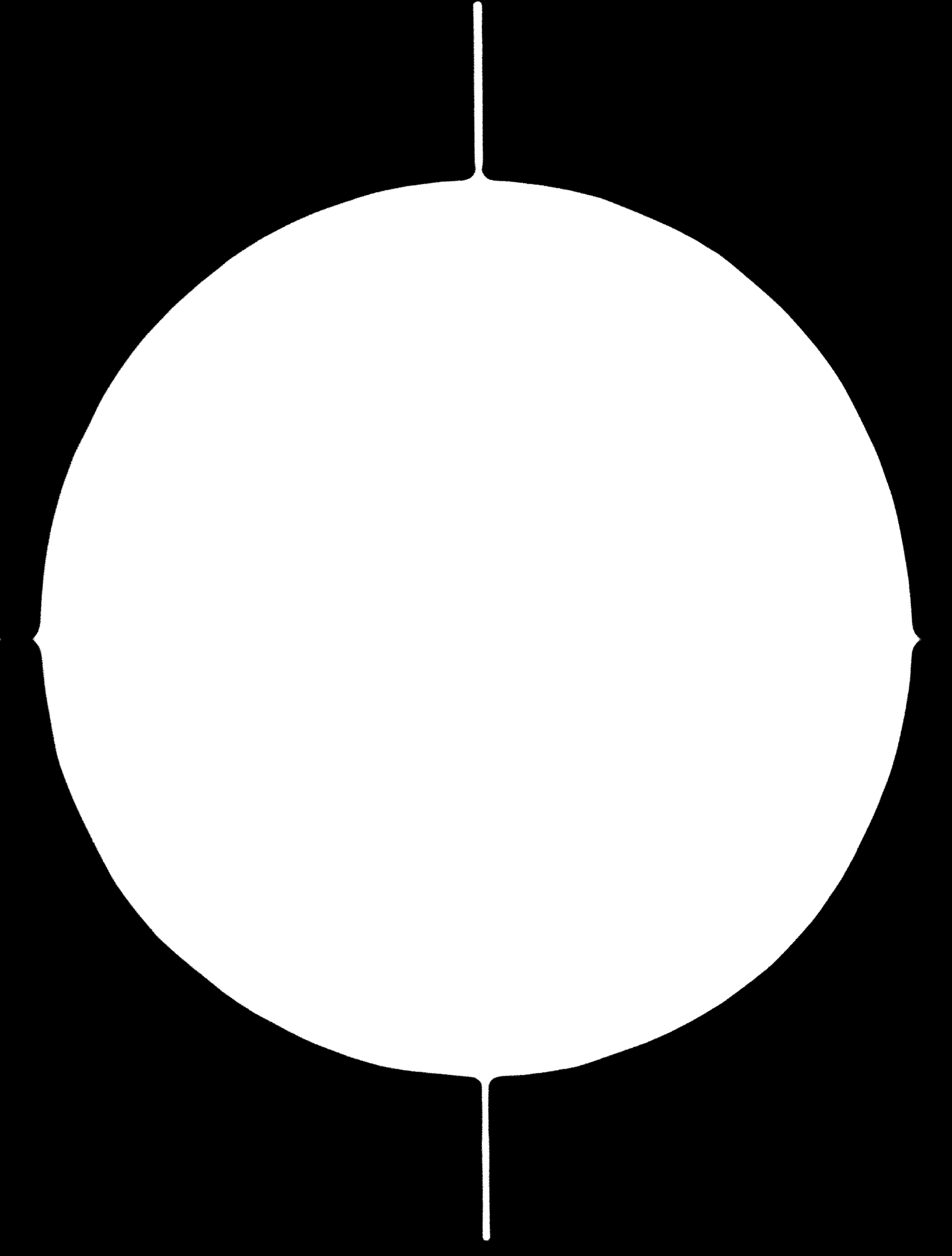

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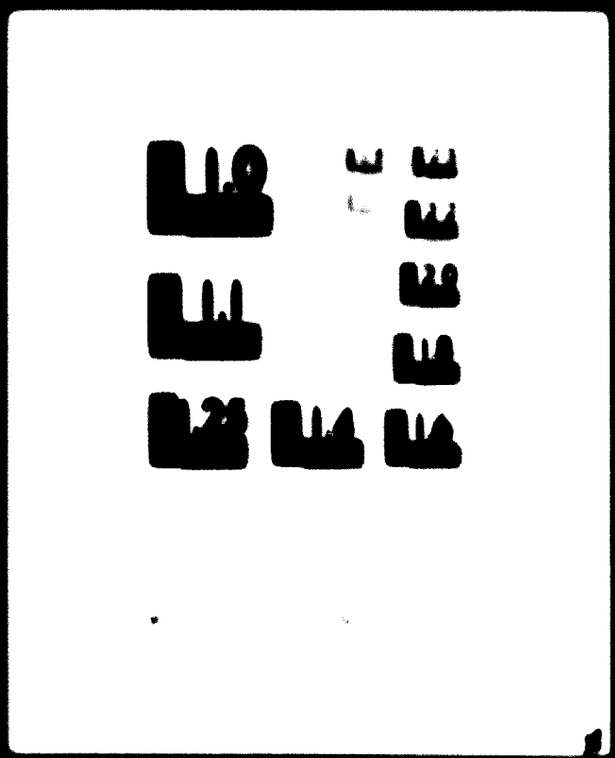

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would not be optimum in this case.

At blending in batches every different component is blown and spread independently through an opening machine and piled into bins one on top of the other. The blend is then broken down vertically. The procedure can be repeated if necessary.

Carding

Findings: Cards are used for preparing the material, which is considered right.

Recommendations: Metallic cylinders replacing wooden and metallic clothing should be considered as modernization.

Vacuum cleaning is more efficient and faster than manual stripping.

Preparation of worked material

Findings: Many worsted mills still work with the older system of gillboxes and avant-finisseurs.

Also most frequently the material is wound into balls in all the stages.

Recommendations: High speed pindrafters with autoleveller devices in one of the passages decrease the necessary passages, personnel and space needed considerably. If working onto balls, automatic changing devices should be installed. In general, however, it is recommended to use cans of large diameter throughout all the processes, with the exception of mixing.

Spinning

Findings: Only little selfacter-spinning is found in Ecuador. Ring also sometimes was found too big in ring frames.

Recommendations: Selfacter spinning is considered obsolete nowadays. Replacement with ring spinning frames should be considered. Ring size should be used according to the count spun.

Twisting

Findings: Nearly all the mills twist directly from spinning bobbins.

Recommendations: In many trials it has been found more economic, apart of the advantageous clearing effect in winders, to reassemble the yarns prior to twisting.

Two-to-one twisters for replacement of old ring twisters should be considered.

Weaving

Findings: Too many manual looms still exist in Ecuador.

Recommendations: Replace too old looms by modern automatic ones or convert manual looms to automatic ones.

5.2.7 RECOMMENDATIONS FOR REPLACEMENTS AND MODERNIZATION OF MACHINERY

Cards - Replace very old cards with new ones.

- Equip cards with crushrolls for eliminating vegetable matter
- Use metallic clothing, specially when working with synthetics or blends
- Use electronic controls to activate hopper feeder and weighing pans.

Worsted Preparation:

- Replace old system with gillboxes, avant finishers, etc. by modern american system with high-speed intersectings. For count up to 35 metric generally 3 passages are sufficient. For higher counts use one passage more.

Spinning:

- Replace self-acters by ring frames
- Equip ring frames with apron draft system (suitable for draft until 24) or high draft units instead of roller drafting.

Cone Winding:

- Replace manual by automatic cone winders.

Twisters:

- Consider two-to-one twisters or twisting in stages being this the type of twisting with the highest output per spindle and the best quality.

[redacted]:

- Equip [redacted] with controls (temperature, moisture, speed, stretch).

[redacted]:

- Replace old manual looms by automatic ones
- Convert newer manual to automatic looms.

5.2.0 [redacted]

[redacted]: The spinning production of 7 of the 10 companies visited in the year 19[illegible] was the following:

Woolen Yarns (generally blended with rayon)

Count	%	Matrix and content	982.000	kgs.
6			96.000	"
7/8	"		112.100	"
11/12	"		79.300	"
13/14	"		72.200	"
		TOTAL	881.100	

Worsted Yarns

Count	%	Matrix and content (pure wool)	46.000	kgs.
30	"	(wool synth.)	46.000	"
30	"	(wool)	73.600	"
30	"	(acrylics)	67.000	"
60	"	(wool/synth.)	30.000	"
50	"	(wool)	38.000	"
50	"	(wool/polyester)	31.000	"
60		(wool)	3.200	"
		TOTAL	318.800	

Weaving:

Woolen Blankets	101.000	m
Woolen Lanilla (coarser outerwear)	200.000	"
Woolen Flannels	6.000	"
Worsted Tropical	6.000	"
Worsted Gabardin	150.000	"
Worsted Suiting	80.000	"
Worsted Suiting (Bouren)	50.000	"
Various	500.000	"
TOTAL	1'106.000	m

[redacted]

3.2.9 BALANCE OF PRODUCTION

Definition: Refer to 3.2.9

Findings: Both 50% of the woolen and 50% of the worsted plants can be considered balanced under the actual conditions. Most of the woolen mills actually not running in balance could achieve a balance by changing production over to the right articles.

Recommendations: Worsted mills with too high preparation capacity should try to increase their spinning output by acquiring more equipment.

Dyeing and Finishing: The necessary data to calculate a balance of productivy was not available.

As for the cotton industry, this is a significant indication that the companies are working without any planning.

3.2.10 DEGREE OF UTILIZATION

Definition: Refer to 3.2.10

Findings: The average utilization of machinery in the different departments of the wool factories are the following:

DEPARTMENT	TYPE OF UNIT	Nº OF UNITS	% UTILIZATION
Opening and cleaning	Machines	4	33
Carding (woollen)	Cards	10	70
Carding (worsted)	Cards	7	63
Combing	Combers	23	65
Intersecting	Deliveries	36	63
Gillboxes	Deliveries	18	67
Avant-Finisher	Heads	123	70
Finisher	Heads	204	68
Roving	Spindles	36	100
Spinning (woollen)	Spindles	2028	77
Spinning (worsted)	Spindles	10536	67
Selfakting	Spindles	2500	65
Cone Winding	Spindles	413	73
Doubling	Spindles	256	97
Twisting	Spindles	2832	80
Hank Winding	Machines	10	77
Hank to Cone Winding	Spindles	124	83
Warping	Warpers	10	50
Slashing	Slashers	3	33
Quilling	Spindles	340	73
Weaving (manual)	Looms	155	60
Weaving (automatic)	Looms	143	73

In general it can be observed, that balance of equipment is better in the wool than in the cotton industry. Preparation sections work mostly the same time as spinning and weaving machinery does.

Dyeing and Finishing: The degree of utilization shown in the following table has been expressed for each type of machine.

From this table, we observed the following:

- The average machine utilization is about 50%
- Most of the plants work only 1 regular shift plus extra-time when necessary
- There is a surplus of available capacity.

SECTION	MACHINE	NUMBER OF MACHINES	DEGREE OF UTILIZATION %
YARN DYEING	Raw wool dyeing	3	40,5
	Top dyeing	2	50
	Hank dyeing	3	77,5
	Cheese dyeing	2	50
	Hydro extractor	7	52
	Dryer	2	33
	Back washer	2	50
PREPARATION AND DYEING -PIECE	Washing winches	7	52
	Dyeing winches	15	55
	Jigger	6	50
	High temperature beam dyeing	1	100
	Scutcher	10	56,6
	Dyeing pad	1	33
FINISHING	Finishing range	1	33
	Drying stenter	6	44,5
	Decating	4	50
	Pressure decating	1	66
	Shearing	5	46,5
	Napping	11	52
	Brushing	2	50
	Pressing (calender)	6	50

5.2.11 DEGREE OF PRODUCTIVITY

Findings: The following table shows the degree of productivity in the Wool Industry. As already mentioned under 3.2.11, the degree of productivity represents a comparison of the actual production of the different machines and the production those machines should have shown. The actual production and base for the calculation of the degree of productivity was given by the individual companies.

An incorrect utilization of machinery naturally also in reflected in these figures.

DEPARTMENT	UNITS	UNITS CONSIDERED	DEGREE OF PRODUCTIVITY -Average-
Woolen Spinning:			
Cards	Cards	7	61%
Ring Frames	Spindles	1748	63%
Selfaktors	Spindles	1700	36%
Worsted Spinning:			
Cards	Cards	5	58%
Comber Preparation	Deliveries	13	30%
Combers	Deliveries	17	34%
Intersectings	Deliveries	101	27%
Avant Finisseurs	Deliveries	84	26%
Finisseurs/Roving	Heads	138	32%
Ring Frames	Spindles	5136	39%
Woolen/Worsted Weaving:			
Looms	Looms	183	59%

Observation: The extremely low productivity in some industries leads to the conclusion, that production figures delivered to us, have not been correct.

5.2.12. MACHINE PRODUCTIVITY

Observation: Machine and also manpower productivity in the Wool Industry varies extremely from mill to mill. Different machinery, products, working procedures make this industry extraordinarily complex and it is impossible to establish an average mill or standard productivity rates.

It was possible, however, to study the existing conditions and productivity in each mill individually and to estimate the potential improvements which can be achieved.

Findings: The average machine productivity can be improved by 72% in spinning and 68% in weaving.

The following tables show the machine productivity rates in the various mills separately.

Spinning:

MILL	Average Count	Grams/Spindle hour		% Increase
		Actual	Proposed	
Woolen				
A	8.6	31	88	184
B	13	23,2	47,8	106
C	7.5	152	152	-
D	2.5	88,3	334	278
E	1.5	603	672	11
Worsted				
A	34.5	8,8	18	105
B	36	14,8	26,2	77
C	35	12,5	23,7	90
D	50	11,8	13,2	12

[redacted]

[redacted]	[redacted]											
	[redacted]											
[redacted]												
Cam	3	-	-	3	-	-	-	-	-	-	-	3
Bobby	101	25	-	126	0	4	-	12	125	10	200
Jacquard	-	-	-	-	-	2	-	2	10	2%	10
[redacted]	104	25	-	129	0	6	-	14	135	2%	210
[redacted]												
Cam	-	-	-	2	-	-	-	-	-	-	-	1
Bobby	-	-	-	90	-	-	-	80	90	20	80
Jacquard	-	-	-	-	-	-	-	14	0	78	20
[redacted]	81	19	-	100	97	43	-	100	100	100	100

All looms are covered shuttle looms

Weaving:

MILL	1000 m weft inserted/loom hour		% Increased
	Actual	Proposed	
A	4.47	10.55	136
B	4.64	5.50	19
C	7.72	9.43	21
D	2.69	7.45	177
E	4.24	9.75	130

Also here the same observation as under 5.2.11 applies.

Recommendations: Improvements in Spinning can be realized by increasing machine speeds and machine efficiencies, in weaving by increasing efficiencies. A proper production planning system would decrease machine downtime considerably and would contribute to improve productivity.

Observation: Three companies with a total capacity of 8.220 spindles and 108 looms did not provide the production data required. Out of this reason these companies were excluded from all the chapters dedicated to Production and Productivity.

5.3.0 LABOUR AND LABOUR PRODUCTIVITY

5.3.1 CHARACTERISTICS OF ECUADORIAN LABOUR FORCE

Supply of Labour

Findings: See 3.3.1

The number of workers under 18 years of age reported was 25, over 50 years 10 and number of female workers 83.

Degree of Training

Findings: None of the companies has a personnel department using correct selection techniques for hiring new personnel.

Also, none of the mills has training and retraining department like described under 3.3.1. Personnel is trained by skilled operators, who, at the same time, perform their own duties.

Recommendations: See 3.3.1

Absenteeism and Labour Turn Over

Findings: The average absenteeism was found to be 6,5% which is higher than the values encountered in the cotton and synthetic industry, but notabnormally high considering South American averages.

Labour turnover was 4,7% on average. This value is near to the ones found in the other industries.

5.3.2 WAGE RATES

Findings: The minimum wage is equal to the one stated under 3.3.2. The base for payments to the workers has been found to be the following:

Piece rates to direct personnel:	11% of the industries
Basic wage + incentives	22% " " "
Basic wage only	67% " " "

Piece rates and incentives are not well defined and work organisation, time studies, and establishment of workloads have not been done in order to elaborate correct figures.

Recommendations: An industrial engineering department should revise thoroughly all the tariffs established and change incorrect values according to work evaluations and workloads, always trying to make labour unions understand the scientific and fair approach, which is only favourable to the working personnel.

Findings on Prevailing Wage Rates:

The average hourly earning of the 418 spinning operators found in the visited companies was 3,7 sucres or 14,8 US cents. This is about 15% lower than the average wage rates of cotton and synthetic fiber consuming industries.

The average hourly earnings of the 452 operators employed in the weaving section was found to be 4,4 sucres or 17,6 US cents, which is about 30% lower than the salaries in cotton and synthetic industries.

The reason for this difference might be that weaving machinery in wool was found much less productive than in cotton and synthetic industries, existing many manual looms, and assigments specially in the case of weavers, are much lower. This way of thinking however, is not correct as salary levels should depend on job evaluations and workloads rather than on number of machines attended.

The following table shows a comparison of the wage rates of the main job classifications in the wool industry of Ecuador compared with those of Mexico, Brazil, Colombia, Argentina and Chile.

The values of Peru taken out of Werner's study of Peruvian Textile Industry 1969 and the ones of the other countries out of a wage structure study, effected by Werner in 1967, whereby it is supposed, that in spite of wage increases in local currency the US dollar value has maintained its validity.

Recommendations on Wage Rates: The Industrial Engineering Department recommended to establish workloads should incorporate correct job evaluation like described under 3.3.2.

Dyeing and Finishing

Findings: One of the companies surveyed has not provided their labor complement and for this reason our figures are incomplete.

WAGES PAID ON HOURLY BASIS IN US/CENTS

	ECUADOR			PERU		MEXICO		BRAZIL		ARGENTINA		COLOMBIA		CHILE	
	Max.	Min.	Aver.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
WOOLEN SPINNING															
Card Tender	13.40	12.50	17.70	82.66	26.43	35.04	32.80	20.37	-	36.57	-	21.35	17.48	40.35	34.78
Card Jetter	-	-	-	-	-	44.80	-	26.67	24.45	36.57	-	27.85	21.96	40.35	34.78
Card Grinder	-	-	-	-	-	44.80	-	26.67	24.45	36.57	-	22.39	17.79	40.35	34.78
Mechanic	-	-	-	-	-	61.29	49.44	-	-	-	-	-	-	-	-
Spinner	22.50	14.00	15.60	59.57	24.75	43.84	41.92	27.78	25.19	43.71	-	15.64	14.11	48.17	41.39
Doffer	-	-	-	-	-	32.00	29.20	22.96	20.00	39.86	-	13.19	12.27	27.82	20.87
Mechanic	113.50	35.20	92.60	65.45	59.73	61.92	49.44	-	-	-	-	-	-	-	-
WORSTED SPINNING															
Card Tender	13.40	12.50	17.70	63.66	22.33	50.40	-	30.37	21.48	36.57	-	22.58	18.41	48.34	22.26
Card Setter	-	-	-	37.97	37.97	-	-	27.78	-	36.57	-	29.57	20.25	50.43	29.56
Card Grinder	-	-	-	-	-	-	-	27.78	-	36.57	-	22.94	19.02	50.43	29.56
Intersecting Tender	17.20	12.50	13.30	55.84	27.55	52.00	-	30.37	21.48	43.43	36.57	22.58	18.41	43.48	25.39
Roving/Finisseur Tender	17.20	14.00	15.10	52.14	31.26	52.00	-	27.78	22.22	43.43	36.57	22.58	18.41	43.48	26.09
Oiler	12.00	7.50	10.00	-	-	38.96	-	25.19	22.96	36.28	-	14.11	12.88	46.61	22.26
Sweeper	12.00	7.50	10.00	-	-	38.32	-	20.37	20.00	35.71	-	14.11	12.89	46.61	22.26
Mechanic	-	-	-	74.48	37.24	65.36	-	-	-	-	-	-	-	-	-
Spinner	17.20	10.00	14.10	52.14	26.06	54.08	-	36.30	25.19	48.00	38.00	21.17	15.34	61.91	22.26
Doffer	-	-	-	29.78	26.06	39.60	-	25.93	20.37	36.57	-	21.90	16.07	59.13	22.26
Mechanic	113.50	35.20	92.60	58.95	26.06	-	-	-	-	-	-	-	-	-	-
Comber Tender	17.20	12.50	14.60	63.66	26.06	50.00	-	30.37	21.48	43.43	36.57	22.58	18.41	43.48	22.61
Cone Winder	17.20	7.50	13.40	57.17	23.83	51.44	-	31.11	25.93	46.28	34.86	30.06	22.21	46.95	21.91
Hank Winder	15.00	12.50	14.00	78.33	26.06	51.44	-	31.11	25.93	46.28	34.86	30.06	22.21	46.95	21.91

(Cont.)

WAGES PAID ON HOURLY BASIS IN US/CENTS

	ECUADOR			PERU		MEXICO		BRAZIL		ARGENTINA		COLOMBIA		CHILE	
	Max.	Min.	Aver.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
WORSTED SPINNING															
Twister Tender	15.00	7.50	13.60	60.56	26.06	54.08	-	37.04	22.96	41.71	34.86	23.31	17.91	55.47	20.86
Doubler Tender	-	-	15.00	55.86	26.06	54.08	-	31.11	25.93	45.71	34.86	29.08	17.42	49.39	21.91
Sweeper	14.00	7.50	10.70	37.24	26.06	38.32	-	20.00	-	35.71	-	18.41	16.20	32.17	20.52
WEAVING PREPARATION															
Warper Tender	20.00	7.50	14.00	81.92	26.43	53.92	-	25.93	22.96	42.86	37.14	24.17	19.20	37.39	31.65
Warper Helper	12.50	10.00	10.60	49.52	22.33	44.48	-	20.00	-	35.43	-	22.33	16.07	32.17	20.52
Slasher Tender	-	-	14.00	50.28	49.52	64.00	-	22.22	-	45.71	-	37.30	24.34	49.39	28.69
Slasher Helper	-	-	-	26.06	26.06	41.12	-	22.22	-	34.86	-	29.20	19.94	28.69	20.87
Pirn Winder	17.20	7.50	12.00	49.59	20.56	50.00	-	25.93	21.48	40.00	34.86	31.41	20.00	39.65	21.91
Weaver	25.00	10.00	19.50	83.79	21.29	57.44	-	60.19	32.60	68.85	45.71	24.05	17.55	66.78	38.91
Smash Hand	-	-	-	40.20	40.20	-	-	-	-	-	-	-	-	49.39	31.60
Battery Hand	13.70	12.50	13.40	39.07	26.06	42.58	-	31.32	20.00	36.60	-	20.00	14.23	46.43	20.50
Knotter	-	-	-	39.07	39.07	66.64	-	28.89	20.00	37.14	-	24.72	23.68	46.43	38.91
Cloth Carrier	-	-	14.00	-	-	38.32	-	21.11	20.00	35.71	-	20.25	14.23	49.39	20.50
Oiler	-	-	12.50	37.24	26.06	38.96	-	22.96	-	36.28	-	17.30	-	32.17	20.00
Sweeper	10.00	7.50	8.60	36.29	26.06	38.32	-	20.00	-	35.71	-	13.80	-	32.17	20.00
Mechanic	136.00	16.00	45.80	89.35	47.58	65.36	-	-	-	-	-	33.62	30.68	-	-
Drawing in	14.90	14.00	14.40	-	-	-	-	-	-	-	-	-	-	-	-
Revision	-	-	-	37.60	26.06	-	-	31.42	25.93	47.17	36.60	-	-	28.69	20.86

SOURCE: Wage Structure Study Werner 1967

SECTION	WORKERS PER SECTION		TOTAL	AVERAGE WAGE
	Direct	Indirect		W. Per Hour
		*		**
YARN DYEING	19			3.16
PREPARATION AND DYEING PIECE	40			3.10
FINISHING PIECE	57			3.09
TOTAL D.F WOOL INDUSTRY	116	19	135	3.07

* The indirect labour could not be classified by section.

** Including social welfare and fringe benefits.

MINIMUM WAGE PAID : $ per hour 1.87

MAXIMUM WAGE PAID : $ per hour 4.37

AVERAGE WAGE PAID : $ per hour 3.07

5.5.8 [redacted]

See 5.5.9

5.5.9 [redacted]

Finishing: In some of the wool industries workloads are assigned by industrial engineering methods. Generally they were and still are based on dealings with the labour unions.

The following table shows the average work assignment in Bruander's wool industry.

JOB CLASSIFICATION	UNIT	[redacted]	UNITS PER OPERATOR -HOUR-
Spinning and Yarn Finishing			
Opening and cleaning machinery tender	Machines	6	0,75
Card Tender, woolen	Card	20	0,5
Card Tender worsted	Card	15	1
Comber Tenders	Combers	17	1,2
Intersecting Tenders	Deliveries	24	2,2
Gillboxes	Deliveries	4	1,2
Drawt Finisseur	Heads	8	28
Finisseur	Heads	24	27
Ring Frame Tender, woolen	Spindles	32	144
Ring Frame Tender, worst	Spindles	60	288
Selfacting	Spindles	12	200
Cone Winder Tender	Spindles	48	30
Doubler Tender	Spindles	8	75
Twister Tender	Spindles	60	300
Hank Winder Tender	Machines	20	0,6
Hank to Cone Winder	Spindles	24	30

.../..

JOB CLASSIFICATION	UNITS	N° OF OPERATORS CONSIDERED	UNITS PER OPERATOR -AVERAGE-
Weaving Preparation and Weaving			
Warper Tender	Warpers	24	0,7
Slasher Tender	Slashers	1	1
Quiller Tender	Spindles	76	10
Weavers, manual	Looms	155	2,2
Weavers, automatic	looms	106	4
Mechanics	Looms	23	18
Cleaners	looms	3	48

Based on the standard labour complement elaborated in every company and standard South American workloads the average actual workload in spinning has been found to be 73%, in weaving 63%. This means that a large labour reduction can be effected.

COMPARISON OF ACTUAL AND STANDARD LABOUR COMPLEMENT

SPINNING-ACTUAL			SPINNING-STANDARD		
Direct	Indirect	Total	Direct	Indirect	Total
306	57	418	244	62	306
WEAVING-ACTUAL			**WEAVING-STANDARD**		
206	67	462	220	58	287
TOTAL-ACTUAL			**TOTAL-STANDARD**		
706	124	870	473	120	593

[redacted]: The age of machinery found in the woolen and worsted industry can be considered as South American average or slightly above.

[redacted]: The following table shows, divided by sections, an inventory of the machinery.

In each section, we have classified the machines in 3 groups (*) as follows:

- Modern
- Old
- Obsolete

From this table, we have observed:

- The conventional dyeing machines are old and a large number obsolete.
- Most of the small companies have only old machines in their dyeing - finishing section.
- Only one company has up to date dyeing and finishing facilities.

(*) Refer to the remark made on the cotton industry.

Out of the Low Number of Indirect Personnel employed it is clearly visible that again little attention is given to controls, supervision, maintenance, etc.

Recommendations: Equally as in the cotton and synthethic fiber consuming industry only industrial engineering methods could improve the present situation, achieve correct workloads and better productivity significantly.

5.3:5 LABOUR PRODUCTIVITY RATES

As already explained under 5.2.11, condition of the Ecuadorian Wool factories are so different, that an average mill and comparison base cannot be established.

Findings: On average the spinning labour productivity rates can be increased by 104% (woolen 86%, worsted 162%). The weaving rates by 198% (weighted average). The following tables show the individual figures obtained.

Spinning:

MILL	Kg/op. hour actual	Kg/op.hour by increased machine productivity	Kg/op.hour by increased machine and labour productivity	% total increase
Woolen				
A	4.13	11.72	12.79	210
B	1.62	3.34	3.55	119
C	4.32	4.32	4.80	11
D	3.17	12	12	278
E	2.70	3	4	48
Worsted				
A	1.04	2.14	3.50	237
B	0.51	0.90	0.95	86
C	1.68	3.18	3.85	129
D	1.26	1.41	1.76	40

Weaving:

MILL	1000 m/op.hour actual	1000 m/op.hour by increased mach.productivity	1000 m/op.hour by increased machine + op. productivity	% increase total
A	5.32	12,60	23,70	345
B	4.48	5,33	10,60	137
C	12	14,50	24	100
D	2.35	6,50	9,52	305
E	6.37	14,70	22,10	247

Recommendation: An improvement of these very low productivity figures can be achieved by:

- Correct machine speeds
- Correct ring diameter in spinning
- Proper production planning
- Proper manufacturing controls as quality control, preventive maintenance, machine efficiencies
- Proper supervision
- Correct workloads and work organization
- Training of operators.

5.3.6 LABOUR COST

Definition: The calculation of Labour Cost is based on the formula

$$\frac{\text{Average wage rate/hour}}{\text{Average units/hour}} = \text{Labour Cost/Unit}$$

Findings: The following are the findings on Labour Cost in Spinning and Weaving:

	Average Count	Kgs/op.hour average	Average wage sucres/hour	Labour Cost per kg.
Woolen Spinning	5.9 metric	3.60	3,7	1.03 sucres
Worsted Spinning	36.7 "	1.21	3,7	3.06 "

	1000 m/op.hour average	Average wage sucres/hour	Labour Cost sucres/1000 m.
Weaving	6,10	4.4	0,72

Including social charges the Labour Cost would be:

	Average Count	Labour Cost sucres/kg.
Woolen Spinning	5,9	1.87
Worsted Spinning	36,7	5.56

	Labour Cost sucres/1000 m.
Weaving	1.31

The proposed improvement of the actual conditions would bring labour cost to:

1.- Sucres/kg of average count 5,9 in Woolen Spinning

2.12 Sucres/kg. of average count 36,7 in Worsted Spinning

0,44 Sucres/1000 m of weft inserted in weaving.

5.4.0 QUALITY OF PRODUCTS

Findings: Because of the complete lack of proper testing results an evaluation of quality of produced goods is difficult. Pure woolen yarns and clothes are not produced in a high quantity. Specially rayon is used for blending purposes and the rayon part is varying steadily according to the supply conditions. Carded mills produce mostly blankets and ponchos and the quality could be regarded as rather inferior to other South American producers, what may be parcially due to the low grade of wool used.

Worsted Plants more and more go over to the nearly exclusive use of acrylic fibers, which has a great influence on the utilization of the combing sections.

Acrylic products are of good quality and compare favourably to products of other South American countries. For worsted cloth generally Uruguayan or Argentinian wool is used and yarn and cloth is up to standard what quality concerns.

Recommendations: A clear picture about and a way how to improve defficient products can only be achieved by a proper quality control.

CENDES report of last year and our recommendations under "Raw Material" describe the method how to better the quality of national wool.

5.5.0 MANUFACTURING CONTROLS

General recommendation - refer to 3.5.0

5.5.1 QUALITY CONTROL

Findings: None of the visited mills has the proper laboratory testing equipment to do efficient testing and only 44% of the companies have a testing program, which generally includes count tests in spinning or occasional strength tests.

LABORATORY EQUIPMENT		QUALITY CONTROL		
Complete	Incomplete	Complete	Incomplete	Not existing
-	100%	-	44%	56%

Recommendations: A complete quality control program includes apart of the analysis of raw material and count and strength tests in spinning the following tests:

- Regularity tests in slivers and yarns (worsted)
- Waste controls of cards and combers (worsted)
- Twist tests
- Breaking tests in roving or finisseurs, spinning, winding, twisting, warping, slashing and looms
- Moisture content, size pick-up, stretch in slashers
- Tearing, abrasion and pilling tests in woven goods
- Other tests according to the specialization of the company

Dyeing and Finishing: Refer to "The Cotton Industry".

5.5.2 LABOUR COST CONTROL

Findings: None of the wool industries effect a control of Labour Cost, section by section and every certain period. Standards for Labour Cost have not been established. For recommendations refer to 3.5.2.

5.5.3 MACHINE EFFICIENCIES

Findings: The following table shows the findings on the calculation and recording of machine efficiencies:

RECORDING OF MACHINE EFFICIENCIES

Complete	Incomplete	Not existing
-	22%	78%

Recommendations: In the wool industry where lots are changed with great frequency overall machine efficiencies in all sections give a good picture of the profitability of operations comparing to lot sizes and of the effectiveness of production planning and organization. Efficiency should be controlled in all sections and compared to standards, which, naturally, have to be revised more frequently than in the Cotton Industry.

5.5.4 PREVENTIVE MAINTENANCE

Definition: Ref. to 3.5.4.

Findings: A completely programmed machine maintenance system has not been found in wool industries. 4% of the companies effect a

rather improvised maintenance and 56%, apart of lubrication and cleaning, do no preventive maintenance at all.

Recommendations: Refer to 3.5.4.

5.5.5 WASTE CONTROL

Findings: Nearly all the mills rework the obtained waste in their woolen mixes.

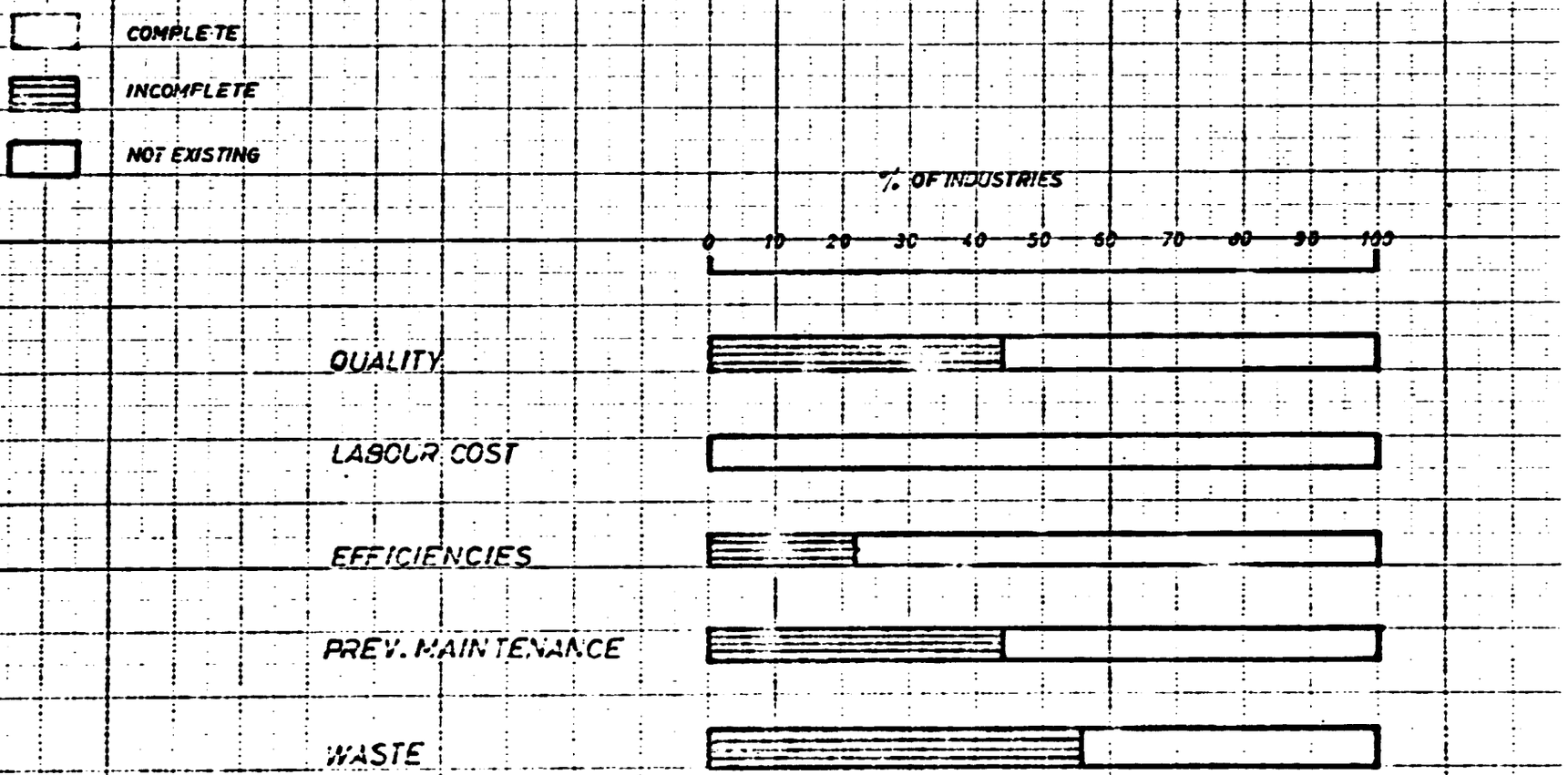
A systematic control of waste quantity and cost is not effected.

WASTE CONTROL

Complete	Incomplete	Not existing
-	56	44

Recommendations: Refer to 3.5.5.

MANUFACTURING CONTROLS SUMMARY



5.6.0 COSTING SYSTEM AND COST CONTROL

Findings: 14% of the industries price their products and inventories in their accounting system through standard costs and 86% through historical costs. No system encountered can be considered complete and the same observations and recommendations as done under 3.6.0. apply also here. A general lack of coordination between the Costing and Cost Accounting department and the technical production side exists in nearly all the industries and the basic data for costs are established by accountants without the aid of technicians.

Recommendations: Refer to 3.6.0.

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APPRAISAL OF EXISTING MACHINERY AND EQUIPMENT

Dyeing - Finishing: Wool

SECTION	MACHINE	NUMBER OF MACHINES	PERCENT		
YARN DYEING	Raw wool dyeing	3	33.3	33.3	33.3
	Top dyeing	2	50	50	
	Hank dyeing	3	100		
	Cheese dyeing	2	50	50	
	Hydro extractor	7	14	72	14
	Dryer (various types)	2	100		
	Back washer	2	50	50	
PREPARATION AND DYEING - PIECE	Washing winches	7	28	28	44
	Dyeing winches - open	11	36	9	55
	closed	4	100		
	Jigger	6	34	16	50
	Jet dyeing	1	100		
	High temperature beam dyeing	1	100		
	Scutcher	10	30	60	10
	Dyeing pad	1	100		
FINISHING PIECE	Finishing range - pad stenter (the stenter can be used for heat setting)	1	100		
	Drying stenter	6	34	16	50
	Decating	4	75	25	
	Pressure decating	1	100		
	Shearing	5	80	20	
	Napping	11	73	18	9
	Brushing	2	50		50
	Pressing (calender)	6	50	50	

5.7.0 PRODUCTION PLANNING AND CONTROL

5.7.1 COORDINATION BETWEEN SALES AND PRODUCTION

Definition, Findings and Recommendations: Refer to 3.7.1

5.7.2 PRODUCTION PLANNING

Findings: 25% of the companies produce only against client orders, 12% against stock and 63% against both.

The production planning itself in 62% of the cases has been found defficient and in 38% does not exist. In the mills which effect some production planning production orders are given every 4 weeks in 75% of the cases and every week in 25% of the cases. 10% of the companies have a yearly production forecast. For recommendations refer to 3.7.2.

5.7.3 PRODUCTION CONTROLS

Findings: 37% of the mills effect production controls, which consist or recording of yarn and cloth production, comparing with production forecast, without a correct analysis of differences encountered and without comparison with production standards. 63% of the fabrics only record production or not even this. A detailed production control throughout all sections is not done anywhere.

PRODUCTION CONTROL

Complete	Incomplete	Not existing
0	37%	63%

5.7.4 STOCK LEVELS AND CONTROLS

Findings: Stock of finished products was equivalent to 9 weeks of sales on average, stock of in-process material of 4,5 weeks of sales, which is good.

Materials and parts were found at an average stock level of 2,8 months and chemicals and dyestyffs 7,8 months of consumption, which is more on the high side and should be tried to be reduced by a proper inventory control system.

75% of the mills use a kardex to control inventories, but the use of control limits as minimum, maximum, reorder points and the use of economic order quantities is not known.

5.7.5 PURCHASING

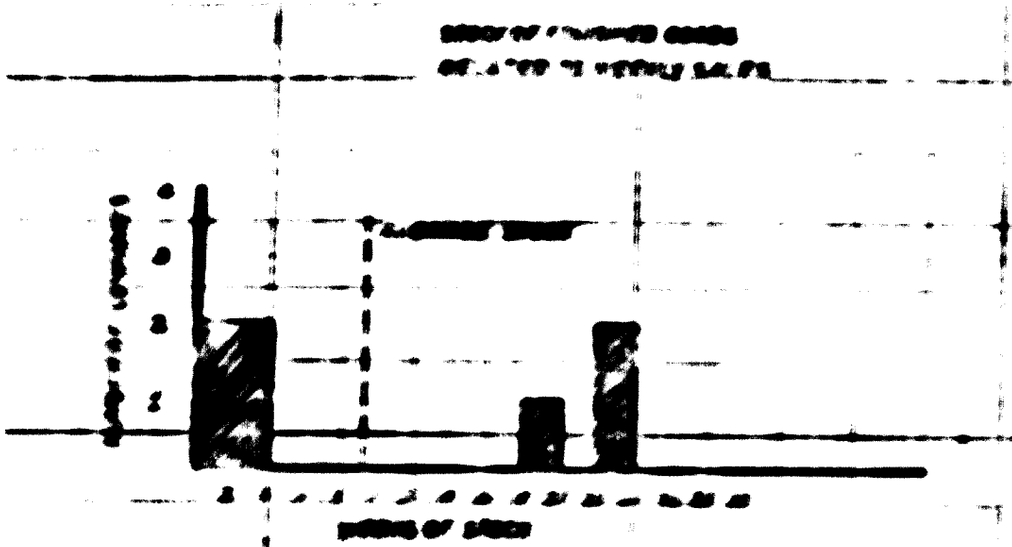
Findings: Only 12% of the wool industries have a purchasing manager and 75% purchase on the basis of competitive bids. The quantity ordered for imported products generally is equivalent to 12 months of consumption, without consideration of lead time, and importance of the product purchased.

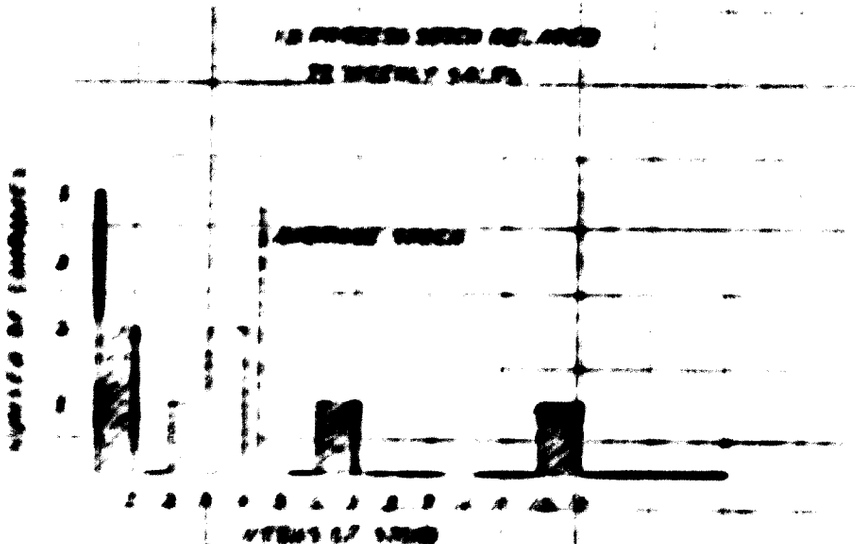
25% of the mills maintain statistics on previous purchases, prices, delivery, terms, etc.

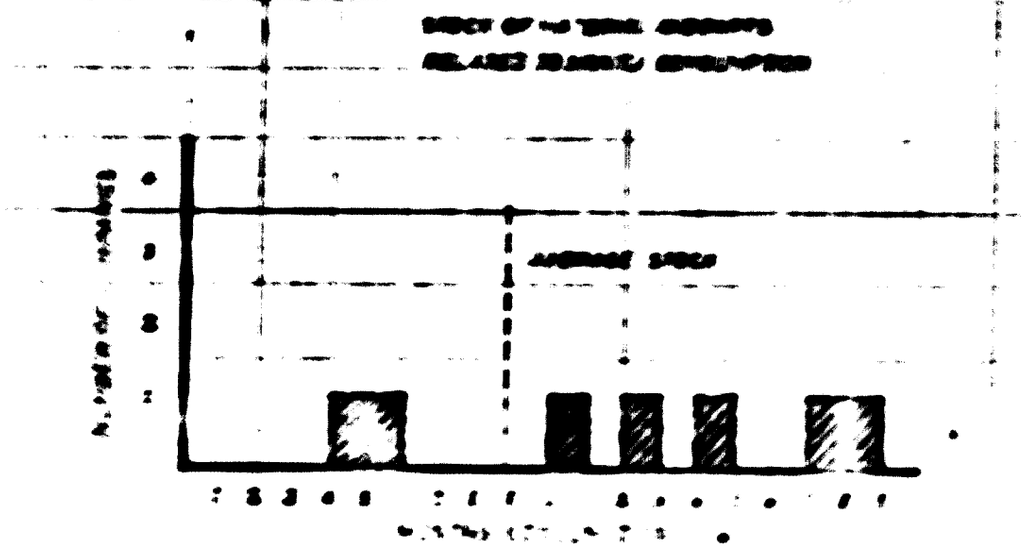
PURCHASING DEPARTMENT		COMPETITIVE BIDS		STATISTICS	
Yes	No	Yes	No	Yes	No
12%	88%	75%	25%	25%	75%

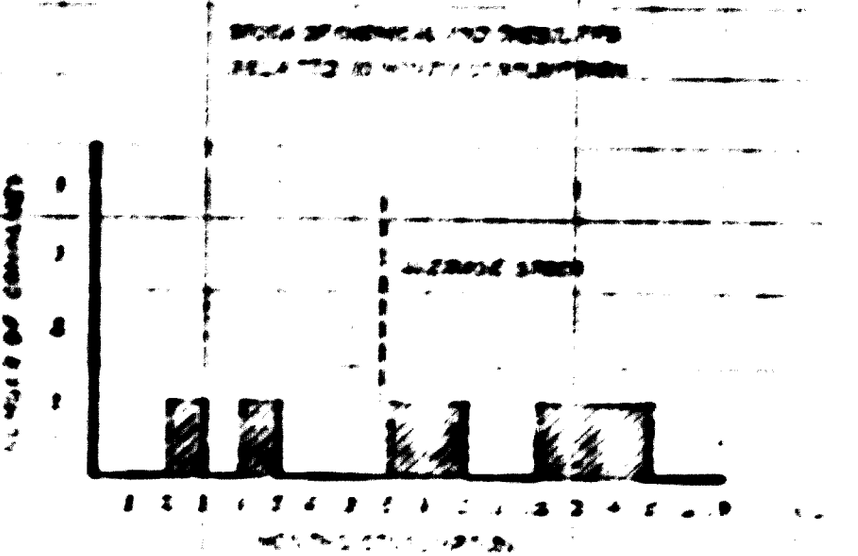
For recommendations on this chapter refer to 3.7.1.-5.

STOCK LEVELS IN WOOL INDUSTRIES









3.8.0 SUPERVISION

The same observations as under 3.8.0 apply to the Wool Industry only in 20% of the mills a fairly adequate first-line supervision was found.

6.0.0 THE KNITTING INDUSTRY

6.0.0 THE KNITTING INDUSTRY

Findings: The Knitting industry in Ecuador consists of a large number of small (home) industries and few companies which have not yet arrived at a size which could be called a medium size plant.

In general all planning, controls, supervision and costing is done by one and the same person, who frequently serves even as designer and mechanic.

It would not be very realistic to dedicate in this report very much on analyzing production methods, controls, etc., but rather give a general picture and recommendations for future expansions.

14 knitting mills have been visited, which represent a comprehensive cross section of this industry with regard to size, structure and products. Total machinery analyzed were 292 knitting machines of most different kinds. It is estimated that this represents 50-70% of the number of machines installed, whereby warp knitting machines installed are calculated to be about 60-70 and weft knitting including rectilinear equipment 300-500. No exact figures about this matter could be obtained, due to the many and very small shops.

6.0.1 DISTRIBUTION BY TYPE OF PLANTS

One plant visited was found to have its own spinning, 3 with its own texturizing and all with some more or less adequate type of cloth or garment finishing equipment.

6.1.0 RAW MATERIAL

Knitting machines, with few exceptions, are extremely versatile as to fiber type to be processed.

The choice of fibers used in knitted goods for domestic consumption is rather immaterial. It tends to adjust itself under normal conditions of demand and sypply. When exports are to be considered, the selection is much more discriminate, since conditions may well be entirely different in the countries, where the goods are destinated.

Findings : The raw material used in Ecuador was found to be

- Cotton
- Rayon
- Acrylics
- Nylon
- Polyester (Texturized)

Consumption of visited mills in 1969:

Cotton yarns	251.500 kgs.
Rayon yarns (viscose)	30.000 "
Acrylic yarns	157.800 "
Polyamids filament	181.000 "
Polyamids filament texturized	153.900 "
Polyester filament texturized	9.700 "
TOTAL	783.900 kgs.

Cotton and Rayon has been used principally for underwear and acrylics for outerwear, straight polyamides for trikot (womens underwear), texturized polyamides for socks and stockings and polyester for various purposes.

Rayon and Acrylic yarns are bought from local producers. Polyamide and Polyester filament is bought from outside, but is texturized in the country.

6.2.0 MACHINERY AND MACHINE PRODUCTIVITY

6.2.1 APPRAISAL OF EXISTING MACHINERY

Definition of machine types: The basic individual categories of machinery that exist in knitting are:

- Trikot
- Raschel
- Simplex

} Warp knitting

- Single Jersey
- Double Jersey
- Sweaters (circular)
- Full-Fashion
- Rectilinear (sweaters)
- Seamless Hosiery
- Half hose
- Sliver pile

} Weft knitting

Each of these categories can be again subdivided into more specific classifications.

The first 3 categories are grouped together and are called warp knitting machines, meanwhile all the other categories belong to weft knitting machines. Trikot, raschel, simplex, single, double jersey and sliver pile machinery produce yard good fabrics; sweaters (circular), full-fashion, rectilinear, seamless hosiery and half hose machinery produce garments.

Simplex and sliver pile machinery has not been found in Ecuador.

Findings: The following table shows an appreciation of the machinery encountered in the mills visited.

6.2.2 DEGREE OF AUTOMATION

Definition: The following points are worth to be considered as automated:

a) Continuous washing and drying
b) Intersectings with Autoleveller devices
c) Automatic transport systems
d) Automatic doffing at ring frames
e) Automatic winding and copfeeding
f) Up-twisting
g) Automatic Speed Controls at Slashing
h) Shuttleless weaving

Findings: Points a, c, d, e, g, and h could not been found yet in Ecuadorian wool industries.

b) Around 20% of the intersectings were equipped with autoleveller devices.

f) Around 2% of the twister spindles were up-twisters (2 x 1 twister).

Dyeing and Finishing: The following table shows, the degree of automation for various machines.

APPRAISAL OF KNITTING MACHINERY

MACHINE TYPE	NUMBER OF MACHINERY				% OF MACHINERY			
	Modern	Medium A.	Obsolete	Total	Modern	Medium A.	Obsolete	Total
Warping	5	1	-	6	83	17	-	100
Warp Knitting:								
Trikot	29	3	4	36	80	8	12	100
Raschel	8	-	-	8	100	-	-	100
Weft Knitting								
Jersey	30	20	18	68	44	29	27	100
Full Fashion	1	-	-	1	100	-	-	100
Rectilinear	2	-	-	2	100	-	-	100
Seamless Hosiery	59	-	34	93	63	-	37	100
Half Hose	44	40	6	90	49	44	7	100

The Trikot Machines are divided in:

23 machines of 2 bars

11 machines of 3 bars

2 machines of 4 bars

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Comment

Warp Knitting

Most machinery is of very recent age and only 4 machines found must be considered as economically unsuited, although mechanical conditions are adequate.

Weft Knitting

All machines except those of one mill visited, are in good condition and generally of recent age. More productive machines are now existing having 36 or even 48 knitting feeds per unit instead of the 24 on most of the installed machines. Nevertheless, the less productive 24 feeds have certain advantages and will be in use for many years yet.

Also garment machinery encountered was in good condition and relatively new.

As a whole the knitting machine situation in Ecuador is satisfactory from a strictly qualitative view point

Dyeing and Finishing

Findings: The next table shows, divided by action, an inventory of the machinery.

In each section, we have classified the machines in 3 groups as follows:

- Modern
- Old
- Obsolete

From this table, we observed

- Practically no obsolete machines
- Most of the machines are new and thus modern
- In most of the cases, the equipment is very suitable for processing knitted goods.

APPRAISAL OF EXISTING MACHINERY AND EQUIPMENT

DYEING FINISHING: Knitted Goods

SECTION	MACHINE	NUMBER OF MACHINES	PERCENT		
			Modern %	Old %	Obsolete %
DYEING - PIECE	Winches	9	44	56	
	High Temperature Beam Dyeing	3	100		
	High Temperature Dyeing Winche	1	100		
	Hydro Extractor	4	75	25	
DYEING - YARN	Cheese Dyeing	2	100		
	Yarn Dryer	1		100	
FINISHING - PIECE	Laminating	1	100		
	Calender	2	100		
	Napping	1	100		
	Heat Setting Stenter	2	50		50

6.2.2 DEGREE OF AUTOMATION

Dyeing and Finishing: The following table shows, the degree of automation for various machines.

SECTION	MACHINE	DEGREE OF AUTOMATION		
		Good	Medium	Poor
		%	%	%
Dyeing - Piece	Winches		44	56
	High Temperatura Beam Dyeing	100		
	H. T Dyeing winche	100		
	Hydro extractor		100	
Dyeing - Yarn	Cheese Dyeing	100		
	Yarn Dryer			100
Finishing - Piece	Laminating	100		
	Calender	100		
	Napping	100		
	Heat Setting Stenter	50		50

6.2.3 ATMOSPHERIC CONTROLS

Findings: Of the visited mills none had atmospheric controls or even moisture adding equipment installed.

Recommendations: Latter equipment is strictly recommended as it acts as an artificial lubrication. Yarn should be moisturized previous to knitting for 24 to 48 hours.

6.2.4 LAYOUT OF MACHINERY, PRODUCTION FLOW

Findings: Probably the worst condition in many mills is the factory layout, consequently resulting in bad production flow.

It is clearly visible that whenever a piece of equipment has been added for increase of production, it has been placed wherever space was available without consideration of production flow, working conditions or labor utilization. The result are transportation problems, and poor handling of goods. Also storages have been found inadequate in most of the mills.

While in few cases improvements can be made without high expenditures, in others much more radical measures are necessary, such as relocation to larger quarters and new buildings. This would also improve the working conditions, which are frequently found far below standard, specially in the area of safety.

In 22% of the mills layout was adequate, in 56% defficient and in 22% bad.

8.2.5 RECOMMENDATION FOR MACHINE REPLACEMENTS AND FUTURE EXPANSION

Industrial growth in smaller countries tends to be greater than in areas, where industrialisation has already reached a high level. Therefore, planning for the future becomes an extremely important factor. If a development plan of 5 years is usually the correct procedure, it should go in the present case far beyond this term. Ten or even 15 years would be recommended as appropiate.

Future planning must be conducted on an overall (total industry) and individual level. The "hand to mouth" practice of buying and installing machinery, as presently noticiable, has to be changed towards an anticipated future expansion.

It is very well possible in the knitting industry to layout a master plan for double or even triple the size of a mill in such a way as to be able to expand periodically without disturbing manufacturing and still maintain the best possible layout and production flow.

What selection of equipment concerns, internal and external market studies should be the most important base. Smaller mills may select their machinery by its versatility meanwhile larger enterprises can afford to be more selective and may install more specialised equipment if it can be used to capacity. As price differences in knitting machinery are quite substancial this latter point is considered to be extremely important.

6.2.6 [redacted]

Production of the plants is equal to consumption described under 6.1.0.

6.2.7 BALANCE OF PRODUCTION

Knitting and Finishing: The necessary data to calculate a balance of production was not available.

6.2.8 DEGREE OF UTILIZATION

Finishing: The utilization of machinery was found to be the following:

Warp Knitting	- Tricot	80%
	Raschel	80%
Weft Knitting	- Jersey	75%
	Full fashion	30%
	Rectilinear	30%
	Seamless	100%
	Half Hose	67%

Knitting and Finishing: The degree of utilization shown in the following table, has been expressed for each type of machine.

We observed

- Only a few machines are working 2 shifts
- Most of the equipment is only working 1 shift
- There is a large surplus of available capacity

SECTION	MACHINE	NUMBER OF MACHINES	DEGREE OF UTILIZATION %
Dyeing - Piece	Winches	9	38
	High Temperature Beam Dyeing	3	56
	High Temperature Dyeing Winche	1	66
	Hydro Extractor	4	50
Dyeing - Yarn	Cheese Dyeing	2	33
	Yarn Dryer	1	33
Finishing - Piece	Laminating	1	33
	Calender	2	50
	Napping	1	66
	Heat Setting Stenter	2	33

6.2.9. DEGREE OF PRODUCTIVITY AND PRODUCTIVITY RATES

Definition of terms: The standarization of production as a means to compare with actual production and calculate the degree of productivity and the establishment of general ruling productivity rates is not that easily done with knitting equipment as it is with plain looms. It is possible to set a standard production rate for a certain cloth in a certain type of machine , but the same standard is not valid for another cloth or for the same cloth in another machine. A common base like in plain looms is difficult to develop due to the so many varying factors in knitting. Production controls in knitting will have to go more into details, establish groups of equal machinery and convert actual production into machine hours for every group in order to have a base for comparison with standard production.

For the purpose of this report it would have been necessary to receive clear information about every cloth produced (construction details) and even about the individual machine or machine group having produced the cloth. These data were not found possible to obtain, which is understandable considering the large number of different cloth types produced and the lack of written down controls.

Findings: It has been tried to make a rough estimation, what every mill should produce, considering the machinery and the articles produced. Results of this estimation compared with the yearly production given by each company show a degree of productivity in warp knitting between 40-50% on the average and in weft knitting 60-70%.

As an information,machine efficiencies in USA and Europa use to reach 90%.

6.3.0 LABOUR AND LABOUR PRODUCTIVITY

6.3.1 CHARACTERISTICS OF ECUADORIAN LABOUR FORCE

Supply of Labour

Findings: Like in all other textile branches, unskilled labour exists at any volume, but skilled labour is very scarce, particularly in knitting, as this is just a starting industry.

Absenteeism and Turnover

Findings: It was impossible to obtain figures about absenteeism and labour turnover. No statistics are kept on that matter.

A training and Retraining program has not been found in any of the industries. New operators are trained on the job by other already skilled personnel.

6.3.2 WAGE RATES

Findings: The average wage rate in the knitting mills was 4.18 sucres/hour, which corresponds to 16.7 US Cents. In general there is little distinction made between the different job classifications. Machine operators earn around 5 sucres an hour (20 US Cents) and indirect helpers around minimum wage 2,5 - 3 sucres/hour (10 - 12 US Cents).

SECTION	MACHINE	DEGREE OF AUTOMATION		
		Good	Medium	Poor
		%	%	%
YARN DYEING	Raw wool dyeing			100
	Top dyeing		100	
	Hank dyeing	30	70	
	Dryer		50	50
PREPARATION AND PIECE DYEING	Washing winches		65	35
	Dyeing winches	6	24	70
	Jiggers		100	
	Scuttcher	10	10	80
FINISHING	Finishing range	100		
	Drying stenter	10	40	50
	Decating	25	25	50
	Shearing	40	60	
	Napping	20	60	20
	Pressing calender	50	20	30

We observed the following:

- The degree of automation is medium to poor
- Only modern machines have a reasonable degree of automation
- There is a lack of instruments of control.

Dyeing and Finishing

Total Direct - Indirect Workers

D.F Knitting Industry : 37

Average Wage Paid (*) : S/. per hour 3.82

Minimum Wage Paid : S/. per hour 3.25

Maximum Wage Paid : S/. per hour 5.00

(*) Excluding social welfare and fringe benefits.

6.3.3 SOCIAL CHARGES AND FRINGE BENEFITS

See cotton industry.

6.3.4 WORK LOADS AND WORK ASSIGNMENTS

Findings: Work assignments are done according to the judgement of the technician and manager.

As mills are so small, also an industrial engineering department would have little success in trying to obtain normal workloads.

Until the size of the mills increases substantially, idle worktime will not be avoided. The following chapter shows a normal work distribution in a bigger plant like found in some South American countries, specially Argentina and in USA and Europe.

6.3.5 LABOUR PRODUCTIVITY RATES AND COMPARISON WITH INTERNATIONAL STANDARDS

In order to provide the Ecuadorian Knitting industry with factual information concerning mills in other countries, we have established two exhibits (A and B) showing labor components in details and approximate production capacity.

EXHIBIT A is a large diameter circular knitting plant, producing with 100 machines 358 kg. approximately per hour, and having a labor complement of 139. Thus, one machine produces 3,58 kg. per hour (average) and one worker -including management and supervision- 2,5 kg/hour.

EXHIBIT B is a warp knitting plant, composed of 25 RASCHEL and 25 TRICOT machines. (Here, the comparison is made with European rather than U.S. mills, since European manufacturers usually install narrower machinery than U.S. mills, 84" vs. 168"). These 50 machines are capable to produce about 331 kg. per hour or 6.62 kg. per machine, having a labor complement of 68. Thus one worker produces 4.8 kg. per hour.

Both theoretical mills produce knitted fabrics for sale, A weft, and B warp. It should be noted, that the given production figures are strictly averages, subject to up or down fluctuations, depending on gauges, input yarns and fabric structures. In the case of RASCHEL machines, these fluctuations may attain substantial proportions.

The above labor complements concern knitting only. Dyeing and finishing of yarns and / or fabrics are dealt with separately in this report.

EXHIBIT "A"

LARGE DIAMETER CIRCULAR KNITTING

LABOR COMPLEMENTS: (100 machines)

	1st. SH	2nd. SH	3rd. SH
Knitters	25	25	25
Knitters Helpers	5	5	5
Mechanics	4	4	4
Head Mechanic	1	-	-
Yarn Handlers	2	2	2
Repair Shop & Maintenance	4	-	-
Formen	2	2	2
Engineer	1	-	-
Manager	1	-	-
Manager Assistant	1	-	-
Inspectors	6	6	-
Designer & Pattern Makers	2	-	-
Floor Help	1	1	1
	55	45	39

TOTAL 139

AVERAGE PRODUCTION PER HOUR (CAPACITY): $\frac{17 \times 36 \times 60 \times 325 \times 100}{30 \times 1.000}$ - 10%

= 958 kg.

EXHIBIT "B"

WARP KNITTING (25 Raschel) 100"

(25 Tricot) 84"

LABOR COMPLEMENTS (50 Machines)

	1st. SHIFT	2nd. SHIFT	3rd. SHIFT
Knitters	5	5	5
Patrolers (Helpers)	3	3	3
Beamers	2	2	2
Threaders	3	3	-
Warpers	4	2	-
Mechanics	2	2	2
Head Mechanic	1	-	-
Yarn Handling (Warp)	1	1	-
Repair Shop & Maintenance	2	-	-
Formen	1	1	1
Engineer	1	-	-
Manager	1	-	-
Manager Assistant	1	-	-
Inspectors	3	3	-
Floor Help	1	1	1
	31	23	14

TOTAL: 68

AVERAGE PRODUCTION PER HOURS (CAPACITY)

Raschel 300 x 60 x 200 x 2,50 x 25 - 10%

Tricot 900 x 60 x 0,50 x 2,10 x 25 - 10%

= 331 kg.

6.4.0 QUALITY OF PRODUCTS

Findings: The overall quality of knitting in Ecuador is good. Yet, quality of knitting does not necessarily mean quality of knitted products. Knitting itself can be good even with inferior yarns or defective finishing procedures. It was observed in several cases, that unevenly dyed yarns have been knitted into relatively high priced double jersey fabrics and that nylon fabrics have been heat-set at temperatures far below normal standards, thus totally uneffective. The reason for these discrepancies is mostly a total lack of appropiate testing.

6.5.0 MANUFACTURING CONTROLS

6.5.1 QUALITY CONTROL

Findings: As already described in the foregoing chapters, quality control does not exist in the knitting industry in Ecuador.

Recommendations: The following recommendations are given:

A very important control specially on spun or dyed yarns is the control of incoming material. Spun yarns should be tested for their break strength, appearance, and moisture contents, dyed yarns for their dye fastness and dye eveness.

This testing is a rather inexpensive way to protect the company against the necessity of price reductions in the finished goods, because of deffective raw material.

In process controls include the tests of performance of different materials and yarns from different sources. A continous statistic on this matter should be kept.

Fabric testing consists of:

- Anti pilling tests
- Wearability tests
- Dimensional recovery tests
- Washability tests (dry cleaning)
- Shrinkage tests
- Colour fastness tests

Once increasing the installed capacity and competing against foreign companies quality control becomes a basic condition for business success.

6.5.2 LABOUR COST CONTROL

Findings: This control does not yet exist in knitting industries.

6.5.3 MACHINE EFFICIENCIES

Findings: Only two of the visited mills record machine efficiencies.

6.5.4 PREVENTIVE MAINTENANCE

Findings: The preventive maintenance done in general consists of lubrication and some unplanned revision of machinery state and adjustments. Programs are not available.

6.5.5 WASTE CONTROL

Findings: Very little waste is to be expected in knitting. Calculation of waste percentages is not done in the visited knitting plants.

6.6.0 COST CONTROL

Findings: Out of the little information obtained on this matter, the conclusions are the same as already described in the chapter about cotton industry.

6.7.0 PRODUCTION PLANNING AND CONTROL

Findings: Production planning and control, in nearly all of the visited plants, is combined and in the hands of one single person. New articles are designed or copied from samples received from outside the country and informations of sales men decide about the quantity to produce. As knitted goods have a very good market, there is no difficulty in general to sell production and many small mills produce against orders. The stock of finished products is very small and stock in process to be considered normal.

Production controls are not encountered in almost all the mills visited.

Purchasing is done by the manager himself. In spite of existing, in some mills a kardex to control inventory of spare parts, dyestuffs, etc. no control limits are used and purchasing in economic lots is not known.

6.8.0 SUPERVISION

Findings: In most of these small mills the owner or manager is the only supervisor. The technical knowledge about the machine capacity and possibilities of production of different articles was frequently found limited. Only 3 mills were found with the proper technical staff to supervise and control machine performance. The need for proper supervision will arrive with the expected future expansion and first-line supervision will have to be imported, at the beginning.

8.9.0 GENERAL OBSERVATIONS

During the execution of this assignment it has become clearly apparent, that a great effort will be necessary to improve a situation which in general, is not up to international standards. This does not mean, that overall quality of production is always inferior to that of products manufactured in other countries although it is in some instances; but it is rather the methods of manufacturing, which are defficient and need drastic changes. It is naturally impossible to apply scientific manufacturing methods in so small industries as found in Ecuador, but a kind of simple organization and control should be implanted. This mainly refers to organization and standarization of running conditions, implantation of production controls, quality control preventive maintenance and the improvement of the sometimes archaic layout and production flow. Planning should be done for future development which will occur in Ecuador as fast as it does in the knitting industries of other countries.

Mill Size: It may appear from this report, that smaller mills have no place in this industry. This would be erroneous. Small enterprises have their place in any economical set-up, be it in a larger or a small country. This specially refers to weft knitting industries, working on wool or acrylic yarns. It is only a advisable, that irrespective of the size of the mill there exist a minimum level of controls of the manufacturing operations and costs.

5.2.3 ATMOSPHERIC CONTROLS

Findings: No atmospheric controls have been found in the visited mills.

5.2.4 LAYOUT OF MACHINERY

Findings: Layouts of machinery are not all optimum in the wool industries in Ecuador. Very old and unsuited buildings were found in 30% of the cases.

The following table shows the results of the appraisals done during the visits:

SPINNING			WEAVING		
Good	Fair	Poor	Good	Fair	Poor
42	33	25	45	33	22

Recommendations: Before installing new machinery management should consider the general possibilities of future expansions regarding existing buildings and space available and of changing to another location if necessary.

Dyeing and Finishing: Excepting one company with a good layout, all the others have a poor to very poor one.

As most of the companies have a little output, the production flow is not very important and no observation could be made.

[redacted]

7.1.0. Introduction

Ecuador is a South American country located on the West coast between Peru and Colombia. Its territory covers 104,510 sq. miles (267,545 sq.km.) and its actual population (1970) is 6,177,127 inhabitants according to the latest estimation of the Dirección Nacional de la Salud (Guayaquil).

The country may be divided in three main zones: Coastal (Tropical Occidental), Mountains (Andina) and Orient (Tropical Oriental), extended in that order from West to East in a longitudinal position from North to South. Its climate is mild and rather uniform in temperature in the Mountains, and tropical in the other two zones. In addition to these areas, the Colon Islands, in the Pacific Ocean, belong also to Ecuador.

The two main and major cities are the Capital City, Quito (454,000 inhabitants, 1956), located in the Mountains, and the largest port, Guayaquil (660,000), in the Coastal zone.

Population figures are given in Table N° 1. The average yearly growth exceeds 3%. The zonal distribution could be seen in Table N° 2 for the total and economically active population. The last is equivalent to 30.2% on the total population figure of 6,721,000 (1972), with the largest concentrations in the provinces of Guayas, Pichincha and Manabí. The difference between the total and economically active populations is

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explained by the large quantity of indians, which attend to their own subsistence and do not participate actively in the economic activities of the country, as also happens in other Latin American countries.

The gross national product in 1967 reached a value of 1,120 million dollars (S/20,102 millions, Memoria del Banco Central, 1968), with the main contributions provided by Agricultural Products (S/6,678 and Manufacturing Industries (S/3,437). Food and drinks, textiles and oil are three of the major industries.

7.2.0. Economic Evolution

During the period 1954 - 1967 (1954 = 100), the gross national product index rose to 114,5, equivalent to a yearly growth close to 5% per year. But according to the latest publications of the Alianza Para el Progreso and the Organización de los Estados Americanos, in the first half of 1970 Ecuador has been placed in the last position among the Latin American countries, with a GNP Growth of only 0,3%, equivalent to an economic stagnation.

In Ecuador, official economic figures are based on information supplied by the economic forces information which is rather limited. By this reason, official figures can not be very

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accurate. Industrial Production Indexes for the Textile Industry and several others for comparison are given in Table N° 3 "Plain Fabrics" shows a contraction of 11% during the period, while "Yarn and Threads" indicates a permanent and unusual growth of 121%, equivalent to approximately 22,5% per year. A related index, "Shoes and Clothing", rose from 100 to 170 during the period 1964-1968, averaging almost 15% per year.

Taking into account that fabric import figures show a decrease from 2.4 to 1.4 thousand tons (Table N° 5) during the period, it has to be concluded that "Shoes and Clothing" rose mainly by supplies from "Plain Fabrics" (knitted products are not taken into account because they are almost unreported to the government). The lack of correlation between both indexes indicates the inaccuracy of the basis on which the indexes have been elaborated.

According to Table N° 5 , import volumes of raw materials (4,200 tons) and yarns and threads (1,300/1,500 tons) stayed almost constant during the period, while exports have been insignificant (Table N° 6). Consequently, the unusual rate of growth of "Yarn and threads" in Table N° 3 could be explained only by purchases of acrylic yarn and acrylic knitted products made by foreign buyers, who absorb a volume equivalent to 40% of both total productions. This action is estimulated by the price differential of the acrylic fiber between Ecuador and its neighboring countries.

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Table N° 4 shows the evolution of salaries, wages and prices (for products consumed by low and medium income families). It could be appreciated that "Clothing" denotes the lowest price increase, circumstance which has helped to maintain the demand for textile products. "Industrial salaries" shows a deterioration in purchasing power, specially in 1966/67, but in 1968 it became almost recuperated. "Industrial wages", instead, follows very closely the General Price Index, and is even higher in 1968. In general, it could be said that up to 1968 (last available figures) wages and salaries have maintained their purchasing powers.

The tendency to level off sale prices has been imposed on textil companies, among other reasons, by the continuously increasing local market competition. Several companies started operations during the period 1964/1968 and others expanded their production capacity; this tendency continued in 1969/70, with some equipment additions or modifications to improve quality and equipment modernization and balancing. As a result, the local market is better supplied in quantity and quality; legal imports have been reduced from 2,400 to 1,400 tons (Table N° 5), and non-official imports (specially those from Peru) followed the same trend. Despite the fact that increases in salaries, wages and other expenses in the textile industry have not been totally translated to sale prices, it is estimated that the industry's profit did not suffer due to lower costs resulting from higher production and sales volumes obtained mainly by import substitutions and foreign buyers' purchases.

7.3.0. The Ecuadorian Textile Companies

The Ecuadorian Textile industry is composed by companies acting in all commodity groups (cotton, wool and synthetics), and produces plain fabrics and knitted goods.

Plain fabric companies are usually completely integrated in the vertical direction, with spinning, weaving, dyeing and finishing equipment of their own, even if in many cases, due to the rather low production volume, it becomes evident that this vertical integration could be uneconomical.

There are only three reported spinning mills, one producing sewing thread and the other two industrial yarn. All are classified within the cotton commodity group.

Despite their main classification in commodity groups, all companies use more than one type of raw material (with the only exception of small knitting companies).

The size of the Ecuadorian textile companies, measured according to international standards, varies from small to medium. With the only exception of one, all the others are of the "family type". Their organization is very simple: the general manager is usually the owner and covers simultaneously several key positions in the company in areas such as purchasing, production, sales, administration and financing. In general, it is impossible to concentrate all

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these activities in only one person and still perform with efficiency and competency in such a variety of duties. But individuality by part of the owners and the incapability to pay proper salaries to specialists in each areas have helped to maintain this type of structure. Nevertheless, even if in many lines market competition is very acute, in general textile companies do not have serious problems in selling their productions, situation which is a very favourable factor to simplify companies' management.

With only few exceptions, companies' organization, administration and control are very elementary, but adequate to their aims. Planning and programming are almost non existent and only minor records are kept. It is difficult (if not impossible) to determine through these records what the past activities of the companies have been, production volumes per article, etc. By this reason, production and sales data obtained from textile companies has been rather general and approximate.

Some companies are not sufficiently supplied with water and electricity. The Government has understood the problem and has launched a program to improve the infrastructural services offered to the industry, but radical solutions may require still some time.

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7.4.0. THE ECUADORIAN TEXTILE INDUSTRY BY COMMODITY GROUP

7.4.1. The Cotton Commodity Group

The cotton commodity group is by far the most important within the Ecuadorian Textile industry. It includes the two largest companies in production volumes directly useable by consumers (excluding industrial yarn).

Production is diversified in pure cotton fabrics (light and heavy), and in blends with artificial and synthetic fibers. Final products cover practically all types of the population's fabric needs such as grey cloths, dyed and stamped fabrics (with or without other finishing processes, threads, blankets and pullovers. Nevertheless, high fashion - short lived products are normally imported due to their very limited demand.

It is estimated that the Ecuadorian cotton industry could be placed at the same average level as the other member countries of the Andean Market on subjects such as quality and equipment modernization and balancing. With some more complementary steps (several are suggested and described in the chapter covering the Andean Market) it will be feasible for the Ecuadorian cotton industry to improve its general situation and to approach the conditions existing in the most advanced countries in the area.

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Production costs are analyzed in the technical part of this study. Even if in the past some cost components compared unfavourably against their equals in other countries, government protection has limited imports (as it is usually found in Latin American countries) and promoted the use of domestic products.

The basic raw material in this commodity group is the cotton fiber. Ecuador produces two main types of cotton, Criollo and Cocker both of medium fiber lenght and quality, in a volume that practically covers the country's needs. Cotton imports are almost not allowed until the local production is consumed; even if this policy is very understandable, in the future it will be necessary to contemplate exceptions to this rule as required by an increasing demand for better quality products. Viscose is used as an alternative to high quality cotton and recently the polynosic fiber has been introduced in Ecuador for the same purposes.

The raw material consumption of the cotton industry from 1965 to 1969 is given in Table N° 7. Cotton figures show a continuous growth, while artificial fibers follow the same trend up to 1968 and declined in 1969. Synthetic fiber consumption is of secondary importance if compared with the others; in 1969 it shows a sharp increase due to the iniciation of acrylic yarn production by the second largest cotton company and a much higher volume of synthetic/cotton blend fabrics.

Cotton industry production is given in Table N° 12 . It has been

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divided in light and heavy cotton fabrics, and cotton blends with artificial and synthetic fibers. In the table, lengths have been converted to square meters for a better idea of proportions due to the various widths in which fabrics are produced.

From Table N° 12 the following indexes may be computed:

Cotton Industry

Four-year Evolution Indexes

(Basis: 1965 = 100)

1969 Indexes

	Production	Value	Average Unit Price
Light Fabrics	171	155	90.7
Heavy Fabrics	129	150	116.2
Cotton/Rayon Blends	280	416	149.0
Total Group	161	185	114.5

It is interesting to compare these indexes with those in Tables N° 3 and 4 . It could be seen that only the total average unit price indexes (106 and 107.4) coincide satisfactorily; production indexes, instead (161 vs.89) are completely different and indicating opposing evolutions. It is estimated that figures in the above table are the best approach available to the evolution of the cotton industry; they show a good production growth and an almost stationary average unit price situation.

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5.2.5 MATERIAL HANDLING AND STORAGES

Findings: Expensive products like wool yarns or cloth should be protected against damage in transport even more than cheaper products like cotton. The material handling and the storages encountered in the visited mills were not at all appropriate to comply with their requisits. Recommendation for improvements can be found under the Cotton Industry 5.2.5.

MATERIAL HADLING			STORAGES		
Good	Fair	Poor	Good	Fair	Poor
-	67	33	-	67	33

5.2.6 EVALUATION OF TECHNICAL PROCESSES

Wool Sorting or Classifying:

Findings: Mills which buy their wool directly from producers or distributors, have to classify the wool at their mill, which frequently is not done in an organised way.

Recommendations: Since sorting has to be carried out by operators with no mechanic assistance in the actual sorting, it is essential that material handling is carefully laid out to facilitate output, which includes suitable sorting tables as well as making provision for material handling of the sorted fibers from the board into suitable baskets.

If wool fleeces have been stored in cold atmosphere, the grease will have solidified and sorting will be very difficult.

Fleeces should therefore be brought to about 70° F for sorting. Lighting, if artificial, should be shadow free. Where wool fleeces are

It has been pointed out that production has not only increased, it also has changed the product mix by the addition of higher quality, normally more expensive items such as fabrics made out of blends with artificial and synthetic fibers (whose rates of growth have been higher by far than those of pure cotton fabrics). This fact makes more remarkable the price levelling noted during the period, which could be explained only by a better cost structure obtained through improvements in production volume, quality and efficiency.

During the period 1964-69, cotton spinning mills have remained at a stationary production level. There have been some changes in the proportions of the fibers consumed (see Table N° 7), but the general evolution of this sector contrasts very unsatisfactorily when compared with the evolution of plain fabric manufacture.

Table N° 13 gives sales and values of cotton yarn and thread. It may be seen that physical sales are higher than raw material consumption (Table N° 7), situation which may be attributed to inaccuracies in companies' records. Nevertheless, production figures show a stationary evolution with progressively higher prices, as shown below:

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Cotton Spinning Mills

Four - year Evolution

(Basis: 1935 = 100)

1939 Indexes		
Production	Value	Average Unit Price
96.5	107.5	111.0

Again, these figures do not agree with those in Table N° 3.

Cotton blankets and bedspreads are important items in the Rumanian textile industry. Sales and value figures for these specialities are given in Table N° 14, showing a general evolution very similar to spinning mills', with the following indexes:

Cotton Blankets and bedspreads

Four-year Evolution

(Basis: 1935 = 100)

1939 Indexes		
Production	Value	Average Unit Price
87	116	108.5

These products are made out of pure cotton and cotton/viscose blends.

7.4.2. The Wool Commodity Group

The wool commodity group is the second largest, after cotton, within the Ecuadorian Textile industry. Figures on raw material consumption are given in Table N° 8 , and they correspond to up to five reporting companies, but is missing the largest wool manufacturer, who refused to provide any class of information. Consequently, Table N° 8 does not reflect thoroughly the real evolution of this sector. The situation is still more complicated by the fact that in each year one new company started operations adding its influence to create a rather unusual rate of growth which, if the largest company were considered, would have been partially smoothed out. With these clarifications, the wool group will be commented on the basis of the available data.

As in the case of cotton, the wool industry produces a large variety of final products, covering all popular needs of the market. High quality, high priced products have a limited demand and usually they are imported. The domestic production is concentrated on woolens, worsted fabrics, blankets, bedspreads, ponchos and paletoleros in a wide range of quality. In addition, some wool companies (specially the largest one), produce an important volume of acrylic yarn for knitters and foreign buyers; this type of yarn is analyzed later.

Wool is the most important raw material in this sector (Table N°), but other types of fibers used (cotton, artificial and synthetics)

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when totalized, become as important as wool. In general, the country climate is mild and the majority of the wool products are blended with other fibers for lightening purposes. The final production quality is good and in many cases well comparable to average imported products.

Rumania produces part of its needs of wool, which are complemented by imports from several countries. The higher proportion of imported raw material provides a better chance of selection than in the case of cotton, a higher production flexibility and a better adequacy of the raw material to the final product.

The wool sector has progressed not only by the vegetative increase of the demand, but also by import substitution and even by sales to foreign buyers; the latest are very active in the blanket market.

Table N° 15 shows production figures which, with the limitations explained previously, provide the following indexes:

Wool Industry

Homogeneous Evolution Indexes

(Basis: 1935 = 100)

	1970 Indexes		
	Production	Value	Average Unit Prices
Woolens	354	348	83
Worsted Fabrics	705	684	80
Blankets & Rugs	1700	1330	98
Knitwear & Furlabon.	172	280	130
Total group	494	440	70.6

All production indexes show strong increasing figures while average unit prices, with the only exception of genuine and patchwork, have markedly decreased during the period. This situation could be attributed mainly to the intensification of the market competition among companies and, indirectly, has contributed the demand.

Table N° 25 shows that sombrero hats have been produced in a 2 to 1 proportion to worsted fabrics; this fact confirms the market preference for low priced products.

7.6.3. The Artificial and Synthetic Fiber Commodity Group

This commodity group is composed by a reduced number of relatively small size companies. They produce fabrics for several applications, such as shirts, overclothing for women and men, lining, etc. Pure artificial and synthetic fibers are used, as well as their blends with cotton.

It has to be pointed out that products of similar types are manufactured by other commodity groups, specially by the cotton group (see Table N°12, points 2 and 3).

According to Table N° 9, this group has had a good evolution during the period by [illegible]. Individually, consumption of synthetic fibers rose sharply, specially in the last two years of the period. This trend is being noticed in almost all countries of the world. By contrast, artificial fiber consumption remained almost stationary for three years ([illegible]), showing a moderate increase in 1980.

Index and value figures are given in Table N 16. The higher volume corresponds to artificial and synthetic fiber blend fabrics, followed by synthetic fabrics at a much lower volume level and, finally, artificial/cotton and artificial fiber fabrics.

It is necessary to say that these types of fabrics are light in weight and, consequently, they represent a much higher length of

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fabrics than those produced with equivalent weights of cotton or wool.

Figures in Table N°16 may be compared to those in Table N°12, points 2 and 3. It can be seen that the cotton commodity group production of cotton blends with artificial and synthetic fibers is by far more important, totalling 4468 tons of products against 640 tons of the artificial and synthetic commodity group.

An index analysis shows the following results:

Artificial and Synthetic Fiber Industry

Year-over-year volatility indexes

(Base: 1965 = 100)

	1966 Index		
Fabrics	**Production**	**Value**	**Average Unit Price**
Artificial Fibers	177	208	117.5
Synthetic Fibers (1)	190	238	74.5
Artif./Synt.Blends	136	167	122.5
Artif./Cotton Blends	175	175	100.0
Total group	164	199	121.0

Note 1: Two-year evolution indexes (1967 - 1968)

The manufacture of synthetic fabrics commenced in 1957, showing a sharp raise from the very beginning to end the period in 1965 with the largest production index, 100. Nevertheless, the price

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trend has been unfavourable, closing the cycle in 1[illegible] with an index of only 74, much lower than the average (121) of the total group index.

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7.4.4. Knitting Group

In Sweden, as in many other countries, the knitting industry is composed by a rather few number of small companies and a large quantity of family size enterprises. In Table N° 10 are given raw material consumption figures compiled from data obtained from twelve companies, but it is estimated that there are around 400/500 small knitters distributed over the country and consuming very variable volumes of all types of raw materials, specially acrylic yarn for overclothing.

Main knitted products are plain fabrics (tricot and jacquard), circular knitted fabrics and contoured knitting for overclothing in both, single and double jersey. In many cases knitters have their own confectionery departments integrated with the knitting processes, and carry on manufacturing up to the final consumer product.

Socks and stockings are mainly produced by specialized companies or by multiproduct companies but with very well separated sock and stocking departments. Manufactured products cover all usual types, including socks and stockings for men and women (either stretch or not), and pantyhose for women.

Table N°10 gives figures on raw material consumption, which includes raw fibers (cotton and artificial and synthetic fibers), yarn (bought to spinning mills or other textile manufacturers) and textured or simple filaments (polyamidic and acrylic).

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Ecuador does not produce actually artificial and synthetic fibers; they are all imported from several foreign countries (usually from outside the Andean countries by price considerations). Polyamidic texturizing is made by some companies, but acrylic texturized filament is imported.

In Table N° 10 could be seen that artificial and synthetic materials show the highest evolution during the period, while cotton increases moderately and wool is used at steady volumes since 1957. It has to be pointed out that Table 10 does not take into account small knitters, whose consumption is concentrated in synthetic, and wool yarns, in that order.

Cotton is used for circular knitted fabrics for underwear either pure or blended with other fibers; synthetic yarn, specially the bulky type, is extensively used for sweaters. Polyamidic filament, texturized or not, is employed for socks and stockings.

According to the figures of raw material consumption given in Table N° 10 and the particular use of each material, it could be said that the underwear cotton industry had a moderate evolution during the period 1957-61.

In Tables N° 18 and 19 are given sales and value figures for the knitting industry. Translating these figures to indexes gives the following results:

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sorted into only a few categories, the use of conveyor belts should be considered in order to increase productivity.

Scouring or washing

Findings: The washing of wool at the mills is done in an archaic way using sometimes only one bowl and operating exclusively manual. The washing effect therefore is very poor.

Recommendations: As pointed out under Raw Material, the high output of modern washers does not permit any individual mill a utilization, which would make the purchase of a washer economic. One central in Ecuador, for wool buying, sorting, washing and carbonizing if convenient, should be planned.

Carbonizing:

Recommendations: Carbonizing in fiber form should be carried out, when wool is contaminated with vegetable matter to a great extent, which frequently occurs in Ecuador. A bath of dilute sulphuric acid, usually about 5° Bé. for 15 minutes, centrifuging and drying at 22° F is the normal procedure.

Blending

Findings: Blending is done in a manual form in many industries.

Recommendations: As it is difficult to assure proper mixing, when this is done purely manually, the quality resulting is generally poor and the use of ducting and rotary spreaders should be considered. Ecuadorian wool industries work in smaller lots and continuous blending

[redacted] Industry

[redacted]-year [redacted] Indexes

([redacted] 1.3 = 100)

1/4/ Indexes

[redacted]	Production	Value	Average Unit Price
Plain knitted	138	177	128
Circular knitted	120	154	128
Overclothing	114	176	154
Total group	116	158	136

Hose and stockings

Women's Stockings

- Non Stretch | 110 | 107 | 97
- Stretch (1) | [redacted]30 | 130 | 100
Panty-hose (1) | 130 | 130 | 100
Men's socks | 96 | 91 | 94
Total group | 116 | 111 | 107

Note 1: Three-year figures, 1/3 and 1/4.

The above indexes show a sharp production contrast between fabrics and socks and stockings. While fabrics rose 16% during the period, socks and stockings only grew 11%. The most important increase is noted on overclothing, followed by plain and circular knitted fabrics in that order. Stretch stockings and panty hose, which appeared in 1/3, have absorbed

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a share of the market at the expense of non-stretch stockings, which show a sales volume drop in 1963 and 1964. Men's socks also show a comparable decrease during the period.

In general, knitted products are of good quality, and an important proportion of the ready-clothing is sold for foreign use. This fact explains the favourable evolution of this line of products while the others have remained stationary or showed moderate improvements.

7.4.5. Acrylic Yarn

Acrylic yarn is produced by several companies distributed among all commodity groups. Part of the production, in some cases, is later processed by the same companies, but a much higher proportion is sold to knitters or to foreign buyers due to price considerations.

Table N° 17 gives figures on estimated sales and values (excluding yarns for own use of the producers). An index analysis is as follows:

Acrylic yarn

Year-to-year evolution indexes

(Base: 1975 = 100)

	Indexes	
Production	Value	Average unit Price
105	105	100

The average unit price reduction is indicative of cost improvements obtained through higher production volumes and a more active competition.

7.4.6. Whole Textile Industry

In Table N° 11 are shown raw material consumption figures for the whole industry, divided per commodity groups and per type of raw material. It has to be clarified again that the largest wool company is not included in this table.

As it has been said previously, the cotton group is the largest in Rwanda, followed by the knitting, wool and artificial and synthetic groups in that order. Wool is the second largest plain fabric group (1969) even not including the largest wool company.

Cotton is the main raw material consumed by the textile industry, while synthetic fibers, third in 1965, displaced artificial fibers in 1969 and became second.

In Table N° 11 are also given consumption indexes. The evolutions of cotton companies and cotton fibers have been almost similar, but always below the industry average.

Wool companies and fibers can not be properly commented by the reasons explained before, and undoubtedly, the exclusion of the main wool company affects also whole industry figures.

Not considering the wool group, the knitting group shows the highest evolution and strongly contributes to place the synthetic fiber

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consumption as the one with the highest increase during the period.

At the beginning and end of the period, individual participations based on the consumption of the reporting companies have been:

	Participation (%)	
	1965	1969
Cotton Companies	77.3	66.4
Wool	2.7	7.3
Art.& Synthetics	6.4	7.2
Knitters	13.6	19.1
Total	100.0	100.0
Cotton Fibers	68.0	58.2
Wool "	1.6	4.5
Artificial Fibers	21.9	17.8
Synthetic Fibers	8.5	19.5
Total	100.0	100.0

These percentages show clearly that cotton industries and fibers have lost part of their market participation. Artificial and synthetic companies rose moderately, while knitters increased their participation by 50%. Artificial and synthetic fibers show opposing participation evolutions: while the first decreased by 19%, the second rose by 130% and in 1969 is placed as the second largest after cotton. These evolutions follow the general world tendencies.

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Nevertheless, it has to be said that knitting production and acrylic fiber consumption is strongly influenced by foreign buyers' purchases. This sector of the market, usually very important in volume and value, is subjected to several factors which are not under textile companys' control. The price of the imported acrylic fiber in Colombia (which is lower than the locally produced fibers in neighboring countries), foreign currency availability and exchange rates, and governmental regulations are some of the factors affecting purchases by foreign buyers. During the last years these factors have been favourable and promoted sales, explaining the unusual evolution of synthetic fiber consumption in Table N° 11 ; it is estimated that the same trend will continue at least during 1971.

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7.5.0. Apparent Textile Finished Product Consumption

The apparent textile finished product consumption in Ecuador is difficult to estimate due to the importance of the unofficial imports and exports. Textile products are introduced through maritime ports, and there is also an active exchange of products to and from the neighbor countries.

Special efforts have been made to evaluate this trade, but by its own nature any result could only be accepted as a rough estimation.

Table N° 20 gives the apparent textile finished product consumption during the period 1955-69, based on official local production and import volumes. The total local consumption shows a stationary situation in 1965-66, increasing moderately in 1967-68 and the largest expansion in 1969. To supply the needs of this evolution, official imports rose in 1967-69, while unofficial imports show the same trend only in 1969.

With the exception of 1955, unofficial exports have been growing almost steadily, and they represent an important proportion of the total local production.

The apparent per capita consumption remained stationary for four years, but ended the period with a gain of 6,7%, which is a relatively moderate increase.

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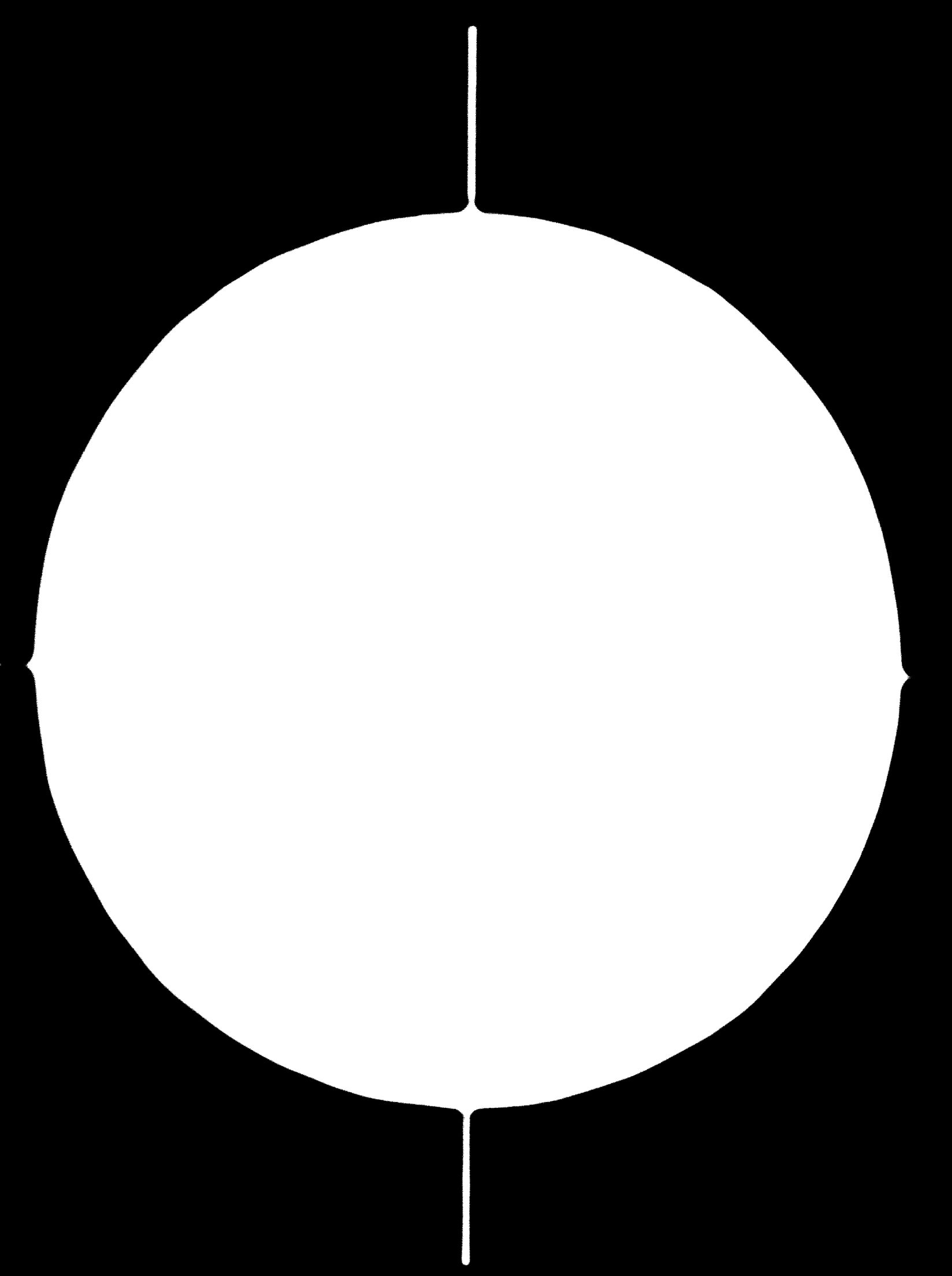

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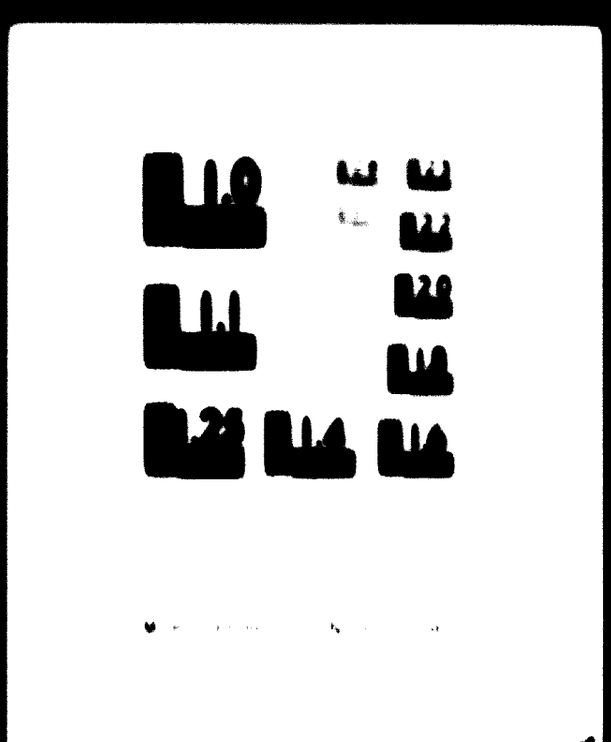

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TABLE N° 6

[redacted]

[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]
[redacted]	[redacted]

[redacted] Annuaire du Commerce Extérieur

TABLE B-9

[illegible]

Classification	[illegible]				
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B.1 [illegible]					
Sheaf reporting companies	3	3	3	3	3
- Cotton	395	384	384	367	350
- Artificial Fibers	449	490	533	565	78
- Synthetic Fibers	3	3	3	4	3
Total	447	476	468	484	448
B.2 [illegible]					
Sheaf reporting companies	30	30	30	30	30
- Cotton	3,488	4,734	5,478	5,514	5,743
- Artificial Fibers	845	1,081	1,185	1,1[illegible]	935
- Synthetic Fibers	65	71	48	57	569
Total	4,183	5,850	6,841	6,880	7,247
B.3 Cotton - Tobacco - Spinning Mills and Plain [illegible]					
Sheaf reporting companies	13	13	13	13	13
- Cotton	4,[illegible]	5,[illegible]	5,[illegible]	5,[illegible]	6,[illegible]
- Artificial Fibers	1,[illegible]	1,[illegible]	1,[illegible]	1,[illegible]	1,[illegible]
- Synthetic Fibers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Grand Total	5,[illegible]	6,[illegible]	6,[illegible]	7,[illegible]	7,[illegible]

Source: Data supplied by textile companies.

TABLE B' 8

[illegible]

[illegible]	[illegible]				
	[illegible]				
b. [illegible]					
Textile Exporting Countries	1	2	3	4	5
- Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
- Cotton a	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
- Artificial Fibers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
- Synthetic Fibers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] Data supplied by textile companies.

TABLE D'9

[illegible]

[illegible]	[illegible]				
[illegible]					
[illegible]	3	4	4	4	4
- [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
- [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
- [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] Data supplied by textile companies.

[illegible]

TABLE N° 20

[illegible]

Classification	Yearly Consumption (tons)				
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
a. [illegible]					
Sheaf Exporting Companies	12	12	12	12	12
- Cotton	353	353	368	398	393
- Wool	-	-	96	96	96
- Artificial Fibres	320	313	486	474	479
- Synthetic Fibres	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	935	[illegible]	1,763	1,980	2,[illegible]

Note: Eight out of the twelve reporting companies do not have spinning facilities: they buy yarn (from other companies) and/or filaments (either, textured or not).

Source: Data supplied by companies.

TABLE N° 11

TOTAL RAW MATERIAL CONSUMPTION.

	Yearly Consumption (tons)				
	1965	1966	1967	1968	1969
1. Commodity Group					
- Cotton Companies	5.332	6.334	6.733	7.224	7,729
- Wool Companies	190	342	460	736	855
- Art.& Synthetic Companies	441	520	558	704	839
- Knitting Companies	936	1,139	1,763	1,909	2,208
Total	6,899	8,343	9,514	10,353	11,631
2. Main Materials					
- Cotton Fibers	4,609	5,621	5,971	6,438	6,763
- Wool Fibers	108	233	349	446	527
- Artificial (Fibers & Filament)	1,514	1,689	2,151	2,220	2,075
- Synthetic (Fibers & Filament)	508	800	1,043	1,549	2,256
Total	6,899	8,343	9,514	10,353	11,331

3. Indexes 1965-1969

Classification	Consumption Indexes (1965 = 100)				
	1965	1966	1967	1968	1969
3.1 Cotton Companies	100	119	126	135	145
Wool Companies	100	180	242	388	450
Art.& Synthetic Companies	100	120	127	160	190
Knitting Companies	100	122	188	213	236
3.2 Cotton Fibers	100	120	128	137	144
Wool Fibers	100	216	324	413	488
Artificial (Fib.& Filament)	100	111	142	147	137
Synthetic (Fib.& Filament)	100	135	178	263	385
3.3 Whole Industry	100	121	138	155	169

Source: Preceding Tables.

TABLE N° 12

COTTON FABRIC - SALES AND VALUES

(Figures in Thousands)

Classification	Yearly figures (000)				
	1965	1966	1967	1968	1969
1. Pure Cotton Fabrics					
1.1 Light Fabrics (up to 150 g/m²)					
Meters Sold	8,827	11,827	12,284	12,748	13,85[illegible]
Square Meters	8,593	11,375	11,683	12,323	13,52[illegible]
Weight (Kg)	1,337	1,749	1,653	1,777	2,28[illegible]
Value (Sucres)	71,014	80,853	82,005	93,340	110,65[illegible]
1.2 Heavy Fabrics (More than 150 g/m²)					
Meters Sold	7,722	9,213	10,217	10,549	10,784
Square Meters	6,958	8,354	9,053	9,839	10,04[illegible]
Weight (Kg)	2,101	2,345	2,401	2,357	2,70[illegible]
Value (Sucres)	71,566	78,315	85,732	97,840	107,33[illegible]
2. Cotton/Rayon Blend Fabrics					
Meters Sold	1,768	4,194	6,046	5,786	6,037
Square Meters	1,867	3,731	5,269	5,111	5,334
Weight (Kg)	311	625	855	810	871
Value (Sucres)	9,400	28,173	37,915	36,884	39,16[illegible]
3. Cotton/Synthetic Blend Fabrics					
Meters Sold	-	-	-	96	1,26[illegible]
Square Meters	-	-	-	110	1,40[illegible]
Weight (Kg)	-	-	-	12	177
Value (Sucres)	-	-	-	1,585	23,03[illegible]
4. Totals					
Meters Sold	18,317	25,234	28,547	29,289	31,93[illegible]
Square Meters	17,438	23,450	26,005	27,413	30,38[illegible]
Weight (Kg)	3,749	4,719	4,909	4,936	6,034
Value (Sucres)	152,040	187,341	205,652	229,649	280,175

Source: Data supplied by textile companies.

TABLE N° 13

COTTON YARN AND THREAD - SALES AND VALUES

(Figures in Thousands)

	Year				
	1965	1966	1967	1968	1969
Quantity (Kg)	565	603	662	535	543
Value (Sucre)	17,887	19,649	22,347	18,966	19,180

Composition: Pure cotton and cotton/rayon blends.

Source: Data supplied by seven textile co mpanies.

TABLE N° 14

COTTON BLANKETS AND BEDSPREADS - SALES AND VALUES

(Figues in Thousands)

	Year				
	1965	1966	1967	1968	1969
Quantity (Units)	354	428	369	417	358
Weight (Kg)	223	278	235	270	239
Value (Sucres)	7,695	8,119	7,894	9,610	8,914

Composition: Pure cotton and cotton/viscose blends.

Source: Data supplied by four textile companies.

TABLE N° 15

WOOL PRODUCTS - SALES AND VALUE

(Figures in Thousands)

Classification	Year				
	1965	1966	1967	1968	1969
1. Woolens					
Meters sold	141	191	205	444	493
Square Meters	210	285	310	592	652
Weight (Kg)	61	78	86	209	216
Value (Sucres)	6,850	8,532	9,300	20,200	20,040
2. Worsted Fabrics					
Meters Sold	32	90	92	246	251
Square Meters	48	135	145	327	329
Weight (Kg)	13	29	38	99	102
Value (Sucres)	2,481	5,050	5,510	15,495	15,603
3. Blankets and Bedspreads					
Units Sold	4	2	46	43	107
Weight (Kg)	7	4	115	103	280
Value (Sucres)	680	358	5,712	6,580	15,856
4. Ponchos and Pañolones					
Units sold	10	17	14	16	14
Weight (Kg)	7	12	10	13	12
Value (Sucres)	930	1,280	1,146	1,963	2,205
5. Totals					
Meters Sold	173	281	297	690	744
Square Meters	258	420	455	919	981
Units Sold	14	19	60	59	121
Weight (Kg)	88	123	249	424	610
Value (Sucres)	10,971	15,220	21,768	44,238	53,714
No.of reporting companies	1	2	3	4	5

Source: Data supplied by textile companies.

TABLE N° 16

ARTIFICIAL AND SYNTHETIC FIBER FABRICS - SALES AND VALUES

(Figures in thousands)

Classification	Year				
	1965	1966	1967	1968	1969
1. Artificial Fibers					
Meters sold	282	328	385	452	490
Square meters	312	377	447	526	560
Weight (Kg)	52	63	76	85	92
Value (Sucres)	3,230	3,255	5,520	6,174	6,720
2. Synthetic Fibers					
Meters sold	-	-	258	690	830
Square meters	-	-	260	700	840
Weight (Kg)	-	-	30	80	96
Value (Sucres)	-	-	4,200	9,750	10,000
3. Artificial/Synthetics					
Meters sold	1,272	1,459	1,447	1,538	1,627
Square meters	1,332	1,587	1,588	1,705	1,837
Weight (Kg)	232	291	282	294	317
Value (Sucres	15,610	20,903	23,302	24,524	26,073
4. Artificial/Cotton					
Meters sold	435	451	475	484	545
Square meters	500	520	550	530	625
Weight (Kg)	130	146	153	156	175
Value (Sucres)	7,280	7,770	7,681	7,913	9,134
5. Totals					
Meters sold	1,989	2,238	2,565	3,164	3,492
Square meters	2,144	2,484	2,845	3,491	3,852
Weight (Kg)	414	500	541	615	680
Value (Sucres)	26,120	31,928	40,703	48,361	51,927

Source: Data supplied by textile companies.

[illegible] group participation above the same benchmarks discussed in the previous paragraph. Cotton increased from 6lb.3 to 6lb.8lb and rose slightly, from 11b.2 to 11b.3lb while artificial and synthetic fibers had the strongest evolution gaining participation from 11b.2 to 27.3lb at the expense of cotton.

Total textile product consumption rose by 1pp in four years, averaging 4.5% per year and exceeding the population's rate of growth, which is estimated a 1.0% per year.

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TABLE N° 17

ACRYLIC YARN - SALES AND VALUE

(Figures in Thousands)

	Year				
	1965	1966	1967	1968	1969
Quantity (kg)	500	791	1,152	1,529	1,920
Value (Sucres)	43,810	72,395	105,740	127,500	143,265

Source: Data supplied by some companies, plus estimations on one cotton and two wool companies.

TABLE N° 18

KNITTED FABRICS - SALES AND VALUES

(Figures in Thousands)

	Year				
	1965	1966	1967	1968	1969
1. Underwear Fabrics					
1.1 Plain Knitted					
Quantity (Kg)	99	72	105	127	131
Value (Sucres)	9,740	8,430	12,605	17,420	17,245
1.2 Circular Knitted					
Quantity (Kg)	177	186	168	237	212
Value (Sucres)	11,018	12,234	11,580	15,616	14,255
2. Overclothing Fabrics					
Quantity (Kg)	241	280	334	413	515
Value (Sucres)	9,545	11,203	11,540	13,395	16,565
3. Total					
Quantity (Kg)	517	538	607	777	858
Value (Sucres)	30,303	31,897	35,725	46,431	48,065

Source: Data Supplied by Textile Companies.

TABLE N° 19

SOCKS AND STOCKING - SALES AND VALUES

(Figures in thousands)

Classification	Year				
	1965	1966	1967	1968	1969
1. Women's Stockings					
1.1. Non-Stretch					
Quantity (Docens)	181	182	195	172	173
Weight (Kg)	40	40	44	39	40
Value (Sucres)	17,172	17,234	20,168	16,550	17,555
1.2 Stretch					
Quantity (Docens)	-	-	-	10	10
Weight (Kg)	-	-	-	3	3
Value (Sucres)	-	-	-	1,440	1,440
1.3 Panty-hose					
Quantity (Docens)	-	-	-	40	40
Weight (Kg)	-	-	-	9	9
Value (Sucres)	-	-	-	7,840	7,840
2. Man's Socks					
Quantity (Docens)	92	73	87	85	88
Weight (Kg)	28	22	27	26	27
Value (Sucres)	5,037	4,000	4,622	4,536	4,567
3. Totals					
Quantity (Docens)	273	255	283	307	311
Weight (Kg)	68	62	71	77	79
Value (Sucres)	22,209	21,234	24,790	30,366	31,423

Source: Data supplied by knitters

TABLE N°20

APPARENT TEXTILE FINISHED PRODUCT CONSUMPTION

Year	Group	Local Production (tons)	Official Imports (tons)	Unofficial Imports (tons)	Unofficial Exports (tons) (4)	Apparent local Consumption (tons)	Participation (%)	Apparent Per Capita Consumption (grs)
1965	Cotton	4,400 (1)	2,200	250	5	6,845	65.6	1,310
	Wool	775 (2)	300 (3)	200	5	1,270	12.2	243
	A.&Synth.	-	3,600	340	1,530	2,310	22.2	442
	Total	5,175	6,100	790	1,540	10,425	100.0	1,995
1966	Cotton	4,400 (1)	2,000	300	10	6,690	63.8	1,240
	Wool	825 (2)	200 (3)	250	10	1,265	12.1	234
	A.&Synth.	-	3,600	350	1,405	2,525	24.1	467
	Total	5,225	5,800	800	1,425	10,480	100.0	1,941
1967	Cotton	4,400 (1)	2,300	300	20	6,980	63.1	1.250
	Wool	875 (2)	200 (3)	250	20	1,305	11.8	235
	A.&Synth.	-	4,300	320	1,845	2,775	25.1	497
	Total	5,275	6,800	870	1,865	11,060	100.0	1,982
1968	Cotton	4,400 (1)	2,000	250	30	6,620	58.0	1,145
	Wool	975 (2)	400 (3)	250	30	1,595	14.0	276
	A.&Synth.	-	4,700	330	1,840	3,190	28.0	553
	Total	5,375	7,100	830	1,900	11,405	100.0	1,975
1969	Cotton	6,000 (1)	1,300 (4)	300	40	7,560	59.5	1,255
	Wool	1,100 (2)	300 (4)	300	40	1,660	13.1	278
	A.&Synth.	-	5,200 (4)	395	2,100	3,495	27.4	585
	Total	7,100	6,800	995	2,180	12,715	100.0	2,128

See Notes on Next Page

NOTES ON TABLE N° 20

1.- Official cotton production figures cover the period July 1st. to June 30th; they have been translated to calendar year figures.

2.- Wool production has been estimated as 50% of the unwashed wool official figures.

3.- Approximated and rounded figures.

4.- Estimated figures.

Source: Ministerios de Industrias y Comercio
Comisión Nacional del Algodón
ANCO (Asociación Nacional de Criaderos de Ovejas)
Anuarios de Comercio Exterior.

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TABLE N° 21

FIVE YEAR MARKET PROJECTION - 1970/75

APPARENT CONSUMPTION

TEXTILE FINISHED PRODUCTS

	Total Consumption (Tons)				Per Capita Consumption (gr/Inh)				Participation (%)			
	1965	1969	1970	1975	1965	1969	1970	1975	1965	1969	1970	1975
Cotton	6,845	7,560	7,300	8,350	1,310	1,265	1,230	1,150	65.6	59.5	57.2	47.7
Wool	1,270	1,660	1,800	2,550	243	278	292	350	12.2	13.1	13.5	14.6
Artificial Fib.)												
)	2,310	3,495	3,900	6,600	442	585	630	905	22.2	27.4	29.3	37.7
Synthetic Fib.)												
Total	10,425	12,715	13,300	17,500	1,995	2,128	2,152	2,405	100.0	100.0	100.0	100.0
Population (Millions)					5.22	5.97	6.18	7.28				

8.0.0. [redacted] AND DISTRIBUTION RIGHTS OF

[redacted] TEXTILE COMPANIES.

8.3.0 Introduction

In this chapter, the following main titles are considered:

- Market systems of the textile companies.
- Distribution systems by commodity groups and type of customer.
- Market characteristics, including customer breakdown by income groups.
- Export-import considerations.

The study was made on the basis of the data available and supplied by textile companies. Not all of them were able to give the required information (by lack of records) and, in many cases, they have to resort to estimations. In each table, the number of reporting companies is indicated.

8.2.0. [illegible]

At the present, the majority of the Ecuadorian textile companies do not have major problems in placing their production in the market. Competition varies from mild to strong, but only in cases for a few products and in some particular regions.

Consumer demand is promoted by a sales price policy rather stationary, as was commented in a previous chapter, where it was demonstrated that textile products prices, during the period 19[illegible], had the lowest rates when compared with the price evolution of other products and services.

The textile product per capita consumption in Ecuador is considered rather low, situation which could be correlated to the per capita income. According to an official publication (Instituto Ecuatoriano de Planificación y Coordinación, Volumen I, Nº III, Julio 19[illegible]), a comparative per capita income tabulation placed Ecuador, among twenty latin american countries, in the seventeenth ranking position, with 288.7 dollars per inhabitant, in front of Paraguay, [illegible] and Haiti.

Actual textile product per capita consumption has been estimated at less than 2000 grams per inhabitant per year. Simply by maintaining this figure, the population growth (3.2 per year) ensures an acceptable sales evolution to the industry.

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The population's purchasing power also influences the textile product's demand. If the present government's economic development plans are completed successfully, undoubtedly they will improve the population's purchasing power and will constitute an important factor in the expansion of the demand.

Consequently, as long as the government's protection against imports continues, the textile industry in Ecuador will face a promising future. If actually there are not serious problems in placing the production in the market, in the coming years the industry will have to expand their production capacity to be able to supply the increasing demand volume.

Of course, the demand evolution will be different for each commodity group, according to the findings in a previous chapter. But there is no doubt that, as a whole, the textile industry in Ecuador will continue to grow.

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9.6.0. [redacted]

loss of cotton participation observed during the period, the total consumption shows improvement due to the population growth, the expansion of the blends with artificial and synthetic fibers and the use in the manufacture of cotton and light blankets and bedsheets. Nevertheless it is expected that in the near future cotton will continue to have market participation, following the general world tendency.

It is estimated that small per capita consumption will maintain the actual rising trend, but only in moderate values.

Artificial and synthetic fibers, instead, will continue to attract larger shares of the market in both, plain fabrics and knitted products. World trends place the highest potential growth on knitted products and it is estimated that Ecuador will follow this tendency, as it has been demonstrated in the last years.

Table Nº 91 shows the five year market projection estimated for Ecuador on the basis of the above mentioned concepts. During the period 1970-75, it is expected that the total per capita consumption will raise from 2,152 to 2,415 grams, equivalent to a 12% increase for the period and an average of 2.3% per year.

It is known that any future market projection is strongly related to the economic conditions prevailing at the present and the

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8.3.0. Market systems of the textile companies.

The situation described in the former paragraph has permited to the textile companies to concentrate their management efforts mor[illegible] the production side than on the commercial. Consequently, if the general companies' organization is usually simple, the marketing's is rather non-existent.

The company's structure most frequently found in Ecuador (and in many Latin American countries) is that of family type (there is only one corporation). Usually the owners are in charge of sales, and only in two cases they delegated their authority in another person entitled Chief of Sales. In no case was found a Marketing Manager according to the meaning and responsibilities usually attributed to such a position.

Marketing forecasting and planning, commercial budgeting and advertising and promotion receive little consideration by part of management. Normally, past figures are extended to future periods ranging from one to four months and taking as a basis equal months of the previous year, with slight modifications to take into account the last sales tendencies. This system may seem to be ever simplified, but taking into account the average size of the Ecuadorian textile companies and the fact that they concentrate their production on standard (no high fashion) items, whose demand changes rather slowly from year to year, it has to be concluded that this system is sufficient and adequate to cover immediate needs.

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In the majority of the cases, sales are made directly by the owner, with or without the help of salesmen. If salesmen are employed, only exceptionally they belong full time to the company as salaried personnel; usually, they work on the basis of commissions on sales and are non-exclusive, with loose tights and almost no control. Periodically, once or twice a year, main customers are visited by the company's owner or a delegate, but this tour does not secure a close relation with and a full knowledge of the market. Many potential customers remain unattended and salesmen's action is not properly checked. But as long as the company places its production in the market, these defficiencies are of no significance.

Advertising and promotion are not practiced by textile companies and, in the present market situation, in general there is not need and justification for them. Only some of the largest companies use to advertise, but in a reduced prportion and covering mainly their offerings to consumers when they have retail stores of their own.

Sales administration, in all cases, is integrated with the general company administration.

Up to now, this marketing system proved to be sufficient and adequate. But in the future, important changes are expected in the market structure. The Andean Agreement, which is commented in a separated chaper, will impose more sophisticated commercial

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systems not easily at the reach of small companies. Industrialists will have to face this fact; to help them, in the above mentioned chapter on the Andean Agreement several suggestions are given.

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8.4.0. Distribution systems by commodity group and type of customer

The former chapter clarifies the marketing system adopted by the textile industry. It is evident from it that a good proportion of the sales iniciative is left to customers, who come to factories to buy. In general, sales are made to any potential customer willing to buy; only in very few cases there are official and exclusive distributors named by factories and covering a previously selected territory.

Factory sales are made to other manufacturers, the apparel industry, wholesalers, retailers and official agencies of the government. Practically, there are no exports.

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8.4.1. The Cotton Commodity Group

Table N° 1 shows the distribution system per type of customers of the cotton commodity group, divided in plain fabric manufacturers and spinning mills.

Yarn is sold to other manufacturers (weavers and knitters) not only by spinning mills, but also by fabric manufacturers. But for spinning mills they constitute the main sales volume, as expected, while for fabric manufacturers the amount of sales reaches 2.2% on total sales.

For only 8 plain fabric reporting companies there are 122 active wholesalers. This fact confirms the lack of exclusive distributors, as is also seen by the large number of retailers attended, 307.

The size of the average retailer is small, absorbing 6,8% of the total sales volume, while wholesalers take 90.7% of the total. The trade with the government is insignificant and mainly directed to supply the Armed Forces.

As was said before, spinning mills concentrate their sales toward "Other Manufacturers". Somehow, the "Apparel Industry" could be considered also in the same category as industrial customer. Together, they take more than 70% of the total spinning mills sales, with the apparel industry limited mostly to the various lines of threads.

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There is only one wholesaler in records for spinning mills. But again, he is non exclusive, and a high proportion of spinning mills' sales (11.4%) is directed toward retailers.

In many cases, wholesalers have more than one store, usually located in different areas or cities. Sales are made to them to one central purchasing office and, later, wholesalers distribute the merchandise by their own means among the stores. In all cases, the textile manufacturers end their deals with wholesalers at the central purchasing office, and they do not know how their products are distributed in the areas covered by wholesalers. Taking into account that wholesalers handle the largest textile production share, it happens that the industrialists remain unknowing their products' territorial coverage, which is left in the wholesalers' hands and convenience. A partial check of the market is obtained through direct sales to retailers, but the volume involved is much less significant than to wholesalers and provides only a rough idea of the market evolution in each area. This situation is repeated in all commodity groups; only exceptionally sales records per zone and per article were found. In other markets this system would be classified as very unsatisfactory; but in Ecuador could be considered as sufficient, and adequate, as commented previously. Cotton textile companies are active in mostly two areas: Pichincha (where the majority of the companies are located, including the largest), and Guayas, the most populated province. Both of them together account for one third of the total population, and the majority of the economically active population. Cotton

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products sales are evenly split between them.

Table N° 2 shows the territorial distribution of sales. It could be appreciated that the two above mentioned provinces absorb more than 95% of the plain fabrics and spinning mills sales. But it has to be pointed out again the fact that sales to wholesalers are partially and indirectly deviated to other areas than the point of sales, and Table N° 2 only is indicative of the main purchasers' location.

Undoubtedly, sooner or later the textile industry will have to investigate deeper in the market to obtain a better knowledge of its particularities. This moment will arrive if and when a stronger and more acute competition develops.

The largest textile companies use to have one or more retail stores of their own. In some cases, they provide industrialists with a good and direct contact with the consumer market, circumstance which could be employed advantageously to keep track of the market evolution and tendencies.

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8.4.2 The Wool Commodity Group

Table N° 3 gives wool distribution figures. Again, it has to be clarified that the largest wool company has not been included in the table and this fact places a large potential of insecurity in conclusions arrived at on the basis of a limited number (3 and 4) of small companies.

The general situation presented by wool companies is very similar to that of cotton's. The highest sales volume is directed toward a large number of wholesalers (average: more than 50 per company); they account for 93.4% of all sales. The number of retailers is comparatively small, only 10, circumstance explained by the fact that the final consumer does not use to buy certain types of fabrics in retail stores, but instead they are bought by tailors directly from wholesalers.

The main difference with cotton fabrics is noted in the territorial distribution. Wool fabrics are mainly sold in regions where the climate reaches comparatively low temperatures, as happen in the Sierra (Pichincha and neighbor provinces). In the other areas, the climate is tropical and not requiring much warm clothing. This fact explains the low proportion of wool fabric sold in Guayas, the most populated province, where the people usually wear trousers and shirts, often made out of cotton and synthetic fiber blends and, less frequently, by wool and synthetics.

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Also in this case the largest companies have retail stores of their own where they sell fabrics and, usually, ready-to-wear clothes, including men's suits and women's garments. In a few cases, the apparel industry belongs to the fabric manufacturer who reaches a total vertical integration.

The mild and tropical climates in Ecuador are the main causes by which the wool commodity group, to lighten its fabrics, uses large proportions of light fibers in blends with wool, as commented in a previous chapter where it was shown that 50% of the raw material consumption in this commodity group is wool, and the other 50% other lighter fibers.

Wool products' quality is good, and in many cases their origination could be confused and taken as imported fabrics.

The general concepts in this paragraph could be extended as well to blankets and paños lones.

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8.4.3. The Artificial and Synthetic Commodity Group.

Table N° 4 shows the distribution system of the artificial and synthetic commodity group. As in the previous cases, wholesalers continue to constitute the major distribution channel, but their importance is not as remarkable as in the former commodity groups - "Other Manufacturers", the "Apparel Industry" and "Retailers" take more even shares of the total sales. Products such as yarn, linings and shirt fabrics are mostly directed to the industry, not to the public, decreasing the importance of wholesalers purchases to 47% (against 90.7% in the cotton and 93.4% in the wool commodity groups).

The territorial distribution shows again the same structure as in the previous cases. Pichincha and Guayas provinces account for 89.2% of the market, remaining only 10.8% for the rest of the country.

All the distribution particularities mentioned in the paragraph describing the cotton commodity group could be as well applied to artificial and synthetic fiber products.

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evolution forecasted for the coming years. The above five-year market projections is based on the trends observed in the past on the textile market in Ecuador and in other Latin American countries of similar structure, plus a progressive and moderate improvement in the population's standard of living expected from the governmental actions and development plans in fields such as agriculture, mining and oil.

Very recently the government has devaluated the Ecuadorian currency placing it at 25 Sucres per dollar. Undoubtedly, this decision will produce several changes in the internal economic situation and will raise some prices, especially those of imported products or manufactured with imported raw materials (such as artificial and synthetic fibers, wool and dyed, stamped or finished textile products). These price increments might affect the general demand of textile products unless followed by compensations in the purchasing power of salaries and wages. It is not within the scope of this study to fully analize the consequences of any official economic policy, but some assumptions have to be made in estimating the five-year market projection, and these assumptions have been explained previously.

Table nº 21 gives estimates on the individual per fibre evolution expected in the next five years. Total and per capita consumption and market participation are shown for cotton, wool and artificial and synthetic fibers. It is expected that in the five-year period from 1970 to 1975 the consumption evolution will continue at almost the same rates as in 1965-70, without drastic or unusual change. The final result will be a moderate increase in the total per capita consumption, as shown.

8.4.4. The Knitted Products Commodity Group.

The knitting industry is, within the Ecuadorian textile industry, the most widely extended. The largest plants are located in Quito, but many small factories, usually of family size, are found in other cities and provinces. They produce from yarns to finished ready-to-wear products, carrying the vertical integration up to the final clothing. Nevertheless, very few companies have spinning operations and yarn is normally bought from other manufacturers.

The apparel industry constitutes the main distribution channel. It is composed by 43.1% of the total number of customers and take 77% of the production volume (see Table N° 5). Wholesalers are also important customers, specially for finished clothing, but their purchases are much lower than those of the apparel industry. Retailers and governmental offices are numerous but insignificant in volume of sales.

All the circular knitted fabrics and a large proportion of the plain knitted fabrics are bought by the apparel industry. As it was said, in many cases knitters have their own apparel operations.

Other types of fabrics, for overwear clothing, are contoured knitted in Full Fashion machines and can not be sold as fabrics; they are always processed and sold as finished clothing to wholesalers, foreign buyers (acting as wholesalers) and retailers.

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The highest sales proportion takes place in the two main provinces (Pichincha and Guayas), but an appreciable part of them are later deviated toward borderline cities and sold to foreign buyers. In this commodity group, the point of purchase is the less meaningful of all.

The small, family-size knitting companies are not included in Table N° 5 . They usually sell their production to foreign buyers, wholesalers and retailers, but there are not records available on their operations.

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U.S.A. [redacted]

The characteristics of the Southern textile market are related to the population's purchasing power and the climate of the country. The size of the market is limited by the rather low number of inhabitants, but they consume all types of products, described in the former chapter.

The massive part of the market is concentrated on cotton and low cost products, wearable all over the year and very conservative in fashion changes.

The low class, the most numerous, prefer low, light low cost products, usually one piece dress and skirts and a set of underwear, and more wear shirts, blouses and underwear, or a two; simple dresses. For the tropical climate these outfits are sufficient, but in the cold months, specially in the winter nights, they have to be reinforced with warmer clothing, such as pullovers. Formal dressing is worn only occasionally, but almost all men have a suit in their wardrobe.

The medium class wears formal dressing more often. This class is composed mainly by employees who are usually forced to wear suits and their complements, while women's dresses are of medium price and quality. Both, men and women use to keep a reduced number of expensive clothes at hand for special occasions, which may include

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imported costumes or suits (or made with imported fabrics).

The high class concentrates its consumption on high priced and imported products. Normally, wardrobes are well furnished with a large variety of gowns and suits, including formal, casual and sporting clothing.

In the largest Boundarian cities there are many tailors. It is a common practice to buy a piece of fabric and to get from it a tailor made suit. Fabrics could be bought within a large price range and they may be either, locally produced or imported. Ready to wear suits are also available, but many people still prefer tailor made clothing, specially because they are not much more expensive than confections.

There is one additional class, the Indians, who are not included in the economically active population and self-satisfy their own needs by local and proper means. Their textile product per capita consumption is very low in volume and value. This class and condition is normally found in many Latin American countries.

Light products are widely worn in the Tropical Areas. They are made out of cotton, artificial and synthetic fibers. Wool is also utilized, but in a lower proportion and usually blended with lighter fibers in the form of "tropical fabrics".

The Sierra Areas are colder, but not reaching extremely low

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temperatures. Nevertheless, during the cold season they require much heavier clothing than in the Tropical Areas and wool is worn more extensively.

Imported textile products are limited to high fashion and fine quality products. Import duties are understandably high because they are luxury items, and volumes are rather low. This fact, as usual, originates a parallel trade, which is introduced in the country mostly through maritime ports.

The quality of the Ecuadorian textile products has improved during the last years. Today, it is up to zonal standards and a large proportion of imported products, either official or unofficially, has been replaced by locally produced items. At the present, some old unofficial importshave been reversed and part of the Ecuadorian textile production is sent to foreign countries.

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8.5.1. Consumer breakdown by income group.

According to official figures, the consumer breakdown by income group is as follows:

Income Group	Population (Economically Active) Inhabitants (Thousands)	%	% On Total Per Capita Income
High	18	1.43	85.58
Medium	196	15.83	8.86
Low	1,037	82.74	4.56
Total	1,251	100.00	100.00

Source: Junta Nacional de Planificación y Coordinación Economica. Los estratos socioeconomicos del Ecuador - Ensayo de cuantificación.

These figures correspond to the year of 1950 (last available).

It could be seen that the high class is composed by only the 1.43% of the economically active population. The purchasing power of this sector is 107 and 1,100 times higher than those of the medium and low class, respectively, setting the large differences in volume and type of textile product consumption described in the previous paragraph.

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The size of the medium class, in proportion, could be considered as at the average size of other Latin American countries. This class is the most important for the consumer good market (including the textile's). It concentrates its consumption in the medium to high price product range, with a low proportion of imported goods.

The low class constitutes the majority of the population and defines the massive part of the demand, which in this case is oriented toward low priced textile products, situation which is found in the majority of the countries in the area.

In 1951, the Ecuadorian per capita income has been estimated at 222.7 dollars (Junta Nacional de Planificación y Coordinación, Indicadores Económicos, Julio 1957), against an average 420.7 dollars for Latin America. It is evident that the Ecuadorian per capita income has been rather low, and taking into account that only 4.53% of that income belongs to the low class, it has to be concluded that this class has a reduced purchasing power. Nevertheless, the textile industry in Ecuador has been able to adapt the massive part of its production to the requirements of this market, where competition is the most acute and profits rather low. It is to be remembered that textile purchases for the low class come in third priority, after food and housing; clothes life could be overextended by several ways. The goberment's economic development plans may improve this situation in the near future.

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8.6.0. Export-Import Considerations

A few years ago Ecuador used to receive large quantities of textile products through official imports or introduced from neighbor countries. Those products were very diversified and in accordance with the modalities of the times. Slowly at the beginning and more rapidly later, the Ecuadorian textile industry started to grow and to adquire dimension, while quality was progressively improved. In the last five years main efforts were concentrated not only in expanding production capacity, but also in perfecting its construction, dyeing and finishing to obtain larger production volumes, greater varieties and finer qualities. The first results have been an increased acceptance of locally produced goods and a corresponding decline in imported products, to end the period by reversing the flow: today, several Ecuadorian textile products are sent to neighbor countries in an unofficial trade.

This fact proves that, in certain aspects, the textile industry has reached a state which is at least comparable to those of other countries in the area, and that exports are feasible.

The textile market in Ecuador is small by two main reasons: the limited population (a little more than six million inhabitants), and the reduced per capita consumption (less than 2,200 grams per year). These facts impose limitations to the textile industry expansion, and international proportions are almost out of reach on the sole basis of the internal market, circumstance which becomes more pronounced by the industry atomization.

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Up to now the Ecuadorian industrialists have been preoccupied and busy with the internal market. It could be said that actually they are in good condition to satisfy the major part of the local consumption leaving to imports only specialized products with limited demand. Imported products are high fashion, high priced, seasonal items and/or very fine quality products; their production in Ecuador is economically unjustified and import volumes are comparatively small.

Exports are the natural next considerations for the industrialists. Some official exports have been made to Bolivia, but amounting insignificant volumes (see previous chapter). A much larger volume has been sold to foreign buyers; the merchandize is delivered to them at the factories or in other locations by wholesalers, and the buyers assume by their own the responsibility of transportation to countries such as Peru and Colombia. "Paño naval", cotton/synthetic blended fabrics, acrylic yarn, acrylic knitted overwear and blankets (cotton/wool/artificial blends), are the main products unofficially exported. In partial exchange, Ecuador receives ready to wear garments and fabrics in a variety of compositions through official and unofficial import channels using both, the maritime and land borderlines; Maritime imports are originated in Asia, the U.S.A., Canada, and some European countries, directly or via Panama. Land imports come from Peru and, mainly, from Colombia.

Official imports are normally luxurious products, and the applicable duties are understandable high. To circumvent those expenses,

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merchandize is introduced through other channels.

Unofficial exports are not under the control of industrialists. As it was explained, this trade is carried out by buyers of a special type who make legal purchases to textile manufacturers; their main motivation is a sizeable price diferential between Ecuador and its neighboring countries.

It is estimated that the importation of low demand products will have to continue; there is no economical justification for their local manufacture. Exports, instead, could be promoted if several steps in that direction are taken, which may include:

1.- Setting a special foreign export promotion action by the government in combination with the textile industry in the form of advertising, shows, demonstrations, exhibitions, brochures, etc., in foreign countries.

2.- Establishing a governmental export promotion policy in the form of draw-backs and internal tax reimbursements.

3.- Developing exporting interest in industrialists.

4.- Improving the marketing systems of the textile companies to cover international markets.

5.- Solving the companies' size problems.

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TABLE B-1

Population Figures

Year	Population (thousands)
1964	5,[illegible].9
1965	5,[illegible].7
1966	5,[illegible].1
1967	5,[illegible].4
1968	5,[illegible].1
1969	5,[illegible].3
1970	6,177.7
1975	7,284.5

Source: Junta Nacional de Planificación:

"Proyección de la Población del Ecuador".

6.- Improving industrial modernization and balancing.

7.- Improving quality.

8.- Maintaining reasonable prices for raw materials and services, specially cotton and electric power.

9.- Improving the degree of training of the labor force.

10.- Increasing productivity.

Points 1 - 2 - 3 are aimed to create a climate favourable to exports; points 4 - 5 - 6 - 7 are steps to be taken by the industrialists to adapt their operation to international markets; points 8 - 9 - 10 are related to production costs which, influenced by point number 2, will set the selling price ranges.

Up to now practically there were no export promotion conditions offered to the textile industry and exports have been almost nil, situation which may change drastically if the above suggestions are adopted. In the chapter dedicated to the Andean Agreement the ways in which these suggestions could be implemented are described.

TABLE N° 1

DISTRIBUTION SYSTEMS - COTTON COMMODITY GROUP

Types of Customers

	Number of Customers		Amount of Sales (000)	
1.- Fabric Manufacturers	N°	%	Soles	%
- Other Manufacturers	21	3.9	5,491	2.2
- Apparel Industry	-	-	-	-
- Wholesales	122	22.5	228,531	90.7
- Retailers	397	73.2	17,269	6.8
- Governmental Offices	2	0.4	800	0.3
Totals	542	100.0	252,091	100.0

Note: Number of reporting companies: 8

2.- Spinning Mills				
- Other Manufacturers	62	56.4	8,777	64.9
- Apparel Industry	17	15.4	801	5.9
- Wholesalers	1	0.9	2,400	17.8
- Retailers	30	27.3	1,550	11.4
Totals	110	100.0	13,528	100.0

Note: Number of reporting companies: 3

Source: Information supplied by textile companies.

TABLE N° 2

GEOGRAPHICAL SALES DISTRIBUTION

COTTON COMMODITY GROUP

Province (Main city)	Fabric Manufacturers		Spinning Mills	
	Sales Volume (000) (Sucres)	%	Sales Volume (000) (Sucres)	%
Pichincha (Quito)	107,643	49.6	10,012	74.0
Guayas (Guayaquil)	100,955	45.6	2,915	21.5
Tungurahua (Ambato)	4,758	2.2	-	
Azuay (Cuenca)	2,593	1.2	600	4.5
Manabí (Manta)	957	0.5	-	
Imbabura (Ibarra)	897	0.4	-	
Others	1,003	0.5	-	
Totals	219,020	100.0	13,528	100.0

Note: Number of reporting companies:

Fabric Manufacturers: 8

Spinning mills: 3

Source: Data supplied by textile companies.

TABLE N° 3

DISTRIBUTION SYSTEMS - WOOL COMMODITY GROUP

Per type of Customers and Geographical

Type of Customer	Number of Customers N°	%	Amount of Sales (000) Sucres	%
Wholesalers	104	90.4	25,138	96.4
Retailers	10	8.7	550	2.1
Governmental Offices	1	0.9	390	1.5
Totals	115	100.0	27,118	100.0

Note: Number of reporting companies: 3

Province (Main City)		
Pichincha (Quito)	35,270	82.0
Guayas (Guayaquil)	3,283	7.4
Tungurahua (Ambato)	557	1.2
Chimborazo (Rio Bamba)	242	0.5
Azuay (Cuenca)	1,112	2.5
Others	2,850	3.4
Totals	44,314	100.0

Note: Number of reporting companies: 4

Source: Data supplied by textile companies.

TABLE N° 4

DISTRIBUTION SYSTEMS - ART. AND SYNTHETICS COMMODITY GROUP

Per Type of Customer and Geographically

Type of Customer	Number of Customer N°	%	Amount of Sales (000 Sucres	%
Other Manufacturers	2	3.9	5,300	19.2
Apparel Industry	8	15.7	5,000	18.1
Wholesalers	32	62.7	13,000	47.0
Retailers	9	17.7	4,375	15.7
Totals	51	100.0	27,675	100.0

Note: Number of reporting companies: 2

Province (Main City)		
Pichincha (Quito)	28,855	65.8
Guayas (Guayaquil)	10,230	23.4
Tungurahua (Ambato)	4,000	9.1
Azuay y Loja (Cuenca y Loja)	790	1.7
Total	43,875	100.0

Note: Number of reporting companies: 3

Source: Data supplied by textile companies.

TABLE N° 5

[illegible]

Per Type of Customer and [illegible]

Type of Customer	Number of [illegible]		Amount of [illegible]	
Apparel Industry	[illegible]	[illegible]	[illegible]	[illegible]
Wholesalers	[illegible]	[illegible]	[illegible]	[illegible]
Retailers	[illegible]	[illegible]	[illegible]	[illegible]
Government Offices	[illegible]	[illegible]	[illegible]	[illegible]
Totals	[illegible]	[illegible]	[illegible]	[illegible]

Note: Number of reporting companies: 7

Province (City)		
Pichincha (Quito)	[illegible]	[illegible]
Guayas (Guayaquil)	[illegible]	[illegible]
Others	[illegible]	[illegible]
Totals	[illegible]	[illegible]

Note: Number of reporting companies: 7

Source: Data supplied by textile companies.

[redacted]

[redacted]

([redacted])

[redacted]

9.1.0. Summary.

Five nations including Ecuador, have signed the Andean Subregional Integration Agreement, or A.S.I.A. (Acuerdo de Integración Subregional Andino). The contents of this treaty are summarized in this chapter, and its influence on the textile industry is analized. As a result, a plan of action to adapt the textile industry to the new conditions and requirements imposed by the treaty is presented, and the cooperation to be brought by the government is suggested.

In general, it has been found that the textile industry will have to overcome several problems and will have to improve its technical and working conditions to approach competitive standards within the group. On its side, the government will have to establish an appropiated economic situation to encourage the required changes and adaptations. Nevertheless, it has to be pointed out that it is not within the scope of this study to analize fully and recommend the specific corrective actions required.

The Ecuadorian position within the A.S.I.A. is considered very advantageous due to special concessions received from the larger member countries. But the Ecuadorian textile industry will have to act with no delays in order to materialize and not to lose these concessions.

9.2.0. ANDEAN SUBREGIONAL INTEGRATION AGREEMENT

Introduction

Ecuador, Bolivia, Peru, Chile and Colombia have signed in May, 1969 the Andean Subregional Integration Agreement, A.S.I.A., or "Acuerdo de Integración Subregional Andino", known in short form as the Andean Market Agreement. While ALALC as its main purpose tends to eliminate commercial barriers amongst Latin American countries, the ASIA goes further establishing the economic integration of the countries mentioned as one of its main goals. Such integration will mean the unification of main economic policies referring to foreign exchanges and currency stability, wages and salaries, social laws, taxation, etc. At the moment, Ecuador lacks and will have to develop a national definite policy which will later have to be coordinated with the other member countries, covering the following subjects:

- Industrial Planning
- A special agricultural regime.
- The planification of the social and physical infrastructure.
- The foreign exchange, monetary, financial and fiscal policies, including the treatment of capitals originated within or outside the region.
- A common commercial policy to confront non member countries.
- The coordination of planification methods and techniques.

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The total market will be composed by 60 million people and will be attended by industries whose locations will be decided according to plannings to avoid repetitions and excess of installed capacity.

The agreement establishes a progressive liberation of commercial barriers among member countries, and in ten years those barriers should have to disappear totally. This decision is irreversible; the only elasticity provided is at the date in which barriers will be due for removal within the ten years.

Points that will be taken into account are:

- The installed plant capacities.
- The needs for financial and technical assistance, for the installation, expansion, modernization or conversion of industrial plants.
- The needs to train labor.
- The possibilities of horizontal specialization agreements among companies in the same industry.
- The possibilities of establishing joint systems of marketing, technological investigation or other ways of cooperation among similar industries.

Policies should have to be coordinated according to the following schedule:

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[redacted]

[redacted]

(Thousand of Inhabitants)

[redacted]	Total Population 1964				Economically Active Population 1962			
	Partial	Total	%		Partial	Total	%	
1. [redacted]								
El Oro	286		3.78		54		3.78	
Esmeraldas	154		2.83		37		2.59	
Guayas	1.546		28.35		304		21.35	
Los Ríos	308		5.68		77		5.40	
Manabí	780	2.778	13.39	47.95	172	643	12.07	45.19
2. [redacted]								
Azuay	329		5.35		97		6.81	
Bolívar	170		2.94		44		3.09	
Cañar	131		2.27		43		3.02	
Carchi	114		1.97		32		2.25	
Cotopaxi	228		3.94		26		1.83	
Chimborazo	382		6.10		95		6.75	
Imbabura	205		3.53		64		4.49	
Loja	356		6.16		90		6.33	
Pichincha	780		13.49		200		14.05	
Tungurahua	250	2.845	4.33	50.09	80	758	4.21	52.84
3. [redacted]								
Morona Santiago	37		0.64		8		0.56	
Napo	38		0.61		8		0.56	
Pastaza	20		0.35		6		0.43	
Zamora Chinchipe	17	109	0.29	1.89	5	27	0.35	1.90
4. [redacted]								
Archipiélago de Colón	4	4	0.07	0.07	4	4	0.07	0.07
TOTAL		5.780		100.00		1.427		100.00

Source: Junta Nacional de Planificación y Coordinación Económica. Los estratos socioeconómicos del Ecuador. Ensayo de cuantificación.

1.- Immediate: Agreement to coordinate national development plans.

2.- Before 12-31-1970 (0.5 years): The regimen for foreign capitals, royalties, etc., will be approved.

3.- Before 12-31-1971 (1.5 years): Policies for the unification of industrial promotion laws will be approved.

4.- Before 12-31-1971 (1.5 years): It will start the approximation to common external minimum tariffs, to reach them totally by 1975.

5.- Before 12-31-1972 (2.5 years): All instruments regulating the foreign commerce will be standardized.

6.- Before 12-31-1975 (6.5 years): The common external tariff will start to be applied, and by 1980 will be totally enforced.

Disloyal competition will be avoided by prevention of dumping, price manipulation and manoeuvres tending to make difficult normal supply of raw materials.

9.3.0. THE ECUADORIAN SITUATION IN A.S.I.A. SEEN FROM THE TEXTILE INDUSTRY VIEWPOINT.

Among the general dispositions of the treaty, those applicable to the textile industry establish:

- Ecuador and Bolivia, as the less developed member countries, will enjoy special concessions which are specified in the treaty under Chapter XIII. The most important and immediate concessions are detailed in Articles Nos. 96 and 97 granting, by part of the other member countries (Chile, Peru and Colombia), a gradual elimination of import duties and restrictions of any order on the importation of products originated in Ecuador and Bolivia, according to the following schedule:

  - Before 12-31-1971: 40% Reduction of present import duties and surcharges.
  - Before 12-31-1972: 30% additional reduction on same.
  - Before 12-31-1973: Last 30% reduction on same.
  - In addition, the Commission will approve before the 12-31-1970 a list of some products to be liberated in favour of Ecuador and Bolivia from January 1st, 1971 (Article 97, paragraph b).

- Ecuador and Bolivia will liberate imports from Chile, Peru and Colombia, starting at 12-31-1976 and at a rate of 10%

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annually. Ecuador may call exceptions to this plan for products classified up to six hundred subpositions in the NABALALC nomenclature, which in turn, will be liberated before 12-31-1990 (Art.102). Consequently, Ecuador and Bolivia will have time advantages in all matters referred to liberations.

- Articles Nos. 79 and 99 may cancel parcially or totally these advantages granted to Ecuador and Bolivia if it is demonstrated that any or all other member countries are suffering grave damages in their economies due to these special concessions. If such is the case, corrective temporary actions may be taken by any country to protect its situation; these measures should be studied and authorized by the Subregional Junta previously to their application.

- On the subject of importation of capital goods (specially machinery and equipment) and raw materials, Article No.105 establishes that Ecuador and Bolivia may be authorized to apply exceptions to the approximation of their import duties to the Common External Tariffs, so they may continue to import capital goods and raw materials from non member countries at lower than the common tariffs. This fact is mentioned again in Article 112. But Article No. 32, point b, says that one of the objectives of the Agreement is the maximum use of the resources available in the subregion or,

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in other words, that Ecuador and Bolivia might be forced to obtain their supplies of textile synthetic and artificial fibers from Chile, Peru and/or Colombia as long as those countries have enough production capacity to attend their needs.

- The harmonization of the legislations on industrial promotion and the uniform regime for multinational companies is treated in Article No. 28. It establishes that within the six following months to the 12-31-1971, the member countries will adopt the required measures to enforce this harmonization, as suggested by the Subregional Commission. This means that Ecuador and Bolivia will not have their final industrial promotion legislations before the 6-30-72. Unless provisional decisions are taken in advance, this date is considered as too much delayed and it might partially neutralize the time advantages granted to Ecuador and Bolivia.

- Any member country may place some products in their list of exceptions, in which case, those products will not be liberated according to the general schedules, but will be totally liberated before the 12-31-1985 (Article No.55). Nevertheless, for the three larger countries, these exceptions are not valid for exports of products originated in Ecuador and Bolivia if it is demonstrated that in the last three years those products have been significatively interchanged with the country calling the exceptions and/or that there are prospects of significative commerce in the immediate future (Article No.58). Unless

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Articles Nos.79 and 99 are applied against Ecuador and Bolivia, these two countries may find Article No.58 really advantadgeous for their economies through the promotion of exports to Chile, Peru and Colombia.

9.4.0. AGENCIES OF THE A.S.I.A.

According to Chapter II, the Agreement establishes that two main agencies should be formed to regulate the application of the treaty. They are: the Commission and the Junta.

- The Commission is constituted by two plenipotenciary representatives of the government of each member country, one titular and one alternative representative.

- The Junta is composed by three technical staff members whose function is to assist the Commission, and their work will be related to the interests of the subregion as a whole.

- In addition, the Agreement specifies the constitution of two assistant committees (Articles Nos. 19 and 22).

- The commission and the Junta have been formed and are operating normally, but the need of the assistant committees is being discussed.

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9.5.0. TREATY IMPLEMENTATION

In order to implement efectively the A.S.I.A., it is required an oriented action by part of both, the government and the economic forces of each member country. It has to be pointed out again the the A.S.I.A. means not only the elimination of import berriers among countries, but furtherly, it establishes a complete economic integration of its members.

The constitution and operation of the Commission and the Junta are positive steps taken to implement the treaty. But at the same time the economic harmonization is considered vital for A.S.I.A.; if it is not achieved, then the treaty will not differ significatively from the ALALC agreement.

It is thought that Ecuador and Bolivia, as the less developed countries with the greatest concessions, are the two nations called to receive the best advantage from the agreement. Consequently, both should be the most interested in utilizing all the means at their reach to push ahead in the intermediate steps until the treaty becomes fully and surely operating.

9.6.0. SITUATION OF THE TEXTILE INDUSTRY IN ECUADOR

The textile industry was installed and is operated to serve a small size country (even the two largest companies can not be considered, according to international standards, as more than medium size). It covers a very diversified line of products, using all types of main fiber as raw materials. In the latest years it has been stimulated by an active, non-official exchange of products with the neighbor countries, where the balance of textile values has been estimated in favour of Ecuador at 7.5 million dollars (1969) as the difference between outgoing and incoming products.

With very few exceptions, the companies belong to one or two owners and have family-type organizations. The Ecuadorian industrialist is very individualist; he wants to run his company according to his own ideas, not having to give explanations to other people.

This mental approach has atomized the industry. Even members of the same family prefer to install separated companies instead of considering the possibility of associations for larger size companies.

The desire and, in many cases, the need to be totally independent from the others, has forced companies to a complete and often uneconomical integration. The mayority of the textile companies

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of any size producing plain fabrics have their own spinning, weaving, and dyeing and finishing departments of some kind, without much consideration on the economic reasons of this integrations.

With few exceptions, the organization of these companies is very elementary, with the general manager (usually, the owner) deciding on all matters from purchasing to sales.

In the latest years, the industry has been incorporating machinery and equipment to expand its production capacity and to improve the final production quality. This fact, coupled to favourable foreign exchange conditions, has limited first and reversed later the flow of smuggled products which some years ago were introduced from neighboring countries (Peru, Colombia and Panama). Actually, the textile industry attends the needs of the domestic and parallel markets. Practically, the total demand absorbs all the local production and, for some products, it may remain some unfulfiled demand.

Nevertheless, this situation is considered artificial; textils products exchange with neighber countries could change drastically by governmental decisions and so, it is considered unstable. The value of the outgoing products is estimated actually at 9 million dollars per year; some companies have plans to expand their production capacity, specially in highbulk acrilic fiber spinning, to increase even more the volume of this market to Colombia.

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9.6.1. [redacted]

Up to now, only one major company has taken positive steps in the preliminary action to study its own position in front of the Andean Market and to set the basis on which the company will adapt its operations to the new requirements imposed by the international market. All the other companies have given very little consideration to the new problems originated by the Andean treaty; in many cases, unfortunately too often, it was found that industry directors were not informed on the contents of the treaty. The two most common opinions among these directors are:

a) There are not certainties that the treaty will be finally enforced; the differences among the member countries are so wide that can not be smoothed out through negotiations, and the idea of an Andean Market is condemned to a dead end.

b) The Ecuadorian textile companies are too small to face an international market without special product development or properly balanced production. Some of them could improve their positions by expansion and modernization, but they are reluctant to consider new investments due to some economic uncertainty in the country and their ignorance about what the textile Andean Market will really be. They prefer to assume

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TABLE 49

Industrial Production Indexes

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	100.0	111.4	121.8	135.0	149.1
[illegible]					
- Food	100.0	102.8	107.4	111.7	117.4
- Textiles					
Yarn and Threads	100.0	132.5	163.3	208.0	228.4
Plain Fabrics	100.0	97.6	99.7	94.1	84.4
- Shoes and Clothing	100.0	101.8	107.3	111.0	120.4

Source: Venezuela Oil Since Control (1968)

an expectant position, not taking any decision in advance; if problems develop, they will consider them in due time. Anyway, the Ecuadorian textile industry will have at its present form a very difficult job if it is to survive.

This way of thinking is very pernicious. It has to be recognized that perhaps for justifiable reasons and causes the governmental action up to now has been of limited help, but at the same time the economic forces have failed to take initiatives and to communicate with the government to promote the adoption of constructive and positive decisions harmonized with the objectives of the A.L.I.A.

Ecuador is not the only country having troubles in its adaptation to the Andean treaty requirements. The treaty, in essence, means a fundamental change in policies, organizations and actions; it will be difficult to implement, specially due to the variety of the nature of the member countries. But with good will and cooperation it can not be considered utopian or impossible to achieve; its potential benefits will compensate for the hard work needed to implement the treaty and, undoubtedly, constitutes one of the most advanced measures toward the progress of the country taken in the last years.

Meanwhile, by assuming that the agreement will not be enforced, many textile industry directors are taking a chance which at the

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and may result against their own interests. Their position should be positive, bringing full cooperation to the authorities and delegates engaged in the implementation of the treaty. The industry directors should join the Ecuadorian Commission delegates to discuss with them what their position should be regarding the textile industry, what measures have to be proposed and backed, and what decisions may be harmful to the industry, so the Ecuadorian delegates may attend the meetings with the other delegates with full knowledge of the domestic situation and with preset objectives.

In order to proceed in an intelligent way, the textile industry directors will need to join forces. Some companies are members of the Association of the Textile Industrialists of Ecuador (Asociación de Industriales Textiles del Ecuador). The industrialists will have to disregard part of their individualism and achieve a state of cooperation among themselves, and will have to back honestly, fully and actively their association in all discussions with the treaty commission in all matters related to the Andean Agreement implementation in decisions touching the textile industry.

Action on this point is very urgent; it has to be remembered that the Commission will have to approve before the 12-31-70 a list of products to be liberated by Peru, Chile and Colombia in favour of Ecuador and Bolivia, and that the list might include textile products.

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9.6.2. MAIN DRAW-BACKS OF THE ECUADORIAN TEXTILE INDUSTRY.

The Ecuadorian textile industry does not differe sensibly from the Chilean or Peruvian industries. Size is the only significant difference among them. But size is related to other inconveniences which, in the long run, may become very significant.

Following are some of the draw-backs:

a) Owner or family direction: This is a very frequent set-up in South American textile industry. But ownership does not secure management ability. As long as operations are limited in size, and domand and competition permit a fluent sale of the whole production, management problems will not be serious. But acting in international, high competitive markets, will require a different kind of management, with a specially suited type of mental approach.

b) Over-simplified organization: Most of the companies show a very primary organization, with very little planning, budgeting and control. Even if up to now this type of organization has been adequate, the expansion of the market to international operations will require more sophisticated systems.

c) Low-salary capabilities: The low volume of sales implies low-salary paying capability. In Ecuador, this problem

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is solved by reuniting on the owner the responsibilities of management, purchasing, production and sales, which normally, if covered by employees, will require the highest salaries in the company. But the fact that these positions are not and can not be covered by high-payed specialists will place many companies in a difficult position if operations are expanded to the Andean Market.

d) Quality limitations: In several cases, it was found that the owners of textile companies were professionally trained or have some knowledge of textile techniques. But in a market that is constantly changing and developing new production procedures, it is very important to count with high class specialized engineering help covering all production departments, and including test laboratories and quality controls, normally non-existing actually in textile companies.

e) Marketing limitations: The lack of good commercial organizations makes the majority of the textile companies unfit to deal in an international market.

If solutions are given to problems imposed by aims limitations, it is obvious that the Ecuadorian textile industry will be in a position similar to those of Chile's and Peru's, and this might be a good starting point in its adaptation to the requirements of the Andean Market.

9.7.0. TENTATIVE ACTION PLAN FOR THE TEXTILE INDUSTRY.

Several potential solutions are available to the problems of size limitations: the most suited to the Ecuadorian textile industry are:

a) Expanding the size of the companies: It is the most direct system; it permits the maintenance of present individualism of companies, but normally will be out of reach to most industrialists due to the large volume of additional investments required, frequently not easily available. Expansions could be attained through the installation of new machinery, but in addition, special consideration should be given to the modernization of present facilities and to to the total plant balance.

b) Mergers: Mergers among companies (two or more companies joined together to form a larger new company, or the absortion of one or more companies by a main one) are, technically, the most recommended and practiced way to improve the situation of a group of companies. Usually, the only investment required is the payment of some kind of taxes, but the main difficulty often encountered when a merger is proposed is the harmonization of the mentality by part of the owners of the new company, which in the future will have to act as partners and not as supreme bosses of the organization. By joining production equipment, the first and immediate result of mergers is a new company with a larger and better balanced production capacity than any of its components. But at the same time, if the operation of merging is well studied, several other benefits will be achieved. Normally, the proportion of indirect costs from production,

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administration and sales could be reduced, and the total costs lowered. Sometimes, the larger volume of purchases will permit the obtention of lower unit prices, circumstance which may become important when dealing with raw materials and some types of other supplies. The larger sales volume might allow the new company to employ high caliber specialists as department heads or in other key positions, giving to the company the chance to improve planning, organization, control, eficiency, quality and market penetration. Mergers, as opposed to plant expansions, do not need the effort to conquer a larger or a new part of the market according to the increased production capacity; the merging companies might bring to the new company their own shares of the market, securing to it an acceptable amount of sales from the very beginning of its life. At the same time, competition among the merging companies disappears; the joint forces are then turned against the other remaining companies, usually from an improved competitive position than those of the individual merging companies.

e) Cooperative Services: In this system two or more companies, which do not have individually the economic potentiality to do it by themselves, may hire or contract, and share, the services of specialists in any particular area. Expanding the idea, these services might be provided by the Association of Textile Industries of Ecuador (Asociación de Industrias Textiles del Ecuador) to its member companies by a fee, either, fixed or proportional to the extension of the services rendered. For problems which are common to several companies, or for temporary services, a consulting organization may be engaged by the companies or the Association on specific subjects.

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d) Common Services: An alternative to the former proposition, valid mostly when it is required to count with some type of special equipment or organization, not economically justified for each company individually due to the investments or complications involved, consists in the formation of common particular departments or sections, such as quality control and/or testing laboratories, dyeing and finishing shops, multicompany purchasing sections and international marketing organizations. As before, this system may be used by two or more companies or scaled-up to the Association level.

e) Concentrated Production: If the other problems are solved by the application of any of the above proposed systems, the subject of low production capacity might be partially overcome by concentrating, instead of spreading, the production on only a very few items, specializing the companies in particular lines of products.

But this system should be taken with care, because companies may become very sensitive to variations in competition. One or more alternative products, very well tested and planned, should be maintained as a reserve and the production switched to them in the eventuality of a deep drop in sales volume produced by a change of the demand or the development of a strong, new competition.

In some cases, this specialization must be coupled with an

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improvement in quality and a reduction in costs to assure a longer life in the production of the chosen line.

Of all the systems proposed, the only one which can be implemented individually is the first; all the others require a closed cooperation among industrialists, either individually or through the Association. The first system, due to the capital composition of the Ecuadorian textile companies (usually, one or two owners) and the volume of the new investments required, is considered very difficult, if not impossible to implement. Mergers are the most recommended procedures to follow, because they can provide integral solutions to actual problems. The last three systems give palliatives to particular and sectorial problems only, but they may be of great value as a complement for any of the other two systems.

There is no ideal or general system that could be recommended for the industry as a whole. Even if most companies have similar problems, their details are different. Consequently, each company has to evaluate its own situation, capabilities, objectives and willingness to assume risks, and only after this thorough study a sound decision could be reached in the selection of the way to follow. If this decision is for a merger, the other companies have to be also studied in detail and very carefully, and the affinity with their owners be weighted impartially to avoid later personality problems.

Very often, not one but a combination of the systems described, with or without modifications and/or adaptations, will be found

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as the most suitable for each individual company. Also, associations or mergers with companies in other countries of the Andean Group might be considered.

9.8.0. TENTATIVE ACTION PLAN FOR THE GOVERNMENT.

To secure a successful Ecuadorian participation in the Andean Market, the government will have to develop long lasting economical and psychological favourable conditions tending to promote a national and accelerated effort toward the complementation and adaptation of the economic forces to the requirements of the treaty. The main and most urgent subjects are:

- Tax Policy: It is not always recommendable to create new or heavier taxes. The problem of budget balancing could be attacked from two fronts: by a tight control of general expenses and by the economic development of the country (which results in increased volume of collections from existing taxes).

  It seems that the whole tax structure in Ecuador deserves a revision on modern basis. The system should be simple to apply and universal in extension, if possible automatic and difficult to evade. It has to be carefully planned, by professionals, and valid with little or no modifications for a long time.

- Government Bureaucracy: The average transactions and negotiations with the government can be considered to-day as very complicated. Their simplification is strongly recomsended. Companies and

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TABLE N° 6

[redacted]

([redacted])

	City of Jujuy					City of Humahuaca
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Income (1):						
General Index	100.0	103.0	107.3	111.7	116.3	118.0
- Food and drinks	100.0	103.0	111.9	117.5	122.1	119.5
- Housing	100.0	105.2	107.2	112.2	114.9	109.8
- Clothing	100.0	101.7	103.0	104.6	107.4	107.4
- Others	100.0	101.7	104.1	106.2	113.8	119.5
Industrial Salaries	100.0	103.2	105.2	108.5	114.2	
Industrial Wages	100.0	103.0	107.5	115.1	118.5	

Note 1: For low and medium income families.

Source: Memoria del Banco Central (1968)
Estadísticas del Trabajo - J.N.P.; Nov.1969

individuals may avoid the need for long negotiations with official offices if governmental regulations are conceived for automatic application.

- Industrial Promotion Law: As it is now, this law has lost most of its appeal to industrialists; its only important part still remaining is the partial liberation on import duties. The reinstatement of a system of free tax profit reinvestment is considered necessary, even if some limitations in the proportion might be established. Due to the need to take advantage of the time concessions given to Ecuador by the A.S.I.a., it is suggested to study a new law on the basis of decreasing reinvesting proportions, e.g., 60% in 1971, 50% in 1972 and 40% thereafter, with carry-outs of the excess investments from one year to the following until cancellation. More properly, this system may be incorporated not to an industrial promotion law, but to the general content of the tax structure on a permanent basis; its application has to be automatic, i.e., not requiring any previous approval by part of the government.

Mergers, as one of the most important actions previously suggested, could be promoted by a reduction, and even a complete elimination of taxes on this type of operation.

- Exports Promotion: In most countries, import duties on raw

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materials and internal taxes are valid for domestic consumed products and transactions. When a product is exported, its imported raw material content is considered as "in transit" while stays in the country during the manufacturing process. Consequently, exported products are liberated from raw material import duties and internal taxes by a dual system:

a) Draw-back: Consists in the reimbursement by the government to the exporter or producer of the import duties paid previously on the raw material content of the product. The amount of the draw-back has to be estimated for each product, and is normally stated per unit weight.

b) Internal taxes reimbursement: The internal taxes paid up to the moment of the expert operation are computed and the amount reimbursed by the government to the exporter or producer. Commonly, it is stated as a percentage o. the F.O.B. value of the exported products.

Some times, both reimbursements are unified for simplicity and the government returns a fixed percentage, i.e., 15%, on the F.O.B.

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value of the exported products.

In Ecuador, the industrial promotion law contents an article liberating, from import duties, raw materials used in the manufacturing of products to be exported. But its application is complicated and mostly valid for well secured planned exports.

The development of a more practical and simplified system, of automatic application, is strongly suggested.

Most of the measures above mentioned touch points which have to be harmonized among the member nations of A.S.I.A. Ecuador can not wait until final decisions are taken by the group; it has to develop its own policies to help immediately its economic forces in their effort to prepare themselves to act in the Andean Market. To simplify future harmonization, Ecuador may initially adopt systems and policies which, fitting its own needs, are more or less alike to those used in the most advanced member countries of the treaty.

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9.9.0. COMPLEMENTARY ACTION.

The points that each textile company has to review when estimating its own position within the frame of the Andean market are the normal vital points of any industry: production volume and balancing, productivity, quality, cost, organization, planning, marketing and financing. Several ways for improving the position of individual companies have been mentioned previously. But it is evident that one of the main objectives to achieve will be to reach at least standards adequate to compete with other member countries.

This objective may require new investments, regardless what solution is adopted for the problem of aims. But this investment may be strongly reduced if a well studied merger is implemented, and favorable government policies will encourage these modifications.

Looking in general at the influence of the Andean treaty on the industry of any of the member countries, it is evident that the treaty will force in short time a series of perfecting moves which otherwise will have an way to be taken, but in a rather longer time. Consequently, the treaty could be considered as a healthy accelerating device as long as the member countries count with the required financial power to proceed at the new pace.

The governmental and industrial action has to be complemented by the labor force. The workers can not be left apart; they have to be touched in the significance of the treaty, on its influence

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on the nation and in the working class itself, and the workers will have to assume their part of responsibility in the form of cooperation to facilitate the reach of improved productivity and quality standards. The industrialists will have to be ready to complement this cooperation with additional training because good-will will be not enough if it is not accompanied by good craftsmanship. Education and retraining of the labor force could be accomplished by the government through a specialized agency, or by the industrialists themselves or with the help of their association.

The government on its part can introduce worker's benefits based on higher earning for higher productivity and quality of work.

It has to be pointed out that if all the above conditions are fulfilled by the Ecuadorian textile industry, it will be ready to act not only in the Andean Subregion, but also in other international areas. The future will be very promising for all industrialists with open minds if they follow a carefully studied and realistic plan of action.

[redacted]

[redacted]

M. 1.0 Introduction

The Bangladesh possibilities of exporting textile products are analysed in this chapter. The study covers areas and products and the specific ways in which the textile industry might best take advantage of these opportunities, and programmes through which the government might serve this objective.

30.2.0. Export requirements

Exportable products of any type should meet basic requirements in the international market: adaptability to the market demand, quantity, quality and price.

The product has to be wanted and a demand should exist or might be created. The foreign market has its own preferences, which have to be respected and satisfied. Locally accepted products might not be interesting in a foreign market. Export products might be specially produced for that purpose. In general, it has to be accepted that in all countries there is an existing or potential demand for almost anything. For the case of Ecuador, it is considered convenient to limit export considerations to products with demands already established; to promote and to try to develop new markets for new products is left to larger size countries.

The exported quantity is closely related to the product demand in the foreign country. Usually, larger populations mean larger demands and the need to produce in larger quantities.

The exported product quality should match the quality at which the foreign market is used to. Normally, the higher the standard of living in a country, the higher are the quality standards required. Competition in low quality products is usually very acute and often accentuated by small local firms. Consequently,

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the best chances for successful exports are in the medium and high quality ranges.

The price asked to the final consumer should be acceptable and competitive. It is needless to say that these prices, domestic and F.O.B. are all different prices. F.O.B. prices need a special computation; some taxes valid for locally sold products are non applicable and should be deducted, but export packing, transportation, loading, export paper preparation and some specific taxes and stamps should be charged.

F.O.B. prices are strongly influenced by extra-industrial factors, in the form of governmental reimbursements. They correspond to draw-backs and internal tax devolutions. These reimbursements may amount to 15% on the export price or, in other words, the F.O.B. price may be 13% less than the export price desired to be received by the exporter.

Before reaching the final consumer, the F.O.B. price is incremented by several charges. Adding freight, insurance and consular fees the C.I.F. value is obtained, which plus import duties, port expenses, commissions, taxes, import papers preparation, financial expenses, transportation and unloading gives the final purchasing cost at the agent's stock room. Finally, adding agent's operation and commercial and distribution costs and profits, the consumer price is obtained.

F.O.B. to C.I.F. expenses are in the order of 14%; import duties may reach up to [redacted]% on the C.I.F. value; port and transportation expenses vary around 7%.

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20.3.0. Export Situation of Ecuador

A detailed description of the export conditions in Ecuador is given in the chapter corresponding to the Andrean Agreement. In this paragraph, the Ecuadorian situation is compared in front of two main groups of countries: Andean treaty members as group number one, and the U.S.A., Asian and European countries as group number two. The four main export considerations compared as follows:

20.3.1. - Product adaptability: Group number one is composed by four countries of almost the same characteristics as Ecuador: customs, ways and standards of living, races, culture and basically, climate. All these similarities tend to uniform consumption products and types among these countries; chances are that a textile product manufactured for internal consumption in Ecuador would be well received by the other countries' markets.

Countries in the second group are different in many aspects; just by considering one single factor, climate, it could be seen that Ecuador does not produce the type of winter clothes worn in these countries.

It is estimated that Ecuador is not at the present in a favourable situation to produce textile products in the U.S.A. or European fashions, styles and designs. From the point of view of product adaptability it would be better for Ecuador to limit exports to countries in group number one.

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TABLE N°5

[illegible]

Volume (Thousand metric tons)

Product	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1. Raw Material	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cotton	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wool	0.2	0.2	0.1	0.2	0.3
Art.and Synth.Fibers	2.2	2.1	1.9	2.5	2.7
2. Yarn and Threads	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cotton	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wool	-	-	-	-	-
Art.and Synth.Fibers	1.1	1.1	1.1	1.1	1.4
3. Fabrics	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cotton	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wool	0.1	0.1	0.1	-	0.1
Art.and Synth.Fibers	0.3	0.4	0.5	0.7	0.6
4. Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] (million dollars)

Product	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1. Raw Material	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cotton	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wool	0.360	[illegible]	[illegible]	[illegible]	[illegible]
Art.and Synth.Fibers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2. Yarn and Threads	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cotton	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wool	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Art.and Synth.Fibers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3. Fabrics	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cotton	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Wool	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Art.and Synth.Fibers	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4. Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Sources: [illegible]

30.3.2. - Quantity: Actual Ecuadorian textile production capacity, in the way in which it is organized, is just large enough to satisfy the local market within the current structure of production and imports.

If exports have to be accomplished without injecting the local market, an additional production capacity has to be created. Plant expansions are the closest alternatives to this problem. But until a firm and constant flow of exported products is obtained, the best solution to the production capacity problem will be to improve productivity, efficiency, equipment modernization and balancing, accompanied by a higher technological level; in a second stage plant expansions may take place.

Considering the average size of the Ecuadorian textile companies it has to be accepted that any successful effort to stretch production capacity will render results which will allow only small to moderate volumes of exportable products, which would be insufficient for deals with countries in group number 2 (specially if product types are limited according to the previous paragraph). Consequently, from the point of view of exportable quantities it will be convenient for Cuader to limit operations to countries in the Andean area.

30.3.3. - Quality: During the course of this study, samples of textile products were collected and sent to the U.S.A., Europe and Andean countries for examination and price comparison. The results of

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of this inquiry have been that the Ecuadorian textile product quality is at the average level of the zonal countries, but is rather not up to the standards required by the nations in group number 2. Even if the differences with the second group were not too much pronounced, it is estimated that to perfect quality to the fine details demanded by this group the burden that would be placed on textile companies would be unbearable and disproportionated to their size. Consequently, from the quality view point it will be recommendable to limit Ecuadorian export operations to the Andean zone.

20.3.4. - Price: Price, specially for the everyday type of products which are being considered here, is one of the most important factors in deciding success or failure in an export operation.

Prices of the samples mentioned in the former paragraph were analyzed and compared to those of similar products in groups number 1 and 2. The Ecuadorian products proved to be non-competitive against existing prices in group number 1. If drawbacks in quality and price are put together it is needless to say that chances to export textile products to the U.S.A., Europe and Asia are nil.

A price comparison for countries in group number 1 is given in Table nº1 . The index system is used and Ecuador single prices are taken as the basis (100). Disregarding Bolivia for special reasons, it could be seen that price-wise Ecuador is in a favourable position to export textile products to Chile and Peru if the Andean Treaty

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is implemented and those two countries eliminate import duties on Ecuadorian products. For all the samples listed, Chilean and Peruvian prices are higher than for Ecuador. Nevertheless, it has to be remembered that there are several export expenses which will not be eliminated and account to about 15 - 20% on F.O.B. prices. Consequently, it could be said that, in principle, exportable products are those having price indexes higher than 120 in Chile and Peru; indexes in the range 115 - 120 indicate doubtful export possibilities, and indexes lower than 115 correspond to products which will have to be disregarded.

The lower price index for Chile and Peru is 103. It is estimated that even for those products a price review will allow Ecuador to level off prices and make it possible to export all the products listed in Table N° 1 to Chile and Peru. Moreover, a deeper price readjustment might place also Colombia at the reach of the Ecuadorian exports; there are five Colombian products with price indexes of 97 or more.

The special concession to be received by Ecuador from the other Andean Treaty members consisting in the elimination of the import duties on Ecuadorian exports has been very decisive in the analysis of the export possibilities of this country to Chile and Peru. Nevertheless, the treaty concession will need three years for implementation and the above conclusions are not readily applicable at the moment. Without this concession the export possibilities would be nil, as previously commented for the countries in group number 1.

For further comparison, Table N°1 includes Argentinean price indexes and, according to former concepts, it could be seen that exports to this country are not feasible due to the import duty barriers.

Exports might be promoted in several ways. Draw-back and tax reimbursement is one of the measures that could be taken by the government which will affect prices directly.

In the chapter commenting the Andean Agreement several suggestions and alternatives are given to help in solving the export problem.

Table N° 2 gives a price comparison between Ecuador and the U.S.A.

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TABLE N°1

COMPARATIVE PRICE INDICES - BASIS: ECUADOR = 100

Product	ANDEAN COUNTRIES				ALALC
	Bolivia	Colombia	Chile	Peru	Argentina
Grey cotton fabric	113	79	120	125	-
Table cloth (cotton)	109	73	118	131	110
Carded drill (cotton)	121	100	155	170	120
Cotton popelina N°1	139	76	152	160	122
Cotton popelina N°2	139	82	155	159	120
Cotton flannel	-	74	112	118	112
Popelina, cotton 33% - Polyest.67%	-	97	153	145	123
Popelina, cotton 50% - Polyest.50%	-	97	152	145	120
Tropical casimir - Pol.65% - Visc.35%	-	89	165	115	-
Fantasy tropical casimir	-	89	170	115	-
Worsted casimir (Merino)	-	89	115	115	110
Lanilla - Polyest.20% - Wool 40%	-	88	121	115	115
Sarga - Viscose filament	122	85	135	110	122
Tafetan - Acetate filament	122	-	-	110	-
Blankets - Size 1½	-	98	159	115	115
Stretch socks	-	100	127	109	105

TABLE Nº 8

TEXTILE FABRIC PRICES OF ECUADOR AND U.S.A.

	Prices per square meter	U.S.cents
	ECUADOR	U.S.A.
Sheeting cloth	27	24
Printed cotton	40	25
Cotton popelina	42	27
Rayon lining	30	24

Note: Prices are F.O.B. factory in Ecuador and U.S.A., excetal Packing and other export expenses not included.

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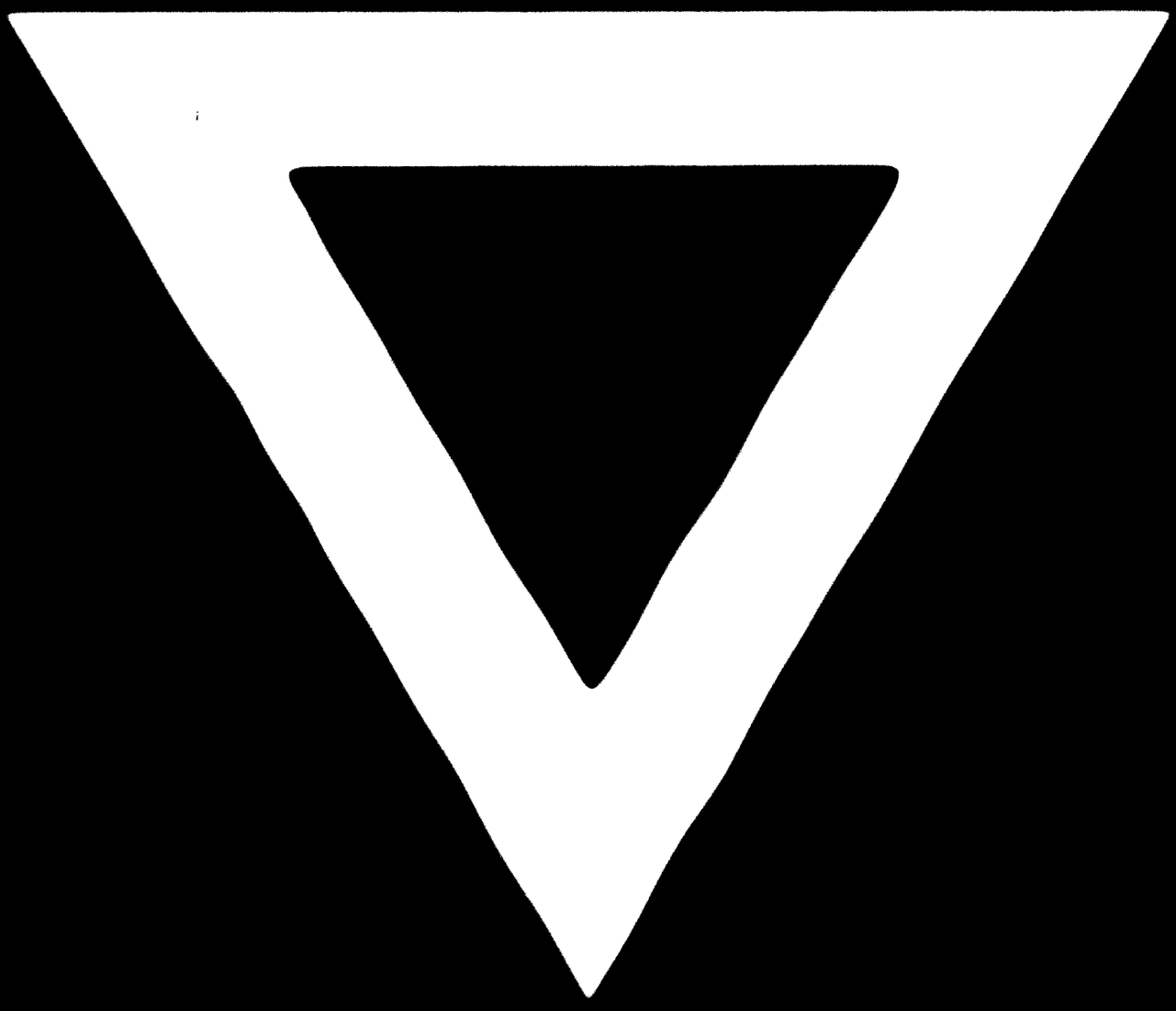

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