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HIGH-LEVEL ADVICE TO THE TEXTILE INDUSTRY
IN THE PTA SUBREGION

US/RAF/92/074

PREFERENTIAL TRADE AREA

Technical report: Assist the PTA Secretariat in preparing a comprehensive report of the textile industry of its member States and recommendations on steps to be taken to improve the efficiency of the personnel and machinery and the quality of its textile products produced in their member countries*

Prepared for the Government of the Preferential Trade Area
for Eastern and Southern African States
by the United Nations Industrial Development Organization

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* This document has not been edited.

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List of Contents

1. Introduction
2. Global Survey of the Present State and Future Trends of the Cotton Based Textile Industry
 - 2.1 Development of Fibre Production and Consumption
 - 2.2 Development of Cotton Production, Mill Consumption, and Fibre Quality
 - 2.3 In 1990 Installed Short Staple Spinning and Weaving Capacities
 - 2.4 Topical Machine Output of Cotton Spinning and Weaving Machinery
 - 2.5 Current Quality of Cotton Yarns
 - 2.6 Potential of Blending Cotton with Man-Made Fibres
 - 2.7 Worldwide Production of Cotton Yarns and Fabrics, Current European Yarn Types and Prices
 - 2.8 End-Uses of Cotton Yarns and Fabrics in Europe
3. Conclusions
4. Status of the Textile Industry in the Preferential Trade Area
 - 4.1 Supply of Raw Material
 - 4.2 Number of Mills
 - 4.3 Number of Employees and Level of their Education
 - 4.4 Products, Output, and Utilization of Capacity
 - 4.5 State of Mechanical Equipment
 - 4.6 Education and Training Facilities
 - 4.7 Quality Standards and Control
 - 4.8 Foreign Trade
 - 4.9 Problems, Shortcomings and Recommendations
5. Conclusions
6. Recommendations made by the First Workshop on Textile Industry in the PTA Subregion
7. Observation

Appendices

1. Introduction

This report is a comprehensive information on the results of the
"First Workshop on Textile Industry in the Preferential Trade Area."

held in Dar-es-Salaam, Tanzania, from 1st to 3rd July, 1992, and
a survey of the textiles exhibited in the

"Fourth PTA Trade Fair"

held just there from 4th to 9th July, 1992.

Compiling these information in the context of the worldwide
development of the cotton based textile industry it was tried
to present a realistic description of the status of the textile
industry in the PTA States.

This report suffers, however, from the fact that the following
member states did not submit a national report:

Angola, Botswana, Comoros, Djibouti, Lesotho, Madagascar, Malawi,
Rwanda, Somali, Swaziland, Zambia, Zimbabwe.

With respect to the proceedings of the workshop itself reference
is made to the report, document PTA/TC/WSTXT/I/11 July 1992.

2. Global Survey of the Present State and Future Trends of the Cotton Based Textile Industry

2.1 Development of fibre production and consumption

Fig. 1 shows the correlation between the growth of world
population, of fibre consumption per capita and of total
fibre consumption extrapolated to the year 2000. Profiteers
of the increase of fibre consumption are cotton and
synthetics. Among the synthetic fibres the main profiteer
is polyester. The consumption of wool and viscose fibres
will remain constant. In 2000 the consumption of natural
and man-made fibres will be of the same magnitude.

Fig. 2 shows the world mill consumption of all fibre types
subdivided into regions: in Western Europe and Japan mill
consumption is decreasing, in USA it will remain constant.
The greatest increase will come off in Africa and Asia
and on a smaller scale in South America.

Fig. 3 shows the fibre consumption per capita subdivided
into regions. According to these estimations one expects
a saturation of the fibre consumption in Europe, USA and
Japan but a strong increase in Africa, Asia, and South
America.

Fig. 4 shows the world fibre mill consumption subdivided into cotton, wool, synthetics and viscose. From now until 2000 the strongest growth is expected with synthetics of 5,6 Mio t, followed by cotton with 4,2 Mio t.

Fig. 5 shows the development of the world fibre production. In 1984 the cotton production made a big step forward due to the production increase mainly in PR China, whereas the synthetic fibre production grows continuously.

Fig. 6 shows that the growth of the man-made fibre production takes place mainly in the countries outside USA, Western Europe, and Japan.

Fig. 7 shows that the main profiteer of synthetic fibre growth is polyester, staple, and filament as well.

Fig. 8 shows the percentage of the production of different fibre types related to the world fibre production. Since 1978 the production of cotton and man-made fibres are about alike.

2.2 Development of cotton production, mill consumption, and fibre quality

Fig. 9 shows the cotton production of the main producers in the season 1990/1991. Due to the high Chinese crops the world production increased in the season 1991/92 about 10 %. About 40 % of the whole crop is in stock today (est. in April 92). The comparison of cotton production and cotton processing shows the possibilities of developing the domestic textile industry on the basis of the national cotton production.

Fig. 10 shows the development of cotton and polyester prices since 1976. Considering that about 50 % of the yarn cost price consists of the cotton price the importance of the domestic raw material supply becomes clear. Just as important is the good knowledge of the processability of the domestic raw material. It should be pointed out that 1990 the polyester price was lower than the cotton price. Today it is about equal to the cotton price. The tremendous increase of the cotton production is the result of the extensive use of fertilizer, pesticides, artificial irrigation, leave stripping agents, and picking resp. harvesting machines. These means and devices have a detrimental impact on the environment. Fibre quality is affected by mechanical picking.

Fig. 11 shows the development of the cotton produce per acre and of the area under cultivation. The figures show the enormous possibilities of increasing the crop by modern techniques.

As a consequence of the fast running modern spinning equipment the fibre quality becomes even more important. The trend away from ring spinning to rotor spinning in Europe and USA necessitates a re-evaluation of cotton breeding objectives to improve fibre and yarn quality. The highest priority in fibre quality improvement programmes should have the fibre strength followed by fibre length, short fiber content, fineness, maturity index, colour and dirt avoidance. The importance of ginning for the fibre quality must be pointed out. It can reduce fibre length and strength if improperly made. The traditional picking by hand leads to a good fibre quality because of less dirt, less immature fibres, and fibre entanglements which are detrimental specially for rotor spinning.

2.3 In 1990 installed short staple spinning and weaving capacities

Fig. 12 shows the 1990 installed spinning capacities, the cumulative shipments of spindles from 1982 until 1991, and the shipments in 1991.

The overwhelming short staple spinning capacity of the Asian countries is noteworthy.

The African countries occupy the 5th place. The comparison of shipments of short staple spindles and OE rotors show the growing importance of the latter process.

Fig. 13 shows the 1990 installed spinning capacities in the African countries. Here OE rotor spinning is playing only a minor role.

Fig. 14 shows the 1990 installed weaving capacities. Again the Asian countries occupy the first place. The large percentage of shuttle-less looms for weaving yarns spun on the cotton system in the European countries is remarkable. The growing importance of shuttle-less looms is shown by the cumulative shipments of looms from 1982 until 1991.

Fig. 15 shows the 1990 installed weaving capacities in the African countries. The top position is occupied by Egypt, followed by Nigeria and Sudan.

2.4 Topical machine output of cotton spinning and weaving machinery

Fig. 16 shows the output of ring spinning cotton of 1 1/16 inch on today's spinning machinery. The results can be gained on cards made by Trützschler, Rieter or Marzoli, draw frames made by Schubert and Salzer, flyer spinning frames made by Rieter, Marzoli or Toyoda, ring frames made

by Zinser or Rieter and winding frames made by Schlafhorst, Murata or Savio. The replacement of knotters by splicers in winding frames enables the increase of the productivity of ring frames. As splicing spots are not visible and breaking less during weaving, the cops weight can be reduced. The smaller ring diameter permits a higher spindle speed because the traveller speed is reduced so limiting the yarn hairiness. This measure requires of course automatic doffing, preparation and transport of the cops to the winding frame.

With OE rotor spinning the card production is 20 - 25 kg/h, the delivery rate of the draw frame 4-500 m/min and the rotor speed with a rotor diameter of 31 mm 100.000 r.p.m.

Apart of its high productivity the advantage of OE rotor spinning is the superior evenness and lower hairiness of the yarns, which make them very suitable for weaving. The finest OE rotor yarn count today is metric 75. The OE rotor process is very sensitive against trash content and fibre entanglements. As the yarn strength of rotor yarns is lower than that of ring yarns fibres with good tensile strength are needed.

The shuttle-less looms have substituted the shuttle looms because of their superior output. Basically rapier and projectile looms are equivalent. Rapier looms are more and more preferred, however, because they are more versatile regarding fabric designs, and they are less pretentious regarding the yarn quality. Projectile looms demand yarns with high strength mainly for the hard conditions of weft insertion and warp tension. Air jet looms have a higher output but they are more difficult to set. Moreover in table lands the atmospheric pressure can be too low. Fig. 16 shows the production rate of different loom types.

An important recent progress in weaving is the uncoupling of the machine functions warp let off, fabric drawing off, shedding, and braking from the mechanical forces of the drive. By means of a board computer each function can be programmed and controlled separately. Thus for example weft setting can be adjusted precisely. Independent monitoring of all machine functions improves the quality and increases the output of the looms. In general one can state that the technical progress now consists of improving programming, monitoring, and controlling the machine functions by microprocessors, sensors, and computers, after a long period of increasing the production rates of the machines according to new production technologies.

2.5 Current quality of cotton yarns

Fig. 17 shows some average quality data of cotton yarn of metric count of 50 demanded now on the market place.

2.6 Potential of blending cotton with man-made fibres

The processability of low grade cotton as well as the yarn quality can be improved by blending with polyester or modal just before the card.

Fig. 18 shows the fibre diagrams of cotton/modal-blends. Even a blending with 30 % modal improves the processability of the fibre significantly without increasing the yarn cost price distinctly. Apart of that yarn strength and evenness will be improved, the spinning limit will be raised and the spindle resp. rotor speed as well.

One has to consider the reduction of hairiness and yarn volume, whereby the cottering of the warp in the weaving shed will be reduced.

2.7 Worldwide production of cotton yarns and fabrics, current European yarn types and prices.

Fig. 19 shows the development of cotton yarn production since 1982. The data include blends of 50 % or more cotton by weight.

Fig. 20 shows the development of cotton fabric production since 1982. The greatest increase of production took place in Asia/Oceania.

The main imports into Western Europe consist of yarns of the metric numbers 20 - 34 (\$ 3,--/kg). The main yarn count spun in Europe today is Nm 50 (\$ 3,60/kg). For the present the demand for fine yarn count, Nm 70, is decreasing (\$ 5,--/kg). Nm 70 and partly Nm 50 are spun from combed cotton. In Europe the portion of cotton/polyester blends has dropped to 20 %. The trend goes further to pure cotton yarns and on long terms also to finer counts.

The production of OE rotor yarns is increasing. In Austria the proportion of ring to rotor yarns is about 1:1.

The price of fabrics for shirts and blouses spun from yarns of Nm 70 is about \$ 5,--/m². The price of fabrics for jeans vary from \$ 4,-- (blue) till \$ 9,-- (black) (June 1992).

2.8 End-uses of cotton yarns and fabrics in Europe

Fig. 21 shows the use of the main fibre types in the European community subdivided into apparel, home furnishings, and technical uses.

Worldwide 60 - 65 % of cotton production is used for garment textiles: e.g. T-shirts, sweat shirts, shirts, blouses, underwear, jeans, trousers, ladies outer wear. 35 - 40 % is used for beddings, towels, canvas, and some home furnishings.

In Western Europe the situation is as follows:

Yarn counts of 10, 16, and 24 are used for canvas covers, awnings, tent cloths.

Rotor yarns of Nm 20-34 are used for trousers and working garments.

Beddings and towellings are made of yarns of Nm 34 (partly rotor yarns).

Jeans are made of rotor yarns of Nm 34 - 40.

T-shirts are made of ring yarns (66 % combed) of Nm 20.

Man's shirts and ladies blouses are made of combed ring yarns of Nm 65. Outside of Europe also Nm 50 is used for shirts.

Print cloth (mainly Rotascreen) is made of yarns of Nm 34-50.

3. Conclusions

- 3.1 Cotton and polyester fibre consumption is on a long-term increasing, but for the present there is an excess of cotton supply on the international market.
- 3.2 There is a need for cotton of better quality corresponding to the development of processing technology. In this regard mechanical harvesting would be detrimental to fibre quality (trash content, degree of maturity, dirt, entanglements).
- 3.3 Worldwide capacity is overwhelmingly concentrated in Asia. It consists of most modern machines with high output.
- 3.4 Worldwide trend is that many countries' cotton processing requirement is catered for by their own domestic cotton production.
- 3.5 In Europe there is a trend to pure cotton fabrics of light weight made of fine yarn counts (comfort factor). In other parts of the world more cotton/polyester blends are demanded (easy care factor).
- 3.6 Mill consumption of all fibre types is either decreasing or stagnating in Western Europe, USA, and Japan. However, strong increases will continue in Africa, Asia, and to a lesser extent in South America. For the time being consumption of textiles is suppressed by an economic recession.
- 3.7 Gaining access to the EC garment market will become more difficult for new exporters including those from developing countries. It is no longer possible to make e.g. two collections a year sold in two seasons. Many smaller collections are needed. Thus, developing countries will have to improve their logistics in order to offer resources especially as reliable subcontractors. The ability of "quick response" will become one of the decisive factors concerning international competitiveness, besides price and quality.

3.8 The main imports to Western Europe consist of yarns of metric count 20 - 34 at US\$ 3,--/kg, while the main yarn count spun in Europe is Nm 50 at US\$ 3,60/kg. Combed yarn of count Nm 70 costs US\$ 5,--/kg (prices are indicative only).

3.9 Worldwide end-uses of cotton yarn are: 60 - 65 % for garment textiles (T-shirts, sweat-shirts, shirts, blouses, underwear, jeans, trousers, outerwear). The balance of 35 - 40 % is for beddings, towels, canvas, and home furnishings.

4. Status of the Textile Industry in the Preferential Trade Area

Based on the National Reports presented on the occasion of the First Workshop of the Textile Industry in the PTA, and based on the Exhibition of Textiles on the Fourth PTA Trade Fair.

(Headlines of the subchapters see List of Contents.)

Angola

A report has not been provided.

Botswana

A report has not been provided.

Burundi (in 1991)

4.1 Production of cotton fibre respectively cotton yarns and twines seem to be well balanced.

Cotton production: 2 904 t

Yarn production: 2 236 t

4.2 Cotebu, integrated plant
Blanket manufacturing plant
Cotton products unit
Garment industry workshops

4.3 1 500 employees, 4,6 % of them are managers and technicians

4.4 2 236 t yarns and twines (100 % used cap.)

9 865 860 m fabrics (100 % used cap.)

9 407 109 m finished fabrics.

The dyeing and printing shop operates at 2/3 of its capacity.

255 969 blankets, capacity: 700 000 pc.

36 t/year sanitary towels

40 t/year cotton wools

32 t/year surgical wool

Sewing yarns (25 % used cap.)

Export articles exhibited on the 4th PTA Trade Fair:

Printed fabrics made of 100 % cotton and 66 % polyester/

34 % cotton, fabrics weight down to 110 g/m².

Cotton yarns Nm 10 till 75.

4.5 Cotebu has launched a project for the extension of the plant for 5 000 000 m.

- 4.6 On-the-job-training, foreign technical assistants
- 4.7 Quality control at all stages of production.
Standards used are close to those adapted by ISO (International Standard Organisation)
- 4.8 Imports from PTA: Nil
Imports from Non-PTA: 3 785 t
Exports to PTA: 196 t (in 1990)
Exports to Non-PTA: 125 t (in 1990)
- 4.9 Tariff and non-tariff barriers for exports to PTA-countries in form of total or partial denial of import licences and local taxes levied on imported products make them uncompetitive.

Comoros

A report has not been provided. On the 4th PTA Trade Fair garment making on job orders was offered.

Ethiopia (in 1990/1991)

- 4.1 A demand of 38 300 t cotton is faced with a supply of 16 489 t (24 753 in 1989/90).
- 4.2 16 factories under the National Textile Corporation.
6 integrated factories, 2 spinning mills,
4 garment making shops, 2 fibre products factories,
1 blanket factory, 1 sewing thread factory.
- 4.3 33 526 employees, 5 % of them are professionals and subprofessionals.
- 4.4 46 333 000 m² fabrics (33,7 % used cap.)
4 235 t market yarns (36,6 % used cap.)
2 112 000 m² blankets, 1 898 pcs. knitwear (18 % used cap.),
6 786 t sacks (64 % used cap.)
hessian cloth, acrylic yarn, rope, sewing thread.
Export articles exhibited on the 5th PTA Trade Fair:
grey sheetings (100 % cotton), Nm 34/34, finished fabrics
Nm 50/50, jersey Nm 50/1 (100 % cotton), sewing thread N.1 DD,
garments, ribbons.
Spinning productivity: 6 kg/operator x h
(Europe: 12 kg/operator x h)
Weaving productivity: 20 000 picks/operator x h
(Europe: 80 000 picks/operator x h)
- 4.5 Old and outdated machinery, spare parts are not easily available. Akaki Spare Parts Factory is far ahead in producing spare parts such as gears and shuttles (in total 13 elements). Items like aprons, roll covers, travellers, rings can be only produced, however, in highly specialized shops.

- 4.6 In 6 out of the 16 mills are well equipped training centers operative. Outside the mills courses for management staff are conducted in collaboration with the Ethiopian Management Institute. Establishing of an Ethiopian Textile Research Institute is in planning. Number of trainees by year: 500 - 1000.
- 4.7 The quality control units in the factories are not well equipped and lack qualified and experienced staffs. There are no references made to standards used.
- 4.8 So far no trade has been practiced with other PTA countries. Export of knitwear, garments and fabrics has been going to Europe and former Soviet Union since 1981/82.
- 4.9 Supply shortage of cotton, spare parts, qualified staffs and lack of an information system. Suggestions on areas of collaboration between PTA countries: common manpower training, development of infrastructure and alleviating shortage of raw materials by way of bartering and other viable means.

Kenya (in 1989/90)

- 4.1 The production of textiles has been adversely affected by lack of cotton for sale, the production of which decreased 1987 - 1988 from 23 800 t to 10 900 t. The production of yarns was 3 980 t and that of fabric 9 960 t in 1990 (10 460 t est. for 1991) according to an UNO-report.
- 4.2 47 mills and registered firms are operational.
- 4.3 The number of employees is 22 291, 10,1 % of them are managers and technicians.
- 4.4 In 1990 the output of cotton-woven fabric was 44 mio m². The capacity utilization in most industries is below 50 % due to poor quality cotton and old poorly maintained machinery. Export articles exhibited on the 4th PTA Trade Fair:
Dyed and printed, finished fabrics made of 65 % polyester/ 35 % cotton, 290 - 470 g/m²; fabrics made of 67 % polyester/ 33 % reyon, 350 - 450 g/m²; hand knitting yarns made of 100 % acrylic; knit wear made of 100 % cotton, 40/1 combed, 270 g/m²; voile, 100 % polyester; knits for sportswear; children's wear; dresses.
- 4.5 The technology found in the textile sector varies from obsolete to the latest computerised technology in some instances.
- 4.6 In-house training is carried out by all mills. Outside the mills textile training is done by the Kenya Textile Training Institute (KTTI), Kenya Bureau of Standards and sponsored bilateral training programmes.
The KTTI does not work since several years, because the private owned mills do not send staff members for training. There are two reasons for it:

- a) Experienced trainers left the KTTI, finding jobs in industry.
- b) The decline of the textile industry prevented the companies from sending staff for training.

The KTTI, however, is in a good technical state of maintenance. From blowing room to jet dyeing machines and screen printers all types of textile machinery is existing, and additionally there is a large testing laboratory. There are dormitories for trainees and lecture-rooms. Local personnel maintain the machines.

Kenya Industrial Training Institute offers different engineering courses.

- 4.7 Quality control and assurance is carried out by each individual mill using guide lines approved by the Kenya Bureau of Standards (KBS), which is said to be an outstanding institution in quality control area. Standards have been set for 11 kinds of textiles. KBS provides also guide lines for the practice of quality assurance.
- 4.8 In 1989 yarns and fabrics were exported to Ethiopia, Zimbabwe, Rwanda, Uganda, and Tanzania in the order of magnitude.
- 4.9 Problems are among others illegal and legal imports of all types of textiles, shortage of cotton and spare parts, over capacity by production of similar textile articles, need of training technicians, obsolete machinery, insufficient quality processing, and lack of modern garment design.
Recommended areas of co-operation for PTA member States:
subregional spare parts manufacturing centre, textile curricula common to the training institutions of member States, facilitating the flow of information to the other member States regarding standards for yarns, fabrics, garments, and common marketing.

Lesotho

A report has not been provided. On the 4th PTA Trade Fair hand spun mohair yarns, pullovers, shirts, and shorts made of 100 % cotton, and handwoven wall carpets were exhibited.

Madagascar

A report has not been provided. Exhibition of hand made embroideries and laces on the 4th PTA Trade Fair.

Malawi

A report has not been provided. Exhibition of kangas and kitenges made of 100 % cotton and blankets made of acrylic on the 4th PTA Trade Fair.

During a visit to the two major textile companies in Malawi in 1991 we learned, that the main products of the textile industry are blankets made of cotton/polyester for warp and acrylic for weft, and plain dyed as well as printed fabrics made of 100 % cotton, which are sold in company owned retail shops throughout the country. Most of the production is sold in the home market, only grey cloth is exported to some extent. 500 weaving looms, partly air jet looms, are in operation.

Mauritius

- 4.1 Imports of wool, mohair, silk, cotton, flax, and synthetic fibres.
- 4.2 368 firms including garment manufacturers in 1991.
- 4.3 81 450 employees in 1991.
- 4.4 There are 1 integrated cotton spinning and weaving mill and 3 weaving mills which produce altogether about 3 mio m²/year cotton fabric. 4 Woollen spinning mills, 40 companies making woollen knitwear, 10 factories making T-shirts and poloshirts, 3 towel factories and many other garment makers are in operation.

On the 4th PTA Trade Fair socks made of 80 % cotton/20 % nylon and ribbons for the computer industry were exhibited.

- 4.5 No statement
- 4.6 No statement
- 4.7 The Mauretian Bureau of Standards is very important specially for the export to sophisticated markets.
- 4.8 There is almost no export to PTA countries but to USA, Japan, EEC, Australia, and Scandinavia. The importance of an Export Processing Zone was pointed out.
- 4.9 Mauritius is more than ready to share its experiences with other countries of the PTA, specially in the textile sector.

Mozambique (1990)

- 4.1 The production of cotton declined from 14 465 t in 1988 to 4 676 t in 1990.
Cotton yarns carded and combed have to be imported.
- 4.2 20 textile companies and 24 garment manufacturers are existing.
- 4.3 The textile mills employ 10 333 people, the garment manufacturers 14 413 respectively.

- 4.4 The installed cotton weaving capacity amounts to 37 802 000 m². 1990 the output of cotton cloth was 22 222 000 m², that means an utilization of capacity of 58,8 %. Other products in 1990: 1 693 000 m² synthetic cloth, 232 000 m² blankets, 777 000 pieces wool clothings, 161 000 pairs of socks, 3 751 000 pcs clothing goods.
On the 4th PTA Trade Fair Mozambique exhibited Kangas.
- 4.5 Status of the machinery is bad. There is a lack of maintenance and spare parts. Frequent power interruptions result in stopping of the equipment, which causes damages.
- 4.6 There are no training centers for the textile industry in the country. In the large companies there are short term trainings for staff only.
- 4.7 There is no national body of quality control and standards. The technical standards are adopted by each company comparing with international criteria for similar products. The laboratories do not have all necessary equipment, and manpower working in this area is not skilled enough.
- 4.9 Speeding up of rehabilitation and modernization of the mills, subregional system of training in quality control and maintenance, establishing of domestic standards for quality control are recommended.

Rwanda

A report has not been provided. On the 4th PTA Trade Fair garments were exhibited as well as fabrics woven and finished in Rwanda.

Somalia

A report has not been provided.

Sudan (1990/91)

- 4.1 The cotton production decreased 89/90 to 90/91 from 127 059 t to 79 652 t. This figure has to be faced with the operational spinning capacity of 26 600 t, which is utilized for the present to about 50 %. Thus the local consumption of cotton is about 10 - 17 % of the domestic production. Therefore Sudan is a potential supplier of cotton to the PTA States.
- 4.2 There are 11 textile mills in the public sector, 12 mills in the private sector, a number of smaller knitting factories and a factory to produce blankets.
- 4.3 The textile industry employs 15 020 people, 4,6 % of them are managers, engineers and technicians.

4.4 22 700 t yarn from Ne 14 carded to Ne 40 combed are produced per year. The production of grey sheeting, bleached sheeting, poplin, and voile amounts to 82,9 mio meters per year.

The degree of utilization of capacity lies between 30 and 70 %. 54 knitting machines are producing 26 tons of knitted fabric which are used in producing underwear. The production of blankets is about 1,5 mio square meters. Yarn count ranges from Ne 14 to Ne 50, fabric weight ranges between 94 g - 160 g/m².

4.5 All mills are starved of consumable items and spare parts. The Khartoum central foundry supplies those items which are based on metal casting. Interruption of the public power supply is frequently cause of loss of production. Lack of reliable telecommunications is a considerable cause of inefficiency.

4.6 Sudan has a well developed educational and training infrastructure which accommodate the training requirements of the textile industry. Education is provided at a diploma level by the textile department of the polytechnic and at a degree level by Gezira University. The Industrial Research and Consultancy Centre provides courses in quality control, testing, workstudy, and others. The managerial performance should be improved. A major problem is the inadequate flow of prompt information.

4.7 There is no national body of setting quality standards and doing quality control. Spinning mills, however, are well equipped for the conduct of quality control, the most important aspects of which are yarn count, regularity, strength, and cleanliness.

4.8 Major textile exports are cotton yarns ranging from Ne 14/1 to Ne 60/1. In 1991 the value of exports of textile products was US\$ 3 532 000, whereas the import value amounted to US\$ 8 440 000.

4.9 The Sudan textile industry is aware of possibilities of collaboration within the subregion. Sudan can offer cotton supply and training facilities and needs additional power supply, and spinning capacity. Moreover it is suggested to set up a service industry for the whole subregion, which supplies the mills in the PTA with spare parts and consumable items.

Swaziland

A report could not be provided due to logistical problems. On the 4th PTA Trade Fair no textiles have been exhibited.

Tanzania

The representative of Tanzania presented a verbal report.

4.1 The textile industry faces severe cotton supply problems. Now the fibre quality has become slightly higher.

- 4.2 The spinning and weaving mills are subsidiaries of the National Textile Corporation. The knitting, finishing, and garment industries are privately owned.
- 4.3 According to an information by Texco in 1991, the personnel was reduced from 24 000 to 12 000 employees.
- 4.4 According to an UNO-statistic Tanzania produced in 1991 8 540 t cotton yarn and 31 600 t cotton fabric. According to the exhibition on the 4th PTA Trade Fair export products are grey cotton yarn, from Ne 10 to Ne 40/1 and 40/2, combed resp. carded, grey cloth, dyed and printed fabric made of 100 % cotton, bedsheet, linen, poplin, kitenge, kanga, napkins, T-shirts (Ne 36/1 combed, 115 g/m²), terry towels, towelling bath robes (330 g/m²), canvas (290 - 720 g/m²), bedford cord, cushion covers, sewing thread, garments, uniforms, blankets, and bags.
The utilization of capacity has been estimated as follows:
spinning: 70 %, weaving: 60 %, knitting: 60 %.
- 4.5 The machinery is fairly old and suffers from the lack of spare parts.
- 4.6 In some mills there are well equipped training centers for operators, but there are constraints regarding the training of high level man power.
- 4.7 Quality control is exercised in the mills throughout the process at each stage.
- 4.8 Cotton yarns and grey cloth are exported to USA, Germany, Sweden, Italy, Switzerland, Belgium, and PTA countries.
The legal trade between Tanzania and PTA countries is considered to be too little.
- 4.9 Among the proposed solutions for the existing problems of the textile industry the following proposals should be pointed out:
Establishing a subregional factory for spare parts, foundation of a central data bank to carter the needs of the local textile industry, replacing the old machines, foundation of a subregional training and research institute, because it is not feasible for each PTA member State to run its own institute.

Uganda

- 4.1 The declining cotton production is one of the reasons of the low capacity utilization.
- 4.2 There are 10 textile mills existing. 2 of them are 100 % privately owned, 8 mills are in operation.
- 4.3 Total number of employees is 5 857.

- 4.4 The installed weaving capacity amounts to 66 mio linear metres p.a., 21,5 % of which are utilized (greys, drills, plain dyes, prints, corduroys, towels, bedsheets, curtains, knits, T-shirts, shorts, school children shirts). The blanket manufacturing capacity is 1,5 mio. pcs. p.a., 33 % being utilized. 53 500 bedsheets are produced, that are 30 % of the existing capacity. According to the 4th PTA Trade Fair T-shirts, and fabrics (corduroy, waffle fabrics, flannels, drills, prints, and plain dyes) are to be exported.
- 4.5 The plant machinery is obsolete, but Government is committed to a privatisation/restructuring programme now being implemented to address the major structural bottlenecks.
- 4.6 No technical training facilities are available except on the job and short duration scholarships from UNIDO, EEC etc.
- 4.7 No statement
- 4.8 There is urgent need to export 100 % cotton yarns of various counts and loom state cloth in order to import polyester/cotton blended yarns resp. grey cloth, which the Ugandan market favours.
- 4.9 In order to obtain solutions for the current problems the following measures should be embarked upon:
Assessment of production capacities and potential for trade within PTA, minimizing product duplication within the subregion, creation of a PTA textile data bank, foundation of a common training facility, and establishing a spare part fabrication. There is need for collaboration in market identification.

Zambia

A report has not been provided.

On the 4th PTA Trade Fair ring yarns (raw white, dyed, and bleached) made of 100 % carded cotton in the count range Nm 24 - 51 were exhibited. Moreover ring yarns of the counts Nm 48/1 and 57/1 made of combed cotton, OE yarns in the count range Nm 10 - 41, ply yarns and 100 % spun polyester sewing threads (Nm 85/2, 85/3) are produced. The yarns are exported to UK, Italy, Germany, Switzerland, and Botswana. Additional spinning capacity is under construction. According to the displayed data sheets the yarn quality corresponds to the international standards.

Zimbabwe

A report has not been provided.

On the 4th PTA Trade Fair PVC coated garments were exhibited.

According to a visit to two major textile companies in August 1991 yarns made of 100 % cotton, cotton/polyester, and polyester/viscose are produced. Dyed and printed fabrics for ladies' outer wear and furnishings, blankets, tentings, and filter cloth are made, moreover stockings, napkins, terry towellings, and labels. 1991 about 30 % of the production has been exported to Europe and USA mainly napkins, towels and printed fabrics. The earnings of foreign exchange are urgently needed for the modernization of the equipment.

5. Conclusions

The country reports show that the textile industries of the PTA States produce similar textiles and have many similar problems, which could be solved by common efforts. Apart of that there are obviously existing possibilities of bilateral exchange of services and goods: eg. supply of cotton fiber, polyester fiber, spare parts, electrical power, spinning capacity, and training facilities.

In particular the following problem areas have been identified:

- 5.1 Due to shortage of foreign exchange the textile industry suffers from limited supply of spare parts, which partly can be manufactured in the subregion, partly must be imported due to the high specialization needed for fabrication.
- 5.2 The availability of cotton is not sufficient in some countries. Due to shortage of foreign exchange the supply of man-made fibres, dyestuffs and chemicals is generally not satisfactory.
- 5.3 Insufficient and unreliable power supply in some countries reduce the utilization of capacity, increases waste, and impairs the technical state of machinery.
- 5.4 In some countries spinning and weaving capacities are unbalanced.
- 5.5 There is a lack of information relating to textile goods, services, and market outlets throughout the subregion.
- 5.6 Common quality standards and technical regulations could promote the intra-PTA trade and hamper the import of sub-standard textiles from abroad, which is killing the textile industry.

- 5.7 There is lack of a common textile institute, which offers training facilities for technicians for production, quality control, and preventive maintenance. This shortage is especially serious in so far as textile technology is continuing to undergo profound transformations. So a permanent upgrading of technical skill is needed.
- 5.8 The infrastructure in PTA does not meet the demands of efficient trading. Telecommunications, railway, roads, post facilities have to be improved. Matching the delivery-dates becomes more and more important for exporters especially in the fashion dependent textile industry ("Quick Response").
- 5.9 High interest rates and unreliable financing facilities are common throughout the PTA countries.
- 5.10 There is a general lack of technology and machinery for high quality finishing of products.
- 5.11 The Mauritian success story, particularly with EPZ and textile industry, was considered an example that could be emulated by the other PTA States. In this regard the PTA Secretariat could facilitate the exposure of other PTA States to the Mauritian experience.
The Mauritian delegate declared his readiness to share experiences with other countries of the PTA specially in the textile sector. He expressed his conviction that the Mauritian economics will depend on the PTA subregion in the years to come.
- 5.12 The greatest problem resulting from the above mentioned shortcomings is the low capacity utilization of existing facilities, which result in high production costs. As a consequence the garments made in the subregion can not compete with the import of second hand garments and dumping of cheap fabrics particularly from the Far East. These imports on the other hand kill the local textile industry.
The only social responsible way out of this "vicious circle" seems to be the increase of the mill efficiency on the technical, managerial, and sales level. Technical co-operation between the PTA States and alleviation of the intra-PTA trade seem to be the most promising step to a recovery of the textile industry in the subregion.

6. Recommendations

The First Workshop on Textile Industry in the PTA made unanimously the following recommendations:

- 6.1 The report of the workshop should be submitted to the Council through the Committee on Industrial Co-operation;

6.2 Develop a spare parts centre for the textile industry in the PTA subregion. In this regard, the existing textile mills should provide their spare parts requirements so that the Akaki Spare Parts Factory in Addis Ababa, Ethiopia, can advise those which it can manufacture;

6.3 A subregional textile training centre is required to:

- a) train textile technologists and maintenance engineers/technicians;
- b) establish common standards for textile products;
- c) conduct tests and issue certificates.

In this regard, the Kenya Textile Training Institute was considered quite suitable as it has most of the basic facilities required for the proposed centre. However, donor support would be required to revive the institute as it had been out of use for quite some time. Therefore, UNIDO was requested to provide assistance;

6.4 A data bank and information system for textile industry should be established for collection of market data, production, and technology. UNIDO would be willing to provide assistance in the establishment of a data bank as a module in the proposed PTA database;

6.5 Eliminate tariff and non-tariff barriers for increased trade in textile products among PTA countries;

6.6 Priority should be given to the development of infrastructure, particularly railways, roads, and telecommunications in order to reduce costs and delivery time for goods and services. However, the individual textiles mill should endeavour to improve its operating efficiency;

6.7 Encourage electrical inter-grid connection to alleviate power shortages being experienced by some member States for industrial purposes;

6.8 The PTA Secretariat should conduct technological and market studies for textile products within the subregion and the rest of the world for distribution to textiles producers;

6.9 The textile industrialists/businessmen should be vigorously encouraged to utilize the PTA Clearing House. In this regard, the PTA Secretariat should arrange to familiarize the business community with the operations of the Clearing House;

6.10 Strengthen or establish national textiles producers association as a first step to the formation of a subregional association;

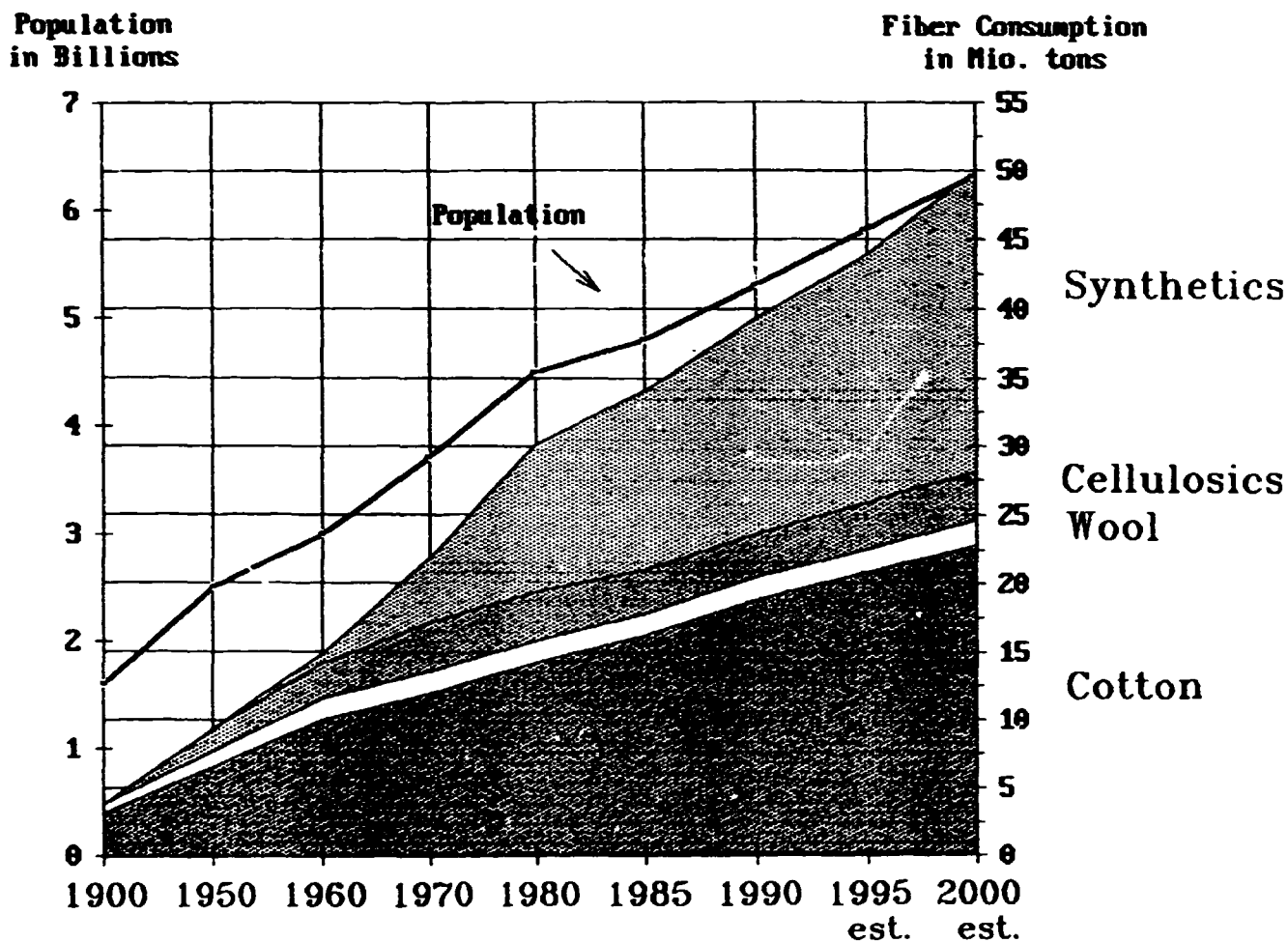
6.11 Similar workshops, seminars or exchange of visits should be organized in the future. Meantime, Austria, UNIDO, and other bilateral and multilateral donor agencies would be requested to support training fellowships and study tours to overseas textile mills.

7. Observation

From our participation in this well organized workshop and discussions with the other participants we have got the impression that the textile industries in the PTA first of all need more information about each other. Establishing a common "Textile Training and Testing Institute" would provide among other things a meeting place for the textile technologists from the PTA subregion, where they can exchange technical and economical information. In this context the revival of the Kenyan Textile Training Institute would yield the following profits:

- Less investments because most of the facilities are existing;
- Central location;
- Good flight connections;
- Agreeable climate;
- Readiness of European experts to teach at the Institute is very probable;
- Technical possibilities for the teachers to share in training and testing, which would increase the motivation of the staff to work with the Institute;
- Embedding of the Institute in a satisfactory infrastructure.

World-Population and Fiber-Consumption 1900 - 2000



	World - Population in Mrd	F I B E R C O N S U M P T I O N (Mio. tons)				kg per capita	
		TOTAL	Cotton	Wool	Cellul.		Synth.
1900	1.6	3.9	3.2	0.7	0	0	2.5
1950	2.5	9.4	6.6	1.1	1.6	0.1	3.7
1960	3.0	14.9	10.1	1.5	2.6	0.7	5.0
1970	3.7	22.0	12.0	1.6	3.6	4.8	6.0
1980	4.5	30.2	14.3	1.6	3.5	10.8	6.7
1985	4.8	34.2	16.3	1.6	3.2	13.1	7.1
1989	5.2	39.4	18.8	1.7	3.3	15.6	7.5
1990	5.3	39.5	18.9	1.7	3.2	15.7	7.5
1995	5.8	44.0	21.0	1.7	3.3	18.0	7.7
2000	6.3	50.0	23.0	1.7	3.5	21.8	8.0

Fig. 2

MILL CONSUMPTION OF ALL FIBRE TYPES

SUBDIVIDED INTO REGIONS

'000 to	Westeuropa	Osteuropa	USA	Latelamerika	Fernost & andere	Japan	W E L T
1970	4.080	4.600	4.150	1.100	6.330	1.740	22.000
1975	4.020	5.000	4.570	1.600	7.290	1.720	24.200
1980	4.332	5.600	5.030	1.900	11.130	2.210	30.202
1985	4.691	5.800	4.970	2.000	16.220	2.180	35.861
1990	5.125	5.500	5.900	2.400	18.550	2.030	39.505
1995	4.190	5.800	5.900	2.800	23.560	1.750	44.000
2000	3.770	6.000	5.900	3.200	29.480	1.650	50.000

Fig. 3

PER CAPITA CONSUMPTION OF ALL FIBRE TYPES

SUBDIVIDED INTO REGIONS

kg/capita	Westeuropa	Osteuropa	USA	Latelamerika	Fernost & andere	Japan	W E L T
1970	12,36	12,78	20,24	4,23	2,59	16,73	5,95
1975	11,65	13,33	21,26	5,52	2,64	15,64	5,90
1980	12,38	14,62	22,06	5,72	3,60	18,89	6,71
1985	13,21	14,54	20,79	5,38	4,89	18,02	7,47
1990	14,24	13,45	23,69	5,78	4,95	16,50	7,45
1995	10,88	14,15	22,87	6,09	5,66	13,89	7,59
2000	9,67	14,12	22,18	6,40	6,42	12,79	7,94

Fig. 4

WTVBFTYP.XLS

WORLD-WIDE FIBRE CONSUMPTION				
	'000 to			
	COTTON	WOOL	Synthetics	REYON
1970	12.000	1.600	4.818	1.957
1975	12.222	1.335	7.439	1.774
1976	12.500	1.483	8.695	1.818
1977	12.465	1.435	9.275	1.861
1978	12.682	1.432	10.173	1.905
1979	13.111	1.546	10.762	1.948
1980	13.560	1.567	10.625	1.992
1981	13.559	1.577	11.101	1.975
1982	13.711	1.564	10.350	1.958
1983	14.077	1.612	11.349	1.942
1984	15.063	1.567	12.489	1.925
1985	16.255	1.598	13.185	1.908
1986	17.797	1.680	13.684	1.927
1987	17.793	1.743	14.523	2.030
1990				
1991	18.760	1.600	16.200	1.785
1995	21000	1700	18000	1855
2.000	23.000	1.700	21.800	1.950

WORLD-WIDE FIBRE PRODUCTION

'000 to

YEAR	COTTON	WOOL	MAN-MADE FIBRES	d a v o n		TOTAL
				Synthetics	REYON	
1900	3.162	730	1	0	0	3.893
1910	4.200	803	5	0	0	5.008
1920	4.629	816	15	0	0	5.460
1930	5.870	1.002	208	0	0	7.080
1940	6.907	1.134	1.132	5	585	9.173
1950	6.647	1.057	1.677	69	737	9.381
1960	10.113	1.463	3.358	702	1.525	14.934
1961	9.819	1.488	3.577	828	1.614	14.884
1962	10.457	1.480	4.010	1.079	1.730	15.947
1963	10.957	1.514	4.458	1.314	1.910	16.929
1964	11.502	1.501	5.064	1.666	2.060	18.067
1965	11.884	1.484	5.469	2.013	2.079	18.837
1966	10.994	1.553	5.887	2.427	2.083	18.434
1967	10.825	1.626	6.237	2.798	2.088	18.688
1968	11.952	1.680	7.411	3.754	2.238	21.043
1969	11.450	1.667	7.964	4.270	2.263	21.081
1970	11.784	1.659	8.397	4.818	2.187	21.840
1971	13.008	1.625	9.347	5.747	2.201	23.980
1972	13.686	1.522	10.224	6.486	2.396	25.432
1973	13.738	1.497	11.623	7.767	2.494	26.858
1974	14.022	1.583	11.363	7.608	2.477	26.968
1975	11.723	1.578	10.640	7.439	2.065	23.941
1976	12.457	1.512	12.167	8.695	2.289	26.136
1977	13.899	1.496	12.826	9.275	2.381	28.221
1978	12.951	1.531	13.778	10.173	2.437	28.260
1979	14.069	1.571	14.431	10.762	2.497	30.071
1980	13.844	1.599	14.182	10.625	2.419	29.625
1981	14.996	1.616	14.617	11.101	2.430	31.229
1982	14.412	1.632	13.606	10.350	2.262	29.650
1983	14.433	1.657	14.545	11.321	2.306	30.635
1984	19.144	1.744	15.751	12.424	2.381	36.639
1985	17.383	1.744	16.369	13.146	2.287	35.496
1986	15.339	1.789	16.868	13.684	2.249	33.996
1987	17.670	1.832	17.706	14.475	2.323	37.208
1988	18.366	1.886	18.530	15.244	2.337	38.782
1989	17.431	1.955	19.002	15.718	2.355	38.388
1990	19.006	1.954	19.133	15.903	2.325	40.093

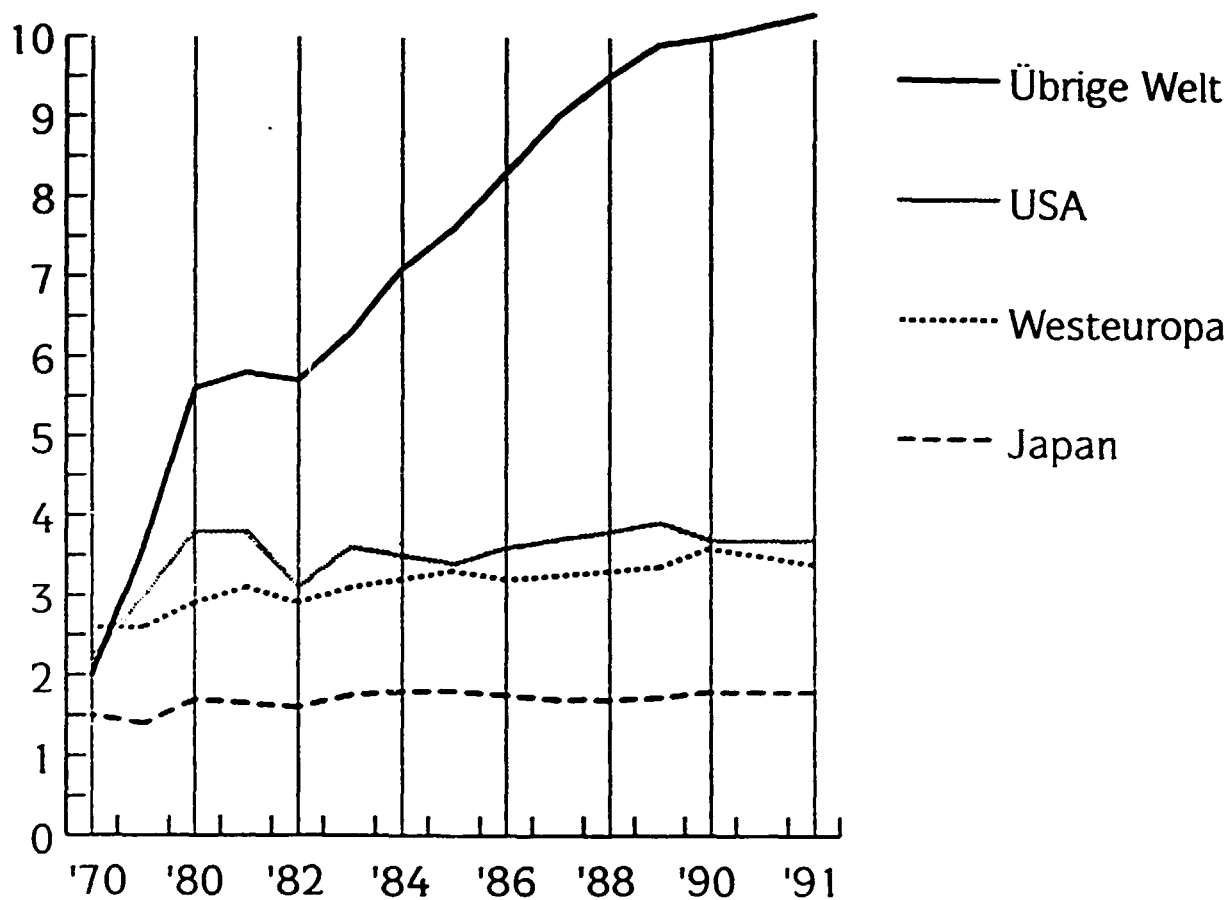
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Quelle: CIRFS Jahressbuch 1991

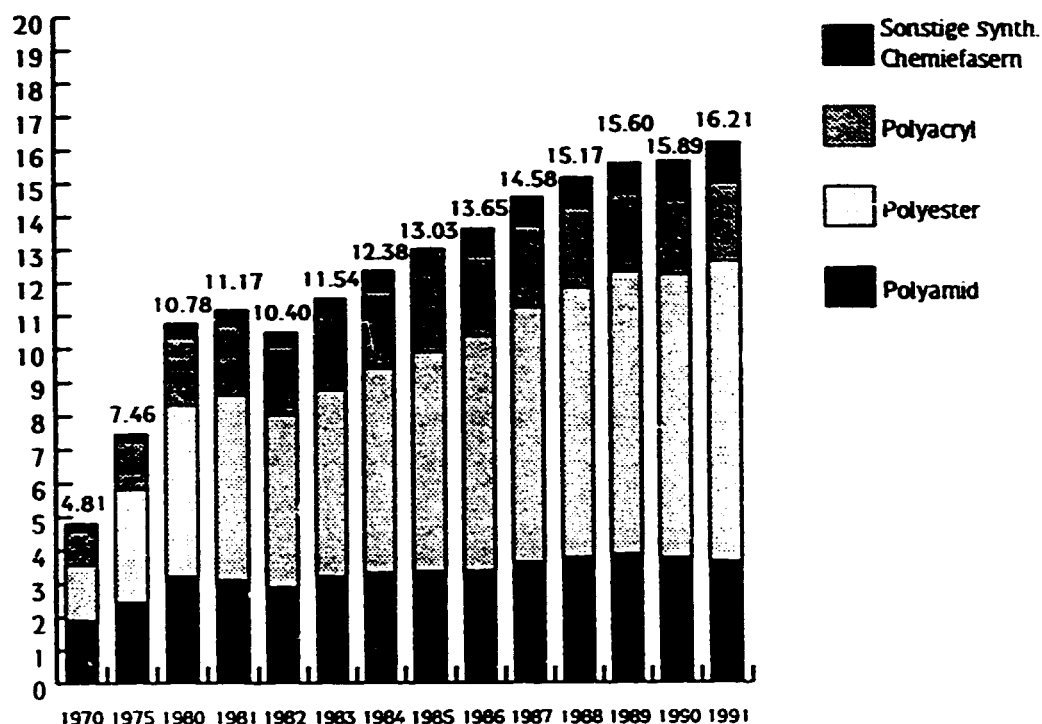
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WORLD WIDE PRODUCTION OF MAN MADE FIBRES (Mio t) IN 1991



WORLD-WIDE PRODUCTION OF SYNTHETIC MAN-MADE FIBRES SUBDIVIDED INTO REGIONS AND FIBRE TYPES



in 1.000 t

Jahr	West-europa	USA	Japan	übrige Welt	Welt insgesamt
1970	1.503	1.553	1.019	734	4.809
1975	1.855	2.513	1.044	2.049	7.461
1980	2.160	3.348	1.378	3.893	10.779
1981	2.341	3.381	1.351	4.094	11.167
1982	2.189	2.713	1.320	4.121	10.403
1983	2.360	3.181	1.340	4.659	11.540
1984	2.521	3.135	1.391	5.330	12.377
1985	2.661	3.082	1.424	5.858	13.025
1986	2.638	3.181	1.382	6.444	13.645
1987	2.676	3.383	1.371	7.148	14.578
1988	2.724	3.447	1.381	7.620	15.172
1989	2.723	3.444	1.412	8.023	15.602
1990	2.894	3.249	1.471	8.271	15.885
1991	2.791	3.269	1.486	8.678	16.224
Veränderungen	-4%	+1%	+1%	+5%	-2%
1991:					
1990					

WORLD-WIDE FIBRE PRODUCTION
IN PERCENTAGE

YEAR	COTTON	WOOL	MAN-MADE FIBRES	d a v o n		TOTAL
				Synthetics	REYON	
1900	81,2	18,8	0	0	0	100
1910	83,9	16,0	0,1	0	0	100
1920	84,8	14,9	0,3	0	0	100
1930	82,9	14,2	2,9	0	0	100
1940	75,3	12,4	12,3	0,1	6,4	100
1950	70,9	11,3	17,9	0,7	7,9	100
1960	67,7	9,8	22,5	4,7	10,2	100
1961	66,0	10,0	24,0	5,6	10,8	100
1962	65,6	9,3	25,1	6,8	10,8	100
1963	64,7	8,9	26,3	7,8	11,3	100
1964	63,7	8,3	28,0	9,2	11,4	100
1965	63,1	7,9	29,0	10,7	11,0	100
1966	59,6	8,4	31,9	13,2	11,3	100
1967	57,9	8,7	33,4	15,0	11,2	100
1968	56,8	8,0	35,2	17,8	10,6	100
1969	54,3	7,9	37,8	20,3	10,7	100
1970	54,0	7,6	38,4	22,1	10,0	100
1971	54,2	6,8	39,0	24,0	9,2	100
1972	53,8	6,0	40,2	25,5	9,4	100
1973	51,2	5,6	43,3	28,9	9,3	100
1974	52,0	5,9	42,1	28,2	9,2	100
1975	49,0	6,6	44,4	31,1	8,6	100
1976	47,7	5,8	46,6	33,3	8,8	100
1977	49,3	5,3	45,4	32,9	8,4	100
1978	45,8	5,4	48,8	36,0	8,6	100
1979	46,8	5,2	48,0	35,8	8,3	100
1980	46,7	5,4	47,9	35,9	8,2	100
1981	48,0	5,2	46,8	35,5	7,8	100
1982	48,6	5,5	45,9	34,9	7,6	100
1983	47,1	5,4	47,5	37,0	7,5	100
1984	52,3	4,8	43,0	33,9	6,5	100
1985	49,0	4,9	46,1	37,0	6,4	100
1986	45,1	5,3	49,6	40,3	6,6	100
1987	47,5	4,9	47,6	38,9	6,2	100
1988	47,4	4,9	47,8	39,3	6,0	100
1989	45,4	5,1	49,5	40,9	6,1	100
1990	47,4	4,9	47,7	39,7	5,8	100

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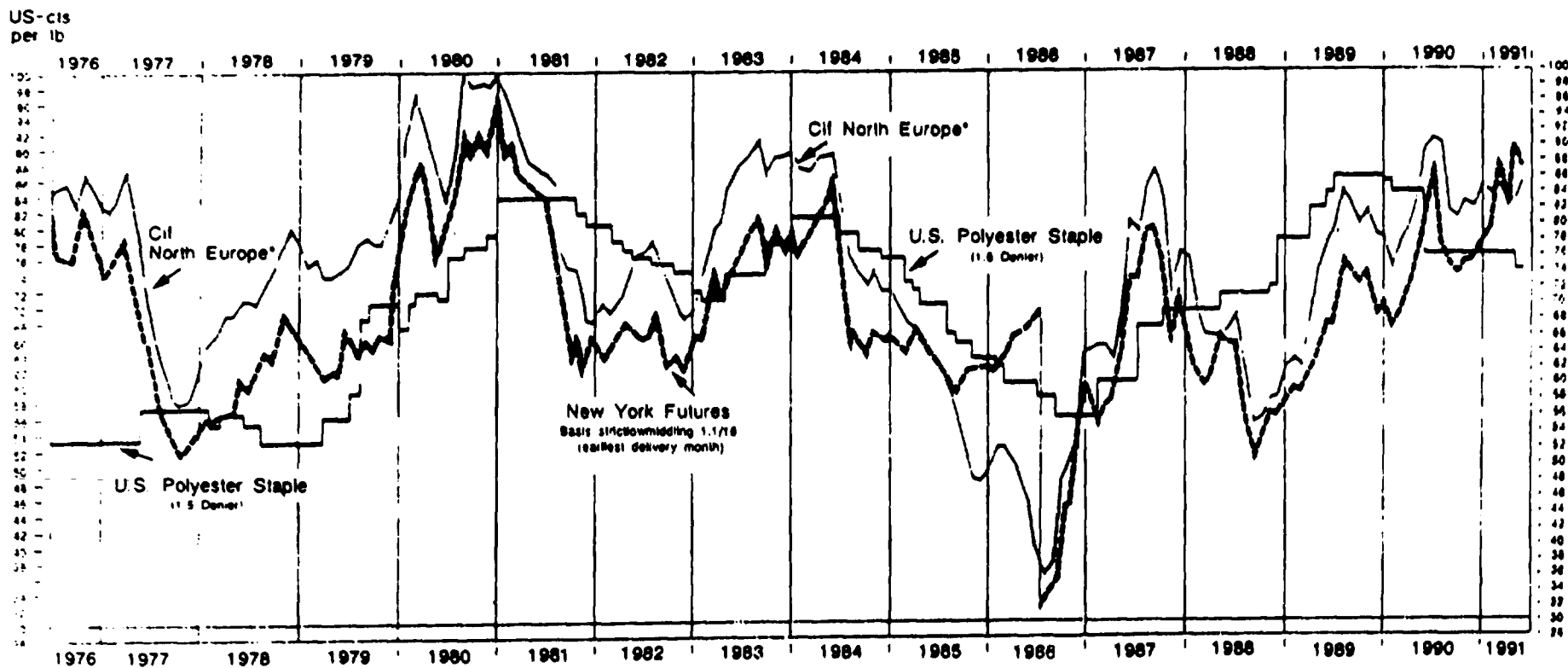
Fig. 9

**Cotton Production and Mill Consumption in the Season
1990/1991 (Mio t)**

	Production	Mill Consumption
PR China	4,46	4,35
USA	3,37	1,83
former USSR	2,63	1,89
India	1,96	1,98
Pakistan	1,59	1,26
Brasil	0,68	0,72
Turkey	0,65	
Australia	0,35	
Argentina	0,30	
Egypt	0,30	
Paraguay	0,24	
Others	1,98	
	<hr/>	
Total	18,81	
1991/92	20,77	
(1.4.92 est.)		
in stock	8,29	

Fig. 10

DEVELOPMENT OF COTTON AND POLYESTER PRICES



Quellen: New York Cotton Exchange, Cotlook Limited, International Cotton Advisory Committee

Fig. 11

PRODUCE PER ACRE AND AREAS UNDER CULTIVATION

	1987/88		1988/89		1989/90*		1990/91**	
	1 000 acres	lbs/acre	1 000 acres	lbs/acre	1 000 acres	lbs/acre	1 000 acres	lbs/acre
Israel	99	1 306	119	1 161	75	1 381	77	1 467
Australien	576	1 087	474	1 361	573	1 178	652	1 189
Guatemala	100	1 051	104	888	98	926	89	897
Türkei	1 448	818	1 829	784	1 791	759	1 649	869
Syrien	201	909	335	729	168	816	207	851
Syrien	318	669	423	595	391	724	386	827
UdSSR	8 715	625	8 480	719	8 202	716	7 764	748
V.K. China	11 970	782	13 676	669	12 857	650	13 591	725
Griechenland	499	766	633	818	687	787	662	699
Mexiko	568	865	630	1 079	465	793	571	679
USA	10 035	706	11 943	619	9 538	6.4	11 708	635
Ägypten	1 017	762	1 052	651	1 044	609	1 032	632
El Salvador	33	646	31	676	25	568	17	611
Peru	330	634	372	604	362	580	304	591
Nicaragua	151	513	98	589	77	704	110	566
Pakistan	6345	510	6 197	507	6 421	500	6 493	548
Iran	484	484	474	541	561	446	581	522
Ø-Ertrag		498		489		494		507
Welt-	Anbaufläche 78 308		82 788		77 866		81 716	
Kolumbien	579	509	538	494	463	498	571	502
Äthiopien	130	332	92	502	87	500	89	500
Mali	368	449	469	456	446	488	507	495
Côte d'Ivoire	446	563	528	536	497	477	491	476
Sudan	786	380	774	395	688	407	441	447
Venezuela	130	410	184	400	192	353	111	447
Argentinien	1 216	511	1 211	354	1 334	453	1 589	411
Kamerun	234	424	276	548	221	429	232	409
Paraguay	1 038	435	1 087	446	1 285	386	1 359	389
Thailand	157	348	174	360	166	434	178	380
Benin	177	339	240	405	224	419	303	379
Togo	167	367	201	398	198	346	198	368
Burkina Faso	421	307	422	311	408	338	435	355
Zimbabwe	672	381	614	330	564	266	642	342
Afghanistan	99	312	111	312	136	325	148	325
Rep. Südafrika	507	338	515	332	406	326	346	312
Brasilien	6 368	299	5 509	284	4 785	312	5 217	285
Mosambik	203	347	235	276	223	267	227	276
Tschad	367	287	493	235	469	273	511	267
Indien	17 446	196	18 144	219	18 114	281	18 038	238
Zambia	193	263	224	163	158	152	240	196
Tansania	1 112	170	1 112	126	642	137	964	131
Nigeria	791	84	890	119	988	85	1 038	89

¹⁾ = siehe Übersicht «Weltbaumwollerzeugung», Seite 26

* = vorläufig ** = geschätzt

o = abgeerntetes Areal

Fig. 12

Spinning Machinery

Table 1.1: Summary

Continent of Destination	1990 Installed Spinning Capacities			Cumulative Shipments 1982- 1991			Shipments 1991		
	Spindles		O-E Rotors	Spindles		O-E Rotors	Spindles		O-E Rotors
	Short Staple System	Long Staple System ^a		Short Staple	Long Staple		Short Staple	Long Staple	
AFRICA	8,003,000	231,000	158,300	1,668,650	142,354	101,264	235,920	16,144	3,926
AMERICA, NORTH	14,989,000	836,000	781,800	1,268,720	174,684	827,097	95,483	2,336	52,634
AMERICA, SOUTH	11,936,000	580,000	247,300	1,820,749	103,914	143,305	160,292	13,988	16,234
ASIA & OCEANIA	99,684,000	6,664,000	1,254,300	18,502,589	1,564,812	962,651	3,051,907	176,414	62,352
EUROPE - EEC	9,480,000	5,817,000	488,600	3,162,224	1,353,901	635,306	265,676	95,132	29,020
EUROPE - EFTA	927,000	145,000	30,500	552,656	65,388	39,714	38,880	1,272	936
EUROPE - COMECON	16,746,000	1,043,000	4,835,900	1,136,966	485,901	4,415,670	536,176	154,352	190,240
EUROPE - OTHERS	3,774,000	624,000	125,100	1,252,953	225,654	114,316	185,308	16,368	12,876
TOTAL	165,539,000	15,940,000	7,921,800	29,365,507	4,096,608	7,239,323	4,569,647	476,006	368,218

Fig 13

Spinning Machinery

Table 1.2: Africa

Country of Destination	1990 Installed Spinning Capacities			Cumulative Shipments 1982 - 1991			Shipments 1991		
	Spindles		O-E Rotors	Spindles		O-E Rotors	Spindles		O-E Rotors
	Short Staple System	Long Staple System ^a		Short Staple	Long Staple		Short Staple	Long Staple	
Algeria	300,000	15,000 ^b	1,000		3,744	1,040			
Angola	50,000			22,848					
Benin	60,000								
Botswana	15,000		1,300						
Burkina Faso	7,000								
C. A. Republic	23,000								
Cameroon	55,000				928	168			
Chad	8,000			944					
Congo	11,000								
Egypt	3,175,000	48,000 ^c	43,600	862,908	64,856	4,488	128,592	5,792	
Ethiopia	285,000			45,816	786	8,000			
Ghana	120,000		400	1,632		168			
Guinea	8,000								
Ivory Coast	120,000		3,000	816		2,832			
Kenya	120,000	4,000 ^b	1,200	43,488	1,216	1,488			
Libya					1,920				
Madagascar	70,000		3,000			1,944			
Malawi	50,000			14,704		168			
Mali	40,000					24			24
Mauritius				3,840	176	840			
Morocco	435,000	50,000 ^b	40,000	183,556	29,584	20,804	20,936	9,252	390
Mozambique	50,000								
Niger	14,000								
Nigeria	700,000		20,000	139,560	320	20,480	25,344		
Senegal	40,000		300	21,000					
Somalia	20,000								
South Africa	796,000	108,000	7,600	108,126	20,814	15,236	3,840	180	528
Sudan	500,000		18,000	96					
Swaziland	50,000			53,136		200			
Tanzania	400,000			29,612	2,600	336			
Togo	26,000								
Tunisia	90,000	6,000 ^b	6,500	66,488	9,688	9,248	36,472	920	384
Uganda	60,000		400	2,760		336			
Zaire	125,000		3,000			192			
Zambia	50,000		2,500	19,080	2,776	2,768	3,456		200
Zimbabwe	130,000		6,500	43,920	2,802	10,504	17,280		2,400
Various				4,320	144				
TOTAL	8,003,000	231,000	158,300	1,668,650	142,354	101,264	235,920	16,144	3,976

Fig. 14

Weaving Machinery

Table 2.1: Summary

Continent of Destination	1990 Installed Weaving Capacities				Cumulative Shipments 1982 - 1991	
	Looms Primarily for Weaving Yarns Spun on the Cotton System ^a		Filament Weaving Looms ^b	Wool Weaving Looms ^c	Shuttle-Less Looms	Shuttle Looms
	Shuttle-Less	Shuttle				
AFRICA	17,470	126,290		2,000	11,953	4,209
AMERICA, NORTH	83,020	96,300		3,380	44,076	861
AMERICA, SOUTH	27,580	186,550		21,470	14,016	3,332
ASIA & OCEANIA	157,890	1,499,440	785,510	65,230	224,397	148,294
EUROPE - EEC	73,290	45,930	24,570	41,940	90,977	326
EUROPE - EFTA	4,560	1,970	810	740	4,389	43
EUROPE - COMECON	227,170	149,040	27,110	30,780	67,746	1,583
EUROPE - OTHERS	8,450	53,000		5,770	8,589	1,269
TOTAL	599,430	2,158,520	838,000	171,310	474,143	159,917

Weaving Machinery

Table 2.2: Africa

Country of Destination	1990 Installed Weaving Capacities				Cumulative Shipments 1982 - 1991	
	Looms Primarily for Weaving Yarns Spun on the Cotton System ^a		Filament Weaving Looms ^b	Wool Weaving Looms ^c	Shuttle-Less Looms	Shuttle Looms
	Shuttle-Less	Shuttle				
Algeria	2,000	8,500			713	67
Angola	60	800			2	221
Benin		2,000				
Botswana	150				156	
Burkina Faso		200				
C. A. Republic		500				100
Cameroon	200	1,000			80	
Chad		280				
Congo		190				
Egypt	4,000	45,000		1,230 ^d	4,014	1,937
Ethiopia	500	3,000			526	80
Ghana	30	3,610				2
Guinea		180				33
Ivory Coast	630	2,000			143	3
Kenya	220	1,750			103	40
Libya	400	2,600			365	40
Madagascar	200	1,730			64	
Malawi	100	600			104	
Mali		1,120			3	
Mauritius					225	31
Morocco	1,500	4,400			1,604	4
Mozambique	20	2,430			3	
Niger		280				
Nigeria	2,500	15,000			382	20
Senegal	150	500			136	
Somalia	150	280				
South Africa	2,100	3,300		770	1,449	52
Sudan		10,000			8	925
Swaziland	110				110	
Tanzania	150	5,000			114	156
Tunisia	1,300	3,500			900	34
Uganda	240	1,240				315
Zaire	160	2,700			164	75
Zambia	150	1,000			117	48
Zimbabwe	450	1,600			314	26
Various					154	
TOTAL	17,470	126,290		2,000	11,953	4,209

Fig. 16

Machines' Efficiency

I. Spinning:	Production Rate	
	Nm 50	Nm 70
blowing room (kg/h)	600	600
card production (kg/h), card flat setting: 10/12/14/16/1000 inch	35	25-28
degree of cleaning (%)	75-85	75-85
cylinderspeed (r.p.m.)	300-400	300
delivery rate of the draw frame (m/min)	500	400
flyer arm speed (r.p.m.)	1000-1100	800-1000
spindle speed of the ring frame, ring diameter: 45 mm (r.p.m.) twist level: $m = 128$	12000-15000	9000-12000
traveller speed (m/sec)	35	30
delivery rate of the winding frame (m/min)	900-1200	700-900

II. Weaving:	Weaving efficiency (r.p.m.)	Weft insertion speed (m/min)	Width (cm)
rapier	450-550	800-1000	195
projectile	400	1545	390
	500	1000	190
airjet	1000	1800	190

Fig. 17

Cotton Yarn Quality, Nm 50

yarn breakages per 1000 spindle hours	30
yarn strength (cN/tex)	12 - 15
yarn elongation (%)	9
yarn unevenness, Uster CV (%)	15
thin spots per 1000 m	10
thick spots per 1000 m	100 - 200
neps per 1000 m	100
yarn defects per 100 000 m (Classimat)	500

Fig. 18

FIBRE DIAGRAMS OF COTTON / MODAL BLENDS

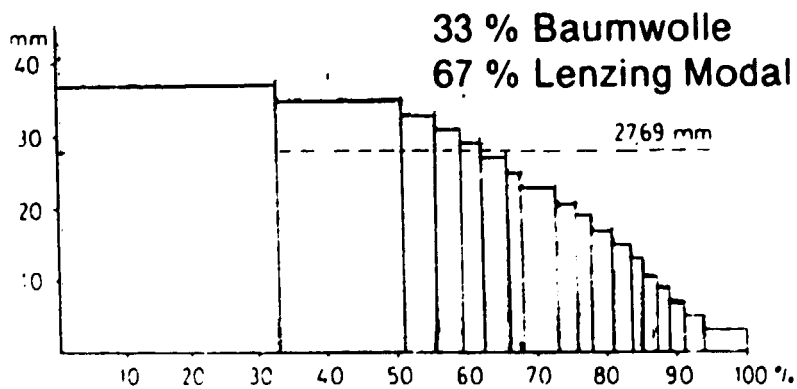
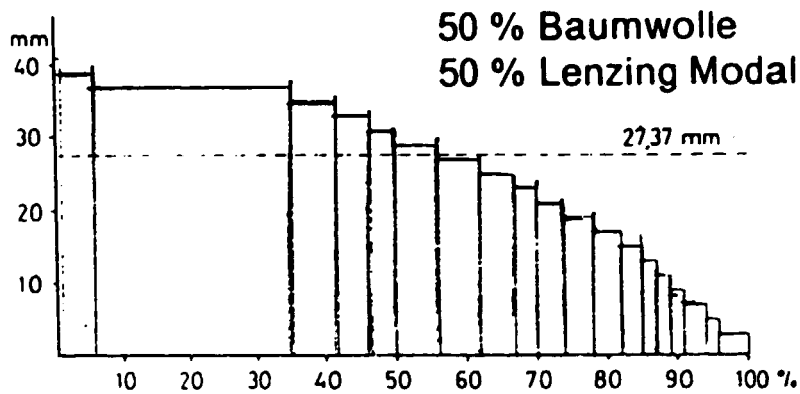
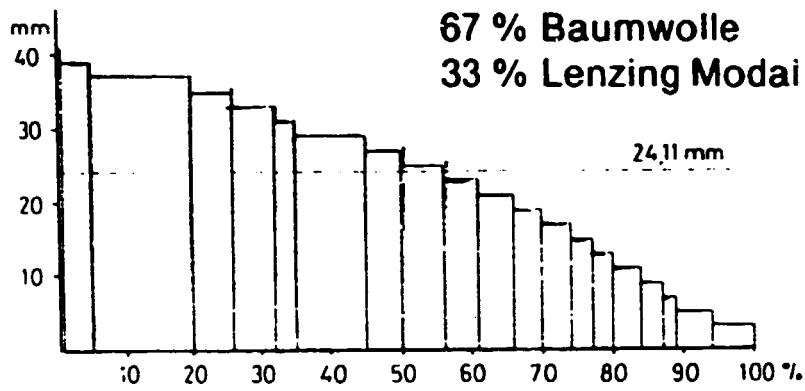
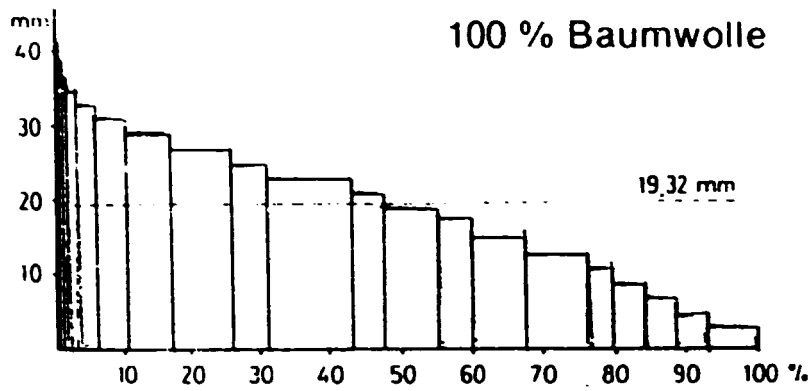


Fig. 19

PRODUCTION OF COTTON YARN

	1982	1983	1984	1985	1986	1987	1988	1989 Prel.	1990 Est.	1991 Est.
000 Metric Tons										
WORLD TOTAL	12,881.92	13,185.88	13,454.10	14,388.58	15,243.33	16,268.80	16,615.08	17,004.03	16,867.23	17,099.66
AMERICAS	1,723.20	1,894.12	2,002.81	2,336.19	2,334.84	2,360.13	2,375.19	2,536.41	2,489.99	2,476.25
AFRICA	400.87	383.76	396.67	417.43	435.90	434.00	435.41	439.60	461.06	465.03
EUROPE	3,541.77	3,556.98	3,659.62	3,710.09	3,800.48	3,885.90	3,825.06	3,746.51	3,520.32	3,378.07
ASIA/OCEANIA	6,926.74	7,032.06	7,102.89	7,626.38	8,382.46	9,274.46	9,635.43	9,932.82	10,052.55	10,430.03
AFRICA	400.87	383.76	396.67	417.43	435.90	434.00	435.41	439.60	461.06	465.03
ALGERIA	21.40	19.90	28.00	30.70	29.60	21.60	28.90	28.09	28.49	28.79
EGYPT	238.22	229.67	238.13	242.96	249.76	251.14	249.93	248.68	268.37	271.19
MOROCCO	37.88	38.44	40.00	41.60	50.76	55.92	57.02	63.32	68.04	69.66
SUDAN										
TUNISIA										
SUB TOTAL	297.50	288.01	306.13	315.26	330.11	328.65	335.86	340.09	364.91	369.63
BURKINA FASO	1.22	1.31	1.52	1.43	.24	.53	.53	.52	.59	.57
CAMEROON	5.62	6.38	6.79	6.58	5.37	5.27	6.35	5.21	4.66	4.43
COTE D'IVOIRE	18.00	19.00	16.69	18.50	19.74	16.32	13.50	13.42	13.42	13.42
SENEGAL	1.14	1.34	1.10	1.19	.89	.77	.63	.60	.59	.56
SUB TOTAL	25.99	28.02	26.09	27.71	26.24	22.89	21.00	19.75	19.26	18.98
ETHIOPIA	8.73	9.95	9.32	9.41	9.41	9.41	9.14	9.04	9.22	9.03
KENYA	2.79	1.53	1.69	2.64	3.09	3.55	3.55	3.74	3.98	4.18
MALAWI	1.10	1.88	.19	6.30	5.22	6.17	6.10	5.86	5.74	5.45
SOUTH AFRICA	47.00	37.25	38.40	40.00	45.00	50.00	45.00	45.00	40.00	40.00
TANZANIA	11.00	9.60	8.08	8.98	8.94	6.95	6.41	7.63	8.80	8.54
UGANDA	4.35	4.30	3.17	1.86	2.21	2.47	2.59	1.95	2.57	2.17
ZAMBIA	2.42	3.20	3.60	5.28	5.68	3.91	5.76	6.54	6.58	7.05
SUB TOTAL	77.39	67.72	64.44	74.46	79.55	82.46	78.55	79.77	76.90	76.42

Fig 20

PRODUCTION OF COTTON FABRIC

	1982	1983	1984	1985	1986	1987	1988	1989 Prel.	1990 Est.	1991 Est.
000 Metric Tons										
WORLD TOTAL	7,443.80	7,725.60	7,585.63	7,781.88	8,534.27	8,992.97	9,199.01	9,382.20	9,390.03	9,488.35
AMERICAS	822.25	893.36	907.57	917.44	1,028.85	1,059.63	1,054.54	1,091.27	1,167.92	1,129.20
AFRICA	200.67	247.25	242.72	241.36	240.72	229.17	230.35	244.80	254.95	257.52
EUROPE	2,235.02	2,255.94	2,309.91	2,366.27	2,379.86	2,411.18	2,387.66	2,362.43	2,245.82	2,181.54
ASIA/OCEANIA	4,018.66	4,142.17	3,960.74	4,095.38	4,722.68	5,119.25	5,336.01	5,491.31	5,532.25	5,727.16
AFRICA	200.67	247.25	242.72	241.36	240.72	229.17	230.35	244.80	254.95	257.52
ALGERIA	6.96	6.47	9.10	9.98	9.62	9.67	8.83	8.97	9.10	9.19
EGYPT	101.33	93.80	91.42	75.23	73.86	69.34	72.48	72.12	77.83	78.64
MOROCCO		22.10	23.00	23.90	28.93	31.87	32.50	36.09	38.78	39.71
SUDAN										
SUB TOTAL	108.29	122.37	123.52	109.11	112.41	110.89	113.82	117.18	125.71	127.54
BURKINA FASO	.88	.89	.95	1.04	.79	.15	.14	.12	.14	.13
CAMEROON	4.89	5.42	5.63	5.33	4.09	4.07	5.04	4.00	4.01	3.81
COTE D'IVOIRE										
MADAGASCAR	8.86	9.15	8.28	8.13	6.68	7.11				
SENEGAL	3.17	3.35	2.51	3.01	2.23	1.92	1.57	1.51	1.48	1.40
SUB TOTAL	17.80	18.81	17.37	17.51	13.80	13.25	6.75	5.63	5.63	5.34
ETHIOPIA	16.30	15.69	15.10	14.50	15.06	15.06	14.62	14.47	14.76	14.45
KENYA	5.75	6.70	6.81	7.17	7.27	8.87	8.87	9.34	9.96	10.46
MALAWI	4.85	4.36	3.85	3.45	2.95	3.46	3.46	3.48	3.41	3.24
SOUTH AFRICA	34.00	26.00	25.35	29.00	29.00	32.00	30.40	34.00	30.22	30.22
TANZANIA		36.14	29.98	34.33	32.20	25.71	23.72	28.24	32.55	31.60
UGANDA	2.82	2.78	2.04	1.28	1.36	1.57	1.64	1.70	1.77	1.54
ZAMBIA	10.87	14.41	18.70	25.00	26.68	18.37	27.08	30.75	30.93	33.13
SUB TOTAL	74.58	106.08	101.83	114.74	114.52	105.04	109.79	122.00	123.61	124.64

APPLICATION OF FIBRES ACCORDING TO END-USE
IN EEC

in Prozent

	Jahr	TOTAL	COTTON WOOL			MAN- MADE	REYON	Synth. Stapel	davon			Synth. Fil.	davon			Cell Fil.
			PES	PAC	Oth.				PES	PA	Oth.					
APPAREL	1984	50	54	69	45	39	49	52	66	15	45	55	44	12	5	
	1985	51	54	71	47	41	50	52	69	17	46	55	44	13	5	
	1986	51	55	70	46	43	49	49	70	14	45	55	44	13	5	
	1987	51	58	72	45	43	47	47	70	14	43	52	43	12	5	
	1988	49	57	74	42	47	41	45	56	13	42	52	45	14	5	
	1989	49	57	73	41	50	40	41	68	12	42	49	44	12	5	
	1990	48	57	72	41	49	38	38	68	12	55	49	44	11	5	
HOME FURNISHING	1984	34	34	29	35	44	41	35	30	70	32	19	35	73		
	1985	34	34	28	34	41	40	36	28	65	32	19	35	73		
	1986	34	33	28	35	41	40	37	26	67	31	19	34	72		
	1987	33	31	26	35	36	41	39	26	66	33	20	35	72		
	1988	34	32	25	36	34	44	44	22	71	33	23	35	84		
	1989	34	31	26	36	32	45	43	27	63	34	21	35	73		
	1990	34	32	27	37	31	45	44	27	62	45	22	35	76		
INDUSTRIAL APPLICATION	1984	15	12	2	19	17	10	13	4	15	22	26	21	15	4	
	1985	15	12	2	19	17	10	13	4	18	22	26	21	15	3	
	1986	15	11	2	19	16	11	14	4	20	23	26	22	15	3	
	1987	16	11	2	20	21	12	14	4	20	24	28	22	16	3	
	1988	17	11	1	22	20	15	17	4	28	25	32	22	19	3	
	1989	18	12	1	22	19	16	16	5	25	24	29	21	15	3	
	1990	18	12	1	23	21	17	18	4	26	0	29	21	14	3	
TOTAL	1984	4.045	1.138	420	2.487	269	1.225	430	510	285	768	310	380	78	15	
	1985	4.219	1.137	425	2.657	286	1.320	458	538	324	816	341	396	80	16	
	1986	4.329	1.204	424	2.701	281	1.348	469	541	338	841	362	393	86	16	
	1987	4.604	1.392	443	2.769	274	1.399	483	539	377	869	371	404	94	15	
	1988	4.596	1.292	432	2.872	328	1.373	511	440	422	922	397	415	110	16	
	1989	4.672	1.283	424	2.965	323	1.384	516	416	452	998	424	444	130	17	
	1990	4.628	1.287	394	2.947	290	1.376	519	404	453	803	449	460	140	15	