## Chapter 2. MARKET SURVEY

## 2. MARKET SURVEY

### 2-1 Transition and Current Status of Textile Consumption

#### 2-1-1 Regional Differences in Textile Markets:

In respect of regions and weather conditions, Nepal is largely divided into 3 parts:

- Subtropical region around Southern Terai district (Terai District)
- Middle temperate region including the central basin (Hills and Valley District)
- Mountainous cold region of Himalayas (Mountains District)

Further, weather in Nepal is composed of the dry season (from October to May) and monsoon season (from June to September), in which from April to June is the most hot and humid period. As a whole, it is subtropical climate with countinental aspect, where temperature difference between night and day is most conspicuous in the dry season.

The above 3 regions are further classified in terms of the market into the following:

- Terai District……Terai plain Region
- Hills District……Hilly Region
- Mountains District……Mountainous Region
- Kathmandu Valley……Capital Kathmandu Valley

Now, for the purpose of market survey, Table 1 and Fig. 1 indicate areas, as well as statistical values of populations, population densities and numbers of household, and their distributions in each region of the above and each of the 5 development regions which altogether make up an economic sphere.

**Table 1 Regional Area, Polulation, Population Density and Numbers of Household in Nepal**

(As at 1981)

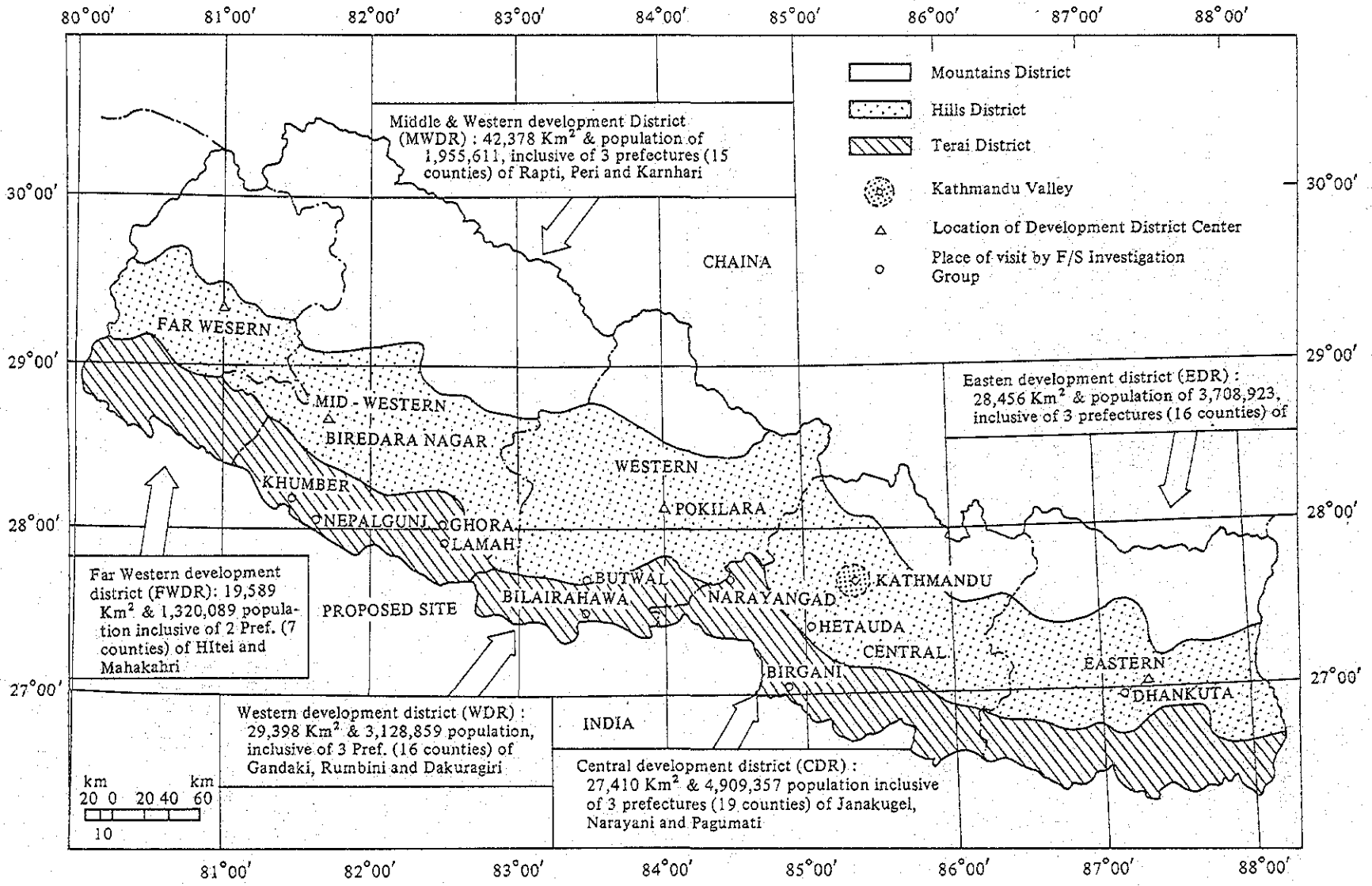
| Region | Total (person) | Population | | Area ($Km^2$) | Population density (person/$km^2$) | No. of household (house) |
|---|---|---|---|---|---|---|
| | | Male (person) | Female (person) | | | |
| EDR | 3,708,923 | 1,901,957 | 1,806,966 | 28,456 | 130.3 | 651,795 |
| CDR | 4,909,357 | 2,538,615 | 2,370,742 | 27,410 | 179.1 | 854,545 |
| WDR | 3,128,859 | 1,584,542 | 1,544,317 | 29,398 | 106.4 | 544,283 |
| MWDR | 1,955,611 | 994,505 | 961,106 | 42,378 | 46.1 | 322,334 |
| FWDR | 1,320,089 | 675,717 | 644,372 | 19,539 | 67.6 | 212,197 |
| G. Total | 15,022,839 | 7,695,336 | 7,327,503 | 147,181 | 102.1 | 2,585,154 |

Cited from: Statistical Pocket Book Nepal (NPC, 1984)

**(When extracted Kathmandu Valley and its peripheral area)**

| | | | | | | |
|---|---|---|---|---|---|---|
| Kathmandu | 422,237 | 227,934 | 194,303 | 395 | 1,069.0 | 67,933 |
| Bhaktapur | 159,767 | 81,833 | 77,934 | 119 | 1,342.6 | 25,047 |

## Fig. 1 Regional Area Distinctions and Population Distribution in Nepal Kingdom




From : Statistical pockot Book, Nepal (Npc. 1984)

- The CDR region including the capital Kathmandu Valley shares 33% of the total population.
- In the above, population in the Kathmandu Valley and its peripheral area is about 600,000, representing 12% of the total population.
- Population density in the Kathmandu Valley and its peripheral area is very high, amounting to 1,342 persons per ㎢.
  In the other areas, the density is generally low, and especially MWDR and FWDR, undeveloped western regions are thinly populated areas of about 46-67persons per ㎢.
- This means that Nepal has been developed from the Cental and Eastern regions and adversely, its Middle Western and Far Western regions have remained as extremely under-developed regions. The Government has been placing emphasis on developing these regions gradually.
- When judging simply from the above situation of population distribution, it can be said that markets for textile products are concentratedly situated presently in 3 development districts, i. e. Eastern, Central and Western regions.

2-1-2 Textile products at the Market:

Kinds, qualities and quantities of textile products consumed are covering a vast range and diversified depending on differnces in climate, human race, regions, social class, ets.

Textile products sold on the market are, with respect to their materials, composed mainly of the natural fiber, (cotton) accounting for 86% of the total consumption.

There are some textiles made of silk or wool in the market.

But it appears that usage of silk is limited to home-made carpets and souvenir goods such as embroideries.

It is informally said that the Government is intending to promote sericulture industry in opposition to import of Chinese silkgoods.

As for wool products, it is assumed that they are consumed in cold mountainous region as well as hilly region in the dry season, however,their consumption volume is considered to be less, and no data on its consumption are available.

For synthetic fiber, polyester as the main, rayon, nylon, acrylic fibres, etc. are being consumed at the market.

And for their woven fabrics, there have been various kinds ranged from fabrics of 100% synthetic fibers to blended fabrics of polyester/cotton, polyester/rayon, wool/nylon, wool/acryl, etc. According to CDB data, consumption of synthetic fiber woven fabrics accounts for 14% of the total consumption.

Further, in respect of the form, there are woven fabrics, knit products, yarns and garment products and their processing and finishing methods include diversely from yarn-dyed products to bleached and dyed products, printed, and fancy products.

They are mainly used for clothing, other living related purposes, souvenir, and house interior purposes as detailed hereunder.

- Shirting ..... For shirts and blouses
- Saree. Dhoti ..... For traditional female dresses, traditional Indian male dresses.
- Suiting ..... For trousers, suits, coats and traditional Nepal jackets for men.
- Tapestry ..... For handwoven brocades, bed sheets, pillow covers, curtains and sofa covers.
- Gamchha ..... For gamchha
- Towel ..... For towel
- Topi and others ..... For traditional Topi

Further, in terms of qualities, they are largely classified into medium class products imported from India, medium and high classes imported from other countries, and home-made low and medium class traditional products, as well as low class products made of coarse yarn.

2–1–3 Present Status of Textiles in respect of their Materials, Product Categories and Consumed Districts, as well as its Position in the World:

1) Textile Consumption in respect of its Kind of Material and Cloth:

**Table 2 Annual Textile Consumption per Kind of Material and Cloth**

Unit: 1,000 meters

| Material | Distinction of cloth | Consumption | (%) | Total (%) |
|---|---|---|---|---|
| Cotton products | Fine cloth | 31,551 | 14.9 | |
| | Medium cloth | 126,713 | 59.8 | |
| | Coarse cloth | 53,773 | 23.3 | |
| | Sub-total | 212,037 | 100 | 85.8 |
| Synthetic and blended woven products | With 100 % synthetic yarn | 21,056 | 60.1 | |
| | Blended goods of thin cloth | 10,137 | 29.0 | |
| | Blended goods of medium and coarse cloth | 3,825 | 10.9 | |
| | Sub-total | 35,018 | 100 | 14.2 |
| Total | | 247,055 | | 100 |

Cited from: Study Report on Textile Development Plan in Nepal (ISC, July 1984)

Tables 2, 3, 4, 7 and 8 show estimated data based on household survey by ISC conducted on 2,157 households from 18 districts in mountainous, hilly, Terai and Kathmandu Valley areas, which are being utilized as the statistical data in both Nepal and abroad.

According to these data, annual textile consumption in Nepal is 247,055 kilometers, in which cotton products share 212,037 kilometers or approx. 86%.

Whereas synthetic and blended fabrics (mainly 100% polyester in addition to those of polyester, nylon, acryl, blended products with cotton and others) are consumed 35,018 kilometers annually, accounting for 14% of total consumption.

However, since width or weight of the cloth is not clear, these data can not be used for international comparison of textile consumptions as they are.

Therefore, assuming a certain value, above consumption was converted into weight terms as below.

**Table 3 Conversion of Textile Consumptions in Nepal into Weights**

| Material | Distinction of cloth | Consumption (km) | Assessed values (width X weight L.m) (cm) X (g/L.m) | Converted weight of consumption (kg) |
|---|---|---|---|---|
| Cotton products | Thin cloth | 31,551 | 114 X 100 | 3,155,000 |
| | Medium cloth | 126,713 | 91 X 140 | 17,740,000 |
| | Coarse cloth | 53,773 | 70 X 170 | 9,141,000 |
| | Sub-total | 212,037 | – | 30,036,000 |
| | Average weight/L.m | – | 142 | (88.6 %) – |
| Synthetic & blended products | Synthetic cloth 100 % | 21,056 | 114 X 90 | 1,895,000 |
| | Thin blended cloth | 10,137 | 114 X 120 | 1,216,000 |
| | Medium & Coarse. blended cloth medium and coarse cloth | 3,825 | 147 X 200 | 765,000 |
| | Sub-total | 35,018 | – | 3,876,000 |
| | Average weight/L.m) | – | 111 | (11.4 %) |
| Total | | 247,055 | – | 33,912,000 |
| Aggregate average weight/L.m | | | 137 | (100 %) |

From the above, the following points can be seen.

- Annual consumption of cotton products ..... Approx. 30,000 tons or 88.5%
- Annual consumption of synthetic and blended products Approx. 3,900tons or 11.5%

Average weight per linear meter is assessed as follows:

- Cotton products ·····142 g/L. m
- Synthetic and blended products ·····111 g/L. m

Criteria for determining assessed values are as follows:

- Thin cotton cloth was considered to be imported from foreign countries in substantial quantity mainly as shirtings of approx. 45″ (114cm) finished width, on which weight per linear meter was assessed to be 100g/L. m
- Medium cotton cloth was considered mainly to be produced in Nepal and/or imported from India as medium class products for shirting, suiting and Dhoti cloth with 36″ (91cm) finished width, on which weight per linear meter was assessed to be 140g/L. m
- Coarse cotton cloth was considered to be produced mainly in Nepal as coarse yarn count products for Tapestry, Topi and Gamchha with an average 27.5″ (70cm) finished width, on which weight per linear meter was assessed to be 200g/L. m
- Cloth of 100% synthetic fibers was considered as high class products, which were mainly imported and partially produced in Nepal, utilized Saree and shirting cloth of approx. 45″ (114cm) finished width,on which weight per linear meter was assessed to be 90g/L. m
- Thin synthetic & blended products were regarded as high and medium classes products, which were mainly imported, utilized for shirting and Saree cloth of approx. 45″ (114cm) finished width, on which weight per linear meter was assessed to be 120g/L. m
- Medium and coarse synthetic & blended products were considered to be mainly composed of imports as well as domestic makes for suiting and Mayalposh cloth with approx. 58″ (147cm) finished width, on which weight per linear meter was assessed to be 200g/L. m

2) Textile Consumption in each Region:

**Table 4 Textile Consumption in Each Region of Nepal (in 1981-82 period)**

| Region | Total consumption (km) | Ratio | | | Population (person) | Consumption | |
|---|---|---|---|---|---|---|---|
| | | Cotton (%) | Synthetic (%) | Blended (%) | | m/person year | kg/person year* |
| Kathmandu valley | 7,256 | 72.3 | 6.9 | 20.8 | 373,176 | 19.4 | 2.7 |
| Terai region | 114,422 | 82.7 | 9.2 | 8.1 | 6,731,240 | 17.0 | 2.3 |
| Hilly region | 113,268 | 89.4 | 8.3 | 2.3 | 6,980,478 | 16.2 | 2.2 |
| Mountanous region | 12,109 | 90.0 | 5.4 | 4.7 | 1,337,553 | 9.1 | 1.2 |
| Average | — | — | 8.5 | 5.7 | — | 16.0 | 2.2 |
| Total | 247,055 | 85.5 | 14.2 | | 15,422,447 | 16.0 | 2.2 |

Cited from: Study Report on Textile Development Plant in Nepal (I.S.C., July 1984)

*: Analyzed data by Survey Team

From Table 4 above, it can be seen that textile consumption in Kathmandu Valley is very high, in Terai and hilly regions are about avarage, while in mountainous region is very low which results in lowering the overall avarage figure.

Summary of textile consumption in Nepal is as below. (in 1981/1982 period)

- Total population of Nepal 15,422,447 persons
- Textile consumption 247.055 million meters
- Consumption per head (in length) 16 meters
- — do — (in weight) 2.2kg

(Aggregate average weight per linear mater was assessed to be 137g/L. m from Table 3)

3) Comparison of per Head Textile Consumption among Nations

Table 5 below shows international comparison of textile products per head as well as the avarage temperature at major cities in the world, taken from the World Apparel Fiber Consumption Survey conducted by FAO of United Nations.

## Table 5 Per Head Textile Consumption in the World (in 1982)

| Country/region | Per head consumption A (kg/person, year) | Average temperature at capitals B (C) | Consumption X temperature A X B |
|---|---|---|---|
| Average of advanced countries | 15.4 | – | – |
| Developing countries | 3.4 | – | – |
| Canada | 14.5 | 6.7 | 97 |
| U. S. A. | 18.9 | 12.6 | 238 |
| EC countries (Prague) | 14.7 | 8 | 118 |
| West Germany | 19.2 | 9.5 | 182 |
| France | 14.3 | 11.4 | 163 |
| United Kingdom | 14.9 | 10.8 | 161 |
| Switzerland | 17.3 | 9.8 | 170 |
| U.S.S.R. | 15.8 | 4.4 | 70 |
| Poland | 10.9 | 7.8 | 85 |
| Australia | 20.3 | 14.8 | 300 |
| Japan | 16.9 | 15.3 | 259 |
| Tanzania | 1.8 | 25.7 | 46 |
| El Salvador | 5.6 | 22.8 | 128 |
| Mexico | 5.8 | 15.1 | 88 |
| Brazil | 5.3 | 23.2 | 123 |
| Iran | 5.5 | 16.5 | 91 |
| Saudi Arabia | 31.1 | 24.7 | 768 |
| India | 2.0 | 25.3 | 51 |
| Republic of Korea | 9.7 | 11.1 | 108 |
| Pakistan | 2.1 | 25.8 | 54 |
| China (P.R. of) | 4.5 | 17.8 | 80 |
| Thailand | 2.6 | 28.0 | 73 |
| Indonesia | 2.0 | 27 | 54 |
| Italy | 10.5 | 16.1 | 169 |
| Argentina | 5.3 | 17.0 | 90 |
| Egypt | 6.8 | 21.1 | 144 |
| *Nepal Kingdom | 2.2 | 18.1 | 40 |

Cited from: Textile Technology News (No. 588, April 1986)

*: Analyzed data by Survey Team

By simple comparison of textile consumption among nations, without taking natural conditions (especially temperature) into account, it is very difficult to discern actual consumption ratio and luxury degrees in use of clothings.

In consideration of this point, the factors obtained by multiplying "textile consumption" and "avarage temperature" at each respective country are employed in the right side column of Table 5.

The larger the factor is, the more textiles are consumed with luxurious living conditions in that country despite in higher temperature.

Adversely the smaller factor means that textile consumption in that country is not much despite lower temperature, or consumption is extremely low with higher temperature, indicating people living in an austere condition.

For convenience, annual avarage temperature in each capital to indicate avarage temprature in the specific country is utilized.

From Table 5, in addition to that in Saudi Arabia, where textile consumption is absolutely higher than other countries, the following are noted.

- Those countries having the factor 200 or more are considered to be consuming textiles in very large quantity, thus people are living in luxurious condition.
- Those countries having the factor in a 150-200 range are considered to be healthy advanced countries where people are consuming textiles rationally.
- Those countries having the factor in a 100-150 range are regarded as half-developed countries.
- Those countries having the factor in a 50-100 range are regarded as developing countries.
- Those countries having the factor of less than 50 are considered to be late-started developing countries.

While textile consumption in the world for clothing had increased by 19% in 1975-81 period, it decreased by 2 % in 1982.

This reduction was mainly due to the depression in the advanced countries at that period. However, in 1983, textile demand in such countries showed some signs of recovery. On the other hand, textile consumption in developing countries for clothing had been increased until 1981, which had shown 35% above against 1975, however decreased in 1982.

This was due to decrease in exports as a result of economical depression.

Among developing countries, China and Far Eastern Countries had kept increasing consumption even in 1982, where People's Republic of China shared 31% of the total textile consumption in developing countries in 1975, which was extended to 39% in 1982.

Per head consumption of textiles for clothing (Table 6) had increased for the 1975-79 period, but decreased year by year thereafter until 1982, when the consumption level was

only slightly more than the level in 1975.

Per head textile consumption in advanced countries (Fig. 2) had increased by 15% in the 1975-79 period, but decreased by 11% in the 1980-1982 period. Per head textile consumption in developing countries is only 1/5 in the advanced countries, but this has been increasing to date, except for a small setback in 1982.

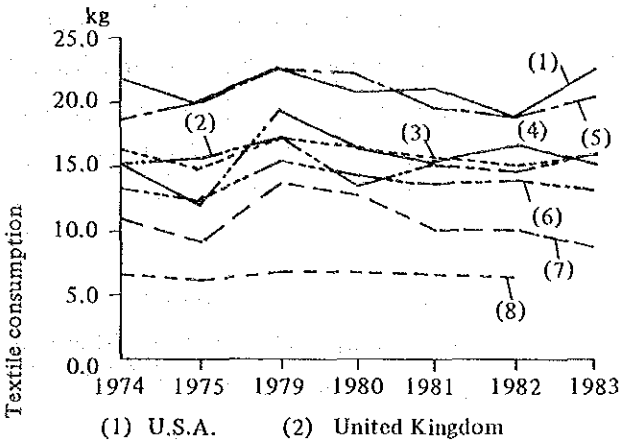
However, this increase varied largely from country to country, where the smallest was East and Central Africa of 1.2kg - 1.3kg in 1982 as against 8 kg of countries in Far East Asia. A large increment was seen in People's Republic of China, where 2.9kg consumption in 1975 had grown to 4.5kg in 1982. In almost all other developing countries, per head textile consumption had decreased or remained unchanged in 1981-82 period, which was still more than the level in 1975.

Table 6 Transition of Textile Consumption for Clothing in the World (for 1974 - 1982 period)

| | 1974 | 1975 | 1979 | 1980 | 1981 | 1982 |
|---|---|---|---|---|---|---|
| Total consumption (1,000 t) | | | | | | |
| Cotton | 13,363 | 13,032 | 13,968 | 14,284 | 14,239 | 14,389 |
| share (%) | (50.2) | (50.6) | (45.7) | (46.7) | (46.5) | (48.1) |
| Wool | 1,459 | 1,551 | 1,768 | 1,770 | 1,792 | 1,826 |
| Linen | 816 | 745 | 767 | 709 | 696 | 719 |
| Cellulose origin fiber | 3,538 | 3,033 | 3,497 | 3,332 | 3,273 | 3,069 |
| Synthetic fiber | 7,459 | 7,400 | 10,576 | 10,498 | 10,606 | 9,933 |
| Share (%) | (28.0) | (28.7) | (34.6) | (34.3) | (34.7) | (33.2) |
| Total | 26,635 | 25,761 | 30,576 | 30,593 | 30,606 | 29,936 |
| Of the above: | | | | | | |
| Natural fiber | 15,638 | 15,328 | 16,503 | 16,763 | 16,727 | 16,934 |
| Share (%) | (58.7) | (59.5) | (54.0) | (54.8) | (54.7) | (56.7) |
| Artificial fiber | 10,997 | 10,433 | 14,073 | 13,830 | 13,879 | 13,002 |
| Population (100 millions) | 3,961 | 4,038 | 4,327 | 4,402 | 4,477 | 4,554 |
| Consumption per head | | | | | | |
| Cotton | 3.4 | 3.2 | 3.2 | 3.2 | 3.2 | 3.2 |
| Wool | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| Linen | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Cellulose origin fiber | 0.9 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 |
| Synthetic fiber | 1.9 | 1.8 | 2.4 | 2.4 | 2.4 | 2.2 |
| Total | 6.7 | 6.4 | 7.1 | 7.0 | 6.8 | 6.6 |
| Of the above: | | | | | | |
| Natural fiber | 3.9 | 3.8 | 3.8 | 3.8 | 3.7 | 3.7 |
| Artificial fiber | 2.8 | 2.6 | 3.3 | 3.1 | 3.1 | 2.9 |

Fig. 2 Per Head Textile Consumption by Country

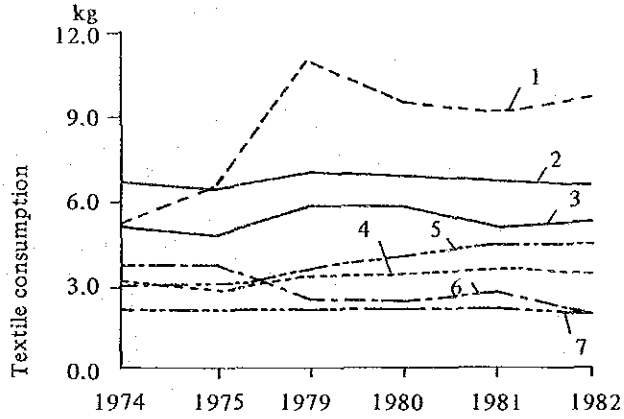
(Advanced Countries)




(1) U.S.A. (2) United Kingdom
(3) Average of advanced countries
(4) Japan (5) West Germany
(6) France (7) Italy
(8) Average of the World

Fig. 3 Per Head Textile Consumption by Country

(Developing Countries)




1 Republic of Korea 2 Average of the World
3 Brazil 4 Average of developing countries
5 China (P.R. of) 6 Pakistan
7 India

Cited from: Textile Technology News (No.588, April 1986)

Under this situation of the world, per head textile consumption in Nepal is 2. 2kg which is much lower than the world average of 6. 6kg. Furthermore, this is again lower than 3. 4kg, an average of developing countries, but slightly higher than 1. 7kg of average of African countries, and considered to be as the same level with India of 2. 0kg. Napal is also ranked low in respect of the factor of "Consumption × Temperature", which means that textile condition is still unfavorable and manufacturing industry is not developed in Nepal.

4) Kinds of Textile, Processing and Finishing, and Consumption by Matearial:
Tables below indicate present status (in 1982) of kinds of textile, processing and finishing, and consumption by material in Nepal.

## Table 7 Kinds of Textile and Consumption by Processing and Finishing (in 1982)

Unit: 1,000 meters

| Kinds | Processing & Finishing | | | | | Total |
|---|---|---|---|---|---|---|
| | Grey cloth | Bleaching | Dyeing | Printing | Yarn dyeding | |
| Shirting | – | 18,186 | 35,431 | 10,726 | 17,647 | 81,991 |
| Saree & Dhoti | 24,809 | 16,526 | 24,320 | 46,035 | 3,179 | 114,869 |
| Suiting | – | 5,386 | 15,392 | – | 5,436 | 26,214 |
| Tapestry | 442 | 1,113 | 3,362 | 3,229 | 4,043 | 12,188 |
| Gamchha | Particulars of processing and finishing unknown | | – | – | – | 1,576 |
| Towel | | | – | – | – | 2,140 |
| Topi & others | | | – | – | – | 8,077 |
| Total | 25,251 | 41,211 | 78,505 | 59,990 | 30,305 | 247,055 |
| % | 10.2 | 16.7 | 31.8 | 24.3 | 12.3 | |

## Table 8 Kinds of Textile and Consumption by Material (in 1982)

Unit: 1,000 meters

| Kinds | Materials | | | Total | % |
|---|---|---|---|---|---|
| | Cotton | Synthetic | Blended | | |
| Shiring | 65,540 | 9,311 | 7,140 | 81,990 | 33.2 |
| Saree & Dhoti | 104,900 | 5,662 | 4,307 | 114,869 | 46.5 |
| Suiting | 18,786 | 5,357 | 2,071 | 26,214 | 10.6 |
| Tapestry | 12,014 | 127 | 47 | 12,181 | 4.9 |
| Gamchha | 1,576 | – | – | 1,576 | 0.6 |
| Towel | 2,132 | 8 | – | 2,140 | 0.9 |
| Topi & others | 7,088 | 591 | 398 | 8,077 | 3.3 |
| Total | 212,037 | 21,056 | 13,962 | 247,055 | 100 |
| Shares (%) | 85.8 | 14.2 | | 100 | |

Cited from: Study Report on Developnient in Nepal
(ISC, July 1984)

From the above Table 7 and 8, the following can be seen:

- When textile consumption is examined in respect of processing and finishing, dyed products are the most numerous which share about 32%, followed by approx. 24% of printed products, then by bleached and yarn-dyed products.
- When examined in respect of kinds of fabrics, Sarees and Dhotis predominantly share approx. 47%.
- This is considered due to recent nation-wide use of them as lady's traditional costume of which one suit portion requires as long as 5-5.5 meters. Further, Dhotis appear to have been counted together with Mayalposh, man's traditional costume, of which consumption is nowadays spread all over the country and used in plain dyed condition, This costume also requires 5 meters of fabrics.
  Therefore, shares occupied by these are expanding. Then, kinds sharing next to the above are approx. 33% of shirting and 11% of suiting which are widely used for man's shirts, trousers, coats (the sack coat is locally called as "coat" only) as well as mainly for lady's petticoats and blouses, in addition to house interior materials and bed-clothes.
- Synthetic and blended fablics are almost all imports regarded as high class products, composed of printed and plain dyed products for lady's Saree cloth with 45″ - 58″ width, which are mainly thin cloth of 80-110g/L. m weight per linear meter. Further, this kind includes a substantial share of plain-dyed products with 58″ width and 150-220g/L. m weight per linear meter for man's coat to be worn on Mayalposh, and trousers. Also, yarn-dyed products of this kind with 100-150 g per linear meter and 45″ width are used widely for shirting.
- Almost cotton products are either home-made or imported from India, comprising generally of medium or coarse clothes with less than 36″ width, majority of which are poor products of simply woven fabrics.
  Medium and darker colours are preferably selected in the hilly and mountainous regions for both printed and plain dyed fabrics.

## 2-2 Transition of Textile Supplies and Current Status

### 2-2-1 Outline of Domestic Textile Production:

Textile consumption, i. e. demand in Nepal is, as aforesaid, approximately 247 million meters annually. Against this quantity of the demand, her actual domestic production amounts to approximately 29 million meters annually or 12% only of the demand. It is thought that the balance 88% are imported from India and other foreign countries (Thailand, Taiwan, Japan, Republic of Korea and People's Republic of China etc.).

Consequently, the Government has been placing emphasis on the following policies:

- To expand domestic production
- To promote domestic production as a substitute of imported goods

・To prevent over-import and drain of foreign currencies

Now, transition and current status of domestic production and supplies are described hereunder.

2-2-2 History of Textile Industry in Nepal:

Textile industries in Nepal, which have been deeply inter-related with that in India were formed during years in 1920s and 1930s.

Hand looms were introduced from India in this period and production of woven fabrics commenced in earnest.

It was only in 1942 that a factory equipped with initial 162 sets of power loom and spinning frames of 13,000 spindles, which however was closed down in 1955 owing to insufficiencies in fund supply, control and technical capacity. Since then, the Government began to promote the textile industry and started to despatch technical trainees to India. Following governmental bureaus were established, whereby functions of development and guidance, procurements of materials and equipment as well as sales of products and business came to be shared between the bureaus:

"Cottage & Village Industry Training and Development Bureau", established in 1955, and "Cottage Industry Handicraft Sales Emporium", established in 1956.

In 1960s and 1970s, semi-automatic looms became to be introduced and together with hand looms, they have infiltrated into local areas.

It was only in 1970s, that enterprises equipped with the following system emerged.

In 1974, Canapati Cotton Mill ·····Commenced operation with 56 looms. With 400 looms and a set of spinning facilities. Cotton fabrics production- 5 million meters/year. Synthetic yarn fabrics production- 1 millon meters/year.

In 1974, Ashok Textiles ·····With 40 looms, 12 warp knitting machines and a range of finishing machinery. Productions of synthetic fabrics and knitted wears-1.5 million meters/year.

In 1976, Gopikapada·····Commenced operation with 10 hand looms and 22 weaving machines, but now with 100 power looms. Production of Cotton and synthetic fabrics.

In Nepal in this period, few power looms were used in medium and small-scale enterprises, and instead. "Fly shuttle hand loom" called as "hand loom" or "semi-automatic loom" came to be widely used as improved loom.

In 1979, Hetauda Textile Mill was established as the only integrated textile mill, consisting of spinning, weaving and processing processes and is now still in operation by the Government as below.

Hetauda Textile Industries ·····Established with financial aid from people's Republic of China. With 486 looms, spinning machines of 14,688 spindles, and a range of processing and finishing facilities as well.

2-2-3 Current Status of Textile Supplying Facilities:

Textile supplying facilities and enterprises currently in operation in Nepal are classified into the following.

- Weaving industries of household and medium/small-scale systems dispersed in various local areas.
- Integrated textile mill, consisting of spinning, weaving and processing processes equipped with modern machinery and equipment.

Apart from the above, there are also factories under construction, in planning or under application, all of which have been promoted as a part of the textile development plan of the Government.

Table 9 Types and No. of Sets installed of Looms by Region (in 1981-82 period)

| Types of looms | Total sets installed | Regions | | Existing looms | | No. of set FWDR | Operation shift | | Production capacity (m/Hr) | Ratio of production capacity (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | EDR | CDR | WDR | MWDR | | Projected | Actual | | |
| 1. Hand loom | (set) | (set) | (set) | (set) | (set) | (set) | | | | |
| – Throw shuttel type | 53,500 | 23,000 | 17,200 | 5,050 | 6,696 | 1,554 | 1 | 1 | 0.25 | |
| – Fly shuttle type | 15,000 | 300 | 13,500 | 800 | 373 | 27 | 1 | 1 | 1.0 | |
| – Semi-automatic | 470 | 70 | 350 | 45 | 2 | 3 | 1 | 1 | 1.9 | |
| Sub-total | 68,970 | 23,370 | 31,050 | 5,895 | 7,071 | 1,584 | | | | 50 |
| % | 100 | 34 | 45 | 9 | 10 | 2 | | | | |
| 2. Power loom | | | | | | | | | | |
| – Factory scale | 926 | 321 | 605 | – | – | – | 3 | 3 | 4.3 | (39) |
| – Medium and small-scale enterprise | 362 | 20 | 250 | 60 | 24 | 8 | 2 | 1 | 3.0 | (11) |
| – Household-scale enterprise | 270 | 20 | 250 | – | – | – | 1 | 1 | – | |
| Sub-total | 1,558 | 361 | 1,105 | 60 | 24 | 8 | | | | 50 |
| % | 100 | 23 | 71 | 4 | 1.5 | 0.5 | | | | |

Cited from: Study Report on Textile Development in Nepal (ISC, July 1984)

In weaving industry, both hand looms and power looms have been developed almost in the Eastern and Central regions. The Central Development Region (CDR), in which capital Kathmandu is, shares 71% of the total numbers of the power loom.

Hand looms are many in their numbers, however, since their productivity and working ratio

are low, they share only 50% of the total prodution in Nepal.

2–2–4 Current Status of Textile Supplies:

Condition of textile production facilities in Nepal is as already described in the previous clause 2-2-3, and in this clause, production and supply capacity as well as actual supplies are examined.

The textile industry in Nepal is mainly composed of the weaving industry, and due to almost complete lack of dyeing and finishing industries, weaving manufacturers have no alternative but to sell their grey clothes directly to customers without any application of finishing processes.

**Table 10 Supplying Capacities and Actual Supplies of Textiles by Material (In 1981-82 period)**

| Items / Distinction | No. of facility | Supplies | | Operation shift | | Working efficiency in production (%) |
|---|---|---|---|---|---|---|
| | | *Approved capacity | Actual result | Projected | Actual | |
| 1. Cotton woven fabrics | (set) | (km) | (km) | | | |
| Integrated factory of spinning, weaving & dyeing | 767 | 17,600 | 6,600 | 3 | 3 | 37.5 |
| Medium & small-scale enterprise | 282 | 3,800 | 1,400 | 2 | 1 | 28.6 |
| Household enterprise | 270 | 1,100 | | 1 | | |
| Hand looms in small household enterprise | 68,970 | 30,800 | 18,100 | 1 | 1 | 58.8 |
| Sub-total | 70,289 | 53,300 | 26,100 | – | – | 49.0 |
| 2. Blended cloth of synthetic | | | | | | |
| Integrated factory of spinning, weaving and dyeing | 159 | 6,400 | 2,700 | 3 | 3 | 42.2 |
| Medium & small-scale enterprise | 80 | 800 | 100 | 2 | 1 | 12.5 |
| Sub-total | 239 | 7,200 | 2,800 | – | – | 38.9 |
| Total | 70,528 | 60,500 | 28,900 | – | – | 47.8 |

Cited from: Study Report on Textile Development Plan in Nepal (ISC, July 1984)

*: Approved capacity was, as in the Table, originally envisaged to be 2 shifts for the medium and small scale enterprise, however, due to disturbed supplies of electricity and materials, only 1 shift was unavoidably approved. Consequently, 60,500 km/Year which is less than the projected capacity, 61,364 km/year, was approved as the capacity.

From the above Table 10, it is noted that the actual supply (production) is 28.9 million m/year which is approx. 48% working efficiency in production.

Of the actual supply, cotton fabrics accout for 26.1 million m/year or 90% of the total, while synthetic and blended goods are 2.8 million m/year or 10% of the total.

The reason and cause for the above mentioned low working efficiency in production will be touched on later.

Since sizing facilities are not available in Nepal, hand looms, which account for 60% of domestic production are used for weaving medium or coarse clothes.
In addition to this, producible kinds are naturally limited by types of looms available. As a consequence, each kind of fabrics shares the following proportion.

| | |
|---|---|
| · Shirting | 40—45% |
| · Saree | 30—35% |
| · Suiting | 8—10% |
| · Quilts, matress, cover Kachhad and Patuka cloth | 2— 3% |
| · Others | 2— 5% |

Cited from: Study Report on Textile Development in Nepal (I S C, July 1984)

2—2—5 Demands and Supplies of Cotton, Synthetic and Blended Yarns:

1) Cotton Yarn

As stated under the clause, 2-2-4 above, textile industries in Nepal are mainly composed of weaving industry to produce woven fabrics for domestic supplies.

As to the cotton yarn, which is one of the main raw materials of woven fabrics, the following points are observed.

Currently, supplyable quantity of the cotton yarn within Nepal is 250 tons/year only which is equal to the production capacity at Hetauda Textile Industries, (the actual production in 1984-85 period was 53 tons/year).

From the Table 10, supply capacity of cotton fabrics by the existing facilities is noted as 53.3 million m/year.

However, yarns with which Hetauda Textile Industries produces woven fabrics (11.0 million meters capacity/year) are spun by themselves, are not regarded as the demand quantity, and thus this quantity is deducted, as below.

53.3—11.0= 42.3 million m/year

When this figure is converted into weight omitting waste and applying a 142g/L. m average weight per linear meter of cotton fabrics (refer to Table 3 ), it is assessed to be approximately 6,000 tons/year.

This figure represents the total demand for the cotton yarn at weaving factories excluding Hetauda Textile Industries.

However, since actual average working efficiency at each factory is approximately 50% of the assumed capacity, current demand will be 3,000 tons/year when this 50% is applied. On the other hand, Hetauda Textiles Industry shares

250 tons/year against 6,000 tons/year ·····4.2% (on design capacity basis)

53 tons/year against 3,000 tons/year ·····1.8% (on actual basis)

Under the above mentioned demand/supply balance, it can be said that cotton yarn spinning industries in Nepal are absolutely in a short supply situation.

If projected cotton yarn supply to be made by new spinning factories up to the 8th 5-year plan is taken into consideration, the picture will be as follows:

| | | | |
|---|---|---|---|
| Hetauda Textile Industries | (Existing ) | 250 | tons/year |
| Butwal Spinning Mill | (Under 6 th Plan) | 1,655 | 〃 |
| Nepalganj Textile Mill | ( 〃 7 th Plan) | 250 | 〃 |
| Pokhara Spinning Mill | ( 〃 8 th Plan) | 1,910 | 〃 |
| Total | | 4,065 | tons/year |

Cited from: Study Report on Textile Development in Nepal (ISC, July 1984)

Therefore, supply capacity of cotton yarn will be 4,065 tons/year in future, representing approximately 68% of current demand, 6,000 tons/year. The shortage will be imported mainly from India.

Cotton yarns now imported consist mainly of those 10Ne- 40Ne yarn counts for medium and coarse woven fabrics.

In addition, double twisted yarns of 2/10Ne, 2/20Ne and 2/40Ne counts are also imported in a large quantity since these are to be woven without sizing by hand looms.

2) Synthetic and Blended Yarns:

Currently, all of synthetic and blended yarns (filament, spun yarn and blended yarn) are imported. Prospects of demand and supply are indicated below:

Unit: ton/year

| Current demand | Prospect of supply | Difference |
|---|---|---|
| *1) 1,090 | *2) 1,510 | 420 |

Cited from: Study Report on Textile Development in Nepal, (ISC, July 1984)

*1: 1,090 tons/year is the converted data by ISC.

*2: Estimated supply of blended yarn from spinning factories now under planning, comprising of:

| | | |
|---|---|---|
| Butwal Spinning Mill | 6th Plan | 1,090 tons/year |
| Pokhara Spinning Mill | 8th Plan | 420 〃 |
| Total | | 1,510 tons/year |

2-2-6 Problems involved in Textile Industry:

When tracing to causes for underdevelopment of the textile industry in Nepal, the following

fundamental problems are observed.

— The weaving industry has been established as an industry which could start with less investment and lower technical level. Type of the loom they started with was hand looms which were no more simplest and cheapest primitive machines than tools. And still these hand looms account for 50% of woven cloth output now.

  National power as well as technical power to improve and modernize these primitive looms have not yet brought up, and thus it appears that even now these looms are in operation and leading textile industry in Nepal.

The cause for drawback in development of this industry, against which none of drastic measures or policy have ever been applied is hereunder.

— Synthetic and blended products which are produced by comparatively modern power looms with imported yarns, appear to flow out again to foreign countries (particularly to India) after they are made up as woven fabrics.

  Consequently, it appears that this domestic production of synthetic and blended goods would not actually contribute much to demand in Nepal. This is due to shortage in purchasing power of Nepal people who regard these synthetic and blended goods as high class and luxurious goods.

  In other words, the policy for domestic supply of synthetic and blended goods still lags behind.

— Working ratio in existing textile production facilities has been left in an inefficient level of approximately 48%.

  Various incomprehensive problems and causes have been observed in this respect, however it is assumed that the real problem in terms of management system and the policy of the Government lies in that such problems and causes are left unsolved.

Actual problems are enumerated as follows.

— Textile industries in Nepal depend largely on India, and as such at present they have no competitive power against India.

  Namely, Nepal has no alternative but to depend on India from seed cotton and cotton yarn to machine, parts, sub-materials, technology, specialist, engineer, as well as even to management and capital investment.

— A policy of making import barrier against synthetic and blended yarns as well as woven fabrics has been adopted by levying a high rate of import duty.

  For instance, the duty and tax to be levied on polyester synthetic goods are:

  - Import duty 136%
  - Import permit fee 40%
  - Sales tax 20%

  When the above are summed up, the goods are to be sold over to wholesalers with a price approximately 228% of CIF value.

Similarly, India prohibits import of synthetic textile products to bring up and protect her domestic industries and to prevent drain of foreign currencies.

A liberal textile policy was applied in Nepal under the new textile policy of October, 1985, however, condition of her domestic textile industries, especially promotion of synthetic fiber industry has been still in an underdeveloped stage.

- Condition of power supply has not been satisfactory, which even if supplied, was not stable and limited in its capacity.

  This situation influences all industries, restrains new enterprise from development and deteriorates operation efficiencies in existing industries, resulting also in the textile industry to make night work in medium and small-scale as well as household enterprises difficult and operating power looms in western, mountainous and hilly regions impossible.
- Supply of cotton yarns has been unstable. In addition, enterprisers of weaving industries have been forced to buy cotton yarns of inferior qualities with higher prices and uncertain deliveries from distributors.

  Furthermore, as the result of almost all hand looms kept mainly in household as well as medium and small-scale enterprises being operated only in farmer's slack season, storage period of yarns and sub-materials is long, pushing the production cost up.
- Due to lack of the sizing machine in Nepal, weaving of medium and coarse clothes with double twisted yarns is only made possible, which consequently makes material cost high.
- Due to lack of dyeing and finishing machine or factory operating with them, only those products with inferior qualities of gloss, luster and solidity, as well as with less competitive power and variety are possible to be supplied.
- There are also problem involved in import formalities and times required for importations of materials, equipments and their parts and sub-materials are relatively long, Namely the formalities are not smooth and actually require weeks or months in clearing them through customs.

  Consequently, this situation affects adversely production costs and delivery periods.
- Shortage in maintenance and control ability of machinery and equipment.

  Namely, all of parts, tools, contractors concerned techniques for repairing and improving machines and equipment are in scarcity.
- Under the present condition, there is no option but to continue operation of hand looms, owing to inferior conditions of electricity, transportation and fund, and this situation cannot compete agaist power looms for productivity, cost and quality.

As above, many problems in respect of available funds, power and raw material supply, technology, non-availability of sizing and finishing machines, level of maintenance, etc. are still remained unsolved.

## 2–3 Transition and Current Status of Textile Import

### 2–3–1 Outline of Textile Import:

As was stated before, the total textile demand in Nepal was 247.0 million meters as at 1981/82 period.

Out of this figure, the domenstic supply of cotton, synthetic and blended fabrics accounts only for approx. 28.0 million meters or 12%.

Therefore, it appears that the balance 218.0 million meters or 88% would have been imported or smuggled from India and othere foreign countries (with the per head consumption assessed at 16 m/year,)

However, only extremely few statistical data are available for import quantity and the reason therefor is presumed as below.

- Customs are eager for collecting import duties, namely they are serious in surveillance and assessment of values of textile products but not in checking on quantity, quality or kinds of such products.
- Customs clearance has been made with incorrect quantities and items.
- Too many cases of smuggling. This situation has been left unrectified because of difficulty in controlling.

  Even though statistical data are available, it is questionable whether such data are accurate or not, due to the reasons above.

### 2–3–2 Transition of Textile Import Amounts:

Tables 11 and 12 indicate transition of woven fabrics import amounts by country, as well as transition of woven fabrics import quantity and amount respectively.

**Table 11 Transition of Woven Fabrics Import Amounts by Country**

Unit: NRs X 1,000

| Countries / Years | India | Other foreign countries | Total |
|---|---|---|---|
| 1980/81 | 338,698 | 332,680 | 661,378 |
| 1981/82 | 301,626 | 343,182 | 644,808 |
| 1982/83 | 122,629 | 299,413 | 422,042 |

Table 12 Transition of Woven Fabrics Import Quantities and Amounts

| Item / Years | Woven fabrics import | | Exchange rate to dollar (NRs/$) | Unit price (NRs/m) |
|---|---|---|---|---|
| | Amount (NRs X 1,000) | Quantity (kg) | | |
| 1973/74 | 448,190 | 124,730 | – | 3.6 |
| 1974/75 | 572,400 | 142,770 | – | 4.0 |
| 1975/76 | 506,860 | 124,640 | – | 4.1 |
| 1976/77 | 519,420 | 120,200 | – | 4.3 |
| : | | | | |
| 1980/81 | 661,380 | – | 11.9 | – |
| 1981/82 | 644,800 | – | 13.1 | – |
| 1982/83 | 422,040 | – | 14.2 | – |

Cited from: Study Report on Textile Development in Nepal (ISC, July 1984)

2–3–3 Current Status and prospect of Woven Fabric and Yarn Import Quantities:

1) Woven Fabrics:

Table 13 indicates forecasted import quantities of woven fabrics (cotton, synthetic and blended goods inclusive) based on the current and projected woven fabrics supply levels and the assessed demand level.

Table 13 Forecasts of Woven Fabrics Supply and Import Quantities

Unit : 1,000 meters

| No. | Item \ Fiscal year | Base 1981/82 | At end of 6th plan 1984/85 | At end of 7th plan 1989/90 | At end of 8th plan 1994/95 |
|---|---|---|---|---|---|
| 1 | Estimated demands | 247,000 | 267,000 | 305,000 | 347,500 |
| 2 | Forecast of supplyable quantities | 28,900 | 28,900 | *49,120 | *49,120 |
| 3 | Projected supply capacity | – | 300 | 52,800 | 115,500 |
| 4 | Forecast of supply capacity (2 + 3) | 28,900 | 29,200 | 101,920 | 164,420 |
| 5 | Forecasted import quantity (1–4) | 218,100 | 237,800 | 203,080 | 182,080 |

Cited from: Study Report on Textile Development Plan in Nepal (ISC, July 1984) for 1st and 3rd columns, and according to analysis by Survey Team for 2nd, 4th and 5th columns.

*: Based on raised working efficiency of existing facilities from approx, 48% to 80%.

2) Yarn:

Demand and supply balance is assessed for cotton, synthetic and blended products altogether on the basis of forecasted supply quantities of woven fabrics and yarns from existing facilities and those facilities now under introduction process or planning. From the Table 13, the forecast of woven fabrics supply capacity is as follows:

Unit : 1,000 meters

| | Base 1981/82 | At end of 6th plan 1984/85 | At end of 7th plan 1989/90 | At end of 8th plan 1994/95 |
|---|---|---|---|---|
| Forecast of woven fabrics supply capacity | 28,900 | 29,200 | 101,920 | 164,420 |

- Since, out of the above figures, those woven fabrics produced in the integrated factory of spinning, weaving and dyeing processes (i. e. Hetauda Mill) are made of their own

yarn, that portion of the yarns is not included in the demand for the yarn. Therefore, that portion (quantity as described below) is deducted from the above forecasted woven fabrics supply capacity.

Unite: 1,000 meters

| Breakdown | Base 1981/82 | At end of 6th plan 1984/85 | At end of 7th plan 1989/90 | At end of 8th plan 1994/95 |
|---|---|---|---|---|
| From existing Hetauda Textile Indust. | *1) 3,900 | *1) 6,100 | *2) 8,800 | 8,800 |
| Estimated woven fabrics supply from factories under planning | – | – | 30,000 | 30,000 |
| Total | 3,900 | 6,100 | 38,800 | 38,800 |

Cited from: *1 – Data supplied by Hetauda Textile Industries
*2 – 11,000 km (production capacity at Hetauda Textile Ind.) X 0.8 = 8,800 km
*3 – Production capacity at Nepalgunj Textile Mill plus estimated production capacity of factories under planning.

- Those woven fabrics for production of which yarns are required to be supplied to weaving and processing factories, as well as to medium and small-scale weaving factories, will be as follows:

Unit: 1,000 meters

| Item | Base 1981/82 | At end of 6th plan 1984/85 | At end of 7th plan 1989/90 | At end of 8th plan 1994/95 |
|---|---|---|---|---|
| Woven fabrics requiring supply of the yarn | 25,000 | 23,100 | 63,120 | 125,620 |

- The above figures are converted into yarn quantities to make them as required quantities of yarn (demand).
As stated in Table 3 above, 137g/L. m is taken as an avarage convertion rate for cotton, synthetic and blended products altogether, however, waste ratio is omitted.

Unit: 1,000 meters

| Item | Base 1981/82 | At end of 6th plan 1984/85 | At end of 7th plan 1989/90 | At end of 8th plan 1994/95 |
|---|---|---|---|---|
| Required quantity of yarn | 3,425 | 3,165 | 8,650 | 17,210 |

- On the other hand, production and supply capacities of yarn (production capacity of existing facilities and facilities under planning) are as follows:

Unit: 1,000 meters

| Item | Base 1981/82 | At end of 6th plan 1984/85 | At end of 7th plan 1989/90 | At end of 8th plan 1994/95 |
|---|---|---|---|---|
| Supply capacity of material yarn | *1) 69 | 53 | *2) 5,525 | 5,525 |

*1 – Annual productions of yarn (for sale) at Hetauda Textile factory were 69 tons for 1981/82 and 53 tons for 1984/85 periods, however, for periods of 7th and 8th plans, each 200 ton/year supply is added at a 80 % working ratio of its supply capacity 250 tons/year.

*2 – yarn supply capacity from

| | |
|---|---|
| Butwal Mill ..... | 2,745 tons/year (1,655 + 1,090) |
| Same from Nepalgunj Textile ..... | 250 〃 (for sale) |
| Same from Pokhara Mill ..... | 2,330 tons/year (1,910 + 420) |
| Total | 5,325 tons/year |

*1 and *2 were added up to make 5,525 tons/year.

・Demand and supply balance of the yarn is now simply calculated as follows.

Unit: ton

| Item | Base 1981/82 | 6th plan 1984/85 | 7th plan 1989/90 | 8th plan 1994/95 |
|---|---|---|---|---|
| Demand/supply balance of material yarn | *Δ 3,356 | Δ 3,112 | Δ 3,125 | Δ 11,685 |

*Δ – Indicate shortage

From the demand/supply balance as stated above, it is noted that required supply of yarns as raw material for projected demand of cotton, synthetic and blended fabrics in Nepal is still insufficient, and yarns are still required to be imported.

However, it is very difficult to estimate dependable supply/demand balance because there are quite a few uncertain factors on actually produced quantities in various factories or on working efficiencies, etc.

In any case, it is obvious that domestic supplies of both woven fabrics and yarns are not sufficient.

## 2–4 Forecast for Textile Demand for a Forthcoming Decade and Demand/Supply Analysis

### 2–4–1 Analysis of Factors determining Demand and Consumption Propensities:

Textiles are mainly consumed for clothings and also utilized for bedcloth, furnitures and room interiors.

Factors to expand or restrict these demands are assumed to be the following:

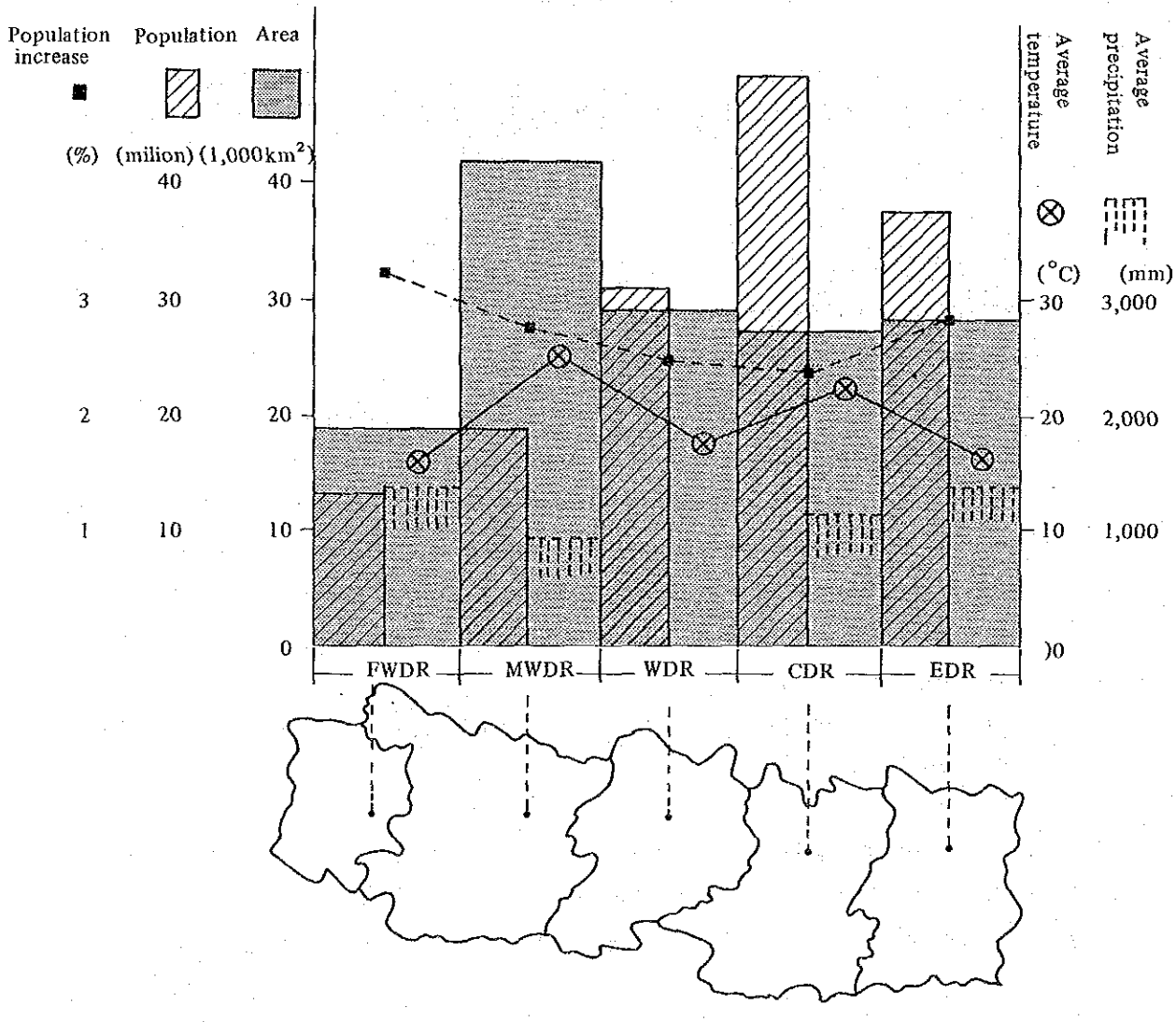
- Natural conditions and trend of population.
- GDP, commodity price index and trend of market prices.

- Social Status and religious elements.
- Populations by profession, productivity and purchasing power.
- Level of industrialization.
- Manners, cutoms and fashion.

1) Natural Conditions and Trend of Population:

As the basic factor to control demand and consumption of textiles, natural environments and conditions, as well as destribution and increment of population are examined. These relating data are presented in a graphic display in Fig.4.

Further, Tables 14 and 15 indicate a comparison of population densities between Nepal and other countries, and a relation between the total population and economic population in Nepal.




Cited from: Statistical Pocket Book, Nepal (NPC, 1984)

* : Climates represent typical data of the specific region.

* : Population increase ratio indicates an average for 1971 ~ 1981 pereod.

**Fig. 4 Natural Conditions and Distribution of Population (as at 1981)**

Table 14 Comparison of Population Density with Countries of the World (As at 1981)

| Countries | Population (000) | Area (Sq. Km) | Density |
|---|---|---|---|
| 1. People's Republic of China | 1,007,755 | 9,596,961 | 105 |
| 2. India | 676,218 | 3,287,590 | 206 |
| 3. Soviet Union | 267,697 | 22,402,200 | 12 |
| 4. United State | 229,805 | 9,363,123 | 25 |
| 5. Indonesia | 150,520 | 1,904,345 | 79 |
| 6. Brazil | – | 8,511,965 | – |
| 7. Japan | 117,645 | 372,313 | 316 |
| 8. Bangladesh | 90,626 | 143,998 | 629 |
| 9. Pakistan | 84,579 | 803,943 | 105 |
| 10. Nigeria | 79,680 | 923,768 | 86 |
| 11. Mexico | 71,193 | 1,972,547 | 37 |
| 12. Federal Republic of Germany | 61,666 | 248,577 | 248 |
| 13. Italy | 57,197 | 301,225 | 190 |
| 14. United Kingdom | – | 244,046 | – |
| 15. France | 53,963 | 547,026 | 99 |
| 16. Nepal | 15,023 | 147,181 | 102 |

Cited from: Statistical Pocket Book, Neapl (NPC, 1984)

Table 15 Comparison between Total Population and Economic Population in Nepal

Unit : Person

| No. | Item | In 1981 | % |
|---|---|---|---|
| 1 | Total pulation: | 15,022,839 | 100 |
| | Less than 10 years old | 4,504,951 | 30 |
| | More than 10 years | 10,517,888 | 70 |
| 2 | Economic population (more than 10 years old) | | |
| | Working population | 6,850,886 | 46 |
| | Non-working population | 3,667,002 | 24 |
| 3 | Economically dependent population per individual worker in working population | $\frac{(\text{Total population}) - (\text{Working population})}{\text{Working population}}$ = 1.2 (estimated) | |

Cited from: 1 & 2 according to Statistical Pocket Book, Nepal, (NPC, 1984)
Column 3 according to analysis by Survey Team.

From the above data, the following are observed:

- Similar to People's Republic of China, India and Pakistan, Nepal holds larger population for her area with a 102/㎢ population density, ranking in more than 100/㎢ population density countries.

  Namely, the problem is that Nepal cannot improve productivity while restricting increment in population, which is the fundamental barrier impeding increment in

textile consumption.

- Population is especially concentrated in Eastern and Central areas of Terai district where natural conditions is comparatively mild. However, industrialization in these areas has been retarded despite concentration of population. Further, population increase ratio is higher in depopulated regions of FWDR and MWDR with an average of 2.66% which is ranked high to the world standard (According to data supplied by Marketing Bank, an average population increase ratio of the world was 1.9% in 1970-1982 period).
- In Table 15, the working population means the number of people aged more than 10, unlike its world standard of 12 years old.
  However, this is the actual condition that more than 10 years old people are really accounted for the economic population in Nepal.

When an calculation is made on the basis of the above data, economically dependent population is estimated as 1.2, which means that per head productivity is low, where children, women and even old people have to work barely to subsist themselves without being able to support others.

2) GDP, Commodity Price Index and Trend of Market Prices:
Various data in connection with GDP, commodity price index, trend of the market price are indicated in Table 16 to 19.

## Table 16 Orders of GDP and GDP/capita of the World (as at 1982)

| Order Countries | Population (000 persons) | GDP (million $) | GDP/capita ($/person) | Increase |
|---|---|---|---|---|
| 1. United States | 232,057 | 3,025,700 | 13,039 | 2.5 |
| 2. Japan | 118,449 | 1,059,990 | 8,945 | 4.7 |
| 3. Soviet Union | 269,994 | 1,000,000 | 3,705 | 4.8 |
| 4. Federal Republid of Germany | 61,638 | 660,280 | 10,712 | 2.3 |
| 5. France | 54,219 | 542,240 | 10,004 | 3.2 |
| 6. United Kingdom | 56,284 | 479,957 | 8,525 | 1.6 |
| 7. Italy | 56,640 | 347,483 | 6,135 | 2.6 |
| 8. Canada | 24,625 | 299,610 | 12,167 | 3.3 |
| 9. Brazil | 126,807 | 295,000 | 2,326 | 7.5 |
| 10. People's Republic of China | 1,008,000 | 290,000 | 287 | – |
| 11. Spain | 37,935 | 179,591 | 4,734 | 3.4 |
| 12. Mexico | 73,011 | 168,348 | 2,306 | 6.1 |
| 13. India | 711,664 | 165,000 | 232 | 3.6 |
| 14. Australia | 15,170 | 158,430 | 10,444 | 2.9 |
| 15. Saudi Arabia | 9,684 | 140,000 | 14,457 | 10.0 |
| 21. Indonesia | 153,032 | 89,000 | 582 | 7.8 |
| 22. Republic of Korea | 39,331 | 68,186 | 1,734 | 8.2 |
| 30. Nigeria | 82,390 | 64,600 | 784 | 6.0 |
| 42. Thailand | 48,490 | 37,320 | 770 | 6.6 |
| 45. Pakistan | 87,125 | 30,400 | 349 | 4.9 |
| 84 Tanzania | 19,111 | 5,400 | 283 | 3.4 |
| 104 Nepal | 15,400 | 2,610 | 169 | 2.4 |
| 180 Bhutan | 1,355 | 116 | 86 | – |

Cited from: Data supplied by Marketing Data Bank

## Table 17 Net Growth Ratios of Developing Countries Affiliating in ADB as at 1985 (in %, '84 figures in brackets)

| | |
|---|---|
| Average (for 16 countries) | 3.6 ( 6.6) |
| Republic of Korea | 5.2 ( 7.9) |
| Taiwan | 4.1 ( 9.6) |
| Hong Kong | 0.8 ( 9.3) |
| Singapore | Δ1.8 ( 8.2) |
| Malaysia | 2.8 ( 7.6) |
| Indonesia | 2.9 ( 5.8) |
| Thailand | 4.0 ( 6.2) |
| Philippine | Δ3.7 (Δ4.5) |
| India | 4.5 ( 3.7) |
| Pakistan | 8.2 ( 4.3) |
| Republic of Sri Lanka | 5.4 ( 5.0) |
| Bangladesh | 3.1 ( 4.3) |
| Burma | 6.9 ( 6.6) |
| Nepal | 2.8 ( 7.4) |
| Fiji | Δ1.7 ( 9.4) |
| Papua New Guinea | 3.0 ( 2.2) |

Note: Gross Domestic Product (GDP base, Δ mark indicating minus figures)
Cited from: The Nippon Keizai Press (1985)

## Table 18 Breakdown of GDP of Nepal by Industry and their Transition

| No. Description \ Year | 1977/78 (%) | 1978/79 (%) | 1979/80 (%) | 1980/81 (%) | 1981/82 (%) | 1981/82, GDP (million NRs) |
|---|---|---|---|---|---|---|
| 1. Agriculture | 58.9 | 60.2 | 57.9 | 56.8 | 55.5 | 16,792 |
| 2. Mining and quarrying | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 68 |
| 3. Manufacturing | 4.0 | 3.8 | 4.0 | 3.8 | 3.9 | 1,189 |
| a) Modern | (2.7) | (2.5) | (2.7) | (2.6) | (2.7) | (820) |
| b) Cottage | (1.3) | (1.3) | (1.4) | (1.2) | (1.2) | (369) |
| 4. Electricity, gas and water | 0.2 | 0.2 | 0.3 | 0.2 | 0.3 | 90 |
| 5. Consturction | 6.8 | 7.0 | 6.7 | 7.2 | 8.4 | 2,537 |
| 6. Trade, restaurant and hotels | 3.6 | 3.3 | 3.8 | 3.5 | 3.5 | 1,070 |
| a) Trade | (3.1) | (2.9) | (3.4) | (3.0) | (3.0) | (932) |
| b) Hotels & restaurant | (0.5) | (0.4) | (0.4) | (0.5) | (0.5) | (138) |
| 7. Transport communication and storage | 5.5 | 5.6 | 6.6 | 6.9 | 6.6 | 1,992 |
| 8. Financial and real estate | 7.8 | 7.3 | 7.9 | 7.6 | 7.8 | 2,351 |
| 9. Community and social services | 6.5 | 6.0 | 6.4 | 6.9 | 7.2 | 2,174 |
| a) Public | (5.0) | (4.9) | (5.2) | (5.8) | (6.0) | (1,820) |
| b) Extra-territorial | (0.1) | (0.1) | (0.1) | (0.1) | (0.1) | (34) |
| c) Provate services | (1.4) | (1.0) | (1.1) | (1.0) | (1.0) | (320) |
| GDP at Factor Cost | 93.4 | 93.5 | 93.7 | 93.3 | 93.4 | 28,263 |
| Indirect Taxes (Net) | 6.6 | 6.5 | 6.3 | 6.7 | 6.6 | 2,002 |
| Agriculture | (0.7) | (0.7) | (0.7) | (0.6) | (0.6) | (183) |
| Others | (5.9) | (5.8) | (5.6) | (6.1) | (6.0) | (1,819) |
| GDP at Market Price | 100 | 100 | 100 | 100 | 100 | 30,265 |

Cited from: Statistical Pocket Book, Nepal (NPC, 1984)

## Table 19 Consumer Price and Textile Price in Neapal

(Base year: 1972/78 = 100.0)

| Calender year | Exchange Rate NRs/US$ | Food and Beverage | | | | Consumer Price Index | | | | General Index | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Clothes, clothing & sewing services | | | | | | | |
| | | National | Kath-mandu | Terai | Hills | National | Kath-mandu | Terai | Hills | National | Kath-mandu | Terai | Hills |
| 1978/79 | 11.90 | 158.8 | 159.3 | 158.9 | 155.7 | 145.4 | 157.7 | 132.7 | 151.5 | 161.8 | 161.1 | 162.2 | 159.7 |
| 1979/80 | 11.90 | 176.2 | 181.9 | 173.0 | 172.9 | 156.1 | 167.8 | 141.9 | 158.7 | 177.6 | 178.3 | 175.3 | 175.3 |
| 1980/81 | 11.90 | 199.9 | 209.5 | 195.3 | 193.9 | 165.7 | 179.1 | 150.4 | 173.6 | 201.4 | 207.2 | 198.0 | 197.9 |
| 1981/82 | 13.10 | 221.9 | 231.8 | 218.8 | 214.5 | 183.9 | 204.1 | 163.4 | 189.3 | 222.4 | 229.2 | 219.5 | 218.0 |
| 1982/83 | 14.20 | 257.4 | 265.7 | 253.9 | 252.9 | 196.1 | 220.7 | 171.7 | 197.1 | 254.0 | 257.5 | 252.6 | 250.2 |
| 1983/84 | 15.20 | | | | | | | | | | | | |
| Average annual increase rate, %/year during 1978/79 to 1982/83 | 4.5 | 12.8 | 13.6 | 12.4 | 12.9 | 7.8 | 8.8 | 6.7 | 6.8 | 11.9 | 12.4 | 11.7 | 11.8 |

Cited from: Statistical Pocket Book, Nepal, 1984, National Planning Commission

Below, various commodity prices collected at various markets in Nepal are shown as referential indices:

Table 20 Various Prices at Markets (in 1986)

| No. | Commodity | Unit | Price | No. | Commodity | Unit | Price |
|---|---|---|---|---|---|---|---|
| 1 | Coca Cola | Bottle | 2.5 | 17 | Blouse | pc | 200 |
| 2 | Caustic soda (solid) | kg | 20 | 18 | Jeans | pc | 200-400 |
| 3 | Acetylene | Cylinder | 1,000 | 19 | T-shirt (knit) | pc | 40-150 |
| 4 | Oxygen | 〃 | 350 | 20 | Y-shirt | pc | 100-150 |
| 5 | Vat dye | kg | 1,000-1,100 | 21 | Flour | kg | 3.5-5.5 |
| 6 | Diesel oil | 1 tr | 7.25 | 22 | Meat (cattle) | kg | 10-15 |
| | Gasoline | 〃 | 11.0 | | 〃 (goat) | kg | 30-45 |
| 7 | Hotel accommodation | A-Class | 620 | 23 | Egg | pc | 1.25 |
| 8 | Land prices (local) | Hectare | 40,000 | 24 | Beer (large) | Bottle | 23-26 |
| | 〃 (capital) | 〃 | 600,000 | 25 | Soap | pc | 3.5 |
| 9 | Taxi ride (passenger car) | 1 km | 1.5 | 26 | Tobacco | Home-made | 2-10 |
| | | City | 10-20 | | 〃 | Import | 25-60 |
| 10 | Rikisha (bicycle taxi) | km | 2.5 | 27 | Sugar | kg | 11 |
| 11 | Bicycle | India-made | 1,000 | 28 | Restaurant | Lunch | 30-50 |
| 12 | Autobicycle | Japan Honda | 35,000 | | 〃 | Dinner | 80-120 |
| | 〃 | India Honda | 25,000 | 29 | Sofa (furniture) | 4 pcs | 1,350 |
| | 〃 | Mopet | 15,000 | 30 | Saree (ladie's) | 5 m | 150-600 |
| 13 | Rice | kg | 4.5-6 | | Dohti (men's) | 5 m | 60-250 |
| 14 | Leather boots and shoes | Medium boots | 200 | | | | |
| | | Shoes | 170 | | | | |
| | | Boots (ladie's) | 300 | | | | |
| | Sports shoes | pc | 100-150 | | | | |
| 15 | Trousers | pc | 250-300 | | | | |
| 16 | A suit of sack coat | set | 550-750 | | | | |

From the above various data, the following is deducible:

- GDP (Gross Domestic Product) is very low. Hence, GDP per capita is small and purchasing power is poor because of low income. Despite Napal's fairly severe natural condition, people cannot afford purchasing textiles and clothings, resulting in increase of Engel's coefficient.
- In GDP per domestic industry, agricultural concern shares approximately 55% of the total. However, since agricultural population shares 91% of the total, it leads that productivity in agriculture will be extremely lower than that in other industries.
- Output of manufacturing industry is still observed low sharing less than 4%, staying flat for past 5 years.
  Namely, industrialization process is delayed.
- Average commodity price increase ratios are as follows:

(for 1978/79 - 1982/83 period)

| | | |
|---|---|---|
| General average | Approx. | 8.6% |
| Foods | 〃 | 13.0% |
| Textiles | 〃 | 7.0% |
| Daily necessities | 〃 | 12.0% |

Lower increase ratio of textile price than others is considered as the result of suppressed price of textile products in a situation where productivity of textiles is increased over the world on one hand while price increase ratio of raw materials for textiles is not correspondingly high on the other.

Further, it is also considered that the price hike is restrained because demand for textile goods is not increasing.

- The above Table 20 indicates commodity prices actually picked up in markets. When these price are converted with a rate 1US$=21NRs=¥176, there is a general feeling that prices in Nepal are cheap.

  In particular, domestic prices of some commodities are 1/2 or 1/3 of those in Japan. Because of low national income, their latent demand and consumption have increased not much. Namely, commodity prices are cheap, but not much of them are sold.

3) Class and Religious Elements:

It is assumed that differences in incomes, as well as complexities of various social problems stemming from principles and thoughts of people may be hampering development of industrialization and restricting economical growth, improvements in productivity and increase in consumption.

Below, shows estimated population shares by social class and income.

| | Income (NRs/mongh) | Population shares | Major professions |
|---|---|---|---|
| High class | More than 2,000 | 5 % | Enterprisers, high class officials and land owners |
| Medium class | 500 - 2,000 | 15 | Company executives, technical specialists and instructors |
| Ordinary farmers and workers | Less than 500 | 80 | Farmers and ordinary workers |

Population in respect of religion and education in Nepal are as follows.

Population Shares by Religion:(as at 1971)

- Hindus 89%
- Buddhists 7 %
- Islamices 3 %

・Others 1 %

Educated Population:

・Ratio of higher education ……3.5%
(higher than college)

・School attendance ratio……35%

・Literacy ratio……23%

From the above, it is noted that population share of high class people who are thought to relate directly to increase of consumption is extremely low, supposedly less than 5 %. Further, because of delayed industrialization, share of medium class in the population is observed low, namely numbers of salaried and white coller people, who comprise a wider range of consumers for textiles and clothing, share low. Therefore, by this reason no spectacular growth in consumption would be expected for about 10 years from now. Numbers of the educated in higher schools, who are to participate in promoting development and modernization of manufacturing industries, are not so many also and the general educational level is observed low. It is also assumed that there may be still conventional or traditional restrictions involved in their religious and class systems, which impede modernization.

4) Populations by Profession, Productivity and Purchasing Power:

Relationship among populations by profession, productivity and purchasing power in Nepal are hereunder.

As shown in Table 15, economic population and its breakdown in Nepal are as follows: (as at 1981)

Economic population more than 10 years old……10,517,888 (persons)

Breakdown:

・Working population ……6,850,886

・Non-working population……3,667,002

— Share of economic population ( more than 10 years old ) in the total population is 70%, of which 46% is accounted for working population.

Table 21 indicates its population shares by profession.

According to Table 21, agricultural population shares 91.4% over whole Nepal, in which even in the industrialized Eastern and Central regions, it shares 88%. Therefore, Nepal can be said to be a complete agriculture leading country.

Table 21 Regional Population Distribution by Profession

(as at 1981)

| No. | Region Major profession | Total population | Total (%) | EDR (%) | CDR (%) | WDR (%) | MWDR (%) | FWDR (%) |
|---|---|---|---|---|---|---|---|---|
| | | (person) | | | | | | |
| 1 | Prof./Tech. workers | 64,132 | 0.9 | 0.9 | 1.0 | 0.9 | 0.8 | 0.8 |
| 2 | Administrative workers | 6,232 | 0.1 | 0.05 | 0.2 | 0.04 | 0.03 | 0.02 |
| 3 | Clerical workers | 49,161 | 0.7 | 0.5 | 1.3 | 0.5 | 0.3 | 0.3 |
| 4 | Sales workers | 85,341 | 1.3 | 1.6 | 1.7 | 0.9 | 0.6 | 0.3 |
| 5 | Service workers | 16,430 | 0.2 | 0.2 | 0.4 | 0.2 | 0.2 | 0.1 |
| 6 | Farmers & fishers | 6,259,613 | 91.4 | 87.9 | 88.8 | 94.3 | 95.4 | 96.1 |
| 7 | Production labor | 213,851 | 3.2 | 5.6 | 4.0 | 1.5 | 1.1 | 0.7 |
| 8 | Non stated | 156,126 | 2.2 | 3.2 | 2.5 | 1.6 | 1.6 | 1.7 |
| | Total | 6,850,886 | 100 | 100 | 100 | 100 | 100 | 100 |

Cited from: Statistical Pocket Book, Nepal (NPC, 1984)

— Next to farmers is worker population in manufacturing industries, however, the share is not more than 3.2% and the output represents only about 4 % as seen from Table 18. Therefore, per head productivity in manufacturing industries is also extremely low and no purchasing power is again expectable for textile products from this source.

— As stated before, having quite a few agricultural population means that people's productivity is low, purchaing farming equipments and fertilizers has preference to buying textiles and clothing while they are working on fields, and those textile products are actually not their absolute needs.

5) Delayed Industrialization:

Industrialization and modernization in Nepal have been very much delayed. Among various reasons for the delay, it is noted that she is poorly given with natural resources and not favorably situated in topographical and natural environments, namely being enclosed by mountains or border with India and without facing to sea, which results in difficult communications with foreign countries and consequently in poor supply of information and impetus.

Furthermore, even within Nepal, almost all areas are hilly or mountainous, which has delayed her developments in communication and transportation facilities. Consequently, it is deducible that naturally her industrialization has been delayed as a result of much distribution cost and unstable deliveries. Next reason for the delayed industrialization is considered to be that Nepal has long been dependent on India, the neighbor country, for all aspects including industry, economy and culture and is still in the same position to receive influences from India.

6) Manners, Customs and Fashion:

Largely classified, races of Nepali people are as follows:

| | | | |
|---|---|---|---|
| Nepali origin ····· | Aryan origins | ····· | 73% |
| | Newar origin | 7 % | ····· 26% |
| | Tamang 〃 | 5 % | |
| | Tharu 〃 | 4 % | |
| | Others | 10% | |
| Tibet origin ····· | | | 1 % |

Patterns and customs have been fixed by races and religions to which we referred before. Yet, it appears in urban areas that patterns and customs are gradually changing from younger generations.

However, in rural areas, hilly and mountainous regions, people have been still obsessed by old customs, where respective tribe's patterns, customs and traditional clothings are adhered to in all their activities from social ceremonies to daily living.

While a remarkable increase in textile consumption is not expectable also in this respect, it appears that patterns and customs change gradually from urban areas to infiltrate its impetus and influence nationwide toward innovation in their clothing life.

2–4–2 Forecasts of Demand and Supply in Coming Decade:

The following is the forecast of demand and supply of textiles in the coming decade in Nepal assumed in accordance with the statistical data and National development plan.

**Table 22 Forecasts of Demand and Supply in coming Decade (with existing facilities)**

| No. Item \ Project year | Conditions | Unit | Base | At end of 6th plan | At end of 7th plan | At end of 8th plan |
|---|---|---|---|---|---|---|
| | | | 1981/82 | 1984/85 | 1989/90 | 1994/95 |
| 1 Forecast of population increase | Increase 2.66% ratio | 1.000 persons | 15,400 | 16,660 | 19,000 | 21,660 |
| 2 Forecast of GDP increase | 〃 2.4% | Mill. $ | 2,316 | 2,487 | 2,800 | 3,152 |
| GDP/capita | | $/capita | 150 | 161 | 181 | 204 |
| 3 Demand forecast Forecast | 16m/person. year | 1,000 m | 247,000 | 267,000 | 305,000 | 347,500 |
| Forecast in changing ratio to synthtic fibers | 1%/year up | % | 14 | 17 | 22 | 27 |
| Breakdown: Cotton | | 1,000 m | 212,400 | 221,600 | 237,900 | 253,700 |
| Synthetic & blended | | 〃 | 34,600 | 45,400 | 67,100 | 93,800 |
| 4 Supply capacity: Working ratio of facilities | *1 design base | 1,000 m | (60,500) | (61,400) | (61,400) | (61,400) |
| 5 Same with above: Working ratio facilities | *2 Actual 48% | 〃 | 28,900 | 29,200 | — | — |
| — do — | at 80% of the design base | 〃 | — | — | 49,120 | 49,120 |
| 6 Demand/supply balance (3-5) | | 〃 | 218,100 | 237,800 | 255,880 | 298,380 |
| Breakdown: Cotton | Changing ratio to synthetic fibers as per (3) | 〃 | 187,600 | 197,600 | 199,300 | 217,780 |
| Synthetic & blended goods | | | 30,500 | 40,200 | 56,300 | 80,600 |

Cited from: Analysis by Survey Team.

*1: Supply quantity when all of existing facilities produce to their design capacity.

*2: Supplyable capacity applying 80% of working efficiencies (furure target) instead of actual 48%.

The above demand forecast is based on future average GDP increase ratio of 2.4%/year, and a simple proportional calculation is performed only to increasing population (average 2.66% /year) on an assumption that current rate of textile demand per head (16 meters/capita. year) will keep on without increase.

On the other hand, for domestic textile supply capacity, the forecast is made up on the basis of firstly the supply capacity produced by existing facilities with the design base working ratio and operation shift, and secondly supplyable capacity by existing facilities unchanged with actual 48% working ratio up to the last year of the 7th plan and 80% afterward.

According to the above concept, self-supply capacity is calculated by

$$\frac{\text{Supply Capacity (5)}}{\text{Demand Forecast (3),}}$$ as below.

Base year (Actual) ……12%
During 6 th plan period ……11%
During 7 th plan period ……16%
During 8 th plan period ……14%

That the self-supply ratio observed for the current 6th plan period is lower than that in the basic year, is because the calculation is made on an assumption that while population increases, quantity of supplying production remains unchanged.

If this situation is unchanged, the balance, approximately 85% or 250. 0 million meters of textile products will have to be imported annualy somehow. When this quantity is converted into amount with a rate 20NRs/meter, it will amount to as much as 5 billion NRs annually. To solve the above situation, the following measures should be taken.

- Working ratios at existing factories, medium and small-scale enterprises and cottage industries shuld be raised from 48% to at least 80%.
- Expansion of existing factories should be carried out and new facories should be introduced.

Table 23 indicates the results of the farecast made on the basis of the above points, incorporating ongoing 7th 5-year plan as well as the next 8th 5-year plan.

## Table 23 Forecasts of Supply Capacity in coming Decade (by current and projected facilities)

| No. Item \ Project year | Conditions | Unit | Base 1981/82 | At end of 6th 1984/85 | At end of 7th 1989/90 | At end of 8th 1994/95 |
|---|---|---|---|---|---|---|
| 1 Demand forecast | Forecast | 1,000 m | 247,000 | 267,000 | 305,000 | 347,000 |
| 2 Self-supply ratio for supply quantity | Target | % | 12 | 18 | 30 | 50 |
| Self-supply quantity in total supply | 〃 | 1,000 m | 28,900 | 48,060 | 91,500 | 173,750 |
| 3 Forecast of supplyable quantity | Forecase | 〃 | 28,900 | 28,900 | 49,120 | 49,120 |
| 4 Projected supply capacity | Projected | 〃 | — | 300 | 52,800 | 115,500 |
| Breakdown: | Factory scale | 〃 | — | — | (30,000) | (30,000) |
| | Weaving & processing factory | 〃 | — | — | ( 9,600) | (33,600) |
| | Medium & small-sized enterprise | 〃 | — | (300) | (13,200) | (51,900) |
| 5 Forecast of supply capacity | Present project | 〃 | 28,900 | 29,200 | 101,920 | 164,420 |
| Self-supply ratio | Forecast | % | 12 | 11 | 33 | 47 |
| 6 Demand/supply balance (Facilities project) | 〃 | 1,000 m | 218,100 | 237,800 | 203,080 | 183,080 |
| 7 Loom increase plan | Power loom only | set | — | 20 | 2,160 | 3,580 |
| Breakdown: | Factory scale | 〃 | — | — | (900) | — |
| | Weaving & processing factory | 〃 | — | — | (400) | (1,000) |
| | Medium and small-sized enterprise | 〃 | — | (20) | (860) | (2,580) |
| 8 Current looms installed | Current | 〃 | 1,558 | 1,558 | — | — |
| | Factory scale | 〃 | (486) | (486) | — | — |
| | Weaving & processing factory | 〃 | (440) | (440) | — | — |
| | Medium & small-sized enterprise | 〃 | (362) | (362) | — | — |
| | Cottage industry | 〃 | (270) | (270) | — | — |
| 9 Forecast of total No. of Looms | Forecast | 〃 | 1,558 | 1,578 | 3,738 | 7,318 |

Cited from: Analysis by Survey Team

According to Table 23, self-supply ratio (supply quantity/demand quantity) is 33% (target, 30%) at the end of the 7 th plan and 47% (target, 50%) at the end of the 8 th plan. Therefore, if expansion projects should be carried out as per Table 23, target can be attained. However, to attain this goal, effective policies and endeavor in settling problems will be required.

2-4-3 Demand and Supply Balance:

Since supply to textile products in Nepal is absolutely in shortage, transaction is always in seller's market condition. Here, a quantitative analysis by indicating demand/supply balance in graphic presentation is applied to show that reinforcement of production machinery should be definitely required in order to meet demand of textile products.

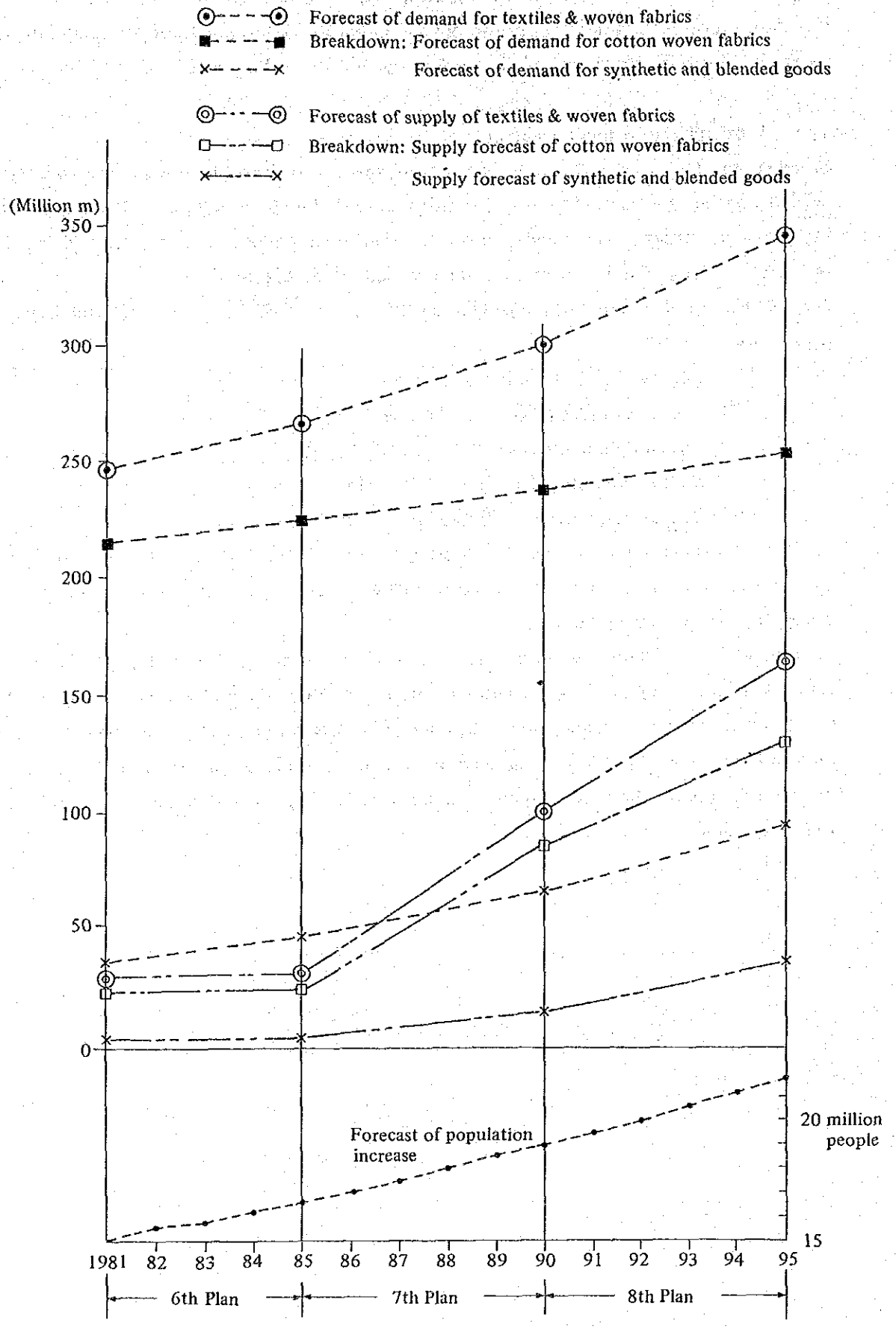
Among various data showing in this chapter, Fig. 5 and 6 indicate the following in graphic presentation.

- Forecast of Population Increase
- Consumption by Kind of Textile
- Consumption by Raw Material of Textile
- Supply Quantity by Kind of Textile
- Supply Quantity by Raw Material of Textile

As it is very clear from the Fig. 5, supply quantity for the next decade is extremely short against demand and its catching-up curve is rising gently, but this gentle up-trend includes many factors of expectation.

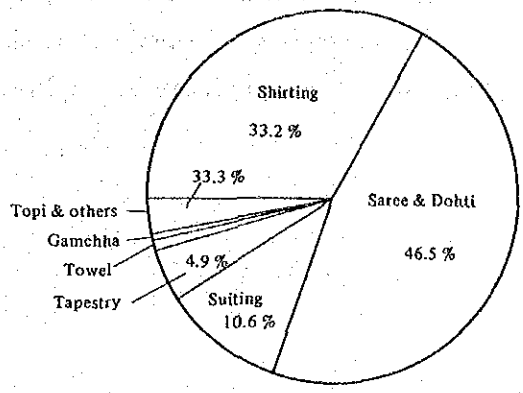
As for the demand, population increase only is taken into the graph, omitting GDP increase ratio of approx. 2.4%, the supply will not catch up to the demand as shown in Fig. 5. With the aforesaid state of demand/supply balance, it is considered that the best measures should be that the new products to be produced by new production machinery through introduction of new projects will be used to replace imports and to improve self-supplying conditions at the same time.

Fig. 5 Graphic Presentation of Demand and Supply Forecasts of Textiles and Woven Fabrics

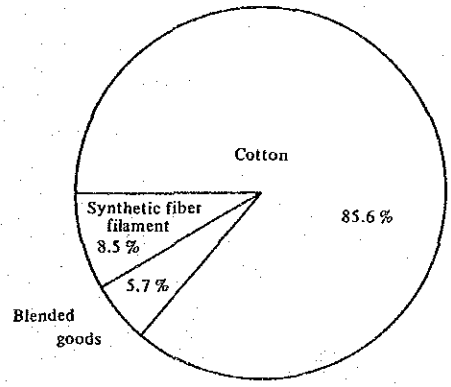


## Fig. 6 Graphic Presentation of Present and Future Demand and Supply (Mass ratios represent by shares in area)

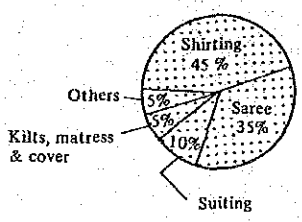
1) Consumption by Kind of Textile (1981/82)



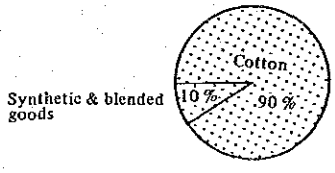

2) Consumption by Raw Material of Textile (1981/82)

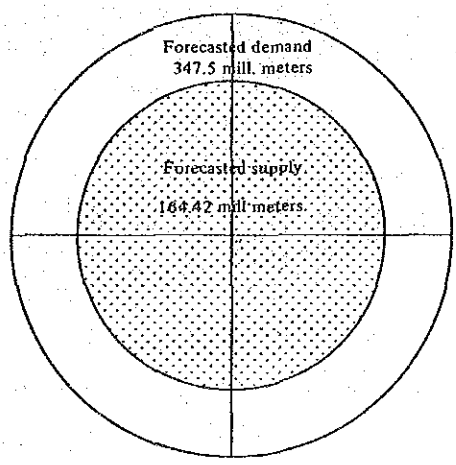



3) Supply Quantity by Kind of Textile (1981/82)




4) Supply Quantity by Raw Material of Textile (1981/82)



## 2–5 Price Structure and Propensity

### 2 – 5 – 1 Analysis of Retail Prices:

In order to analyze elements composing the price as well as its propensity, textile product samples were collected at retail shops in 2-3 districts in Nepal to conduct a survey on their end prices, and analyzed results of sampling informations are shown in Table 24. In addition Table 25 indicates sampling informations produced by the Pre-Sarvey Mission previously.

## Table 24 Sampling Informations collected from Retail Shops and Analysis Table Fabric Samples in Nepal

(as at March, 1986)

| Sample No. | Type of textile | Fabric material (%) | Density Warp (end/in) | Density Weft (picks/in) | Processing | Fabric width (cm) | Unit weight (g/m) | Origin of fabrics | Sampling location | Unit price (retail) (NRs/m) |
|---|---|---|---|---|---|---|---|---|---|---|
| N - 1 | Shirting | P/C 65/35 | 138 | 70 | Bleach | 114 | 126 | Japan | Kathmandu | 60 |
| N - 2 | Shirting | P/C 65/35 | 95 | 84 | Piece dye | 114 | 85 | Japan | 〃 | 90 |
| N - 3 | Shirting | P/C 65/35 | 98 | 66 | Yarn dye | 115 | 100 | Japan | 〃 | 85 |
| N - 4 | Shirting | P/C 65/35 | 113 | 76 | Piece dye | 114 | 120 | Thai | 〃 | 65 |
| N - 5 | Shirting | P/C 65/35 | 115 | 77 | Piece dye | 114 | 120 | China | Nepalgunj | 65 |
| N - 6 | Shirting | R/P 55/45 | 117 | 87 | Piece dye | 111 | 113 | Korea | 〃 | 65 |
| N - 7 | Twill | Polyester 100 | 107 | 88 | Piece dye | 153 | 230 | Korea | 〃 | 110 |
| N - 8 | Suiting | R/P 55/45 | 52 | 53 | Piece dye | 148 | 265 | Japan | 〃 | 125 |
| N - 9 | Suiting-Dobby | Polyester 100 | 80 | 74 | Yarn, piece dye | 154 | 305 | Korea | 〃 | 225 |
| N - 10 | Shirting | R/P 55/45 | 76 | 57 | C-side dy | 115 | 127 | Japan | 〃 | 75 |
| N - 11 | Shirting | Cotton | 94 | 51 | Piece dye | 91 | 100 | India | Kathmandu | 20 |
| N - 12 | Shirting | Cotton | 68 | 102 | Bleach | 113 | 110 | Japan | 〃 | 30 |
| N - 13 | Sheeting | Cotton | 56 | 42 | Piece dye | 98 | 130 | Nepal | 〃 | 14 |
| N - 14 | Sheeting | Cotton | 51 | 56 | Piece dye | 86 | 130 | Nepal | 〃 | 14 |
| N - 15 | Shirting | Cotton | 102 | 56 | Piece dye | 89 | 114 | India | 〃 | 22 |
| N - 16 | Shirting | Cotton | 92 | 47 | Print | 86 | 100 | India | 〃 | 20 |
| N - 17 | Shirting | Cotton | 112 | 53 | Print | 91 | 120 | India | 〃 | 25 |
| N - 18 | Saree | Cotton/gold | 54 | 48 | Print + gold | 86 | 105 | India | 〃 | 25 |
| N - 19 | Saree | Polyester gold | 80 | 60 | Yarn dye + gold | 88 | 45 | India | 〃 | 65 |
| N - 20 | Twill | Cotton | 102 | 40 | Bleach | 90 | 240 | India | 〃 | 80 |

## Table 25 Sampling Informations produced by the Advance Survey Team

Sampling Date: December 16/20, 1985
Location: Napalgunj, Bahirawa, Hetauda and Kathmandu

| Sample No. | Type of fabrics | Fabric material | Dinsity Ends/Inch | | Colour | Fabrics width | Unit weight | | Origin of fabrics | Price, Rs/m** | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Warp | Weft | | cm | g/m² | g/m | | Wholesales | Retail |
| N2301 | Saree | Cotton | 57 | 44 | Print | – | 130 | – | Nepal | – | – |
| N2302 | Sheeting | Cotton | 37 | 24 | Bleached | 98 | 43 | 43 | India | – | 18.0 |
| N2303 | Sheting | Cotton. | 54 | 45 | Bleached | 101 | 125 | 127 | Nepal | – | 15.0 |
| N2304 | Saree | Cotton | 89 | 69 | Print | 112 | 45 | 50 | India | 17.0 | – |
| N2305 | Cholo for women | Cotton | 39 | 32 | Yarn dye | 66.5 | 197 | 131 | Nepal | 10.0 | – |
| N2306 | Suiting | Cotton | 63 | 54 | Plain dye | 134 | 178 | 288 | Nepal | 80.0 | – |
| N2307 | Broad | Cotton | 57 | 43 | Print | – | 134 | – | Nepal | – | – |
| N2308 | Suiting | Cotton | 39 | 32 | Mixed yarn dye | 69.4 | 177 | 123 | Nepal | 10.0 | – |
| N2309 | Shirting | Cotton | 65 | 49 | Blenched | 135 | 42 | 56 | India | – | 15.0 |
| N2310 | Broad | Cotton | 83 | 57 | Print | 100 | 119 | 119 | Nepal | – | – |
| N2311 | Broad | Cotton | 57 | 44 | Print | 100 | 133 | 133 | Nepal | – | – |
| N2312 | Stripe | Cotton | 68 | 49 | Yarn dye | 113.5 | 101 | 114 | Nepal | 9.0** | – |
| N2313 | Twill | Cotton | 82 | 65 | Print | 87 | 144 | 126 | India | – | 35.0 |
| N2314 | Sheeting | Cotton | 40 | 25 | Grey | 83 | 47 | 39 | India | – | 5.0 |
| N2315 | Shirting | Cotton | 70 | 57 | Blenched | 92 | 145 | 133 | China | – | 18.0 |
| N2316 | Shirting | Cotton | 91 | 79 | Plain dye | 87 | 66 | 57 | India | – | 31.6 |
| N2317 | Suiting | PET/textured | 3 | 57 | Yarn dye | 105 | 108 | 113 | Nepal | – | – |
| N2318 | Suiting | PET/textured | 15 | 61 | Yarn dye | 144 | 145 | 209 | Nepal | – | – |
| N2319 | Shirting | PET/textured | 117 | 61 | Mixed yarn dye | 110 | 91 | 100 | Nepal | – | – |
| N2320 | Twill | PET/textured | 114 | 68 | Piece dye | 140 | 147 | 206 | Nepal | – | – |
| N2321 | Jeans | Cotton | 69 | 47 | Plain dye | – | 178 | – | Nepal | – | – |
| N2322 | Suiting | PET/rayon* | 73 | 48 | yarn dye | 138 | 181 | 250 | Nepal | – | – |
| N2323 | Suiting | PET/rayon* | 64 | 45 | Yarn dye | 113 | 183 | 207 | Nepal | – | – |
| Simple Average | | | 70.3 | 50.2 | | 106.4 | 124.3 | 28.7 | | | |

Notes: * Polyester 48% and Rayon 52%
** Ex-factory price in Nepalgunj
*** Exchange rate: Rs = US$ 0.0481 = ¥ = 9.77 on December 15th, 1985

1 ) Retail Price:

The following tabulation was made after conversion to finished width according to results of the above sampling analysis and currenct retail prices:

— Imported Woven Fabrics: Synthetic and Blended Goods (from Japan, Thailand and Republic of Korea)

| Kind | Material | Size (finished) | Finishing | Retail price |
|---|---|---|---|---|
| . Shirting | P/C | 45″ | Bleached | 60 NRs/m |
| . Shirting | P/C | 45″ | Dyed | 65 〃 |
| . Suiting | P/R | 58″ | Dyed | 125 〃 |
| . Suiting, Dobby | P | 60″ | Dyed | 225 〃 |
| . Twill | P | 60″ | Dyed | 125 〃 |

— Imported Woven Fabrics: Cotton Products (from Japan and India)

| | | | | |
|---|---|---|---|---|
| . Shirting | C | 45″ | Bleached | 30 NRs/m |
| . Shirting | C | 45″ | Dyed | 25 〃 |
| . Shirting | C | 45″ | Printed | 32 〃 |
| . Twill | C | 58″ | Bleached | 50 〃 |

— Domestic Woven Fabrics: Cotton Products

| | | | | |
|---|---|---|---|---|
| . Sheeting | C | 45″ | Dyed | 21 〃 |
| . Sheeting | C | 45″ | Dyed | 24 〃 |

Since finished width was in several kinds, prices were adjusted by width conversion accordingly. Among imported goods, not much price differences due to kind of material itself are found in both polyester filament and blended products.

Similarly, prices were not much changed due to finishing processes such as bleaching and dyeing. On the other hand, factors such as quality, width, weight per linear meter and texture are rather affecting the prices much.

Also, prices of imported cotton products are not much affected by kinds of finishing, but rather largely dependent on factors such as where imported from, namely quality and sizes.

2 ) Components of Price:

The retail prices above mentioned are further examined to presume their prime costs as follows.

Taxation systems are fractionized to be applicable in varied rates to materials and countries from which they are imported, however, for convenience, the following tax rates are applied in this study.

— Imported Woven Fabrics: Synthetic and Blended Goods
(from Hong Kong, Republic of Korea and Thailand)

a ) Customs duty 136% of CIF value
b ) Import License fee 40% of (a ×1.36)
c ) Sales tax 20% of (a ×1.36×1.4)
d ) Total ····· Approx. 228% of CIF value
e ) Commission and profit of ····· 20-25% of d) price
wholesalers and retailers
f ) Inland transportation charge ····· Approx. 1 NRs/kg
(from Calcutta to Hetauda)
g ) Insurance premium ····· Approx. 0.25% of CIF value
(from Calcutta to Hetauda)

Cited from : Cottage Industries and Handcraft Emporium,
Hetauda Textile Industries

— Imported Woven Fabrics: Cotton products (from India)

a ) Customs duty 8 % of CIF value
b ) Sales tax 5 % of (a × 1.08 )* 1
c ) Total Approx. 14% of CIF value
d ) Commission and profit of ····· 20−25% of c) price
wholesalers and retailers
e ) Inland transportation charge ····· Appox. 1 NRs/kg
(from Calcutta to Hetauda)
f ) Insurance premium..... Approx. 0.25% of CIF
(for Calcutta - Hetauda)

* 1 — More strict, it is 5 % of (product price + customs duty + 15% profit)

Cited from: The Customs Office

3 ) Presumption of Costs (CIF value, Calcutta):

Referring to above price component, prime costs are estimated from retail prices as below.

— Imported Woven Fabrics: Synthetic and Blended Goods

Unit: NRs/m

| Kind | Material | Size (finished) | Finishing | Retail price | *Cost |
|---|---|---|---|---|---|
| . Shirting | P/C | 45″ | Bleached | 60 | 20.5 |
| . Shirting | P/C | 45″ | Dyed | 65 | 22.2 |
| . Suiting | P/R | 58″ | Dyed | 125 | 43 |
| . Suiting | P | 60″ | Dyed | 225 | 75 |

| | | | | | |
|---|---|---|---|---|---|
| Twill | P | 60″ | Dyed | 125 | 43 |

— Imported Woven Fabrics:Cotton Products

| | | | | | |
|---|---|---|---|---|---|
| . Sheeting | C | 45″ | Bleached | 30 | 19.5 |
| . Sheeting | C | 45″ | Dyed | 25 | 16.3 |
| . Sheeting | C | 45″ | Printed | 32 | 20.8 |
| . Twill | C | 58″ | Bleached | 50 | 32.6 |

— Domestic Woven Fabrics: Cotton Products

| | | | | | |
|---|---|---|---|---|---|
| . Sheeting | C | 45″ | Dyed | 21 | 16.3 |
| . Sheeting | C | 45″ | Dyed | 24 | 18.6 |

*The word cost reperesnts CIF value, Calcutta for imports and exfactory value for domestic products.

From these, it appears that the Government is restricting inflow of synthetic and blended goods by levying on them high import duties and excise taxes and at the same time earning national revenue from these high taxes.

When the above costs are converted with a rate 1US$= 21 NRs, it makes 1-2 US$/m, which is very cheap. Customs duty on imports from Japan is 143% which is higher than 136% indicated as an example in the above. Consequently, the synthetic and blended goods from Japan will be levied approximately 240% taxes of CIF value in all.

Further, import taxes applicable to cotton woven fabrics are set comparatively at low rates to such an extent that imports can compete against the domestic, and further reduced import tariff has been preferentially allowed to imports from India.

2 — 5 — 2 Cost Analysis for Existing Factories:

1 ) Ex-factory Price by Kind of Fabrics:

The following is prime cost analysis conducted in accordance with the data obtained from existing factories.

## Table 26 Ex-Factory Prices of Cotton Products by Kind at Existing Factories

| No. | Kind | Brand | Yarn number count x width | Ex-factory price (NRs/m) | Sales tax (NRs/m) |
|---|---|---|---|---|---|
| 1 | Sheeting | Grey – plain | $\frac{18'S \times 18'S}{- \times -} \times 39"$ | 8.25 | 0.06 |
| 2 | " | " – " | $\frac{18'S \times 18'S}{48 \times 44} \times 46"$ | 9.30 | 0.07 |
| 3 | " | " – " | $\frac{18'S \times 18'S}{- \times -} \times 51"$ | 11.50 | 0.09 |
| 4 | Twill | Grey – Twill | $\frac{18'S \times 18'S}{88 \times 60} \times 40"$ | 14.00 | 0.11 |
| 5 | Sheeting | Bleach – plain | $\frac{18'S \times 18'S}{- \times -} \times 36"$ | 9.65 | 0.07 |
| 6 | " | " – " | $\frac{18'S \times 18'S}{48 \times 44} \times 42"$ | 10.70 | 0.08 |
| 7 | Twill | Bleach – Twill | $\frac{18'S \times 18'S}{88 \times 60} \times 36"$ | 15.55 | 0.12 |
| 8 | " | Dye – Plain | $\frac{18'S \times 18'S}{- \times -} \times 36"$ | 10.25 | 0.08 |
| 9 | " | " – " | $\frac{18'S \times 18'S}{48 \times 44} \times 42"$ | 11.50 | 0.09 |
| 10 | Twill | Dye – Twill | $\frac{18'S \times 18'S}{88 \times 60} \times 36"$ | 16.80 | 0.13 |
| 11 | Shirting | Print – Plain | $\frac{18'S \times 18'S}{- \times -} \times 36"$ | 11.30 | 0.08 |
| 12 | " | " – " | $\frac{18'S \times 18'S}{48 \times 44} \times 42"$ | 12.60 | 0.09 |
| 13 | " | Print – Twill | $\frac{18'S \times 18'S}{88 \times 60} \times 36"$ | 24.00 | 0.18 |
| 14 | " | Grey – Plain | $\frac{30'S \times 30'S}{- \times -} \times 42"$ | 9.40 | 0.07 |
| 15 | " | " – " | $\frac{30'S \times 30'S}{68 \times 60} \times 48"$ | 10.10 | 0.08 |
| 16 | " | Bleach – Plain | $\frac{30'S \times 30'S}{68 \times 60} \times 36"$ | 10.40 | 0.08 |
| 17 | " | " – " | $\frac{30'S \times 30'S}{68 \times 60} \times 42"$ | 11.50 | 0.09 |
| 18 | " | Dye – Plain | $\frac{30'S \times 30'S}{- \times -} \times 36"$ | 11.40 | 0.09 |
| 19 | " | " – " | $\frac{30'S \times 30'S}{68 \times 60} \times 42"$ | 12.40 | 0.09 |
| 20 | " | Print – Plain | $\frac{30'S \times 30'S}{- \times -} \times 36"$ | 12.40 | 0.09 |
| 21 | " | " – " | $\frac{30'S \times 30'S}{68 \times 60} \times 42"$ | 13.75 | 0.10 |
| 22 | Yarn | Yarn – Grey | 10'S | 14.2/Lb. | 0.11/Lb. |

Cited from: Data obtained from existing factories. (1985/86)

As for the sales tax, a rate of 0.25% obtained from the existing factories was used in the calculation.

2) Analysis of Production Cost at Existing Factories:

Table 27, 28 and 29 indicate analyzed production costs of brands under Nos. 2, 4, 15 and 22 in the Table 26.

a) Spinning:

**Table 27 Analysis of Spinning Production Cost**

Unit : NRs/kg

| Item \ Yarn Count | Spun yarn number count | | | | | |
|---|---|---|---|---|---|---|
| | 10'S | % | 18'S | % | 30'S | % |
| Material cost | 27.05 | 76.0 | 31.59 | 74.4 | 31.11 | 65.8 |
| Labor cost | 1.88 | 5.3 | 2.39 | 5.6 | 3.57 | 7.5 |
| Submaterial cost | 0.02 | 0.1 | 0.03 | 0.1 | 0.05 | 0.1 |
| Utility cost | 0.84 | 2.4 | 1.07 | 2.5 | 1.60 | 3.4 |
| Maintenance cost | 0.63 | 1.8 | 0.80 | 1.7 | 1.19 | 2.5 |
| Depreciation cost | 2.66 | 7.5 | 3.38 | 8.0 | 5.04 | 10.6 |
| Administrative cost and others | 2.53 | 7.1 | 3.20 | 7.5 | 4.78 | 10.1 |
| Total | 35.61 | 100 | 42.46 | 100 | 47.34 | 100 |

Cited from: Data obtained from existing factories (1985/86)

b) Weaving

**Table 28 Analysis of Weaving Cost**

Unit: NRs/m

| Item \ Kind & texture | Sheeting $\frac{18'S \times 18'S}{48 \times 44} \times 46''$ | % | Shirting $\frac{30'S \times 30S}{68 \times 44} \times 48''$ | % | Twill $\frac{18'S \times 18'S}{88 \times 60} \times 40''$ | % |
|---|---|---|---|---|---|---|
| Material cost | 6.28 | 69.8 | 6.28 | 62.8 | 9.14 | 71.1 |
| Labor cost | 0.73 | 8.1 | 0.99 | 9.9 | 0.99 | 7.7 |
| Submaterial cost | 0.07 | 0.8 | 0.10 | 1.0 | 0.10 | 0.8 |
| Utility cost | 0.60 | 6.7 | 0.81 | 8.1 | 0.81 | 6.3 |
| Maintenance cost | 0.21 | 2.3 | 0.29 | 2.9 | 0.29 | 2.3 |
| Depreciation cost | 0.21 | 2.3 | 0.28 | 2.8 | 0.28 | 2.4 |
| Administrative cost & others | 0.90 | 10.0 | 1.25 | 12.5 | 1.24 | 9.6 |
| Total | 9.00 | 100 | 10.00 | 100 | 12.85 | 100 |

Cited from: Data obtained from existing factories (1985/86)

c) Dyeing and Finishing:

## Table 29 Production Cost Analysis by Dyeing Process

Unit: NRs/m

| Kind / Item (Dyeing process) | 30'S x 30'S (30'S shirting) 68 x 60 x 48" (42"finish) | | | | | |
|---|---|---|---|---|---|---|
| | Bleaching | % | Dyeing | % | Printing | % |
| Grey cloth cost | 10.00 | 86 | 10.00 | 77.2 | 10.00 | 61.5 |
| Labor cost | 0.08 | 5.0 | 0.16 | 5.4 | 1.11 | 17.7 |
| Submaterial cost | 0.27 | 66.8 | 0.74 | 25.1 | 0.68 | 10.8 |
| Dyestuff | – | – | (0.32) | (10.8) | (0.20) | (3.2) |
| Chemicals | (0.18) | (11.2) | (0.33) | (11.2) | (0.39) | (6.2) |
| Packing | (0.09) | (5.6) | (0.09) | (3.1) | (0.09) | (1.4) |
| Utility cost | 0.76 | 47.2 | 1.5 | 50.9 | 1.92 | 30.6 |
| Electricity | (0.03) | (1.9) | (0.07) | (2.4) | (0.49) | (7.8) |
| Fuel | (0.66) | (41.0) | (1.36) | (46.1) | (1.36) | (21.7) |
| Gas | (0.07) | (4.3) | (0.07) | (2.4) | (0.07) | (1.1) |
| Water | – | – | – | – | – | – |
| Maintenance cost | 0.01 | 0.6 | 0.07 | 2.4 | 0.07 | 1.6 |
| Depreciation cost | 0.05 | 3.1 | 0.10 | 3.4 | 0.10 | 1.1 |
| Administrative cost & Others | 0.44 | 27.3 | 0.38 | 12.9 | 2.38 | 38.0 |
| Sub-total for dyeing processes | 1.61 | 100 | 2.95 | 100 | 6.26 | 100 |
| Total | 11.61 | 100 | 12.95 | 100 | 16.26 | 100 |

d) Totalization of Production Costs by Production Process:

Table 30 indicates a summary of the calculation of production costs by each process from raw materials to spinning, weaving and dyeing/finishing processes.

## Table 30 Production Costs by Process, Kind and Finishing

Unit: NRs/m

| Kind / Process | Sheeting 18'S x 18'S / 48 x 44 x 46" | % | Shirting Shirting 30'S x 30'S / 68 x 60 x 48" | % | Twill Twill 18'S x 18'S / 88 x 60 x 40" | % |
|---|---|---|---|---|---|---|
| *Material cost* | 4.67 | (B) 44<br>*(D) 38*<br>(P) 30 | *4.13* | (B) 36<br>*(D) 32*<br>(P) 25 | 6.80 | (B) 47<br>*(D) 43*<br>(P) 33 |
| Spinning cost | 1.61 | (B) 15<br>(D) 13<br>(P) 11 | 2.15 | (B) 19<br>(D) 17<br>(P) 13 | 2.34 | (B) 16<br>(D) 15<br>(P) 11 |
| Weaving cost | 2.72 | (B) 26<br>(D) 22<br>(P) 18 | 3.72 | (B) 32<br>(D) 29<br>(P) 23 | 3.71 | (B) 26<br>(D) 24<br>(P) 18 |
| Dyeing costs | | | | | | |
| Bleaching finish | (B) 1.62 | (B) 15 | 1.61 | (B) 13 | 1.64 | (B) 11 |
| Dyeing finish | (D) 3.23 | (D) 27 | 2.95 | (D) 22 | 2.91 | (D) 18 |
| Printing finish | (P) 6.34 | (P) 41 | 6.26 | (P) 39 | 7.97 | (P) 38 |
| Total Production Cost: | | | | | | |
| Bleached product | 10.62 | 100 | 11.61 | 100 | 14.49 | 100 |
| Dyed product | 12.23 | 100 | 12.95 | 100 | 15.76 | 100 |
| Printed product | 15.34 | 100 | 16.29 | 100 | 20.82 | 100 |

Cited from: Data obtained from existing factories, (1985/86)

When a dyed product of 30's shirting of 48″ width (42″ finish) is picked up from the above, as a representative kind to examine its competitive power of costs, it is observed as follows:

Total Production Cost (factory cost)

| | | | | |
|---|---|---|---|---|
| as shown in Table 30 ····· | 12. 95 | (NRs/m) | ····· | 100 (%) |
| Breakdown: Material cost ····· | 4. 13 | 〃 | ····· | 32 〃 |
| Spinning process cost ····· | 2. 15 | 〃 | ····· | 27 〃 |
| Weaving process cost ····· | 3. 72 | 〃 | ····· | 19 〃 |
| Dyeing and finishing process cost ····· | 2. 95 | 〃 | ····· | 22 〃 |

Namely, the cost of raw cotton shares approximately 1/3 of the total production cost, followed by 2/3 of other processing costs. Adversely, those countries importing raw cotton share usually approximately 2/3 for material cost. The production cost is largely influenced by the material cost level, therefore, if domestic raw cotton, which must be cheap, is used as much as possible, domestic products of Nepal would become more advantageous in respect of their competitive power.

2 — 5 — 3 Production Cost Comparison with Factories in Medium-developed Countries and Japan:

In order to compare production cost of existing factories in Nepal with others, factories operating in the similar structures, producing short fiber woven fabrics are selected among those in midium developed countries and Japan.

The factories picked up from the midium developed countries are joint enterprises with those of develpoed contries which are in operation in Southeast Asian or Middle American Countries.

Therefore, presumably there will be a considerable difference between production cost at these factories and that at other factories of purely local managements.

- Of the data showing in Table 31, those for Nepal and Japan represent data in 1986, and others for medium-developed countries are data for 1981.
  Dollar exchange rated were set at 1US$=¥176. and 1US$=21.0NRs.
- In the data of Nepal, a conversion ratio of 0. 944 was used to convert those of 30'S yarn counts into 40'S.
- Production cost in each country varies depending on years when data collected and what kind of conversion rates applied, and consequently, the comparison has become not so accurate, although it serves as a guideline.

1 ) Spinning Process:

**Table 31-1 Production Cost Comparison with Textile Factories in Medium-developed Countries and Japan - Based on Card Yarn 40'S Cotton Yarn**

Unit: US$/bale

| Country/factory / Item | Indonesia | % | Middle-american | % | Thailand | % | Japan | % | Nepal | % |
|---|---|---|---|---|---|---|---|---|---|---|
| Labor cost | 24.87 | 16.4 | 43.9 | 28.5 | 31.45 | 22.8 | 159.1 | 50.0 | 32.5 | 22.0 |
| Submaterial cost | 14.23 | 11.1 | 14.6 | 9.5 | 0.09 | 0.1 | 22.7 | 7.1 | 0.46 | 0.3 |
| Utility cost | 29.06 | 22.8 | 22.9 | 14.8 | 41.69 | 30.2 | 39.8 | 12.5 | 14.6 | 9.9 |
| Electricity | (22.19) | – | (19.0) | – | – | – | – | – | – | – |
| Fuel | (6.87) | – | (33.9) | – | – | – | – | – | – | – |
| Maintenance cost | 7.36 | 5.8 | 10.6 | 6.9 | 11.80 | 8.5 | 31.8 | 10.0 | 10.9 | 7.4 |
| Depreciation cost | 22.66 | 17.8 | 17.8 | 11.5 | 12.80 | 9.3 | 22.7 | 7.1 | 46.0 | 31.0 |
| Administrative cost and others | 32.87 | 25.9 | 44.5 | 28.8 | 40.40 | 29.1 | 42.0 | 13.3 | 43.6 | 29.4 |
| Spinning cost | 127.05 | 100 | 154.3 | 100 | 138.23 | 100 | 318.1 | 100 | 148.06 | 100 |

Cited from: Information obtained from existing mergered factories in medium-developed countries (as at 1981 and 1986)

2 ) Weaving Process:

Kind of converted grey cloth for Indonesia, Middle-American countries and Thailand

Cotton combed yarn, 40's Shirting

$$\frac{40'S \times 40'S}{133 \times 71} \times 38''$$

--do-for Nepal and Japan·····Cotton combered yarn 30'S Shirting

$$\frac{30'S \times 30'S}{68 \times 60} \times 48''$$

**Table 31-2 Production Cost Comparison with Textile Factories in Medium-developed Countries and Japan - Based on Card Yarn 40'S Cotton Yarn**

Unit: US$/1,000m

| Country/factory / Item | Indonesia | % | Middle-american | % | Thailand | % | Japan | % | Nepal | % |
|---|---|---|---|---|---|---|---|---|---|---|
| Labor cost | 53.17 | 27.3 | 65.7 | 33.7 | 38.44 | 25.5 | 201.5 | 66.4 | 47.0 | 26.5 |
| Submaterial cost | 28.97 | 14.9 | 20.1 | 10.3 | 33.6 | 15.6 | 15.9 | 5.2 | 4.8 | 2.8 |
| Utility cost | 17.31 | 8.9 | 9.4 | 4.8 | 27.51 | 18.2 | 54.9 | 18.1 | 38.6 | 21.8 |
| Maintenance cost | 17.79 | 9.2 | 29.9 | 15.3 | 30.02 | 19.9 | 31.3 | 10.3 | 13.8 | 7.8 |
| Depreciation cost | 28.91 | 14.9 | 7.4 | 3.8 | 7.64 | 5.0 | – | – | 13.3 | 7.5 |
| Administrative cost and others | 48.27 | 24.8 | 62.4 | 32.1 | 23.82 | 15.8 | – | – | 59.5 | 33.6 |
| Weaving cost | 194.42 | 100 | 194.9 | 100 | 151.03 | 100 | 303.6 | 100 | 177.1 | 100 |

Cited from: Information obtained from existing mergered factories in medium-developed countries (as at 1981 and 1986)

3 ) Dyeing and Finishing Process:

In the case of examining dyeing and finishing process, conversion and comparison of the production cost by setting standard kind and finishing method involve many fluctuating factors and practicably it is very difficult. Therefore, Table 31-3 below shows the average production cost for all factories operating bleaching, dyeing or partialy print finishing of short fibers and cotton/synthetic blended products. Thus, only percentages in each item of this Table shall be referred to in case that comparison is made. In the Table, data for Nepal are as at 1986 and other countries are as at 1981.

Table 31-3 Production Cost Comparison with Textile Factories in Medium-developed Countries and Japan - Based on Card Yarn 40'S Cotton Yarn

Unit: US$/1,000m

| Country/factory / Item | Indonesia | % | Middle-american | % | Thailand | % | Japan | % | Nepal | % |
|---|---|---|---|---|---|---|---|---|---|---|
| Labor cost | 23.6 | 15.7 | 39.4 | 16.22 | 68.5 | 32.0 | 92.3 | 26.9 | 7.5 | 5.4 |
| Submaterial cost | 57.4 | 25.4 | 80.2 | 33.0 | 71.3 | 33.3 | 103.6 | 30.2 | 35.2 | 25.1 |
| Utility cost | 30.9 | 15.3 | 25.3 | 10.4 | 27.8 | 13 | 57.6 | 16.8 | 71.5 | 50.9 |
| Electricity | (3.0) | (1.5) | (5.1) | (2.1) | (6.5) | (3.1) | (11.7) | (3.4) | (3.4) | (2.4) |
| Fuel | (21.4) | (10.6) | (15:6) | (6.4) | (5.4) | (2.5) | (38.4) | (11.2) | (64.7) | (46.1) |
| Gas | (3.8) | (1.9) | (4.1) | (1.7) | (15.0) | (7.0) | (4.8) | (1.4) | (3.4) | (2.4) |
| Water | (2.7) | (1.3) | (0.5) | (0.2) | (0.9) | (0.4) | (2.7) | (0.8) | – | – |
| Maintenance cost | 11.3 | 5.6 | 8.7 | 3.6 | 7.5 | 3.5 | 9.3 | 2.7 | 3.4 | 2.4 |
| Depreciation cost | 32.3 | 16.0 | 29.2 | 12.0 | 20.1 | 8.4 | 18.9 | 5.5 | 4.8 | 3.4 |
| Administrative cost and others | 46.5 | 23.0 | 60.2 | 24.8 | 18.8 | 9.8 | 61.3 | 17.9 | 18.1 | 12.9 |
| Dyeing & finishing cost | 202.0 | 100 | 243.0 | 100 | 214.0 | 100 | 343.0 | 100 | 140.5 | 100 |

Cited from: Information obtained from existing mergered factories in medium-developed countries

## 2–6 Production Planning

### 2 – 6 – 1 Product Determination and Scale of Production:

1 ) Product Determination and Participation Possibility:

a ) Napal has published her industrialization strategies for 5 fundamental industrial fields to be achieved in the next decade. They are:

- Development of food industries
- Development of clothing and textile industries
- Improvement in housing condition and construction of houses
- Improvement in education and expansion of its facilities
- Improvement in medical cares and their facilities

The plans have been gradually put into effect under the succesive 5-year plan as

below.

- Completion stage of the 6th 5-year plan (1981-1985 period)
- Implementation stage of 7th 5-year plan (1986-1990)
- Planning stage of 8th 5-year plan (1991-1995)

In line with the above strategies, development of the textile industries has also been planned, executed and promoted.

This F/S Survey is understood to have also been included in the 7th 5-year plan forming a part thereof. Therefore, this survey is very important and will be promoted with a high priority. Its aim is to reduce textile imports (amounting to approximately 85% of the total demand), to produce substitutes in Nepal to cover domestic demand with domestic products, to prevent drain of foreign currencies from Nepal, and to contribute to increase in employments and to improvements in productivity of the nation. Further, by using domestic seed cotton as much as possible, production of the seed cotton in Nepal will be stimulatated to make the cotton cultivation active.

At the same time, this project must be such that can suffice the nation's rational concept and liking toward clothing.

For the purpose of realizing these aims practicably, new products should be produced at the newly established textile mill, for the sake of avoiding competition with products of existing textile mills and of being able to substitute for imported textile goods. In this sence and from overall points of view, the best option to be taken at the present moment is to produce cotton/synthetic blended fabrics.

b ) There is a question on whether the new factory is planned to be an integrated textile mill, having spinning, weaving, and processing process or to be a spinning mill only.

At present and also in future forecast as well, cotton/synthetic fiber blended yarn is falling short of demand in Nepal and these yarns are to be used in existing factories, as well as in new medium and small-scale weaving cloth factories. And there are 2 spinning factories planned for establishment under the 7th plan.

By the following two reasons, it is reconmmended that the new mill planned under this Report is to be established as an integrated textile mill, having spinning, weaving, dyeing and finishing processes.

- To avoid competition with the 2 spinning factories planned under the 7 th development plan.
- It is generally understood that superiority in respect of the cost and quality, which are decisive control factors of a factory is achived by only integrated textile mill. No originality is also expected if yarns are only produced for supply to other factories.

Under the condition where almost all items except lint cotton and labour have to be imported, adoption of as far as rational structure of production, namely an integrated

process of production is to be preferable.

c ) The only survey conducted in 1982 revealed that textile demand in Nepal was approximately 247.0 million meters, against which supply capacity of the domestic facilities was approx. 60.5 million meters or 25% of the total demand on the basis of designed capacity of all available facilities of new and old types. When calculated in terms of the actual output, it is only about 29.0 million meters or 12% of the total demand. Therefore, the balance 218.0 million meters are actually being imported somehow from foreign countries, mainly India.

The project aims to decrease this import level as much as possible to be replaced by domestic substitutes to raise self-supply ratio, and further to make the domestic substitutes competitive to such an extent that they could be exported if possible to acquire foreign currencies. In this respect, it can be said through the market survey, that there is of course participation possibility if higher quality and lower cost of products are achived. Namely, it is considered that it would be able to well compete aganist imports from India and other countries and of course to participate in the market in Nepal without competing with domestic products of existing enterprises, if we can combine raw cotton, which is thought to be supplied amply in Nepal, and labour force, as well as modern facilities, production technologies and control techniques altogether.

d ) Further, the garment industry in Nepal, which has developed rapidly in these 2 - 3 years, is now introducing from India sewing machine facilities, cotton fabrics materials, submaterials, technologies and in some cases even funds and is exporting garment products to U. S. A. after processing in Nepal by adding to the above labour forces, working place and some energies.

This industry has grown to such an extend that its export amounts are expected to reach to NRs 800 millions by end of 1986, however, as will be stated later, a quota system was applied with U. S. A. from 1986, by which export in excess of the prescribed amount was made impossible in respect of designated cotton products. Therefore, garment manufactureres are now planning to convert themselves to sew synthetic or blended fabrics, on which the quota system has not yet been applied for their exports.

Since the market is in such a situation, it appears that garment manufacturers, if they could procure synthetic and blended goods in Nepal, would immediately change their using material to expand their exports of garment products. Therefore, it could be said that the synthetic and blended goods would have latent possibility of being exported to foreign countries through the garment industry in Nepal, in addition to its supply of products to markets in general.

e ) Textile products considered to be possible for participation in the market according to results of this market survey require the following elements to be examined:

- To use domestic-raised seed cotton as much as possible to promote the seed cotton cultivation which is one of promotive industries in Nepal.
- Cotton-directional policy of Nepal and the nation's fasion propensity and liking toward clothing are both considered to be satisfied by producing polyester fiber/cotton blended goods which have been a world trend for several decades.
- Furthermore, the synthetic fiber ratio restriction policy (ratio between cotton and synthetic fiber···80/20 to 70/30) of Nepal for textile products should be adhered to as far as possible.
- International price of the polyester fiber has become almost same with that of seed cotton and sometimes rather cheaper. Taking this advantage, kinds of the product are to be examined in consideration of the material's durability and wash-and-wear merits, as well as climate, natural features and customs of Nepal.
- Specification and processing particulars of the product are to be determined in consideration of productivity and control aspects in a factory in addition to its marketability.
- The products should be those contributing to as wide range of market as possible (from Terai region to mountainous region, from upper class of the society to working class and from gentlemen to ladies, etc.) and even such as leading to improvements in living pattern of the nation.
- The products should also be those salable also to the garment industry, which is a latent market, through conforming to their requirement in respect of the quality and specification, etc.

2 ) Scale of Production and Production Facilities

a ) Since supply shortage is currently as much as 220 million meters annualy, as large as possible production scale should be preferable for the new factory to be planned. However, on the other hand, the production scale should be economical in consideration of restrictions from other related aspects (infrastructure, electricity, water and technology etc.)

b ) Provision of yarn dyeing and printing facilities is considered to be too early at initiating stage of an integrated textile mill.

c ) Facilities to be installed should be those of the most modern type to harmonize with local conditions, and that with high performances, easy operation and maintenance, and better durability.

d ) Facilities to be installed should have capability of giving variations to plain cloth and of weaving dobbies to meet fasion in future.

e ) To enable supplies to the garment industry, the facilities should be designed in accordance with specified cloth width and shipping pattern.

f ) The facilities should be capable of dyeing from dark to light colours to acquire marketability and that of finishing high class products.

After an overall examination of the above aspects, we consider that the following product mix and production scale should be employed to the new project.

**Table 32 Product Mix and Production Scale of the Project**

Unit : 1,000 meters/year

| No. | Item | Weaving | Texture | Dyeing & finishing | Output |
|---|---|---|---|---|---|
| 1 | Shirting | Dobby | $\frac{45'S \times 45'S}{100 \times 76} \times 45''$ | Bleaching, Dyeing and Resin finishing | 2,560 |
| | | Plain | $\frac{45'S \times 45'S}{100 \times 62} \times 45''$ | 〃 | 2,740 |
| 2 | Suiting | Plain or dobby | $\frac{30'S \times 30'S}{100 \times 62} \times 58''$ | 〃 | 2,620 |
| 3 | Twill | Twill | $\frac{30'S \times 30'S}{118 \times 68} \times 58''$ | 〃 | 2,380 |
| Total | | | | | 10,300 |

Numbers of working day and hour in a year, as well as operating system are planned as follows:

- Numbers of working day in a year ····· 330 days
- Numbers of working hour in a year·····7, 920 hours (330×24)
- Operating system ··· Spinning, weaving ····· 3 shifts by 4 groupes and utility
  Dyeing/finishing····· 1 to 3 shifts

## 2–7 Distribution and Current Sale Condition of Textiles and Other Commodities :

Nepal is in a social regime of Monarchism, however, in her general society and enterprises, a capitalistic free economy system has been adopted to some extent, where managemental system are diversified into various forms such as state-run, publicly run, privately run and semi-governmentally run.

Also, enterprises concering textiles are classified as follows:

—Enterprises with a scale of a factory

Founded by aid or debt from foreign countries and governmental fund ·····State and publicly Run

Governmental and private fund·····Semi-govermental management

Private fund ·····private management

—Medium and Small-scale Enterprises

With governmental and private funds·····Semi-governmental management

Private funds ·····private management

—Cottage Industries

With private fund and governmental aid fund ·····Private management

Therefore, sale and distribution conditions vary, depending on which one of the above managemental pattern is adopted, accordigly.

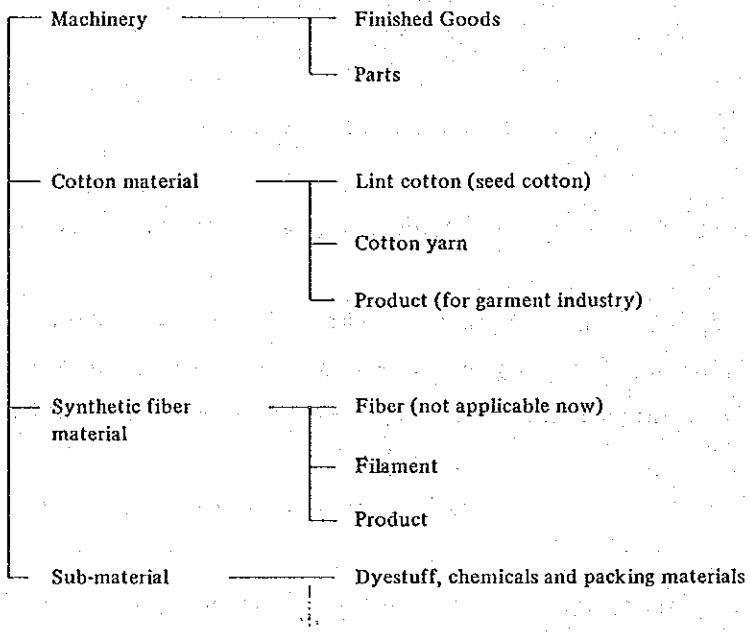
2 — 7 — 1 Distribution Mechanism of Commodities:

1 ) Items of Purchasing and Procurement by enterprises:

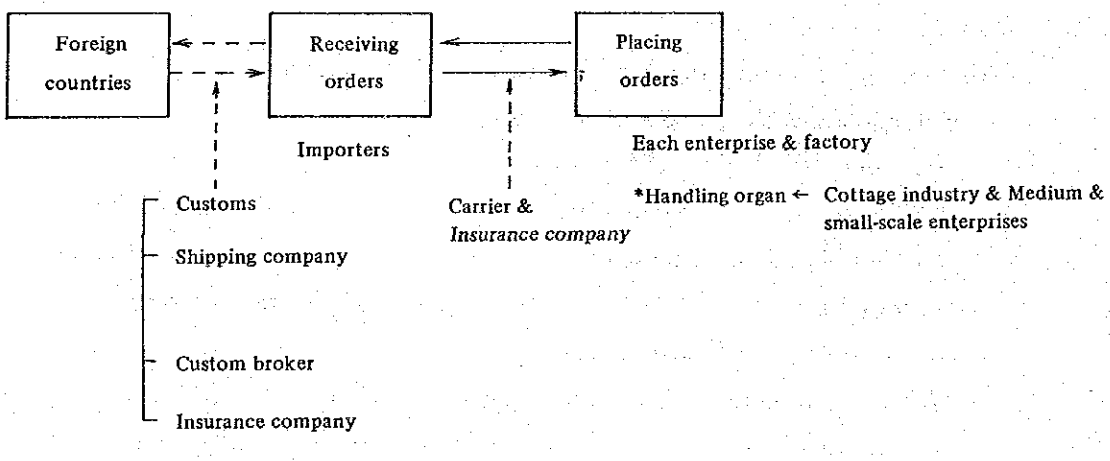
First of all, every enterprise or factory is required for his production of textile products to purchase and procure equipments, raw materials and sub-marerials ranged from imported articles to domestic supplies, which are classified as follows.

a ) Imported Articles:

— Classification:




— Handling Mechanism:




* CIHE (Cottage Industries Handcraft Emporium)

— Import Procedures:

Imports are cleared through customs against the following taxes, comissions and expenses before they are brough into Nepal.

- Customs duty and import license fee
- Customs clearance charges
- Excise tax
- Sales tax
- Inland transportation charge
- Insurance premium

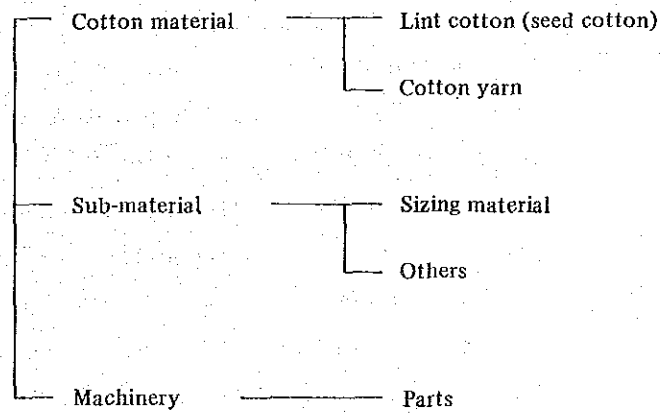
Rules and tariffs of these taxes and expenses are minutely varied according to applicable commodities. Since, almost all imports to Nepal are unloaded and cleared at Calcutta port, time lapse required for port and custom clearance and inland transportation is posing such problem as hindering economical development in Nepal. For instance, it takes sometimes 4-6 months for port handling, inland transportation and custom clearance before delivery to the requred place in Nepal.

— Major Customs Clearance Points in Nepal

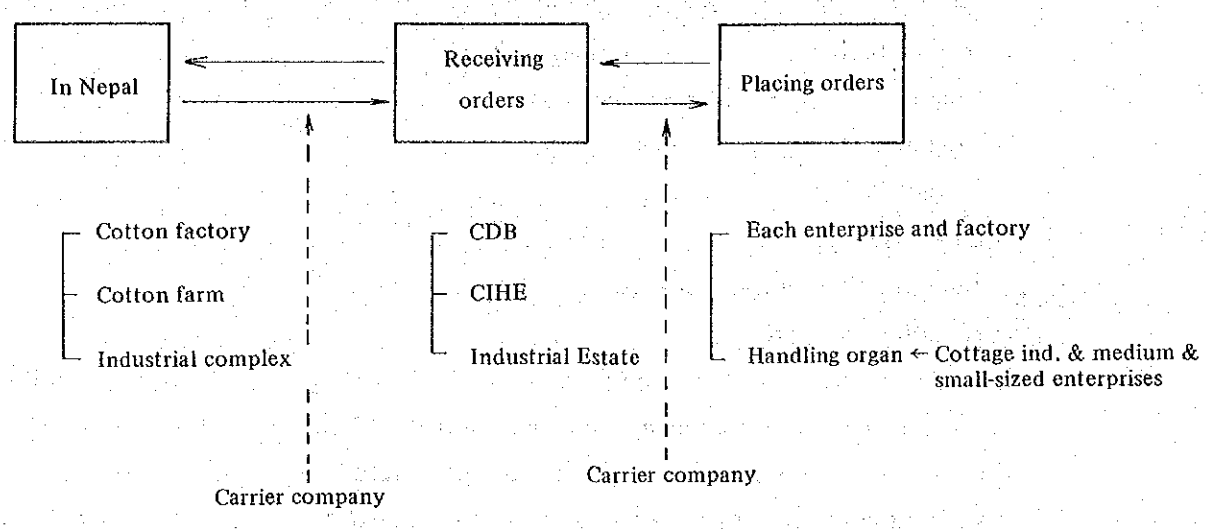
- For Eastern region ..... Biratnagar
- For Central region ..... Birganj
- For Western region ..... Bhairahawa and Kapilbastu
- For Middle-western region ..... Nepalgunj

b ) Domestic Items:

— Classification:



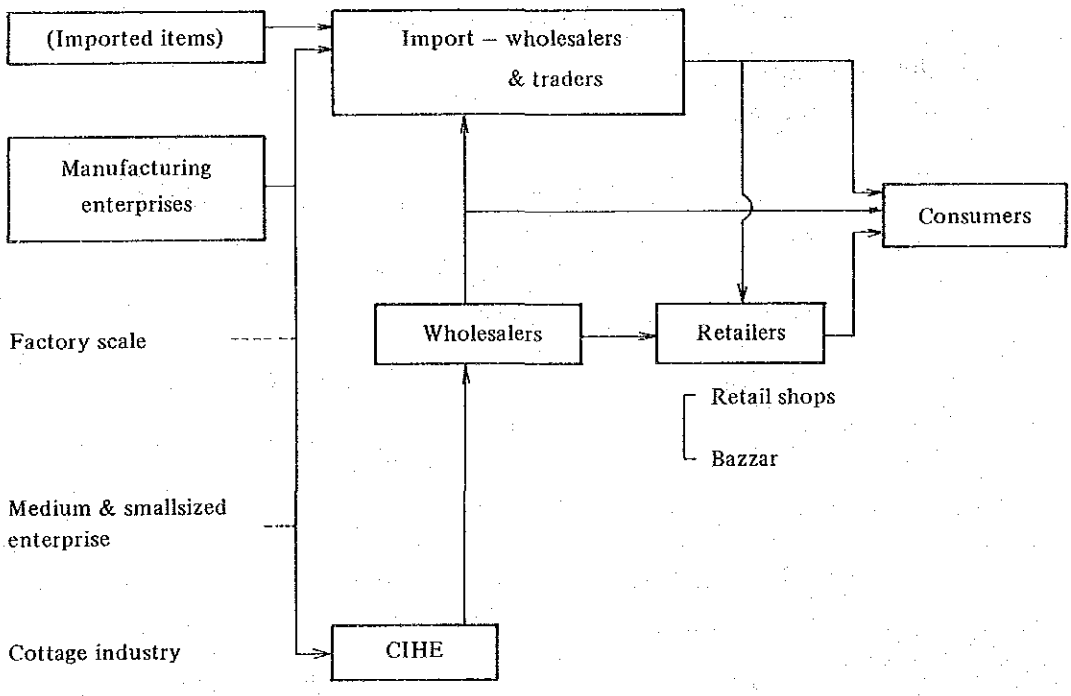
– Handling Mechanism:




2 ) Products sale by Enterprise:

a ) Distribution Mechanism

Products manufactured at various enterprises and factories in Nepal are distributed to consumers through the following mechanism:




b ) Scales of Wholesalers and Retailers:

There is a governmental organ called CIHE (Cottage Industries Handcraft Emporium) which assists medium and small-scale enterprises and cottage industries in purchasing

and procuring materials, and further handles their products for sale. In addition, there are comparatively larger scale private wholesalers who deal with import business as well as wholesales of domenstic products. They also sell wholesale products to other wholesalers in cities and local areas. These larger wholesalers include also foreign traders and their total numbers are assumed to be tens of them. Except some minor portion sold directly to consumers, majority of products are distributed generally from these wholesalers to retailers. There are various scales of these retailers including a large one having a 5-8 meters width shop with a 30-50㎡ sales space hiring 5-6 attendants and a smaller one having only about 5-6 ㎡ sale space with products displayed by hangers, Nothing of such large scale shops as department store in foreign countries is not seen there.

There sre also bazzars in local cities and towns, where retail shops of textile goods, sundries and foods etc. are accommodated, numbers of which amount to hundreds in such larger local city as Nepalgunj, however, small towns as Lamahi have much less shops and naturally kinds and quantities available are limited.

c ) Selling Form of Products:

Almost all products delivered from various enterprises and factories are in doubling & lapping style with paper or jute cloth and fastened by nylon bands or hemp codes. Imported products are in tube winding style, which are either sold as they are at shops or are sold rewinded in doubling & lapping style. These are sold by retailers by meter. Consumers are either to sew them by themselves, or to order for sewing to such sewers as operating with a sewing machine at a shop or on the street.

There are also some sewers in cities who operate with several treadle sewing machines in a full-scale cottage garment industry form.

d ) Procurement of Raw Materials, Distribution of Products

Soon after commencent of the operation of the new mill, following the completion of the project, it will be necessary to examine and establish concrete plans on both procurement of raw materials and distribution of products. It is recommended such procurement and distribution system to be as simple as possible. It is also recommended procurement of raw cotton shall be made from CDB directly and polyester fibers from import dealer, both on condition of delivery on arrival basis, which will avoid risks in connection with marine and land transportation.

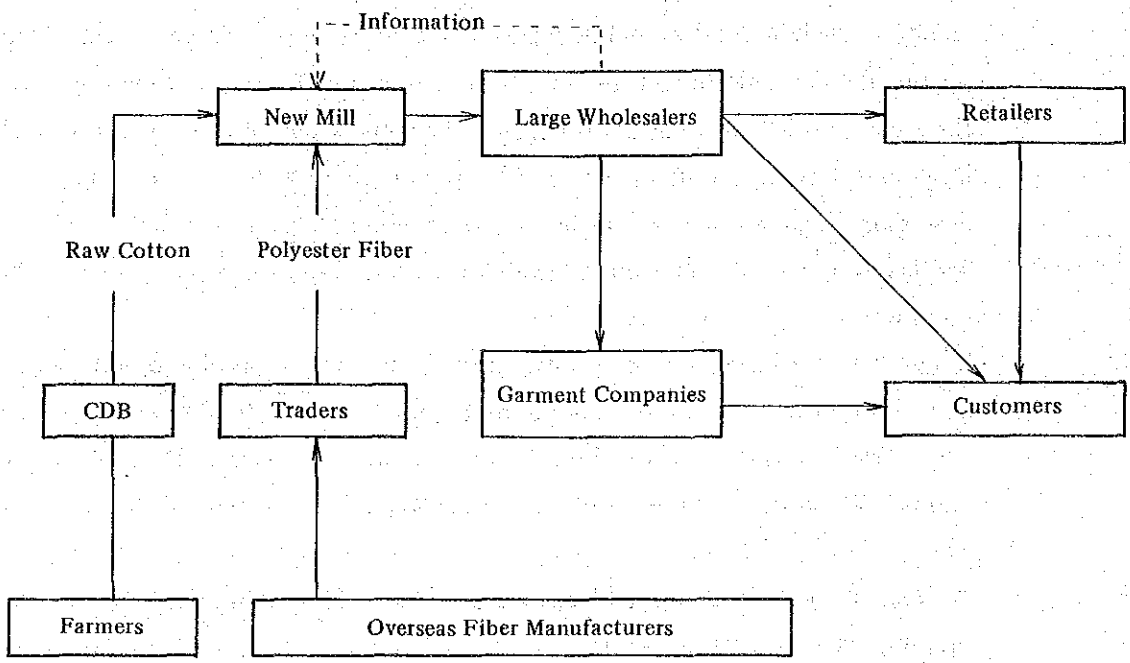
As regards distribution of products, these are preferably delivered to the private wholesalers available in Kathmandu or other local cities under the responsibility of the manufacturer. It is advisable not to meddle in the sales onward.

It is assumed that these wholesaler normally forward textile products to retailers with some exceptional direct sale to customers, in addition to the positive sales to the garment companies.

It is expected that wholesalers are able to assess the actual value of the textile products

since they are used to imported goods, and further through them, procurement of various information as to colours design, fashion, etc. is expected.

The figure below represents summary of the above.




2 — 7 — 2 Transportation Means and Road Conditions for Distribution:

Nepal is enclosed for three quarters by mountains and for South by the border with India, without facing to sea in all directions. Therefore, distribution and transportotion of all commodities are posing problem. While trunk road networks are being developed now under financical aid from foreign countries, it is yet far from completion of the infrastructure as a whole.

The capital Kathmandu, the largest place of consumption, is situated in the oval-shaped basin of 20km ×30km area in the Central Region, surrounded by mountains of 2, 500 meters class height. Therefore, transportation of commodities, as well as movements of people to/from the city will be more costly in general. For instance, distance from Kathmandu to Hetauda is approximately 100km by way of the mountain road route and 175km via Narayangadh along comparatively flat road, and through either of which takes about 3-4 hours to get to Hetauda by car.

Consequently, the location of the new mill in the Kathmandu Valley poses various problems in respect of tranportation of materials and delivery of goods, etc. although there is such merit as near location to the largest place of consumption.

The following are the metoods of distribution studied by the Survey Team.

— Road Diatance from importing port, Calcutta to Nepal:

- Calcutta-Birgunj ..... 960KM ..... Approximate 4 days required by a truck
- Calcutta-Kapilbastu .....1,219km .....-do- 5 days -do-
- Calcutta-Nepalgunj .....1,440km .....-do- 6 days -do-

— Condition and Restriction of the Road:

In Dang area, where the proposed site is located, a thorough paved trunk road has already been completed. However, the road, running between Bhairahawa-Kathmandu, has many bridges and obstacles such as sharp curves at the mountain road and appears to be inconvenient. For instance, numbers of the bridge count tens of them between Bharatpur and Kathmandu including some old bridges which are restricting max. weight, height and width as 8 tons, 10 feet and 10 feet respectively. Further, the mountain road has many dangerous places such as curves, narrow width and slopes, due to which an average speed of a passing car will be decreased to as slow as 20-30km per hour. In addition, roads are much congested with long-distance buses, city buses, trucks, oxcarts, bicycles and pedestrians not only in Kathmandu but also in other local cities. On the other hand, trunk roads are paved with 5.5-7.5meters width, along which driving at 80-100km/hour speed is possible.

— Transportation Means and their Scales:

As transportation companies, there is first of all a public corporation, Nepal Transport Corporation (NTC), under which there are hundred of private companies including large and small sizes, situated in urban and local areas. Every company holds trucks and some larger companies keep trailers and forklifts. As a reference, numbers of vehicles held by one of the above mentioned companies under NTC are roughly:—

- Truck, 4 — 8 tons capacity ..... 82
- Trailer ..... 2
- Low—deck trailer ..... 1
- Crane, 10tons capacity ..... 1
- Forklift, 1.5 tons capacity ..... 1

There are also other private companies not belonging to NTC, however, their numbers are not known.

## 2—8 Present Condition and Prospect of Garment Industry :

The following is the assessment on current status and prospect of the garment industry in Nepal, in accordance with the data obtained by MOI as well as the leading garment companies.

### 2 — 8 — 1 Production Output and Export Volume:

Table 33 indicates production output at present and transition of export volume.

**Table 33 Production Output and Transition of Export Volume**

| Year | Production output (1,000 suits) | Export volume (million NRs) | No. of enterprise | | No. of sewing machine (set) | No. of people employed (person) |
|---|---|---|---|---|---|---|
| | | | Enterprise | Cottage | | |
| 1981/82 | 345 | 13.8 | – | – | – | – |
| 1982/83 | 230 | 10.0 | – | – | – | – |
| 1983/84 | 340 | 20.5 | – | – | – | – |
| 1984/85 | 8,600 | 500 | – | – | – | – |
| 1985/86 | 11,400 | 800 | 134 | 80 | 16,000 | 1,000 |

Cited from: MOI data

Following are the points to be observed at present moment;

- Cotton fabrics as raw materials are mainly imported from India.
  The cloths are mainly shirtings of 30's yarn count, weight per meter 80—100g/Lm and finished width 36"—45", of printed or yarn-dyed products.
- Products are exported to U. S. A.
- Price of the cloth is US$0. 8—0. 85/m on an average. The price on delivery to the garment factory including various expenses is approximately US$1/m, 18%-up amount of the above.
- Average selling price of the product after sewing is approximately US$3. 25-3. 5/suit on FOB, Nepal.
- The cloth required to sew up a suit is about 1. 5m x 45".
- Ordinary sewing machines used are of manual operation of new or used ones made in India. Special sewing machines (for button holes and button fixing) are electrically operated ones made in Japan.
- Sub-materials (machine sewing thread, padding cloths, needles, buttons and hooks etc.) are imported from India.
- Major cutting and tailoring are dependent on techniques of Indians. Generally in Nepal, textiles are sold in the market as cloths. And customers buy them and sew up either by themselves or have it sewn up by cottage sewer for wearing. However, Sarees and Dohtis, their traditional costumes, require no sewing, which is considered to be one of the reason why they are widely used till now. Apart from the above, there are more than 200 factories ranging in structure from a cottage industry form keeping or lent of severral manual sewing machines to a large-scale factory form keeping hundreds of manual sewing machines, and employing 500 to 600 employees which numbers as many as 200 facilities.
  However, as stated before, they are actually dependent on India for materials of the

cotton fabrics, sub-materials, techniques and even funds in some cases.

2 — 8 — 2 Quota System;

The garment industry in Nepal has rapidly developed since 1984/85 period, of which production output of lady's blouse has now grown to the 3rd position in the world next to India and Hong Kong. However, owing to the quota system having been established with U. S. A. for the following kinds of the product, amount of the export has now begun to be restricted.

**Table 34 Products subject to Quota System**

Unit: Suits/year

| Quota No. | Products | Material | Quantity |
|---|---|---|---|
| 337 | Rompers | Cotton 100 % | 864,000 |
| 340 | Men's shirts | 〃 | 2,000,000 |
| 341 | Ladie's shirts | 〃 | 7,200,000 |
| | 〃 blouses | 〃 | |
| 342 | Skirts | 〃 | 1,200,000 |
| Total | | | 11,264,000 |

Cited from: Mittal & Company, Nepal, 1986

2 — 8 — 3 Prospect in Future:

Enterprisers in Nepal have found their way out in the garment industry through making use of cheaper labours and facilities with less energy, and have developed this industry.

In other words, this industry in Nepal is considered to be under very suitable and advantageous condition.

Though quota system has applied to pure cotton to be utilized for the products in above Table, no restriction has been imposed yet on others. For instance, the quota system is not yet applicable to man's trousers, lady's onepieces, as well as to synthetic and blended goods. By this reason, enterprisers are eager to convert their products to the synthetic and blended goods. However, since these fabrics have to be all imported presently, there are problems involved in respects of their prices and delivery deadlines. Under this circumstance, the enterprisers are placing great hope on self-supply of such products in Nepal.

Conclusively, the garment industry is regarded as the more and more prospecting and hopeful industry of Nepal.

Further, in order to bring up industries, the Government has established the following organ to train up expert workers under MOI, which has been in operation since 1980 and giving satisfactory results.

The organ :"Ready-made Garment and Hand-made Paper project"under Department Cottage and Village Industries

The organ has commenced its activities since October, 1980 and 8 Japanese in total have been sent there by October, 1985 as instructors and / or trainers for education and training of Nepal trainees. The total trainees in Garment Department have numbered 122, of which 64 have advanced to the special course and 87 to tailoring course.

Apart from a large-scale training as above, policies aimed at acquiring techinique have been kept on in an attempt to become independent from other countries in the field of textile industries.

## Chapter 3. SUPPLY OF RAW MATERIALS

## 3. Supply of Raw Materials:

### 3-1 Current Status and Forecast of Demands for Cotton and Polyester:

#### 3-1-1 Demand for Cotton:

1) Currently, cotton spinning facilities available in Nepal are 14, 688 spindles only owned by the Hetauda Textile Industries and planned demand for lint cotton by these facilities is estimated to be 2, 400 tons annually. However, the actual consumption volume has been as indicated below due to drop in working ratio of facilities and decrease in production efficiency :

**Table 1 Consumption of Lint Cotton of Hetauda Textile Industries by Origin of Production (Unit: Ton/year)**

| Years | Cotton produced in Nepal | Cotton produced in India | Total |
|---|---|---|---|
| 1981/82 | 59 | 758 | 817 |
| 1982/83 | 284 | 928 | 1,212 |
| 1983/84 | 122 | 919 | 1,041 |
| 1984/85 | 176 | 871 | 1,047 |

Cited from: Data obtained from the Hetauda Textile Industries.

The above indicates that only 34-50% of the annual 2, 400 tons planned demand had been consumed in a period from 1981/82 to 1984/85, however, it could be said that currently, the annual actual demand for lint cotton is approximately 1, 000 tons. To increase consumption more than this level requires arrangements of factories and improvements in their operating conditions.

2) On the other hand, textile industries in Nepal has started in 1926 with manual operation looms and it was only in 1970s when it was introduced enterprises with factory system before it came to the current status. Therefore, these 1970s years could be said to have been beginning of its growth period. According to data made in 1981/82, though they are a little older, available supply in Nepal of textile was 28, 900, 000 meters or 12% of her total demand 247, 000, 000 meters. Of these figures, production of cotton cloths was 26, 100, 000 meters, which when converted in terms of weight (average weight per linear meter : 142 g/L. m), equals to approximately 3, 706 tons. When this tonnage is converted into weight of lint cotton, the raw material, it will be approximately 4, 633 tons based on an average yield rate of 80 %. If arrangements could be made in 1981/82 to make up all domestic-produced yarn (cotton yarn) with domestic-produced lint cotton, a demand of at least approx. 4, 633 tons could have been anticipated.

3) In the current 7 th and 8 th 5 -year plans, modernization and industrialization of textile indutries have been promoted, of which projects now under construction or in planning are as follows :

a) Butwal Spinning Mill — Under Construction :

Under the 7 th 5 -year plan and scheduled to complete in 1987. Spinning facilities : 25000 spindles, with an average yarn counts : Ne 30.

Annual productions : Cotton yarn — 1, 655 tons and Blended yarn — 1, 090 tons

b) Nepalganj Taxtile Mill — In Planning :

Under the 7 th 5 -year plan and scheduled to complete in 1990. Integrated facilities for spinning, weaving and dyeing : 36, 106 spindles for spinning and 553 looms.

Annual productions : Cloth —13, 000, 000 meters and selling yarn — 250 tons (Yarns : 2, 360 tons cotton yarn and 1, 500 tons blended yarn)

c) Pokhara Spinning Mill — In Planning :

Under the 8 th 5 -year plan and scheduled to complete in 1992. Spinning facilities : 25, 000 spindles an average yarn counts Ne 30.

Estimated annual productions : 1, 910 tons cotton yarn and 420 tons blended yarn

Source : ADB Data of Cotton Development Project New Pora. Table 2 indicates estimated annual demands for lint cotton by above factories under the projects plus Hetauda Textile Industries now in operation. This Table indicates estimated demands by the projects already published to-date only, however, the demand should increase more if other projects now under applications are added thereto. Nevertheless, it is considered to be very hard that all projects are constructed and secured of their working ratio as sheduled. In concrete terms, it would be more realistic to estimate the actual demand from 1985 to be 70-80% of demands indicated on the Table 2.

**Table 2 Estimate of Demand for Lint Cotton by Year**

(Unit: Ton/year)

| Years | Hetauda | Butwal | Nepalganj | Pokhara | Total |
|---|---|---|---|---|---|
| 1984 | *1,047 | — | — | — | 1,047 |
| 1985 | 1,710 | — | — | — | 1,710 |
| 1986 | 1,640 | — | — | — | 1,640 |
| 1987 | 2,400 | — | — | — | 2,400 |
| 1988 | 2,400 | — | — | — | 2,400 |
| 1989 | 2,400 | 540 | — | — | 2,940 |
| 1990 | 2,400 | 1,620 | 1,400 | — | 5,420 |
| 1991 | 2,400 | 1,800 | 4,200 | — | 8,400 |
| 1992 | 2,400 | 1,800 | 4,200 | 800 | 9,200 |
| 1993 | 2,400 | 1,800 | 4,200 | 2,420 | 10,820 |

Cited from: ADB.Data of Cotton Development Project

* Actual consumption by Hetauda Textile Industries

(Note) : Terms for cotton are hereby defined as follows :

- ○ Seed cotton : General naming of the cotton
- ○ Lint cotton/or ginned cotton : Cotton fiber part of ginned cotton.
- ○ Seed : Seed of cotton
- ○ There is the following weight relation among above items : 100% seed cotton=Lint cotton (33. 3%) +Seed (66. 7%)

3—1—2 Demand for Polyester :

1) Presently, there is no spinning factory to produce cotton and synthetic blended yarns in

Nepal. The Hetarda Textile Industries which is now in operation produces cotton yarns and cotton cloths only. Synthetic woven fabrics now supplied in Nepal are those woven by medium and small-sized weaving factories in Nepal using synthetic filaments imported from Japan, Korea and Singapore etc. According to available data, the woven volume is said to be 2,800,000 meters annually, which are composed of chemical and synthetic filament woven fabrics for nearly 100%. When this volume is converted into weight (average weight per linear meter : 111 g/L. m), it equals to approximately 310 tons annually and annual consumption of synthetic filaments is estimated to be approx. 315 tons when calculated with an average yield rate of 98.5% for the annual 310 tons as material, however, it appears that the 315 tons consumption contains little of polyester fiber.

2) It is considered that demand for the polyester fiber will emerge in future only as the required materials for polyester/cotton blended yarns to be produced by Butwal Spinning Mill, Nepalganj Textile Mill and Pokhara Spinning Mill which are now under construction or in planning. Annual production volume of these blended yarns is, according to data available, estimated as follows :

| | |
|---|---|
| Butwal Spinning Mill | 1,090 tons |
| Nepalganj Taxtile Mill | 1,500 tons |
| Pokhara Spinning Mill | 420 tons |
| Total : | 3,010 tons |

When annual consumption of the polyester fiber is estimated from the above annual production volume, it will be as follows, provided that blending ratio is 65% and waste ratio at 1.5% :

$$3,010 \text{ tons} \times 0.65/0.985 \fallingdotseq 2,000 \text{ tons}$$

That is, demand for polyester fiber in future is estimated to be approximately 2,000 tons annually, which are raquired to be imported since no poyester fiber plant is provided in Nepal.

3) On the other hand, Nepali government is studying on making nation's clothing need replaced with chemical and synthetic woven fabrics in a long-term project. Namely, the government estimates demand and supply in 1995, the year terminating the 8th 5-year plan, as follows:

| | |
|---|---|
| Total annual demand for textile | 347,500,000 meters |
| Target production for domestic supply | 173,750,000 meters |

Of the above, it estimates 27%of the domestic supply to be of synthetic and blended products :

$$173{,}750{,}000 \text{ meters} \times 0.27 = 46{,}910{,}000 \text{ meters}$$

When the above figure is converted into weight (average weight per linear meter : 111

g/L.m), it equals to approximately 5,200 tons annually. Even if 3,010 tons fabrics to be produced by blended yarn of 3 factories now in planning are added to the approx.310 tons polyester filament woven fabrics now being produced ,a shortcoming in production of approximately 1,880 tons will be brought about annually in 1995 against the target. Therefore, in future measures should be taken and planning be made to increase productions of synthetic or blended yarn woven fabrics. It is not clear yet with what materials these will be woven, however, if they are to be woven with 40 %filament and 60 %fiber, the following amounts would be required to be imported from abroad :

Polyester filament : 1880 tons × 0.4/0.985=763 tons

Polyester fiber : 1880 tons × 0.6× 0.65/0.985 =744 tons

According to the above, estimated annual demands of the polyester filament and polyester fiber are tabulated as follows :

**Estimated Annual Demands of Polyester Materials** (Ton/year)

| Kinds | Currently | Planned | Shortage in production | Total |
|---|---|---|---|---|
| Filament | 315 | — | 263 | 1,078 |
| Fiber | — | 2,000 | 744 | 2,744 |

### 3–2 Current Status and Future Planning of Seed Cotton Cultivation:

#### 3–2–1 Outline of Seed Cotton Cultivation

In Nepal, population working in agriculture and forestry industries occupies 91 %of the total working population of the kingdom and output from this agriculture industry shared 54 % of GDP in 1982/83. Domestic seed cotton cultivation has been researched and developed since 1970s by DOA and promoted under cooperations and aids from China and Israel and later from U. S. A and FAO. Topographically, Terai area in her middle Western region is said to be the most suitable for seed cotton and now development, cultivation and expansion projects are promoted in the following 3 areas :

| | | |
|---|---|---|
| Bardiya(Kumkher)area | 1,350 ha | 68 % |
| Banke area | 457 ha | 23 % |
| Dang area | 179 ha | 9 % |

Other Western Terai area is regarded as not suitable for cultivation of seed cotton because of rainfall in harvest season and heavy humidity. During a period from 1975 to 1980, the goverment implemented a full-scale policy under a 5 -year plan and seed cotton cultivation had been promoted with priority under CDB established as the Development Bureau. Purposes of the policy were :

- To achieve self-supply of seed cotton for the demand, especially its supply to existing factories.
- To diversify kinds of crops in agriculture in Terai area.
- To develop under-developed areas in middle Western and far Western regions.

The exploitation and development have since then been promoted steadily and their targets were almost attained in the 6th 5 -year plan.

3–2–2 Development Areas for Seed Cotton Cultivation :

In the initial stage, the cultivation was developed under DOA, however, now in the growth period, it has been promoted under CDB with aids rendered by UNDP and FAO. The development areas are concentrated in areas of Bardiya, Banke and Dang area in subtropical zone in middle Western region and each development area has exisiting farm area and the extension area newly expanded. Figures 1 and 2 indicate current status of the seed cotton cultivation areas and planned areas for expansion. Furthermore, locating conditions of each development area are shown in Table 3, where as against exploited area amounting to approximately 30% of the total area, the irrigated area is yet approximately 6.4% of the total, indicating a need to further increase these areas. Current cultivated area for seed cotton is approximately 2,000 hectares, which is no more than appox. 1 % of the total exploited area. To increase production of the seed cotton, a further raise of the land utilization ratio is required.

Fig. 1 Current status of the seed cotton cultivation areas and planned areas for expansion

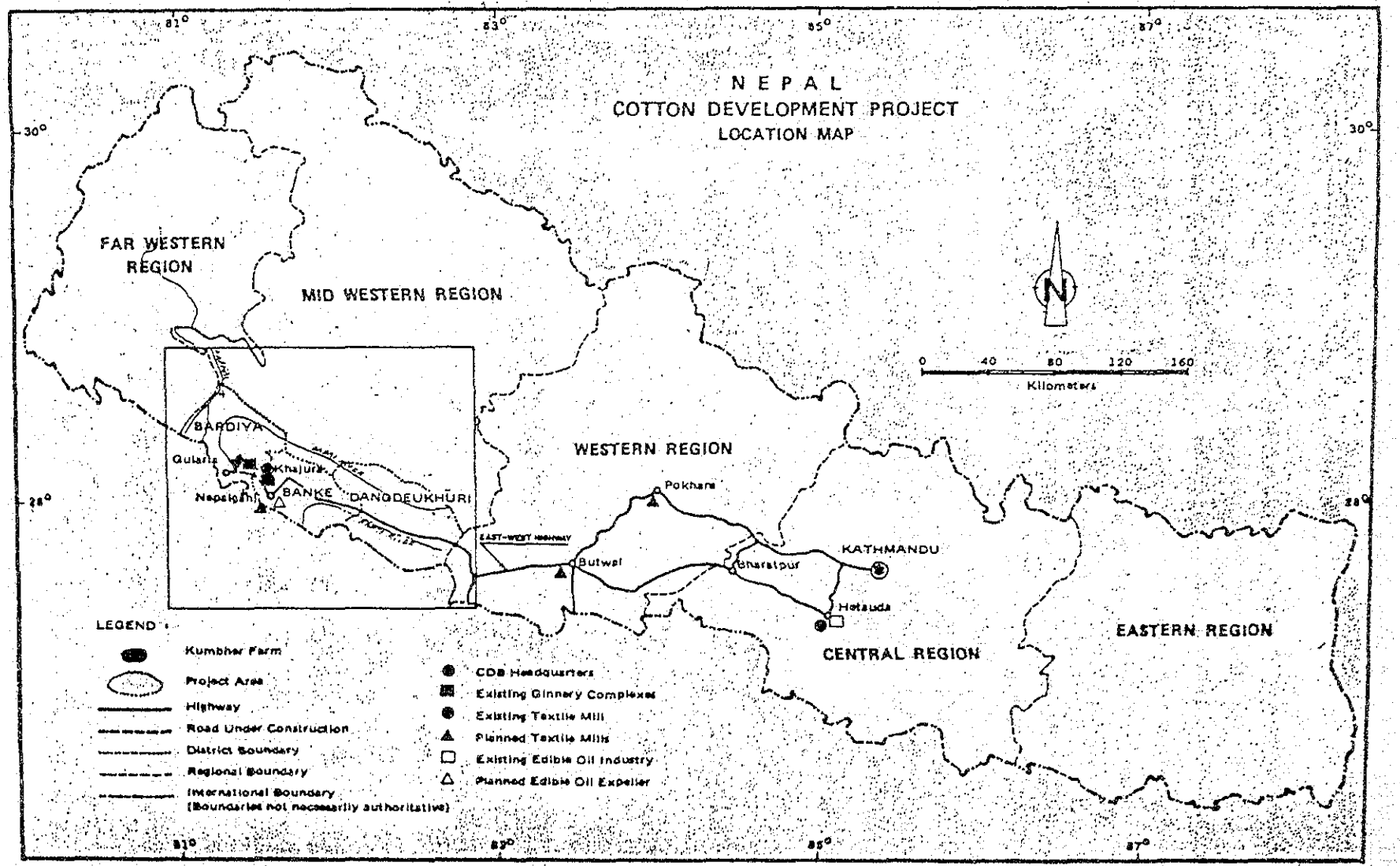


Fig. 2 Current status of the seed cotton cultivation areas and planned areas for expansion

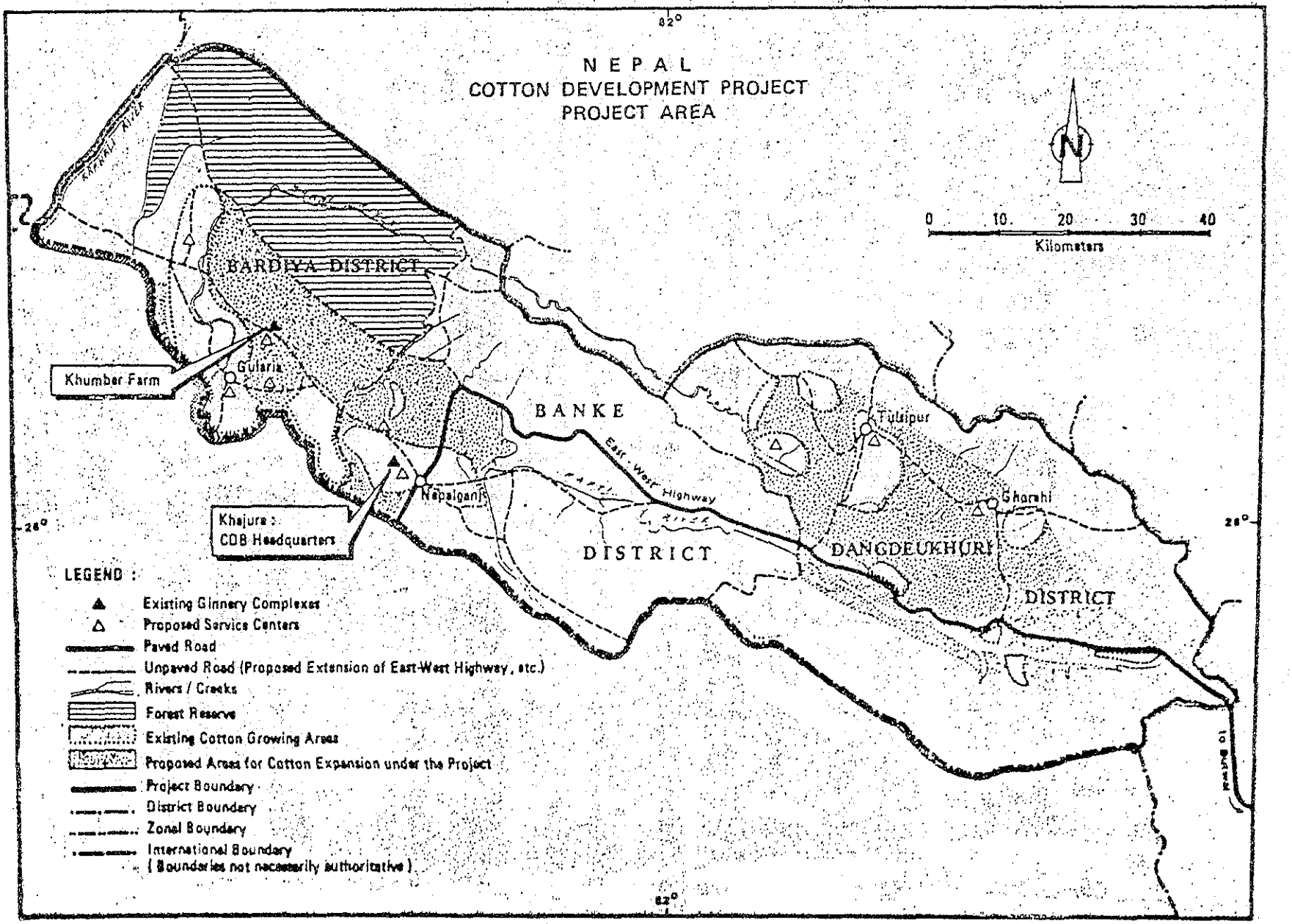


Table 3 Locating Conditions of Seed Cotton Cultivation Areas

| Items Areas | Unit | Bardiya | Banke | Dang | Total, Ave. |
|---|---|---|---|---|---|
| Local areas | ha | 160,800 | 202,400 | 297,800 | 643,000 |
| Exploitation areas | ha | 52,274 | 50,785 | 81,924 | 185,983 |
| Flatland | | (35,992) | (23,478) | (30,660) | (90,130) |
| Hilly land | | (16,233) | (17,967) | (21,226) | (55,426) |
| Others | | ( 1,049) | ( 9,340) | (30,038) | (40,427) |
| Population (in 1980) | men | 139,109 | 171,795 | 229,344 | 540,251 |
| Population density (in 1980) | men/km² | 87 | 85 | 82 | 85 |
| Population increase ratio | % | 3.53 | 2.53 | 3.53 | 3.20 |
| Agricultural population | men | 18,440 | 20,740 | 25,515 | 64,695 |
| — Independent farmer | | (11,093) | (15,673) | (21,913) | (48,679) |
| — Tenant farmer | | ( 7,397) | ( 5,067) | ( 3,602) | (16,016) |
| Unit area of cultivation | ha | 2.89 | 2.45 | 3.21 | 2.85 |
| Precipitation (annually) | mm | 2,099 | 1,263 | 1,388 | 1,583 |
| Average temperature | | | | | |
| — Maximum | °C | 30.5 | 30.8 | 28.9 | 30.1 |
| — Minimum | °C | 17.7 | 16.2 | 20.5 | 18.1 |
| Irrigated area | ha | 1,360 | 3,690 | 6,848 | 11,898 |

Cited from Nepal District Profile, 1982

3–2–3 Cotton Seed and Harvest Ratio :

There have been various trial cultivations carried out and endeavours made in order to improve harvest ratio of seed cotton per unit farming area by planting the most suitable kind of cotton depending on temperature, precipitation and soil etc. in the seed cotton planting area.

1) Kinds of Seed Cotton :

The following kinds of seed cotton were tried at the cultivation :

- In the initial stage (by 1980) : Delta pine-16
- Trial period (by around 1984) : Acala
- Present (1986) : Tamcot-SP-37

Currently, tamcot-SP-37 is planted. Since seeds harvested from the same land will be deteriorated of their quality in about 5 years, it is scheduled to import seeds from U. S. A in order to change them every 5 years.

2) Seed Cotton Harvest per Hectare :

Harvest of seed cotton is largely dependent on precipitation of the harvesting year, and further dependent on weeding and fertilization in growing period of the seed cotton. Table 4 indicates comparison of past results in Nepal and other countries :

Table 4 Average Harvests in Bardiya Farm and Extension, and Harvests in Other Countries

(Unit: Kg/ha)

| Years | Nepal | U.S.A | China | Pakistan | India |
|---|---|---|---|---|---|
| 1981/82 | 893 | 1,821 | 1,716 | 1,035 | 528 |
| 1982/83 | 1,440 | 1,983 | 1,851 | 1,089 | 522 |
| 1983/84 | 990 | 1,698 | 2,277 | 627 | 480 |
| 1984/85 | 640 | 2,058 | 2,574 | 1,377 | 516 |

Cited from: CDB Data and ICAC Data

An average harvest in recent 3 years is 1, 023kg/ha. Although a 1, 500kg/ha harvest is planned as the future harvest, this figure is an expected value and its realization is considered to be difficult to some extent.

3–2–4 Transition and Future Plan of Seed Cotton Cultivation Area :

1) Transition of Seed Cotton Cultivation Area :

Table 5 indicates transition of cultivation area in the seed cotton planting regions :

**Table 5 Transition of Seed Cotton Cultivation Areas**

(Unit: ha)

| Years | Distinction of planted areas | Target areas | Cultivated areas | Tbtal cultivated areas |
|---|---|---|---|---|
| 1978/79 | Farm | 27 | 27 | 27 |
| 1979/80 | Farm | 150 | 150 | 150 |
| 1980/81 | Farm | 230 | 230 | 230 |
| 1981/82 | Farm | 300 | 300 | 401 |
| | Extension | 100 | 101 | |
| 1982/83 | Farm | 410 | 410 | 721 |
| | Extension | 400 | 321 | |
| 1983/84 | Farm | 500 | 500 | 1,375 |
| | Extension | 800 | 875 | |
| 1984/85 | Farm | 500 | 400 | 1,986 |
| | Extension | 1,600 | 1,586 | |
| 1985/86 | Farm | 100 | 100 | 1,800 |
| | Extension | 3,000 | 1,700 | |

Cited from: CDB Data of 1986

Decrease in 1985/86 of the farm area from that in 1984/85 is considered due to change of the decrease of 400 ha in the farm distinction to jurisdiction of the extension.

The reason for only 1, 700 ha cultivated area accomplishment in the extension category in 1985/86 against the target cultivation area 3, 000 ha for the extension in the same period seems to have been due to a large quantity of precipitation in the seeding period.

2) Future Plan of Seed Cotton Cultivation Area:

The target cultivation area is planned to be increased by every 2, 000-3, 000 ha year by year since 1985/86, however, it is considered to be doubtful if this expansion could be realized smoothly as scheduled. Although enough area has been secured, as indicated in the Table 3, for the exploitation, the accomplishment is considered dependent on whether conditions such as fertilization and availabilities of cultivating equipments and labour forces could be obtained or not. The future cultivation plan is shown in Table 6.

**Table 6 Future Plan of Seed Cotton Cultivation**

(Unit: ha)

| Years | Distinction of planted areas | Target cultivation areas | Total cultivation areas |
|---|---|---|---|
| 1986/87 | Farm | 150 | 5,150 |
| | Extension | 5,000 | |
| 1987/88 | Farm | 200 | 8,200 |
| | Extension | 8,000 | |
| 1988/89 | Farm | 200 | 10,200 |
| | Extension | 10,000 | |
| 1989/90 | Farm | 200 | 12,200 |
| | Exbension | 12,000 | |

Cited from: CDB Data

## 3–3 Present Status and Forecast of Seed Cotton and Polyester Supplies:

3−3−1 Present Status and Forecast of Seed Cotton Supply :

Table 7 indicates transition and future planning of seed cotton supply through cultivation.

**Table 7 Transition and Planning of Seed Cotton Supply**

| Years | Cultivated areas (ha) | Harvest ratio (ton/ha) | Seed cotton harvst (ton) | Lint cotton production (ton) |
|---|---|---|---|---|
| 1978/79 | 27 | | | |
| 1979/80 | 150 | | | |
| 1980/81 | 230 | | | |
| 1981/82 | 401 | 0.90 | 360 | 120 |
| 1982/83 | 731 | 1.44 | 1,051 | 350 |
| 1983/84 | 1,375 | 0.99 | 1,332 | 444 |
| 1984/85 | 1,986 | 0.64 | 1,273 | 424 |
| 1985/86 | 1,800 | 1.05 | 1,890 | 630 |
| 1986/87 | 5,150 | 1.5 | 7,725 | 2,572 |
| 1987/88 | 8,200 | 1.5 | 12,300 | 4,100 |
| 1988/89 | 10,200 | 1.5 | 15,300 | 5,100 |
| 1989/90 | 12,200 | 1.5 | 18,300 | 6,100 |

Cited from: CDB Data

While actual results are shown for 1984/85 period, a part of figures for 1985/86 period is estimated values since it was under harvest at the time of survey. Figures for 1986/87 on are planned values. A sharp drop observed in the harvest ratio in the 1984/85 period stemmed from a large decrease in harvest due to heavy precipitation in the harvest season. When analyzing future prospect through comparison of lint cotton production indicated in Table 7 and demands shown in Table 2, it is estimated theoretically as appears in Table 8.

**Table 8 Actual Demand/Supply of Lint Cotton and their Prospects**

(Unit: Ton)

| Years | Prospect of demand | Prospect of supply | Balance |
|---|---|---|---|
| 1981 | 817 | — | −817 |
| 1982 | 1,212 | 120 | −1,092 |
| 1983 | 1,041 | 350 | −691 |
| 1984 | 1,047 | 444 | −603 |
| 1985 | 1,710 | 424 | −1,286 |
| 1986 | 1,640 | 630 | −1,010 |
| 1987 | 2,400 | 2,572 | 172 |
| 1988 | 2,400 | 4,100 | 1,700 |
| 1989 | 2,940 | 5,100 | 2,160 |
| 1990 | 5,420 | 6,100 | 680 |

As indicated in the above table, balance of demand and supply has resulted in minus figures by 1986 and shortcomings have been imported from India. As for 1987 on, it is unpredictable to forecast how actually the balance moves as there are so many unstable factors involved. When cultivated area for seed cotton increases, output of the seed cotton will also increase almost for sure, however, on the other hand, production in factories would immediately decrease if achievement of the project delays or spare parts required in existing factories may not be supplied smoothly. Consequently, it is estimated that the seed cotton would be further oversupplied from 1987 on. The oversupply amount is estimated to be 1, 000-1, 500 tons

annually.

3–3–2 Outputs of Polyester Fiber in Major Countries:

The polyester staple fibre is neither produced at present in Nepal nor imported since there are no existing spinning facilities using that fibre. Polyester filament, however, is being imported for weaving materials mainly from Japan, Taiwan, Korea, etc. . The change of polyester cut fibre output in the world are shown in Table 9 . Spinning productivity is largely affected by the quality of polyester to be blended with cotton, therefore, care should be taken of its physical and chemical properties at importing polyester fibre.

**Table 9 Transition of Polyester Staple Fiber Outputs in Major Countries in the World (Unit: 1,000 tons)**

| | 1980 | 1983 | 1984 |
|---|---|---|---|
| West Germany | 175.4 | 164.0 | 162.0 |
| England | 22.4 | 17.2 | 19.5 |
| France | 25.2 | 42.5 | 42.5 |
| Spain | 50.1 | 60.1 | 60.0 |
| U. S. S. R | 120.8 | 139.3 | 148.7 |
| Poland | 41.3 | 34.1 | 39.0 |
| East Germany | 38.5 | 39.4 | 40.4 |
| U. S. A | 1,146.0 | 991.0 | 994.3 |
| Mexico | 42.8 | 53.2 | 69.0 |
| Brazil | 64.8 | 54.0 | 65.4 |
| Canada | 21.6 | 37.3 | 43.0 |
| Argentine | 4.2 | 5.0 | 5.5 |
| Columbia | 11.9 | 12.0 | 12.0 |
| Peru | 10.2 | 8.0 | 8.0 |
| Japan | 320.1 | 319.9 | 319.9 |
| Korea | 140.8 | 174.8 | 213.4 |
| Taiwan | 194.0 | 309.0 | 317.4 |
| China | 113.2 | 199.0 | 447.3 |
| Thailand | 50.0 | 50.0 | 52.4 |
| Philippine | 14.0 | 16.0 | 16.0 |
| Indonesia | 53.9 | 55.0 | 73.3 |
| India | 23.0 | 26.6 | 38.5 |
| South African Republic | 20.0 | 21.0 | 21.0 |
| Australia & New Zealand | — | 1.0 | 1.0 |
| Total in the World | 3,033.0 | 3,257.0 | 3,673.2 |

Cited from: Chemical Textile Handbook, 1986

3–3–3 Demand and Supply of Seed Cotton in the World :

In recent years, demand and supply situation of the seed cotton in the world has been changed largely.

When seeing transition in recent 4 - 5 years, it is noted that while American cotton is leading the trend as it used to be, China has emerged as the No. 1 producing country in the world in a short period, which changed herself from the past importing country to a leading exporting country of the seed cotton at a dash.

Further, conspicuous is the increased production in Australia and adversely a decrease in Mexico.

These situations are shown in Tables 10 and 11.

Under this increasing situation in seed cotton production, while consumption in China has been increasing to some extent as seen in the below Table, situations in other countries remain almost unchanged.

Consequently, the seed cotton of the world is now coming into a state of oversupply in recent years. which situation is indicated in Table 12. Further, Fig. 3 shows a graphic presentation of demand and supply, as well as stock levels of American cotton.

Below, transition of seed cotton outputs and consumption in China is shown with the reference taken those in 1980/81 period.

| | 1980/81 | 1981/82 | 1982/83 | 1983/84 | 1984/85 | 1985/86 |
|---|---|---|---|---|---|---|
| Outputs | 100 | 110 | 133 | 171 | 230 | 185 |
| Consumptions | 100 | 107 | 109 | 108 | 108 | 116 |

From the above, it is observed that while output of the seed cotton has almost doubled in 5 years since 1980, the consumption has only increased by about 10 % in the same period. This current phenomenon of oversupplied seed cotton in the world is considered to have resulted from American protection of seed cotton cultivation through maintenance of protective pricing system by its existing agricultural legislation, Chinese production increase through partial system reform and improvements in production techniques under its 5 -year plan of the national policy and gradual production increase in communist countries and underdeveloped countries through improvements in production techniques and aids by respective government.

**Table 10 Transition of Seed Cotton Cultivation and Output in the World**

| Region/country | Area ('000 ha) | | | | Lint Yield (kg/ha) | | | | Production ('000 bales) a/ | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1981/82 | 1982/83 | 1983/84b/ | 1983/85b/ | 1981/82 | 1982/83 | 1983/84b/ | 1983/85b/ | 1981/82 | 1982/83 | 1983/84b/ | 1983/85b/ |
| Argentina | 404 | 373 | 493 | 500 | 375 | 298 | 324 | 339 | 696 | 511 | 735 | 780 |
| Brazil | 2,080 | 2,120 | 1,999 | 2,023 | 327 | 305 | 270 | 355 | 3,125 | 2,971 | 2,475 | 3,300 |
| Paraguay | 324 | 324 | 300 | 350 | 302 | 244 | 307 | 295 | 450 | 263 | 423 | 474 |
| United States | 5,601 | 3,927 | 2,982 | 4,209 | 607 | 661 | 566 | 686 | 15,641 | 11,963 | 7,771 | 13,271 |
| Mexico | 350 | 191 | 253 | 322 | 895 | 959 | 867 | 811 | 1,440 | 840 | 1,008 | 1,200 |
| China, P.R. of | 5,186 | 5,828 | 6,105 | 6,416 | 572 | 617 | 759 | 858 | 13,632 | 16,525 | 21,300 | 25,300 |
| India | 8,013 | 7,900 | 8,000 | 8,000 | 176 | 174 | 160 | 172 | 6,473 | 6,320 | 5,878 | 6,350 |
| Iran | 194 | 205 | 183 | 200 | 379 | 452 | 485 | 462 | 338 | 427 | 409 | 425 |
| Pakistan | 2,167 | 2,260 | 2,277 | 2,270 | 345 | 363 | 209 | 459 | 3,438 | 3,775 | 2,188 | 3,750 |
| Turkey | 654 | 595 | 614 | 668 | 747 | 828 | 847 | 867 | 2,244 | 2,241 | 2,388 | 2,660 |
| Egypt | 495 | 448 | 417 | 417 | 1,007 | 1,029 | 967 | 991 | 2,291 | 2,117 | 1,853 | 1,900 |
| Nigeria | 429 | 405 | 405 | 405 | 49 | 49 | 34 | 38 | 97 | 92 | 62 | 70 |
| Tanzania | 395 | 375 | 399 | 455 | 113 | 106 | 117 | 104 | 205 | 183 | 215 | 218 |
| World Total | 33,076 | 31,929 | 31,844 | 33,932 | 466 | 460 | 459 | 522 | 70,765 | 67,501 | 67,224 | 81,468 |
| Comparison: Nepal | 0.1 | 0.3 | 0.9 | 1.6 | 298 | 438 | 455 | 466 | 0.1 | 0.7 | 1.8 | 2.7 |

a/ 1 Bale = 480bs = 218kg
b/ Preliminary estimates
Source: International Cotton Advisory Committee, December 1984, Cotton Review

## Table 11 Seed Cotton Outputs in Major Countries

(Unit: 1,000 tons)

| Region/Country | | 1970/71 | 1975/76 | 1980/81 | 1981/82 | 1982/83 | 1983/84 | 1984/85 |
|---|---|---|---|---|---|---|---|---|
| Asia & Oceanioa | China, P. R. of | 1,995 | 2,320 | 2,707 | 2,968 | 3,598 | 4,638 | 6,075 |
| | India | 954 | 1,160 | 1,326 | 1,409 | 1,376 | 1,280 | 1,428 |
| | Pakistan | 542 | 514 | 715 | 749 | 822 | 476 | 980 |
| | Turkey | 400 | 480 | 499 | 489 | 488 | 522 | 586 |
| | Syria | 150 | 158 | 118 | 130 | 158 | 193 | 156 |
| | Iran | 154 | 139 | 63 | 74 | 93 | 89 | 93 |
| | Australia | 19 | 25 | 99 | 135 | 101 | 141 | 218 |
| | Israel | 35 | 49 | 78 | 91 | 87 | 93 | 88 |
| | Total (including others) | 4,334 | 4,949 | 5,747 | 6,190 | 6,850 | 7,553 | 9,753 |
| North & Central America | United States | 2,219 | 1,808 | 2,422 | 3,405 | 2,605 | 1,692 | 2,894 |
| | Mexico | 312 | 197 | 353 | 314 | 183 | 226 | 274 |
| | Guatemala | 57 | 102 | 125 | 82 | 46 | 61 | 54 |
| | Nicaragua | 78 | 109 | 77 | 65 | 79 | 72 | 76 |
| | Total (including others) | 2,726 | 2,283 | 3,034 | 3,919 | 2,963 | 2,090 | 3,340 |
| South America | Brazil | 594 | 390 | 615 | 640 | 650 | 561 | 840 |
| | Argentine | 85 | 140 | 84 | 152 | 111 | 180 | 160 |
| | Columbia | 117 | 121 | 116 | 88 | 33 | 77 | 125 |
| | Peru | 88 | 57 | 101 | 94 | 31 | 72 | 96 |
| | Paraguay | 7 | 38 | 105 | 98 | 79 | 90 | 131 |
| | Total (including others) | 921 | 795 | 1,049 | 1,090 | 924 | 999 | 1,381 |
| Western Europe | Greece | 110 | 130 | 117 | 120 | 100 | 128 | 140 |
| | Spain | 54 | 43 | 61 | 70 | 55 | 37 | 52 |
| | Total (including others) | 169 | 176 | 179 | 192 | 156 | 167 | 193 |
| USSR & Eastern Europe | U.S.S.R | 2,342 | 2,528 | 2,866 | 2,825 | 2,602 | 2,674 | 2,537 |
| | Bulgaria | 15 | 11 | 12 | 11 | 11 | 11 | 11 |
| | Total (including others) | 2,364 | 2,546 | 2,885 | 2,842 | 2,619 | 2,691 | 2,554 |
| Africa | Egypt | 509 | 382 | 529 | 499 | 460 | 400 | 402 |
| | Sudan | 245 | 108 | 96 | 154 | 209 | 219 | 187 |
| | South Africa | 18 | 19 | 57 | 36 | 29 | 34 | 44 |
| | Tanzania | 76 | 42 | 51 | 45 | 40 | 47 | 40 |
| | Ivory Coast | 12 | 26 | 56 | 56 | 66 | 58 | 75 |
| | Zimbabwe | | 47 | 72 | 64 | 56 | 91 | 98 |
| | Mali | 20 | 39 | 40 | 38 | 50 | 54 | 49 |
| | Total (including others) | 1,270 | 974 | 1,152 | 1,136 | 1,191 | 1,202 | 1,201 |
| World Total | | 11,784 | 11,723 | 14,042 | 15,367 | 14,703 | 14,703 | 18,423 |

Source: Cotton World Statistics, ICAC Data
Provisional values are used for 1983/84.
Estimated values are used for 1984/85.

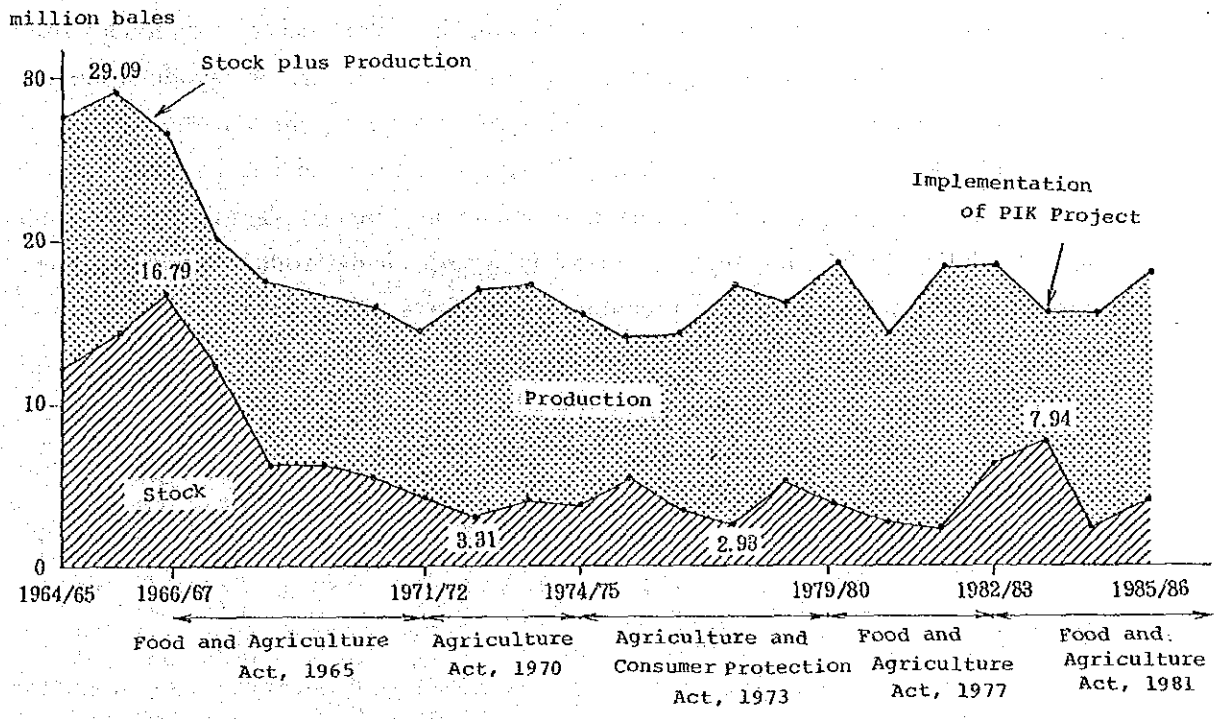
Table 12 Transition of Seed Cotton Demand/Supply and Consumption in the World

(Cotton year a year starting from 1st August)
(Unit: million bales 480 Lbs/bale)

| | 1980/81 | 1981/82 | 1982/83 | 1983/84 | 1984/85 (Provisional) | 1985/86 (Est.) | 1986/87 (Est.) |
|---|---|---|---|---|---|---|---|
| Stock at start of period (1st Aug.) | | | | | | | |
| United States | 3.00 | 2.67 | 6.63 | 7.94 | 2.78 | 4.07 | 9.39 |
| Other pure exporting countries | 8.89 | 8.07 | 9.05 | 7.77 | 7.50 | 12.55 | 11.49 |
| Pure importing countries | 5.34 | 4.53 | 4.46 | 4.14 | 4.00 | 4.01 | 4.27 |
| (Sub-total) | 17.23 | 15.26 | 20.14 | 19.85 | 14.28 | 20.63 | 25.14 |
| China, P. R. of | 2.21 | 3.02 | 2.74 | 3.78 | 8.00 | 19.30 | 23.40 |
| U. S. S. R | 2.07 | 2.16 | 2.18 | 1.97 | 2.73 | 3.20 | 3.30 |
| Other communist countries | 1.05 | 1.05 | 1.17 | 1.20 | 1.20 | 1.20 | 1.20 |
| (Sub-total) | 5.32 | 6.24 | 6.09 | 6.94 | 11.93 | 23.70 | 27.90 |
| World Total | 22.55 | 21.50 | 26.23 | 26.79 | 26.20 | 44.33 | 53.04 |
| Production | | | | | | | |
| United States | 11.12 | 15.64 | 11.96 | 7.77 | 12.98 | 13.88 | |
| Others | 27.69 | 28.25 | 26.97 | 26.08 | 34.35 | 31.82 | |
| (Sub-total) | 38.81 | 43.89 | 38.94 | 33.85 | 47.33 | 45.69 | |
| China, P. R. of | 12.43 | 13.63 | 16.53 | 21.28 | 28.70 | 23.00 | |
| U. S. S. R | 13.17 | 12.98 | 12.19 | 12.28 | 11.72 | 12.30 | |
| Other communist countries | 0.09 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | |
| (Sub-total) | 25.68 | 26.69 | 28.80 | 33.66 | 40.50 | 35.38 | |
| World Total | 64.50 | 70.58 | 67.73 | 67.51 | 87.83 | 81.07 | |
| Stock plus Production | | | | | | | |
| United States | 14.12 | 18.31 | 18.60 | 15.71 | 16.76 | 17.95 | |
| Others | 41.92 | 40.85 | 40.48 | 37.98 | 45.85 | 48.37 | |
| (Sub-total) | 56.04 | 59.16 | 59.08 | 53.69 | 61.60 | 66.32 | |
| China, P. R. of | 14.64 | 16.66 | 19.27 | 25.08 | 36.70 | 42.30 | |
| U. S. S. R | 15.23 | 15.13 | 14.37 | 14.25 | 14.45 | 15.50 | |
| Other communist countries | 1.13 | 1.13 | 1.25 | 1.28 | 1.28 | 1.28 | |
| (Sub-total) | 31.00 | 32.92 | 34.89 | 40.60 | 52.42 | 59.08 | |
| World Total | 87.05 | 92.08 | 93.97 | 94.30 | 114.03 | 125.04 | |
| Consumption | | | | | | | |
| United States | 5.89 | 5.26 | 5.51 | 5.93 | 5.48 | 5.58 | |
| Others | 32.89 | 32.21 | 33.41 | 34.42 | 35.55 | 36.30 | |
| (Sub-total) | 38.78 | 37.48 | 38.92 | 40.35 | 41.03 | 41.87 | |
| China, P. R. of | 15.08 | 16.09 | 16.41 | 16.30 | 16.30 | 17.50 | |
| U. S. S. R | 8.97 | 8.98 | 9.04 | 9.10 | 9.15 | 9.20 | |
| Other communist countries | 3.28 | 3.27 | 3.47 | 3.46 | 3.53 | 3.55 | |
| (Sub-total) | 27.33 | 28.35 | 28.91 | 28.86 | 28.93 | 30.25 | |
| World Total | 66.10 | 65.82 | 67.83 | 69.21 | 70.00 | 72.12 | |

Cited from: ICAC "Cotton", Dec. Issue, 1985

Fig. 3 Transition of Demand/Supply of American Cotton




## 3–4 Current Status and Forecast of Seed Cotton and Polyester Fiber Prices:

### 3–4–1 Current Status and Forecast of Seed Cotton Price :

1) Market price of seed cotton in Nepal and selling price of lint cotton at ginning factories are determined with the following factors :

Labour expenses for picking seed cotton is paid on a piecework payment basis to the following rates :

1 st Picking ..... 0.35 (NRs/kg )

2 nd Picking ..... 0.50 (NRs/kg )

The reason why the 2 nd picking charge is higher than the 1 st is that the 2 nd picking is harder and less volume than the 1 st, where a normal female worker harvests around 20—40kg a day, earning herself about NRs 7 —14 a day. Price of the seed cotton is determined by adding production costs such as cultivation, seeds, equipments and power, fertilizers and weeding to the above picking cost. Currently, the price is controlled by CDB to be approximately NRa 7 /kg as selling price of the seed cotton.

The seed cotton is then processed in a cotton ginning factory to be lint cotton and cotton seed. Selling prices at cotton ginning factories are as follows for their A—grade products :

- Lint cotton ..... 23.93 (NRs/kg )
- Cotton seed ..... 3.0 (NRs/kg )

These prices move in proportion to harvest in that year and price of Indian seed cotton (India H— 4 )26.0 NRs/kg . The buying price at textile factories is determined by adding inland transportation charge and insurance premium to the above selling price of the lint cotton. Buying price of the lint cotton at existing textile factories has been calculated as follows :

| | |
|---|---|
| Selling price of the lint cotton | 23.93 NRs/kg |
| Inland transportation cost (for about 500km distance) | 0.72 NRs/kg |
| Insurance premium (0.25%) | 0.06 NRs/kg |
| Sales tax (—) | — |
| Total (Buying price at factories) | 24.71 NRs/kg |

As against the above, buying price of the imported lint cotton from India is approximately 30.0 NRs/kg, which is about 21 % higher than the domestic lint cotton although there is some difference in their characteristic values. Under the circumstances, also from viewpoint of the price competition, domestic seed cotton cultivation should be further promoted to cover all of the domestic demands.

2) Cotton Prices (Lint Cotton) in the World :

As was already stated, the seed cotton is now in a state of oversupply in the world due to a big expansion in production in China. Under this world situation, United States, which has been for a long time a leading country in the world cotton economy, is now in a state of left—alone situation from general trend of the world due to its rigid pricing policy of the existing agricultural legislation and is facing with problems of her drastic decrease in American cotton exports and sharp rise of its stock level.

To cope with this situation and to give competitive pricing power to the American cotton, a new agricultural legislation has been enacted last year, which is scheduled to be put into effect as from August, 1986. This bill aims at solving at the same time the

difficult problems of allowing cotton planting farmers and dealers in American cotton to secure profits even though the American cotton is sold by a cheap international price, and at the same time of decreasing stock level of the cotton bought up and held by the American government. Under these circumstances, the market price in New York of the cotton, which in the former half of 1984 was at 80—85 US¢ /Lb (SLM 11/16), has gone down to 65—70 US¢ /Lb in a period from latter half of the year to former half of 1985. Furthermore, the price is now floating up and down around 60 US¢ /Lb from latter half of 1985 to former half of 1986.

Similar to this trend of the United States, prices of cottons produced in Australia, Nicaragua and Mexico are now going down to about 50—55 US¢ /Lb., and sales share, which so far has been held by the American cotton, is now largely replaced by Australian and Chinese cottons. Also, in respect of demands for cotton to be used for coarse yarn counts including counts Ne 20, Pakistani cotton is now beginning to be competitive in exports, and its price is now as cheap as 35—40 US¢ /Lb.

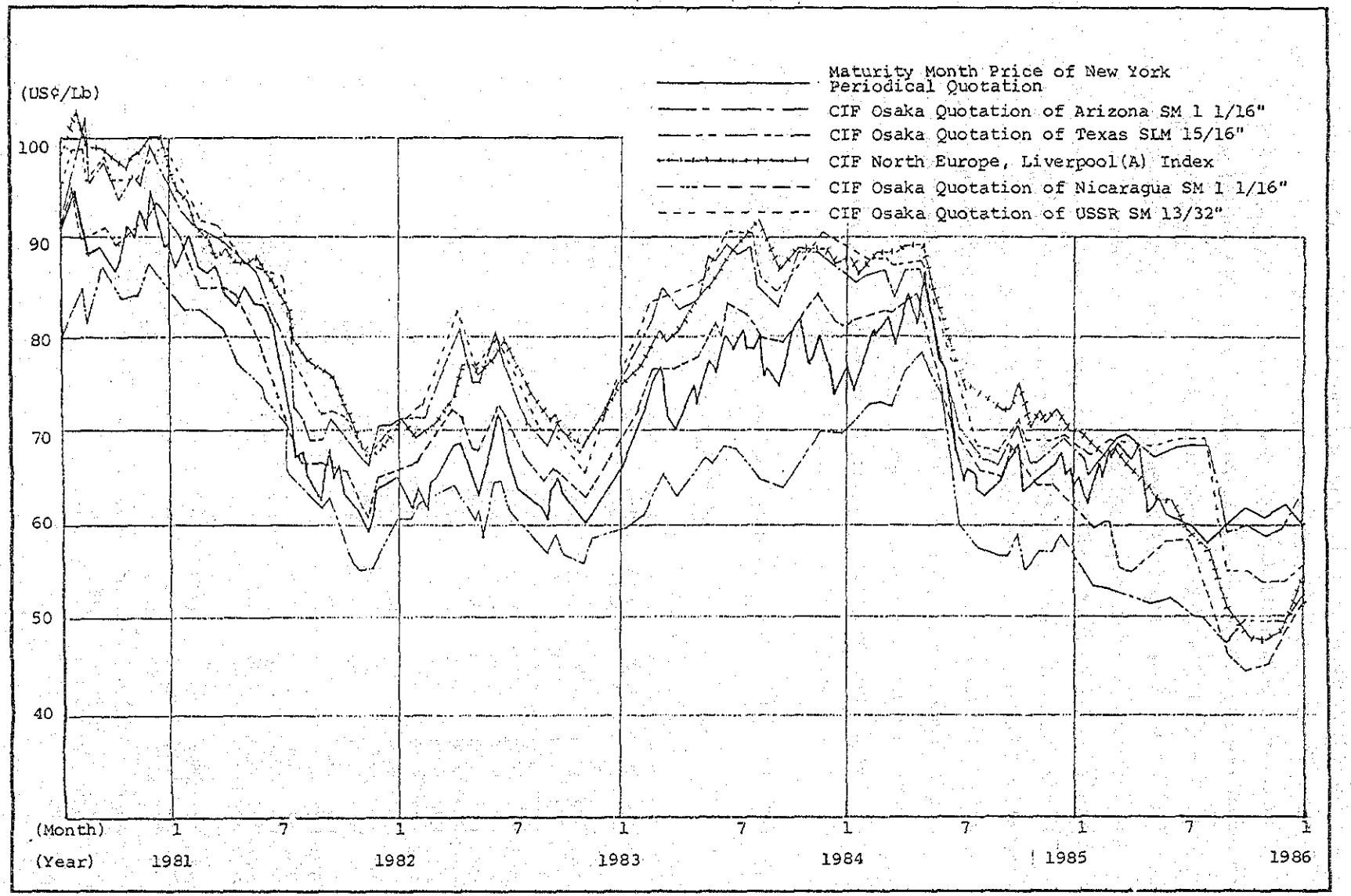
For referential purpose, these fluctuations of the price are shown in Table 13 and Fig. 4 .

**Tabll 13 New York Periodical and CIF Osaka Cotton Quotations (Unit: US¢/Lb.)**

| | American Cotton Sanhokins 3135 | Cal/Ali 3134 | Mexico SM 11/16" | Nicaragua SM | Australia | USSR Bervi | American Texas | Pakistan | New York SLM 11/16" |
|---|---|---|---|---|---|---|---|---|---|
| Jan., 1984 | 88.00 | 85.00 | 83.50 | 82.50 | 82.50 | (N)88.00 | 69.50 | | 76 |
| Feb., 1984 | 86.00 | 83.00 | 80.50 | 79.00 | 79.00 | (N)88.00 | 69.00 | | 78 |
| Mar., 1984 | 91.50 | 88.50 | 84.00 | 82.50 | 84.50 | | 74.00 | | 82 |
| Apr., 1984 | 86.00 | 84.00 | 82.50 | 81.00 | 82.50 | 86.00 | 75.00 | | 81 |
| May, 1984 | 88.50 | 86.50 | 84.00 | 83.00 | 84.00 | 88.00 | 78.00 | | 86 |
| June, 1984 | 86.00 | 84.00 | 82.50 | 81.50 | 82.00 | 85.00 | 76.00 | | 82 |
| Jul., 1984 | 83.50 | 81.50 | 73.50 | 75.00 | 75.00 | (N)83.00 | 70.00 | | 66 |
| Aug., 1984 | 70.00 | 68.00 | 68.00 | 68.00 | 69.00 | | 60.00 | 64.00 | 64 |
| Sep., 1984 | 69.50 | 67.50 | 67.00 | 66.50 | 66.50 | (N)70.00 | 58.50 | 60.00 | 64 |
| Oct., 1984 | 70.50 | 68.50 | 68.00 | 66.00 | | | 59.00 | 55.00 | 69 |
| Nov., 1984 | 69.00 | 67.50 | 66.50 | 65.50 | | (N)68.00 | 57.00 | 54.50 | 64 |
| Dec., 1984 | 68.50 | 67.00 | 66.00 | 65.50 | | | 57.00 | 53.00 | 66 |
| Jan., 1985 | 70.00 | 68.50 | 64.50 | 66.00 | 65.00 | 70.00 | 58.00 | 53.00 | 64 |
| Feb., 1985 | 68.50 | 67.00 | 62.50 | 61.50 | 60.00 | | 55.00 | 50.00 | 63 |
| Mar., 1985 | 68.50 | 67.50 | 61.00 | 60.50 | 55.00 | 68.00 | 54.50 | 45.00 | 68 |
| Apr., 1985 | 72.50 | 71.50 | 63.00 | 62.00 | 58.00 | 70.00 | 57.50 | 49.50 | 67 |
| May, 1985 | 70.00 | 69.00 | 63.50 | 61.50 | 57.50 | 70.00 | 57.50 | 47.50 | 63 |
| June, 1985 | 69.50 | 68.50 | 61.50 | 60.00 | 57.50 | (N)68.00 | 56.00 | 45.00 | 61 |
| Jul., 1985 | 70.00 | 69.00 | 58.00 | 55.00 | 53.00 | 68.00 | 54.50 | 42.00 | 60 |
| Aug., 1985 | 61.00 | 60.00 | 53.50 | 53.00 | 49.50 | | 51.00 | 39.50 | 58 |
| Sep., 1985 | 60.50 | 58.50 | 48.00 | 47.50 | 49.50 | 56.00 | 51.00 | 37.00 | 61 |
| Oct., 1985 | 62.00 | 59.00 | 44.00 | 43.00 | 49.50 | | 51.00 | 35.50 | 62 |
| Nov., 1985 | 61.50 | 59.50 | 44.50 | 43.50 | 50.00 | 53.00 | 52.00 | 34.50 | 61 |
| Dec., 1985 | 60.50 | 59.00 | 47.00 | 47.50 | 54.00 | 53.00 | 52.00 | 35.50 | 61 |
| Jan., 1986 | 65.00 | 63.50 | 51.50 | 51.50 | 53.00 | 55.00 | 54.00 | 38.50 | 62 |
| Feb., 1986 | 67.00 | 65.00 | 52.00 | 52.00 | 52.75 | 57.00 | 54.00 | 39.50 | 62 |

Remarks: (I) indicates quotation at middled of the month.
(N) means nominal prices (estimated)
Cited from: Data from Japan Spinning Association

Fig. 4 Graph of Transition of Cotton Quotation



3-4-2 Current Status and Forecast of Polyester Fiber Price :

Due to the 1 st and 2 nd oil shock caused in 1972 and 1979 respectively by OPEC countries, the oil price hiked sharply and went up to as high as approximately 34 US$/barrel. Thereafter, up to this date, the price has been in a range of 24-26 US$/barrel on an average, however, some months ago it went down to as low as 10-14 US$/barrel coming down below the 20 US$/barrel line. Due to this move, prices of products made of oil have naturally gone down in proportion to this move of the oil price. On the other hand, supply of the polyester fiber has been becoming excessive due to introduction of equipments and commencement of production in medium and under-developed countries in recent years in addition to that in the developed countries.

Tables 14-1, 14-2, as well as Fig. 5 indicate an example ( mean price daily fluctuating prices ) of the polyester staple fiber(ESS).

Table 14-1 Example-1 ESS (1.5D) Price (FOB, L/C, A/S) (Unit: US¢/kg)

| Year Month | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|---|---|
| January | — | 151.3 | — | 109.5 | 123.8 | — | — |
| February | — | 161.2 | — | 104.0 | 123.8 | 129.3 | — |
| March | — | 161.2 | 149.5 | 104.0 | 123.8 | 129.3 | — |
| April | — | 161.2 | 249.5 | 104.0 | 133.7 | 129.3 | 103.0 |
| May | — | 166.2 | 142.5 | 103.0 | 133.7 | — | — |
| June | — | 166.2 | — | 103.0 | 133.7 | — | — |
| July | 152.4 | — | — | 103.0 | — | — | — |
| August | 152.4 | — | — | 103.0 | — | 101.8 | — |
| September | 152.4 | — | — | 103.0 | — | 101.8 | — |
| October | 149.1 | — | — | 111.7 | — | 101.8 | — |
| November | 149.1 | 162.3 | — | 111.7 | — | — | — |
| December | 149.1 | 159.6 | 109.5 | 111.7 | — | — | — |

Table 14-2 Example-2 ESS (1.5D) Price (FOB, L/C, A/S) (Unit: US¢/kg)

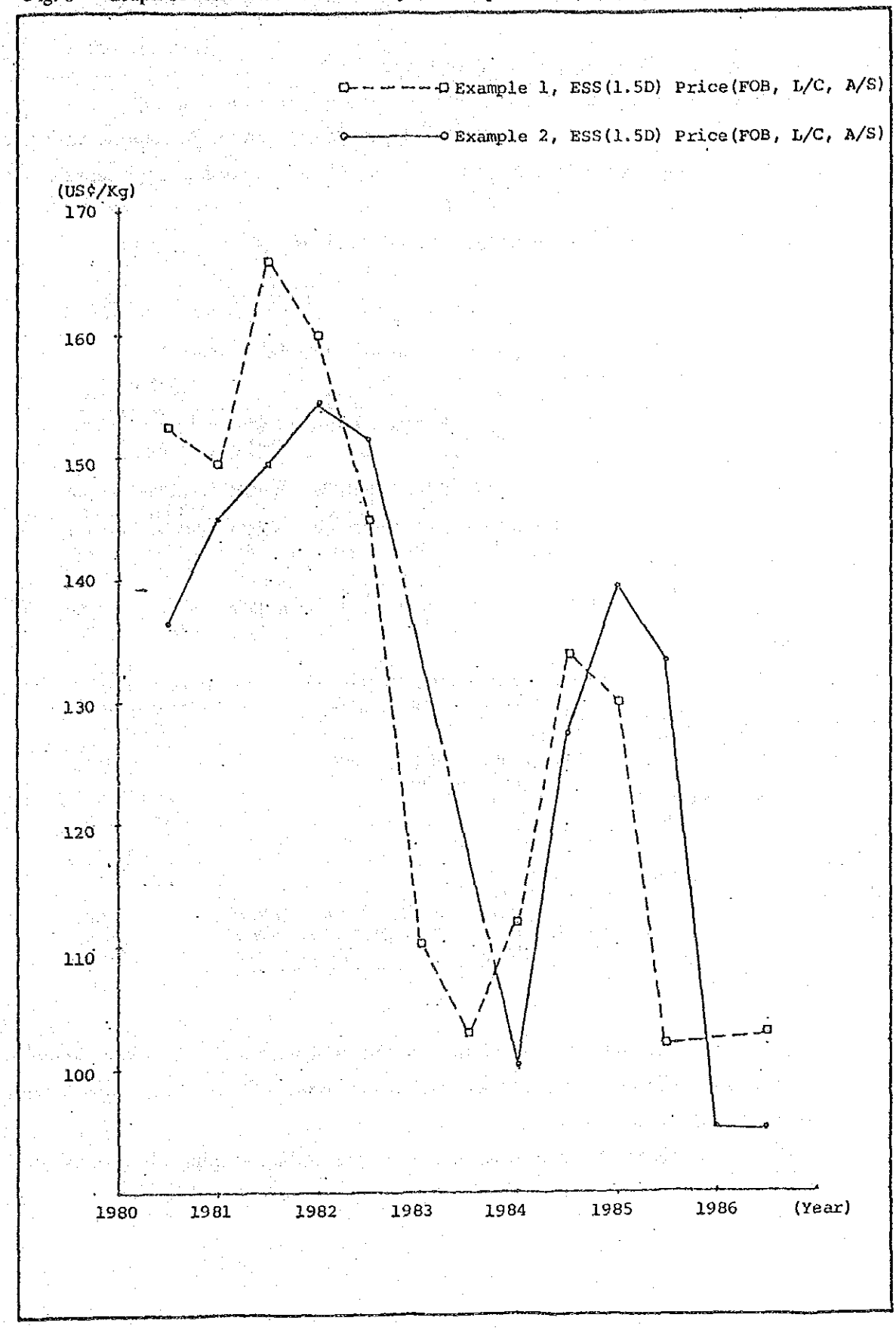
| Year Month | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 |
|---|---|---|---|---|---|---|---|
| January | 136.5 | 149.5 | 151.5 | — | 117.5 | 133.3 | 95 |
| February | 136.5 | 149.5 | 151.5 | — | 117.5 | 133.3 | 95 |
| March | 136.5 | 149.5 | 151.5 | — | 117.5 | 133.3 | 95 |
| April | 136.5 | 149.5 | 151.5 | — | 127.5 | 133.3 | 95 |
| May | 136.5 | 149.5 | 151.5 | — | 127.5 | 133.3 | 95 |
| June | 136.5 | 149.5 | 151.5 | — | 127.5 | 133.3 | — |
| July | 145.0 | 154.7 | — | 96.0 | 139.8 | 95.0 | — |
| August | 145.0 | 154.7 | — | 96.0 | 139.8 | 95.0 | — |
| September | 145.0 | 154.7 | — | 96.0 | 139.8 | 95.0 | — |
| October | 145.0 | 154.7 | — | 105.0 | 139.8 | 95.0 | — |
| November | 145.0 | 154.7 | — | 105.0 | 139.8 | 95.0 | — |
| December | 145.0 | 154.7 | — | 105.0 | 139.8 | 95.0 | — |

When the price is compared with that of the lint cotton, now the price of the polyester staple fiber is cheaper than that of the lint cotton.

- As at January, 1986·····Cotton(Lint cotton) ·····New York Periodical SLM 11/16″ 136. 4 US ¢/kg
- As at January, 1986·····Polyeste staple fiber(1. 5D) ···FOB, L/C, A/S 95-103 US¢/kg

Quotations are as indicated as above, and there are even such countries among seed cotton planting developing countries which are importing synthetic fibers and exporting seed cotton in order to change themselves into synthetic blended textile fabrics industries.

Fig. 5 Graph of Price Transition of Polyester Staple Fiber (ESS) by Destination Country



## 3–5 Characteristic of Various Seed Cotton and General Description of Polyester Fiber:

### 3–5–1 Quality Analysis of Seed Cotton by Grade :

Nature of the seed cotton and major grading criteria of it are as follows :

1) For grading, mainly visual check is carried out, where grading is determined by an overall evaluation through appearance of tint, crowded condition of leaves, and preparations.

Table 15 indicates relation between the grade and tint

Table 15 Grades of American Cotton and Code No. for Tints

| Color codes | (0) | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|---|
| Grades | Plus | White | Light spotted | Spotted | Tinged | Yellow stained | Light grey | Gray |
| (1) Strict good middling | | (01)SGM | | | | | | |
| (1) Good middling | | (11)GM | (12)GM Lt Sp | (13)GM Sp | (41)GM Tg | (15)GM YS | (16)GM Lt Gray | (17)GM Gray |
| (2) Strict middling | | (21)SM | (22)SM Lt Sp | (23)SM Sp | (24)SM Tg | (25)SM YS | (26)SM Lt Gray | (27)SM Gray |
| Middling plus | (30)M plus | | | | | | | |
| (3) Middling | | (31)M | (32)Mid Lt Sp | (33)Mid Sp | (34)Mid Tg | (35)Mid YS | (36)Mid Lt Gray | (37)Mid Gray |
| Strict middling plus | (40)SLM plus | | | | | | | |
| (4) Strict low middling | | (41)SLM | (42)SLM Lt Sp | (43)SLM Sp | (44)SLM Tg | | (46)SLM Lt Gray | (47)SLM Gray |
| Low middling plus | (50)LM plus | | | | | | | |
| (5) Low middling | | (51)LM | (52)LM Li Sp | (53)LM Sp | (54)LM Tg | | | |
| Strict good ordinary plus | (60)SGO plus | | | | | | | |
| (6) Strict good ordinary | | (61)SGO | | | | | | |
| Good ordinary | (70)GO plus | | | | | | | |
| (7) Good ordinary | | (71)GO | | | | | | |
| (8) Below grade | | (81)BG Below GO | (82)BG Below LM Lt Sp | (83)BG Below LM Sp | (84)BG Below LM Tg | (85)BG Below Mid YS | | (87)BG Below SLM Gray |

2) For grading of fiber length, both visual and touching tests are used, where grade is determined by collation of the representative part of drawn fiber from the sample with the authorized standard fiber type.

Table 16 shows general relation between these fiber lengths and spinnable yarn counts.

Table 16 Relation between Fiber Lengths and Spinnable Yarn Counts

| Fiber Lengths (in) | Carded Yarn | | Combed Yarn | |
|---|---|---|---|---|
| | warp | weft | warp | weft |
| Up to 1 | Up to 28s | Up to 36 | — | — |
| Up to 1 1/8 | — | — | Up to 30s | Up to 40s |
| 1 1/8—1 1/4 | 30— 50s | 40— 60s | 30— 60s | 40— 70s |
| 1 1/4—1 3/8 | 50— 75s | 60— 80s | 60— 70s | 70—100s |
| 1 3/8—1 1/2 | 50— 75s | 60— 80s | 70— 80s | 100—120s |
| 1 1/2—1 5/8 | 75—100s | 80—120s | 80—100s | 120—150s |
| 1 5/8—1 3/4 | 75—100s | 80—120s | 100—180s | 150—180s |
| Over 1 3/4 | — | — | 150—100s | 150—300s |

3) The character means various factors not belonging to the grade nor staple, which includes the following :

Fineness

Maturity

Tensile Strength

Unitormity of fiber length.

The evaluation standards are shown in Table 17.

## Table 17 Quality Evaluation Standards for Cotton Fibers

(1) Characteristics of Fiber Length:

| | | |
|---|---|---|
| Uniformity of fiber length M/UHM (Servo type) | Extremely uneven | Less than 74 |
| | Uneven | 74—76 |
| | Normal | 77—79 |
| | Even | 80—82 |
| | Extremely even | Over 82 |
| Uniformity of fiber length 50/2.5 (Digital type) | Extremely uneven | Less than 42 |
| | Uneven | 42—43 |
| | Normal | 44—45 |
| | Even | 46—47 |
| | Extremely even | Over 47 |
| Variation coefficient of Fiber length | Extremely small variation | Less than 26 |
| | Small variation | 26—29 |
| | Normal | 30—33 |
| | Large variation | 34—37 |
| | Extremely large variation | Over 37 |

(2) Fiber Strength:

0 Gauge:

| Evaluations | 1000psi | g/tex |
|---|---|---|
| Very weak | Less than 70 | Less than 34 |
| Weak | 70—76 | 34—37 |
| Normal | 77—83 | 38—41 |
| Strong | 84—90 | 42—45 |
| Very strong | Over 90 | Over 45 |

1/8 in. Gauge:

| Fiber Length (in) | g/tex |
|---|---|
| Less than 15/16 in. | 20 |
| 31/32—1-1/16in. | 22 |
| 1-3/32—1-1/4in. | 24 |
| More than 1-9/32 in. | 33 |

(3) Fineness by Micronnaire

| | | |
|---|---|---|
| Fineness | Extremely fine | Less than 3.5 |
| | Fine | 3.5—3.9 |
| | Average | 4.0—4.4 |
| | Rough | 4.5—5.0 |
| | Extremely rough | Over 5.0 |

(4) Maturity:

| | | |
|---|---|---|
| Causticare scale maturity index | Very immature | Less than 72 |
| | Immature | 72—75 |
| | Normal | 76—79 |
| | Mature | 80—83 |
| | Very mature | Over 83 |

(5) Sugar Content

| | | |
|---|---|---|
| Sugar content(%) | High | More than 0.3 |
| | Normal | 0.1—0.3 |
| | Low | Less than 0.1 |

(6) pH Value:

| | | |
|---|---|---|
| pH value | Very high | More than 10 |
| | High | 9—10 |
| | Normal | 7—8 |
| | Low | 5—6 |
| | Very low | Less than 5 |

3-5-2 Quality Analysis of Seed Cotton harvested in Nepal :

Table 18-1 indicates results of analysis made by Experiment Center of Japan Spinning Tests Association of the lint cotton planted and harvested recently in Nepal.

**Table 18-1 Results of Analysis of Cotton harvested in Nepal**

Testing Method: JIS L 1019 Cotton Fiber Testing Method
Results of the Test: As following

| Test items | | | Test pieces Grade (A) | Grade (B) |
|---|---|---|---|---|
| Fiber length | Fibrograph method | 50% span length (in) | 0.50 | 0.41 |
| | | 2.5% span length (in) | 1.11 | 1.01 |
| | | Evenness (%) | 45.0 | 40.6 |
| | Sorter method | Efective fiver length (in) | | |
| | | Content ratio of short fibers | | |
| Tensile strength | Pressley index (WSR) | | 7.1 | 6.7 |
| | Strength (1000 Lbs/in2) | | 76.6 | 72.4 |
| Fineness (Micronaire reading) | | | 3.3 | 2.7 |
| Maturity (index) | | | 75.8 | 72.3 |
| Tint | Reflenctance (Rd) | | | |
| | Yellowness (b) | | | |
| Impurities | Foreign matters | | | |
| | Scattering (%) | | | |
| | Total content (%) | | | |
| | Honeydew | | Nill | Very few |
| | Remarks: | | | |

Temperature in Laboratory: 20°C. Relative humidity: 65%

Table 18-2 indicates test results of the sample taken from the same lint cotton conducted by a spinning company in Japan, where for making sure those under (A) grade are separated into Saw Gin and Roller Gin and also test items are modified slightly.

**Table 18-2 Analysis Results of Cotton harvested in Nepal**

| Test items | Grade (A-1) Saw Gin | Grade (A-2) Roller Gin | Grade (B) |
|---|---|---|---|
| Fiber length (by fibrograph method) | | | |
| 50% Span length (in) | 0.52 | 0.54 | 0.42 |
| 2.5% Span length (in) | 1.13 | 1.07 | 1.04 |
| Evenness (%) | 46.0 | 50.4 | 40.4 |
| Pressley strength (1,000Lbs/in$^2$) | 79.7 | 82.1 | 73.9 |
| Micronaire fineness | 3.35 | 2.5 | 2.85 |
| Sugar content (by 5-stage method) | 1.5 | 1.5 | 2.0 |

When the seed cotton is evaluated from the above mentioned results of analysis, the following can be said :

1) When strength of a single yarn is estimated, it will be 215-220g for grade (A) and approximately 200g for the grade (B). If with the said strength for the grade (A), spinning should be possible for Ne. 40 combed yarns and polyester/cotton blended yarns.

2) Since the grade(A-1)is found to be a little too fine, care must be taken to avoid nep taking place in spinning of fine yarn counts. Since the grade(A-2)is too fine, it is recommended not to be used for spinning yarns of fine yarn counts as neps will take place at that time.

3) The grade(B)was found to be discolored, extremely uneven, and further too fine, and as such can not be used in general sense. If yet to be used, it should be for spinning yarns of low grade.

3-5-3 Points to Be Observed in General Use of Lint Cotton :

It is needless to say that to decide which kind of the lint cotton to be used in a spinning factory is the most important factor. It is required in a factory to test the delivered lint cotton by means of a tester to use it suitably for appropriate product categories according to its grade, fiber length and character resulted by the tests.

On the other hand, while spinning conditions of the production machinery should be appropriate for the raw cotton to be used, yet in some cases, selection of the raw cotton should be made according to the specifications of available production machinery. In addition to the above, there are following cases which are apt to occur in a factory :

1) Mixture of foreign fibers :

It is often found that foreign fibers such as waste cloth, colored waste yarn or string etc. are mixed in the cotton to be used. Sometimes, even mixtures of metals such as iron scrap piece, nail, bolt or nut etc. are found. These should be removed with an utmost care at feeding the raw cotton into the machine.

2) Honeydew :

Very often honeydew causes troubles of yarn and shivers winding round rollers. Usually, honeydew appears on fibers in a state of small grains of brown, dark green or black colors. If these grains of honeydew are fonud, they shall be disposed before use so that the subsequent troubles in the process to be avoided.

3) Immature Cotton :

Yarns spinned with lint cotton containing much immature part are considerably inferior in yarn evenness and strength, and further, this sort of cotton often causes roller troubles. While there is a way to know to some extent mixture of the immature by measuring suger content in the seed cotton, yet inclusion of the immature is considered to be comparatively much when the fiber is found to be extremely fine by micronaire fineness measurement as compared with the other of the same kind cotton.

3-5-4 General Description of the Polyester Fiber:

The reason why a large quantity of the polyester fibers has come to be produced and consumed is for its excellent properties, among which it is particularly superior to other

synthetic fibers in respect of the following as a fiber of spinning and weaving for general use:

1) Strength:
   The polyester fiber is far stronger than the aclyric fiber and has durability next to the nylon fiber. Its special merit is the unchanged strength in dry and humid conditions.
2) Auti-abrasiveness:
   It is far better in anti-abrasiveness than natural and acrylic fibers, next to the nylon.
3) Moisture/Water Absorbing Property:
   Its moisture content ratio is 0.4% under 20℃. temperature and 65 % RH humidity, which can be said almost without moisture absorbing property. It is also with less water absorption and dries up fast if got wet.
4) Crease Preventiveness
   Its recovering property from creases is quite superb and is better than the wool in moistened and highly humid conditions.
5) Touch:
   It is felt elastic and warm and its woven fabrics can be worn very comfortably.
6) Thermal Resistance
   It has best of this property among various synthetic fibers with its melting point at about 259-263℃.
7) Chemical Proof
   It is generally resistant against chemicals, especially more resistant against acids.
8) Resistant Properties against Moulds, Worms and Bacilli:
   It is not damaged by either mould, worm or bacteria.
9) Thermosetting Property:
   Once set thermally, it never deforms. Consequently, it does not shrink, cause small creases nor extend, and keeps stable pleats and wash & wear property.
10) Blendability with Other Fibers:
    With a better blendability of spinning with other kinds of fibers, merits of other fibers are further improved by the blending.
11) Electrical Property:
    It has a better electric insulation property.

In many cases, twill for uniforms and poplin for shirting cloths are produced by blending the polyester fiber having aforesaid merits with the lint cotton. Standard physical specification of the polyester fiber to be used is as follows:

| | |
|---|---|
| Denier | 1.4−1.5 D |
| Denier variation ratio | ± 5 % |
| Cut length | 38 mm |
| Devidtion percetage of cut lenth | ± 5 % |
| Dry tenacity | More than 6.7g/d |
| Dryelongation | 25.5± 4 % |
| Number of crimps 25mm | 14±2.5% |
| Oil attachment ratio | 0.11±0.05% |
| Melting point | 262± 5 ℃ |
| Moisture content ratio (Under standard condition) | 0.4% |

### 3−6 Procurement of Sub-materials, Dyestuffs and Chemicals:

Self-sufficient materials like mustard oil (a kind of grain oil) for sizing material and flour are not used for polyester/cotton blended yarn. Sodium silicate and urea are also suppied within Nepal.

These are cement and fertilizer factories, which are producing some by-products. Other sizing materials, sub-materials, dyestuffs and chemicals than the above must all be imported from abroad. Cur-rently, Nepal is importing these mainly from India, China and West Germany. Buying price at factories is made up by adding the following costs to the CIF value at Calcutta:

| | |
|---|---|
| Import duty | 11%of CIF value |
| Unloading and other port charges | 1 % of CIF value |
| Inland transportation charge (Calcutta-Nepal) | about 1 NRs/kg |
| Insurance premium | 0.25% of CIF value |

Table 19 shows comparison of various commodity prices obtained through the site survey and prices in Japan, where following conversion rates are used:

1 US$ ..... 21 NRs
1 US$ ..... 176¥
1 NRs ..... 8.4¥

## Table 19 Prices of Dyestuffs and Chemicals (Unit: US$/kg)

| Items Commodities | Specifications | Domestic product | Imported product | Imported from | Price in Japan | Price comparison Nepal/Japan |
|---|---|---|---|---|---|---|
| (Sizing Materials) | | | | | | |
| Corn starch | | | 0.37 | India | 0.49 | 0.76 |
| Mustard oil | | 0.95 | — | homemade | — | — |
| Cepol HV | Sizing agent | | 0.51 | India | — | — |
| Beta Naphthol | | | 4.10 | India | — | — |
| Flour | | 0.25 | — | Homemade | — | — |
| (Chemicals) | | | | | | |
| Caustic soda | Solid 99% | | 0.29 | China | 0.26 | 1.12 |
| Soda ash | | | 0.42 | India | 0.34 | 1.24 |
| Hydrogen peroxide | | | 2.1 | India | 0.64 | 3.28 |
| Sodium sulfite | | | 0.65 | India | — | — |
| Sulphuric acid | | | 0.33 | India | — | — |
| Acetic acid | | | 1.40 | India | 0.84 | 1.67 |
| Hydrochloric acid | | | 0.09 | India | — | — |
| Hydrosulfite | | | 1.10 | West Germany | 1.48 | 0.74 |
| Ammonia | | | 0.77 | India | — | — |
| Chlorine gas | | | 0.68 | India | — | — |
| Cepol HV | | | 0.51 | India | — | — |
| Sodium acetate | | | 0.69 | India | — | — |
| Sodium nitrate | | | 1.25 | India | — | — |
| Sodium silicate | | | 0.19 | Homemade | — | — |
| Desizing agent | DS Conc. | | 0.52 | India | — | — |
| Desizing agent | DAT | | 1.72 | India | — | — |
| Penetrant | CVO | | 1.25 | India | — | — |
| Urea | | 0.17 | — | Homemade | — | — |
| (Reactive dyestuff) | | | | | | |
| Procion Brillant | Red H8B | | 10.75 | India | 23.86 | 0.45 |
| Procion Brillant | Blue H5G | | 10.37 | India | — | — |
| Procion Brillant | Black HN | | 17.24 | India | — | — |
| Procion Navy | Blue H3R | | 18.16 | India | — | — |
| Youhoa Reactive | Violet K3R | | 6.86 | China | — | — |
| Youhoa Reactive | Yellow KRN | | 5.95 | China | — | — |
| (Naphthol Dyestuff) | | | | | | |
| Naphthol | AS | | 9.88 | India | — | — |
| Naphthol | AS D | | 11.33 | India | — | — |
| Veramin Blue | B salt | | 3.38 | India | — | — |
| (Vat Dyestuff) | | | | | | |
| Navinon Jade Green | FFB | | 45.14 | India | 17.61 | 2.56 |
| Navinon Blue | BC | | 20.38 | India | — | — |
| Navinon Yellow | CCN-H/C | | 35.34 | India | — | — |
| Navinon Olive Green | B | | 23.41 | India | — | — |
| Navinon Brilliant Violet | RR | | 31.93 | India | — | — |
| Indanthrane Olive | RM | | 13.79 | West Germany | — | — |
| Youhoathrane Blue | RSN | | 10.76 | China | — | — |
| (Packing Materials) | | | | | | |
| Corrugated Cardboard for Cotton Cheeses | (170×C170g, 600×290×420) | | — | Japan | 0.59 | ($/pc) |
| Corrugated Cardboard for Cotton Cheeses | ESF3K×12pcs, B280×B220g, 535×400×425 | | — | Japan | 1.0 | ($/pc) |
| Kraft paper cut at 75kg/m$^2$ | | | — | Japan | 1.11 | ($/kg) |
| Polyethyl film bag | | | — | Japan | 0.00142 | ($/cc) |
| Sewing thread, 30/5000 bleached | | | — | Japan | 6.62 | ($/pc) |

Cited from: Monthly Report of Japanese Materials (March, 1986).
Data of Hetauda Textile Industries.

## Chapter 4. SITE SELECTION AND CONDITION OF LOCATION

# 4. SITE SELECTION AND CONDITION OF LOCATION

## 4-1 Method of Selection and Evaluation criteria

One of the main objectives for the Field Study Team was to recommend the most suitable site for the Project among a number of prospective places offered by the Government of Nepal.

Since the success of the Project is deeply dependent on appropriate selection of the site, to make careful studies and detailed analysis of each proposed site are very crucial.

The method of site selection and its evaluation criteria applied were the following stagewise elimination.

–STEP 1 : Preliminary Selection

By applying 4 primary criteria, –geographical conditions, power supply, water availability and physical site features – and through referring to experiences in the similar type of projects, a number of places proposed by the government of Nepal to be eliminated to 2 or 3 prospective sites.

–STEP 2 : Detailed Evaluation

Site investigation to each pre-selected site shall be carried out and elaborate assessment shall be made by using value analysis method. Evaluation criteria and their weighting factors were decided in advance by the Experts as shown in Table 1.

–STEP 3 : Recommendation

The result of step 2 shall be further examined to make firm recommendation on the most suitable site to be selected.

## 4-2 Course and Result of Site Selection

The Site to be selected was recommended to the Government of Nepal by the Field Study Team during their visit to Nepal in March '86 in compliance with the procedure mentioned above.

The following is the course and result of the site selection.

At the beginning, following 6 places, all in Nepalgunj or Dang Area, were offered by the Government of Nepal (For location of offered sites, see Fig. 1) as the proposed site for the Project.

## Table 1 Site Selection – Value Analysis (1)

| | CRITERIA \ WEIGHTING FACTOR | | SITE A | | SITE B | | SITE C | |
|---|---|---|---|---|---|---|---|---|
| | | | MARK | WEIGHTED TOTAL | MARK | WEIGHTED TOTAL | MARK | WEIGHTED TOTAL |
| 1 | GEOGRAPHICAL POSITION | | | | | | | |
| | 1-1 Site Location (Town, Distance, Existing Industry) | 6.0 | | | | | | |
| | 1-2 Climate in General | 6.0 | | | | | | |
| | 1-3 Earthquake/Thunder/Tornade/Storm etc. | 6.0 | | | | | | |
| | 1-4 Public Authorities | 2.0 | | | | | | |
| | 1 : Sub-total | 20.0 | | | | | | |
| 2 | POWER SUPPLY | | | | | | | |
| | 2-1 Availability | 15.0 | | | | | | |
| | 2-2 Quantity | 3.0 | | | | | | |
| | 2-3 Quality | 2.0 | | | | | | |
| | 2 : Sub-total | 20.0 | | | | | | |
| 3 | WATER SUPPLY | | | | | | | |
| | 3-1 Availability | 15.0 | | | | | | |
| | 3-2 Quantity | 3.0 | | | | | | |
| | 3-3 Quality | 2.0 | | | | | | |
| | 3 : Sub-total | 20.0 | | | | | | |
| 4 | PHYSICAL SITE FEATURES | | | | | | | |
| | 4-1 Site Area/Cost of Procurement | 4.0 | | | | | | |
| | 4-2 Slope/Surface | 2.0 | | | | | | |
| | 4-3 Soil (Top-soil, Sub-soil, Bearing Capacity) | 2.0 | | | | | | |
| | 4-4 Underground Water | 1.0 | | | | | | |
| | 4-5 Site Clearance/Cut and Fill | 0.5 | | | | | | |
| | 4-6 Existence of Embedded Pipes/Cables | 0.5 | | | | | | |
| | 4-7 Site Restriction or Restraint | 5.0 | | | | | | |
| | 4 : Sub-total | 15.0 | | | | | | |
| 5 | ENVIRONMENTAL PRESERVATION | | | | | | | |
| | 5-1 Receiving River | 3.0 | | | | | | |
| | 5-2 Prevailing Wind Direction | 2.0 | | | | | | |
| | 5-3 Natural Preservation | 2.0 | | | | | | |
| | 5-4 Laws/Regulations | 3.0 | | | | | | |
| | 5 : Sub-total | 10.0 | | | | | | |

## Table 1 Site Selection – Value Analysis (2)

| CRITERIA \ WEIGHTING FACTOR | | | SITE A | | SITE B | | SITE C | |
|---|---|---|---|---|---|---|---|---|
| | | | MARK | WEIGHTED TOTAL | MARK | WEIGHTED TOTAL | MARK | WEIGHTED TOTAL |
| 6 | TRANSPORTATION | | | | | | | |
| | 6-1 Road Network/Access to Site | 2.0 | | | | | | |
| | 6-2 Railroad | 2.0 | | | | | | |
| | 6-3 Bus-services | 1.0 | | | | | | |
| | 6-4 Air Transportation/Sea Routes | 1.0 | | | | | | |
| | 6 : Sub-total | 6.0 | | | | | | |
| 7 | GENERAL INFRASTRUCTURE | | | | | | | |
| | 7-1 Communication | 1.0 | | | | | | |
| | 7-2 Construction Materials | 1.5 | | | | | | |
| | 7-3 Fuel/Gas | 1.0 | | | | | | |
| | 7-4 Services/Shop/Repair | 1.5 | | | | | | |
| | 7-5 Health/Admi. Facility | 0.5 | | | | | | |
| | 7-6 Recreation Facility | 0.5 | | | | | | |
| | 6 : Sub-total | 6.0 | | | | | | |
| 8 | STAFF AND LABOUR POTENTIALS | | | | | | | |
| | 8-1 Availability | 1.0 | | | | | | |
| | 8-2 Quality | 0.5 | | | | | | |
| | 8-3 Quantity | 1.0 | | | | | | |
| | 8-4 Productivity/Absentism | 0.5 | | | | | | |
| | 8 : Sub-total | 3.0 | | | | | | |
| | TOTAL | 100 | | | | | | |

[REMARKS]

Weight (Gravity)

5 : Most Suitable

4 : Suitable

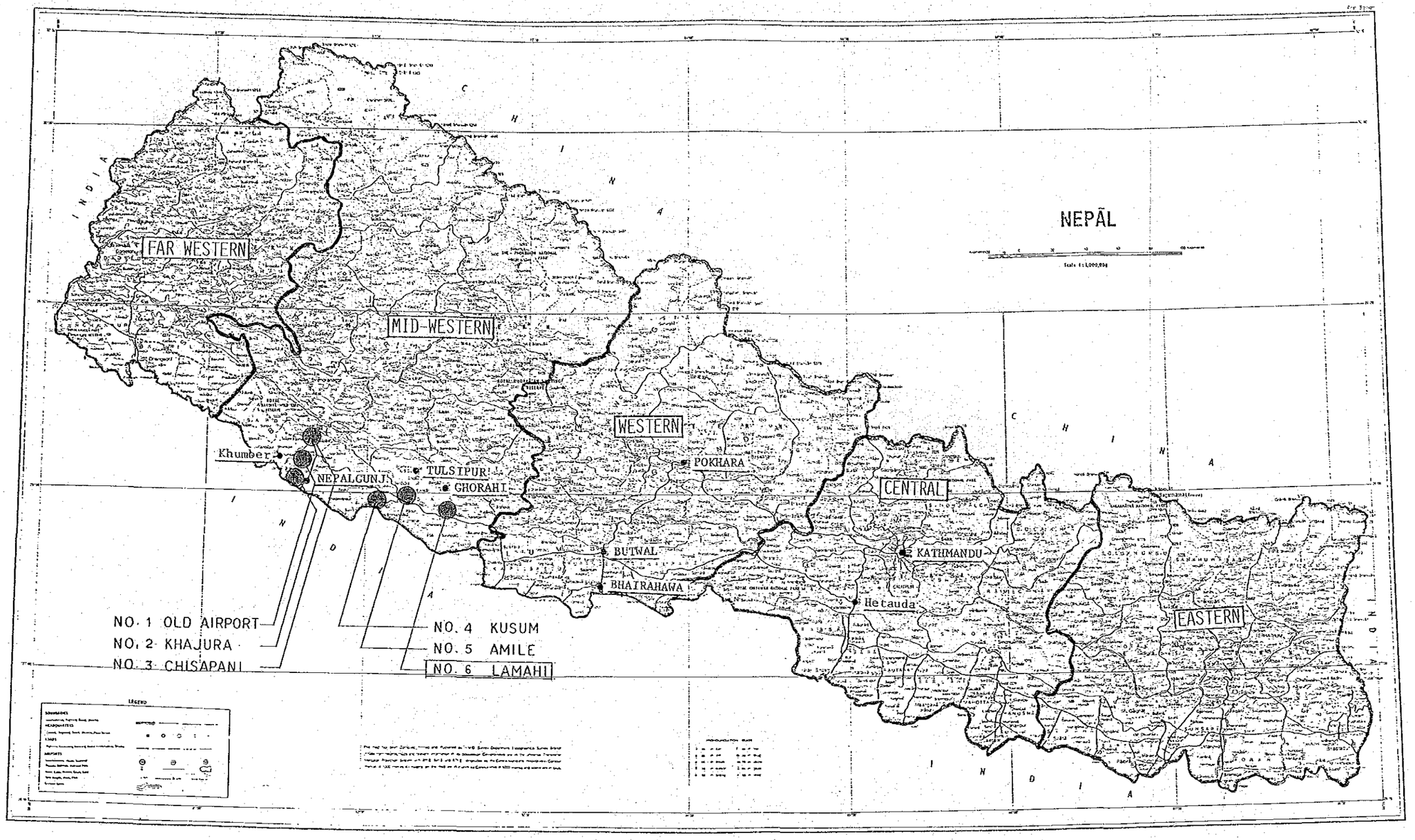
3 : Suitable but minor restrictions

2 : Suitable but major restrictions

1 : Unsuitable

Full Mark : 500

Fig. 1 Location of Proposed Sites



(Nepalgunj)

–Site No. 1 . . . . . Khajura Old Airport

–Site No. 2 . . . . . Khajura

–Site No. 3 . . . . . Chisapani

–Site No. 4 . . . . . Kusum

(Dang Area)

–Site No. 5 . . . . . Amile

–Site No. 6 . . . . . Lamahi

4-2-1 STEP 1 : Preliminary Selection

Step 1 was the method of selection through experiences and intuition of the Experts. Both the Site No.4 and the Site No.5 have no power available presently and the distance from the Sub-station under construction to the Site No.4 and Site No.5 are 40 km and 50 km respectively.

In addition, Nepalgunj and Butwal where labours and materials for the project to be procured are also quite far away from the Site No.4 as 70 km/170 km and the Site No.5 as 80 km/160 km respectively.

As a result of unsatisfactory evaluation on two primary items, i.e. power supply and geographical location, among 4 pre-selected primary criteria, both the Site No.4 and No.5 were eliminated.

Since geographical location of the Site No.2 is quite adjacent to the Site No.1, except configuration of the site, other conditions such as power supply, water availability, etc. are almost the same each other.

The Site No.1 is owned by the Government and special site preparation works are not to be required due to remains of the airport, whereas the Site No.2 is now a private land which may require special procedures for procurement. Further, physical features of the Site No.2 are not on the same level with the Site No.1, namely heavy site preparation works such as removal of top-soil and filling to the recessed area will be necessiated at the Site No.2. Consequently the Site No.2 was also eliminated.

4-2-2 STEP 2 : Detailed Evaluation

Following careful site investigation to three pre-selected sites, detailed evaluation and assessment were carried out by the Field Study Team through referring to each evaluation criterion and by using the value analysis method.

1) Geographical Location

The Site No. 1 is located 8 km west of Nepalgunj and the Site No. 3 is 38 km north of the same city. The Site No. 6 is situated south of Ghorai with a distance of 23 km, and lying halfway between Nepalgunj and Butwal, having a distance of approx. 100 km and 130 km respectively from these cities.

All are in the Terai Region and thus having similar weather characteristics as the sub-tropical Monsoon.

With regard to the public facilities and governmental offices concerned, Nepalgunj, the center of Banke District covers both the Site No. 1 and No. 3, and the Ghorai, the center of Dang Area covers the Site No.6.

2) Power Supply

The Sub-station of 10,000 KVA capacity is now under construction at Kohalpur and the 3,000 KVA power lines to Nepalgunj from this sub-station will be expected to be complete by 1987.

It is, however, questionable in terms of capacity whether sufficient power will be made available to the Site No. 1 from this line.

Another alternative is to take power from this Sub-station directly but this will also be quite costly in view of the distance of 20 km.

Power supply to the Site No. 3 also depends on the same Sub-station, but there has been no scheme so far of constructing 10 km length power line to this Site.

Power to the Site No. 6 will be supplied from the 5,000 KVA Sub-station which is in progress at Lamahi, being situated 2.5 km west of this Site.

Eventually, Site No. 6 has the least problem among three prospective sites in respect of the power supply for the Project.

3) Water

There is no source of water available at and around the Site No. 1 and existing industries adjacent are taking water from the deep wells. A small brook of 4 m in width runs north-east of the Site with a distance of 700 m and will be utilized as the discharging river.

East of the Site No.3, there is a small brook, but it seems to be very difficult to take water from this brook because of its limited flow. Man River running at south of the Site will also create distance-wise problem as a water source.

Thus, water intake by means of shallow wells is to be investigated.

Arjun River runs just east of the Site No. 6, along the road to Ghorai and no problem thus is anticipated in taking and discharging water from/to this river.

4) Physical Site Features

The site No. 1 is the remains of the airport as mentioned before. Therefore the land is almost flat and drainage system of the overall area has already been taken into account.

The Site No. 3, being utilized as a farmland, was a forest formerly and some stumps are still remaining now. Although 2 to 3 meters difference in height are observed in this Site, there would be no hinderance to earthworks in general.

The Site No. 6 is an untilized land now and having 3 to 4 meters accidents of the ground. Whereas some stones are observed on the surface, sub-soil is presumably considered as clayish laterite and enough bearing power of the soil is expected in so far as a building stands on the cut area.

As regards ownership of the land, unlike the Site No. 1 and the Site No. 6, both owned by the Government, the Site No. 3 is a private estate and cost of procurement shall be taken into consideration.

5) Environmental Preservation

Discharged water from the Site No. 1 will be received by a small brook, running north-east of the Site with a distance of 700 m. The flow, however seems to be too little to receive a large quantity of industrial effluent.

A brook of 6.5 m in width flows just west side of the Site No. 3 and is connected to the Man River which runs south of the Site with a distance of 1 km.

The Arjun River is to be a receiving river with enough volume of water and thus the Site No. 6 is superior to other two sites in terms of avoiding water pollution problem.

At any rate, it is indispensable to provide a plant for effluent treatment in order to minimize effect on inhabitants or cattles around the Site.

Three prospective sites have obtained almost the same marks in the assessment of air pollution and natural preservation.

6) Transportation

The width of the road, running between the Site No. 1 and Nepalgunj is about 7.5 m and only its central parts of 3 ~ 3.5 m width are paved by asphalt. However, there are quite a few road surfaces seriously damaged which are hindering smooth movement of vehicles. In addition, the road in 500 m length between is very narrow, cranking and close to private houses and these will also encumber smooth traffic movements. Expansion and full pavement works of the road between Nepalgunj and Gularia are expected to commence in 1987.

As to the railway service, it is not available now in the area of Nepalgunj but in Indian side. (There is an Indian railway running 500 m south of the border.) There is an airport in a suburb of Nepalgunj and now its terminal building is under construction. Bus services are also available connecting between west district and Nepalgunj twice a day.

The Site No. 3 is situated along the Highway to Surket and bus services to Nepalgunj are available 8 times a day. However, air services and railway transport are subject to Nepalgunj.

The Site No. 6 is situated along the Highway between Nepalgunj and Butwal and at the corner of the road to Ghorai. Bus services available here are to Ghorai (8 times a day) and on a line of Nepalgunj – Lamahi – Butwal – Khatumandu (9 times a day) The nearest airport is at Tulsipur locating approx 50 km from the Site.

7) Infrastructure in General

Telephone facility will easily be extended to the Site No. 1 from Nepalgunj, however the Site No. 3 and the Site No. 6 would have very poor chance in getting

communication facilities.

Construction materials such as sand, gravels and bricks are easily obtained at/around every prospoctive Site.

With respect to maintenance, repair and services for the Mill, both the Site No. 1 and the Site No. 3 are dependent on Nepalgunj and the Site No. 6 on Ghorai or Butwal, but such services are limited to the small scale.

8) Labour Conditions

Procurement of labours for the Site No. 1 and the Site No. 3 shall be considered from Nepalgunj and for the Site No. 6 from Ghorai or Butwal. In any case, it seems to be very difficult to procure competent and skillful labours.

As a result of value analysis applied to each site, the total marks obtained by the Site No. 1 were 355.5, the Site No. 3 were 331.5 and the Site No. 6 were 386.0.

Table 2 and Table 3 show the outcomes and the breakdown of assessment/Comparison among three sites.

## Table 2 Site Selection – Value Analysis (1)

| CRITERIA \ WEIGHTING FACTOR | | SITE #1 | | SITE #3 | | SITE #6 | |
|---|---|---|---|---|---|---|---|
| | | MARK | WEIGHTED TOTAL | MARK | WEIGHTED TOTAL | MARK | WEIGHTED TOTAL |
| 1 GEOGRAPHICAL POSITION | | | | | | | |
| 1-1 Site Location (Town, Distance, Existing Industry) | 6.0 | 3 | 30 | 4 | 24 | 3 | 18 |
| 1-2 Climate in General | 6.0 | 3 | 18 | 4 | 24 | 4 | 24 |
| 1-3 Earthquake/Thunder/Tornade/Storm etc. | 6.0 | 4 | 24 | 4 | 24 | 4 | 24 |
| 1-4 Public Authorities | 2.0 | 4 | 8 | 2 | 4 | 2 | 4 |
| 1 : Sub-total | 20.0 | | 80 | | 76 | | 70 |
| 2 POWER SUPPLY | | | | | | | |
| 2-1 Availability | 15.0 | 3 | 45 | 2 | 30 | 5 | 75 |
| 2-2 Quantity | 3.0 | 3 | 9 | 2 | 6 | 5 | 15 |
| 2-3 Quality | 2.0 | | | | | | |
| 2 : Sub-total | 20.0 | | 54 | | 36 | | 39 |
| 3 WATER SUPPLY | | | | | | | |
| 3-1 Availability | 15.0 | 4 | 60 | 5 | 75 | 5 | 75 |
| 3-2 Quantity | 3.0 | 5 | 15 | 5 | 15 | 5 | 15 |
| 3-3 Quality | 2.0 | | | | | | |
| 3 : Sub-total | 20.0 | | 75 | | 90 | | 90 |
| 4 PHYSICAL SITE FEASURES | | | | | | | |
| 4-1 Site Area/Cost of Procurement | 4.0 | 5 | 20 | 3 | 12 | 4 | 16 |
| 4-2 Slope/Surface | 2.0 | 5 | 10 | 3 | 6 | 3 | 6 |
| 4-3 Soil (Top-soil, Sub-soil, Bearing Capacity) | 2.0 | 4 | 8 | 3 | 6 | 3 | 6 |
| 4-4 Underground Water | 1.0 | | | | | | |
| 4-5 Site Clearance/Cut and Fill | 0.5 | 5 | 2.5 | 3 | 1.5 | 3 | 1.5 |
| 4-6 Existence of Embedded Pipes/Cables | 0.5 | 4 | 2 | 4 | 2 | 3 | 1.5 |
| 4-7 Site Restriction or Restraint | 5.0 | 4 | 20 | 4 | 20 | 4 | 20 |
| 4 : Sub-total | 15.0 | | 62.5 | | 47.5 | | 51 |
| 5 ENVIRONMENTAL PRESERVATION | | | | | | | |
| 5-1 Receiving River | 3.0 | 3 | 9 | 3 | 9 | 4 | 12 |
| 5-2 Prevailing Wind Direction | 2.0 | 5 | 10 | 5 | 10 | 5 | 10 |
| 5-3 Natural Preservation | 2.0 | 5 | 10 | 5 | 10 | 5 | 10 |
| 5-4 Laws/Regulations | 3.0 | 4 | 12 | 5 | 15 | 5 | 15 |
| 5 : Sub-total | 10.0 | | 41 | | 44 | | 47 |

## Table 2 Site Selection – Value Analysis (2)

| | CRITERIA \ WEIGHTING FACTOR | | SITE #1 | | SITE #3 | | SITE #6 | |
|---|---|---|---|---|---|---|---|---|
| | | | MARK | WEIGHTED TOTAL | MARK | WEIGHTED TOTAL | MARK | WEIGHTED TOTAL |
| 6 | TRANSPORTATION | | | | | | | |
| | 6-1 Road Network/Access to Site | 2.0 | 3 | 6 | 5 | 10 | 4 | 8 |
| | 6-2 Railroad | 2.0 | | | | | | |
| | 6-3 Bus-services | 1.0 | 2 | 2 | 3 | 3 | 4 | 4 |
| | 6-4 Air Transportation/Sea Routes | 1.0 | 4 | 4 | 4 | 4 | 4 | 4 |
| | 6 : Sub-total | 6.0 | | 12 | | 17 | | 16 |
| 7 | GENERAL INFRASTRUCTURE | | | | | | | |
| | 7-1 Communication | 1.0 | 3 | 3 | 2 | 2 | 2 | 2 |
| | 7-2 Construction Materials | 1.5 | 4 | 6 | 3 | 4.5 | 3 | 4.5 |
| | 7-3 Fuel/Gas | 1.0 | 3 | 3 | 2 | 2 | 2 | 2 |
| | 7-4 Services/Shop/Repair | 1.5 | 3 | 4.5 | 2 | 3 | 2 | 3 |
| | 7-5 Health/Admi. Facility | 0.5 | 4 | 2 | 2 | 1 | 2 | 1 |
| | 7-6 Recreation Facility | 0.5 | 4 | 2 | 3 | 1.5 | 3 | 1.5 |
| | 7 : Sub-total | 6.0 | | 20.5 | | 14 | | 14 |
| 8 | STAFF AND LABOUR POTENTIALS | | | | | | | |
| | 8-1 Availability | 1.0 | 4 | 4 | 3 | 3 | 3 | 3 |
| | 8-2 Quality | 0.5 | 3 | 1.5 | 2 | 1 | 2 | 1 |
| | 8-3 Quantity | 1.0 | 4 | 4 | 2 | 2 | 3 | 3 |
| | 8-4 Productivity/Absentism | 0.5 | 2 | 1 | 2 | 1 | 2 | 1 |
| | 8 : Sub-total | 3.0 | | 10.5 | | 7 | | 8 |
| | TOTAL | 100 | | 355.5 | | 331.5 | | 386 |

[REMARKS]

Weight (Gravity)

5 : Most Suitable

4 : Suitable

3 : Suitable but minor restructions

2 : Suitable but Majour restructions

2 : Unsuitable

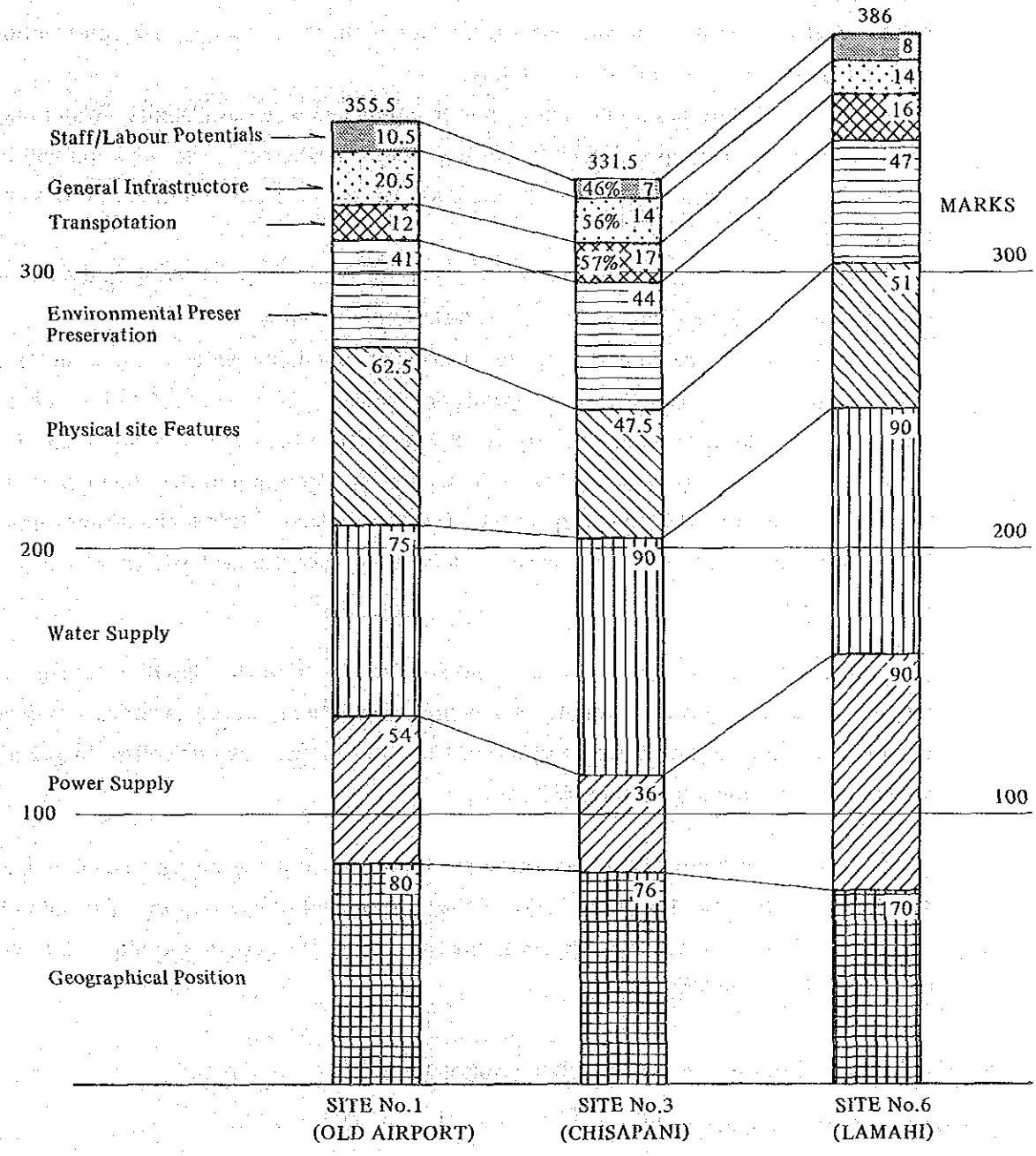
Full Mark : 500

NOTES : SITE NO.1 : KHAJURA (OLD AIRPORT)

SITE NO.3 : CHISAPANI

SITE NO.6 : LAMAHI

## Table 3 Comparison of Sites



4-2-3 STEP 3 : Recommendation

The Site No. 1, as a summary of Step 1 and Step 2, has already been prepared as a plant site and no special cost will be involved in site levelling works. Thus, it is really blessed site in respect of the physical features. Further it is situated only 8 km distance from Nepalgunj, resulting in the benefits of procurement of labours and construction materials as well as communication facilities.

However, this Site has a question of power supply and water availability. Water may be obtained through deep well facility but it is doubtful whether sufficient water will be obtained from the well or not, in consideration of assumed consumptions (100 tons/hour) of the Mill.

Power supply to the Site looks also big anxiety from an economical viewpoint in consideration of 20 km distance from the sub-station in progress.

With regards to the Site No. 3, the problem in obtaining water is the same level with the Site No. 1. This Site also depends on Nepalgunj for procuring labours and materials, but the distance from this city is 28 km, farther than the Site No. 1 and the question is more serious accordingly. Besides, there is a question of the procurement of the land by reason of the present ownership as a private land. Further the power supply to the Site shall depend on the same substation, and it may also be costly because of the distance of 10 km.

Comparing with the two sites above, the Site No. 6, although it has disadvantages in respect of location, physical conditions, labours procurement, service facilities, obtained the highest marks among three prospection sites due to the less difficulties in getting very important criteria, i.e. power and water.

Taking into account all of the foregoing, the Field Study Team had recommended the Site No. 6 to MOI, the counterpart of the Government of Nepal as the most suitable site for the Project and following the mutual discussion in details, the Site No. 6 was finally decided as the Project Site.

## 4-3 Conditions of Location at and/or around proposed Site

4-3-1 District Development Plan

The present position of the land development plan and the outline of the Seventh 5-Year Plan (1986 ~ 1990) of Nepal have already been described in the previous Chapter. It is getting to be a mooted point to improve infrastructures and living conditions in the Western District where the development still lags behind.

One ongoing project at Dang District is the Rapti Integrated Development Project, costing 26 million U.S. Dollar. Although such projects as water supply scheme, irrigation scheme, usage of the underground water, etc. are also listed in the district development

plan, a part of the Seventh 5-Year Plan, their sizes are small and their scopes are limited.

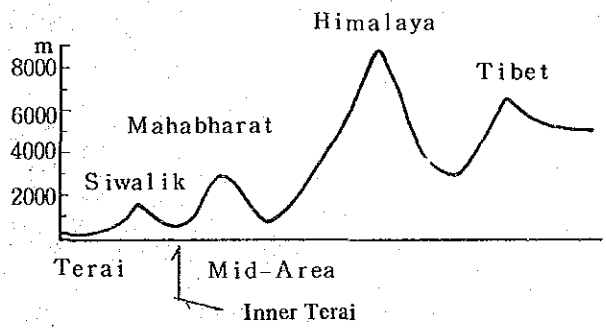
Only one plan – Usage of the Underground Water – is programmed at Lamahi in the near future and nothing will be expected to make influence on our Project. Thus water and power supply for the Project will be considered as a part of the total project investment.

4-3-2 Geographical Features and Configuration

The geographical aspect of Nepal is composed of three beltlike areas, i.e. the Mountainous Area along northern Himalayan Mountains and hinterland of Himalaya, the Mid-Area between Mahabharat Lekh and Himalaya Mountains, and the Southern Terai area, continuation of Hindustan Plains of India.

As shown in the Fig. 2, in the Terai, there is Siwalik Hills of 1,000 to 1,500 meters in height, lying from Kashmir to the eastern border, which creates a small-scale valley called inner Terai.

**Fig. 2 Geographical Features (Section) of Nepal**




The Site is situated at Dewakuri Valley in the Terai with a distance of 2.5 km west of Lamahi and in between Chure and Duduwa hills, both parts of Siwalik Hills.

Fig. 3 shows location of the Site. Main geographical data of the Site are as follows.

– North Latitude : 27°54′ East Longitude : 82°30

– Meters Above Sea Level : Approx. 200 m

– Distance from Major Cities

Kathmandu : Approx. 350 km

Napalgunj : Approx. 125 km

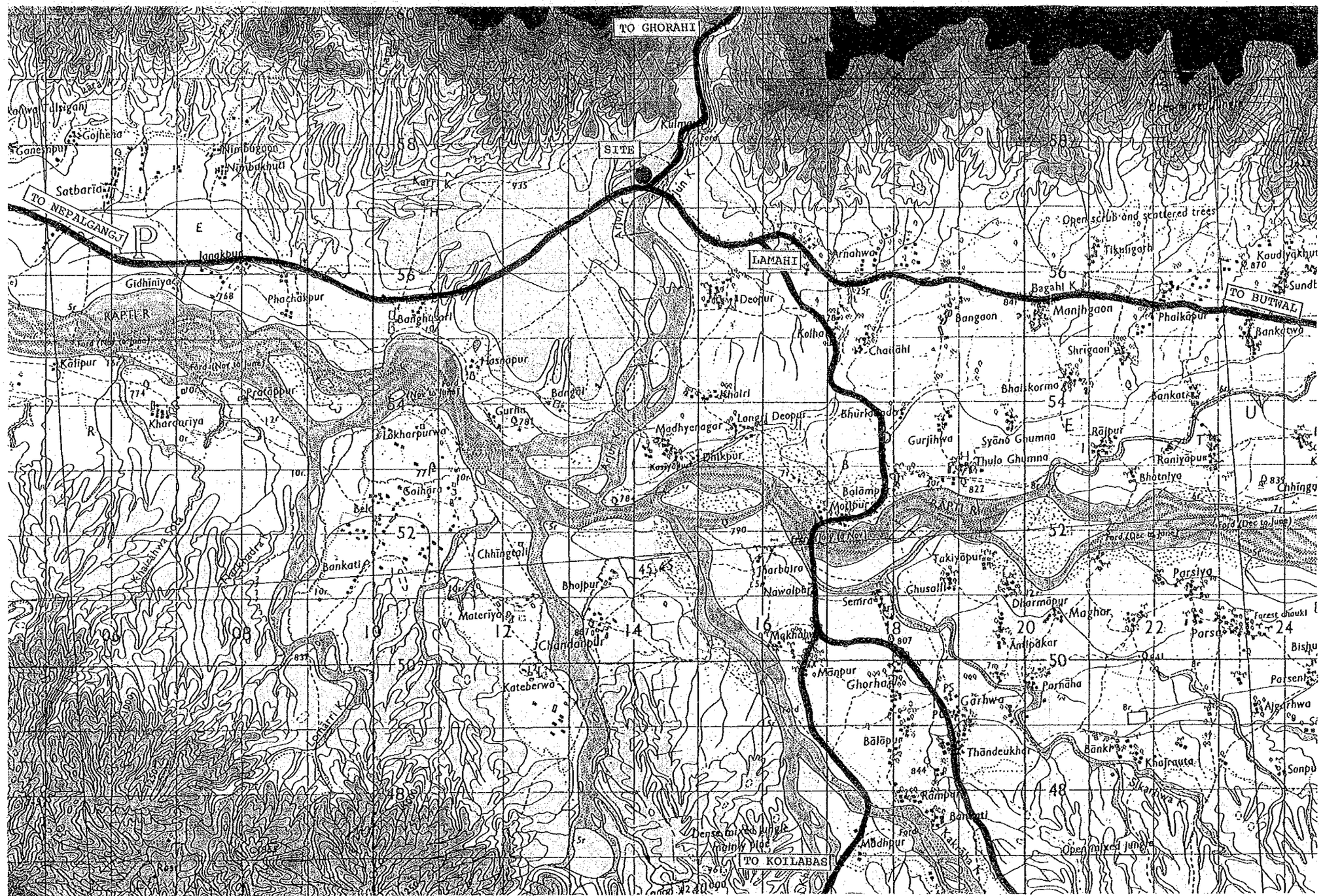
Butwal : Approx. 110 km

4-3-3 Climate and Soil Conditions

1) Climate

The climate in Nepal changes extremely in accordance with the geographical

Fig. 3 Site Location



locations ranged from the subtropical weather in the Terai, temperate and chilly weather in the Mid-Area represented by Kathmandu Valley to the arctic or subarctic weather in the Mountainous Area. In spite of the short distance between the north and south boarder, the weather in Nepal varies to a great extent which is quite uncommon in the world.

The weather in the Terai has a general characteristics of Subtropic, receiving a great influence of the Bay of Bengal. There is a little difference between east and west Terai, and the former which is closer to the Bay has more humid climate than the latter.

By the Monsoon, north wind in dry season, (October to April) and south wind in wet season (May to September) are prevailing. Although there is a difference in precipitation in each of the Terai area, almost of the area have a precipitation of 1000 mm or more and some areas receive more than 400 mm per month.

The weather record in Lamahi is unknown but, annual precipitation and mean temperature of three cities in the Terai which would have similar characteristics with Lamahi are shown in Table 4 and Table 5 respectively.

**Table 4 Annual Precipitation in Terai Region (1961-1970)**

| month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nepalgunj | 45 | 15 | 12 | 0 | 36 | 363 | 343 | 198 | 270 | 79 | 0 | 0 | 1,263 |
| Tulsipur | 32 | 32 | 10 | 22 | 69 | 322 | 475 | 390 | 266 | 73 | 7 | 8 | 1,706 |
| Bhairahawa | 18 | 10 | 11 | 0 | 24 | 511 | 540 | 271 | 135 | 64 | 0 | 0 | 1,588 |

(Statistical Pocket Book, NEPAL 1984)

**Table 5 : Mean Temparature in Terai Region (1961-1980)**

| | month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nepalgunj | Max | 22.8 | 25.1 | 31.0 | 37.6 | 39.7 | 36.7 | 32.6 | 32.9 | 32.7 | 32.2 | 28.5 | 23.6 |
| | Min | 9.1 | 11.1 | 15.2 | 21.1 | 24.2 | 22.2 | 25.9 | 26.0 | 24.9 | 21.2 | 15.0 | 9.4 |
| Tulsipur | Max | 20.1 | 22.6 | 28.1 | 33.4 | 34.5 | 32.5 | 29.5 | 29.9 | 29.2 | 28.5 | 25.1 | 21.1 |
| | Min | 6.9 | 9.4 | 12.8 | 18.7 | 21.2 | 22.1 | 22.8 | 22.5 | 20.9 | 16.7 | 12.1 | 7.6 |
| Bhairahama | Max | 22.4 | 25.2 | 31.4 | 36.4 | 36.6 | 34.8 | 32.6 | 32.6 | 32.0 | 33.1 | 28.4 | 23.9 |
| | Min | 8.0 | 10.0 | 13.8 | 20.0 | 23.9 | 24.9 | 25.3 | 25.4 | 24.2 | 20.6 | 14.4 | 9.1 |

(Statistical Pocket Book, NEPAL 1984)

Other weather elements such as wind pressure, tornade, sand storm, etc. which might significantly affect on the project design have not been found in Lamahi area.

However, earthquakes are quite frequent in this area and quakeproof design to the building structures is needed in general.

2) Soil Conditions

Soil is formed by the weathering of a mother rock and its characteristics will be subject to the mother materials, land configuration, climate, lapse of time, biological activities, etc. Especially the weather plays an important roll in the soil formation, and among its elements, temperature and rainfalls will directly affect such formation.

In Tropic Monsoon and Subtropic Zones, the water-solvable substances in the soil are normally dissolved out and basic groups in the substances such as Calcium and Magnesuim are dissolved as well which results in making up a sterile soil. In addition, by desilicate activity, the soil becomes red-yellow colour, containing condensed iron and alumina minerals. This soil is called "Latelite". Although, the boring test shall be needed for finding out the details of sub-soil and underground water conditions at or around the Site, it is presumed that the soil has a general characteristics of Laterite due to the geographical location and the climate of the Site, as previously mentined.

However, as the Site is configuous to the Arjun River and Chure Hills are situated at its back, the soil condition is hence considered as a river drift, and this to be taken into account when the boring test be carried out.

Laterite soil has normally a good characteristics from the engineering point of view. But its dynamical properties is changing to a great extent by the water contents and further, the sample of the soil obtained at the Site was clayish and thus careful attention shall be made to changes of water contents during filling and compaction as well as stress balance during cutting.

4-3-4 Water

1) General Features

Nepal has generally abundant water resources. The Site is also in the area with much rain, receiving 1,000 mm or more rainfall annually. However, the rain only falls during May and September and the seasonal surface running water varies drastically.

It is generally understood that the underground water is abundant in the Terai, although there is no wells to be referred to around the Site.

2) Water Source

The Site is located on the plateau and at the foot of the Hills, lying along the Arjun River, a branch of the Rapti River. This plateau is regarded as one of the

fan deltas of the Arjun River.

Therefore, it will be possible to take water for the Mill from a shallow well, a deep well, running water of the Arjun River or a underflow water.

However, it is advisable to construct shallow wells at the riverbed of Arjun River as the water sourse for the Mill (consumption approx. 100 ton/hr) because of the following reasons.

a) Since there are no data available for the consturction of a deep well around the Site, in case such well is employed, it is necessary to carry out the boring test in advance in order to graspe subsoil conditions, quantity and quality of underground water, etc.

It is costly in general to construct a deep well and to make provision of a stand-by well.

b) Surface running water of the Arjun River occasionally vanishes at the end of the dry season, but pools of the river do not. Consequently, it is considered that there will be always much underflows. Further, surface running water sometimes becomes muddy at rainy season but this is avoided by taking underflow water by means of shallow wells.

3) Quality of Water

What is needed for water to be utilzed for industrial purposes is not only sufficient quantity but also good quality.

Although, surface running water normally dissolves substances contained in the basic of the river, quantities of such substances are limited and less than that of under ground water. However, surface water normally has quite a few organic materials by reason of containing perished plants, soils and sewage of the basin.

During the stay of the Field Study Team in Nepal, three water samples – from Arjun River, deep wells at Nepalganj and Khajura were collected.

Test results of such sampled water are shown in Table 6, which augurs well for the characteristics of each kind of water.

According to the Table 6, total hardness and dissolved solids are fairly high, however, by applying umcomplicated treatment plant, it seems that to make the water for industrial and domestic use is not so difficult.

In any cases, it is necessary to make in-depth investigation on such items as water permeability coefficient of soil, underground water level both in dry and wet season, water quality, etc. at the time detailed design is carried out.

**Table 6 Analysis of Sampled Water**

| Description \ Water | | Site No. 6 (Lamahi) (Surface water) | Site No. 2 (Khajura) (Deep Well) | (Nepalgunj) (Deep Well) | Standard of JTFA *1 | "WHO" Standard Potable Water |
|---|---|---|---|---|---|---|
| P H | | 8.4 | 8.2 | 8.4 | 6.5 ~ 7.4 | 7.0 ~ 8.5 |
| Colour (Degree Pt-Co) | | 8 | 2 | 1 | 4 | 5 |
| Turbidity (Degree) | | 0.5 | 0.1 | 1.5 | 3 | 5 |
| Total Hardness (as $CaCO_3$ | mg/l) | 172 | 312 | 165 | 18 ~ 53 | – |
| Chloride (as $Cl^{-2}$ | mg/l) | 21 | 3.9 | 18.9 | 9 ~ 25 | 200 |
| Total Iron (as $Fe^{+2}$, $Fe^{+3}$ | mg/l) | 0.1 | 0.16 | 0.06 | 0 ~ 0.1 | 0.3 |
| Silicate (as $SiO_2$ | mg/l) | 5 | – | – | 16 | – |
| Sulfate (as $SO_4^{-2}$ | mg/l) | 86.8 | 44 | 81.5 | 25 ~ 30 | 200 |
| Organic Matter | mg/l) | 4.3 | 0.8 | 0.6 | – | – |
| Anmonia Nitrogen | mg/l) | 0.24 | 0.34 | <0.01 | – | – |
| Total residue | | 239 | 418 | 630 | 130 ~ 170 | 500 |

*1 JTFA (Japane Textile Finisher Assosiation)

4-3-5 Power

1) General Features

The constructions of hydraulic generation using abundant water resources have been stressed recently in Nepal. While the area, where they can get stable power supply to operate large-scale industries is still restricted.

The unit price of independant power plant by using of diesel or steam turbine generators is quite costly due to the high fuel and maintenance costs as well as depriciation cost and now it is amounting to 2 to 3 times of the NEA's unit price.

As a consequence, the stable power supply by NEA was one of the important factors for the Site Selection as mentioned in the previous Chapter.

Fig. 4 and Fig. 5 show "The Location of Large Hydro Generater Plant in Nepal" and "Power Development Scheme in Nepal" respectively.

In 1982, Kulekhoni I Hydro Generating Plant (60 MW) was completed and in 1983 Devighat Hydro Plant (14.1 MW) was also completed, both in Central Region.

Further, Kulekhoni II (32 MW Completion expected in 1987), Andhikhola (5 MW Completion expected in 1988), Marsyangdi (60 MW Completion expected in 1989) are all under construction now. And Sapta Gandaki (225 MW) is on foot. In addition, possibllities in developing hydro plants lie at Sunkosi High Dam (360 MW) and Karnali (3,600 MW).

On the other hand, power demand is constantly increasing and the construction

of transmission lines are in progress to strengthen power supply capacity in Kathmandu and other cities. The Main Transmission Lines, running through the Terai Region and linking customers with the Power Plant is being constructed by ADB's financial assistance. Namely, the Transmission Line between Butwal and Nepalgunj is in progress setting the goal of completion by mid-1987.

The Completion of this line enables three substations at Shivpur, Lamahi and Kohalpur to commence operations, and will result in supplying sufficient power to Mid-Western Region.

2) Power Supply to the Mill

There is no power available at the proposed Site at present. Lamahi, the town lying 2.5 km east of the Site has power being supplied by India, as a branch of lines running from Kailabas at Indian border to Ghorai via Lamahi.

Lamahi Substation is equipped with 5 MVA Transformer (Primary 132 KV, Secondary 33 KV) with 4 feeders including one spare which will be utilized for the Project. "Single Line Diagram" of Lamahi Substation is shown in Fig. 6.

One of the main reason of the power failure is caused by the accident of the transmission lines. It is therefore advantageous to make shorter and simpler transmission system with less branches.

It is intended that alloted charge will be paid to NEA and a exclusive line will be constructed by them from Lamahi to the Site.

Fig. 4 Location of Large Hydro Generator Plant and Main Transmission Line

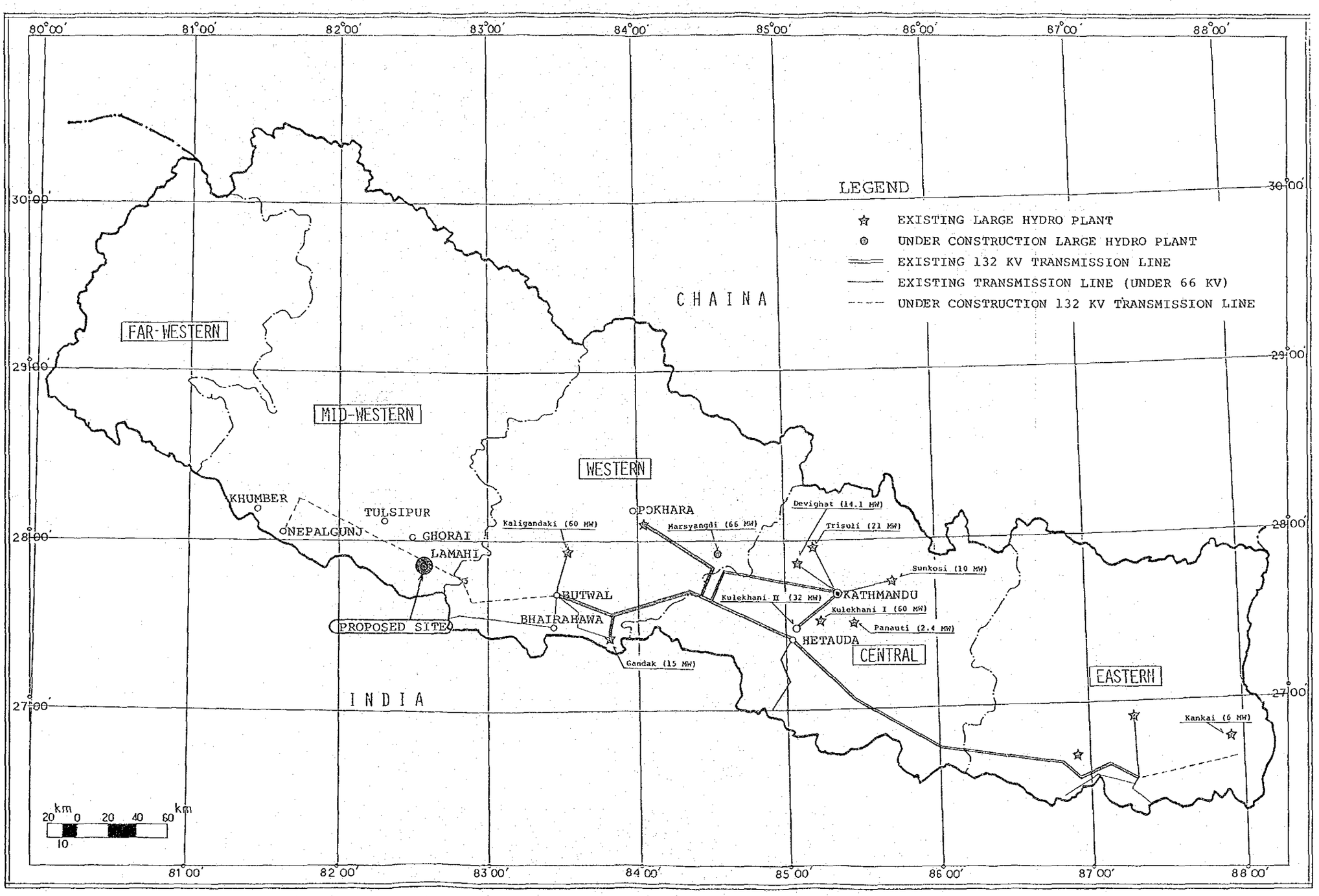


Fig. 5 Power Supply and Demand in Nepal

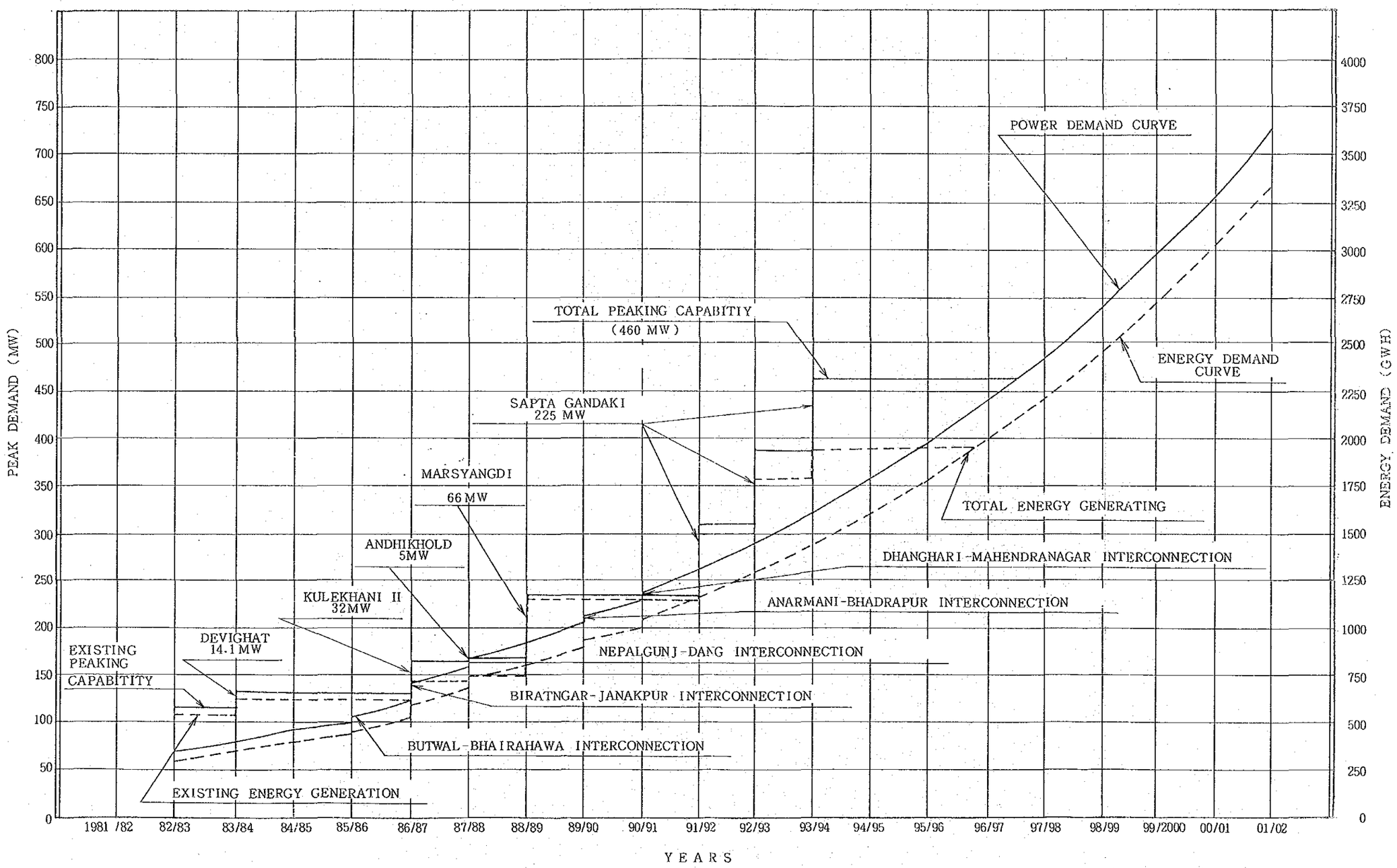
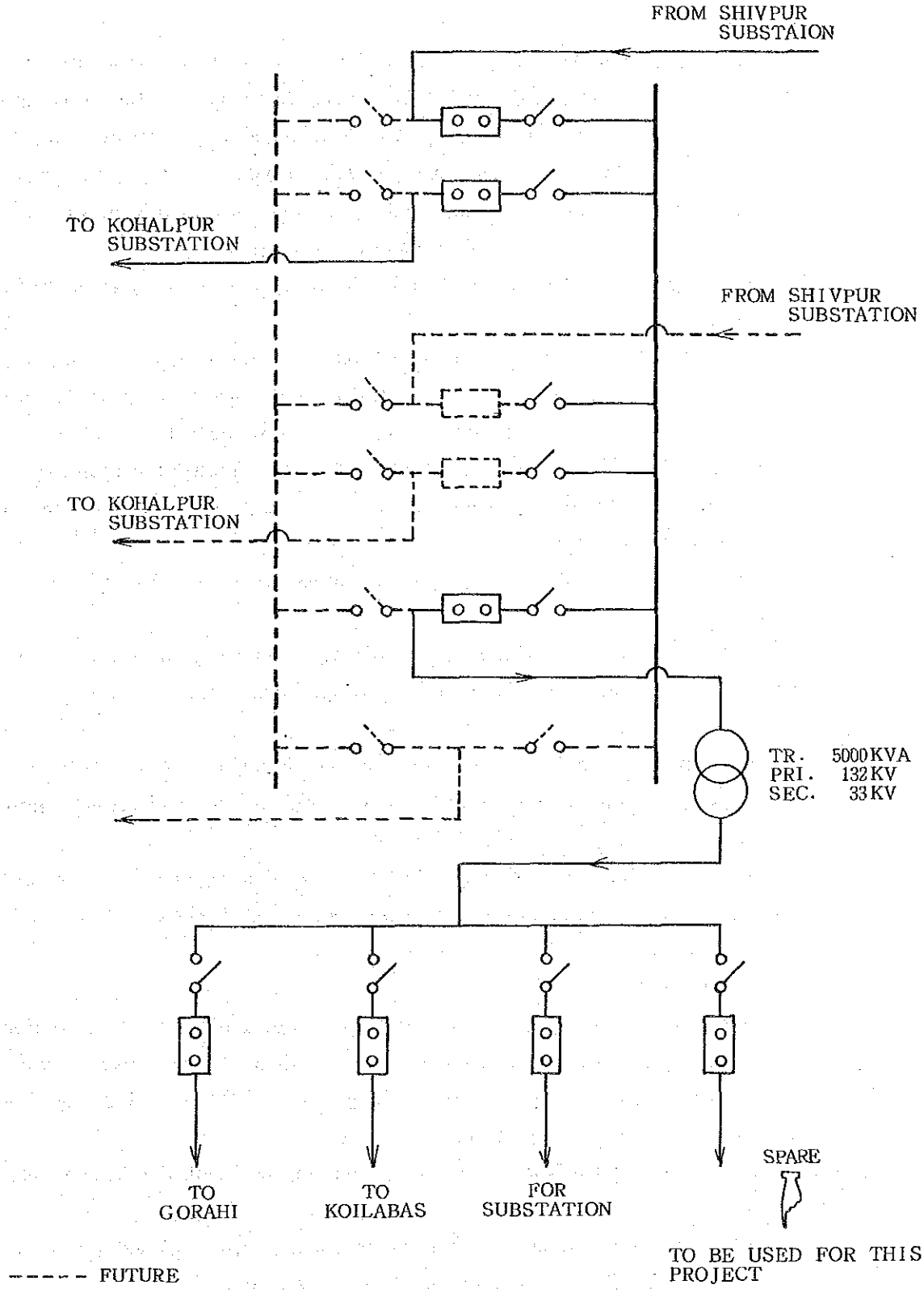


**Fig. 6 Lamahi Substation – Single Line Program**



4-3-6 Transportation and Communication

1) Transportation

a) General

Nepal is the country covered with steep mountains which is accounting for 86 % of the land. In 1928, Nepal Railway between Raxual and Birganj started operations as the first modern transportation in the country. However, due to the difference of the width of the railroad between India and Nepal, it had been inconvenient to transport materials from India and consequently, it was abolished along with the improvement of road transportation.

At present, the road transportation has become the main measure of Nepali transportation.

Since the commencement of the first 5-year plan, the, construction of roads, as the root of the Nepali transportation had been attached to great importance in the public investment, and the roads to India and China from Kathmandu were constructed. In addition, "the Highway" running through the Terai Region from Kathmandu to Nepalgunj was also completed and it is now extending to both eastern and western districts.

However, Nepal still lags behind in such areas as road density and ratio of paved road as well.

"The Highway" is completely paved and hence a long distance bus network has quite developed which is connecting various places each other along the Highway.

Recently, the recognition of air transportion has enhanced as a substitute of road transportation because of high construction cost of road resulted from mountainous geographical features of Nepal.

There is no airport around Lamahi but all weather airports are available at Nepalgunj and Bhairawa, which make it possible to shorten the travelling time to Kathmandu.

b) Transportation Plan

It is necessary to consider three aspects of transportation, i.e. transportation of construction materials, machinery and equipment during implementation stage, transportation of raw materials and products during operation stage and transportation of labours/employees.

Fig. 7 shows Main Road Network in Nepal together with the distances between Lamahi and major cities.

The proposed site is situated at a cross between the Highway and the road to Ghorai and thus the access road to the Site is not necessary.

—Transportation of Materials

Almost construction materials as well as machinery and equipment for the project will be imported.

It is understood that the Highway through Krishnagra is the most desirable route to transport materials from Calcutta Port.

No problems is so far observed in off-loading materials at Calcutta Port, in consideration of the max. lifting capacity of 200 tons.

On the other hand, there is a little concern over the material handling capacity in Nepal where 10 to 15 ton cranes be only available. As the bridge in new mainroads in Nepal is designed on the basis of 20 tons bearing capacity, it will be possible to transport up to 20 tons by using the special trailer truck.

Detailed investigation on transport is however, required in the stage of implementation, since the radius of curvatune at the hilly areas is not sufficient enough occasionally for long body trailers.

In the case that the difficulties in transportation of materials arise, to use the route via Nepalgunj shall be examined as a substitute.

—Transportation of raw materials/products

In general, instead of using own vehicles, a private transportation firm is to be employed for the transportation of raw materials and products.

—Transportation of labours/employees

There are no residential houses around the Site and exclusive buses for the transportation of labours/employees shall be provided.

For general use, it will be necessary to purchase some trucks, cars and land cruisers within the scope of the project investment.

2) Communication

There is a communication network by wireless telephone, working twice a day for a hour around the area of Tulsipur. However, this facility is not available at Lamahi and it looks very difficult to establish new wireless telephone facilities there.

Further, 6 stations for the rural telecommunication are on programme now but they do not include Lamahi.

At present, "VHF" radio communication system is the most realistic and practicable method to be employed at Lamahi. (This method is being utilized at Nepalgunj Telephone Office and CDB Nepalgunj Office.)

However, in consideration of necessity in the special study for establishment of relay station, relations with the future communication facility at the area and difficulty in obtaining permission of its establishment, detailed investigation on possibilities in establishing "VHF" Radio communication system, at/around the Site shall be required in advance.

Fig. 7 Main Road Network Between Kathmandu and Nepalgunj