Chapter - 6

ECONOMICS OF THE STUDY:

Natural fibres have been used historically to produce various end products and the use of natural fibres to meet our needs goes back thousands of years and plays a significant role in history. Like agriculture, textiles have been a fundamental part of human life since the dawn of civilization. In the last hundred years or so there has been a turn away from natural fibres towards synthetic materials mostly derived from petrochemicals. This change was a result of the technological revolution and the short term economic advantage of synthetics. The pendulum is once again swinging towards natural fibres and we are now seeing a growing movement away from petrochemical based fibres back to natural fibres due to the continuing rising costs of the petrochemical based fibres. Synthetic fibres rely not only on precious non-renewable resources, but also incur environmental costs in their production. It also poses a health risk both from direct exposure and also from secondary exposure through soil, water and air pollution. The return of natural fibres to meet our fibre needs is only one part of the change that is required if we want to achieve sustainable living.

Banana, the second largest fruit crop in the world, produced in the tropical and sub-tropical regions of developing economies, constitutes the important staple food commodity in terms of gross production value. Banana is also the fourth most important commodity but has received little research efforts in the past. It is grown in different agro-ecological conditions and the year offing 2020 the production has to be raised to 25 million tones from the current level of 10.4 million tones annually. From the estimated yield of 1.5 million tons of dry banana fibres annually, a very small quantity is presently being utilized for the preparation of handicraft items. However this pseudostem waste can be very well used for the production of items such as cardboard, paper, tea bags, fibre lining for car interiors, high quality dress material and also currency notes. With the rise in urbanization and increasing literacy levels, the paper industry is likely to face the crises of shortage of raw material. In this regard, banana pseudostem could be used as a very good raw material for the paper
industry. Because banana is an all season’s crop, substantial quantity of pseudostem waste is produced throughout the year, ensuring constant supply of raw material for the production units. Recent studies have indicated that banana fibers possess lots of advantageous physical and chemical properties because of which it can be used as a very good raw material for textile industry. Given the background, the proposed work on banana fibre is expected to give results about utility of the fibres in the textile industry. This would require effective utilization of resources with concerted efforts on banana research. Considering the economics of the study, banana fibres extracted at Jalgaon, Maharashtra were used for the present investigation.

The estimated cost of extraction of the banana fibres = 80 Rs per Kilogram.

PROCESSING OF BANANA FIBRES:

The banana plant is of great economic importance, being harvested for its fibres and the fibres were further converted into yarns on the jute spinning system which has already been discussed in the previous chapters. The conversion cost of the fibres to yarns was approximately rupees ten thousand for sixty four kgs of yarns, therefore

Conversion cost of 1 kilogram of yarn =150 Rs.

Yarn realization from fibres is approximately 65% to 70%. It means, to get 1 kg of yarn, one has to use about 1.5 Kg of fibres. Thus raw material ocst would work out to be Rs.120 for 1Kg yarn. Therefore the cost of 1 Kg yarn made made from banana fibres would be Rs 150 + Rs 120 = Rs 270/-

PREPARATION OF THE FABRICS:

Cotton – banana union fabrics was prepared at Mahila Samabaya Silpa Kutir Ltd., in Manipuram village, Barrackpore, West Bengal. As the banana yarn is very coarse and with lot of protruding fibres, it was not possible to use it in the warp. Therefore, cotton yarn of about 10s count was used in warp. The weft
yarn was made from 100% banana fibres. The jute/banana yarns are further taken on the hand-loom to make jute/banana blended fabrics having warp and weft of the jute/banana blended yarns. As the banana jute/banana yarn is very coarse and with lot of protruding fibres, there were technical difficulties in the weaving of the fabric. About ten meters of fabric of 36 inch width was produced. The cost of the fabrics would again ultimately depend on the type of fibres used, the processing methods involved etc.

**Approximate conversion cost of yarn to fabric = 200 Rs per Kg.**

**DYEING OF THE FABRIC:**

The jute/banana blended fabrics were further dyed using two different shades each of sulphur and reactive dyes. The dyeing was carried out using the facilities available at Clariant India Ltd (Thane). The jute/banana blended fabrics were dyed using four different dyes namely: Sulphur N-blue, Sulphur H-green, Reactive blue and Reactive green.

**The approximate dyeing cost of the fabrics (Per Kilogram) = 100 Rs.**

**FINISHING OF THE FABRICS:**

Finishing’s are processes carried out after the application of a finish to a textile fabric in which appropriate conditions are used to effect a chemical reaction. Usually, the fabric is heat treated for several minutes. However, it may be subject to higher temperatures for short times (flash curing) or to low temperatures for longer periods and at higher regain (moist curing). Padding (finishing) is the impregnation of a substrate with a liquor or paste followed by squeezing—usually by passing the substrate through a nip—to leave a specific quantity of liquor or paste on the substrate.

The Jute/banana blended fabrics was further scoured and then treated with various enzymes. Finishing treatments made the fabrics softer, clean, increased pliability and thereby making the fabrics more suitable for varied end-uses. All the finishing treatments were carried out using the facilities available at Clariant India Ltd. The following treatments and finishes were tried out on the jute/banana union fabrics.
1. Scouring  
2. Bleaching  
3. OBA-treatment  
4. Biopolishing  
5. Softening  
7. Resin treatments  
8. Padding with enzymes  

**Table 6.1.: Finishing costs.**  
The finishing costs are as follows,

<table>
<thead>
<tr>
<th>RECIPE</th>
<th>Dosage in gpl</th>
<th>PRICE per mt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin treatments</td>
<td>15</td>
<td>0.84</td>
</tr>
<tr>
<td>OBA - treatment</td>
<td>4</td>
<td>0.12</td>
</tr>
<tr>
<td>Biopolishing</td>
<td>10</td>
<td>0.56</td>
</tr>
<tr>
<td>Enzyme treatment</td>
<td>25</td>
<td>0.61</td>
</tr>
<tr>
<td>Padding treatments.</td>
<td>7</td>
<td>0.27</td>
</tr>
<tr>
<td>Coating with softeners</td>
<td>20</td>
<td>1.95</td>
</tr>
</tbody>
</table>
Since the fabric GSM (Grams per square meter) is around 350-400, so 1 kilogram of fabric would consist around two and a half meters of the fabric which would cost approximately Rs.1000. Thus considering the economics involved in the processing of the banana fibres to fabrics, the fabric would go for the Niche market or the commercial market depending upon the ultimate cost of the ready fabric which would also finally depend on the end-use requirement and the finishing processes applied onto the fabrics. Thus looking at the current expenditure involved in the processing of the banana fibers it seems that the fabric would be more apt for the niche market or rather the higher end (upper cost) market sector and the applications could vary depending on the end use requirement like furnishings, upholstery, curtains and blinds, or even for automobile coverings and backings. Further developments in the processing methods would probably make it more suitable for the apparel market, fashion fabrics, bed-covers etc as the fabric becomes better-quality-wise, finer and smoother.