CHAPTER IV
Before the raw silk can be woven, it must go through a series of operations, which condition it for the loom. The raw silk fiber as it comes from the filature is too fine to withstand the rigors of weaving.

The series of operations involved in this process are collectively known as throwing. The term itself comes from the Anglo-Saxon word THRAW, which means to twist or spin. It calls for the following operations.

1) Sorting - Skeins separated for quality
2) Soaking - To soften the sericin
3) Drying - Dried by a centrifugal extractor and circulating warm air
4) Winding - Rewound from reels onto bobbins
5) Doubling - Also known as low twisting. The first twist is a downward process on the machine and calls for more than ten twists.
6) Uptwisting - Also known as high twisting. The doubled thread is now wound upwards and acquires as many as 75 twists per inch (for crepe) in the process. Such reinforced yarn is usually used for the warp of the fabric.
7) Conditioning - High twist thread is then placed in an oven which sets the twist so it will not unravel.

All the above processes are carried out by units called twisting units. This twisted yarn is utilised for preparing the warp and weft for the silk cloth to be manufactured.

Once the first preparatory operation is over, then degumming and dyeing processes will be taken up. The twisted yarn is dull in colour as it is coated with the yellowish substance, sericin. To remove this, the yarn is degummed by immersing it in a diluted solution of alkaline soap for a short time. This process of removing the sericin is known degumming. After degumming, the yarn is dyed. For dyeing silk, only synthetic dyes are used. The choice of a dye usually depends on the end use.

Dressing: The next stage in the process of weaving is dressing and it is done at the weaver's end. The warp yarn is dressed by stretching it out in the open yard between two bamboo poles. The weaver removes the dust or dirt from the yarn and mends the broken ends if any. The warp is removed and twisted into a hank. This process can be done anytime during a dry day.
Sizing: Sizing is done with a view to impart in the yarn the required strength so that it can withstand the stress and strains during the subsequent processes of weaving. The solution used for sizing is prepared from rice. The warp is dipped into this solution, squeezed and stretched out once again as in the case of dressing. Sizing is done before sun rise to ensure the ends do not stick to one another. The warp takes about an hour to get dried. The sized warp is then rolled as before and brought to the loom.

Warping: Warping is the operation that prepares the yarn that runs lengthwise in a fabric while weaving. The number of threads per inch multiplied by the width of the cloth determines the total number of warp threads. All the warp ends are entered through the eye of the heddles. To achieve the desired density of the fabric, the warp ends are controlled by the reed. The entering operation is employed when a new type or design of fabric is to be produced. Otherwise, the threads in a new warp are twisted or tied to the previous warp. The warp is again stretched to ensure that all the ends are even and not tangled. The reed and healds are pushed forward over the new warp threads and approximately twelve rows of weaving are done to prevent them
from slipping. Then the warp is rolled and brought to the loom where the reed is fixed to the slay of the loom. The preparation is now complete and the warp is to be fixed to the loom for actual weaving.

**WEAVING:** It consists of warping and prin-winding as preparatory processes.

In warping special attention should be paid to creel. Good results have been obtained by employing **nylon type creels** which consists of the feed packages being placed on the floor or wooden platform, and yarn drawn through eyelets and yarn guides mounted on a wooden frame-work placed directly above the feed packages. Such creels occupy less space and are easier to maintain since there are no mechanical gadgets. Safe warping speeds are in the range of 15 to 20 RPM.

It must be understood that once the warp is prepared it is **as good as woven**, since further changes are NOT possible. Therefore a weaver should take up warp preparation with a pre-decided warping programme.

Fixing the warp to the loom: One end of the warp is attached to the cloth beam and the other end is attached to warp beam. The
length of the stretched warp should be such as to ensure tension while weaving and should be adequate enough for the free operation of the slay. Hence the distance between the two beams is 12 feet.

**Joining the Zari threads:** The joining of Zari threads for the border designs is a very complicated process and is done in the following manner. The healds through which the lace has to be passed are known to the weavers as design healds or "pettu vizhudu" which consist of hollow glass beads. At first, some old silk threads are passed through the glass beads in the design healds band, then the design lace is tied in order to avoid 'handling'. The lace is stretched on the outer sides of the warp to the same length. Each thread is then pushed through a dent in the reed and finally all the threads are attached to the cloth beam. The other end is attached to the lace beam which lies below the warp beam. If the body of the saree has a weft design, warp threads must be joined to the putti adai, which is suspended over the loom behind the heald.

**Setting up new designs** A majority of the weavers use the country style 'Jacquard' attachment or 'design adai' or 'Jhungu' to weave the border designs and pallav. In Kanchipuram border designs are
developed on to the graph in the ratio of 40K x 30K per inch, where 'k' means kuligai representing a pair of ends or picks. Then the adai which is prepared as per the graph designs is connected to the extra warp ends in groups or as per pre-calculated lay-out on both sides or on one side. Some of the weavers are using mechanical Jacquard boxes for producing designs.

Preparation of Weft  Generally the weft is prepared by the female members of the weaver households during their spare time. It involves two steps. First, the hanks of weft threads are placed between two bamboo horses and the end thread is wound around the parivattam. The second step consists of transferring the thread from the parivattam to the pirn and this is done with help of charka.

In pirn winding special attention should be paid to yarn content and shape. Lower yarn content on the pirn or (Prin) results in frequent pirn changes affecting the efficiency of the loom. All such bad pirns must be collected and may be either rewound or used on one or two separate looms. Pirn winding tensions should be of the order of 0.2 to 0.3 gms/denier. Irregular tension not only results in a bad pirn but also in a defective fabric (dull and shiny areas in the fabric)
In weaving proper, the most important factor for economic weaving is the loom itself. Under-pick looms with smaller shuttles are ideal for silk.

**PROCESS OF WEAVING:** It consists of interlacing the two series of thread viz warp and weft at **right angles** in a loom.

A loom must provide for

(a) **SHEDDING**—ie. raising and lowering the warp threads in a pre-determined order so as to divide them into layers between which the weft may be passed.

(b) **PICKING**—placing threads or picks of weft between the divided warp.

(c) **BEATING UP**—pushing each weft thread into its proper position in the fabrics that is up to a specific place known as the 'fell' of the cloth.

(d) **LETTING OFF**—holding the warp tense and releasing it as weaving spreads.

(e) **TAKING UP**—Drawing and winding the cloth at a certain fixed rate as it is being woven.

(f) **TEMPLES**—for keeping the fabric stretched during weaving in order to prevent unnecessary contraction in width as also to prevent selfedge threads of the warp being broken and injuring the reed.

Shedding is generally done by controlling the warp threads by means of healds which are lifted or lowered to form the **SHED.** The weft is inserted by the shuttle after the shed has
been formed and beating-up is done by the reed, which is moved forward by the sley or beater. Intermittently driven cloth roller takes up and winds cloth and the frictional drag applied to the weaver's beam through weighted ropes or chains regulate the left-off and warp tension.

Weaving of saree  The right end cord of the design adai(Jhungu) is pulled down and fixed to a nail six inches below its original position. The weaver presses down the right treadle of the loom to obtain the necessary shedding of the warp, throws the shuttle from the right hand side to the left and the pick is beaten. The right treadle is released and the left treadle is pressed down and the shuttle is thrown from left to the right. Two picks are woven for one adai cord. Now the adai cord fixed to the nail is released and the next cord is pulled down and attached to the nail. The shuttle is pushed from right to left and again in the reverse direction with the treadles being operated. In this way all the cords are utilised to complete the design. This process is repeated until 5 1/2 metres are woven.

For looms in which mechanical Jacquards are used, the design is controlled by cards and only one cord is manipulated. The weaver pulls down the same cord each time to move the card into the proper position.
Weaving of a double border saree  Most of the silk sarees produced in Kancheepuram have contrast borders on both sides. In this case the weft threads do not enter into the borders. The weaver uses three shuttles, one for the body and the other two for the borders. The weaver operates the shuttles for the left hand border and the body. An assistant usually a boy or girl assists in operating the shuttle for the right hand border.

Joining the body and pallav (Mundhi)

The pallav or Mundhi is the contrasting end of the saree. After weaving 5 1/2 yards in a 6-yard saree, the pallav is produced conforming to the colour of the border. For this another warp having the colour of the border is arranged over the existing warp. The weaver then weaves over a length of one inch and the body warp is cut out with a knife. The ends so cut are pushed up by a brush to enable the weavers to remove all traces of the old ends. A length of 4" to 6" is then woven and the ends of the two warps are again neatly trimmed so that the body of the saree and mundhi appear to blend together as one piece. This is the glory of the Kancheepuram saree and it rightly differs from any other saree produced in other silk weaving centres in Tamil Nadu.
Removing the saree from the Loom and folding:

After joining the Pallav, the saree is cut from the loom with a knife and the ends are knotted into tassels. The saree is now rolled on the cloth beam. Then the saree is unrolled from the beam and spread on a mat. Now the saree is folded by the weaver with the help of an assistant in such a way that its size becomes 9" x 11". While folding the saree, care is taken to ensure that the mundhi is always on the inner side so that it is not soiled while handling.

It is to be noted that the silk weavers themselves attend to the various preparatory work with the help of assistants. Since they use costly raw materials they do not entrust these duties as job work to others.

LABOUR REQUIREMENT FOR WEAVING PROCESS (SAREE)

Since weaving involves number of processes, labour requirements vary from one to the other. A consolidated list of the processes with the labour requirement for weaving a 5.5 metre Korval saree is given in the following table.
<table>
<thead>
<tr>
<th>SL.No.</th>
<th>Process</th>
<th>Personnel</th>
<th>Time required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Preparation warp</td>
<td>2</td>
<td>2 hrs per 3 sarees</td>
</tr>
<tr>
<td>2.</td>
<td>Setting up loom</td>
<td>1 tyer 1 Asst</td>
<td>1 Day per 3 sarees</td>
</tr>
<tr>
<td>3.</td>
<td>Setting up new design</td>
<td>2</td>
<td>1 Day per 3 sarees</td>
</tr>
<tr>
<td>4.</td>
<td>Preparation of weft</td>
<td>1</td>
<td>2 days per saree</td>
</tr>
<tr>
<td>5.</td>
<td>Weaving of saree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.</td>
<td>Body Weaving:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1)</td>
<td>Single Border simple design or skirt</td>
<td>1 + an asst.</td>
<td>9 to 15 days</td>
</tr>
<tr>
<td>2)</td>
<td>Double border simple design</td>
<td>1 Weaver + 1 Asst</td>
<td>9 to 15 days</td>
</tr>
<tr>
<td>3)</td>
<td>Double border large design</td>
<td>1 Weaver + 2 assts.</td>
<td>9 to 15 days</td>
</tr>
<tr>
<td>B.</td>
<td>Mundhi (Pallav) Weaving</td>
<td>1 Weaver + 2 assts.</td>
<td>1 to 1 1/2 days</td>
</tr>
<tr>
<td>C.</td>
<td>Joining body and Mundhi</td>
<td>1 tyer weaver + 1 asst</td>
<td>3 hrs</td>
</tr>
<tr>
<td>D.</td>
<td>Removing saree from loom</td>
<td>1</td>
<td>30 minutes</td>
</tr>
<tr>
<td>E.</td>
<td>Folding saree</td>
<td>2</td>
<td>15 minutes</td>
</tr>
</tbody>
</table>

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1. Yvonne J. Arterburn, *The Loom of Interdependence: Silk weaving in Kanchipuram*, Delhi: Hindustan publishing corporation, 1982, p.33. The first three processes are done only for each warp i.e., for three sarees woven.
Techniques of Pallav Weaving

Usually three techniques are adopted for weaving a saree with pallav of a colour different from that of body.

They are  
1. Tie-dyeing  
2. Porai method  
3. Petni method  

I. Tie Dyeing:

It is very common and is considered the easiest. The warp, which may be for a number of sarees, usually six, is folded conveniently, so that the pallav portions and the body portions are brought together by arranging alternatively i.e., the body portion followed by the Pallav portion and the Pallav portion followed by the body portion. The body portions are tied and the pallav portions are dipped in dye bath. For dyeing the body portion, the pallav portions are tied and the body portions are dipped in the respective dye bath. Usually the body portion is dyed first. After dyeing the warp which is in an elongated ball form, is mounted on the loom gradually opening and spreading the warp while the weaving continues. The sequence of weaving the body and the pallav portions in successive sarees continues alternately. The joining line of
the two different colours becomes irregular and wavy. To cover the irregular coloured edges between the body portion and the pallav, a cross border of about 3 to 4 cms is woven in a weft satin weave.

II. The Porai Method

This method is **Common in Kumbakonam**. The irregular coloured edge between the body portion and the pallav is not woven into the fabric. The mounting of the warp on the loom is so arranged that the ends can be made loose, as required. The irregular coloured edge portion can then be pulled out while weaving and then cut off and eliminated.

The pulling out of the irregular edge mentioned above is done in two stages. - I stage First & fourth healds are pulled out II stage second & third healds are pulled out and weaving is continued. The saree is woven backside up and the cut ends show-up in two lines on the back-side of the cloth.

III **The Petni method:**

It is commonly adopted in **Kanchipuram**. The ends of the body warp and pallav warp are joined not by strong twisting. When the body portion is almost woven, another sharp warp (for
weaving one saree at a time) for the pallav portion is drawn through the same healds keeping the order of the combined warps in the order of one of the body and one of the pallav in sequence. After drawing through the healds, the pallav warp end is taken loosely round the corresponding adjacent body warp end then drawn through the same dent by simply pulling the body warp end which is kept slightly loose for the purpose. (The entire warp is kept slightly loose.) When all the warp ends are thus combined and drawn through the reed, the warp is put on reasonable tension and weaving started and continued till the combined portion is woven for about 3cms, holding the pallav warp ends, firm and joined to the body cloth. The remaining portion of the body warp ends are then cut off and taken out of the loom. This process gives a smoother appearance and feel to the joined portion even though the joined portion is thick. (These being double the number of required ends in the joined portion) The respective ends of the two warps show up in two lines on the back side. The cloth is woven back side-up.

For a keen observer, the above mentioned techniques have often been the identifying factors for locating the place where the fabrics of similar category are woven. However, at present
such special techniques are being introduced in other places also as in the case of design motifs and lay-out of patterns and motifs. The proliferation of the special technique is not very wide yet.

During the year of Handlooms an ordinary fly shuttle technology has been developed at Weaver's Service Centre, Bangalore, to increase the productivity in the manufacture of contrast colour solid temple border silk sarees-with one weaver. Three to four days are needed to complete weaving of the silk saree of that design. It does not involve much additional cost.

Advantages of the new Technique

i) Increase in the production by 250 to 350%

ii) Saving in labour

iii) Increase in the earnings of the weaver

iv) Improvement in the quality of the product.

v) Perfection in the joining of the body weft with border weft of the saree.

1. Prof. B.C. Mohanty, 'The technique of weaving a saree with pallav of a colour different from that of body - Silver Jubilee Souvenir 1985 - Indian Institute of Handloom Technology - Salem. PP.47-49.
The loom required is an ordinary fly shuttle loom fitted with regular heald set for the body warp threads. Separate healds for border warp threads are used on both sides. Elastic threads are tied to the bottom of the border healds for heald reversing motion.

Depending on the pattern and size of the temple design (single rake or petals) separate heald set bunch in pairs are connected in between the border and body to a single pick changing dobbey (pick and pick dobbey). This dobbey changes for every two picks towards border and it will change for every pick towards body as per the design arranged in pegging the lace separately for both the border temple. This dobbey is operated by both the treadles.

The temple border threads controlled by pick and pick dobbey and body threads controlled by ground healds will change the shed for every pick. When the shuttle enters the other border, the border shed remains stationary and only body shed will change during subsequent pick. Instead of three dobbies, two dobbies can be used to get solid temple border on only one side of the saree.
With this construction, the texture in the border of the saree will be extra-ordinarily heavy compared to the body texture as different from the saree woven by conventional method. The extra-ordinary heavy texture in the border of saree woven by the new technique does not therefore require any attachment of saree-fall as it possesses good draping qualities. Compared to the saree woven by the conventional method, the saree woven by the new technique will have better joining of the body weft with that of border weft as the loop linking will be between the opposite weft threads loop of the body and not with the adjacent weft thread loop of the body. On account of this fly-shuttle technique successfully developed, the productivity increases by 250 to 350%, thereby increasing the earnings of the weaver. It will also help bringing down the cost of the saree.

For weaving a Korvai(solid bordered) saree, the silk weavers in other silk weaving centres such as Arni, Kumbakonam, Salem and Thanjavur are also adopting the same practices like that of Kanchipuram weavers, but with a little variation. The pallav is woven separately and skillfully attached to the body of the saree.

1 "Development of contrast coloured solid temple order silk saree weaving with one fly shuttle-Article by H.Sanjeeva shetty Asst Director, WSC, BANGALORE Souvneir-1986 Indian Institute of H/L Technology PP.56-59".
the saree so as to blend into a continuous whole. This effect is not achieved in the case of sarees produced at other centres.

Another speciality of Kanchipuram is the production of tissue sarees. In a tissue saree the body of the warp is pure silk. The weft and border threads are of Zari. Since the tissue sarees are very costly, the weaving units do not produce many of this type.

Kanchipuram sarees are more durable than the varieties produced in other centres because Kanchipuram weavers, use four filaments of Suppuri twisted on the dola as weft yarn, whereas in other centres the weft yarn consists of only two filaments. The Kanchipuram sarees are very popular not only because of their technical excellence but, also due to their novel designs.

In Arni, dobby sarees are produced in bulk by using fly shuttle loom. For weaving this type of saree, the weaver does not require any assistant. Other items such as skirts and shirting pieces are also produced at Arni using fly shuttle looms.

In Kumbakonam and Thanjavur, Korvai sarees and skirts are produced by using throw shuttle looms. In Kumbakonam most of the weavers are using Jacquard boxes for producing designs.
In Salem centre, Dhoties, angavastrams, shirting pieces are produced by using fly shuttle looms, whereas sarees and skirts are produced by using throw shuttle looms.

**Designing of Silk Fabrics**

Breadth taking designs and colour excellence without resorting to mechanisation—Hand block printing and screen printing—are the excellence of Indian Weavers. They are second to none in the world in giving immaculate effects by employing discharge process on silks.

Supply of high-grade non-dischargeable colours against replenishment licences and imports canalised through Central Silk Board are insufficient.

Central Silk Board should recommend limited import of **basic dye materials** for the colour manufacturers. In such an event high quality non-dischargeable range of colours at low price may be made available indigenously.

The creations coming out from the famous fashion houses of **St. Laurence, Givenchi** and **Hanna Mori**, where Indian silks dominate quite considerably, should be utilised.
Machine Printing is not suitable for Indian silk for two specific reasons;

1. Handloom goods are available in short lengths

2. The demand for our silk is mainly decided by "Individuality" of each piece, a characteristic which could hardly be made possible on mass-printing machines. The concept of "unique individuality" is a plus point for the export of Indian silks.

**WEAKER POINTS:**

Indian Silk Printing consists of the following Three vital segments.

1. Conceptual designing by artists
2. Handblock Printing
3. Screen Printing

Our artists are experts at permutation and combination of evolving "synthesis" between orient and Occident with remarkable effect. Their colour-sense is superb and widely appreciated everywhere in the world.
Method of Printing: The National policy - handloom development planning is based on promoting employment potential of this sector. Mechanisation in printing, on the contrary, diagonally cuts across this directive Principle.

Hand block printing and screen printing provide for complicated pattern. Any number of colours that can be registered and super imposed effectively on the fabrics by these methods.

Screen printing is used for larger orders of fixed layouts, say for scarves. Indian designers have the desired level of expertise in visualisation and designing.

The "Achilles Heel" of the silk printing sector which, substantially, subdues the head ways earned in earlier stages are

a) Communication gap
b) Inadequate availability of non-dischargeable colours
c) Lack of guidance/manual literature on colour mixing.

a) By the time, the exporters come to know of the latest designs by the sketchy information from fashion magazines, which reach the Indian shores months after publication, the fashion would have gone a sea change.
b) Non-dischargeable colours are mainly suitable to only **sunny countries like India.** The SUNSHINE is the sine quo non for effective and bright results. Various alternative lights like ultra violet rays etc. were tried, but that could not succeed in replacing sunshine.

c) The only literature available on this is the SILK SHADE CARDS, published by the weavers service centres and the Indian Institute of Handloom technology Salem. **These cards are too costly and generally out of stock.** The task of an exporter is of continuous vigilance on colour mixing.

Eventhough, the printer may be equipped with full-range of non-dischargeable colours, he would not know the end-use of the fabrics. Certain other colours are prone to fading colours; certain colours suit only evening dresses and some others for late evening wears. Therefore the exporters should be in constant touch with importer and keep on solving out these problem to avoid complaints.
OPERATIVE POINTS

1) Central Silk Board should regularly subscribe to the colour forecasts published by A & FF (US) International Textiles (Europe) for major seasons of fall and spring - one Dozen copies to be procured.

2) Textiles/Printing experts should study the colour cards analyse it and issue guidance, after consultation by correspondence with SONA, TDA offices and other official agencies abroad.

3) Central Silk Board, Weavers Service Centres, Handicrafts and Handloom Export Corporation and Handloom Export Promotion Commission should pool a part of their promotional funds and jointly publish adequate number of copies of silk shade at a subsidised rate.

4) Each year at least one fashion designer should be invited by the Central Silk Board to tour weaving centres in India for slide-aided lectures for people concerned.

5) Free training should be provided to weavers/printers for short duration of 3 months, in a separate lab for silk printing and dyeing technology.
6) The Central Silk Board should employ half a dozen top designers on retainer basis who should evolve new designs in consultation with the expert committee and arrange its large-scale reproduction for supplies to actual users at subsidised rates.

7) The standing export Advisory committee of Central Silk Board should have on it a couple of top class design consultants and acknowledged fashion designers.¹

India's handloom industry which has a long tradition of excellence and unrivalled craftsmanship, is spread throughout the country and the rhythm of the looms can be heard in almost all the villages.²

The handloom industry has displayed innate resilience to withstand and adapt itself to the demands of modern times, characterised by keen competition from the more efficiently organised mill industry and change in fashions and tastes. Today, it uses not only the traditional raw materials but has also substantially, switched over to mill-spun yarns and chemicals

dyes. It has abandoned the primitive throw shuttle loom and has taken to pedal looms; modern fly shuttle loom and semi-automatic loom. It is taking to the use of modern bobbins, dobbies, Jacquards and other improved appliances in ever increasing measure. Handloom fabrics and products are becoming an item of choice especially amongst the discriminating and fashion conscious symbolise the best traditions of India's ancient culture and they have an irresistible appeal to the most sophisticated and advanced nations. Individuality being the hallmark of true craftsmanship, Indian handloom fabrics have always taken the pride of place wherever elegant textiles are prized. The highlights of the handloom development programmes are as follows:

(a) Modernisation of looms

(b) Training of weavers in improved techniques

(c) Development of Co-operatives - The aim is to cover 60% of all weavers by the end of sixth plan

(d) Assistance to weavers outside co-operatives through handloom development corporations.

(e) Strengthening of primary and apex Co-Operative institutions for production and marketing.

(f) Setting pre-loom and post-loom processing facilities.
(g) Substantial expansion of credit through RBI scheme of handloom finance and through commercial Banks.

(h) Research and Development. This will involve strengthening and expansion of Indian Institutes of Handloom Technology and weavers' service centres.

(i) Special assistance through NCDC for augmenting spinning capacity, marketing and processing by cooperative institution. Support and assistance to weavers in design & technology is provided through 21 weavers service centres and Two Institutes of Handloom Technology;

The special features of these projects are:

(a) Credit needs of the weavers are being met through nationalised banks and in majority of cases the benefit of Differential Rate of Interest i.e., 4% is being applied.

(b) Steps have been taken to arrange for the supply of yarn, dyes and chemicals on a regular basis to these weavers.

(c) Individual weavers will be brought under umbrella of state development handloom corporations.

A massive programme of production requires efficient system of marketing coupled with effective measures of cost reduction and quality control. In the years ahead, measures will be put through to realise these objectives. An integrated textile policy has also been formulated to accord the handloom industry its proper place.

The productivity of the Handloom is as low as an average of
two metres or so per loom per day. It is estimated that a large capacity in Handloom is under utilised or unutilised and 18 to 20 lakhs looms will be sufficient to produce the existing production as against 35 lakh looms.

A majority of Handloom weavers are un-organised carrying on their work in their huts/houses scattered throughout the nook and corners of Tamil Nadu. It may be very difficult to arrange for a regular flow of finance, raw materials, assistance for marketing of the products, unless they are brought into organisational set up under a centralised management. It has been found from experience, that Co-operative Societies form the best institutional agency for providing all these facilities to the weavers. The Sivaraman committee appointed by Government of India recommended that 60% of Handloom weavers in the country should be brought into the co-operative fold so as to enable them to carry on their industry on profitable lines and to provide continuous employment and regular income.

The majority of Handlooms in India is of throw-shuttle and fly-shuttle type. These looms can weave the finest silk and the most intricate designs and patterns.
A **throw shuttle** pit loom consists of

a) wooden sley (without a race board)
b) two shafts
c) one shuttle
d) warp beam
e) a cloth roller
f) a pair of treadles usually placed in a pit in the ground.

The weaver operates while sitting on the edge of the pit. The shuttle is thrown between the divided warp by one hand and picked at the opposite side by the other hand. Shedding is done by operating the treadles by feet the output of the loom is low 3-5 square metres fabric per day of eight hours.

In a **fly shuttle** pit loom, the shuttle is made to move either way on the race-board of the sley by a simple mechanism. The battem projecting on both sides of the wrap space is fitted with a Shuttle Box at each end. In the upper region of the box is mounted a spindle while the base is provided with a groove for the movement of the picker. The shed is formed when the treadle is pressed down by one foot. The shuttle is projected from one box to the other by pulling the card attached to the picker. The production on these looms is **about double that of one throw-**
shuttle loom. In a fly-shuttle frame loom, the shuttle is fitted to a frame and a seat is provided for the weaver to sit and operate. All parts of the looms such as

1. Weaver’s beam
2. back rest
3. lease rods
4. healds
5. reed
6. slay race
7. shuttle box
8. picker
9. top roller
10. treadles
11. temples
12. front rest and
13. cloth roller

are fitted in the frame in such a way as to make the weaving smooth and easy.

There are several variations of the above two types indicating the name of the weaving centres

Varanasi Loom : 
Chanderi Loom : 
Himroo Loom : 
Kanchi Loom : throw shuttle looms
Gadwal Loom : 
Jamdani Loom :

Uddappa Loom :
Salem Loom :
Madras Loom : Fly-shuttle looms
Sendilla Loom :
Nagpur Loom :
Throw-shuttle looms are being replaced by fly-shuttle looms, as the fly-shuttle looms have Dobby and Jacquard mechanisms installed in the fly-shuttle loom to increase the working capacity and efficiency. Also, looms are being provided with DOBBY and JACQUARD Mechanisms to facilitate the weaving of intricate and artistic designs without extra labour.

DOBBIES are generally used for producing small designs on Sarees or Dhoti borders and JACQUARDS for elaborate design on the body of the fabric and overall effects.

**TYPES OF FABRICS:**

The major portion of mulberry silk output in India is utilised in the production of sarees which bear traditional patterns and motifs according to each region. The bulk production in South India is of thick Saris, Dhotis and angavastrams. In Tamil Nadu, a local speciality is a three-shuttle weaving to produce SOLID BORDERS.

1) **SARI** - is a piece of cloth with border, worn by women. It is woven in different sizes in different parts of the country - measuring 6 - 9 yards in South India and 5-6 yards in the North.
The width is usually 44-46". In costly pieces, gold or silver thread or coloured yarns are woven in various patterns and designs. Ornamentation is done on the border, in the body and in one end (anchal or Pallav)

Types:

Varanasi - Kalga, Kewa, Kataw & Tissue sarees

Murshidabad - Baluchav silk Sarees
   The weaving is very complicated and may require the help of 14 persons

Kancheepuram - TEMPLE sarees

Gujarat - PATOLA & BANDINI Sarees

2) DHOTIS: A piece of male - wear measures generally 5 yds x 44-48" in North & 3-4 yds x 52 - 54" in South India.

3) ANGAVASTRAM: A male-wear in South India measuring 2-3 yds x 44 - 45". This material from Tamil Nadu is known for its luster and elegance

4) LUNGI: Is another variation of dhoti worn by men.

5) SCARVES, TIES and Handkerchiefs:
   The scarves and handkerchiefs, of silk are made with or without design, in various prints and embroidery pattern. The sizes vary somewhat in different regions.
Varanasi, Kashmir & West Bengal are the important Centres of production. In recent years TIES made from printed Handloom silk have come into prominence.

6) DRESS MATERIALS: They are suitable for women’s dresses, men shirtings and suitings drapery and furnishing. The material is manufactured in different sizes in Karnataka, West Bengal & Kashmir and is sold by length.

Beautiful silk materials for shirts and blouses in oriental designs also come from Tamil Nadu. Himroo from Aurangabad district is an extra weft damask having a satin or twill background with figurative motifs, woven from silk yarn and gold thread.

7) BROCADE It is a glittering lady’s dress material. The dazzling silk brocade material is woven in a great variety of beautiful floral and other designs worked with gold or silver thread. It is produced in Varanasi by special weaving techniques requiring great dexterity and precision. Recently the use of coloured artificial silk thread in the weft in place of silver and gold threads has greatly increased owing to the demand for cheaper brocades and kinkhabs.
8) Embroidered Materials & Carpets

Coarse silk threads after dyeing are used for embroidery purpose. It is practiced in North India. The embroidered Kashmir shawl is very popular. The pattern is woven with hand by working the thread on small wooden quills. Silk carpets are woven in Kashmir with thick Dupion or Coarse Silk.

In the opinion of T.R. Somasekar the silk-loom should be of
a) under pick type
b) with small size shuttles
c) equipped with nylon loops
d) all-metallic reed
e) porcelain eye-lets in the head
f) chromium plated revolving back-rest.

Reeds should be maintained well and a check on its quality made before drawing a beam. "Shirley gratings" and ATIRA gratings for checking the reeds are available and they must be used as routine process control gadget.

It is well-known that replacement accessories such as
picker
Buffer Have a certain life of operation.
Shuttle reels
healds
Similar philosophy of maintenance should be extended to dobby and Jacquard attachments as well. Checking of picks in the fabric at least twice a shift is a must for maintaining quality. Special attention should be given to the construction details of selvedges and it is best to employ standard constructions.

Above all, special attention must be given to better house-keeping to avoid (a) oil & metal stains and (b) soiling of the fabric (c) and to use proper lighting to enable twisters and weavers to work with least strain on their eyes (d) use of humidifiers in dry seasons goes a long way in improving twisting and weaving operations.

A control of waste at various stages of the operation brings in a lot of savings since silk is a very expensive material. As a guide-line, waste at weaving and throwing together must not exceed 1%.

**PROBLEM OF IDLE LOOMS**

A loom is treated as an idle loom, if a weaver does not work continuously for a period exceeding six months. The problem is severe in the case of silk co-operatives. The following table gives an idea as to seriousness of the problem in silk Co-operatives.
TABLE 4.2
Table of Active and Idle Looms As on 30.6.1985

<table>
<thead>
<tr>
<th>Region</th>
<th>Active Looms</th>
<th>Idle Looms</th>
<th>Total Looms</th>
<th>Percentage of Idle Looms to the total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiruchi</td>
<td>5539</td>
<td>698</td>
<td>6237</td>
<td>11.19</td>
</tr>
<tr>
<td>Salem</td>
<td>1572</td>
<td>1674</td>
<td>3246</td>
<td>51.57</td>
</tr>
<tr>
<td>Kanchipuram</td>
<td>8030</td>
<td>4704</td>
<td>12734</td>
<td>36.94</td>
</tr>
</tbody>
</table>

Source: Administrative Reports of Assistant Directors of Handlooms and Textiles.

Nearly one-third of the total looms are idle looms. The idleness of the looms in the co-operative sector are due to lack of sufficient working capital, non-availability of raw materials at reasonable prices, disloyalty of weaver members and due to inefficient management of the societies.

Being private entrepreneurs, the master weavers do not have the problem of idle looms so severely like that of silk-weavers' Co-operatives. The main reason for the idleness of the looms in this sector has been the non-availability of skilled weavers.
UNDER-UTILISATION OF LOOMS

This problem of under-utilisation of looms is created by the failure on the part of the weaver members to avail themselves of the facilities extended to them and partly due to the inefficiency of the societies to provide the required inputs to the weavers. With a view to solving this problem of under-utilisation, the silk co-operatives fix a time-limit for weaving each type of fabric. If the weavers fail to return the finished goods within the prescribed period the societies collect a penal rate of interest of 24% from the defaulting weavers for the excess period. The interest is computed on the basis of the raw materials issued to the weavers. In spite of this action, still some weavers are erring.

The following are the main reasons for the under-utilisation of looms by the weavers.

1. Ill health
2. Domestic work and
3. Pledging the silk and zari with the pawn brokers.
4. In some cases the societies fail to supply the required inputs to the weavers continuously.

The under-utilisation of looms in the case of master-
weavers is largely due to the shifting of loyalty of the weavers. This frequent change over from Co-operatives to private sector and vice-versa is possible due to the divided loyalty of the members. The main reason for under-utilisation of looms is on account of non-availability of major inputs at reasonable prices

Production Trend of Silk Fabrics in Tamil Nadu

Indian silk fabrics have unique charm and beauty being the products of the creative genius of the silk handloom weavers whose skill is the continued heritage of many generations. They symbolise the best traditions of India's ancient culture with an imperishable and irresistible appeal even to the most advanced nations. To meet the ever-growing foreign demand as well as local demand, India is steadily increasing her silk-fabric production.

Production Trend of silk fabrics on an All-India level vis-a-vis silk co-operatives of Tamil Nadu during the period between 1981-82 and 1985-86 is give below.
TABLE 4.3
Share of Silk Co-operatives of Tamil Nadu in the Total Production of Silk Fabrics
(Unit in Rs Lakh)

<table>
<thead>
<tr>
<th>Year</th>
<th>All India Production</th>
<th>Production by Silk Co-operatives of Tamil Nadu</th>
<th>Percentage Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981-82</td>
<td>31,400</td>
<td>2005.02</td>
<td>6.39</td>
</tr>
<tr>
<td>1982-83</td>
<td>41,184</td>
<td>2403.42</td>
<td>5.84</td>
</tr>
<tr>
<td>1983-84</td>
<td>52,251</td>
<td>2681.11</td>
<td>5.13</td>
</tr>
<tr>
<td>1984-85</td>
<td>71,763</td>
<td>2786.04</td>
<td>3.88</td>
</tr>
<tr>
<td>1985-86</td>
<td>83,896</td>
<td>3490.01</td>
<td>4.16</td>
</tr>
</tbody>
</table>

Source: Govt. of India central silk board, silk in India statistical Biennial 1986, p.108 and Govt of Tamil Nadu- Department of Handlooms and textiles - unpublished records.

The above table clearly shows that the share of silk Co-operatives of Tamil Nadu to the total has been steadily decreasing up to 1984-85. From 1985-86 it shows an increasing trend indicating the extent of coverage by Silk Co-operatives in Tamil Nadu.

With a view to find out the increase/decrease of productions on an All-India level vis-a-vis Tamil Nadu the following table has been designed with the help of the basic data given in the earlier table.
### TABLE 4.4
Comparative Table - All India Vis-a-Vis Co-operatives of Tamil Nadu

<table>
<thead>
<tr>
<th>Year</th>
<th>All India Production</th>
<th>Percentage Increase/Decrease</th>
<th>Production Silk-co-operatives of Tamil Nadu</th>
<th>Percentage Increase/Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981-82</td>
<td>31400</td>
<td>-----</td>
<td>2005.02</td>
<td>-----</td>
</tr>
<tr>
<td>1982-83</td>
<td>41184</td>
<td>31.16</td>
<td>2403.42</td>
<td>19.87</td>
</tr>
<tr>
<td>1983-84</td>
<td>52251</td>
<td>26.87</td>
<td>2681.11</td>
<td>11.56</td>
</tr>
<tr>
<td>1984-85</td>
<td>71763</td>
<td>37.34</td>
<td>2786.04</td>
<td>3.91</td>
</tr>
<tr>
<td>1985-86</td>
<td>83896</td>
<td>16.91</td>
<td>3490.01</td>
<td>25.27</td>
</tr>
</tbody>
</table>

All India production of silk fabrics shows a steep increase in 1982-83 and 1984-85 whereas the production by silk co-operatives of Tamil Nadu also shows a similar increase in 1982-83 but in 1984-85 a very negligible increase followed by a further steep increase in 1985-86. Over a period of five years the All-India production of silk fabrics has increased by 2.7 times, whereas the production by Silk Co-Operatives of Tamil Nadu increased by 1.74 times.
PROBLEMS IDENTIFIED

From the foregoing analysis, the following problems have been identified by the researcher.

1. The use of throw shuttle looms hampers the production efficiency of weavers. The weaving of a korvai saree requires two or three shuttles. So far, no device has been developed to weave a korvai saree on a fly shuttle loom. Instead of using jacquard boxes for weaving designed fabrics, still most of the weavers are using the country styled jacquard viz., adai. This shows that the weavers are very reluctant to use new techniques of weaving with existing looms and also not willing to go for modernising the traditional type of looms.

2. The silk weavers have been using out-dated methods for performing pre-loom processing activities such as dyeing, sizing, warping and the like. Due to this outmoded pre-loom processes, there is an enormous consumption of labour which leads to a hike in the cost of production of the silk fabrics. The high labour cost leads to a spurt in the price of silk fabrics. As a result, the silk weaving industry is facing a stiff competition from the art silk industry.
3. Most of the silk weavers are learning the art of silk weaving from their elder members. This tradition of imparting skill from the elder members to the entrants is a stumbling block for establishing formal institutions for imparting skill in weaving.

4. The product mix of silk weaving units in Tamil Nadu is very narrow mainly consisting of sarees and skirts. Moreover, the demand for these silk fabrics is seasonal. The narrow product line and seasonality of demand compel the production units to stop production intermittently leading to unemployment and under employment among the silk weavers.

5. The silk Co-operatives have been confronted with the ever increasing problem of idle looms. The problem of idle looms upsets the production targets of the silk societies and retards their growth.

6. The problem of under utilisation of looms in Co-operatives and master weavers occurs mainly due to the inadequate and untimely distribution of inputs, inefficiency of the management and disloyalty of the weavers.