1.8 DELIMITATIONS OF THE STUDY:

In fact, at present Paithani manufacturing and marketing is mainly concentrated in Yeola rather than Paithan. This traditional textile of Maharashtra is kept alive by the Weavers of Yeola, because of two reasons, it is a forefather's occupation and there is an increasing demand from customers for Paithani so they have not shifted on any other profession and production as well as sale of Paithani is high.

As a result of it a few delimitations were imposed upon the study.

1. The locale selected for the study was Yeola rather than Paithan as production of Paithanis are on large scale at Yeola.

2. The sample size for training programs is limited, i.e. 120, for following reasons-
   - Imparting training to a large group is difficult as dyeing and designing both aspects are technical and scientific.
   - It is a costlier and self financed project.
   - Usually, accepting the new concepts by population is not an easy job, it is difficult to change their mind set up.

3. Frequency and duration of training is not often and longer as they are not ready to spend too much time apart from their busy dyeing and weaving schedule. This is also a one of the reason for a restricted sample size.

4. The investigator has to totally rely on the information provided by the respondents.
CHAPTER - 2

REVIEW OF LITERATURE
2. REVIEW OF LITERATURE

In any research review of literature plays a significant role. This chapter gives us guide line for identification or areas of research already covered in a particular field, understanding the methodology used by the researcher in past which helps in preparing the research designs and selecting tools for data collection. It even gives us an idea about the research gaps in particular field under study. Hence review of literature is inevitable.

After reviewing some of the relevant studies here, it was observed that many studies were carried on problems of Handloom Industry, socio-economic status of Handloom Weavers but the study which is conducted by Researcher here is unique, which covers the socio-economic status of Dyers and Weavers, problems faced in Silk degumming and dyeing, difficulties faced in designing by Dyers and Weavers and finding the solutions to these problems.

These aspects were studied in this research, so this chapter consist following sections.

2.1 Paithani Silk Degumming and Dyeing
2.2 Paithani designing
2.3 Paithani Handloom weaving
2.4 Training
2.5 Attitude
2.6 Studies conducted

It has been commonly observed that Silk Sarees and garments find, a superior place in an Indian women's wardrobe, because of its dignity, splendor and of course price. Reasons for its ranking first among other fabrics are many. If dress and dressing is the criteria to grade a person at the first instance, dressing oneself in Silk gets a plus to the Weaver. 62.5% of the target women agreed in its entirely that Silk is a status symbol. Wearing Silk is more a tradition than a status symbol. The dressing is the way of presentation of the self and Silk adds to the physical look only.

Attitudes towards New Techniques in Dyeing and Designing among the Paithani Weavers of Yeola. 20.
Sinha Rajesh and Kirsur M. (1994) stated that, in the survey, it has been found that, the most important aspect in the choice of a fabric for a Saree is its design, color and prints. Till recently motifs of the Sarees used to represent culture and art of the contemporary ages. However, there may be observed a recent trend in the representation of tradition through Silk Sarees which a modern woman calls a new wave in wave. Elders may feel comfortable that we are not running away from our traditions and many of our young women still like to look traditional and Indian as supported by representative from housewives, working women and aesthetician groups. The survey revealed that there are a set of colors in Silk which are popular and fissionable among the cross section of the society.

A general consideration is that -

● Pallov should be grand to enhance the beauty of the Saree.
● A thin line of Zari on the border mostly in the printed Silk Sarees.
● Heavy Zari of Banarasi and Kancheevaram Sarees.

Body colors generally liked are pink, mustard, pale yellow, maroon, blue, black, green and pastal shades. Popular color combinations of body and pallov are parrot green with red, yellow with red border, white with maroon border, yellow and maroon, cream and maroon, mustard with green border and bright colors in off white background.

Most of the housewives like Silk Sarees with grace, elegance, softness, wide range of colors and suitable contrasts, durability of Silk and that which give them a sense of feeling "Special". Sometimes the designs in Silk fascinates. Someone likes Silk for keeping her warm in winter in addition to its draping and shining qualities. Silk is rich with glamour in look. To some working women it has become a part of their daily life.

Silk is not an increasingly costly affair but to some extend, a dead investment also even then the women love Silk extend. When the number of women were interviewed...
with view to assess the liking of women in general for Silk, in which color, design and form they have liked and would like to have Silk in their wardrobes, on the occasion of the "Year of women in sericulture-1994".

2.1 PAITHANI SILK DEGUMMING AND DYEING:
Among the women, once we talk of Silk, Saree is the most predominant and noticeable attire. Silk Sarees are most popularly used for wedding ceremonies, festivals and formal parties. Silk is loved for its glamour, richness, beauty, bright colors, fashionable look, modern and unlimited range of designs. Light Silks of crepe, tissue, chiffon and printed Silks with little zari are preferred for weddings of acquaintances or relatives, informal parties, functions at working place, puja, temple visits and occasionally as daily wear whereas thick and unprinted Silks of kanjeevaram, Banaras with Zari and lighter Silk with heavy zari for weddings, formal parties, puja and temple visits on festivals (http://www.fashionindia.net).

But, whether the buyer, who is most often a woman, can make out the purity of Silk and zari; if so what are here common parameter? What are the Silk fanciest of a woman, what she think of its place in the society is, effect of her sociological back-ground in the selection of Silk and above all what is there in Silk which fascinates her most? With such many more queries, stated by Sinha R., et al., (1994) met recently women representing different walks of life, in the Silk showrooms, offices, at home, attending training programme on Silk and colleges to work out a common behavioral pattern of the buyer's of Silk.

2.1.1 History of Silk:
Silk the mystical fibre has a fascinating history, legends woven together. It was discovered in China more than 4500 years ago. Silk was known and produced in India from pre-vedic times. India was from on the fabled Silk route, which stretched 6000 miles across the heartland of Asia from china to the
Mediterranean. When one thinks of Silk one naturally thinks of China. The cultivation of Silk was a well-guarded secret and a number of exotic stories are associated with it. A Chinese princess married to a ruler in Singkiang is supposed to have smuggled Silkworm eggs in her elaborate hairstyle. She taught people how to nurture the eggs and develop sericulture. This is supposed to have occurred in 140 B.C. It was from Singkiang that the skill was carried to India along the Asian Silk route and developed there. (http://www.india.crafts.com)

Jain records at Pali, a town near Jodhpur in Rajasthan that was important on the Western Indian trade routes, mention that large quantities of plain Chinese Silk used to bring for dyeing. In a research paper mentioned by Choudhary S. N. for the sericulture and weaving Department of the Government of Assam in 1982 entitled Endi Silk Industry, it is mentioned that the art of Silk weaving was known from the ancient epic age of Kamrup. Another Assamese scholar P.C. Chowdhary, in the History of the Civilization of the People of Assam stated that in the Rama-Yana there is mention of kasakaranam bumih which refers to cocoon rearing in Kamrup. Assam is the naturo home of Endi worms, that feed on castor leaves, locally known as Eri.

Kumar Bhaskar Varma (AD 600-650) of ancient Kamrup presented Hieum Tsang with a Silk wrapper of a brilliant gold hue, which is an obvious reference of the glowing golden color of Muga Silk. Sri Shankar Deva (1449-1569) sent a woven piece to "Koch King Narayan" which depicted scenes from Brindaban. The majority of Silk weaves trace their origins to Gujrati. Some of the most important Weavers of southern India working in Silk were originally known as Sorathis. The fact that an inscription in the 5th century AD Sun Temple at Mandsor mentions that the Silk Weavers had donated towards the building of the temple, indicates the importance of the Silk Weavers shreni or guild.

Ramswamy A. (1985) investigated that India was the 3rd largest producer of Silk in the world. China produces about 23,000 tons, Japan about 16,000 tons and India...
about 6,000 tons of Silk. Though India occupied 3rd position in the world, its rate of
growth today is possibly the highest in the world. India has the unique distinction of
producing all the four varieties of Silk i.e. Mulberry, Tasar, Eri and Muga Silk.
According to 'Silk and Color' (SANDOZ, 1988), the collective 'Silk' is applied to
protein-containing secretions which are exuded as filaments by the glands of the larva
of different species of moth. Two types of Silkworm and Silk are distinguished.

- Bombyx mori Silkworm: Cultivated Silk Bombyx mori or cultivated Silk is
produced by Silkworm larval which are cultivated in special roofed enclosures
and fed with freshly picked mulberry leaves. This type of Silk is fine, almost
white, soft filaments with a soft luster.

- Wild Silkworm also called 'tussah' or 'gaint Silkworm': Tussah Silkworms
produce wild Silk, also called tussah, tasar, tassar or tussor Silk. They mostly
live in the wild on bushes and trees, where they feed. Wild Silk filaments are
coarser, more irregular, 'grittier' and beige-brownish in the natural state - they
are never as white as cultivated Silk filaments.

Luxury, beauty, refinement, sensuality, elegance - Silk is synonymous with all of
these. No fiber natural or man-made rivals its versatality. Silk are light but strong,
smooth and soft superbly adaptable. It gives you warmth in winter and cool in
summer. It can be dyed with infinite shades suitable or bold. When worn or draped,
its fluidity is spellbinding. Silk is sumptuous, royal and heavenly; it is exotic, erotic
and sensual. Most of all it is simply sheer beauty. It is soft and fluid; no other fabric
drapes or falls so well on the body as Silks. This century has been the invention of
man-made fibers or artificial Silk, but there remains nothing that has all the qualities
of Silk. Therefore the 'Silk is Silk only'.

In 1989 edition of Marg titled, "In quest of Themes and skills Asian Textiles" covered
velvet in Mughal India. This was the exquisitely woven voided velvet made for the
Mughal Court. We were the second largest producer of mulberry Silk in the world
during that period and occupied the second rank so far as Tasar Silk is concerned opined by Ullal S. R. and Narsimhana M. N. (1994).

Woven Silk was produced in India from the earliest times, for Silk was treated as a pure material to be used for sacred and ritual purposes. The Buddha has permitted bhikkus the use of Kauseya - pravara, a Silken chadar. A range of techniques was developed and though no actual examples exists, literacy references to Silk weaving are found from ancient times. Wild or uncultivated silk was known in India since that period. It is however, likely that Chinese Silk was traded with India for its other commodities and was also processed here. The art of dyeing and printing was an ancient one and Indian Dyer's had a reputation for luminous permanent dyes. Merchants could have dyed their Silks in India before carrying them to Europe by the sea-route reported by Kirsur M. and Ramesh M. (1998).

Though reeled lustrous mulberry Silk may have come into India at a date later than it reached china and central Asia, the art of Silk weaving was always highly developed in India. Each center in the region developed its own distinctive style: be it the Silk khes and lungi of Punjab, the soft checkered patterns of Kashmir, the gold brocades of Varansi, the Ashavalis of Gujrat with rich gold patterns, the Satins, Atlas, Chinese style of Brocade, Tanchois of Surat, the Patan patolas, the Mashrus and Himroos of Andhra, the Paithanis of Mahrashtra, the Chanderis, the rich Armoori, Gadwal, and Nander of the Deccan or the richly woven saris of heavy kanchipurum Silk and later day Silk weaves of orissa. Nowhere in the world today can such a range of hand-woven Silk be found as in India.

Koshy T. D. (2001) expressed that Silk, the glorious gift of nature is an inimitable natural fiber synonymous with splendor, sibilant with luster and spectacular in vision. Silk is an obsession to the fashion conscious man of today as he is slowly returning back to nature and started showing his increased preference to Eco-friendly natural fibers like Silk. Ever since its discovery in 2500 B.C., Silk is surrounded by mystery.
and has had an adventurous course of evolution. At the end of the journey traversing through the intricate Silk route for the past 4000 years, Silk stands proudly today braving well the onslaught from the mighty art-Silk sector, keeping height the flat of naturalism an proclaiming herself to be the 'Queen' of textiles.

From time immemorial, the soft, lustrous and eye catching Indian Silk, done in splendid colors and gorgeous patterns, has attracted global attention. No wonder, India along with China continue to meet much of the global demand for Silk products. India stands second on the sericulture map of the world, next only to China. And during 2003-04 the export of Indian Silk goods fetched US$ 5111.73 million. The biggest strength of the Indian Silk industry is that India happens to be the only country in the world which produces all the four types of Silk, Eri, Muga, Tussar and Mulberry. (http://www.mtdcindia.com)

Currently, India produces 15,000 tons of raw Silk per year against the annual requirement of 24,000 ton. The rest of India's requirement of Silk yarn comes from China which is the largest producer with an annual output of 60,000-tonne, pointed out by Rao Radhakrishan (2005)

A Saree symbolizes Indian women and Silk in all, plays an important role. Silk has intermingled with our culture an life. That's why no other fabric can substitute Silk. In India more than 85% of Silk produced is consumed in the domestic market, mostly for Sarees. And most of the intricately designed Sarees are woven on simple Handlooms. Even though there is demand for Powerloom Sarees, the Handloom Saree retains its own grip on the market. Weaving of one of the best Handloom Silk Sarees take about three months where as it does not take more than a few hours for production of Silk Saree in power loom. It is evident from the designs of the Silk Saree that imagination, hand work and skill play an important role for attraction in the Saree. Weaving of Silk differs from that of cotton and wool. The Silk Weaver should have more patience, sense of art, expertise, color combination and accuracy in the
techniques. A Silk Saree is valued for the art, material, designs and the presentation. The intricate designs woven in Silk can not be reproduced on other textiles. It is difficult to find an Indian women abroad any other costume then Saree. A Saree covers her, reveals her and has the traditional grace associated with a women from time immemorial. The link between Saree and Silk may be traced back to the Rigvedic ages and Silk at all times has added to the beauty of the wearer. The aesthetic value of Silk has been well recognized by our women and the gorgeous Silk also looks splendid on an Indian women (http://www.fashinindia.net).

So Silk has been widely used for producing statewise traditional textiles all over India. For the Pathani, which is worldwide famous, the only Silk is used, i.e. Mulbery, China, Filiature and Sidalgatta. Silk is the heart of Paithani, which gives luster, sheen to the Saree. Color of the Saree enhances the beauty of Saree. So color or dye which is used for Silk is very important. The importance of color is studied in this Research.

2.1.2 History of Dyestuffs:

Most objects made by human beings are decorated in some way. Textiles are no exception. The decoration of textiles may be achieved through varying the construction of the fabric, by adding color through dyeing, or by applying in patterns by printing. Even the earliest fabrics excavated by archeologists show evidence of ornamentation, through the use of natural fibers of contrasting colors or by embroidery or dyes. Cave paintings made by prehistoric peoples of at least twenty-five thousand years ago clearly demonstrate that these people knew how to make pigment colors from natural materials. Pottery from any cultures was painted with designs. Probably the first addition of color to fabrics was made by painting designs on the cloth, mentioned by Kapadia K. (1994).

Color has been playing a dominant role in the life of man from time immemorial. Even in the prehistoric times, the ancestors of man must have noticed (perhaps with or with-out undertaking) the abundance of a multitude of colors worn by
nature. Thus he must have wondered at the spread of transient bright golden color on the diffused clouds and on the landscape during dawn and sunset, the "vibgyor" colors of a rainbow, the vast expanse of the blue sky on a cloudless day or acres and acres of land crowned with chlorophyll-dominated green colored vegetation or even an infinite variety of plants and trees, bearing flowers and fruits of varied colors of an almost innumerable combination of yellow, red and blue hues in different depths and shades or even the multi-colored stripes and dots on the bodies of the birds of the sky, the animals of the land and the fish of the sea. With the growth of intelligence in man, he must also have noticed that most of the colors he saw in nature (clouds at sunset, flowers on plants etc.) were not permanent; the fading of the colors of flowers took place when their petals fell; the green color of leaves changed to yellow or brown due to ageing, etc. There might have been an urge in him to try to retain the pleasing colors for longer periods and working in this direction, he might have found that certain plant juices and extracts from certain organisms produced colors which would last long. He even painted various parts of his body with these different preparations, which he learnt to devise and obtained multicolored effects on his body.

2.1.2.1 Dyestuff:
To be usable in color in fabrics, dyes and pigments must have these properties they must be highly colored, and they must yield goods with resistance to color change or loss in use and care. This latter quality is known as colorfastness. Furthermore, dyes must be soluble or capable of being made soluble in the medium in which they are applied, or they must themselves be molecularly dispersible into the fibers. The medium most often used for dyes that require a solvent is water. Dyes derive their color from the conjugated double bonds in their molecular structure.

Kulkarni S. A, et al. (1986) mentioned that the rate of dyeing depends on three factors. The first, the rate of migration of dye onto the fiber surface, is assisted
**Natural Dyes:**
The main source, which provided him with coloring matters had been leaves and barks and other parts of plants and some organisms. This custom of coloring the parts of human body is still in vogue, especially with beauty conscious ladies, but the main source of the coloring matters today is the factory, producing synthetic dyes and pigments, which find their way in various beauty aids such as lipsticks, cutex, rouge, hair darkening preparations etc.

When man realized the necessity of the use of cloth, first as a protective covering to brave off the onslaught of the wrath of nature in the form of biting cold in winter or in other forms in other seasons and later to adjust himself to the changing patterns of newer and newer fashions, he had been using various means to decorate the cloths he wore and here again the chief source of the coloring matter, until about a century ago, had been nature in general and vegetation in particular. He had learnt to use different types of natural coloring matters to dye clothes prepared from different natural textile fibers such as cotton, linen, wool, Silk etc. He must also have found that some dyes, which produce intense coloration on woollen fabrics, did not even stain cotton clothes, for which other types of dyes had to be found out and he did find cotton dyes. Thus, indigo, cutch, logwood, Tryian purple and henna were some of the natural dyestuffs used for long for coloring fabrics. However, the method of extraction of these dyes from natural sources and the subsequent processes of application to textile materials were lengthy, laborious and tiresome. Further, these dyes, being natural products, could not be obtained in as much quantity as one wanted and man had to depend on the slow and time consuming natural processes for obtaining these dyestuffs. As a result, the dyes were very costly stated by Goel M. and Satinder Kaur (1996).

Natural dyestuffs can be divided into two groups. The first group is known as 'Substantive' or 'Non mordant' dyes which will produce a fast color on Silk by
boiling. The second group which needs an additional chemical to make the color permanent, it termed mordant dyes.

Natural coloring matters are broadly classified into 3 categories.
1. Vegetable Origin: Root, leaf, bark, trunk or fruit or plants.

A study of older literature shows that early in history man found that by the process now known as mordanting it was possible to produce different hues from the same natural dyes by varying the metal used. Mordants are indispensable to the dyeing industry because many dyes do not become fixed on a given fabric unless applied with a mordant. Many dyestuff will not directly color a fiber; so intermediates must be used. These dyestuffs have the property of combining with metallic oxide such as those of ferrous Chromium, Aluminium, Stannous etc. to form colored bodies, which are called "Color Lake" and the metallic compound used in their production "Mordant" and hence often dye stuff applied by this method are termed mordant dyes, eg. Tin, copper, Iron, Harda or myrobalan mentioned by Kothari M. (1997).

The natural dyes were used extensively during the Harappan and vedic civilizations, during Mediaeval times and even during early days of British rule in India. With the influx of synthetic substances for most of the traditional dyes including blue, during the nineteenth century, the use of natural dyes has gradually ceased. This is due to the fact that synthetic dyes were cheaper and the dyeing process followed when using them was somewhat simpler.

Synthetic dyestuff such as azo dyes are now being seen as carcinogenic substances and ban is being imposed on them. The ban of German and other European countries on importation of garments dyed with certain synthetic dyes, which produce harmful effects on skin during wearing, has resulted in natural dyes, which are ecofriendly, getting more importance in the dyeing field (Mondal subrata, 2004).
**Indigo of Ancient India:**

Indigo has been in use in the textile industry for the last several thousand years. It is one of the earliest dyestuffs recorded in history and yet retaining its supreme importance even today. The methods of application have undergone radical changes during the intervening centuries. Today it is being dyed both by the most modern continuous dyeing and by the most primitive fermentation methods.

India has been credited with the discovery and use of indigo in the distant past, when the art of producing blue dyeing was practiced in this country. The name indigo, itself owes its origin to this country. This knowledge is believed to have spread to Egypt of the Pharaohs, where mummies wrapped with indigo-dyed clothes of about 5,000 years old have been discovered in their tombs. From there, it spread to Asia Minor and then to Italy.

Dyestuff gives color to the material onto which they have been anchored, by selectively retaining some of the wavelengths out of the light falling upon the surface. It, therefore, a dye absorbs strongly at the red end of the spectrum the light which is reflected will be of a bluish hue. Only a limited number of organic molecules possess this property of absorbing light selectively. Ever since about 1860 intense interest has been displayed in investigations to discover which aspects of molecular structure are responsible for color.

In 1868, Graebe and Liebermann records the observation reducing agents almost invariably destroyed the color of organic that color was associated with unsaturation. With suggested that groups such as nitro, nitroso, azo and Carbonyl conferred upon a substance the potentiality of becoming colored. To these groups he gave the name chromophores. In order, however, that the potentially colored substance should become a useful dye, the molecule should contain, in addition to the Chromophore, amino, substituted amino, hydroxyl, sulphonic or Carboxyl groups which where were called auxochromes. Not only
do the auxochromes, in many cases, supplement the Chromophore in the production of color, but they also render the molecule soluble in water and assist in giving it an affinity towards the fibers mentioned by Trotman E.R. (1984).

It was the research in organic chemistry especially in the reactions of aniline, conducted by the famous British chemist, William Henry Perkin (1838-1907), that directly led to the foundation of the modern synthetic dyestuff industry. He had synthesized and then manufactured for the first time a synthetic dye, Mauve (Mauevine).

- **Some Landmarks:**
  Perkin's synthesis and later commercialization of Mauveine was followed by another basic dye, Magenta in 1859 by a chemist named Verguin of Lyon, France. This was made by oxidizing p-toluidine and aniline (mole ratio, 1:2) and was the first triphenylmethance (TPM) dye. Another dye, Bleu de Lyons, was made by heating Magenta with aniline, the dye being insoluble in water but soluble in ethyl alcohol. Water solubility was imparted to it by sulphonation by Nicholson in 1862. This reaction (sulphonation) has since been used in the case of a large number of compounds to impart water solubility to insoluble substances. Oxidation of aniline in cotton fibers was carried out by Lightfoot in 1863 to get a cheap jet black on cotton. A very large amount of cotton cloth is still dyed by this dye on umbrella cloth and is known as Aniline Black.

  Graebe and Libermann in Germany and Perkin in England independently succeeded in manufacturing alizarine, the active ingredient of Madder in 1869.

  Another landmark in the history of dyestuffs is the discovery of Congo Red in 1884 by Bottiger, who has prepared it by tetrazotising benzidine and coupling with two moles of naphthionic acid. This dye could be directly dyed on cotton. But this dye is soluble in water and has poor washing fastness. In 1885 Meister Lucius Bruning prepared Para Red in cotton fibers by first reacting them with an
alkaline solution of β-naphthol and then coupling with diazotised p-nitroaniline. The resulting red pigment is insoluble in water and has good washing fastness.

The discovery of Raymond Vidal, a French chemist, in 1893, of a greenish black dye by heating a mixture of sodium sulphide and sulphur with p-nitrophenol or p-aminophenol laid the foundation of sulphur dyes, which later included blue, green, yellow, brown and orange dyes. Tyrain Purple and Indigo had been in use from the ancient times and both these dyes produced dyeings. The first one was extracted from a shell-fish and other from a plant. It was in 1880 that Von Bayer established the structure of indigo. This was followed by the synthesis of a number of indigoid vat dyes. Rene Bohn prepared indanthrone by fusing β-aminoanthraquinone with caustic potash. This was the first anthraquinonid vat dye and was followed by a large number of vat dyes.

The vat dyes needed sodium hydroxide for their application and wool fiber could not be dyed, since sodium hydroxide damages wool. This problem was solved in 1922 by Bader and Sunder in collaboration with Durand and Huguenin and Co. (now merged with Sandoz) by converting the vat dyes into the sodium salts of sulphuric esters of reduced vat dyes, which are converted into the original insoluble vat dyes in the fiber by treatment with an oxidizing agent under acidic conditions. Wool fiber is not affected under acidic conditions. These dyes are known as solubilised vat dyes and introduced under the trade name Indigosol.

Around 1912 the German firm, Greisheim Elektron A.G. of Frankfurt-am-Main introduced the anilide of β-oxynaphthoic acid (BON-acid) under the name Naphtol AS as a substitute for β-naphthol to be reacted with a series of diazotised bases to produce azoic colors. Naphtol AS was followed by other similar products.

When cellulose acetate rayon was introduced at the end of the First World War (1914-1918), the then-existing dyes could not dye this fiber. Certain basic dyes based on galloycyanine could be used in dyeing the fiber and were introduced as Cellutyl dyes with a limited range of colors. (Shenai V. A., 1991)
2.1.2.2 Colorfastness:

A fabric that retains its color during care and use is said to be colorfast. Fastness of dyestuff is related to the chemical and physical forces holding the dye within the fiber, the stability of the combination of dye and fiber to environmental factors, and the location of the dye within the fiber. Small aggregates of dyestuff molecules distributed evenly throughout the fiber make for a more satisfactory result than do surface applications of color.

Fabrics may be more or less colorfast to a variety of different substances or conditions. The importance of colorfastness depends on the use of the fabric. Colorfastness to laundering is, of course, important in those garments and household textiles that must undergo frequent laundering. Some colors are not fast to laundering but are fast to dry cleaning, or vice versa.

Perspiration may cause some color change and/or color transfer, and many colors are not fast to light. Ascertaining the colorfastness to sunlight of curtains, draperies, carpets, or other items that have prolonged exposure to sunlight may be important in evaluating the usefulness of fabrics for these items. Some colors may be lost or diminished by heat.

Some dyes tend to crock or rub off on fabrics or other, materials with which they come in contact. Others will bleed into water during laundering and may be picked up by lighter-colored fabrics. Chlorine bleaches will remove color from most dyed fabrics, but some types of dyestuff are more sensitive than others to the action of chlorine bleaches.

Even dyes that belong to the same class of dyestuffs can have differing degrees of colorfastness to the same condition, so that the consumer has no real guarantee of color permanence unless a label specifies that a particular fabric is colorfast. Dye performance labeling is not required by any form of legislation or regulation. Some manufacturers do, however, include colorfastness
information on labels. Such labels will generally describe the conditions under which the fabric is colorfast, such as "colorfast to laundering, but not to chlorine bleaching" or "colorfast to sunlight." A few terms may be found on labels that carry an assurance of colorfastness, such as trademarks that have been applied to spun-dyed synthetic fibers. The pretreatments basically includes all wet processing steps that are given to Silk prior to its dyeing and printing. (Totora P. and Collier B., 1997)

2.1.3 Paithani Silk Degumming:
Natural fibers contain miscellaneous things that are derived from nature. These are pectin, grease, wax, inorganic substance, coloring matter etc. Apart from these some secondary impurities like oil, starch, etc. are also present in the fiber which were mainly added to make twisting and weaving easy. These impurities obstruct dyeing as well as prevent the fiber from exhibiting its merits, thus deteriorating the yarn quality and as well as the ultimate products. Thus it is necessary to eliminate them prior to chemical processing. In the raw Silk there is about 20-30% protein called sericin is present. Besides this, miscellaneous substances and secondary adhesive are also present which make the Silk coarse, lacking luster, thus hampering the merit of Silk. The process of eliminating sericin from raw Silk is known as 'Degumming'. The purpose of Silk degumming is mainly three fold:

(i) To remove the sericin content.
(ii) To remove the reagent added by the twister during soaking of raw Silk
(iii) To remove dirt picked up during reeling, doubling and twisting operations.

Keeping in mind the end requirement degumming is done to varying degrees so as to obtain a fine balance of softness, suppleness and the requisite luster. The degumming process may be considered primarily as the process of cleavage of peptide linkages of sericin either by hydrolytic or enzymatic method and its subsequent removal from
fibroin by solubalisation or dispersion in water. Removal of sericin results soft handle and enhanced luster in Silk yarn.

The degumming the yarn a good soft water, quality soap, maintenance of optimum temperature in the bath and finally delicate handling of Silk yarn and good final wash in cold water. If proper attention is not paid to these factors, it may conclude that the degumming is imperfect. Improper degumming causes difficulty in dyeing and the feel will be harsh. In the study of Sinnur K. H., et al., (1988) investigated that the process of eliminating the 'gum' from raw Silk or Silk waste in known degumming or scouring. The Silk filament in the cocoon consists of two filaments, which are made into one by means of a proteinous gummy substance called sericin.

Due to the present of sericin the following undesirable effects are found in the Silk :-
1. It gives a harsh and stiff feel to the fiber.
2. It hides luster and whiteness of Silk.
3. It make the penetration of dye liquor and other solutions during the chemical processing difficult.

Acidic method of degumming was studied by Flensberg H. and Hammers, I, (1988). Efficient degumming can be achieved at a $pH$ of 1.5 - 2.00 using hydrochloric or tartaric acid. However different processes degumming include water extraction alkaline method and enzymatic method reported by Brozezinski, Stefanand and Malinowska Grazya(1989)

According to Indian Silk (1989) whether it is raw Silk twisted yarn or gum fabric to obtain that brilliant luster, softness, suppleness and sheen, degumming of Silk is absolutely necessary. The removal of the gum layer from the raw Silk, although a simple process is of considerable importance in Silk technology. Silk, if it is to be called Silky with its characteristic qualities, this process is essential.
Kannam V. A. (1989) opined that considerable expertise and experience is required for degumming the Silk yarn. Very few have realized the value of scientific methods of degumming and the incalculable damage caused to the yarn by not following the rational methods in order to reduce the time and cost; often we see crude methods are in practice. In crude method, generally the Dyers use copper vessel and the liquor is directly heated with fuel to a boiling temperature, as such there is no control over temperature. The degumming liquor is made up of 5 gms. soap, 0.5 gms of soda ash and 0.5 gm. of Hydrosulphite per liter. When the liquid boils, the yarn is inserted and rotated with the aid of two wooden rods in order to obtain uniform degumming. The temperature is kept approximately at 190°F, but without control. The duration of degumming is one to one and half hours then the material is removed, then the material is removed, given a hot wash, followed with a cold water wash and scrooped with acetic acid. In the rational method the time taken is two to three hours and the process is slow.

Taking into consideration that most of the degumming agents are only mild solutions and understanding the basic Silk degumming principle, a soluble salt is formed by the material reaction between the alkali and Carboxyl radicals in sericin during the scouring process. It must be understood therefore that the idea scouring agent should contain a weak alkali for the purpose of removing the sericin from Silk fiber without damaging the fibroin which is sensitive to hydrolysis. During the degumming process the sericin is hydrolysed and the long protein molecules are broken down into smaller fractions which are dispersed and solublished in degumming medium observed by Gupta S., et al., (1990).

Sundarm S. (1990) revealed in his study that it is important to have the stability of the Silk fiber to the dynamic forces in preparatory, washing, dyeing and printing processes. In the past degumming was done using oleic acid soap and for several hours. The long and sometimes repeated operations affected the properties of Silk. Hence in this study, synthetic degumming agents like Miltopan SE (Henkel) and
Product P400 (Hepatex) were developed and concluded that degumming process with these agents is well controlled and subsequent damages can be avoided. The advantages of this synthetic produce are:

i. Reduction of degumming time.
ii. Repeated usability of baths.
iii. There is no fiber damage despite of a pH of 11-11.5.
iv. Absorbancy is excellent resulting in even dyeings and prints.
v. Finish cost reduced due to shorter process.
vi. Hard water up to 260 German hardness can be used.

From this study, it is investigated that, we have to come out of our old methods and adopt modern techniques in Silk processing otherwise, we are sure to be left at our present cottage industry stage and reach stagnation.

Somashekar M. and Sampath Kumar P. (1993) pointed out that the degumming process involves use of soap and soda ash and hydro sulphite of soda but the proportion varies from unit to unit. Approximately 20 gms. soap and about 5-10 gms. hydrosulphite soda along with 50-60 gms. Soda ash are used. These are the existing practices prevailing in small dye-houses. An excessive use of soda ash or alkali is practiced. As a result of this Silk becomes very weak, and loses strength. It is observed that same procedure is followed by Yeola Dyers which deteriorates the Silk. Mishra S.P., et al. (1993) investigated that degumming of silk is necessary for achieving good shades in dyeing.

The disadvantages in these conventional methods are:

i. During degumming as well as mild scouring, an excessive use of soda ash or alkali is practiced. As a result of this, the Silk yarns become very weak and lose strength. Majority of the Silk Dyers argue that a higher amount of soda or alkali is a must for effective degumming.

Scouring and remedial measures suggested to overcome the above mentioned disadvantages:

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Attitudes towards New Techniques in Dyeing and Designing among the Paithani Weavers of Yeola.
i. In advanced countries like Japan and Italy, in degumming, neutral soap is used. These neutral soaps are based on olein or olive oil and are very safe to use. Neutral soaps will not cause any damage to the structure of the Silk. Unfortunately neutral soap is not being manufactured in India.

ii. The second remedy suggested to overcome these defects is that the Silk should have a uniform denier or density. Denier variations will result in an uneven dyeing giving light and dark shades when fabrics are dyed.

In Germany, M/s. Henkel have developed a specially chemical called MILTOPAN-USE for degumming. It reduced the degumming time to nearly one fourth of the time taken during normal degumming. When this product is used, the degummed Silk also becomes very lustrous and also attain a fine handle and the degummed Silk.

The combined degumming, bleaching and dyeing in single bath system save the cost and time, but dyestuff remains in the bath and dyed Silk exhibits poor fastness proportion and use of hydrosulphite of soda also affects the fibroin structure of Silk. The hardness of water also affects the degumming, bleaching and dyeing process because excess quantity of soda ash, hydrosulphite of soda and soap is required. Therefore to overcome of degumming and bleaching and dyeing process the important suggestions are given. (Colorage, Gujtex, Feb, 1994).

The hydrolysis of sericin is normally carried out in alkaline medium by the use of soap, soda and hydros for 1 to 2 hrs. at boil concluded by Shukla S.R., et al., (1998).

Fibroin and sericin both are proteins hence the treatment necessary to remove sericin from fibroins tend to hydrolyze both proteins. This difficulty can be overcome by taking advantage of the difference in the chemical composition of those two proteins. Fibroin has roughly 76 mole % of amino acids having non-polar side chains and only about 21% polar groups. In sericin the ratio is other-way round. This difference in the composition makes sericin more water soluble than fibroin. The section content of cocoon filaments varies accordingly to the position in the layer of the cocoon. The
maximum sericin is present in the outer layer of the cocoon and lowest in the innermost. Silk degumming can be done with the following methodologies.

- Extraction with water
- Degumming with soap
- De-gumming with alkali.
- Enzymatic degumming.
- Degumming with acidic solution
- Degumming with organic amines.

Amongst all the processes degumming with soap is the commercially recommended standard method for Silk degumming.

Silk degumming is the heart of the chemical processing. Improper degumming results into faulty dyeing which ultimately deteriorates the final produce quality. Under partial degumming results into uneven dyeing and harsh feel of the yarn, whereas over degumming affects the fibroin resulting the generation of lousiness, quoted by Ray Sankar Maulik (2004)

Dyers of Silk report that they are having sleepless nights trying to correct what they think may be the biggest bugbear of their uneasy lives. They refer to the fact that the dye yield obtained when dyeing Silk with acid, or reactive, dyestuffs is frequently very poor when no account is taken of the specific structure of Silk molecules. They point out that Silk fibroin is largely composed of structural amino acids, terminal component without lateral chains capable of bonding the amine groups of acid and/or reactive dyestuffs.

From the data collected for the present study, it has been realized that the Silk yarn which is degummed and dyed by the Dyers of Yeola using traditional and crude method of degumming and dyeing, creates a problem during weaving process blamed by the Weavers. Though this dyeing profession is passed on generation to generation and use of the traditional method and nonbranded dyes is creating a problem of color bleeding. Hence the complaints are received from the customers that the color of...
Paithani Saree bleeds in dry cleaning as well as by sweating. Weavers have to face these problems while selling the Paithanis.

- **Degumming with Soap:**
  The soap which is used for degumming purpose has to be neutral, readily soluble in water and free from any coloring matters. The recommended standard method of Silk degumming is based on Marseilles soap which is obtained from olive oil. Olive oil soap is considered particularly suitable for Silk degumming because of its high degree of hydrolysis, which gives better luster. Soaps from unsaturated fatty acids or oil retain a better luster on Silk than do soaps produced from saturated fatty acids. The oils can be classified as drying, semi-drying and non-drying oils.

Quantity of soap required for complete degumming depends upon the nature and type of Silk yarn. i.e. filature, doupion, spun etc. Generally 20-30% soap on the weight of material is used for degumming at a material to liquor ratio of 1:15 to 1:20. Degumming temperature and time also depend upon the type of Silk yarn and their end uses i.e. whether it will be used for taffeta or satin warp and weft or in other qualities warp and weft. Generally degumming of Silk is carried out at 90°-95°C temperature for 40 to 60 minutes. In the degumming bath apart from green soap or Marseilles soap, synthetic soap, sequestering agents, wetting and dispersing agents are also used. Synthetic soap is liquid or powder form with which it is possible to obtain a perfect degumming in a shorter production time observed by Sankar Ray Maulik (2004).

- **Traditional Technique of Degumming Used by Paithani Silk Dyers:**
  As per traditional method, Dyers and Weavers who dye the Silk as per their requirement in Yeola use the copper vessels for degumming, wooden rods for immersing hanks and the entire procedure is carried out on Hatbhatti.
Method:
For 1 kg. of Silk, amount of water taken is approximately 50 litres. Water is boiled and 100 gm. of Soda ash, 100 gm. of Soap and 1 to 2 Tsp. coconut oil is added. This mixture is added and Silk hanks are immersed into the soap solution for 1 to 1½ hours. The hanks are placed on the wooden rod to turn frequently in the solution. P" concentration (M.L.R.), temperature is never considered. Rinsing of hank is done 2 to 3 times directly in cold water and twisted harshly with iron rod and kept for dyeing.

As far as the proportion of water and chemicals are concerned, it is added approximately just by hand and not by exact measurements. From all above references, excess use of soda ash and soap which deteriorates the quality of Silk. Amount of water taken is depending on the availability of water. Temperature of water is not maintained. Time given to degumming is more than the requirement so over boiling for longer time is in practice, which also affects the luster and strength of Silk.

After degumming, rinsing is done direct in cold water for 2 to 3 times i.e. also depend on availability of water. Degumming is done in copper vessels as they believe that it gives saline water because of traces of metals in water. Wooden rods are used for rotating hanks continuously in degumming solution, which damages the yarn. After rinsing the hanks, squeezing is carried out by hanging hank on metal rod and twisted harshly with wooden rod to remove the water. This causes breakage in yarn and creates a problem in weaving.

- **Drawbacks of Traditional Method of Degumming:**
  1. Use of Copper vessels creates produces metallic salts in dye bath solution which affects the luster of Silk. (Colourage, Guj Tex, Feb, 1994). But the Dyers used it as a Saline water.
  2. Excessive use of soda ash and soap makes the Silk weak and losses the strength. The Hydrosulphite of Soda affects the fibroin structure of Silk. (Colourage, May 1994)
3. Over boiling of Silk for longer period or without controlling temperature and time affects luster of Silk.

4. Due to rotating the hank with wooden rod and twisting harshly occurs more breakage in yarns which creates difficulty to the Weaver during warping process.

5. Traces of gum retains on Silk yarn, due to rinsing the hanks in cold water immediately after taking out from hot degumming solution.

6. Due to inadequate amount of water, the hank does not float in solution and hence gets spoiled as it touches the hot bottom of the vessel.

7. Due to combined degumming and dyeing process in single bath, dye molecules remains in the bath which affects the fastness property of the Silk. (Colourage, Guj Tex, Feb, 1994)

8. Hardness of water also affects the degumming process as some times hard water from bore well is used.

2.1.4 Paithani Silk Dyeing:

Silk is dyed in yarn, fabric and garment from with the application of various dyes namely acid, direct, basic, mordant, vat and reactive. Silk is readily dyed by ionic dyes like acid, basic and direct due to the amphoteric nature. According to Das Subrata (1989), acid dyes are mostly sodium salts of organic acid and the anion is the active colored component. They have direct affinity towards protein fibers. Silk exerts its affinity for acid dyes at lower temperatures than wool because Silk fibers have no scaly layer and therefore swell more easily. Venkidusamy P.and Ramasamy K. (1994) mentioned that acid colors are widely used to dye Silk in various bright colors. They generally possess good light fastness and moderate wet fastness. The degummed Silk yarn may be dyed with the required shade keeping a liquor ratio of 30:1. Three classes of acid dyes are applied on Silk, namely level dyeing acid dyes, milling acid dyes and super milling acid dyes.
I) Application of level dyeing acid dyes:
The material was entered into the dyebath containing the dye required quantity, 2% (owf) sulphuric acid and 10% (owf) Glauber's salt at 40°c. The pH of the bath varies from 2 to 3. The dye bath was heated to near boil in 15 minutes and the dyeing carried out at this temperature for 45 minutes. The dyed material was washed and dried.

II) Application of acid milling dyes:
Here instead of strong sulphuric acid, acetic acid is used. The pH range of this weakly acid bath is between 5 to 6. The other conditions are same as before.

III) Application of super milling acid dyes:
The dyeing of Silk with neutral dyeing acid dyes may be carried out in neutral baths containing only 5-15% (owf) Glauber's salt. Dyeing is started at 40°c and the temperature is gradually increased to near boil, after which Silk is left for a certain time in the cooling bath. Finally Silk is rinsed and dried. Total dyeing time is 2 ½ hrs.

Normally Silk is dyed with acid dyes. This has mainly been so because acid dyes are comparatively cheap and have good fastness properties.

The wet processing methods for Silk adopted in our country are age old conventional methods. Silk is generally dyed with direct, acid and Basic dyestuffs after degumming and bleaching. The Dyer should know the color index, number of the dyes and instead of cost of the dye stuffs only, the fastness properties, brilliancy, stability, purity along with chemicals, auxiliaries which are also use in dyeing, should be taken in to consideration.

Most of small dye houses employ copper vessels for dyeing but it should be replaced by stainless steel. The degumming and dyeing is carried out for maximum of 20 minutes hence in reality, instead of economizing the process this results in poor fastness properties and wastage of dye stuffs. The use of soda also to be avoided as it affects the luster and strength of Silk (Colorage Gujtex, Feb 1994).
Earlier Technique of Dyeing Used by Paithani Silk Dyers:
Dyeing of Silk with natural dye stuff is a traditional craft of India. Until the latter half of the nineteenth century, almost all dyes were vegetable or animal in origin, coloring matter was extracted from the roots and stems, leaves, berries and flowers of various plants and from certain insects and shellfish by an elaborate series of processes used. Most of the natural dyes are not substantive, but must be used in conjunction with mordants in the form of urine, saliva, egg, albumin, tannis or metallic salts. According to Das Subrata (1992), the most widely used and known dyes up to the invention of synthetic colors in the 1850's were purple, madder, wood, indigo, kermes, cochineal, saffron and Orseille. He mentioned the advantages and disadvantages of natural dyeing. Natural dyes are fairly nonpolluting, automatically normonizing colors, rare color ideas, more challenging because of the element of chance. The disadvantages are higher cost and limited range, lack of availability of precise technical knowledge of extracting and dyeing technique, some of the mordants are harmful to Silk fiber, few dyes have good fastness to light.

Earlier the ancestors in Paithan and Yeola used to apply a natural dyes on Silk which were extracted from the leaves, flowers like Majinstha, Tessu Flower Behada, Catthu, Geru, Pomegrennate, Yellow Soil, Turmeric etc. and typical colors were produced like Black colored - Kalichandrakala Pasila - Green - Yellow, Gujari- Black White, Mirani - Black- orange, Motia - white pink, Phalasa-Violet Pink, Peacockgreen, Anjiri.

Natural dyes are staging a come back thanks to the hazardous nature of chemical dyes. There is virtually a worldwide hunt for Eco friendly dyes, narrated by Gahlot Manisha and Satinder Kaur (1996). They concluded that Natural dyes are fast and permanent unlike chemical ones and are fast to washing and light as well. These dyes produce beautiful and elegant shades, which even synthetic dyes cannot produce. Vegetable dyes which were once prevalent all over India
are now hardly to be seen. But with the revival of interest in natural dyes and Eco friendly textiles, a great deal of research has been initiated, the world over, on Vegetable dyes.

Hence, in the present study, the investigator tried to inculcate the technique of Silk dyeing with Natural dye among the Dyers and Weavers of Yeola as a new technique as it was totally vanished from their tradition.

Ahmed S. S., et al., (1997), reported that in earlier days Silk was dyed with the vegetable dyes which were extracted from plants, such as roots, stems, stalks, foliage, barks, berries and seeds. In the dyeing of Silk, the most essential requisite is the fastness of the dye as these fabrics are not laundered or ironed as frequently as other fabrics. The selection of dye is therefore very important as dyeing increases the value of Silk. Hence the investigator has made an attempt to find out the effect of natural dyes on Silk. The conclusion drawn from the study was that dyeing of mulberry Silk with vegetable dyes have pronounced effect. After dyeing, the breaking strength of the Silk material has increased in warp direction.

Venkidusamy P. and Arunkumar J. (1997), pointed out that in recent times there has been a revival in the awareness of the importance of the usage of vegetable dyes. This interest is the result of a worldwide movement to protect the environment from indiscriminate exploitation and pollution by industries. The synthetic dyes, which produce a wide variety of colors also produces wastes which are hazardous to man. A need has therefore been felt to reconstruct the ancient and traditional dyeing technology and to use the unpredictable variations in tones for the creative and artistic urge of modern textile designers.

Deshmukh A. (2003), expressed out that in recent years concern for the environment has created a deep interest in natural dyes. This is further enhanced when toxicological effects of synthetic dyes during production and harmful effect on skins during wearing are being more and more known. Therefore in recent years, natural
dyes are gaining much more importance to researchers in dyeing field. Hence in this study, the investigator had tried to communicate the importance of Natural dyes to the Dyers and Weavers of Yeola through the training programme.

- **Present Practice of Dyeing used by Paithani Silk Dyers:**
  Presently the Dyers of Yeola are practicing dyeing of Silk with direct dyes. There are only three main Dyers who have the monopoly in this profession. Many of the Weavers have to depend on them for getting the Silk dyed and others are following the harsh and same method of dyeing. Some of the direct dyes are applied to Silk satisfactorily but many of them bleeds the color. The fastness of the color, luster of Silk, Achievement of perfect shade is never considered.

- **Method:**
  The 'Bhatti' is used for degumming and dyeing of Silk yarn. Bhatti's are located in the house approximately. *50 liters of Water* is taken to dye 1 Kg. Silk. When water gets boiled *approximate dye powder, common salt, 3-4 drops of coconut oil* is added into it. Then Silk hanks are immersed into dyebath solution and dyeing is carried out for ½ *an hour*. Rinsing of Silk hank is carried in *cold water* for 2-3 *times*. Factors like *concentration, temperature* is not maintained. It results in poor dyeing. Dyers charge Rs. 60/- per kg. for dyeing process.

*Plate No. 3: Traditional method of silk dying ...*
Drawbacks in Traditional Method of Dyeing:
1. Correct proportion of dye, acetic acid is not taken as per percent shade. As such exact shade is not achieved.
2. Temperature, time is not controlled so quality and luster of Silk deteriorates.
3. Repetition of same shade is not possible as lack of knowledge of percentage shade calculations.
4. Low quality of direct dyes are used for dyeing which creates problem of color bleeding.
5. Not aware of achieving the various shades by mixing two colors.
6. Rinsing in water only, once keeps the traces of dye molecules on the surface of Silk yarn.
7. Not aware of getting light colors or English colors shades.
8. Bleached pallov with hydro, re-dyed with red color, becomes blackish after some period.

The traditional technique of dyeing was studied in detail, under this research and problem in their present practices were sorted out.

2.1.5 Colors Used in Paithani:
Generally the Silk received for Paithani from Banglore in hank form, in raw stage. Silk fiber in its natural state, contains a heavy coating of glue-like substance or gum called 'Sericin' which gives it a harsh and stiff feel and hides the rich luster and whiteness of the real fiber. This Silk gum amounts to about 25 percent of the weight of raw Silk opined by Prayag R. S. (1994). The removal of gum from Silk is known as 'degumming' and is a very important preparatory process, when the gum is completely removed, Silk loses 22 to 30% of its weight.
At present, there are three main Dyers in Yeola. Silk dyeing was done in Yeola only with direct dyes. Earlier, the dark shades were used for Paithanis, but nowadays there is a demand for light shades of Paithanis as per current fashion. The Paithani comes in various colors. Some are pure and some resulting from the blending of yarns of different colors in the weave. Usually the dominant color in the border and Pallav is different from that of the body. The local name for the colors are interesting kaali chandrakala, Uddani (a fainterblack), Pophali (Yellow), Neeligunji (Blue), Pasila (red-pink green blend), Gujri (black white blend), Mirani (Black red blend), Morphankhi (green-blue blend) Firozi (White-red pale green), samprus (green-red), Motia (Pale pink) and Sankirodak (White), Vargi (aubegine purple), aboli (peach-pink), Kshirodak (pure white) The darker tones of green, yellow, red and blue are very popular. Earlier just 2-3 colors were popular which were integrated in the sari in the dhup chaon pattern which, when translated means light and shade. But today the taste of the customers is changing and they prefer all types of shades, even the English colors in Paithani (http://www.mssidc.com/paithani.html).

2.1.6 Unique Features of Saree and Dimension:
The sari that is renowned and famous for its workmanship and wonderful creation well known from generation is the Paithani Saree from Maharashtra mentioned by Joshi Damodar (1984). A typical Paithani is heavy weight, bright colors and solid zari border, butti with Pallav. Each Saree woven to a standard size of 61/4 yard which includes blouse piece of 1/4 yard. It consumes near about 500-575 gms. of Silk and 200-250 gms of zari. A finished Saree depending upon the variety of Silk may weigh from 600-750 gms.

Bansal Rajani and Sunanda Phadke (1984) studied the hand woven saris of Maharashtra. The study revealed the various Sarees of Maharashtra. It was observed that pallows of Paithani Sarees were very different. The pallav of Paithani Saree was known as 'Laphepadar'. The pallav measured 19"to 49".
The whole area of pallav has jari wefts. The ground portion of the sarees was woven in plain weave.

The width of border ranges from 7 inch to 9 inch. Usually the borders are neither very broad nor narrow. Borders were given names either after the motifs used in them or after the name of the village where they were produced, like Narlikath, Paithanikath, PankhaKath.

At present borders are seen mostly with Narali motif or brocade borders are made to the orders, as brocade technique is very time consuming. Very few weavers know the brocade technique.

As far as the pallov is concerned the length of pallov is 18" for single pallov and 36" for double pallov. Brocade is the type of pallov which is fully woven by hand. But this type of pallov is rarely manufactured as the process is time consuming and adds to the cost.

1. Body with Naral
2. Gom
3. Muthda
4. Karvat

Plate No. 4: Style of Border...

1. Muthada
2. Munia
3. Barav Panja Dhadi
4. Munia
5. Barav Panja Frame with Peacock and Flower Kunda

Plate No. 5: Style of Pallov...
DIFFERENT VARIETIES OF PAITHANI SAREES PRODUCED AT YEOLA:

**Simple Paithani:**
Saree with Kuyari butti, extra warp in contrast with body for border, border with Narali motif. Same colored weft for body and border, single width pallov ornamental with extra multicolored weft and cost ranges from Rs.3000/- to Rs.5000/-, takes 7-8 days time for weaving.

**Kadiyal Paithani:**
Saree with butti, ornamental pallov on zari background but pure contrast in border known as Kadiyal border. It requires contrast warp as well as weft for border which interlocks with body warp and weft. Its cost ranges over Rs. 5000/- to 7000/- . It requires 25-30 days to weave the complete Saree.

**Brocade Paithani:**
Border of these Paithani are heavily ornamented with attractive and delicate motifs like Pallov. Ornamentation done manually by attaching the design paper beneath the warp threads. To weave an inch takes a full day. It is very tedious job which requires 3 to 6 months, sometimes a year also. These Sarees are very expensive and cost ranges above
Rs. 7000/- to 10000/- and sometimes in lakhs depending on the type of motifs used for border and Pallov and type of zari. In generally the major cost controlling factors for above mentioned Sarees are types of motifs, types of zari used, numbers of butties and time required for weaving. (http://www.hinduonnet.com).

2.2 PAITHANI DESIGNING:
Nowadays we have broad choice of designs whether they are woven designs or printed designs. Passing fashions include for instance a demand for very sheer synthetic fabrics, designs with folk motifs and there is a demand for change in designs of traditional Sarees. We still are in age of transition. New materials, new methods of manufacture open increasing opportunities to delight the eye and satisfy our modern needs, all providing designers and producers with an opportunity and a challenge stated by Appasamy Jaya (1957).

2.2.1 History of Designing:
Indian artists and designers have started making use of patterns in the present day designing with successful efforts. The only specially used traditional pattern is of mango fruit (keri) pattern which is exclusively used in most Indian saris. The Indian sari is incomplete with out a mango design, in border, or the pallov. There are other patterns also in use and more majestic looking like elephants, peacocks, parrots, horsemen, and other patterns derived from flowers. In some saris there are hunting scenes, procession of elephants, the garba dance and to some extent the decorative arches of the temples and some religious and puranic motifs which give feast to the eyes explained by Joshi Damodar (1984).

Textile design is of two kinds namely (1) Structural and (2) Decorative. The first relates to the specific manner in which warp and weft threads are interlaced by which is evolved woven design, which constitute the technique of fabric structure. The second relates to the scheme of ornamentation by which a textile fabric is decorated, introduced by Vaidya M. D., (1961).
The main principle of design lies in the step by step selection of the warp threads. The weft is thrown through the gap which is created. However many of the older techniques were done by hand, the avadh and nilambari jamdanis are examples. The Weaver uses his hand. With his fingers he delicately picks yarn after yarn, counting the strands and choosing what should be picked and what should remain. The alphabet of the pattern lies in his mind and accordingly he manipulates the yarn.

The Mughals were great naturalists. When a monarch wandered through his beautifully laid out gardens, a Weaver formed part of his encourage. The badshah would then point to the leaf of a mango, or to the lotus and the Weaver would imitate them in his weave. Gradually the rigid lines of the pann leaf, the mango leaf underwent a change, a certain spontanity entered. There were religious and mythological influences. The shikara design depicted within a limited space the Weaver's skill in satisfying the whim of his patron. His perfect planning and ajustment illustrated the detailed scene of a royal hunt. The jungle, the animals, birds flying, a man with a bow, a fleecing deer. This reflected the time, the era and the rapport. Some years ago, a Weaver wrote the Geet Govinds in bandhani or tie dye, on a sari. But this proved to be too expensive and remained unsold. The respondent Weaver retired as a sadhu, a legend to inspire many a Weaver (Mary K., 1968).

Nature and the environment are never ending sources of limitation. The more exotic the imagination, the more the desire to capture rare things of beauty for prosperity. The strands of a peacock feather woven into a length of fabric.

The earlier technique of designing was a 'Brocade' is a kind of weave and is also called embroidery made on a loom. The pattern looks as though embroidered on the top of an already rich Silk. The background may be taffeta, twill, satin or damask, usually of one color or with a warp stripe to contrast with the multi-colored floral pattern. Indian brocades were having colored Silk or gold threads interwoven to form the most attractive floral designs. The Indian brocades were earlier made entirely from fine
gold or silver threads. The motifs used for brocades were shikarghar for kinkhab, hunting scenes, Buttidar designs, Scroll motifs, flowers, birds (swan), flame etc. A specific charm and subtle beauty were imparted to the fabric by a judicious choice of color harmony and perfectly distributed colors mentioned by Shenai V.A. (1974).

When the plain cloth was first woven the technique was simple. There were basic weaving patterns. Each pattern had endless variations and coordinated colors. Many of the older techniques were done by hand, the avadh and nilambari jamdanis are examples. The main principle of design lies in the step by step selection of the warp threads. The weft was thrown through the gap which is created. The Weaver with his fingers picked up yarn after yarn, counting the strands and the alphabet of the pattern used to lie in his mind and accordingly he manipulated. The attitude to work was emphasized by a particular designs called latifa. The word evolved from 'lusfts of mazza' which means that which given joy. And so it was joy that infused life into the weave and made textiles a living tradition mentioned by Supakar J. N. (1984).

Textiles have always been important in India. Our museums and those of the west have superb examples of ancient Indian Craftsmanship; both in quality and color among the finest in the world. Today while this country is again producing vast amount of cloth and there is fair consciousness of the different kinds of local traditional design available, there are new designs which are both original and inspiring.

Textile design is inevitably of three types. Firstly, fabrics interest lies in the type and variation of the yarn. The second important variety of textiles are those designed in terms of the loom and its processes. Woven designs follow definite trends which derive naturally from the processes of the loom. While special examples of the luxury weaving such as brocade, or ikat are famous in India. The third and most common kind of textile design is design imposed on the woven material, which includes all the various types of printing, dyeing and embroidery. At the present time the hand
printing of textiles is by itself quite a large small scale industry and varies from the quite traditional textile produced in Rajasthan or Masulipatam to the modern fabrics of Bombay or Delhi. Indian clothes (Saree and Dhoti) is really more suited to woven than printed patterns.

Vedic literature has many reference to weaving. There were female Weavers called 'Vayitris' and 'Siris'. In one of the hymns of Rigveda there are veiled reference to the technique of weaving. Authentic records indicate that weaving was one of the earliest craft in Egypt and China, but India was familiar with this process at an equally early date. However instead of interwoven patterns such as those produced in other countries, the Indian craftsman made up in cotton cloth, which they decorated with dyes and paints. This made up for greater originality and variety. Unfortunately none of these early fabrications has been preserved, due to the high humidity of the air and the many plagues of insects (http://www.blessingonnet.com).

When Alexander invaded India in 326 B.C. He was tremendously impressed by their advancement. He took with him some of Indian printed cottons and many of Indian finely woven Silk fabrics which he considered similar to the Master Weavers of China, though their manner of decoration was similar to that of Persia. When the Mohammedans invaded India in 711 A.D., they were intrigued by the Indian painted and printed cotton fabrics. They carried these with them along with Indian Brocades heavy with gold and embroidery.

For the Banarasi brocades, the throw shuttle pit looms with 'Jala' or 'Naksha' locally known as 'Naksha loom' were used for creating intricate patterns and for the pallovs and borders of the saris. A combination of plain, satin and twill weaves were used to create the designs. Variation in the arrangement of motifs further enhanced the beauty of the fabric. The different motifs were grouped floral, fruit, animal and birds, geometrical and linear patterns and human figures, expressed by Thomas Anna (1985).

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The technique of tapestry weave is one of the most ancient methods of creating patterns with the weaving in of multiple weft threads of different colors. The technique is found in Central Asia, as well as in Egyptian and Latin American textiles. In central Asia it was initially woven in wool. Later, the technique was developed in China for intricate Silk weaves. It is possible that this technique came to India from Central Asia and was developed into a fine art in the Deccan, where the Weavers excelled. No examples of this technique have survived in north of the Deccan area. However, old samples which simulate the Paithani technique can be seen in the Ashavali and Surati Saris of Gujrat (http://www.gujarattourism.com).

Researchers have also identified 'Chanderi' in 'Madhya Pradesh' a powerful kingdom known for its rich gold thread making and weaving, as an important central of this technique. There they wove intricate patterns in gold and Silk on the border and pallov in the Paithani technique. It is likely that this technique was practiced all over the Deccan as Weavers with a mastery over the skill have been found in Hyderabad, Gadwal, Wanapatri and Paithan. It is not known which particular center was responsible for developing this technique in India and one is not even sure of the name of the technique. The name "Paithani" by which it is known today is probably very recent. It was the only center 'Paithan' by which this complex technique of weaving was kept alive during the colonial period.

When India became independent in 1947 and the programme for the revival of traditional craft was initiated by Kamaladevi Chattopadhyay in 1958, the only center, weaving this technique was 'Paithan' and the technique became identified with the place. Paithani weave refers to the technique of weaving patterns i.e. designing with gold and Silk threads in the tapestry technique, on the broder and Pallov of Sarees and Shalus. It is possibly one of the early weaving techniques developed to create a range of intricate designs. The tapestry weave was distinguished from all other weaving techniques in having multiple weft threads which interlock to produce the woven
surface. In this technique multiple non-continuous wefts in contrasting or complementary colors were woven in plain weave, the yarns of different colors interlocking at the change of colors, thus creating a solid color effect. It was similar to the Central Asian technique of weaving the gelim. The Paithani technique used the dovetailing of weft threads and interlocking in others. The weft threads were closely woven in, fully covering the warp, thus imparting a solid color effect. The gold was the background, while the Silk is inlaid to create the pattern.

Earlier the brocade technique was also popular among traditional textiles and very very famous was the Banarasi Brocades. But the brocading technique was quite distinct from the tapestry. In brocading, extra weft threads were woven in, creating a range of patterns without disturbing the basic cloth. The technique of brocading being more complex it was probably developed later quoted by Dhamija Jasleen (1995).

The technique used for creating patterns for Patola is very different and it is a 'Ikkat' technique, one of the oldest technique of textile decoration by the process of 'tie-and-dye'. It is believed that this intricate technique of Patola dyeing and weaving originated during the 5th century A.D. In the golden age of the Imperial Guptas and evolved into a refined industry by the 11th century. This unique technique was adopted by the Dyers and Weavers of Andhra Pradesh and Orissa. Nowadays this 'ADAI' device has been replaced by Jacquard. Jungla Silk Sarees are produced with all over jacquard designs with extra warp and weft with full of gold ornamentation, said by Nadiger G.S., et al., (1995).

Kanchipuram produces brocade Silks of superb texture and color. Kanchipurum sarees are wellknown for their traditional designs and their bright eye-catching contrasts. Although the designs and the methods are traditional, the Weavers and designers try to keep pace with the changing trend. The expert designers prepare designs on graph paper, which then are transferred to the harness of the looms. Designs and patterns woven with extra warp and weft are worked into the body of the
fabric by means of an indigenous device known as 'ADAI' which fulfills the same function as the jacquard, stated by Jacob Mary (1995).

Dharmavaram Silk industry though has a long history, has always been facing competition from other important weaving markets like that of Kancheepuram and Banaras. The buyers cherish purchasing Dharmavaram Sarees for their admirable designs. Dharmavaram Silk industry has a constant zeal to produce new varieties of Silk Sarees with varied designs. Hence, designers play a vital role in the promotion of Dharmavarm Sarees with their craftsmanship. The buyers will be in a dilemma always while selecting the Sarees, as every Saree gives a new look with different designs.

This change is influencing many interested and talented designers to get pulled towards the field to make a fortune. Since 1984, the designers have started their individual business by coming out from the Societies and Silk houses, who were working as low paid employees. The jacquard was introduced to Dharmavarm Weavers in 1987 and by the year 1992 many looms were equipped with Jacquard. With the help of Jacquard, the designers have been able to generate fancy designs, which are nothing but a change in the pattern of designs on pallov, quoted by Rama Kumar B. and Nerli S. (2001)

At the same time, common people like Joseph Marie Jacquard beautified the queen of Textiles with their inventions. Joseph Marie Jacquard was born in July, 1752 at Lyon the Silk city of France. His father was reputed master Weaver of Silk. His mother worked in a Silk factory where her job was to read the patterns. Being a Weaver's son, young Joseph Marie used to observe his father working on loom. At 12, he assisted him and very soon started weaving the Silk. He hated weaving because of its heavy labor and tedious work. Besides, weaving had its own limitations especially in the designing aspects. Therefore, Joseph decided to invent a loom that would automatically weave the intricate patterns. After repeated experimentation, he succeeded finally in fabricating his 'dream loom, and thus, the jacquard loom came into being.
It is the system of weaving which with its of pattern making mechanism of great versatility permits the production of a vast number of designs. Here, the weave pattern is copied from the design paper by punching a series of cards, said Kirsur Mukund V. (2001).

This invention was the blessing for modern as well as for traditional textiles, which can produce the most elaborate and beautiful designs. Nowadays Jacquard weaving is mainly used for brocades, damask and tapestry.

New designing trends which are of any value, show two or three different trends. First of all there is the 'back' to the ancient 'textiles' school of thought which adopts old designs whether for loom or print to modern needs. A second trend draws its inspiration from Western fabrics. Many of them with abstract or semi-abstract patterns, new technical processes and the use of specific 'modern' color combinations. Some kinds of fabric and design also survive only by reason of their novelty.

2.2.2 Designing Technique used for Paithani:

The word 'designing' refers to the total composition of lines, forms, color, shapes and texture in a decorative manner. Textile designing is not a new concept. The concept exist even in the pre-historic cave paintings as evidenced by designs appearing on costumes, tapestries and carpets etc. But, designing has become more of an intellectual endeavor over a period of time. Advancement in technology has facilitated production of designs through permutations and combinations.

Production of new designs is possible with jacquard mechanism with the jacquard, which is the usual medium for carrying out woven figuring of fabric in more elaborate pattern, there is the limitation on the machinery involved. The size of jacquards and their repeats, together with the type of jacquard mechanism used, require expert knowledge pined by Wright P.H. (1949).
Designs on textiles are called textile designs. Textiles which can be either invigorating or blurred, depending on the sensitivity develop from three sources:

(i) The quality of fibers, the size and type of yarns and the way they are agglomerated, if more than one is used;

(ii) The processes by which they are woven and

(iii) Any ornament incorporated during weaving and the ornamentation applied after the weaving.

- **Before Weaving:**
The qualities of the fibers deserve first consideration, because it is the fiber with which the designer begins. Different fibers have different feasibilities and limitations. Jute is naturally stiff, but, Silk is fine and soft and the manner in which the fibers are processed into yarns indicate the general characteristics of the textiles and suggest possibilities for inherent structural design and for applied ornamentation.

- **During Weaving:**
The second consideration is the way in which the fibers are interlaced to form a textile. The embellishment comes from the structure of the textiles. It is often referred to as structural pattern. These designs can originate when the yarns are being interlaced. The different weaves used will produce different designs.

- **After weaving:**
The third way includes many methods of ornamenting textiles. In this, the designs can be introduced to textile with the help of embroidery, applique and printing. Usually, raised designs are produced when we use needle and other securing devices (Mitra Anita, 1987).

In Paithani, the designs are introduced during the weaving process. The designs which are interwoven on pallovs are just simply drawn or traced on tracing paper or simple paper and attached beneath the warp yarns. The skilled Weaver tries to
interlace the colorful fillings with ground warp with the help of cloths spool, known as 'tillis', in local language it is called as 'kandy'. It is a tapestry weaving technique.

Plate No. 10 : Colourful filling with tillis ...

It was a hard pace to the designers in the past, whereas now a days a designer will just supply the designs and give suggestions to the Weavers if needed. The designing field is very competitive, as a designer must have an esthetic sense, be creative, industrious and also must have a thorough knowledge in weaving, card punching and working principles of a Jacquard and Dobby and new technologies implemented in the weaving sector to bring gorgeous designs on to the fabric. In the past, a design on Sarees used to run in the market for more than 5 years, but now-a-days, as customers demand for the designs. In designing, competition is on the increase and the designers must struggle every time to create a new withstand in the industry.

Traditionally, Jacquard weaving was an expensive and time consuming process. But the chaning trends in fashion, more stringent demands on quality and cost, and global change in market scenario have made quick response and shortened lead times an essential requirement, making it imperative to change the approach to production of woven design.

Some of the important developments and changes in the woven designs, Weaver has to cope up with are :-

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Fast development and changes in fabric designs.
- Increased competitiveness in world of fashion.
- Need for higher productivity, better quality, greater flexibility.

Jacquards can handle the most complex shed forming needs efficiently and economically so the use of Jacquard mechanism for woven designs is very popular among all the tradition textiles. Old techniques have been taken place of Jacquard reported by Mankodi Hireni R., (1998).

In many traditional textiles, like Banaras textiles like Banaras textile, Kanchee Purum textiles, use of jacquard for designing became today's need as manufacturer has to cope with the fast development and changes in designs, increased competitiveness in world of fashion, need for higher productivity, better quality, greater flexibility.

In present study the aspect of designing with Dobby and Jacquard mechanism have been implemented among the Paithani manufacturers who were not aware of simply of designing on graph paper.

Though it was assumed that jacquard weaving was, an expensive and time consuming process, it was the only procedure for developing designs. Designing with jacquard was the solution for changing trends in fashion. So to gain the knowledge of designing was the only option for Paithani Weavers of Yeola.

It has been realized that the Weavers of Paithani have restriction in creating new designs of Butties and Borders as they are lacking in knowledge of technical method of designing. There is monotony in the designs of the sari because of absence of appropriate knowledge creates a problem in producing varieties of designs and marketing potential too. To meet the requirement of changing market, it is necessary to get the knowledge of Jacquard and Dobby designing, to increase the adaptability of Paithani with modified designs.
2.2.2.1 Traditional Technique of Designing used by Paithani Weavers:

In the past, a design on saris used to run in the market for more than five years, but now a days a customers demand for variety of designs, make it mandatory to produce new designs. This change is influencing many interested and talented designers as well as Weavers. Traditionally the Weavers from Yeola were using Dobby and Jacquard mechanism for weaving Paithani. But no one tried in designing field. They used to copy the old designs from old punched cards so change in design was restricted. Since their ancestors, they are using the same designs like Narali for border, Kuyari for butti and typical Peacock and Kunda for pallov so monotony in the design was serious problem. They were not aware that with the help of Jacquard it is possible to generate modern designs and change in the pattern of designs on pallov and butti which is today's necessity. They were not aware of producing a balancing, accurate, perfect design with minute details. Even if the designs are in geometrical forms, they never knew about the designing with the graph papers.

In the traditional method, Weavers of Yeola make the changes in designs manually by keeping the design paper beneath the warp end, which is very time consuming, affects the rate of production and cost of Paithani. Due to tedious job of making designs manually, they are reluctant to create new designs which result monotony in the designs. But today's situation is, customers generally first view the designs and then only care for other considerations like Color, Jari, Quality of the fabric etc. A variety of eye-catching designs would certainly attract the customers forever. In designing, day to day competition is on the increase and the Weavers will have struggle every time to create a new variety of saris with heart touching designs to withstand in the market.

So it is today's need to use developed technique of designing with the help of Dobby & Jacquard mechanism. It is mandatory for Yeola Weavers to gain more and more knowledge in designing and update themselves with new
technologies as Weavers from other states have started producing the Ditto Paithanis with Jacquard designs and Selling it at very lower cost than Yeola Paithani. So automatically the market of original Paithani is affected.

2.2.2.2 *New Technique of Designing for Paithani:*:-
From the Survey it has been realized that the Weavers were facing the technical problem in designing. They were not even aware of the graph paper used for designing. So the Researcher had taken these efforts to change their attitude towards the technique of designing which was totally new for them and taught them actual designing on graph as per available size of Dobby and Jacquard and punching the cards as per design, transferring the graph design on the lattices, Pegging the lattices etc.

I) **Dobby Designing for Border:**
The dobby is a shedding device attached to the top of the loom in order to produce a figured pattern by using large number of healds than the capacity of the tappet. Paithani border is woven on 20 shafts dobbv.

Narali motif is woven on 12 shafts which carries 63 heddles to weave half Narali. Total heddles required to weave complete Narali border is 126. These 126 heddles divided in four groups. 3 Groups of heddles carries 36 heddles in each group and one group carries 18 heddles. Each group of 36 heddles divides into 6 section carries 3 heddles means total 6 x 3 = 18 heddles. These 6 sections are joined to 6 shafts. Remaining 6 sections of 18 heddles are tied to other 6 shafts. Each heddles carries 36 warps. Therefore 126 heddles carries 252 warps to complete the Narali border. Similarly muthda is produced on 1 shaft, Gom or Lehar is produced on 4 shafts, Karvati is produced on 3 shafts and Narali on 12 shafts. So total 20 shafts are required to produce Paithani traditional Narali border. 8 lattices are required for pegging a Narali border. Tyeing the heddles to the Shafts (Pawadi) is known as 'Vaicha'.
The Narali border which is used for Paithani is traditional and Weavers assume that it has demand in market. But with the changing demands of the customers, Weavers should be able to change the design on Dobby. But the drawback in designing is the Weavers are not aware of how to make the changes in designs.

In the training programme, Researcher tried to teach them selection of design, enlarging the design in scale as per the number of lattices required for that particular border design, actual enlarging design on graph paper, transferring design on lattices, actual pegging on lattices, formation of designs doing variation in traditional Paithani border. Various designs were produced for border during training programme.

II) **Jacquard Designing for Butti and Pallov:**

The jacquard is shading device attached to the top of the loom to produce a figured pattern by using a very large number of warp threads separately by means of harness cords, hooks and needles but without any heald shaft. It is the finest of all machines from making the figured woven fabrics. Each hook in a jacquard represents a single heald.

In Yeola, jacquards of 120 hooks, 160 hooks or 200 hooks are in use. The Weavers of Yeola commonly use mostly jacquard of 120 hooks. In 120 hooks jacquard, there are six rows of needles 20 hooks are tied to each row of needle. So each row carries 120 hooks. In 120 hooks Jacquard 12 to 13 drafts can be fitted and one butti motif is produced in one draft. There are 40 mails per inch means 80 warps per inch. So in 120 hooks jacquard 1.50 inches width design can be produced. Following formula is used for calculating the width of design.

\[
\text{Width of design} = \frac{\text{Number of hooks}}{\text{Warp per inch}}
\]

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In 200 jacquard there are 10 rows of needles and 20 hooks are tied to each row of needles. So width of design achieved is \( \frac{200}{80} = 2.50 \) inches.

The size of pattern obtainable from a jacquard depends upon the number of figuring needles available and the closeness of the warp threads. It is customary to name a jacquard according to the number of needles; it contents, as a 100 or 400 hundred jacquard. In single lift jacquards, where a separate needle, the figuring capacity is always equal to controls each lifting hook either the number of hooks needles which the jacquard contents. Preparation of jacquard designing should include first and foremost, sound training in drawing and design, as well as through study and practical experience.

Plate No. 11: Jacquard Mechanism...

2.2.2.3 Process of Designing on Paper to a Finished Paithani:
Jacquard fabrics depend on exactly the same standard weaves as any other woven fabrics. Due to freedom from the restriction of shafts a change of weave can be made at any point and drawn and figured patterns are possible. The shapes in jacquard designs are simply a series of areas filled with different...
weaves fitted together to make a pattern. In existing practice, some part of pallov of Paithani like barav-kaup, panja, is woven with jacquard mechanism.

- **Planning the basic structure:**
  As a preliminary to designing for a particular Jacquard loom, its sett should be ascertained and a suitable warp yarn should be selected.

- **Preparing sketch designs:**
  Sketch designs can be made freely on paper, the size intend in the finished fabrics, though the width of a repeat in a jacquard design is fixed, the length is not limited. Extra length simply means more work on the point paper and more cards to cut. If the unit of the design is to occupy the full width of the repeat sketch designs can be made with out reference to the number of ends in repeats. But if the design is to repeat twice or more times within the capacity of one repeat of the loom then special care is needed to avoid difficulty at later stages.

In designing for jacquard fabrics, it is usually wise to avoid too much fine detail. Bold drawing, especially of curves, makes the translation from sketch to point paper easier. Diagonal lines which follow the direction of the twill on the sample are usually more satisfactory.

- **Choosing suitable point paper:**
  Design or point paper is a strong cartridge paper usually blue in color and ruled in black. It is made with a variety of different types of ruling and it is most important to choose the correct one. Several counts like 8 x 8, 8 x 3, 8 x 5, 12 x 12 etc. first three count papers are suitable for designs for 200 S, 300S and 400S machines as they have a heavy vertical lines ruled after every 8 square. Count paper of 12 x 12 is suitable for 600S design. Mistake in the choice of point paper may destroy the proportion of the design in weaving.
• **Enlarging the sketch designs:**
  When the most appropriate design paper has been selected, the next step is to count the number of squares across the top of the paper equal to the number of ends in a repeat. Measure this distance and it gives the width to which a single repeat of the sketch design must be enlarged ready for tracing on to the point paper. From the width the proportionate increase in length is calculated and this is marked along the side of sheet of design paper. If the design is planned with an all-over ground weave, it is important to see that the calculated measurement gives an appropriate number of picks to accommodate an exact repeat of the chosen ground weave.

• **Preparing the point paper design:**
The enlarged design is traced in bold pencil outline on the point paper. Red marks are generally used to represent warp ends up and blue paper represents weft up. It is usual to begin at the right hand bottom corner and work on steadily all-over the design, especially in the case of all-over ground weave. It is important to make certain that weaves are properly locked together, especially along straight, vertical and horizontal lines. Extra long floats, in either warp or weft, where two weaves meet must be rectified by the addition of extra intersections or rearrangement of existing ones. When the marking is finished great care should be taken to see that the weaves joint correctly on all sides of the repeat.

• **Cutting the cards:**
The design is ready for card cutter. Cards may be cut on "hand plate", but this is very tedious method. And now a days "Piano cutter" is usually employed. hand plate is used by the Weavers of Yeola, with the help of this plate, whole row of holes across the card are selected and punched with the help of hammer. Extra holes are also cut from the sides simultaneously for lacing the cards together. While punching the design is read along the horizontal lines of weaves from left to right, cutting all red marks, one horizontal line on the point paper represents one card.
Lacing the cards:
As cards are cut it is very important that, they should be systematically numbered on the same side and at the same end. It is then possible to place cards in sequence and the correct way up on lacing frame. They are laced together with a soft tubular cotton tape and are ready for loom (Banerjee N. N., 1993).

Plate No. 12: Lacing the Cards...

Weaving the Fabric:
The set of cards placed over the cylinder and are then joined into a continuous belt. Weaving is carried out by treadling the on pedal, which rotate the cylinder. One pick is inserted for each turn on the cylinder.

In training programmes Researcher taught them to select design, enlarge for butties and pallov to the designs in scale as per hooks in jacquard mechanism and number of picks, to select the count of graph paper as per size of jacquard, to give stepping to the design, to give the binding with various weaves, transferring the design on cards with punching machine, lacing the punch cards, actual weaving those designs on Paithanis.

2.2.2.4 Comparison between the traditional technique of designing and New technique

Traditional method of designing for butti comprises:
- Punching the new cards by copying the old cards.
- Similarly for border design, using the age old lattices of Dobby, pegging new lattices in the place of old ones.
They were not aware of designing technique for Dobby and Jacquard, not even the point paper.

New technique of designing comprises:

- Selection of design considering the suitability.
- Enlarging the design on point paper considering size of jacquard and design repeat.
- Punching the cards as per design.
- Mounting the cards on the loom.
- Weaving actually on Saree.
- Inspecting the design on the sari from time to time.

2.2.3 Traditional Motives Used in Paithani and Their Significance:

Throughout the ages various kings and noblemen who ruled the area patronized this craft. No wonder, it survives today in its pristine form. Evolution and adaptation are so essential for survival and that is what the Paithani is today—a vibrant link with the past. The oldest traditional Paithani designs are the Asavli (Vine and Flowers) and the akruti (Squarish floral motifs). Some other traditional designs are the Narli (Cocount) the Pankha (fan), Rui phul (probably cotton bud) and the kalas Pakli (a petal form). During the shalivan era (decorative Saree-end worn over the shoulder) storks and swans were popular while the golden lotus belongs to the Yadav Periods (13th Century AD).

There is evidence that the Mughal Dynasty which ruled Indian from 16th to 19th Century A.D. greatly influenced the motifs of the Paithani. The motifs that were inspired by the Mughal influence were the Bangdimor (peacock in a bangle), the Tota maina (parrots), the Humaparindas (the pheasant) the Behesti Parinda (the bird of paradise), the Anarvel (Pomegranate flower). The traditional designs that survive today are the kuyri (the paisleys) the Gokarnavel and the Drakshavel (Vine and Grapes).
The border and the pallov (decorative Saree end worn over the shoulder) were woven with these intricate designs while on the body of the Saree numerous small motifs were woven in the form of a circle (paisa) and Paisley (Kuyri). Skilled Weavers count the threads on the warp for each part of the design and use tiny cloth pirns called tillies to interlock the gold yarn or colored Silk on the weft with them. During 19th and 20th Centuries Nizam of Hyderabad ordered large quantities of Paithani Silks. The seventh Nizam's wife, Begum Niloufer is attributed for contributing the motif of the 'Parinda'. Sometimes as many as 400 tillies are used for a pallav. The result is most fascinating design on both sides of the fabric.

The textile Designer Meera Mehta explains the fact that a design for woven borders known as Pankha (fan) in the Paithani Sarees, is the same as that known as half-chatai. (a variation of the geometrical chatai motif) in the Maheshwari Saris woven at Maheshwar near Indore. The most complicated design is the Bandimor which is essentially and peacocks woven in a bangle or a circle of diameters 7.5 cms. This takes an expert Weaver anything between 18 months to 24 months to weave. In a 12 hours. working day only 0.50-0.75 cm. of design can be woven. The popat, Maina or the Kuyari, are the relatively easy design to weave. During the shalivahan era, storks and swans were popular while the golden lotus belongs to the Yadav Period (http://www.mbarth.freeserve.co.uk/paithbio.htm).

Traditional motives are generally in geometrical forms. So there is a perfect balance in the designs. The designs are made with the help of straight, diagonal lines, angles and circles, which also help to speed up the work. On Paithani borders generally Narali, Simple Pankha, Jalidar Pankha,Akruti,Asavali,Kalas Pakali Rui Phool,Ashtkaval Kuyari and Hansadi motives were produced. Among these motives Simple Pankha,Jalidar Pankha and Narali motives were prominently incorporated on the border of Paithani.

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In earlier days, the motives like Rudraganthishi, Shikarkhani, Ancient trees, Ornamental Kuyari were made on Pallov. All these motives had spiritualand superstitiuos meaning. Traditional Paithani motifs are generally in geometric shape balancing the design perfectly. The design are made with the help of straight, diagonal lines, angles and circles which also helps to speed up the work.

In addition to the motifs of pallov and border, about 500 to 900 zari buttis were woven on the body of the Paithani. Hence it was also called as 'Buttedar Jartari Paithani'. In ancient time buttis like Paisa, Phool, Patti, Peacock, kuyari, Shankarpale were woven with pure jari, or sometimes woven with multicolored Silk.

**Narali Design:**

This design is considered as an oldest and ancient design among all the motifs. Today also this design is very prominently seen on borders of Paithani. On the border, 8 or more than 8 Narals are seen which forms netted design and looks more attractive. This design has specific traditional significance. The Narali design is considered as a symbol of good luck and holiness. The shrifal is generally made in geometrical patterns and used for Paithani and Pitamber. It is believed that if women wear the Paithani of this motif, she would not suffer from black magic. Today also this tradition is still continued in rural areas. The males also wear Pitamber of Narali Design; with the similar belief.

![Plate No. 13: Naroli Motif](image)
**Pankha:**
This design is similar to 'Narali' design. Narali design is little bit vertical and horizontally netted but the Pankha design is more or less flat in form. This design form is different from Narali so it has different meaning and inbuilt beauty. This design has dominance in Paithani as well as in Pitamber and earlier it was used in Yeola shalu also on large scale. This design does not have old tradition as Narali design has. This design became more popular from the time, manufacturing of Yeola shalu and Yeola Pitamber was started. During that period this motifs received more importance. There are two types in this design.
1) Simple Pankha.
2) Narali Pankha.

**Akruti (Zipruti):**
This motifs is also most ancient. Akruti motif is deliberately woven on Pallov in combination with Narali and Pankha motif, which was woven on border. In the center of Pallov, designs are woven in a row forming a tree in the circular design form. This motif carries satvahan tradition, which is also termed as 'Zipruti'. This motif has geometrical shape like almond.
• **Asavali:**
  This is also very ancient motif of Paithani. This creeper is made of beautiful flowers. With a multicolored Silk, this motif is woven on pallov and border of Paithani. 'Asawali' is a type of flower, which has no botanical family background but it is only the creativity and visualization of the Weavers that till date it is ornamented on pallov and border of Paithani. This motifs has thousand years of tradition but very few of them rehabilitated it. This is widely known as a 'Satvahankalin Nakshi'.

• **Kalas - Pakali:**
  Very religious and ancient motif is a kalas-Pakali. Earlier it was woven on Paithani and Pitamber border but recently this design is obsolete. Existence of these designs is experienced in religious saint literature. These designs are very often found on trousseau of gods.

• **Ruiphool:**
  This motif is very traditional woven on Paithani and Pitamber. Ruiphool is enclosed within 4 or 8 petals. Beautiful jali is made on zari woven border with Ruiphool motif. The four petals of this flower has specific meaning. Fourvedas, Four muktis, four direction, four religious places (chari dham) with the tradition of Weaver. Similarly 8 petals of this designs have spiritual meaning.
• **Suvarn-Kamal:**
  Design of Golden lotus also has received old tradition. Survarnkamal of this design found in literature during Yadava's period. This is also found on the ceiling of old Matha's (House for Saints). This motif had been associated with signs with Lotus motif which had also been seen on the articles found in Mohenjadaro Excavations. This symbolic form of the lotus is found to be prepared about five thousand years ago. From this lotus picturisation, innovative design is created.

In the poetry of Saint Kabir "Ashtakawaladal" the reference of 8 petal lotus also exists and which carries specific spiritual meaning. This motif is termed as Suryakamal, which is a symbol of sun. Favorite lotus of Vishnu is believed as a symbol of Laxmi. Today this type of Lotus motif is not woven on Pallov, border of Paithani. But lotus motif which is produced presently, is imitated from ceiling of Ajanta Caves.

• **Hans: (Swan)**
  In early days flying swan motif was woven in the circular form of Paithani Pallov, mentioned in Satvahan's history. The swan had been replaced by HumaParinda and Behasti Parinda during Mughal period.

![Plate No. 18: Hans (Swan)...](image)
• **Bangadi Mor:**

Bangadi Mor is also very old and ancient motif. Peacock is a National bird and very beautiful looking and popular bird in India. Mughal women were fan of these dancing peacocks. So in early days this motif had been woven on the Pallov of Paithani.

Daughter in laws of Nizam, Smt. Duredeshawar and Smt. Nilofar Begum visited Paithan for booking the order of those Paithanis. The cost of Paithani with Bangdimor was Rs.7000/- each during that period. Today also, the Paithani of 'Bangdimor', motif is seen in shalarjang Museum at Hyderbad. The four weavers used to sit to weave this motif on Paithani.

Mughals had observed only the beauty of this design and ordered the Paithanis of this motif. But Hindu culture had given spiritual meaning to this motif elevating its level. Expertise required one to two years to weave this motif with delicacy and perfection.

In this design the four peacocks are placed in a circular form facing each other opposite. These peacocks are depicted as sitting on petals of flower. There is a specific meaning as Bangadi means round earth, four peacocks means four hands of Vishnu and Lotus of four petals is a Nabhi Kamal of Narayan which represents the 'Prosperity'.

*Plate No. 19: Bangdi Mor*
This is also believed as a symbol of sun and it is belief that every woman who wear the Paithani of Bangdimor motif, leaves long life and can prevents widowness.

- **Traditional Kuyari:**
  This is old motif but this motif was not woven on Paithani border or border of Pallov but it was woven in the center of circle on Pallov. 3 to 5 kuyari were woven in a row. But today this motif has little bit changed and used on border and Pallov of Paithani. But presently the kuyari is little modified and being woven on Pallov of Paithani and as a butti.

![Plate No. 20: Traditional Kuyari](image)

### 2.2.3.1 Mughal Influence on the Motives of Paithani:
It has a specific characteristics. In this type, the design paper is kept beneath the warp while weaving design on Pallov and border. This type of work had been carried by momin men and women till today. During the Nizam's period, there were 500 houses of Momin weavers in Paithan. Special 'Sanjarpura' had been established by Malinkabar in Paithan for Momin weavers. The existence of huge door of sanjarpura is a proof of residency of momin weavers in Paithan during that period.

The designs from Mughal tradition, like "Huma-Parinda" "Behasti Parida", "Anarvel". "Tota-Maina", "Kerivel", "Ajantalotus", "Phulpatti" etc. are
nowaday simplified and woven. Today also the designs from Mughal tradition are woven on the border and pallov of Paithani and recently such Paithani are named as "Brocade Paithani."

Mughals' favourite designs were used to weave on Paithani only when Mughal enter South. The samples of these designs are seen today in old Muslim Sardar Gharana. Many Paithanis of these designs are displayed in Salarjung Museum of Hyderabad.

In olden days, these Brocade Paithanis were recognized as untraditional Paithani because Muslim Sardar demanded the designs which were not traditional. Later on tradition of these motifs migrated to 'Banaras' these were named as a Brocade and ultimately Paithani also acquired this untraditional name.

- **Huma Parinda:**

  Originally, this word is 'Parasi'. This motif is generally woven in center circle of Pallov of Paithani. This is from Mughal tradition. On heavy zari Pallov this bird used to be ornamented with multicolored silk to make it more beautiful and attractive. The weaving of this motif is very intricate and difficult.

  Weaver tried to apply his creative imagination to make the bird beautiful and attractive as well as Paithani. It is assumed that whenever the Paithani with this heavenly birds wore by young woman, she looks like "Apsara" and hence Paithanis with this motif became popular among young women during that period. By wearing them on special occasions, the young women exhibit their beauties.
There are many references regarding the meaning of 'Huma Parinda'. Among them one legend is 'It is assumed to be an imaginary bird' and meaning of Huma-Parinda' is heavenly bird. He makes his nest at high altitude. There is imagination that eggs from the nest is hatched during falling down and small baby bird directly starts flying in sky. Their feet never touch to the earth, nest being at high altitude. This is the legendary story has a support of Weavers imagination and skill also.

- **Behasti Parinda**:
  This is also a bird motif woven in a circle of Pallov, As such it looks like a birds are flying in 'Galaxy'. After seeing these birds flying, mind flooded with full of happiness. It has been observed that Mughul Sardars were fond of variety of birds, hence these birds used to be woven on Paithanis.

- **Anarvel**:
  This is a beautiful creeper which is woven on borders and Pallovs of Paithani. In this creeper, Pomegranate fruits were beautifully structured with flowers and leaves which makes the border pretty. It takes $1\frac{1}{2}$ to 2 years to weave on Paithani. Some skilled Weavers used to weave this design by counting warps instead of keeping design, beneath the warp. But this is very difficult job.

- **Tota-Maina**:
  The story of Tota-Maina is very ancient. This is a symbol of Loving couple. Weaving of colorful and romantic forms of Tota sitting on beautiful creeper on Paithnai border, the Weaver make it immortal. This was favorite motif of Mughals. Today also this motif is woven on Paithanis, on large scale.

![Plate No. 22: Tota - Maina ...](image)
Ajanta-Lotus:
This beautiful design is found on the ceiling of Ajanta Caves. It looks very pretty on the borders. This motif was seen on ancient Paithanis but later on the Mughals made it more popular. Lotus leaves, flowers, buds and birds were delicately interlocked and woven on the borders of Paithani.

As it is a Ajanta Motif, naturally it receives the ancient tradition. And only during Moghul's period it was rehabilitated.

Plate No. 23: Ajanta Lotus...

2.3 PAITHANI HANDLOOM WEAVING:
The birth of art of weaving was first in India. In ancient times the Indian fabrics were famous all over the world. Indian craftsmen were experts in the art of manufacturing the fabrics. They were using their exquisite art of weaving cotton and silk threads. The cloth was also studded with pearls and jewels raising the value of these fabrics to million pieces of silver. Even the kings and queens of Europe were very fond of these priceless materials.

During that time because of scientific methods of color mixing, artistic and clever use of buttis and bird designs in the art of weaving, the fabrics were in great demand in the Western and Eastern countries where, they were being exported. Thus this art of weaving was utilised for the manufactures of saris by the craftsmen who put in their hereditary skill.
It is very amusing to note that the word "sari" is derived from the Sanskrit word Shatti (putta of cloth). From Shatika, word satee was formed, so came to be known as "sadi" in Marathi. In the language of the Udiya, Bengali, Bihari and Hindi, the word sadee is popular. It has been claimed that the sari was famous undoubtedly since ancient times. It is difficult to say as to when this feminine wear sari came into existence, as at the birth of Christ, during Sindh culture and also in some ancient sculptures of the Sumerian tradition it showed its existence. There are examples of some of tiny sculpture pieces which are claimed as the first examples of saris (Usha M. V. and Marathe S., 1981).

Indian's craftsman - the weavers have won fame through the centuries. This is not only for the beauty, originality and variety of their art of weaving. But for the ornamentation of motif and color combination that they have used on textiles to bring out the intrinsic character of the style and texture of the fabrics on which the decorative motives have been placed.

Textiles art is very old in Indian Handspun and hand-woven textiles probably go back to the earliest days of her civilization. No country to my knowledge, in the world has such a rich heritage of hand-woven fabrics. Indian history, for two thousand years or more, has been closely bound up will her convince as a producer of textiles. A large portion is still woven on handlooms as they were woven centuries ago. The finest of craftsmanship and the same ingenious techniques of weaving still survives (http://www.rajakelkarmuseum.com).

The Indian Handloom Weavers maintain their dignity and skill in spinning, dyeing and weaving said by Pandit Savitri (1989). Traditional Textiles are mostly weaving Saree since Saree is the National costume of the Indian Women and India is the country which still sticks to her traditions in this respects. The Saree which is six yard piece is draped in different style in different regions in this country. Though the length and breadth of it is same except in Maharashtra, it is nine yards piece and Maharashtra is also famous for its six yard Saree i.e. Painthani.
2.3.1 History of Handloom Weaving:

The word Handloom refers to a traditional weaving method employing quite simply a loom operated by hand. The looms which are driven either by hand or by leg or by both can be termed as handlooms. But "hand looms of India" means something much more than its literal meaning. It represents an ancient craft with rich heritage providing a great source of sustenance for millions of artisans. Indian handloom textiles which are manufactured or woven on handlooms operated exclusively by manual power using handspun and / or mill spun yarns and the essential primary motions viz., shedding, picking and beating are accomplished totally by manpower. Powerloom textiles are woven on power looms and all the primary motions are accomplished by using electrical energy.

The weaver is the originator of the textile. Yarn is his first word, his first note. The loom is the theatre of his activity, the instrument on which he plays his music. The weaver uses the language of the loom to build a fine vocabulary of skills and techniques. The loom is a limited space but the weaver uses its extent and constraints to its utmost capacity. He understands every nuance of the weave and automatically moves with the rhythm of the loom to play the music he knows best. The weaver and his loom blend with perfect harmony in the weave.

Sarkar B. P., et al., (1991) had made an attempt to classify the Handloom into different groups based on their distinctive characteristics which finally help to identify a particular type of loom.

According to Rangarajan S. (1996) handloom literally refers to a traditional weaving method, symbolically it stands for much more. It represents a philosophy, a way of life. The philosophy is the simple faith of Indian folk artisan - the Handloom Weavers - the man behind the loom. His work stands in evidence of the creative skill of the hand and its ability to do the whole job. It
stands for the revitalization of traditional creative energies and the certainty that they can be infused into our modern civilization. Though the method employed in making handloom fabric are simple, the result is extraordinary. The human effort results in creations which are both aesthetically delightful and extremely durable.

The Handloom industry in India is one of decentralised nature. 38.9 lakhs of Handlooms is numerous varieties are scattered all over the country. Each variety will have its own characteristics and may be varying from the other to a great extent or with a marginal difference. Thus, it poses a difficult problem to identify a particular type of Handloom, but this is very important while selecting a right type of loom for producing a particularly kind of fabric. To this end, hardly there is any kind of information or literature available with Handloom industry (http://www.handloom.com).

The art of weaving is the age old industry known to the mankind. In India, the inception of handlooms can be traced back as old as the vedic period. The first known method of weaving in India was provided with an upright vertical frame to hold the warp in stretched condition during weaving. In this loom the weaver used to pass a weft thread with his finger through alternate warp threads. This method, was succeeded by 'Shed stick weaving' in which a shed was produced by passing a stick through alternate warp threads. The weft was inserted through this shed by weaver's hands and beating up of weft was to be effected by means of a separate wooden comb.

The next improvement was to pass the warp threads through the loops of 'healds'. These were called the "horizontal loom" which were being used for weaving fine muslin or silk. There was a kind of loom which was erected by sinking the frames in the ground and the treadles were to be operated inside the pit by feet. It is called the pit loom. This loom had been known to be in use in India 5000 to 6000 years B.C. and continued still today in same form. This loom seemed to be the invention of India although it may be seen from time to time in paintings of Northern Asia.
In 'throw-Shuttle loom' a metal wire is used for holding the pirn in the hollow of shuttle. This kind of loom is still in use in India and the same exclusive variety of fabrics are still produced on the same type of loom. In 1733 A.D. John kay of Bury England invented the "Fly Shuttle Loom" which was very important in the history and development of weaving, because this loom saved the way for development of the next series of loom.

The semi-automatic loom of iron framing invented by Messers Hatttersley and Hill of Keighley, Yorkshire is called the Hattersle loom which works on the principle of an ordinary powerloom except the power to drive the loom. For producing checks with more than one color, count or material, multiple box motion is used in handlooms. Ordinarily, two shuttle - boxes at one end and a single shuttle boxes at the other end are used in drop-box handlooms. In order to increase the design capacity of handloom the shedding the machines of dobbey is used. Horizontal dobbies are largely used in the Handloom industry. The first and the most effective method of figure weaving in India is the 'Draw loom' in which the 'draw boy' produces shed for figure weaving and the Weaver performs the extra weft figuring manually whereas the ground of the fabric is woven by depressing treadles.

In 1801, Joseph M. Jacquard first invented his Jacquard machine and since then many developments were carried out to reduce the cost of machine and to increase the speed of the machine and it was attained by the development of the present state of Jacquard machine. A handloom had long been a very simple machine. With the invention of Powerloom in 18th century, the improvements in Handlooms as well started flourishing. Thus the semiautomatics Handloom which came into being was developed with all its primary motions automated and was fitted with take-up and let-off motions.

The handloom may also be mounted with Dobbies, Jacquard or drop-boxes. In fact, very elaborate and intricate patterns in the case of Banarasi, Baluchari, Damask,
Brocade fabric are developed by the handlooms fitted with these attachments or by draw looms. As in the case of Muslins have been commonly used in India from a time long before Christain Era.

The Primitive weaving of Indian brocade as described by Dr. J. F. Watson is performed by two weavers who place the pattern drawn on paper below the warp and arrange along the warp a number of cut threads equal to the flowers or parts of the design. Then with two small, fine pointed bamboo sticks they draw each of these threads.

The shuttle with ordinary weft is then passed by one of the weavers through the shed and returned by the other weaver. However, there will always be an appreciation of and a desire for, fabrics more individual than it is possible to produce by machinery. These can easily be accomplished by the Indian weaver to whom skill and artistry are still of paramount importance.

2.3.1.1 Appropriate Technology Need to be used in Handloom Industry:
The handloom sector is an important segment of the Indian textile industry. It has the largest unorganized economic activity after agriculture. According to the census of Handlooms in India in 1987-88, there are roughly 3.8 million handlooms in India, by far the largest number anywhere in the world. About 6.5 million people depend either fully or partially on these handlooms for their livelihood. The handlooms produce approximately 3,600 million meters cloth annually which is about 30% of the total cloth produced in the country.

Sarkar B. P. (1990) stated that the Handlooms are special in India. Where there is a development of multi-phase, Air-jet, water-jet weaving, we weave a few inches a day in Jamdani weaving. When we talk about high-technology in corporate sector, in handlooms we go back to our traditional hand-crafted textiles, but still we are proud of our craft. However, in other to improve the earnings of Weavers and to standardize the quality of products, we have to rethink about the appropriate technology for the Handloom industry.
I) **Appropriate Technology and Modernization**: Appropriate technologies should fulfill the felt needs and use locally available resources. This is very true in the case of handloom industry and in its development. As the appropriate technology and modernization go hand in hand, in our modernization programme, it aims at harnessing the full potential of the handloom sector. Modernization means better productivity with better quality. By manufacturing a larger volume of fabrics, the handloom weaver's will be given an opportunity to maximize their earnings. The following three key areas have been identified for the on-going modernization drive.

- Improvement of loom designs and training of weavers on modernized looms.
- Production of polyester mixed and blended fabrics.
- Revival of traditional weaves and designs.

**Recent development in the Handloom Industry**

- **Weaving**:
  - *Computer aided textile designs*:
    Computer aided textile designs enable the textile designer to conceive better and more patterns to the requirements and liking of the customers. Textile designer can generate and visualize very quickly a panorama of the designed weave from elementary weave by thread interchange, by modifying / replacing the draft and / or Peg plan.

    Jacquard textile design system, it may produce weave designs of more than 2000 x 2000 ends, generate very fine weave even with two colors - give color print out of designs. Dobby textile design system, it may be designed around low cost personal computer warp and weft colors can be changed individually, display repeat patterns on screens and on color print.
**Improved type pedal operated loom:**
A new design of pedal operated loom is developed by improving ergonomic designs which reduces human effort required to run the loom continuously and improved design of picking cam which also reduces the effort has been developed by ATIRA, Ahmedabad.

**Use of plastic parts in Handlooms:**
Plastic have the merit of light weight, excellent dimensional stability, choice of color for ease of identification, safe in use, reduction of man hour loss due to minor accidents, excellent resistance to corrosion, longer life, reduction in down time in production resulting in higher productivity etc.

It is felt that the advantage the plastic parts as discussed, could also be explored for the use in handloom industry by replacing conventional material parts by plastic parts.

**Jamdani weaving by Jacquard:**
Jamdani is a famous Dampach weaving since centuries where design work is accomplished by stitching warp ends and introducing extra weft for figuring in Plain weave. The order of insertion of pick is followed as one pick ground and one pick extra weft. This technique is performed in most of the places in slightly different form and techniques. One important feature of this kind of weaving is that no Jacquard or Jala or any other device is used. Hence this is slow process of weaving. For achieving somewhat faster weaving the following two systems are introduced.

- Banarasi System by jacquard, pagia and Naka.
- Frameloom by jacquard and healds.

**Use of vegetable colors in the Handloom Industry:**
It has been a good trend in the past to produce colored textiles using Natural colors in our country which was unique in world. Due to number of reasons this practice was greatly affected and this art / craft has now almost vanished from
commercial field. The creative potential and non-pollutant nature of natural dyes has been attracting us even after the introduction of synthetic dyes.

In order to give life to this craft various Institute has taken several steps by developing shades on wool, silk and cotton using locally available vegetable matters and taking up a project "study of fastness properties and other dyeing characteristics of nature dye-yielding products" jointly with IIT, Delhi and Weavers Service Center, Delhi. Under this project, work will be carried out to release standard information for commercial use by the small scale/ handloom sector. Work has already been started to identify the natural coloring matters and developing shades on cotton and silk.

The handloom craft today is a small Industry in terms of tools and technology, but a vast industry in terms of its employment potential. Therefore the appropriate technology to be accepted for the handloom Industry is to be chosen in such a way that it should balance between generation of employment in one hand and enhancement of production rate in the other.

Handloom fabric is the versatile fabric. The variety of material designs and articles woven on the Indian Handlooms is almost infinite. They range from the finest muslins to be coarset dhurries and floor coverings, from the softest pastel shades to the most vibrant earthy hues, from strikingly simple to delightfully intricate.

II) Merits of Handloom Fabrics:

The handloom advantage is specially noted in the following types of production.

i. Cloth made from even extremely fine material is woven more safely on the handloom owing to comparative lightness of jerks.

ii. Cloth interwoven with gold and silver thread, the polish of which would be taken out by the extremely frictional action of the healds in the power loom.
iii. Cloth with multicolored designs in which the weft is to be changed very frequently.

iv. Cloth with embellishment in the border and beading or with entire effects with delicate designs of various colors, such work calls for individual skill and must be carried out slowly.

v. Short pieces of cloth of unique design to meet individual tastes which cannot be economical for the Powerlooms and mills.

vi. Handlooms have monopolistic position in the manufacturer of checked and striped fabric, colored fabrics of numerous designs and cloths in which fancy yarns, slub yarns, gold and silver laces are used.

vii. The individualistic production base of handloom industry is a versatile asset; as it is capable of producing the most fanciful colors and designs for regional, national or international market in small quantities if so required.

viii. The hand-weaving and preparatory process impart a certain fascination and sentiment to the produce itself which is quite different from the fabrics coming out of Powerloom and Mills.

ix. The bulk of the cotton hand-woven floor coverings exported overseas are in the form of dhurries which are flat woven pileless rugs made of weft faced fabric.

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III) **Exclusive Characteristic feature of Handloom textiles:**

i. Multi-colored and / or different yarns in the same pick so also pick and pick fabric having irregular weft repeats.

ii. Fabrics with multi-colored heavy reed and picks having more than four different colors in weft.

iii. In some types like bordered items, weft yarn of the border interlocks with the weft yarn of the body in the same pick.

iv. Fabrics with frequent extra weft uncut / cut work with no limitations in design / color.

v. Double cloth, backed cloths, piques etc. with unlimited design colors.
vi. Tie and dye fabrics where the yarn is dyed at broken intervals to produce predetermined pattern after weaving.

vii. Brocades with no limitations in designs/color.

viii. Fancy fabrics manufactured to produce design by use of materials like loose silver, rags, grass etc.

ix. Multi-colored, elaborately designed fabrics beyond jacquard limitations.

x. Handspun dried silk fabrics commonly known as Tussar fabrics.

xi. Tufted fabrics like carpets, druggets, rag-rugs etc.

xii. Leno with unlimited figuring work in extra weft / extra warp.

xiii. Home textiles including floor coverings, dhurries, floor mats, etc.

xiv. Woollen made-up items commonly known as Namdas.

According to Indian Textile Journal (1996), in the field of Handloom weaving technology, two important consideration are kept in view while manufacturing for the export front. These are:

i. The design specifications have to be met in as much as these are to be controlled and operated manually in the pre-loom and loom process.

ii. The fabric should be reasonably free from defects originating on the yarn and the pre-loom and on loom processes.

III) Their properties:

The following properties are generally observed in handloom fabrics -

● Aesthetic properties: As far as the typical design and color combinations of handloom fabrics are well accepted and in face fetch much better application in the export market. Due to manual operations, several combinations are possible.

● Functional Properties - The functional properties mostly relate to drape, dimensional stability.

These aspects are determined by the design specifications of the fabrics, type of fibers used, count and twist of warp and weft yarns, end and pick density, type of weave, type of chemical finishing and process employed, prints etc.
Visible Defect:
These defects are more apparent in handloom fabrics. Many of these defects are due to limitations in the equipment the weaver has with him. The incidence of these defects is, to a very large extent, influenced by the mechanical conditions of the looms, be it a handloom or powerloom.

According to Adhau Vimal (1995), Handloom sector in India represents one of the country's oldest cottage industries which have survived the process of industrialization an livelihood of about 100.65 Lakh people in the country. In 1990-91, Government made a number of changes in its policies and has drawn up a number of new schemes for implementation during 1992-93 for inclusion in the 8th plan.

Changes in Fashion:
Today the changes in taste towards clothing has been taken place and the result of this change of outlook however manifested itself visibly in the clothes of men and women and children all over the country.

In southern India formerly Hindu women of the upper classes wore tastefully colored nine yards woven sarees. In western India, the heavy and costly Paithanis of traditional design came in fashion, but in Northern India a large number of women changed over from their traditional attire to mill made sarees and blouses.

Formerly, Hindu men of upper classes wore lace bordered dhotis and chaddars or angavastrams on all occasions. But of late craze of simplicity has come over them everywhere. In Madras high class Dhotis and dupatta of Madura and Salem continued to be the fashion longer than elsewhere in India. But after 1921, a simpler kind of dhoti's place has taken by trousers, pants, shorts, Bermudas, denim jeans.
Formerly all over India about 70 percent of men both Hindu and Muslims, wore same kind of turban or Gandhi topi, but today only a small proportion of people wear such headgear. Even in rural areas caps have taken their place.

In all these case, it is noted that the vagaries of fashion have benefited the mill and hit the Handloom.

V) Role of Handloom Sector in Export Market:

Competition is growing day by day and Indian mills are producing Sarees, dhotis and other textiles suited to the requirement of common people. Such competition helps in declining the price of cloth. Even in the export market, competition with cheaper market, competition with cheaper goods, this trade was greatly affected and there was a great decline both in quantity and value.

Rangarajan S.(1990) opined that Handloom exports have long remained a vital element in the Indian export basket. Europe, U.S.A. and Japan form a major market for our handloom products. As such, it is natural and in fact, absolutely essential that we continuously monitor the fast changing market trends in these countries.

Even after 40 years of Independence we are not still clear in our mind as regards the technology absorption by the handlooms. In the last 4 yearly International Textile Machinery Association Exhibition (ITMAE), held in Paris in 1987, emphasis was laid on projecting the near perfection in the existing textile technology, the pressure for which has probably come from large number of textile machines being installed in developing countries.

In colourage (1992) it is stated that Handloom Industry is declining due to stiff competitions with an organized sector textile industry. Existence of master weavers who exploit the poor weavers, non-availability of adequate finance on time and at reasonable rate of interest, absence of yarn dyes, chemicals in adequate quantities and also at reasonable prices, inadequate facilities providing...
for development of new techniques, skills, designs and inadequate arrangements to propagate the developments that take place. The technological development is very meager with the result that it yields low productivity. The reason for the low productivity is that the cottage Handloom has a very low stature and capacity to absorb high technology.

Misra S. K.(1985) stated that in order to improve the competitiveness of the Handlooms, steps would be taken for modernization of looms, for supply of yarn to the Weavers, for production of value added items on Handlooms by using blended and mixed fiber and for removing the cost handicap vis-a-vis Powerlooms by bringing about suitable fiscal measures. There are two distinct kinds of fabrics which can be produced on handlooms. The first kind is of exclusive type with designs. For this, handlooms have exclusive role to play and face not threat from the other two sectors. The second kind the cloth would be inexpensive type like Dhotis, Sarees with or without simple designs and other plain cotton cloth. In the second kind, Handloom face stiff and unfavorable competition from the Powerloom.

In the context of the new enlarged role assigned to the handloom sector under Government's policy and if the cottage-based and traditional industry like handloom weaving is to play a significant role in the National economy, constant technical improvement is essential.

Everyone could agree that technology is development and if we really want to do good business in the Handloom Export Trade, concerted efforts should be made in the pre-loom, loom and post loom weaving processes. For generations before and even now, the loom remains the same in the handloom sector. This position was all right as long as we exported what we produced. Now, there is a phenomenal change in the Handloom export front, viz. we have to export what the importers specifically want.

The importers are quality conscious and they pinpointedly state their preference regarding quality, specifications, color fastness, finish etc. It is said that I am quite
emphatic that Handloom can non survive only on Government subsidies. If we really want to put this handloom sector engaged in export production on a sound footing, we have to naturally ensure technical improvement.

And if the Handloom of India want to remain in real business and withstand the competition from the organized mill sector at one end and the expanding decent realised powerloom sector, at the other end they should compete in the export market on the relative strength of their design features, quality and cost. Technology is concerned with all these. Accordingly effort should be made to modify the machines or processes in Handlooms with a view to lessening the strain on the operatives, increased productivity and enhance quality of the product, thereby increasing the wage earning capacity of the Weaver.

In this research, Investigator has studied the technology related to design features, quality dyeing and cost used by Handloom Weavers of Yeola.

In general, the position being so, the aims and objects for the utilization of improved tools, appliances, equipments and accessories should be:

i. To increase production of cloth and wage earning capacity of the Weavers.
ii. To improve designing capacity of loom.
iii. To improve quality of cloth.
iv. To reduce fatigue on the Weaver.

The above could be accomplished by the use of the following improved gadgets appliances and accessories.

- **To increase production and wage**:
  i. Flyshuttle sley and in broad width.
  ii. Semi-automatic looms.
  iii. Take-up motion attachments.
iv. Double and multiple shuttle box sleys.

v. Let-off motions.

vi. Roller temples

vii. Special attachment for weaving long bolts of cloth.

- **To improve the designing capacity of loom:**
  i. Dobbies.
  ii. Jacquards.
  iii. Drawbox harnesses to work in conjunction with jacquards to increase figuring capacity.
  iv. Better reeds.
  v. Better healds.
  vi. Shuttles.

- **To improve quality of cloth:**
  i. Let-off motion
  ii. Roller temples.
  iii. Improved methods of sizing and processing.
  iv. Improved fly shuttle sleys.
  v. Better reeds.
  vi. Better healds.

- **To reduce the fatigue on weavers -**
  i. Dobby
  ii. Jacquards
  iii. Take-up motion attachments.
  iv. Let-off motion.
  v. Better healds.
  vi. Better reeds.
  vii. Shuttles.
  viii. Pirns.
Jayachandran K. and Sundaran R. (1995) suggested that as far as the design is concerned Computer graphics is one of the fastest growing areas of computer applications in Industry. Computer graphics has a wide application in business, industry, science, medicine and entertainment. In the textile industry, with the introduction of new fibers, new machinery and processes and with the ever increasing demand for new fashions and aesthetic designs, the art of textile designing has become more challenging than ever before.

The designing of a woven fabric is a time-consuming task demanding the following-
- Development of an attractive artwork.
- The point paper design of the weave pattern.
- The conversion of weave pattern to draft and lifting plan.
- Choosing the color of yarns and analysis of the interaction of color and weave pattern.
- Making samples for approval by painting of cloth size sketches or by hand weaving or by cut and paste technique.

The time and labour involved in the above route increase the cost of manufacturing of a newly designed fabric sample in industry which reduces the competitiveness in market. Also, this sample gives no ideas of what other designs could be created by simple alterations like changing over the warp and weft patterns. In other words, for every change of color and weave pattern a sample fabric has to be produced to visualize the effect of change on the aesthetic value of fabrics. It has its own limitations.

But the Computer aided textile designing (CATD) has now given a viable solution to the above problems. All the basic weaves can be programmed in computer language and stored in computer memory. Whenever required, the computer can be asked to plot the desired design with various weaves, warp and weft color patterns. The latest high resolution color graphics computer provides full freedom for selecting colors,
color schemes, structure of the fabric, design pattern etc. through computer hardware and software system.

Using such system, it is proposed to help the decentralized handloom and Powerloom sectors in developing exquisitely designed fabrics for various purposes.

**VI) Indian Handloom Outlook in 21st century -**

According to Handloom export August, 1997 how the Indian Handloom industry will behave in the coming 21st Century and measures to be initiated to overcome the obstacles may come in the way for achieving better results in the early part of the 21st Century. If the best way to understand the future is to know the past and analysis the present, then it may be useful as a first step to focus briefly the major changes that have taken place in the handloom sector.

The only phenomenal change that has taken place in the pattern of production in the handloom Industry is that by and large the throw shuttle looms have been replaced by the flyshuttle looms mainly producing plain fabrics. The trend in 2000's in the handloom production will be to switch over to fabrics produced other than plain weave since the production of plain sorts will have been completely taken over by the decentralized Power-loom sector. The demand for plain items will be on progressively declining trend and fabrics with weaves, multishaft, Dobby and Jacquard designs and wider widths could catch up. Towards this objective, the type of looms existing in each handloom center has to be carefully studied and new attachments introduced accordingly.

Each state in India has a number of exclusive handloom items with special characteristic feature and in order to be competitive in the global textile trade, emphasis should be given on color, styling and high quality in terms of both design and performance.
A very interesting development that may take place in 20th in the fashion world is that the traditional made to order (Hautecoutre) would give up entirely their top position to new designers of fast moving world of (ready-to-wear) pre-aporter where garments in very large quantities would use more and more of man made fibers along with natural fibers and special items of handloom fabrics in their collections, thus giving a boost to the consumption of such special items. It is here that the Indian handloom should reach its widest audience.

The following techniques and fabric constructions, which are difficult if not impossible to copy on Power-looms will continue to stay in the 21st century in handloom weaving and play a prominent role in the pattern of Handloom export production.

- **Modified pit and frame looms weaving.**
  - Tie and dye fabrics.
  - Katari fabrics.
  - Payadi effects.
  - Novelty fabrics with blends of conventional fibers and cotton / silk wool.
  - Fabrics with good cover factor with cotton / Jute / ramie blends.
  - Fabrics using cotton with other fibers in combination with fancy yarns / colored yarn of different thicknesses to break the flat and monotonous effect.
  - Fabrics with weaves and color effects.
  - Plain weave fabrics with chamber / plaids stripes using more than four shuttles in filling.
  - Ikat dyed warps and weft design effect from one end to other in the width of the fabric.
  - Madras handkerchief / Madras checks / stripes / plaids ribs on the modified dimensions and new weaves to offer different end uses and create a new market base / in non-traditional markets and expand it market base in traditional markets.
- Modified pit and frame looms with pressure harness weaving.
  - Inlay tissue patterns.
  - Side border designs.
  - Cross border designs.
  - Very fine sheet cotton muslin, cut work items and structured silhouettes.

- Modified pit and frame looms dobbies and jacquards -
  - Side border fabric.
  - Cross border fabric.
  - Inlay tissue patterns.
  - Combination of inlay tissue patterns with border.

- Dobby frame looms with
  - Intricate threading of warps.
  - Use of more than four colors in the filling, the prominent group of seer suckers in plain, colors, woven and prints to be used for young sports wear.

- Jacquards-
  - Blends with very intricate open patterns.
  - Dress materials with intricate colors / designs.
  - Furnishing / upholsteries / household articles in floral, geometrical fancy designs etc.

- Lungies with elaborate color / designs effects maintaining their special characteristic feature and also with batik and print effects.

- Madras fabrics with use of different designs ranging from fancy plaids, stripes to intricate over printed floral designs with or without discharge effects.

- Enlarging the designs / color scope in bedsheets / furnishing / upholsteries, quilts etc. with intricate weaves and interesting textures in varying thickness for use, as bed linens and upholstery materials.

- Poly-chrome summer and winter patterns by combining treadling with tabby shot. In poly-chorme summer and winter two patterns of wefts are used.
Co-ordinated towels, bath mats and curtains in interesting designs for the bath add personal touch to any bathroom. Handloom should evolve these new patterns in a co-ordinated way.

On the question of what types of produces will be preferred in 2000's evidence collected over the years illustrate clearly that the discretionary or fashion textiles will dominate to attract the consumer preference. Computers may revolutionise the manufacturing and marketing processes along with the internet world wide web pages. The impact of computer aided designs on the Handloom will have to progressively grown to keep pace with the textile mill industry which is now ahead in the adoption of computer based systems.

In order to be competitive in the export market, it is imperative that the Handloom Industry adopts introduction of ISO 9000 for total quality management and the use of Eco friendly colors to meet the Garman and Netherlands ban on the use of Azo Colors. Therefore it is essential from the point of view of export production to undertake a major programme for technical upgradation of equipments and possess employed in the Handloom sector whereby the end products would meet the exacting demands of international market and would also be comprehensive in terms of cost.

If proper environment guidance and assistance are provided right earnestly and such potential exists, one can reasonably expect in turn, from these master craft men of this great country to exhibit that their

- Muscles can do it.
- Muscles can be trained to do it.
- Condition can be created to do it.

2.3.2 Yarn Requirement for Weaving Paithani:

The two main items of raw material required for Paithani are silk yarn and zari. Yeola needs on an average about 450-500 kg. of raw silk per month and over 100 kg. of zari thread. The silk yarn which is procured in a lot on monthly basis

Attitudes towards New Techniques in Dyeing and Designing among the Paithani Weavers of Yeola.
by the weavers from Bangalore, Sidalghatta, Ramnagar etc., from Karnataka, normally weighs 4250 gms. (1250 gm. Warp and 3000 gm. Weft). Besides, there are three traders at Yeola who provide the silk yarn. Weavers are buying more than one lot of about 25 kgs. of silk at a time, which is enough for six saris. Preferably filature silk is used for warp and sidalghatta or charakha silk is used for weft. Generally silk yarn prices are lowest during the months of February/March. However, considering the carrying cost of stock as also non-availability of working capital funds, weavers do not prefer to purchase it in bulk during this period.

Plate No. 24 : Dyed Silk Yarns...

Another major raw material that enhances the beauty of Paithani Silk Saree is 'Zari'. Surat in Gujarat is main center of the production of zari thread and meets almost the entire demand of the country's weaving community. Yeola weavers procure 'Zari' from Surat in varieties viz. Real Zari, Tested Zari and Half fine Zari. Trader from Surat make regular visits to Yeola for supplying the same. In the olden days the zari used in making Paithanis, was drawn from pure gold. But today silver is substituted for gold, thus making the Paithanis more affordable to medium class.

Generally in Yeola for the Paithani production, 18/20 and 20/22 denier, twisted and fine, 2 ply yarn is used for warp. And for weft, 20/22 denier, less twisted mostly 3 ply or 4 ply is used. Silk yarn for warp, required to weave one Paithani is 200 gms., which generally weighs 250 gms. before degumming. Total amount of weft required is 375 gms after degumming process. One hank (Wagi) of raw silk is of 45 yards length, weaves 6 to 8 Sarcees. Zari thread required for a single saree is 200-250 gms.
Cost of the raw silk varies as per the about type of silk. China silk costs about Rs. 1500/- Kg, Sidalghatta about Rs. 1400/- Kg, Filiature ranges from Rs.1350/- to 1300/- Kg. and Charakha Silk costs about Rs.1300/- Kg.

2.3.3 Zari Specifications for Paithani:

According to Nadiger G.S. and Subramanian S. (2001), in India, Surat and Banaras are the two main centers manufacturing Zari products which are used to decorate textile goods such as dress material, Sarees, fashion fabrics and table clothes. Zari is used in weaving a wide variety of Sarees viz, Banaras, Kanchivaram, Dharmavaram, Gadwal, Venkatagiri, Paithani and Mysore silk to create rich ornamentatives. Besides, a small quantity of zari is manufactured in Kanchipurum of Tamil Nandu also.

The origin and the existence of the Zari Industry in India is traced to the times of Ramayana, Mahabharatha and Vedas. It is an ancient Industry of India. It is often claimed that India learned this art of manufacturing Zari from Mohammedans. It may not be true as there is a mention about zari cloth in the voyage of Megasthanese and various other Western literatures. The origin and existence of zari industry dates back to ancient time but it reached its zenith during Mughal period.

In the medieval period under the patronage of Mughal emperors and princely states, the industry was well established and acquired export market in the western India. Surat was having sea connection with almost all major countries of the world. During the period of Mughals and thereafter, Surat was the largest and important port on the Western Coast of India. By 1614, when the East India Company from U.K. landed at Surat, the city was a famous commercial and Industrial center. Zari being an article of wear and ornamentation for Muslims of the Middle Eastern Countries and to some extent for Europeans, the port of Surat played a significant role in the establishment of Zari Industry in this part
of the country. It also attracted the traders from countries like China, Arabastan, Turkastan, Egypt, Morocco, Portugal, Holland, France, Sweden and England. Some countries like England, France and Holland had also established their warehouses in Surat between 1610 and 1950.

The Zari industry in India has since several ups and downs till 1958, when it was placed under the care of All India Handicrafts Board. Since then, the industry has started progressing and today it exports Zari articles worth more than Rs. 50 Crore to Middle East, UAE, Indonesia, Malaysia, USA and several other countries.

- **Types of Zari:**

  According to Padma Vathy A. and Jacob Mary (1992), the type of zari used on each variety may differ from real zari to half fine and powder zari. Most Indian women prefer to wear zari sarees on weddings and other special occasions. Therefore, there is a great demand for zari sarees which are very attractive but expensive. Zari is made from precious metals like gold and silver. This is known as gold zari or silver zari. Owing to the high cost of the precious metals and to meet the aspirations of middle and lower income consumers for wearing zari based apparels, imitation zari was developed.

1) **Real Zari:**

   The inside core of real zari is made up of pure silk, over which a silver wire is wound which is electroplated in pure gold solution.

2) **Half-fine zari:**

   The inside core of half fine zari is pure silk, over which a thin copper foil is wound and electroplated in pure gold solution.

3) **Powder Zari:**

   The inside core of powder zari is rayon (art silk), over which a copper wire plated with silver is wound and finished with chemicals to get the color and luster of gold.
Process of making Zari:
The main technique involved in zari making is to manufacture thin metallic wire of silver which can be used for weaving after winding it on silk thread. Silver is first converted into thin wire of 32 SWG (standard wire gauge) in the process known as 'Pawtha'. This wire is further drawn into a very fine wire as thin as a human hair in the unit known as 'Tania'. Then the thin wire is flattened with the help of a machine. The flattened wire is called 'Lametta' or 'Badla'. It is then wound on silk yarn which is twisted and dyed with red or yellow colour. This final product is called 'Zari'. Gold plating is done on the zari by electroplating.

In imitation zari, copper is used in wire is drawn into a fine wire. Instead of gold gilding, powder gilding is done on imitation zari. Importance characteristics in assessing the quality of the zari are linear density (denier or count), percentage of silver, gold and silk. In addition, the purity of silver is also an important parameter for assessing its quality.

The processes involved in zari manufacturing, depending on the final product can broadly be grouped as under:

1. Real Zari:
   - Melting of silver.
   - Preparation of silver wire bars.
   - Hammering of silver bars for elongation.
   - Drawing of silver wire of different gauges-coarse, medium, fine and superfine in Pawtha and Tania wire drawing units.
   - Flattening the wire or lametta making in flattening machine.
   - Dyeing of cotton or twisted silk or art silk yarn.
   - Winding of lametta on silk, art silk or cotton on winding machines to make zari yarn.
   - Electroplating of silver zari threads to make gold threads using hazardous chemical viz. Potassium Cyanide (KCN)
2. **Imitation Zari:**

- Making of ½" copper coils from copper bars, in rolling mill.
- Copper wire drawing units pawtha for drawing wire upto 30 s.w.g.
- Gilding of 30 s.w.g. copper wire by silver in cement concrete or polythene tanks.
- Further drawing of this 30 s.w.g. silver electroplated copper wire in fine gauges.
- Flattening of silver-glided copper wire in Lametta machine.
- Winding of lametta on yarn on kasab winding machines.
- Gliding of silver threads.

The quality of zari required for weaving depends on the part of Paithani Saree to be woven and it varies design to design. Zari, used in warp is generally fine and for butti and Pallov, it is thicker. Three types of zari is mostly used for border, butti and Pallov. Real Zari is made up of pure silk over which a silver wire is wound. After burning it, traces of pure silver can be obtained. Real Zari which is used for border costs about Rs. 1800/- bundle and for Pallov, costs near about Rs. 1900/- bundle. One bundle for border weighs 230 gms. and one bundle for Pallov weighs 250 gms.

Thus the rate of zari ranges between Rs. 8000/- to Rs. 10000/- per Kg. Tested Zari or powder zari is rayon (Art silk), over which copper wire plated with silver is wound and finished with chemicals to get golden color. After burning, tested zari turns into ash. It costs about Rs. 450/- bundle i.e. Rs. 700-2000/- Kg. Half fine zari is pure silk, over which thin copper foil is wound and electroplated in pure gold solutions. It costs about Rs.2100/- to Rs.2200/- Kg.

Silk has been considered a predominantly superior fabric among highly priced textile fabrics and at the same time zari is used in weaving a wide variety of sarees all over India. The traditional Sarees are generally with heavy zari borders and Pallov. Most Indian women prefer to wear the zari sarees on weddings, religious occasions, on festivals. Therefore there is a great demand for Zari Sarees which look very attractive and rich. Richness of the Saree adds to the cost of it hence requires special care to preserve its luster and overall appearance for a long period.
2.3.4 Manufacturing Process for Paithani:

I) Warp and Weft Preparation:

*Traditional technique of opening silk on 'Asari' and Preparation of 3 ply weft:*

Dyed silk when obtained in hank form, the opening of yarn is essential. The process is carried out with the help of equipment known as 'Asari'. This equipment consists of three stones in conical (Cylindrical) shape called 'Thape' in local language which are placed in triangular fashion indicated the shape of 'Chulla'. Each 'Thapa' is of 6" to 9" in height has a single hole 3/4" diameter in which the wooden sticks are inserted vertically known as 'Atanya'. The hank is inserted on these sticks and the yarn is taken out. It is passed through the bangle which is tied to the wooden roller at ceiling level then it is wound on 'Asari'.

![Plate No. 25: A Lady Winding Silk on "Asari"](image)

Asari is a wooden equipment, conical in shape, front side pointed and backside broader. In the center of this Asari long wooden stick is fixed. Front side of stick is kept on wooden block having a hook to maintain position of Asari called 'Belaki' and back side stick is placed on another wooden block called as 'Ghoda'. The person rotates the sticks of Asari continuously with a right hand and releases the silk yarn closer to the Asari with a left hand. This way the hanks are opened and wound on Asari and 3 Ply weft is prepared.
II) New equipment for unwinding and weft preparation:
At present few Weavers are using the equipment for winding which is operated with the help of electricity. The hank is placed at the bottom of the machine and cones (bobbins) are placed at the top of the machine. The yarn is wound on the cones automatically. Whenever the yarn breaks, machine is stopped by switching off the button. The speed of winding and unwinding from hank is 3 times faster than the traditional equipment i.e. 'Asari'. The cost of this machine rages from Rs.4000/- to Rs.5000/- . Total 30 bobbins are filled within an hour.

Plate No. 26 : A Lady preparing a weft on Automatic Machine ...

III) Warp Preparation:
Warp is prepared with the help of Peg Warping. The apparatus consists of a small rectangular wooden stand known as 'Tansal' at the ends of which is fixed a number of pegs for preparing a warp, mentioned by Amalsad D.M. (1964). Normally, a Paithani Saree has about 6500 ends. At home made device is used to rewrap the silk from the hanks on to an 'Asari'. From the Asari-it is wound onto the warping board. The warp is prepared on a rectangular warping board.
called the 'Tansal'. The silk thread is wrapped around the pegs of the Tansal about 360 times and then rewound on to Kandya or pegs. It takes approximately 21 pegs to form the 48" warp. The borders of the saree have a different color yarn i.e. 2 Kandya or pegs each for the upper and lower border and remaining 17 pegs for the body of the saree. Normally just enough warp for a three Paithani Sarees are approximately 17 yards is warped on the beam. For one Saree 6 yards and its blouse plus a little wastage is enough.

**Plate No. 27 : Peg warping on 'Tansal' ...**

### IV) Warping for Border:
Warping for border is done on big rounded drum shape equipment. The circumference of this machine is 6 ¼ yard. For one Saree, one round is taken and total 73 warps are for one width of border. Total 6 ½ rounds are taken for 6 Sarees.

**Plate No. 28 : Warping for Border ...**
V) **Attachment of Warp on Handloom:**

Once the warp is ready, numbers of warps are passed through the cotton / Nylon heddles and followed by the dents of reed this process is known as 'Poyane Karane'. If the left over warp is already on the loom then new warps are joined to the earlier warps one by one by twisting the yarns. For twisting, gum or garlic water is used. This process is known as 'Sandhani' or 'Ghathani'.

When the harnesses are ready, and harnesses are tied to the ruler from top called as 'Wai Rules' and from bottom 2 harnesses are joined to one paddle and another 2 harnesses to second paddle (Pawade) and weights are tied to two Paddles.

After joining the warps to previous one, they are tied to the back roller of the loom and lease sticks are inserted and warps are stretched tightly. To maintain the proper tension on this beam, cord is tied to the beam and then this cord turned around the 'Pardesi Peg' and tied to the 'Hathkhunta' which is digged into the platform of loom. To maintain the tension of warp beam, there are four holes from right side over beam and iron rod is inserted into the hole to maintain required tension.

After beaming the warps on loom are spread out and sugar solution is spread on silk warps to maintain its stiffness and evenness. When one paddle is pressed the warps from first two harnesses goes down and tunnel or shed is formed called as 'Pela'. Shuttle is thrown through this shed known as 'Partan' (Pherna), then beating is carried out with the help of reed so the weft pushes nearer to the previous one.

VI) **Earlier technique of producing Nakshi with the help of 'Adhi Tantra':**

In Paithani weaving 'Adhi technique' is a unique traditional technique and therefore the Paithani is surviving till today and became 'Maharashtra' among the traditional textiles opined by Narendra Marwade (1991). In this technique, when the ubhar (Warp) is placed on loom, borders of Narali or Pankha designs are fixed in 'Hatchala' or 'Paychala' and the middle silk weft is separately interlocked with both sided border weft by 'Adhi technique', means two shuttles...
are required for two side borders and middle portion is woven with separate shuttle. The Paithani which is woven with this a technique called 'Parthiv Paithani'. This Paithani will give separate color for border and middle portion of Paithani will look independent.

VII) Traditional Design fixing on 'Hatchala'/'Pachala'
For the traditional Paithani border, the design was fixed on 'Hatchala'. This technique was required mathematical calculations. When the warps are placed on the loom for border, 304 warps, and equal number of zari threads used to take. So for border total 608 threads were used. Out of these 608, 234 silk warps and 234 zari threads, total 448 threads were used for 'Pankha' Design. Besides this Pankha Nakshi for Bugadi 28 silk warp + 28 Zari warps, total 56 threads were used. For Muthada which is nearer to Bugadi total 64 threads (32+32), for Gom total 40 threads, were used (20+20) this way division of 608 warps is carried out.

Recently fly-shuttle pit looms are used to manufacture Paithani Sarees at Yeola and to facilitate speedy weaving of these numerous designs, the hand Jacquard has been introduced in which figure designs are woven by healds controlled by perforated Cards for each design, and for borders Dobby device is popular among the weavers. The cost of wooden handloom is about Rs.25,000/- and angled loom is Rs.20,000/-.
• **Parts of the Loom :-**

1. **Dholaje** : Two vertical wooden poles to which warp beam and cloth beam is attached.

2. **Cloth beam** : It is four sided wooden roller has groves and four holes in each groove. In holes 4 to 5 nails are fixed and steel rod is fixed. When the woven saree has to wound on beam, this rod is put into further hole and therefore the beam gets loose and saree is wound on cloth beam. This cloth beam is known 'Turai' in local language.

3. **Harness** : It is a wooden frame in which cotton heddles are tied. Now a days nylon heddles are used. Four harnesses are used. Hareness is termed as 'Tatfani'. Two warps are passed through a single heddle.

4. **Reed** : It is a wooden frame in which metal wires are fixed and having shuttle boxes from both sides. Reed is called as 'Fani'. 4 warps are passed through a dent.

5. **Hatty a** : Reed is fixed into wooden frame called as 'Hatty a'. With the help of this device reed can be pushed forward.

**Passing order of warps through harnesses :**

- 1st warp down the 1st heddle of 1st harness.
- 2nd warp above the 2nd heddle of 2nd harness.
- 3rd warp below the 3rd heddle of 3rd harness.
- 4th warp above the 4th heddle of 4th harness.

Lastly all 4 warps together are passed through a single dent of reed.

6. **Treadles** : Formation of shed is done with 2 treadles. Treadles are termed as 'Pawadi'. These treadles are tied to wooden rulers known as 'Pawasari'. Two Pawadis are joined to two Pawasaris which are connected to weights, two
harnesses are tied to another two harnesses. When one treadle is pressed two harnesses are raised up. Harnesses are raised up and down. Weights maintain the tension of the warps.

7. Wooden Rule: This rule is fixed at the backside of jacquard harness on the distance 1 to 11/2 feet long. This rule helps to lift the warp up as per necessity of the design. This rule is known as 'Dang'.

8. Warp Beam: It is a rounded wooden roller which has two metal plates of 1 1/4" circumference. This beam is connected to the wooden roller, with the help of wooden strips. At right hand side, it has saw-toothed wheel which helps to release warps and tighten them.

9. Shuttle: Shuttle used made from the horn of bovine animals or made of wood. Which is 14" long and 1 ½" in width. Wooden pirn or plastic pirn is used for weft known as 'Virkandi'.

10. Charakha: Cycle charkha is used to fill up these prins called as 'Rahat'.

11. Kakade/Tillis: Strips of cotton material is rolled and used as a small shuttle. The silk weft is wound on these kakades and used for insertion of multicolored weft in pallov motifs.

12. Mati: Woven Saree which is rolled on roller should remain stiffer with tension so this device is fixed from both sides infront of the reed.

13. Knots: When Pawaris are tied to Pawasaris with thick cord, knots are put called as 'Pende'.

Attitudes towards New Techniques in Dyeing and Designing among the Paithani Weavers of Yeola.
VIII) Process of production:

The basic weave of the Paithani sari is simple. It is tabby weave, but even the modern Jacquard has been incorporated. Multiple spindles are used to produce the linear designs. It is a fabric woven entirely on throw or fly shuttle pit loom. Its special dhoop chaav effect is achieved by bringing two different colored silk threads together in the process of a simple tabby weave. Paithani weave refers to the technique of weaving patterns with golden and silk threads in the tapestry technique, on the border and pallav of saris. It is possibly one of the early weaving techniques developed to create a range of intricate designs.

(http://www.tribuneindia.com).

The tapestry weave is distinguished from all other weaving techniques in having multiple weft threads which interlocks to produce the woven surface. In this technique multiple non-continuous weft in contrasting or complimentary colors are woven in plain weave, the yarns of different colors, interlocking at the change of colors, thus creating a solid color effect. It is similar to the central Asian technique of weaving, the 'Gelim'.

Linda Linton (1995) said that the borders are created with the interlocked weft technique either with colored silk or Zari. A wide band of supplementary warp, Zari (in a mat pattern) is woven upon the colored silk patterns are added as supplementary weft "Inlay" against a zari, usually in the form of flowers or creeping vines. The endpiece (Pallu) has fine silk warp threads are bleached and redyed with red color, so that the Zari derives a particularly prominent sheen. The weft threads are only of Zari, forming a golden ground upon which angular, brightly colored silk designs are woven in the interlocked weft technique, producing a tapestry effect.

Nowadays, to facilitate speedy weaving of these numerous designs, the hand Jacquard has been introduced, instead of Jala, in which figured designs are woven by healds controlled by perforated cards for each design. Dobby is used for weaving the borders so that variation in design can be easily adopted.
I) **Jacquard Shedding**

According to Grosicki Z. (1989), a Jacquard shedding motion is used in weaving designs that are beyond the scope of Dobby shedding. In practice, Jacquards are mainly used for large and intricate figure designs with several hundreds or even several thousands of ends working in different fashion and repeating upon a similar numbers picks. Weavers at Yeola presently using Jacquard mechanism for producing Kuyari butti on body of the sari and some part of the pallov. Mostly Jacquard of 120 hooks or 160 hooks is being used by them. Total 1560 mail eyes are used in Jacquard of 120 hooks. There are six rows of needles and 20 rows of hooks. To each needle 20 hooks are attached, so one draft consists of 120 hooks. Total 13 drafts are required to produce one row of butti design width wise on the sari. Therefore 120 hooks × 13 drafts = 1560 mail eyes.

If a single butti is to be woven on 38 hooks, two buttis require 76 hooks, so that the distance between two buttis will be of 22 hole on punch cards.

II) **Dobby Shedding**

According to Fox (1993) when a pattern is beyond the range of a tappet, either in the number of shafts to be manipulated or in the picks to a repeat of the pattern and is at the same time too small to be economically produced by a Jacquard, attachment is employed known as Dobby. In Yeola, doby of 24 levers is used for Narali Border. Narli motif is set on 7 levers and 3 repeats of Narals are produced on 21 levers. Remaining 3 levers are used for Karwati designs, this way total 24 levers are consumed. 3 heddles are tied to each lever, so 21 heddles are used for one repeat of Narali design.

2.3.5 Price Range and Marketing of Paithani:

The price of the Paithani starts from Rs.3000/- and can move upto Rs.1,50,000/-. The Paithani Sari is an entirely hand-woven item. Depending on the intricacy of the design, it takes anything from one month to year to weave. Paithani so it is expensive, explains Naina Jhaveri of Swayam Siddha, Bombay (http://www.nikharcreations.com/Paithani.htm)
The bangdimor Paithani costs per meter is US$850/- which will retail at US$ 1000 per meter. Starting price for a Paithani sari during the Peshwa days was Rs.75/- a princely sum indeed! The sari takes its own time to get woven, from two weeks to a year depending on the intricacy of the pattern. The cost can be anything from Rs.5000 to Rs.50,000. Saris worth over a lakh of rupees a piece are made to order.

Indicative cost and time taken for weaving of different design of Paithani are summerised below:-

- **Duration and Price for different designs of Paithani Saris:**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Design Type</th>
<th>Approximate days required for Weaving Paithani</th>
<th>Price (Rs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>With artificial Jar.</td>
</tr>
<tr>
<td>1.</td>
<td>Sadhi (Simple) Paithani</td>
<td>7</td>
<td>2500</td>
</tr>
<tr>
<td>2</td>
<td>Box</td>
<td>9</td>
<td>3700</td>
</tr>
<tr>
<td>3.</td>
<td>Kadiar</td>
<td>30.36</td>
<td>5000</td>
</tr>
<tr>
<td>4.</td>
<td>Double Munia</td>
<td>45</td>
<td>7500</td>
</tr>
<tr>
<td>5.</td>
<td>Tripple Munia</td>
<td>60</td>
<td>9500</td>
</tr>
<tr>
<td>6.</td>
<td>Popat (Parrot) Borcade</td>
<td>90</td>
<td>13500</td>
</tr>
<tr>
<td>7.</td>
<td>Mor (Peacock) Brocade</td>
<td>90</td>
<td>13500</td>
</tr>
<tr>
<td>8.</td>
<td>Baropanja (Palm)</td>
<td>90</td>
<td>7500</td>
</tr>
<tr>
<td>9.</td>
<td>Asavali Border</td>
<td>90</td>
<td>11500</td>
</tr>
<tr>
<td>10.</td>
<td>Sadha Lotus</td>
<td>120</td>
<td>-</td>
</tr>
<tr>
<td>11.</td>
<td>Zavra Lotus</td>
<td>180</td>
<td>-</td>
</tr>
</tbody>
</table>

Since the Weavers don't know the market and lack the unity to form co-operatives, they are still at the shopkeeper's mercy and are exploited by middlemen. No loan facilities, long electricity cuts and heavy taxation. A high capital was required for production but the returns came late and remained unpredictable. Meanwhile the
The market was flooded with textiles from Banaras, Calcutta and Kanchipurum. No supply, so no demand, no demand and therefore no supply. The government failed to understand that manufacturing means nothing without marketing.

The majority of the weavers from Yeola, do not market the products on their own. In most of the cases, they supply saris to the local traders who at times get the job done through these weavers by supplying them design, yarn, specifying the colors etc. some of the weavers weave the Paithani as per their own design, color etc., which are supplied to local traders. In this case the income to the weaver is slightly more than those weavers employed by the traders. The prices are affected according to the fluctuations in the market i.e. demand-supply position. Very few Weavers have established direct contacts with traders at other centers like Pune, Mumbai, Nagpur, Ahmedabad, Kolkata. Generally the credit is extended upto one month. The local traders who procure the Paithanis have contacts with major trading centers of the country and they supply saris to the wholesale traders as per their demands regarding the design, color, quality etc.

But in Paithan, Paithani weaving activity grew weaker. Only the old men and women kept the art alive. To preserve this Paithani culture in Paithan, Government established 'Paithani training and Production center' and 150 Paithanis are produced annually. All the paithanis produce at the center are marketed by the MSSIDC through its Trimurti Emporia at Mumbai and New Delhi. The wages of artisans are being constantly revised and the provision of other facilities like housing, medical care, annmunity for old weaver. The new paithani scheme evolved higher stipend was offered and the trainees were absorbed in Production Programme.

2.3.6 Care and Maintenance of Paithani:

The women folk, especially in India, have sentiments attached to their silk collection. It is hard to imagine her wardrobe without a few, it's not full, silk sarees or garments. But most often, it is seen that silk misses the much required...
keep and one day she would be surprised to find her most affectionate silk saree damaged. Silk yarn is basically a combination of sericin and fibrion which are proteinacious in nature and subject to decay. And that is why, the silk clothes need proper care to retain their luster even after years.

Generally the silk clothes are not used frequently and are kept folded for a long time. (Tapati S., 1995) Paithanis are made of silk so it requires proper care as per mentioned below:-

1. Paithanis should not be creased or folded too much.
2. It should not be kept in cardboard box or plastic bags, or paper as it damages the saree. During the paper making some chemicals are used and ink used for printing may harm and forms hole in saree.
3. The best way is to keep it is wrapped in a muslin cloth and stored in a wooden box or cupboard.
4. No perfume should be applied directly onto the sari, neither should menthol balls be packed with Paithani Sari, no iron pins should be used.
5. It should not come in contact with dampness or should not get wet, and should not used in moist weather.
6. Staining and high temperature ironing should be avoided as it can burn the yarns.
7. It should be dry cleaned, as the technique of washing it with a reetha nut solution lost.
8. Traditional thinking is that Paithani should be kept in sunlight in Hastha-Nakshtra atleast once in a year so that it can be prevented from moth and mildew and also its luster is regain.
9. Stains should be removed by the help of experts.
10. There is no need to polish the Zari often since it will weaken the sari. To add the sheen to zari border, keep it on wooden block and rub the cowaries on zari.
(http://www.mssidec.com)
2.4 TRAINING:
In present study the Research is focused on "Training" of Dyers and Weavers of Yeola and their change in 'Attitude' is evaluated. So Training plays very important role in this study.

Conceptualized training as a means to bring about a continuous improvement in the quality of work performed, it would equip them with necessary knowledge, skill, abilities and attitude to perform their jobs.

Lynton R. P. and Pareek U. (1978) described "Training then comes to consist largely of well organized opportunities for participants to acquire, necessary understanding and skills." The training not only means, teaching methods and teaching aids, but the entire training process includes a long list of various important steps.

Pareek has concisely described all the steps in 3 phases -
1. Pre-training phase.
2. Training phase.
3. Post-training phase.

Singh R.P. (2000), opined that there are so many components, which are essential for organizing an effective training programme. The most important and essential components for organizing an effective training programme are :-

- Training need assessment.
- Training objectives.
- Course planning and preparation
- Course design.
- Training methods.
- Monitoring and evaluation

All the above components have greater contribution in organizing a training programme successfully and effectively. All these components are considered to make the trainings successful by the Researcher in the present study.
2.4.1 Training Need Assessment:
Training need assessment is a means to find out who needs training and of what kind? Training Programs were generally designed by trainers based on their own experience, interests and judgements rather than through a systematic training need assessment. In this study, training programs were related to the profession of trainees and even more to the needs of the dyers and weavers community. While assessing training needs, two basic questions are to be considered i.e. (1) who are to be trained and (2) what are their training needs?

The answer of the first question proclaims about the sample i.e. Dyers and Weavers and for seeking answer of the second question following procedure was applied. The Questionnaire method was practiced to ascertain the relative importance of tasks. This tool was used for need analysis and responses in the questionnaire were evaluated and summarized to identify the training needs. In this Research, 120 respondents were categorized into two groups i.e. one group was interested only in dyeing and other group was interested in both dyeing and designing. In some cases interview method was used, a number of prepared questions were used in interviews which clearly identifies the need of the individuals and other useful information can also be gained in the process.

As per their interest and need the groups were made for training.

2.4.2 Training Programme Planning and Preparation:
The planning and preparation has been divided into 3 parts, as given below:
A) Pre-course planning.
B) Infrastructure for training.
C) Physical facilities for training.

A) Pre-Course Planning:
For organizing an effective training Program, a large number of steps are essential. Since a training course includes a large number of interlocking activities, a good planning is very essential for conducting an effective training
course. Some of the important activities for planning a course are mentioned below.

- Developing Course objectives on the basis of assessed training needs.
- Developing a course design (day-to-day program)
- Deciding training methodology to be adopted during the training course.
- Selection of place.
- Preparation of course information brochure.
- Preparation of handouts / reading material for trainees.
- Preparation of Audio-Visual Aids / Teaching Aids for Training.
- Development of Training program evaluation performance.
- Invitation to guests for inaugurate and concluding the course.
- Purchasing of stationary and other material required for conducting training-course.
- Getting funds.

In the present study, short term training programmes were formulated, considering the need of trainees and discussion with the experts. Training programs in dyeing and designing were finalized, for improving the quality and appearance of saree. It was observed that there was a great need to train them in new techniques in dyeing and designing, as they could not satisfy the customer regarding colorfastness and change the designs easily as they are using traditional technique which is very time consuming.

- **Developing Training Program Objectives:**

  Following objectives were formed for three different training programs.
  
  1. To make them aware, with the correct and scientific method of degumming and dyeing.
  2. To expose them with suitable dyes and proper method of application in dyeing.
  3. To acquaint them with the method of designing for dobbey and jacquard.
4. To enable them to adopt new designs over traditional one.
5. To make them able to design various weaves.

B) Infrastructure For Training:
The infrastructure plays a vital role in organizing quality training. Unless there are adequate building, adequate funds, a successful training program cannot be organized. The following infrastructure, is essentially required for organizing an effective training program.

a. Budget-Sufficient budget provision should be made and sufficient funds be arranged well in advance for meeting all the training material.

This research, was self financed and the funds arranged for all three training programs were by Researcher.

b. Building - A Raghoji Naik Hall, Enzochem High School, Yeola was used for conducting all three training programs

c. Physical facilities - A large number of small items like books, designs, graph Papers, pencils, sketch pens, erasers, rulers, shadecard books, gas-stove, utensils for dyeing, were arranged by Researcher.

d. Acid Dyes, Natural dyes and chemicals were sponsored by Weavers Service Center, Mumbai.

2.4.2.1 Training Evaluation:
Any evaluation and measurement of training and development can serve two important objectives.

- The impact of training, In other words, assessing whether the training has resulted in better performance by the trainees and brought about a change in attitude.
- To get a feedback about the relevance and usefulness of the training for those for whom it was intended.
Whether the first objective of measuring the impact of training is concerned, it is very difficult to do that in the short term. The trainees may come from different environments with different value systems. Therefore, it may be very difficult to measure the long term impact of training. Moreover, the impact of any training can be known only in the course of time and not immediately. The implementation of any new idea depends upon a number of factors operating in an organization. A training programme is only one such factor.

On the other hand, it may even lead to frustration among the trainees, if the training philosophy and the philosophy of the organization are not in harmony.

Evaluation also presents a problem with regard to objectives of both the training program and of the trainees. An objective evaluation system must be linked with the goals of the program.

Until there is a congruity of expectations, evaluation of a training programme course is very important not only from the point of improving training but also to help the participants improvement and impact of training on the participant to work more effectively.

- **Purpose of Training Evaluation:**
  - To find out the extent to which the objectives of a course / program have been achieved or are being achieved.
  - To examine if the course contents are relevant and fulfilling the objectives.
  - To assess the efficacy of the training methods and to improve the same.
  - To evaluate general atmosphere in the class, physical arrangements, duration of training etc.
  - To study the entire program or a part of it from the cost effectiveness point of view.
  - To see that the instructions are conducted in a manner consistent with the system as it is planned and designed.

There are many components of a training programme. An evaluation aims to determine the effectiveness of the training.
• **Types of Evaluation:**

**Pre-course Evaluation:**

Evaluation conducted at the entry point in the course is known as pre-course evaluation. Questions regarding the knowledge and skills could be listed and trainees asked to answer so that the trainees know the level of knowledge and skills they already possess.

Trainees should also list their expectations in the order priority.

Areas in which the trainees would like to learn more or further improve their skills should also be indicated at the beginning to improve programmes. Pre-course evaluation helps in planning the course to meet the specific needs of trainees and include such areas that help them to perform better in their jobs. But the problem here is that the information collected at pre-course evaluation may not be very reliable. Evaluation of a program towards the end can at best be "reaction oriented" and not "Learner oriented". Therefore evaluation should be done weekly in case of long-term training programs and daily in case of short term programmes.

The concurrent evaluation can be done in the following training situation.

Each participant is asked to give his own views through a schedule questionnaire filled during or at the end of each course.

Each trainee is asked to give his / her views through a schedule or a questionnaire in writing at the end of the whole course.

Discussion takes place between representatives of the trainees.

There is an open discussion on the assessment of the program.

• **Post-Training Evaluation:**

After training, the participant goes back to his work situation. He is well equipped with new knowledge, new aptitudes and skills. His performance in the practical situations, depends upon how effectively he has been trained and the support he gets to meet the needs of working environments. An attempt is made to assess the impact of the training. The post-course evaluation may be done by filling the evaluation sheets at the end of the course.
The post-training evaluation is of two kinds - one which takes place immediately on the termination of the course and the other is which conducted after the trainees have been placed in their field situation. In such evaluations, the usefulness or efficacy of the trainees in field situation is assessed. A trainer should have a balanced approach. He should be able to accept the fibers and mistakes and the basic belief that there is always try for further improvements in the training programme. Investigator tried to implement both kinds of post training evaluation under this research study.

A training program as a whole can be ultimately evaluated by the performance and impact of ex-trainees after the training.

Feedback has developed the training institutions to improve -

a) Knowledge base.
b) Imparting of skills.
c) Use of methods.
d) Use of aids.

- **Questionnaire as a tool of evaluation:**

  Apart from evaluation tools such as informal discussion, observation and interview, the questionnaire is the most important tool.

  Some are the advantages and drawbacks of using the questionnaire:

  ¬ The data obtained by using observation and discussions was based by the personal judgement of the researchers. But the learning scores gave a completely different picture altogether. Thus by using a questionnair, it is able to assess the trainee more accurately.

  ¬ The exercise of questionnaire formulation by the trainers itself resulted in the improvement of training inputs.

  ¬ The response and learning both improved by using and constantly modifying the questionnaire from course to course.

  For example, the first attempt at framing the pre-training questionnaire resulted in a very generic one with open-ended question. Gradually the questionnaire
can be made more specific which resulted to examine the own needs of trainees. The follow up questionnaire increase the interaction between trainer and trainees.

2.5 ATTITUDE:
As this Research is concentrated on attitude, to know the various components affecting the attitude, method of measuring the attitude is very important which is discussed in this chapter.

Attitude are not inborn traits. We acquire them through social interaction. The term is defined by Freeman as "a dispositional persons, objects or ideas in a consistant manner, which has been learned and has become one's typical made of response." It is a tendency to react in a certain way toward a designated class of stimuli. These are the ways in which an individual thinks, feels and acts. Attitudes are not observable. They can only be inferred from overt behavior. We may, therefore, look upon attitudes as "hypothetical constructs" are expressions of one's attitudes. If one's opinion and action do not match we term it as 'hypocrisy'. Overt behaviour may not always provide a reliable index of attitude stated by Fletcher M. R., 1981.

Attitude represent feelings and beliefs of individuals toward others. Attitudes affect motivation, satisfaction and job commitment. Negative attitudes need to be converted into positive attitudes.

Changing negative attitudes is difficult because
(i) They refuse to change
(ii) They have prior commitments and
(iii) Information needed to change attitudes may not be sufficient. Nevertheless, attitudes must be changed so that employees feel committed to the organization, are motivated for better performance and derive satisfaction from their jobs and work environment mentioned Dandpani S. and Santhanam S. (2000).

Attitude ranges from Positive extreme to Negative extreme though a Neutral Zone. This would result in "Approach-behaviour" and "Avoidance-behaviour".
New comb Says: "An attitude toward a specified object lies at some point on a single continuum like that of a thermometer running from large negative values to a zero point and becoming increasing positive".

2.5.1 Components of Attitude:

Broadly viewed attitudes are reflected in behaviour. Behaviour has three components. The cognitive component or element consists of knowledge and beliefs. One's attitude depends upon knowledge. Knowledge is logical and rational.

The second component of attitude, namely 'Feeling' element. Attitude always arouses one's feeling and emotions. We like some persons and we hate some others. These are based on our feelings. Feelings that unite an disintegrate people are termed 'Positive' while those that divide and disintegrate people are termed 'Negative'.

Both 'knowledge' and 'Feeling' urge an individual to 'act'. This Action-tendency in an attitude enables others to infer the feelings and understanding. It is rather difficult for an individual to act in a manner contrary to his feelings and understanding. It is rather difficult for an individual to feelings and understanding. Some believe that the action component of an attitude affects the feelings - component. It is difficult to say which is the cause and which is the effect.

Attitudes are multi-dimensional. They are susceptible to change or modification. Until one experiences a need for change it remains specific (Herman J. 1984)

2.5.2 Measuring Attitudes:

The task of measuring attitudes is not a simple one. To begin with, the concept of attitude, is a creation a construct. As such, it is a tool that serves the human need to see order and consistency in what people say, think and do, so that given
certain behaviours, predictions can be made about future behaviours. An attitude is not something we can examine and measure in the same way we can examine the cells of a person's skin or measure the rate of her heartbeat. We can only infer that a person has attitudes by her words and actions. When the attitudes is being measured, the following precautions proceed in mind:

When the attitude is being measured, one must rely on inference, since it is impossible to measure attitudes directly. Behaviours, beliefs and feelings will not always match, even when one correctly assume that person reflect a single attitude, so to focus on only one manifestation of an attitude may tend to distort the picture of the situation and misled us. There is no guarantee that the attitude want to assess will "Stand Still" long enough for a one-time measurement to be reliable. A volatile or fluctuating attitude cannot be revealed by information gathered on one occasion. When the certain attitudes are to be studied. It can be done without universal agreement on their nature.

Attitude measurement for program evaluation generally calls for assessment of the attitudes of a group of people. Though the measures one use must be sensitive to the attitudes you are attempting to measure, they will not need to precision of measurement that is essential for making predictions about individuals. Before making any decision about how to collect attitude information, the attitude objectives should be examine to do the job of evaluation of attitude objectives.

But essential preliminary questions are planned when somebody is planning to measure attitudes either because of the audience for one's evaluation will want to know about certain attitudes or because the program you are evaluating is concerned with raised is how important are the attitude objectives? Are they the major program objectives? Answer to this question will determine the quantity and variety of information to the gathered.

The another question, Are the attitude objectives specific-narrowly defined and...
described in detail, or are they general broadly defined? one should make sure that the objectives are clear and described in detail which will show the impact of program on attitudes. Can you realistically expect that the attitude objectives will have been achieved by the time you plan to do the measuring? The answer to this question will determine to what degree you must focus on the processes (activities, materials) of the program in evaluation as opposed to the results or outcomes of the program.

Once you have clarified your attitude goals or objectives, you can begin to consider the types of information you will need and decide on the best approach for obtaining total information.

Will have to make a decision at least about the kinds of instruments that will best serve the measurement needs. The main approach is 'Self-Report', includes all procedures by which a person can be asked to report on his or her own attitudes. The information can be provided orally through the use of interviews, surveys, or polls; it can be provided in written form through questionnaires, attitude rating scales, logs, journals or diaries.

When you use self report procedure, you assume that the people whose attitudes you are assessing have the self-awareness to recognize their own beliefs and feelings and the ability to articulate them. You also assume that they have no reason to lie about their attitudes. Self-reported procedures represent the most direct type of attitude assessment and should probably be employed. Unless you have reason to believe that the people whose attitudes you are investigating are unable or unwilling to provide the necessary information.

The Questionnaire is the other method for evaluation of attitude. People do not hesitate and quote the answers freely so questionnaires and Rating scales are also effective for assessing the attitude. In the present study, both types of tools are used effectively. Questionnaires are used in the form of Evaluation Proformas to test the attitude and acceptance of new technique and Rating Scales are used to test Knowledge, Skill, Attitude and Satisfaction.
2.6 STUDIES CONDUCTED:

2.6.1 Studies Conducted on Silk Degumming:

In the experimental study conducted by Gulrajani M. L. et al., (1991), a plain woven mulberry silk fabric was used and three acid dyes were used. Prior to dyeing the silk fabric was degummed in a 4 gl. Solution of a non-ionic detergent (Lissapol N) at a temp. of 80-850c for one hour keeping a material to liquor ratio of 1:50 and a P'H of 7.5. It was concluded that dye is not fixed strongly to the fiber at a lower temperature and time of dyeing.

The author Denter, Joachim schlenter, Johannes Trappe of Fachhochschule Niederrhein, Krefeld describe their studies of the influence of swelling treatment with formic acid on the dye absorption of silk. They found it necessary to determine conditions to be provided for such pretreatments in order to decrease the dye absorption of the goods. An experimental study was carried out on material of mulberry silk. In this study, Pretreatment was done with formic acid at room temperature and treatment lasted 60 seconds. The samples were dyed in beam dyeing apparatus.

It has been observed that the dye absorption of these samples were higher than the untreated silk samples. It was also indicated that acid pretreatment does not affect the strength and elongation of the material, only the shrinkage increased slightly. Finally the observation might also be made that it was found possible to demonstrated that the dye absorbing power and the dyeing rate achieved during the dyeing of silk can be increased significantly by pretreatment of the material with formic acid without running the risk of detrimentally affecting the service properties of the fabric.

As far as silk degumming is concerned, Hadimani V. V., et al., (1998) observed in their experiments that all the methods available for degumming, the combination of soap and soda has been the most popular method employed in
India and elsewhere. According to literature higher quantities of good quality soap are suggested to be used for degumming even to the extent of 50% on the weight of the material and soap degumming require. Hence in this study, degumming soap is used to achieve a good quality of silk.

After making a survey of wet processing activities in Karnataka and some places in Tamil Nadu, it was revealed that the recipe used for degumming varies to a great extent. The processors have modified the process according to their own needs and conveniences without giving the needed attention to the quality of the degummed product. Hence, it was felt that there is a need for optimizing the parameters of soap, soda, method of degumming keeping in view the degumming loss, yarn and fabric handle and strength of the degummed yarns and fabrics.

Gulrajani M.L. et al., (1999) in their study, revealed that very few studies have been conducted on waxes and oils present in silk, their quantities composition, properties, exact quantities and methods of removal. The complete elimination of these waxy substance is very essential. It is believed that a fraction of these waxes in saponifiable and therefore can be removed with alkali or soap treatment, but these methods are believed to be harmful to fibroin. For this purpose, a special class of enzymes called lipases, which are specialized in hydrolyzing waxes into fatty acids and alcohols seems to be an appropriate answer.

Unsuitable water can do plenty of harm during wet processing of silk, Swamy P. and Vijayendra M. (1999) suggested a method to soften water that can also enhance the inherent qualities of silk. Water is an essential raw material for wet processing of silk. The use of pure water is essential for degumming, bleaching, dyeing and printing processes. The processing chemicals viz, soap, soda, hydrose, dyestuff’s and other chemicals are sensitive to hardness of water. The hardness causing salts readily react with degumming chemicals like soap, soda forming insoluble calcium and magnesium precipitations, making the chemicals insufficient for degumming and
bleaching activity. They also get deposited on the surface of the fabric or yarn, resulting in negative effect on the shades of dyeing.

From these studies it has been observed that, silk degumming is very essential to achieve a good quality dyeing so this aspect is considered in this study.

2.6.2 Studies Conducted on Silk Dyeing:

Silk is most commonly dyed with acid dyes. However, there are wide variations in fastness properties of acid dyes depending upon a number of factors like chemical constitution, molecular weight, diffusion characteristic, method of application etc. Gulrajani M. L. et al., (1993) carried out the study on effect of dye-fixing agents on the fastness of acid dyed silk. They concluded that the fastness of these dyes can be improved by an after treatment with dye-fixing agents though sometimes light fastness is affected.

Processing of silk is completely different from processing of other textiles. According to Shenai V. A. (1974), although various types of dyes are used for dyeing of silk, acid and direct dyes are popular in use and have excellent affinity for silk. Direct dyes are similar to acid dyes, but have planner structures, require a high temperature which affects the morphology of silk fiber.

Venugopal B. R. (1994) have investigated that the combined degumming, bleaching and dyeing in single bath system save the cost and time but dyestuff remains in the bath and dyed silk exhibits poor fastness properties and use of hydrosulphite of soda also affects the fibroin structure of silk. The hardness of water also affects the degumming, bleaching and dyeing process because excess quantity of soda ash, hydrosulphite of soda and soap is required. This deteriorates the silk fiber. In advanced countries neutral soaps namely marscilles soaps or olien soaps are used for degumming process. The other methods also include the proteolytic enzyme treatment and use of acid for degumming of silk.
Venkidusamy P. and Ramasamy K. (1994), pointed out that silk dyed with a redox system shows higher dyeability. As silk exhibits both acidic and basic qualities, it has affinity both for acid and basic dyes. Acid dyes have excellent affinity for silk, they are best dyed from an acidic dye bath at boil. However at boil easily damages silk, deteriorating its qualities.

The energy required for dyeing can be minimised either by lowering the dyeing temperature by using dye bath additives or by giving some pretreatments to the samples. Dyeing at reduced temperature with redox systems has drawn the attention of many investigators. In this study, the effect of redox system on dyeability of domesticated silk fabrics was invested. Redox system based on potassium peroxidisuphate as oxidant and glucose as reductant were incorporated in the dyeing bath.

Gulrajani M. L. (1994), stated that silk is generally dyed with acid and metal complex dyes in small lots at boil using appropriate machines. The dyer starts dyeing a light shade of yellow and ends the days with the dyeing of black shade from the same bath without draining it in between dyeings and dyeing is carried out for 15-20 minutes such dyeings can be easily discharged but have poor washing fastness. He also suggested that the dyeings of silk with reactive dyes should be expanded as these dyes have good overall fastness properties and full range of dischargable colors.

Vijayendra M. K. (1994) reported that the wet processing methods for silk adopted in our country are age old conventional methods. Silk is generally dyed with direct, acid and basic dyestuffs after degumming and bleaching. The dyer should know the Color Index Number of the dyes and instead of cost of the dyestuffs only the fastness properties, brilliancy, stability, purity, alongwith chemicals / auxiliaries which are also used in dyeing should be taken into consideration. There are four methods for dyeing depending upon the chemicals / auxiliaries that are to be used and in general required quantity of Gluaber's salt along with acetic acid, formic acid or sulphuric acid are used.
The important thing is to obtain a clear solution of the dye stuff using boiling water with continuous stirring. The dyeing is started at 40°C to 60°C and temperature is slowly raised to near boil and the dyeing is continued for 45-90 minutes. Most of the small dye houses employ copper vessels, but it should be replaced by industrial stainless steel. The degumming and dyeing is carried out for a maximum of 20 minutes hence in reality instead of economizing the process, this results in poor fastness properties and wastage of dye stuffs. The use of common salt is also to be avoided as it affects the luster and strength of the silk. He also pointed out that our exporters will have to ensure Eco-friendly silk fabrics using Eco-friendly dyes and chemicals so as to able to meet the international ecological challenges and buyers specifications.

Silk is generally dyed with acid and metal complex dyes in small lots at boil using appropriate machines. The dyer starts dyeing a light shade of yellow and ends the day with the dyeing of black shade from the same bath without draining it in between dyeings and the dyeing is carried out for 15-20 minutes. Such dyeing can be easily discharge but have poor washing fastness concluded by Gulrajani M. L. (1994).

In the case of direct dye the absorption by silk fiber decreases with the increase of dye concentration. But with acid dyes, the absorption increases, pin-points a study carried out by Farouqui F. I. et al., (1995). Dye absorption by silk fiber decreases with the increase of dye concentration for direct dyes. But in case of acid dyes, the absorption of dye increase with the increase of dye concentration.

Grover Ekta and Manisha Gahlot (2001) concluded that, silk has good affinity for various dyes and is also known for brilliance of dyed colors. Most silk garments are preferred to be dry-cleaned for best results due to the fear of color loss in laundering, as some colors (turquoise blue, magenta etc.) are most susceptible to bleeding or loss of dyestuffs into the washing water, as compared to others. But dry-cleaning alone is not a permanent remedy for this problem. Therefore, in dyeing of silk with these dyestuffs, the most essential requisite is the fastness of the dye. So Researcher had...
tried to give knowledge to Dyers and Weavers, regarding dyeing of silk with acid dye which was not in practice.

Silk is an animal fiber of delicate and fine texture, which needs special care in laundering. Silk does not shrink and felt or loose its shape, as the silk fibers are long and smooth. Silk on reaction with alkali and heat, harden the texture of the fiber and discolor it. Too much friction weakens the strength of the material. Further, silk fiber under wet conditions becomes highly ductile and loses its strength by nearly 40%. A few good consumers follow systematic dry-cleaning while most of them go for classical "hand washing" using any available soap/detergent.

The most important characteristic of dry-cleaning fluids is that they do not soften fibers as water does, nor do they cause wrinkling, shrinkage or bleeding of dyestuffs, as that of cleansing in water. Perchloro-ethylene is the solvent used in 80% of dry cleaning plants while petroleum ether is used by few drycleaners. Dry cleaning has proven itself to be an efficient, affordable and cost effective process for cleaning a wide variety of fabrics. However it is not that popular in the rural and semi urban areas.

Nadiger G. S., et al. (2003) investigated in their study that color value of silk is hampered much after hot washing with alkaline nature of detergent. The acidic detergent does not affect the color value of dyed silk considerably after cold wash. This may be due to its mild nature and also acidic pH. When dry cleaning of the silk perchloroethylene and petroleum ether was carried out, it is found that color strength of silk is not affected and very less bleeding of color occurred.

2.6.3 Studies Conducted on Zari:
Padmavathy A. and Jacob Mary (1992) compared the performance of three types of Zari in her study, viz., real, half fine and powder zari in terms of aesthetic characteristic after subjecting them dry cleaning. The samples were laundered by home laundering procedure as well as by dry cleaning. A rating
scale was used to evaluate the characteristics like luster, color, texture, puckers add overall appearance of the three types of zari. It was concluded that home laundering using reeta nut solution is suitable for all the three types of zari. Dry cleaning is not advisable particularly for powder zari as it discolors the zari.

2.6.4 Studies Conducted on Handloom Weaving:

Hand weaving has been the basic activity of human society since time immemorial in which utility and aesthetics are blended together. Handloom industry is the largest unorganized sector and constitutes an integral part of the rural life of the country. Despite strong competitions from mill-made textiles, handloom fabrics are still in demand to some extent primarily because of the popular patronage of the women folk. In this dynamic era, fast changes in fashion trend have led to increasing demand for handloom products from even the foreigners and at times the demand is virtually more than that of the supply. In pursuance of the 20-point Economic Programme the Andhra Pradesh Government has taken several measures to develop the industry for achieving the twin objectives of providing steady and sustained employment to the handloom Weavers, ensuring lucrative income and increased production of cloth.

Sahu (1969) said that in the olden days Orissa has a flourishing trade with the outside world and textile goods were among the chief items of export. In the survey all the sample units reported that they were working in their own premises. However this is not indicative of their sound economic conditions. Bythell (1969) suggested that, it may not be correct to infer that the nature of the work does not require separate work place. Hand weaving when carried on in the home, contributes nothing either to industrial efficiency or to domestic comfort.

Eberhard and Hakushah (1970) conducted a study on simple weft ikat, from south Gujarat India. The study was specifically undertaken to know socio
economic conditions of the Weavers working procedures which includes warp and weft yarn preparation, dyeing of the yarns, looms used and the method of weaving followed. Form and function of the Ikat textiles was also studied. Findings revealed that 'Telia Rumals' of Chirala is a double Ikat tie-dye fabric always woven in 43" x 43" size and is a dyeing craft, which is due to lack of consumers support for this product, and as a result weaving community is poor. The fishermen of Bombay are the only regular consumers in the country. Due to this uncertainty of the market demand the Weavers are often in a position where their stock is to be accumulated for long periods. Today the weavers have started producing fabrics which do not employ the ikat technique and which bears no link with the traditional items.

Bhagyam and Raji (1971) conducted a study to understand the preferences of selected home makers for coimbatore handloom sarees. It was found out that amount colors, blue seemed to be favorite for most of the homemakers. Green and Red came next in the order of their preference. Light and dark shades were preferred by many but bright and dull colors were acceptable only to few homemakers.

The traditional kodi borders with intricate designs were liked by homemakers of all age groups. Cotton-jari and Cotton, art silk and cotton jari and art silk were the combinations of yarns preferred for the borders. Homemakers of all age groups showed their preference mainly to cotton for the body of coimbatore handloom sarees because of the desirable qualities.

The main problem felt by them were the prices not being standardized, lack of salesmanship and lack of attractive designs. Same problem is facing by the Paithani Weavers of Yeola.

Mohanty and Krishna (1974) conducted a study on Ikat fabrics of orissa and Andhra Pradesh. Findings revealed that in orissa Meher Weavers who wove 'ikat' fabrics were thought to be migrated from Garh Sambav in North India near Delhi. The technique of tie and dye on cotton yarn developed in Bolangir and Sambalpur districts
due to local support and lack of easy accessibility of the area to the traders of machine manufactured cloth. Tie and dye on cotton was more common in Sambalpur and Bolangir districts, while that on silk in Naupatna-Cuttack district. Tie and dye technique on silk was in existence in Nuapatna area in the 18th century, while that on cotton started in 20th century. In Andhra Pradesh 'ikat' technique attained a high degree of skill by Padmasalis and Devangana Weavers.

In a study of Raji and Nirmala Devi (1976), it was found that with regard to properties like fabric count, fabric weight, breaking strength, bursting strength, abrasion resistance, the mill woven fabrics showed better results when compared to the Handloom fabrics. This may be due to the closeness of yarns in millwoven fabrics. The Handloom fabric showed less strength perhaps because of the processing factors involved in the weft preparation and the difference in the fabric count. So it is recommended that more case should be taken in the preparation of weft yarn for hand woven fabrics. It was concluded that millwoven was better than the hand-woven.

In the study of Vimala and Krishnabai (1977) on "Developing and Weaving Jacquard Designs" It was evident that 84 percent of the students showed deep appreciation for Handloom sarees with cotton ranking first due to its dignified look and low cost. Mixture of cotton and rayon was preferred since it is comparatively cheaper than mixture of silk and polyester. Jacquard woven designs were accorded high priority by majority of the students. All of them expected the border and pallov to be in larger form, which shows the importance of Jacquard woven designs.

Vasantha and Raji (1977) observed in their study that 60 percent of the families had 4 to 6 members in the family and 40% had 1 to 3 members in the family. 76 percent of the Weavers had elementary education. 93 percent of them belonged to the low income level. The study revealed that approx. 90 percent of the weavers possessed Plain cum dobby loom and on an average they were weaving 4 to 6 meters of cloth per day. But there earnings were very poor. 30 percent of them tendered their
dissatisfaction with the wages, they were receiving. 17 percent only of them formulated the designs by themselves and rest got the design from the co-operative societies and manufacturers. It seems that all over India, the picture of socio economic status of Weavers is more or less same. In the present study, the Researcher had tried to study the socio economic status of Dyers and Weavers of Yeola.

From the various studies it seems that the Weavers were receiving assistance from their family members. Sizing, winding weft yarn where done at home by majority of the families. Dyeing and reeling the warp yarns were not done at home. While commenting on the factors affecting weaving process it was mentioned that poor yarn quality, climatic conditions, numbers of members assisting, sickness of the Weaver, and efficiency of skill were the major factors which affected weaving.

Unfortunately none of the Weavers were members of Weavers Association but they were aware of the new economic program and the changes or the rapid improvement taking place in handloom sector. Same situation was found with Yeola Weavers, but they are trying to come together and trying to form association.

Vadgama U. and Marathe S. (1981) conducted study on the origin and history of Orissa 'Ikkat' Saris, to study the background information of the tiers, Dyers and Weavers; to know about the yarns, loom, tieing and dyeing process and weaving techniques to study the traditional motifs of the saris, to that used today, and the reason that brought the change to know the marketing of the saris. For weaving 'Ikkat' saris cotton as well as silk yarns of different count and deniers were used. Silk yarns used were of two types, mulberry and Tassar Silk. Cotton yarns were of 20₅ to 120₅ count while silk yarns were of 16/18 and 20/22 denier. In the places visited the classes of dyes used for dyeing were vat, Napthol, Acid and Reactive.

Weavers used the primitive pit looms. Generally pit looms were found installed inside the houses or verandah on the kuccha floor. The pits were 2 to 3 feet wide and 1½ ft. deep. The minimum number of looms owned was one and maximum was two.
The weaving is always done in plain weave. Saris produced in Orissa were of three general type, each type having woven design borders and pallovs, introduced with an extra warp or weft yarn.

Field survey was conducted in Orissa State which according to census of India (1981) covers an area of 1,55,707 sq.km. Another finding of the field survey is that the Weaver are being encouraged to switch over to fly-shuttle frame looms with 75% subsidy and 25% loan of the total cost of the loom. Some Weavers have availed of the facility but in some cases it was found that such frame looms lie idle and have even been dismantled and the Weavers are using their own old pit looms. However these results are in line with the findings of Boothalingam M. (1981) and Anitha V. (1988). The socio economic condition of Kanpur textile workers studied by Lohani B. K.(1988). It was indicated that they are nearly equally divided into literates and illiterates. The average size of a workers family is large. Majority of workers make their own arrangement for living accomodations.

It was found out by Jakhotiya (1987), Sundari and Manimekalai (1989) in their studies that majority of the Weavers expressed that lack of demand and modern tools and shortage of finance were the major problems of low productivity. The independent Weavers opined that shortage of finance was the major problems whereas, lack of demand and non availability of modern tools were cited as problems by the Weavers working for master Weavers and in co-operative societies, respectively. The Weavers working for master Weavers and co-operative societies opined that to obtain financial assistance from the bank influence was very much needed. Inability to provide security was another problem. This may be due to the reason that majority of the Weavers were illiterates, belonging to middle income group who did not get employment throughout the year. Hence, they were forced to take financial assistance from sources other bank. This finding is in agreement with the studies conducted by Rao C. and Prashant (1989) and Perumal (1991).
The Weavers expressed that non-profitable labor and lack of demand for the products were the major problem faced by them. The independent Weavers opined that lack of demand for the handloom products and the Master Weavers opined that non-profitable was the major problem of merchandising handloom goods are mainly due to lack demand which is in turn affected because of lack of publicity and advertisements, non-profitable labor, low income of the Weavers, their ignorance and illiteracy, low productivity, lack of financial facilities, indebtedness competition from power looms and inadequate aid from the Government for the upliftment of the handloom sector. Hence, there is a great need to improve and expand the marketing facilities of the handloom products.

Shashikala S. and Shekar P. (1991) conducted a study on the status of Weavers from Melkote which is one of the main traditional silk weaving center of Karnataka, 48 kms. away from Mysore. Not more than two decades ago, the Melkote cotton Dhotis with red color pure silk border. But none of the Weavers are, at present weaving this type of fabric. It has been replaced by 100% cotton dhotis.

At present in Melkote, on an average, a family owns one to two looms, the maximum extending upto four. Only 200 handloom are operational and manufacturing silk sarees like 'kanchi' type and imitation of kancheepurm fabrics, cotton fabrics and cotton dhotis. The type of fabric woven depends mainly on the organizations like Karnataka Handloom Development Corporation (KHDC) and Mysore Provincial society or the Master Weavers, for raw materials supply and for marketing of the finished product.

Very often the income earned has to be shared between a large number of people who are part of a joint family. Even though the services of the family members are required and are rendered to the weaving activity, it is not completely utilized owing mainly to two factors, a) Shortage of raw material supply and b) space constraint for adding more number of loom.
Considering the fact that weaving is a time-consuming activity, the Weavers hire themselves out as agricultural laborers. Lack of alternative employment opportunities in Melkote has also necessitated their dependency on weaving. The Weavers have been unable to seek employment outside owing to the distance from the city center. Also their literacy level which is not highly appreciable has restrained them from pursuing more remunerative activities.

The younger generation Weavers are found migrating to other areas, in search of other pursuits, at times connected with and at times different from weaving activities. With the increase in the trend of migration, which is supported by the older generation Weavers, hardly any youngsters, who are continuing their inherited occupation, are found in Melkote.

In the present study, the socio economic status of the Dyers and Weavers of Yeola has been studied, but the results are entirely different.

In the survey of Varanasi silk Industry, Pathak S. et al., (1993) reported that Varanasi, is an old city with an approximate number of 60,000 handlooms and 8000 powerlooms working on silk has a unique distinction for its brocade designs. Weaving industry is divided into three heads -
1. Silk weaving under small weavers.
2. Silk weaving under private societies.
3. Silk weaving under apex varieties.

Handlooms have been preferred due to the domestic demand for traditional designs for which handlooms were suited and also because of low initial investment and traditional practices. Raw silk received in hank form, it is degummed in Solution containing soap and soda. Quantity of soap and soda vary from processor to processor. Dugmmed silk hanks are taken for dyeing. Natural dyes used by the forefathers of the weavers were gradually replaced by synthetic dyes. Today for most of the color requisites, acid dyes are being used. However natural dyes are sometimes

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used. Zari silk industry of Varanasi has its own glorious past. Pure gold zari, silver coated copper and imitation zari is manufactured in Varanasi.

Weaving is done by three persons. The zoria (weaving assistant) is seated below the looms and raise the selected threads of silk warp. On these, the yarn is laid with shuttles having gold, silver and silk thread by the weaver. The master weaver is assisted by zoria. The warp thread is then lowered and the weft is beaten up. Final produce is obtained after incorporating such complicated weaving techniques which speaks about all its story of production.

General products of Varanasi silk industry with loom accessories required for them are as follows.

i. **Brocade**: Ground is kept plain or satin, designs appears on the face of the fabric and easily distinguishable from ground. Pit loom, throw shuttle and jacquard is used.

ii. **Jamavar Designs**: Brocade fabric with plain or twill ground without use of Zari. Loom used is pit tom, jacquard, jala.

iii. **Kinkhab**: It is a rich brocade. Pitloom with jala technique and throw shuttle arrangement are used.

iv. **Ganga Jamuna, Shikargah**: Pitloom, throw shuttle and jacquard are used.

v. **Tanchoi**: Word literally means body touching. It is a typical and heavy looking design.

The quality of final produce greatly depends upon quality of raw material and processing techniques. In Varanasi, there is a supply of less than one thousand tones of silk threads against the requirement of about 4000 tons. This has resulted in price hike and caused nearly 6.5 lakhs of spindles to be idle. Because of this crisis, most of the Weavers are shifting from their inherited occupation to some other pursuits.

Second it comes to the quality of raw silk which is still at stake. There is no facility for yarn testing in Varanasi. Quality of dyes and chemicals is also of no less importance. In Varanasi most Dyers and Printers are using untested and unreliable chemicals and dye stuffs which finally results in quality deterioration and poor fastness properties.

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Production techniques are based on traditional level of technology because of communication gap between technologist and manufactures. They are not aware of global technical development. In Yeola, the Dyers are using the same type of untested dyestuffs and traditional method of dyeing, causes the poor fastness and no facilities available to learn technical and perfect method.

In the study of Traditional Handloom weaving of Chhotaudepur, Phadke S. and Trivedi M. (1994) revealed that the Vankar community producing day-to-day utility items on the loom which is supported by wooden posts fixed deep in the ground. The cotton twine is used to make the heddles, and the reed is made with thin flat bamboo strips fastened by knotting on two horizontal wooden stick.

The ground structure is always plain weave and extra weft yarns are introduced to form designs, with colored threads. Two or three strands together are used for the weft. The motifs are geometrical, consisting of diamonds, triangles and rectangle. The colors commonly used are yellow, red and green, purple maroon and black are occasionally used.

Most of the men and women work throughout the year. Men are mostly engaged in warping and weaving and women carry out all the preparatory job including sizing, winding, dyeing and pegs warping. Besides the weaving craft, women are also engaged in making 'kandora', 'nada' indhono and fishing nets. They get some additional income from these crafts. The weaving profession and allied crafts once fed many families of chhoaudepur and its nearby villages. Today, the art is slowly dying out due to changing needs and life styles of the rural people. So diversification of the craft for contemporary use will help the artisans family to earn a decent living.

Motifs and designs used in Chhotaudepur if arranged and utilized artistically have a great potential. They can be well suited for various articles like table linen, cushion covers, table cloth, sling bags, bolster covers etc. Fashion designers trying to evolve something innovative have also a lot to learn from these lesser known artisans of India.

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Antil R. (1995) reported that, he was associated with the process of weavers training activity. In the training Department, the training regarding, weaving, weft distribution smash filling, bobbin cleaning and running pirn winding machines. Trainers were selected on the basis of different tests like IQ, educational level, general knowledge, color blindness, finger dexterity, physical test etc. During the process of training of existing weavers, he faced typical problem of reluctance of workmen to participate in the training and development program, with the result that drop-out during the program was high.

The following factors could be attributed for the workers not participating effectively in the training program.

1. Suspicions in the minds of Weavers that trainer will talk of production increase for the benefit of the organization.
2. Majority of workers were uneducated and from rural background. Their inferiority complex and fear that trainees will ask some questions which they would not be able to reply and fellow participants would laugh at them.
3. Union's active members used to ask what is in it for them. How the workmen are going to be benefited?
4. Workers wanted that either training programme should be in duty hours or overtime should be paid for extra time for attending the training programme.
5. Some people are not able to attend training programme after duty hours even if overtime is paid due to personal problem of transport, part time occupation etc.
6. Discouragement and denominational by yellow workmen who fear competition from their younger colleagues.
7. Uncomfortable training hall and boring or monotonous lectures of trainers.

The solution to the above problems were found out and steps were taken as follows.

1. Training activity and achievement were regularly reported in the in-house journal, newspapers to boost the moral of participants.
2. Timings for training has to be so adjusted that 50% is inside duty hours and 50% outside duty timing. Repetition of participants in all programme was checked.
3. The training room were renovated, in may and climate used to be very hot.
4. To make the training programme more interesting contents of training inputs were redesigned which consisted of 30% for developments which benefit the workers, 50% for job knowledge and skill, 20% for shop floor training.
5. The Executive President of the organisation was requested to be present in valedictory session for interacting with the participants who had helped in removing fears and suspicion from the minds of workmen.
6. A certificate of participation in training programme was given by the Executive President to keep their mission of learning sustained.

The result of implementation of above steps was very encouraging, and there was marked improvement in attitude of the participants. Thus he said that for the success of any training programme the environment and follow-up play a very significant role.

In this study, the training programmes are implemented to improve the quality of dyeing and designing and to adopt new designs to make the Painthani more attractive which will increase the demand as well as the cost. All the above mentioned factors are considered in the training Programmes conducted in present study.

In the study, on Problems faced by the handloom Weavers, Mamatha A. and Naik S. (1997) found out that majority of the weavers (71%) were working for master weavers and very few worked independently. The Weavers working with master weavers and co-operative societies were unhappy because of lack of continuous work and freedom to select the designs. Moreover, delay in returning the finished goods due to inconvenience has adversely affected the regular payments.

It is clearly mentioned that 20% of the master Weavers face the problem of procurement of raw materials. The common problem faced by all the weavers was in adequacy in the raw material. The respondents opined that the reasons for the existing problems were mainly due to improper distribution of raw materials, exploitation by
the middlemen, reservation of limited counts of yarn for handlooms and the counts reserved for handlooms being employed by the powerloom sectors.

Handloom industry can benefit immensely if fabrics are converted into garments. This is more true of the Assam handloom textile industry, investigated by Barva N. and Gogoi A. (1997). Handloom plays an important role in the socio-economic development of the society. The handloom textile are unique, and they differ from monotony of mill-made textiles. Therefore the handloom textiles need to be encouraged. As beautiful handwoven fabrics from handlooms are available in Assam, have been used for different garments like jacket, baby dress etc. This research is the outcome of a study conducted to find out the marketing benefits and economic importance of the handloom products number of jackets were prepared from the collected handloom textile pieces of Assam and were displayed for the consumers to take their opinion. Average cost offered by them is compared with estimated cost of production, percentage of loss and profit was calculated. In estimating the cost of production, profit was also calculated in additional to the fabric cost, accessories cost and labor charges. Since one of the main objectives was to find out the economic importance of handloom textiles and to commercialize the textile products in garment from through the products in garment from through the small-scale garment industry these findings are in line with the findings of Das N. (1989).

From the study, it can be firmly concluded that comparatively more money can be earned from the handloom fabrics by making garments rather than selling it in fabric form. The handloom products have a greater economic importance in the rural sector as they provide a vital source of rural employment and an economic support. This study revealed that there is not only a great scope to provide employment opportunities by establishing small-scale industries based on these handloom fabrics, but also tremendous opportunities to commercialise the fabrics.
Any organization or entrepreneur can establish small-scale garments industries for production of garment particularly for children and can export outside Assam. Besides, the state can earn a handsome amount of revenue by exporting the garments made of the cotton handloom textiles. Sericulture Training school at channapatra which is 60 kms. Away from Banglore, is the place of pride where an opportunity is offered to budding entrepreneurs to exhibit their talent opined by Vathsala T. (1997). It is a silk cocoon handicraft developed by Smt. K. N. Manjula Devi, Assistant Director of Sericulture, Sericulture Training School, Channapatna. The training began in June, 1994 mainly because of the initiation and personal interest of her. It educates the skilled women entrepreneurs to be economically self dependent. Candidates from almost all districts of Karnataka have been trained so far.

"The display of cocoon handicraft given women a weather of ideas to develop their skills" opined a visitor from DANIDA Mr. Ronald Currie, Secretary General of the international Silk Association, France says, "Cocoon craft is a very interesting bye-product of sericulture". Garlands, flowers, flower vases, dolls, wall hangings, greeting cards and many more made outs of the waste cocoons displayed in school.

The trained candidates will get around 50% subsidy when they purchase cocoons from the state Government grainages. The state has granted Rs.5 Lakh for the purpose. The state Government of sericulture has taken initiative and made it almost compulsory for all the State Government organizations and offices to use cocoon garlands during official functions. The district officers are also requested to encourage the trainers by purchasing their products for various departmental functions and through other channels such as Gramana Udyog or District Marketing Committees.

Thus, this budding art-based avocation with ample potential can be developed into a profitable venture, if nourished well. A planned approach to popularize the art with a special emphasis on training, product diversification, raw material availability and

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better marketing would certainly go a long way in encouraging the new entrepreneurs to come up with numbers of new products of utility and artistic value. Such a venture not only ensures additions revenue to the silkmen, but also makes sericulture further attractive.

Sannapamma K. and Mahale Geeta (2001) studied the socio-economic system of the weaving enclave and its possible causes of the weavers from Molakalmuru, which is situated in Chitradurga district is about 250 Km. away from Banglore. The study was take up to know the historical background of Molakal muru sarees and to find out the socio-economic aspects of the weavers. The 60% of the weavers belonged to middle age, 30% of weavers belonged to young age. This may be due to the fact that the younger generation of the weavers community preferred to take up employment other than handloom weaving after their higher education and involvement of old age people was less because of their health problems. Thus, weaving was mainly occupied by middle age people.

In the study, it has been observed that 22% were illiterate. 17% of the weavers had education up to Post graduate and degree. This might be due to their financial crisis, insistence by the elders to take up employment of weaving and lack of encouragement from the elders to go for higher studies. Nearly half of the weavers fall in the middle income group and remaining belong to high and low income group. This may be due to the reason that most of them belong to nuclear family with medium size family where the number of family members engaged in weaving is limited.

Moreover, the demand for the handloom silk sarees, many a times sets back because of a variety of powerloom goods, lack of fashion etc. which indirectly affect their socio-economic condition. It has been observed that the weavers selected weaving as a profession, mainly because of its being hereditary occupation and to keep their age-old tradition alive.
Vastrad J. and Naik S. (2004) pointed out that even if powerlooms came into existence since last three decades (1970s) and the output on powerloom is remarkable higher, but even then a greater percent of weavers in Northern percent of weavers in Northern Karnataka have not installed powerloom because of lack of capital, technical services, training and fluctuation in power supply (Shailaja D. 1991). Study was designed to discern the demographic conditions of the weavers involved in the production of polycotton sarees which are famous for their elegantly designed contrast borders not only in India but also abroad. Lakkundi village of Gadag district of Karnataka formed the locale for the study. There are two types of looms existing in North Karnataka viz. fly shuttle pit loom and powerloom without jacquard attachments for designing. Dobby is the only shedding mechanism adopted for producing designs in the borders.

The demographic status includes the categorywise distribution of wage weavers according to their age, education, family size, family type subsidiary occupation, total annual income and caste. It has been observed that, 52 percent of the wage weavers at Lakkundi belonged to the middle age group followed by older age and young age group. Majority of younger wage weavers preferred to take up jobs rather than weaving. On the other hand more than fifty percent of the middle aged preferred to continue their ancestral occupation. The educational level of wage weavers showed that 64 percent of the wage weavers had education upto primary. None of them had higher education, which may be due to their financial crisis, non-availability of local educational facilities. Findings revealed that maximum number of wage weavers belonged joint family type. The majority of the wage weavers belonged to the medium family size having 4-7 members. Regarding the income, majority of the wage weavers at Lakkundi belonged to high-income group with an annual income greater than Rs.31,728.00 followed by low income group. This might be because of the opportunities available for Lakkundi wage weavers to earn more through subsidiary occupations like agriculture, Kambli weaving, weaving for Karnataka Handloom Development Corporation and other pretty business.
Most of the studies mentioned here are on Handloom Weavers to study their socio economic status, present practices of weaving, designing and problem faced by them. In the present study, the socio economic status, problems faced by Dyers and Weavers are studied and solutions to their problems are conveyed through the training programmes.