CHAPTER 4

RESULTS AND DISCUSSIONS

The results have been discussed under the different heads based on the researched data collected through interview and observation method in view of the structured specific objectives. The researched data has been critically examined along with the interpretation of the data. The critical challenge was faced by the researcher to make results out of the massive amount of data, reducing the volume of information, identifying the important patterns and constructing the framework for presenting the core quintessence of what the data revealed and thus arriving at the empirical solution to the problem. The data collected for the present study were in terms of the information collected through the interview schedules for the weavers, museum curators, museum conservators, private shawls collectors and private conservators. The data had also been collected through the observation methods by the researcher while visiting the places of the data collection such as production houses of weavers, Government museums, private museums/organizations and private conservators. The responses received through interview schedules were analysed qualitatively (content analysis) as well as quantitatively. The results and discussions have been compiled under the various headings as follows.

4.1 Weavers from Himachal Pradesh, Gujarat, Jammu & Kashmir and Nagaland

4.1.1 Analysis of the weavers in terms of their profile and shawl weaving techniques

4.1.2 Analysis and interpretations of the problems faced by the weavers

4.1.3 Analysis and interpretations for reviving and preserving the tradition

4.2 Curators and private collectors

4.2.1 Analysis and interpretations of the preservation practices adopted by museum curators

4.2.2 Analysis and interpretations of the preservation and conservation practices of shawls adopted by the private collectors and private museums

4.3 Conservators in museums and in private practice

4.3.1 Analysis of the conservation practices of shawls adopted by museum conservators

4.3.2 Analysis of the conservation practices of shawls adopted by private conservators

4.4 Practical approach to conservation of woollen shawls

4.4.1 Woollen samples

4.4.1.A: Assessment of the sample test fabric for tensile strength, colourfastness properties and visual characteristics by using *Sapindus mukorossi* and Synperonic 91/6 as cleansing agents for woollen fabric

4.4.1.B: Assessment of the sample test fabric for tensile strength, moisture regain, bending length and visual characteristics by using lanoline and glycerine as protective coatings over woollen fabric

4.4.2 Woollen shawl

4.4.2.A: Remedial conservation of woollen shawl

4.1 Weavers from Himachal Pradesh, Gujarat, Jammu & Kashmir and Nagaland

The present work brought its scope for the vast field in the study of the preservation aspect. Here the emphasis was given to the development of the age-old tradition of shawl weaving and its present condition in the local market. An endeavor was made to study the socio-economic life of the weavers and traditional craftsmen as well as an account on the location, raw materials, traditional looms and production techniques was made. The documentation of the production process was also done before the shawls' craft become extinct in the hands of the modern culture.

4.1.1 Analysis of the weavers in terms of their profile and shawl weaving techniques

4.1.1.1 Data analysis and interpretations for the profile of the artisans from Himachal Pradesh, Gujarat, Jammu & Kashmir and Nagaland

In view of the objective number one of the present study, i.e. objective 1. To study the profile of the artisans from Himachal Pradesh, Gujarat, Jammu & Kashmir and Nagaland, the data was collected from the interview schedules made for the shawl weavers. Shawl weaving was the major source of income to all the four states. The percentage-wise data has been calculated and presented in the tabular form. The analysis and interpretations regarding the profile of the weavers has been presented based on the responses received from each shawl weaver who was personally interviewed by the researcher from all the four states of the country.

The data regarding the shawl weavers age was procured and its has been shown in the table 4.1

4.1.1. An age-wise distribution of the weavers revealed that a greater number of weavers fell in the age group of 41-50 yrs (40%) and 31-40 years (31.11%) followed by 24.44 % in age group of 51-60 years. Very few weavers were present in the age group of 61-70 years (4.44%). It was also noticed that 50% weavers in Jammu and Kashmir were in the age group of 51-60 years which was found to be highest in all four States.

Table 4.1: Distribution of weavers according to their age from all four states:

State	**Total weavers interviewed**	**11-20 yrs**		**21-30 yrs**		**31-40 yrs**		**41-50yrs**		**51-60 yrs**		**61-70 yrs**	
		f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Himachal Pradesh	11					4	36.36	5	45.45	2	18.18		
Gujarat	11					5	45.45	5	45.45	1	9.09		
Jammu and Kashmir	12					1	8.33	3	25	6	50	2	16.67
Nagaland	11					4	36.36	5	45.45	2	18.18		
Grand Total	45					14	31.11	18	40	11	24.44	2	4.44

4.1.1.b The data regarding the gender of weavers who were more involved in shawl weaving was procured from each weaver and it has been presented in the table 4.2. The numbers of male and female weavers interviewed were about same. It was observed that there was no gender biasness for doing any kind of work. Every kind of work related to weaving was done by both except some technical work like shearing. Carding, combing and embroidering work was done by women as compared to men. Data revealed that male were more involved in weaving in the region of Jammu and Kashmir, followed by Gujarat (63.64%) and Himachal Pradesh (45.45%). Highest percentage of women from Nagaland was found for shawl weaving.

Table 4.2 Distribution of weavers according to their gender from all four regions:

Region	Total weavers interviewed	Male		Female	
		f	%	f	%
Himachal Pradesh	11	5	45.45	6	54.55
Gujarat	11	7	63.64	4	36.36
Jammu and Kashmir	12	10	83.33	2	16.67
Nagaland	11	0	0	11	100
Grand Total	45	22	48.89	23	51.11

Table 4.3: Distribution of weavers according to their religion from all four regions:

Region	Total weavers interviewed	Hindu		Muslim		Buddhist		Christian		Sikh	
		f	%	f	%	f	%	f	%	f	%
Himachal Pradesh	11	10	90.90			1	9.09				
Gujarat	11	11	100								
Jammu and Kashmir	12			11	91.67					1	8.33
Nagaland	11					1	9.09	10	90.90		
Grand Total	45	21	46.67	11	24.44	2	4.44	10	22.22	1	2.22

4.1.1.c The data revealed that maximum weavers were Hindus in the state of Gujarat followed by Himachal Pradesh (90.90). 90.90% weavers were Christians in the state of Nagaland and 91.67% Muslim weavers were from the state of Jammu and Kashmir. In the Kinnaur region of Himachal Pradesh and in the Nagaland state, Buddhists weavers (9.09%) were also found practicing this art form of shawl weaving. The motifs in the shawls of Kinnaur were found inspired by the Buddhists religion and culture.

Table 4.4: Distribution of weavers according to their marital status from all four regions:

Region	Total weavers interviewed	Married		Single/ Unmarried		Widow		Divorced/ separated	
		f	%	f	%	f	%	f	%
Himachal Pradesh	11	8	72.72	2	18.18			1	9.09
Gujarat	11	9	81.81	2	18.18				
Jammu and Kashmir	12	12	100						
Nagaland	11	8	72.72			2	18.18	1	9.09

Grand Total	45	37	82.22	4	8.89	2	4.44	2	4.44

4.1.1.d The data revealed that majority of the respondents were married (82.22%) followed by unmarried (8.89%). 4.44% weavers were found widow and divorced/separated each.

Table 4.5: Distribution of weavers according to their family type and size from all four regions:

Region	**Total weavers interviewed**	**Nuclear**		**Joint**		**1-3**		**4-6**		**7-9**		**9 & above**	
		f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Himachal Pradesh	11	2	18.18	9	81.81	2	18.18	7	63.63	1	9.09	1	9.09
Gujarat	11	3	27.27	8	72.72	2	18.18	6	54.54	2	18.18	1	9.09
Jammu and Kashmir	12	2	16.67	10	83.33	1	8.33	10	83.33	1	8.33		
Nagaland	11	3	27.27	8	72.72	2	18.18	7	63.63			2	18.18
Grand Total	45	10	22.22	35	77.78	7	15.55	30	66.67	4	8.89	4	8.89

4.1.1.e With regard to family type, a greater number of weavers belonged to the joint family (77.78%) as compared to the nuclear family (22.22%). When size of the family was studied, it was found that maximum weavers were falling in the range of 4-6 members per family (66.67%) followed by 1-3 family members (15.55%). Whereas the data also revealed that very less number of weavers family size was from 7-9 (8.89%) and 9 and above (8.89%).

Table 4.6: Distribution of weavers according to weaving as their occupationally acquired or inherited work from all four regions:

Region	**Total weavers interviewed**	**Inherited**		**Acquired**	
		f	**%**	**f**	**%**
Himachal Pradesh	11	6	54.54	5	45.45
Gujarat	11	9	81.81	2	18.18
Jammu and Kashmir	12	9	75	3	25
Nagaland	11	7	63.63	4	36.36
Grand Total	45	31	68.89	14	31.11

4.1.1.f According to the data mentioned in the table 4.6, it was revealed that majority of the respondents had weaving as their inherited occupation (68.89%) as it was their family business with the little major difference from the weavers who have acquired (31.11%) it as an occupation so as to serve their families.

Table 4.7: Distribution of weavers according to their experience in years from all four regions:

Region	**Total weavers interviewed**	**6-10**		**11-15 yrs**		**16-20 yrs**		**21-25yrs**		**26-30 yrs**		**31-35 yrs**		**35 yrs & above**	
		f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Himachal Pradesh	11	1	9.09			2	18.18	4	36.36	4	36.36				
Gujarat	11					2	18.18	2	18.18	4	36.36	3	27.27		
Jammu and Kashmir	12			1	8.33	1	8.33			4	33.33	1	8.33	5	41.67
Nagaland	11			3	27.27	6	54.54	2	18.18						
Grand Total	45	1	2.22	4	8.89	11	24.44	8	17.78	12	26.67	4	8.89	5	11.11

4.1.1.g The data in the above table 4.7 revealed that the weavers had the highest experience ranged from 26-30 years in all the states except Nagaland where the maximum weaving experience was recorded to be ranging from 16-20 years. This may be attributed to the fact that there are women weavers in Nagaland and due to the family and household work they may be not able to do the shawl weaving at the older stages of life.

Table 4.8: Distribution of weavers according to their type of residence from all four regions:

Region	**Total weavers interviewed**	**Katcha houses**		**Pucca houses**		**Semi-katcha & pucca houses**	
		f	**%**	**f**	**%**	**f**	**%**
Himachal Pradesh	11	1	9.09	8	72.72	2	18.18
Gujarat	11	3	27.27	6	54.54	2	18.18
Jammu and Kashmir	12	4	33.33	7	58.33	1	8.33
Nagaland	11	5	45.45	5	45.45	1	9.09

Grand Total	45	13	28.89	26	57.78	6	13.33

4.2.1.h The majority of respondents in Jammu and Kashmir (7) were residents of pucca houses and only four of them were still staying in katcha houses due to the lack of income. One family had both the constructions at their residence (semi-katcha & pucca house). The majority of the respondents from all four regions were the residents of the pucca houses (57.78%) followed by the katcha houses (28.89%) and least weavers were found to be the residents of the semi-katcha and pucca houses (13.33%).

4.1.1.2 Analysis and interpretations of the different shawl weaving methods and technique

A. In view of the objective number two of the present study, i.e. to study the different shawl weaving methods and preservation of the weaving techniques, the data collected has been portrayed in this section. The data regarding the shawls' production technique was procured through the semi-structured interview schedules and the observation methods. The collected data has been analysed qualitatively (content analysis). The researcher has compiled all the parameters for shawl weaving and they have been presented in the table 4.9 given below.

Table 4.9: Shawl weaving parameters from all four states.

S. No.	Parameters	Himachal Pradesh	Gujarat	Kashmir	Nagaland
1.	Places visited	Shamshi, Kullu, Mandi, and Kinnaur	Ahmedabad, Kutch, Surendranagar	Dal Lake, Nishat Garden, Gandhi Nagar, Kanihama village, Ganderbal, Budgam.	Dimapur, Kohima, Phek, Kigwema, Diezephe village, Nagaland
2.	Type of work done by women	Preparation of warp threads, weaving, embroidering,	Carding, spinning, dyeing, warping	Spinning, carding of wool, finishing of shawls embroidering.	Spinning, weaving, dyeing, Preparation of warp threads.
3.	Type of work done by men	Weaving, warping, dyeing,	Spinning, dyeing of yarns, weaving over loom	Weaving on looms, embroidering, dyeing	Making of the bamboo wooden looms
4.	Religion	Hindu, Buddhism	Hindu	Muslim	Christian Buddhism
5.	Traditionally	Desi wool,	Desi wool, cotton,	Shahtoosh,	Cotton and wool

	used raw materials	Pashmina	camel wool,	Pashmina, Angora wool,	
6.	Raw materials (threads) used nowadays	Cotton, Pashmina, angora, raffal, desi wool, acrylic, polyester Australian wool/ merino wool, yak's wool	Merino wool, acrylic, silk and rayon	Pashmina wool, local fine wool, raffal, cashmilon, cotton, silk, merino wool.	Acrylic (Thai yarn), polyester, viscose rayon, wool and nylon blend (Cashmilon)
7.	Types of shawls woven	Kullu shawls, Kinnauri shawls	Dhabla, tangaliya, luri.	All types of Kashmir Pashmina shawls, Kani shawls, Jamawars, plain shawls, reversible shawls, jacquard weave and space dyed shawls,	Naga Tribal shawls
8.	Types of embroidered shawls	Kullu shawls, Kinnauri shawls	Dhabla, luri shawls and tangaliya shawls	Pashmina sozni shawls, Aari (crewel embroidery) shawls, Zardozi, Talibar (Gold work), Qashidah (Kashmir embroidered shawls),	Naga Tribal shawls
9.	Type of weaves	2/2 herringbone weave, design in dove tail tapestry technique in 2/2 basket weave. weft rib weave for patterns. diamond weave patterning.	Plain weave with extra weft technique, rib weave, knotting technique	Twill tapestry weave	Plain weave with floats, rib weave, twill weave
10.	Type of stitches used	Running stitch, chain stitch,	Knot stitch, running stitch, herringbone stitch, satin stitch, stem stitch, chain stitch, fish stitch	Single stitch, stem stitch, herringbone stitch, knot stitch, chain stitch, satin stitch, button-hole stitch,	Simple running stitch

				slant-darning stitch, running stitch	
11.	Colours used in shawls	Red, orange, pink, blue, green, yellow, black, white, grey, beige and brown	White, black, yellow, maroon, red, orange, blue and brown	Black, brown, white, cream, yellow, red, maroon, blue, grey, green, pink	Red, black, blue, yellow, white, green, orange, grey,
12.	Traditional type of loom	Throw shuttle pit looms	Traditional Pit looms (Goda Sar)	Running small looms	Loin loom (Back strap loom)
13.	Looms used presently	Throw shuttle looms, fly shuttle frame looms, border looms	flying shuttle frame loom (Khada sar)	Throw shuttle looms, Jacquard looms	Fly shuttle looms
15.	Threads used for embroidering	Acrylic, wool, silk	Wool, silk, acrylic, cotton	Silk, dyed cotton, wool, Zari (metal threads)	Nylon and rayon threads
16.	Motifs used on shawls	Angular, geometrical designs in horizontal borders in single motifs or combination yashin, kyumso yongrong, yongrong, darje- setham, cchoktin, yaguma/ chholopanma, kulri design, floral motifs, akhrot, double chasham, round chasam, swastik, Ganesha, badam	Animal and diya, huts, four squares, female form, dhogla, phupti (full, half), harde, chaumukh, hathi, satkani, vakhiyo, dholak, hiragiriya, kacchchi motifs For tangaliya, dots, geometrical patterns like circles, parabolic designs, straight lines, curvilinear shapes, contemporary motifs, peacock, tree, birds, bushes, button, aero plane .	Mangoes, ghobi, badam, panjdar, cheet misri, kev posh, chinar leaves, flowers of lilies, lotus, creepers, blossoms, snake forms, heart, cypress tree, bushes, pinecones, date palms, paisley, buta flower vases, samovar, kashir- jaal (fine-embroidery over neck and sleeves) motifs	Simple lines, stripes, squares, bands, formal arrangements of lozenge shapes and diamond motifs. The other motifs are hornbill heads, bison heads, tigers, elephants, a spear, dao, cock, snakes, barbets, lizards, monkeys, mithun head or horns, sun, moon, stars,
17.	Year of the Geographical identification	Kullu shawls (Himachal Pradesh) from April 2005 and Kinnauri shawl (Himachal Pradesh) from April 2010	Kachchh shawls (Gujarat) from April 2011. Tangaliya shawl (Gujarat) from April 2009	Kani shawl, Kashmir Pashmina and Kashmir Sozani craft (Jammu and Kashmir) from April 2008	Chakhesang shawl (Nagaland) from April 2017

The results for the study pertaining to the process of weaving traditional woollen shawls from Himachal Pradesh, Gujarat, Kashmir and Nagaland have been shown in the tabulated manner above. The type of work done by men and women weavers showed that both were involved in the process of weaving except in Nagaland state where men were only seen making the bamboo wooden looms. It was observed from the rows no. 5 and 6 that threads used traditionally were more natural and purer as compared to the threads found nowadays which were either synthetic or blended. It was also found that the shawl weaving was region specific and that is actually the reason for their value in the market. As far as the types of stitches are concerned, maximum varieties of stitches were practiced on shawls weaving in the State of the Jammu and Kashmir as compared to the other states surveyed. Herringbone stitch was profusely used for fillings in the embroidery of Saurashtra, Gujarat. It was analysed that traditionally pit looms were more prevalent as compared to looms used today which are mostly throw shuttle and fly shuttle looms as well as the more technically advanced machine looms. All the four states were given geographical identification for their unique traditional shawl weaving techniques.

B. Shawls' weaving methods

The researcher further classified and presented the data State-wise. In this section the type of shawls, its production techniques and motifs have been explained pictographically

1. Himachal Pradesh

Himachal Pradesh was the first place visited by the researcher. This state is rich in art and craft of shawl making. It has attracted a lot of visitors from all over the world. Handmade shawls found here were really very creative in its design and essence. These were the fine quality shawls that enhanced the clothing and dressing sense. This state is famous for Kullu and Kinnauri shawls. As far as the raw material is concerned types of wools used for weaving the shawls in these regions were: angora (rabbit wool), pashmina, yak wool, local goats/sheep wool and acrylic yarns.

On comparing the technical specifications of Kullu shawls and Kinnauri shawls, they were found quite similar. These shawls were made in varied shapes and sizes depending upon the demand of the customers. Size of the shawls was found to be 2mt - 1mt. The handspun threads were pashmina and angora threads. For patterning the threads were kept 2-3 ply as 2/32's woollen worsted/ acrylic. The weaving was majorly done in 2/2 twill (base) & weft

rib in patterning. Weft ribs were made by extending the plain weave horizontally. The weight of shawls varied from 360 to 390 gms, conditionally depending on the outline & design. It was found that that shawls of Lahaul-Spiti had vertical strips with floral patterns all over the cloth. The patterns were also similar to the shawls from Kinnaur. Kinnaur shawls were woven in the twill weave for home purpose as well as for the ceremonial purpose they weave more intricate designs in them. It was found that the bright colours which were used for the weaving shawl meant for some meaning and they represented five elements which are found on this planet. White represented water, red represented fire, green stood for air, blue represented space and yellow represented our earth. The shawls of half-width were stitched and joined from the centre through the stitching technique when complete. It was observed by the researcher that in order to decrease the labor work wool mixing was done. Machine made yarns were being preferred by the weavers imported from Ludhiana, Punjab. Therefore, wool blends were present in the market and were preferred by the customers more than the pure wool. With time shawls were now being manufactured in a wide variety of patterns and the use of vegetable dyes, is in vogue. As far as the prices of Kullu shawls is concerned, the price depended upon the following factors such as the design, patterns, the amount of patterns in shawls, the fiber variety and the nature of the fabric made of those furs. Prices ranged from Rs 1500/- to Rs 20,000/-.

Production technique: On probing around 11 weavers it was found that majority of them were collecting wool every spring and spinning was done by hand. The yarn was rotated on a spinning roller provincially known as 'Charkha'. The reeling was done from the ruffle, pashmina, and angora. Before spinning, the wool, raw material was cleaned by stretching to remove any dirt and soaked in a mixture of rice and water to make it softer. Each piece was dyed individually by hand. Only metal and azo-free dyes were used. The pure water was used for dyeing purpose. Dyeing was done at a temperature just below the boiling point for nearly an hour. Pashmina took the dyes readily and deeply as the fiber was found to be very absorbent. Until the 19th century, pattus were made on pit looms, but after that handlooms came into the way. In Kinnaur still, pit looms were being preferred by the weavers other than the handlooms. The essential construction for the shawl was 2/2 twill spun on a straight or fine drafting system. The decorative border of the shawls was always woven in a basket weave with the dove-tailing or slit-tapestry techniques. The coloured graph of the design had to be woven was used as a reference and the number of ends per designs were considered. Cut lengths of the coloured acrylic wool threads were placed in

the warp in 2-3 plys. The technique used to produce the pattern in intertwining or the 'dove-tailing' technique also referred to as the tapestry weave. After knowing about the process, the researcher got to know that since the yarn was very fragile for the vibration caused by the power looms thus the weaving of the traditional 100% pure woollen shawls was done on the handlooms. If there had been any negligence in the weaving of the shawls, then it will reflect on the final product made.

A

B

Plate 4.1 (A, B): The cooperative societies of weaving shawls on the way to Shamshi, Dist. Mandi, Himachal Pradesh.

A

B

C

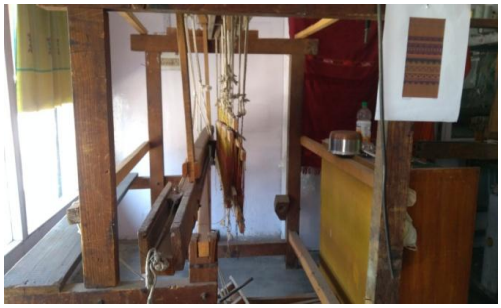
D


E F

Plate 4.2 (A-F): The production of the shawls at The Chamunda Mahilla Weaving Cooperative Society Ltd., Nagwaiin, Dist. Mandi, Himachal Pradesh.

In this production house (plate 4.2), Mr. Atma Ram Thakur was the master, manufacturer of Kullu shawls based in Mandi. He had the experience of 30 years. Women weavers were more involved in the making of shawls because there were very fewer wages earned by men in the weaving industry. Ms. Kanta was the core keeper of the weaving society as the space belonged to her. The lady was weaving the maroon coloured woollen shawl on the handloom.


A B

C D

Plate 4.3 (A-D): The production unit at the Himshaktico Society, Shamshi, Dist. Mandi, Himachal Pradesh.

In this production house (plate 4.3), Mr. Puran Chand was weaving a pure woollen shawl at the Himshaktico Society, Shamshi, Dist. Mandi, Himachal Pradesh. At the time of exhibitions, all the looms were used for the demonstration purpose of shawls. Such exhibitions and demonstrations could be seen at Delhi haat, New Delhi and fairs and festivals at Pragati Maidan, New Delhi.

a b c

Plate 4.4(a-c): Warping of the yarns at Bodh Shawl Industry. It takes around 3-4 hours to put threads.

Plate 4.4d: The rack for keeping the pure woollen threads.

Plate 4.4e: The woollen threads were being dried under the sun in order to save them from moisture and insects attack.

Plate 4.4f: The close up of the yellow thread for its specifications such as: blend and shade.

Plate 4.4g: Space dyed wool: An example of the space dyeing wool yarn. It was done 2-3 times. When woven it gave a different natural look to the shawl.

Plate 4.4h The dyeing machine

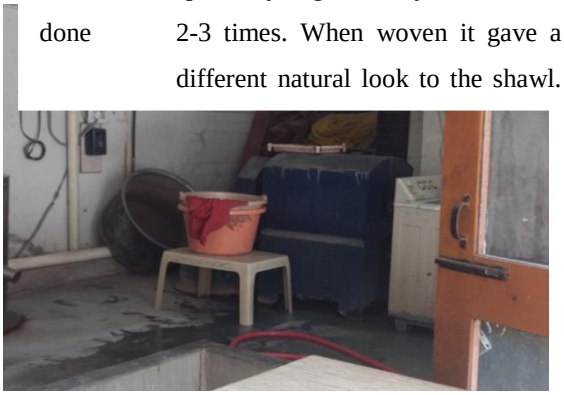


Plate 4.4i: The dyeing equipments

Plate 4.4j: The lady was weaving the chasam pattern on the white coloured shawl.

Plate 4.4k: The rollers

Plate 4.4l: Iron machine for flattening shawls

m

n

Plate 4.4 m & n: The long pattu (Kullu shawls) not found presently. An old Kullu shawl kept by the owner as a heritage sample. This was a very long shawl and is not made nowadays. One can validate its authenticity by its stitched joint in the centre of the shawl.

Plate 4.4o: The contemporary designs were being sold by the company to the brands like Fab India. Best products were sold in Fab India, Delhi. Blue-black check patterns and red black check patterns were being opted rather than Kullu designs due to modernization.

Plate 4.4: The Production unit of Bodh Shawls Industries Private Limited at Shamshi, Himachal Pradesh.

Butti Weavers Cooperative Society Ltd. was another one of the most famous weaving industry which was located in Shamshi. They offered authentic Kullu shawls. Around thousands of weavers were working in the direction of shawls' production. The weavers used blended threads as well as the pure wool threads in the fly shuttle looms. The types of wool used by them were angora wool, pashmina, sheep wool, yak wool and merino wool. On probing the shopkeepers of woollen threads, it was found that Kullu angora wool shawls were quite expensive as compared to the lamb wool shawls which were found to be relatively cheaper.

Designs and motifs on the woollen shawls from Himachal Pradesh

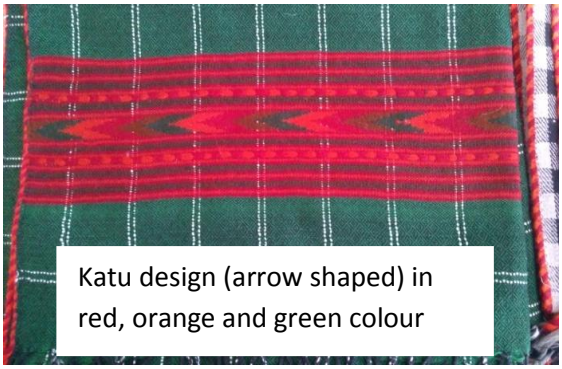
Kyumsa Yongrong pattern where four Ts are arranged in a square

Akhrot pattern in the round form

Straight T and reverse T patterns aligned in horizontal direction

Dholak and katu designs in both the shawls

Katu motifs in check patterned shawl

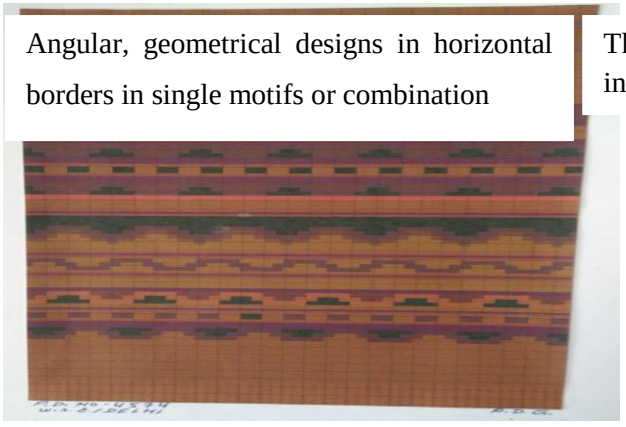


Katu design (arrow shaped) in red, orange and green colour

Ganesha pattern in black and sky blue colours

Chasham pattern

Angular, geometrical designs in horizontal borders in single motifs or combination



The printed designs show the lahariya designs in the form of waves

Plate 4.5: Different designs and motifs on shawls from Kullu and Kinnaur, Himachal Pradesh

2. Gujarat

A. Bhujodi, Kutch, Gujarat

Bhujodi village in Kutch, Gujarat was the second place visited by the researcher for analysing the shawl weaving processes. Kutch weaving is known for its incorporation of distinctive traditional motifs. It was found that wool was the basic requirement for weaving shawls. It was seen that communities of Gujarat and migrated communities from Rajasthan were involved in this art. Despite the hot climate of the state, the people were found weaving with wool rather than using some lighter fiber like cotton. It was due to the availability of wool in these areas. Wool was used to be extracted from the local sheep reared by the Rabari community. As the demand for wool increased, the weavers felt the need to outsource the wool. On probing around 11 weavers from the Gujarat state it was revealed that the weavers do not use the 100% pure wool. The types of yarns used by the weavers are sheep wool, acrylic, merino wool (Ludhiana) and silk. It was seen that vegetable dyed woollen Dhabda shawls were being made by the National award winner vankar Gabhubhai-Jakhubhai. On further probing he responded that for vegetable dyeing they used all-natural ingredients like onion peel, lac, madder, harad, dates, etc. Local sheep wool and merino wool were mostly used for weaving shawls. As far as the stitches are concerned, chain stitch is extremely popular in the embroidery of Kutch but it is also used in outline of embroidery of Saurashtra. The printed patterns as seen in the central circle and outside the outer most one were always embroidered with interlacing stitches.

Production technique:

The researcher visited several places of production of shawl collections in Gujarat and analysed the shawls weaving process. Here the researcher has explained the production process by presenting the photographs in the manner of the procedure of shawls' production takes place.

Plate 4.6a: The camel wool

Plate 4.6b: The local goat's wool.

Plate 4.6c: Cleaning of the woollen yarns by hand. She was separating the wool fibers repeatedly one by one and the dirt from them was falling on the ground.

Plate 4.6d: The dirty wool fibers

Plate 4.6e: The cleaned wool fibers

Plate 4.6f: The making of the yarn from the fibers.

Plate 4.6g: The craftsmen uses the charkha or the spinning wheel used for spinning yarn from the woollen fibers.

Plate 4.6h: Dyeing of the skeins.

Plate 4.6i: The dyed wool kept for weaving.

Plate 4.6j: The white coloured sheep wool threads. Acid dyeing is usually done using synthetic dyes.

Plate 4.6k: The dark brown coloured wool ready for weaving shawl.

Plate 4.6l: Drying of indigo dyed wool hanks

Plate 4.6m: The thread made by using hand spindle.

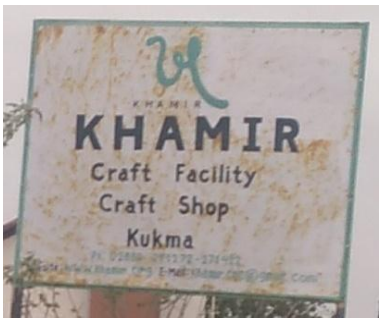


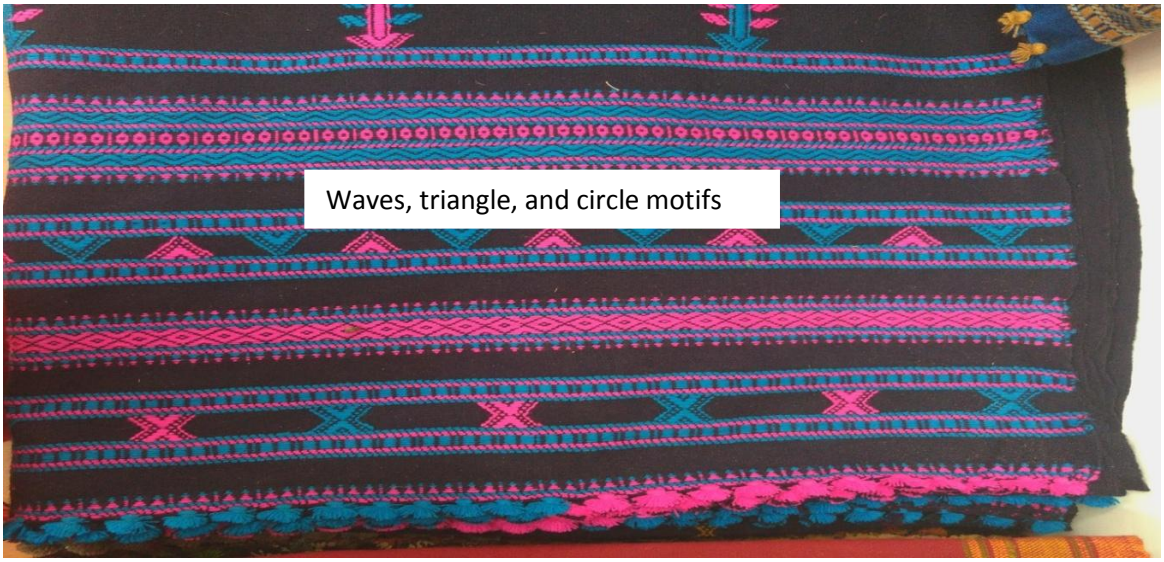
Plate 4.6n: The traditional pit loom which has now been replaced by the frame looms. Frame looms for weaving shawls at Khamir Organization (Reviving crafts), Kukma.

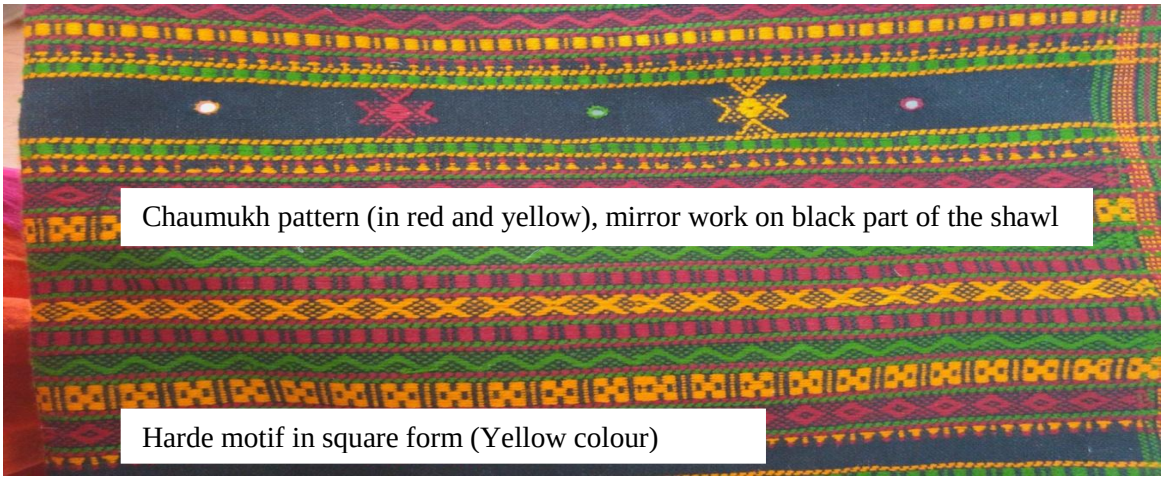
Plate 4.6o: The workshop of the artisan at Bhujodi, Kutch.

Plate 4.6p: The weaving of designs by hand embroidering.

Plate 4.6: The description of the production techniques of shawls at Bhujodi village, Kutch, Gujarat.

Designs and Motifs on the woollen shawls from Gujarat



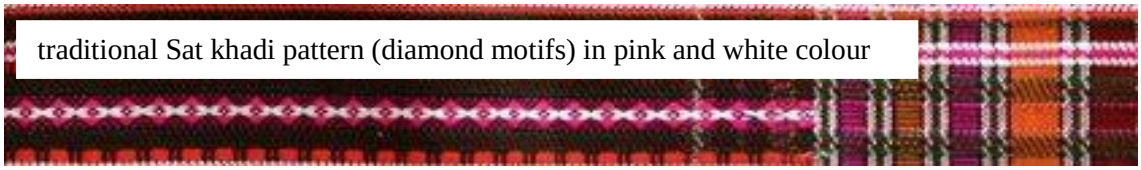


Chaumukh pattern (in red and yellow), mirror work on black part of the shawl

Harde motif in square form (Yellow colour)

Dholak motifs

Dhogla motifs in triangle shape



traditional Sat khadi pattern (diamond motifs) in pink and white colour

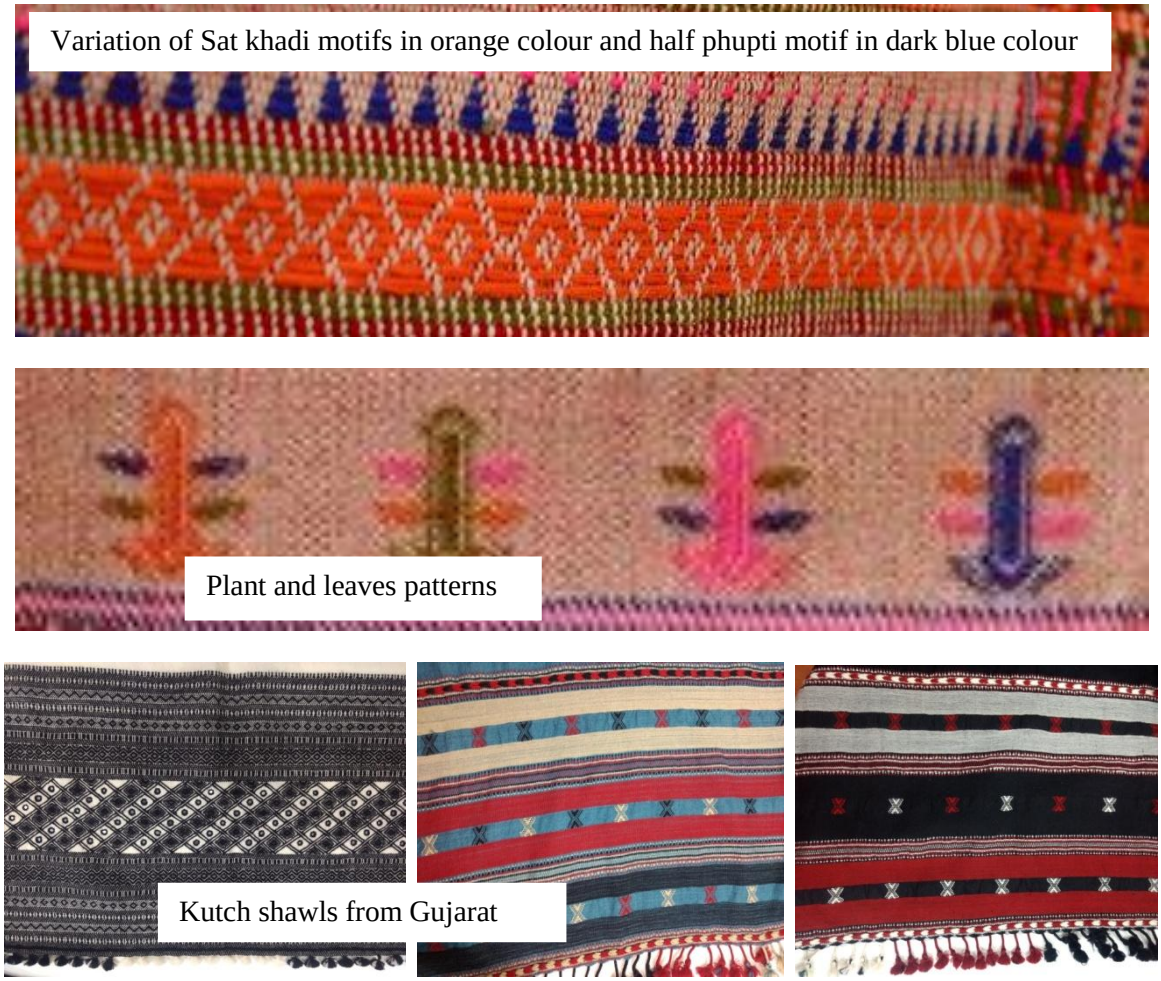


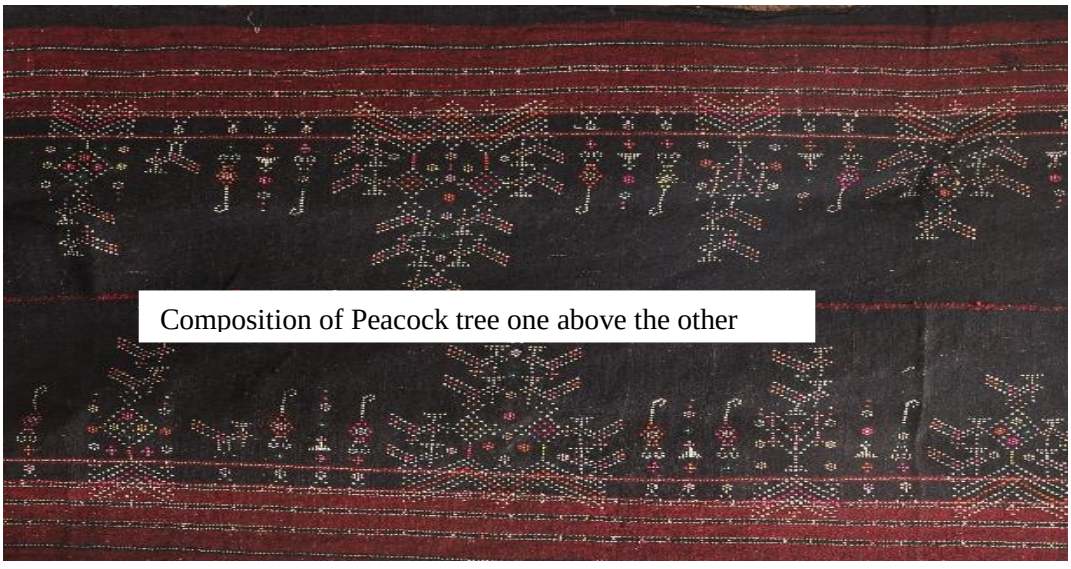
Plate 4.7: Traditional Dhabla Shawls and their motifs

B. Surendranagar District, Gujarat

The tangaliya shawl is a handwoven product made by the Dangasia community of Gujarat. It is a 700 years old indigenous crafts still being practiced in Surendranagar district of Saurashtra, Gujarat. In this region pit looms were found in the houses of the weavers. These shawls were traditionally woven in pit looms at the houses of the weavers. On observation it was found to have an effect of raised dots and geometrical patterns. The weavers reacted that at present merino wool was more used instead of sheep wool. It is a very laborious work. In this crafts, colourful, bright coloured threads were twisted together to form a bead or dana in the geometrical patterns onto the dark surface of the woollen shawl. Around 20 villages were still practicing this art of dana weaving. The researcher analysed that the women were more involved in the cleaning of wool, yarn dyeing & preparation rather than working on the loom itself. But with the advent of the printed textiles into the market, this handwoven art has lost its consequence to nurture. Most of the weavers here were operating in the cooperative societies in order to earn their living. The

Tangalia art used to be done by the wool traditionally but because of the availability of readymade yarn such as cotton, acrylic, and silk, wool is not used. On exploring about the details made on the shawls, it was noticed that the main body of the shawl was made in the plain weave pattern. The motifs such as peacock, circle, triangle, trees, airplane and temple were found over the shawl. Black, maroon and white colours were used for tangalia weaving. Black and maroon were mostly for the background and white coloured thread was used for the beading or the danas. One of the e.g. of the tangalia weaving was seen in the shawl named "Ramraj" whose base was black and zari work was done on the borders. The large beading work was observed on many shawls. On probing about the supporters of this art, it was revealed by one of the weavers that many NGOs were found to be supporting weavers so that they don't lose interest in shawl weaving. It was helping them in gaining momentum with the modernization. The researcher came across some of the designs and motifs on the tangalia shawls which have been presented as follows in plate 4.8.

Peacock patterns and diamond motifs



Composition of Peacock tree one above the other

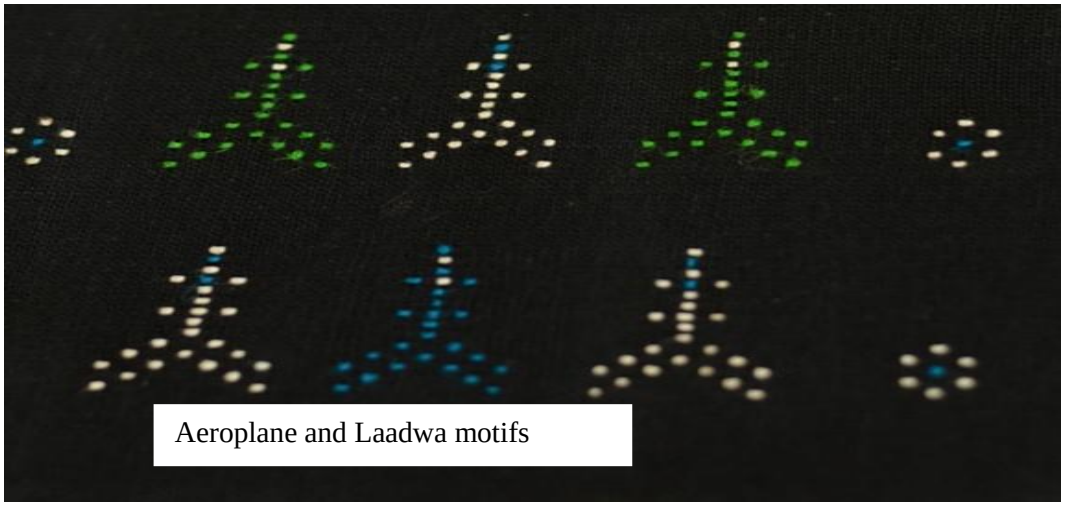


Plate 4.8: Designs on the Tangalia Shawl

3. Jammu and Kashmir

The third place which was visited by the researcher was Kashmir. It is a valley in the mountains of Himalaya. It has a very rich, ancient culture and tradition of shawls weaving. This place had the unique designs and motifs which were made up on the shawls. Here it was noticed that only the elders were engaged in this art, and the younger ones were found to be not as interested. No child was seen working on the loom or charkha, which showed that they were completely against child labor. Few children were found to have knowledge of this art. Presently, traditional shawl weaving is losing its roots slowly. The artisans do not prefer their children to follow the profession. The children are instead pursuing higher studies or working in some multi-national companies (MNCs) which were paying them much higher than what they will earn from the shawl weaving. The languages spoken by the respondents were Urdu, Hindi and most of them could converse in English.

Raw materials and the production techniques

The results in relation to the raw materials and production technique of shawl weaving revealed that shawl weaving technique is learned and passed on from generation to generation. Kashmiri shawls were made up of three types of wool fibers: pashmina, shahtush, and raffal. However, shahtush is now banned from all the three fiber's. On investigating about the time taken to weave a single shawl, it was revealed by the craftsman that it takes a very long time to weave a single shawl. It was also found that, it takes into account a lot of hardships, training and designing to create one shawl. The pashmina fiber was also addressed as cashmere, by majority of shop owners of shawls.

It was seen that handlooms were used for weaving shawls in Kashmir. The goat named Capra hircus produced very fine wool known as "*pashm*". The raw pashmina wool, sheared from the fleece of the domesticated Capra Hircus goat is from Tibet, Ladakh and remote places in Kashmir. The other mountain goat that supplied pashmina is the Capra Ibex. It is also known as the Himalayan or Siberian Ibex. Most of the woollen fabrics of Kashmir were made up of Pashm and hence they were called Pashminas. It was found that the fine fleece which grows beneath the rough outer hair, the finest being that from the under-belly is being used for weaving shawls. In summers, these goats shed their fleeces. These fibers from these goats were very soft, light and warm. The goat again grows new coat in the winter months. The fibers were handspun on the spinning wheel. The prepared yarns were given to the "rangur" or the dyer. The hanks of wool were dyed and put into the bobbins for the shawl weaving processes. The warping process was done by using the stick with the hook which very easily picked up the thread and passed through the warp ring. It took a few hours for the warping process. Once it was finished, it was then attached to the loom and then blueprint was made called as Talim which consisted of certain symbols and colours that had to be incorporated in the shawl. The small bobbins known as "Kani" were used to make up the design depending upon the Talim. It used to take around 15-20 days to weave one pashmina shawl. It might take a longer time to weave the shawl with more intricate designs.

It was seen that the threads which were used for shawls with woven designs varied according to the warping of the shawls. Pashmina was being used for the main body and designs were made by Raffal threads. Jamewars were also made using Kani technique. The most dominant motif in Kashmiri embroidery is the boteh flower. On probing about the motifs, it was revealed that they were woven in extra weft and tapestry techniques. Famous motifs were seen on the shawls such as paisley, lotus and foliage. Chain stitch, satin stitch, the slanted darn stitch, stem, herringbone and the dori or knot stitch were observed and identified by the investigator.

Today, if one wishes to determine whether a shawl for sale is a true Kashmiri shawl or a copy made in Europe, the easiest test is to see whether it has been joined from many pieces or whether it is woven as a single piece. It is thus clear, that Kashmir shawls are woven in a twill-tapestry technique, having multiple weft threads. It was also used to be woven in a number of pieces later joined together. It was told by one of the weavers in Kashmir that since the Kashmir Pashmina was facing the critical challenge of

counterfeiting which reduced its value in the market. Therefore, to overcome this problem, the handicrafts department, came up with a novel concept of fixing nano-technology chips on pure pashmina to make it distinct from the duplicate. According to the Director Handicrafts, "the project was in the sequel to a similar initiative by silk mark India, which introduced an authentication scheme for handmade Indian silk goods. Therefore, the same company that was providing nano-technology tags to the silk mark was hired and these tags were of same quality and standard (Parvaiz, 2017).

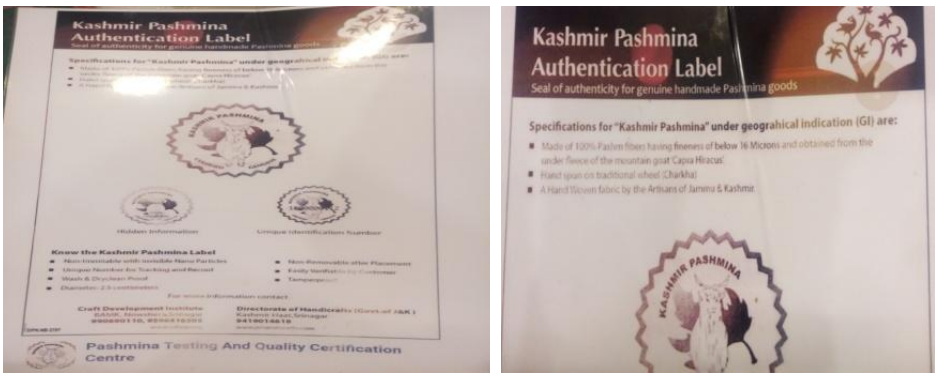


Plate 4.9: Kashmir Pashmina authentication label shared by one of the weavers in Kashmir

Determination of Kashmir Pashmina: While gathering the information about shawls weaving processes, the researcher came across the testing methods, instruments and methodology to determine the specified quality standards for the genuine handmade Kashmir pashmina which got its geographical identification from April 2008. It has been mentioned below in table 4.10 and it was shared by one of the shop owners in Kashmir.

Table 4.10: Determination of the Kashmir Pashmina

S. No.	Parameter to be tested	Testing instrument	Testing methodology
01	Origin of fiber	Differential scanning calorimeter	By testing the thermal properties of Kashmir pashmina fiber
02	Fitness of fiber	Projection microscope	By testing the diameter of Kashmir pashmina fiber
03	Spinning process	Twist tester	By testing the twist direction of the pashmina yarn which in case of handspun yarn is to be "S" twist and "Z" twist in case of machine spinning
04	Weaving process	Pick glasses	By comparing the consistency and variation levels of ends and picks in a given product or item.

Production technique of shawl

The researcher visited the production houses of shawl weaving in Jammu and Kashmir. During the investigation process, the researcher probed into the production process of shawls and did the photographic documentation in order to preserve the tradition in some way or the other. Here the researcher has explained the production process by pictorial representation of shawl weaving methods in plate 4.10.


A-Capra Hircus


B-Capra Hircus


C-Herds of sheeps


D-herds of goats

Plate 4.10 A-D: The goats and sheep for extracting wool. The herds of sheep's and goats searching for food in the mountains. The long-haired goat (Capra Hircus) found on the way to Sonamarg, Kashmir.


E- Shearing of wool


F- spinning yarn


G- Dyed yarns

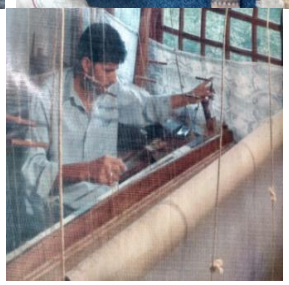

H- Thow shuttle loom

Plate 4.10 E-H: Collection of the wool fibers. The wool was also collected from the mountains and at the bushes of the plants and rocks. The yarn spun through the spinning wheel and then dyed in the dye bath. After dying they were hanged to dry. After the drying process, it was ready to take on the loom for preparing shawls.

I J K L

Plate 4.10 I-L: The woven self-designed, loom made shawl

Q- The blue print of the design R-Blue print of design

Plate 4.10 Q. R: The blue print of the design of flower and foliages used over the shawl. The usage of carbon and kerosene over the tracing sheet to create the design outline.

Plate 4.10 (A-R): The process of weaving shawls at Jammu and Kashmir

A B C

D E F G

H I J K

Plate 4.11 (A-K): The Aari embroidery work on Pashmina

A B C D

Plate 4.12 (A-D): Soznikar (suzi) of Kashmir Pashmina

A B C

Plate 4.13 (A-C): Kani shawl weaving process (www.gaatha.com)

Kani work takes 8 to 9 months for shawl weaving with varied coloured tojis. The place specifically for kani work in Kashmir is the village named Kanihama. The number of small sticks ranged from two to ten depending upon the intricacy of the designs and patterns.

D E F G

Plate 4.13 (D-G): The pashmina shawls prepared by kani technique in single and multi-colours.



H I J K

Plate 4.13 H-K: Blended kani shawls

Plate 4.13 (A-K): The Kani work of Kanihama District, Kashmir (A-K)


A B

Plate 4.14 (A & B): Pure pashmina Zardozi (Zari) shawl.

The researcher visited one of the production houses at Jammu and Kashmir, named Angad Creations. The data procured from them was quite interesting to note. The weaver stated that the merino wool was imported from China and Ladakh. The organization set up the factory for the weaving of shawls. The mention was made of various machines which replaced the handwork and manpower. The machines such as carding machines, in which, the readymade threads were put into the bobbins automatically. The machines took up the single thread, and the double thread is used as per the demand of the customers. It was told to the researcher that 90% of the shawls in Kashmir outlets sold the machine-made shawl from Amritsar and Ludhiana, Punjab.

On further probing it was revealed that some shop owners also sold the fine wool shawl stating them as pashmina shawls in the market. It was found that the ladies shawls' weight was quite lighter than the gents' shawls. Ladies shawls weight was found to be 150-250 gms whereas the gents shawls weight was 250-450 gms or more depending upon the

intricacies of the design and the thickness of the thread. The lady's shawls were 2 m to 1 m in width, and the size of the stoles was 2 m- 1 m. The gents' shawls size was 2.5 m to 1.4 m. On enquiring about the preservation of shawls, the weavers recommended to iron the shawls after every wear for long-lasting. The reason stated by them was that ironing would evaporate the moisture from the shawl and it will keep it safe from even any kind of biological attack. Out of the total places visited, only this production house had machines for weaving shawls. It was observed that the contemporary blended pashmina shawls were being preferred by most of the buyers because of their stability in today's market, cheap price, variety, profitability and high demand. These were made up of mixed fibers depending upon the percentage (mix) of other fibers such as silk, cotton, cashmilon, merino wool, and fine local wool. The contemporary shawls were mainly machine-made ones and could be found in great varieties and designs (Plate 4.15).

A-Double faced shawl B-Two coloured shawl C-Jacquard weave shawl D-Space dyed shawl

E-Kalamkari designed shawl F-Check-striped shawl G-Ikat designed shawl

Plate 4.15: The contemporary Kashmir shawls (A-G)

4. Nagaland

The fourth State visited by the researcher was Nagaland. It is the 16th state of the Indian Union established on 1st December 1963. According to the census reports (2011), it was

observed that there were about 46 Naga tribes, out of which 16 were the major tribes. Here the scenario was totally different from what it was found in the above mentioned three states. It was found that the women were wholly solely responsible for weaving though men helped them in making the loom which was made up of bamboo and wood. The simple backstrap loom was willingly used by the weavers. Nagaland was found to be a state where most of the region is tribal. Weaving was used to be done in the family circle but now this practice of weaving is improving and slowly its becoming profit-oriented due to merchandization.

Raw materials: It was investigated that wool yarns were used to be procured from the neighbouring states. But nowadays these have been replaced by the viscose rayon. Some weavers were themselves not aware of the type of thread they were using and they were calling it wool instead of the synthetic thread. The reason they gave was that it was very easily available in the local market and it was cheaper than wool.

Production techniques: Spinning and weaving were the two major occupational activities carried out by the weavers in the top hills of Nagaland. However, it was observed that the locally available spun yarns were replaced by the machine-made ones. Therefore, recent developments in the globalization division showed that aboriginal weaving techniques were steadily becoming lost. Some of the production houses have been shown in the pictorial presentation as follows.

A

Plate 4.16A: Warping threads
Naga woman was found preparing the warp on warping pegs

B

C

Plate 4.16 (B & C): Loin Loom

Naga women were weaving shawls on the traditional loin loom (Indonesian loom)

During spinning, the tip of the spindle is made wet and the lower one is put into the vessel. The spindle is then rotated in the clockwise direction. The yarns were wetted, pounded, starched and dried. This is how they were made ready for weaving. The one-ply, two-ply and four-ply yarns were dyed. The responses from the weavers stated that earlier there used to be the natural dyes but now chemical dyes were more preferred by the dyers. At present, there were many weavers who just preferred to purchase the dyed threads from outside as they were easily available whereas some of them still dyed them at the work area.

D

E

Plate 4.16 (D & E): Production houses of Naga weavers


F G

Plate 4.16 (F & G): The workshop of weavers.


H I

Plate 4.16 (H & I): Shawl weaving on fly shuttle looms

Plate 4.16 (J)- Traditional shawl weaving

Plate 4.16 (K)- Thread keeper


L M

Plate 4.16 (L & M): The traditional shawl weaving. Ms. Suu (one of the owners of the production houses in Dimapur, Nagaland) presided over the workshop and guided the artisans for the shawls production technique

Plate 4.16: The production houses of shawls at Nagaland

The researcher came across different type of Naga shawls which were woven over the traditional loin loom and fly shuttle looms. These have been presented below in the plate 4.17. The motifs made over the traditional Naga shawls have also been presented in the plate 4.18.

A B C

Plate 4.17(A-C): Tribal Sangtam naga shawl

D E

Plate 4.17 (D & E): Sumi naga mens shawl

F

G

Plate 4.17 (F): Rengma naga men's shawl Plate **4.17 (G):** Lotha naga tradtional woman's shawl

H

I

Plate 4.17 (H)- Naga Sumi traditional stole
Plate 4.17 (I): Naga Sumi tribes' traditional shawl

J

K

Plate 4.17 (J & K): Lotha naga tribal shawl

L

M

Plate 4.17 (L & M): Angami woman's shawl

N O

Plate 4.17 (N & O): Chakesang naga men's shawl

P Q

Plate 4.17 (P & Q): Konyak naga men shawl

R S

Plate 4.17 (R & S): Ao naga men shawl "Tsungkotepsu" shawl

T U

Plate 4.17 (T & U): Chakesang naga men's shawl

Plate 4.17: Tribal shawls of Nagaland

Motifs woven over the traditional shawls of Nagaland

Plate 4.18: Tribal motifs on Naga shawls

4.1.2 Analysis and interpretations of the problems faced by the weavers

In view of the objective no. 2. stated as 'To study the different shawls weaving methods and preservation of the weaving technique', it became imperative to analyse the problems faced by shawls weavers so as to preserve our tradition of shawl weaving and its production process. Therefore, the researcher in this section has analysed the problems faced by the weavers so as to derive certain necessary measures and solutions. The problems addressed by the weavers were different from each region but some of the problems were found common with most of the weavers. In the Kullu region, nearly every dwelling in the valley was found involved in shawl weaving. There were about 21,000 weavers engaged in this craft. The public who was unaware of art, culture, tradition was definitely buying the machine-made ones. The imitations of Kullu shawls were being made by the outsiders. It was investigated that Ludhiana, Punjab was in news for drowning the traditional shawls and hand-woven art. The shawls which were being made on the traditional handlooms were on the verge of being replaced by the power looms due to the quicker output. Where handloom took 4 days for a single

shawl, power looms, on the other hand, was weaving a number of shawls in a single day. The traditional shawl weaving was a time intensive job and it involved a lot of labor. The labor cost decreased, for the one who was weaving it on the handlooms. The weavers had to face a lot of difficulty in the marketing of the shawls at reasonable prices. They were not paid sometimes reasonably. Therefore, the wages earned by the local weaver was less and hence their economic condition wasn't satisfactory.

On questioning about the raw material, it was told by the craftsmen that since there is a difficulty in the availability of local wool, therefore they have to import it from the outside which caused a lot of prices and hence increased the cost of the shawls. For the quality check of wool, it was important to take care of the animal. It should be healthy. The breed of the animal from which the wool is taken was also important. The process of shearing and cleaning also defined the quality of the wool being used for the shawls.

The quality of the locally available wool should also be improved so that they don't have to import it from outside. Along with this, the shops for selling raw materials should also be made so that weavers don't have to search for the raw material and it can be easily available in the areas where concentration of the artisans was more. Therefore, the government should also take necessary measures in this regard and improve the weavers' condition.

Many problems were observed in the handloom industry in relation to the shawl weaving from all the four states such as out-dated skills and methods, unformed fabrication network, low efficiency, insufficient funds, common selection of artefact in making, poor selling line, static output and overall competition from power loom industries. Proper market research is needed if the sustainability of craft is required. The younger generation should come forward and help preserve this art and craft by providing the training in shawls weaving to the amateurs without hampering the pure version of it and help the weavers in coming up with new manufacturing mechanisms and techniques while maintaining its quality. Proper marketing, new production techniques, and standardization, as well as innovative designs of the shawl, are the key factors which should be given importance. Last but not the least an approach should be made to link the producers to the market.

4.1.3 Analysis and interpretations for reviving and preserving the tradition

In this section the researcher has discussed the important measures to preserve the tradition of shawl weaving in relation to the objective no. 2 stated as "to study the different shawl weaving methods and preservation of the weaving technique". The researcher has presented an overview of solutions which can be helpful in changing the socio-economic background of the weavers by addressing the problems faced by them.

The production and marketing of Himachal craft products are helping in preservation and Nagaland have a rich traditional heritage of shawl weaving. But it was found losing its worthiness and richness. The handloom industry was examined to be still underdeveloped. The weavers were facing socio-economic problems. The problem of unavailability and the high cost of the raw material, as well as the higher production cost, made it tough in the daily life of the weavers. Therefore, the efforts were being made by the cooperative societies, the weavers' associations and other organizations related to weaving for reviving this craft. Khamir organization and many such organizations in Gujarat, Himachal Pradesh, Kashmir, and Nagaland were involved in preserving the tradition. It was observed that still there is need for the revival of shawls in the modern market. The entry of famous brands such as Fab India, Nalli with designer shawls in the urban and modern markets had left a negative mark in terms of demand for the traditional shawls. Modernization and industrialization had led to the changes in the socio-economic background of the crafts persons.

Weavers in Gujarat used the vegetable dyes instead of the synthetic dyes. Synthetic dyes replaced the vegetable dyes. It was found that synthetic dyes and chemical dyes had an environmental impact and hence were causing pollution and affecting the human health. One of the weavers revealed that due to the limitations in colours obtained from vegetable dyes, chemical dyes were being used. But this replacement from natural dyes to synthetic dyes should not be the scenario. According to literature referred it was found that natural dyes which were used in ancient India were found to be less toxic than the synthetic dyes which were being used in modern India.

Some of the observations by the researcher has been mentioned in following points.

- In order to preserve our tradition of shawl making it was observed that weavers were being given achievement awards in traditional shawl weaving in order to showcase their talent.
- Mill spun yarn replaced the home-spun yarn which came in the variety of colours.
- There were mostly throw shuttle looms and fly shuttle looms being used by the weavers rather than pit looms.
- It was observed that traditional shawls weaving was at the verge of extinction. One of the main reasons being that the artisans do not prefer their children to follow the profession. The children were rather found pursuing higher studies or working in some multi-national companies which were paying them much higher than what they will earn from the shawl weaving.
- Another reason being that the shawls made on the handloom were expensive as compared to those made on the power loom.
- In addition to it, wool weaving industry had grown manifold in the past ten years, but at the same time, commercialism has caused an overall decline in the quality. Even today, the artisans faced excessive competition in the market in terms of finance, demand for real shawls as well as the power.
- Marketing was also a problem. People were still unaware of the importance of the real woollen shawls and the ones who were aware were ready to pay for the handmade and authenticated real shawls which carried a lot of hard work in it.
- The prices of the raw material were higher in the local market and due to the lack of transport facilities, they were unable to go far off places to buy raw materials.
- It was observed that commercial units were selling their products in the emporiums and showrooms.
- It was also observed that due to the lack of education and educational institutions children were forced to take up this profession of shawl weaving in some of the rural areas.
- The master weavers were found setting good examples too by setting business unit of weaving on the large scale where they employed weavers also.

- Due to the globalization, machine made and synthetic material of wool was easily available and affordable also due to the cut down in market costs. But it was observed that the locals were still lacking faith in the modern market due to the commercialization and its very high altitudes.

On the basis of the observations mentioned above, the researcher has provided the solutions in order to preserve this dying tradition of shawl weaving. These have been mentioned in the following points.

- Government is major support to the weavers and their families. Proper sanctioning of loan for the various artisans and weavers should be given in order to improve their living standards and improved business opportunities for them. It helps them organize different kinds of occasions and functions such as exhibitions, marketing stunts in order to encourage and aid in traditional shawl weaving.

- There are certain NGOs which assists the shawl makers in the procurement of the raw material, variegated expertise in design making as well as marketing of the end commodity. The raw materials prices should also be fixed by the Government so that the weavers can find the raw materials at the local places.

- Various services of financial assistance, market exposures, assimilation of diversified blueprints or plan of designs as well as the conventional help of institutions can cater to the need of the artisans and thereby would be useful to fulfil their necessities.

- The tradition of shawl weaving can also be achieved by providing the manpower and manpower can be achieved by providing the financial stability to the artisans, so that they can transfer the tradition to the future generation by teaching them the art of handloom weaving and its future prospects.

- Empowerment is one of the keys through which the market can grow. The weavers should be appreciated for their real hard work which is so much laborious. They should be given the opportunity to explore and participate in the exhibitions and events not only at the National level but also on the international level. This may led them see the impact, appreciation for our crafts from the world as well as their interest for shawl weaving.

- The tie-up with the retail outlets such as Fab India retail pvt. ltd., Nalli, 360 degrees, the institutions, and organizations should be taken as an initiative to showcase this art to the larger audiences.
- Lastly, training facilities should be provided for the weavers in order to teach them new trends and designs in the shawl weaving.

4.2 Museum Curators and Private Collectors

In order to achieve the objective 3, i.e. To study the different types of shawls in museums, private collections or individuals, objective 4, i.e. To understand and enumerate the preventive and remedial conservation methods adopted by museums in India, private collectors, and conservators in private practice and objective no. 5 i.e. To identify and analyse different kinds of damages that cause degradation of shawls, the researcher visited various museums in India to collect the first-hand information for the present study through interview schedules as well as through the observation method. The preceding section discusses the data procured through personal interviews of the museum authorities. The data has been analysed and interpreted qualitatively. The museums were classified on the basis of the type of museum, their controlling authority, year of establishment and the location. The data on the general information about museums interviewed has been presented in the table 4.11.

Table 4.11: Museums Data

S. No.	Name of the Museum	Type of Museums	Location of museums	Year of Establishment	Controlling Authority	No. of shawls in collections
1.	Government museum and art gallery, Chandigarh	Multipurpose Museum	Jan Marg, Sector 10C, Chandigarh	1968	Government museum	10
2.	Himachal State Museum, Shimla	Multipurpose Museum	Chaura Maidan, Shimla-171004	1974	Government Museum	DNR
3.	Bhuri Singh Museum, Chamba	Multipurpose Museum	Hatnala Gali, Chowgan Mohalla, Chamba, H.P. 176310	1975	Government Museum	DNR

4.	Kangra Art Museum, Dharamshala	Art Museum	Kotwali Bazaar, Dharamshaala	1990	Government Museum	4
5.	Baroda Museum and Picture Gallery, Vadodara	Multipurpose Museum	Dak Bunglaw, Sayajigunj, Vadodara, Gujarat 390018	1894	Government Museum	DNR
6.	Kutch Museum, Bhuj	Multipurpose Museum	Opposite Hamirsar lake, Bhuj, Gujarat, India	1877	Government Museum	Nil
7.	National Handicrafts and Handlooms Museum, Delhi	Specialised Museum	Pragati Maidan, Bhairon Road, New Delhi, India	1956	Government Museum	300
8.	National Museum, New Delhi	Multipurpose Museum	Janpath, New Delhi	1949	Government Museum	DNR
9.	Bharat Kala Bhavan, Varanasi	Multipurpose Museum	Opp. Institute of Management Studies, Banaras Hindu University, Varanasi	1920	University Museum	DNR
10.	State Museum, Lucknow	Multipurpose Museum	Narhi, Hazratganj, Lucknow, Uttar Pradesh, 226001	1963	Government Museum	DNR
11	Allahabad Museum	Multipurpose Museum	Chandrashekhar Azad Park, Allahabad, Uttar Pradesh	1931	Government Museum	35
12	State Museum, Directorate of Art and Culture, Government of Nagaland	Multipurpose Museum	Upper Bayavu Hill, Kohima, Nagaland	1970	Government Museum	DNR

13	CSMVS, Mumbai	Multipurpose Museum	Mahatma Gandhi Road, Kala Ghoda, Fort, Mumbai, India	1922	Autonomous Trust	75
14	Indian Museum, Kolkata	Multipurpose Museum	Chowringhee - Kolkata, West Bengal, India	1814	Government Museum	125
15	City Palace Museum, Jaipur	Multipurpose Museum	Jaleb Chowk, opp. Jantar Mantar, Jaipur, Rajasthan	1727	Government Museum	DNR
16	Albert Hall Museum, Jaipur	Multipurpose Museum	Museum Road, Ram Niwas Garden, Kailash Puri, Adarsh Nagar, Jaipur, Rajasthan 302004	1876	Government Museum	DNR
17	Salarjung Museum, Hyderabad	Multipurpose Museum	Minar function hall, Darushifa, Hyderabad, Telangana	1951	Government Museum	DNR
18	Dogra Art Museum, Jammu	Art Museum	Panjtirthi, Jammu, Jammu and Kashmir 180001	1954	Government Museum	DNR
19	Shri Pratap Singh Museum, Srinagar	Multipurpose Museum	Lal Mandi, Srinagar, Jammu and Kashmir	1898	Government Museum	62
20	Calico Museum of Textiles, Ahmedabad, Gujarat	Specialised Museum	The Retreat, Airport Road, Opp. Rani Sati Mandir, Jain Colony, Shahibaug, Ahmedabad, Gujarat,	1949	Sarabhai Foundation/ Trust	DNR

			380004			
21	Shreyas Folk Museum, Ahmedabad, Gujarat	Multipurpose Museum	7/8 Shreyas Tekra Rd, Opposie Mithila society, Bhudarpura, Ahmedabad, Gujarat, 380015	1977	Charitable Trust	DNR
22	Sanskriti Kendre Museum, Delhi	Multipurpose Museum	Mehrauli-Gurgaon Road, Anandagram, New Delhi, 110047	1993	Registered Public Charitable Trust	20
23	Arts and Crafts Museum, Gandhi Smriti, Bhavnagar	Multipurpose Museum	Gandhi Smriti, Bhavnagar	1963	Gandhi Smriti Trust	DNR
24	Living, learning and design centre, Shrujan Campus, Bhuj	Specialised Museum	705, Bhuj-Bhachau Hwy, Ajrakhpur, Gujarat 370105	2016	Shrujan Trust	DNR

DNR: (Data Not Revealed). In order to maintain confidentiality of the data some of the museums did not reveal the number of shawl collections.

The table 4.11 reveals the total number of museums visited by the researcher. The analysis of the information on the types of museums, their controlling authority and the number of shawl collections in each museum has been presented in the tables mentioned below.

Table 4.11a: Analysis of museum data in terms of types of museums

Type of Museum	Museum Data N (total number)-24 f-(frequency)	%
Multipurpose Museum	19	79.16
Specialised Museum	3	12.5
Art Museum	2	8.33
Grand Total	24	100

The museum data was further analysed on the basis of the type of museums. The results in terms of classification of museums data revealed that out of the total 24 museums, maximum i.e. 19 were classified under the multipurpose category followed by 3 specialised museums and 2 art museums. It was seen that out of the 24 museums in the country only three museums were found to be specialised textiles museums (12.5%). The data pertaining to the controlling authority has been presented in the table 4.11b

Table 4.11b: Analysis of museum data in terms of controlling authority

Controlling Authority	Museum Data N-24	
	f	%
Government museums	17	70.83
University Museum	1	4.16
Trusts	6	25
Grand Total	24	100

The results in terms of classification of museums data revealed that out of the total 24 museums, maximum i.e. 17 museums (70.83%) were governed by the Government of India followed by 6 museums which were controlled by the trustees and only 1 museum (4.16%) was found to be the University museum.

Table 4.11c: Analysis of museum data in terms of the number of shawl collections

No. of shawls	Museum Data N-24	
	f	%
DNR	15	62.50
Nil	1	4.17
10	1	4.17
4	1	4.17
300	1	4.17
35	1	4.17
75	1	4.17
62	1	4.17
20	1	4.17
125	1	4.17
Total	24	100

The results in terms of classification of museums data revealed that out of the total 24 museums, maximum i.e. 15 museums i.e. 62.50% didn't reveal the numbers of shawls in the collection. It was found that a museum didn't have the shawls in their museum collections. It was also found that only 8 museums revealed the data and maximum number of shawls were found to be 300 in one of the museums.

Other than these classifications, the data on type of disasters in different museums was procured and is shown in Table 4.12.

Table 4.12: Distribution of museums on the basis of the type of disasters

Museum	**Type of Disaster**
Govt. Museum and Art Gallery, Chandigarh	Theft
Kutch Museum, Bhuj	Earthquake
Shri Pratap Singh Museum, Srinagar	Flood
Baroda Museum and Picture Gallery, Vadodara	Flood
Shreyas Folk Museum, Ahmedabad	Theft and flood
Sanskriti Kendre Museum, New Delhi	Fire and flood
Tapi Collections, Surat	Flood

Table 4.12a: Analysis of museums on the basis of the type of disasters

Type of Disasters	Distribution of Museums N-24 f	%
Flood	5	20.83
Theft	2	8.33
Earthquake	1	4.17
Fire	1	4.17
No Disaster	17	70.83

According to the table 4.12a, out of 24 museums, 7 museums faced disaster. It was found that maximum museums came across the problems caused by flood, followed by theft which was faced by two museums. Earthquake and fire was faced by 1 museum. Precautionary measures were being taken by the museum staff in order to save the collection from disasters.

4.2.A. Museum Curators

The researcher in this section has discussed each museum individually along with data procured with the help of interview schedules and by the observatory method. This section presents an individual report of the museums pictographically which was made on the basis of the documentation and condition of the shawl's collections on display and storage. Only that information has been stated which was revealed by the museum staff. Therefore, there may be variations in the data for each museum. Personal survey of each museums undertaken by the researcher is as follows.

1. Government Museum and Art Gallery, Chandigarh

The researcher explored the museums' library in order to procure the information on the shawl's collections. The catalogue cards in the library, showcased the details of the shawls at the museum which has been given in the table 4.13 below.

Table 4.13: The shawls details at the Government Museum and Art Gallery, Chandigarh.

S. No.	Title	Period	Provenance	Dimensions	Physical Condition
1.	Woollen shawl	19th Century A.D.	Kashmir	$4^{2/3}$ X $152^{/3}$	Damaged and torn
2.	Embroidered shawl on woollen base	19th Century A.D.	Kashmir	6' X 6' .10	Damaged, puckering in the middle
3.	Sikander namah rumal (Pashmina, embroidered with wool)	1852 A.D.	Jammu, J&K	175 X 193 cm	Satisfactory-repaired
4.	Dosala with Amlikar work	19th Century A.D.	Kashmir	5'. 9" X 5' .5.5"	Creases
5.	Dosala (Zari work on cloth)	19th Century A.D.	Punjab plains	50 X 100"	Damaged badly
6.	Do Shala (on woollen base)	19th Century A.D.	Kashmir	162 X 344 cm	Damaged edges
7.	Shawl (wool, embroidered)	Ca. 20th century A.D.	Kashmir	218.5 X 79 cm with tassels	Threads fraying, stained, tassels damaged

The data stated in the table 4.13 was further classified in terms of the period, provenance and conditions of the shawl's collections in museum in order to achieve the required outcomes.

Table 4.13a: Analysis of the shawls in terms of their Period

Period	Shawls' Details N-7	
	F	%
18th Century A.D.	1	14.28
19th Century A.D.	5	71.42
20th Century A.D.	1	14.28
Total	7	100

Table 4.13a revealed that maximum shawls were from 19th century A.D. at Government Museum and Art Gallery, Chandigarh. The curator revealed that they either purchased the shawl or it was gifted for the museum collection.

Table 4.13b: Analysis of the shawls in terms of their Provenance

Provenance	Shawls' Details N-7 f	 %
Kashmir	5	71.42
Punjab	1	14.28
Jammu	1	14.28
Total	7	100

It was observed in table 4.5b that maximum shawls were from Kashmir region with the highest percentage of 71.42%. It revealed that Kashmiri shawls were more famous for their intricate designs and techniques as compared to shawls from Punjab and Jammu.

Table 4.13c: Analysis of the shawls in terms of their physical condition

Condition	Shawls' Details N-7 f	 %
Satisfactory	1	14.28
Damage and torn	5	71.42
Creases	1	14.28
Total	7	100

As seen in table 4.13c, 71.42% of shawls were found to be damaged and torn while 14.28% of shawls were found in satisfactory condition and with creases. The shawls condition revealed that no textile conservator was present to look after the collection.

2. Himachal State Museum, Shimla

The mission of this museum is the conservation and preservation of cultural heritage for posterity. The researcher investigated about the shawls collection and their condition. It was revealed that there were woollen shawls and they were all in good condition. There were local woollen shawls. They were recently purchased and housed in the galleries, in order to show the ethnic culture of Himachal Pradesh. All the organic objects were sorted together in order to keep them in the storage. The curator responded that there was no separate storage area for textiles. 90% of the shawls' collection was on display. They were displayed according to different regions of the Himachal Pradesh. The researcher has presented some of the photographs from the display section of the museum. The shawls were found displayed on the mannequins in plate 4.19.

a

Plate 4.19a: Kinnauri Dress (from Kinnaur, H.P.)

b

Plate 4.19b: The closer view of the shawl

c

Plate 4.19c: Pangwali Dress (from Chamba, H.P.)

d

Plate 4.19d: Gaddi Dress (from H.P.)

e

Plate 4.19e: Kullu Dress (from Kullu, H.P.)

f

Plate 4.19f: Closer view of the shawl

g

Plate 4.19g: The display of Chadru (Rohru Shimla) on the left hanging position. It is a Gent's woollen shawl in the geometrical pattern. Two shawls in the center are Pattu Kullu shawls (ladies) and besides it, is a Pattu Kullu shawl for gents. Pattu shawls for ladies consists of the geometrical pattern along with floral colourful motifs in order to make it more feminist and beautiful for ladies whereas the pattu Kullu shawls for gents is simple and only have geometrical patterns with extra warp threads.

h i j k

Plate 4.19h: Kinnauri lady laden with traditional jewellery and shawl

Plate 4.19i: Spiti Belle (from Spiti, H.P.)

Plate 4.19j & k: The ladies wearing traditional shawls from Himachal Pradesh

Plate 4.19: Display of shawls at Himachal State Museum, Shimla

A discussion with the curator of the Himachal State Museum, Shimla, Mr Hari Chauhan revealed that the curator can neither organize nor can take part in any training programme organized on any aspect of museology because there is no sufficient staff in the museums of Himachal Pradesh.

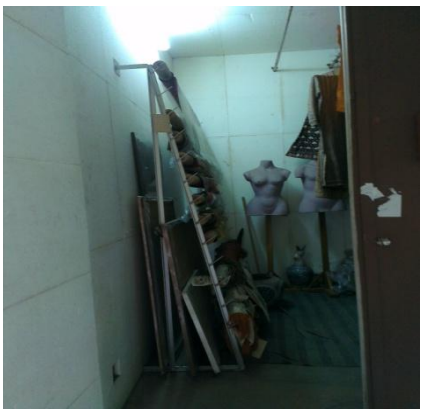
3. Kangra Art Museum, Dharamshala

The researcher found that work for developing the documentation software was under process. Observations revealed that textile gallery was under renovation. The museum curator unveiled that museum had a collection of 4 woollen shawls. All the shawls were in good condition owing to the fact that the shawls were not dated. Out of the four shawls in the collection, three shawls were found to be of the mixed wool and one was pashmina shawl. On probing about their storage, it was disclosed that all the organic objects were placed together in the storage.

4. Baroda Museum and Picture Gallery, Vadodara, Gujarat

The mission of this museum is education and entertainment. The observations regarding the display section of the museum revealed that the materials used for display were stainless steel rods, acid-free tissues, and the wooden boxes which were made up of sag and sesame. As far as the storage is concerned, the artefacts were found in the distorted shapes. In order to overcome the problem of folds, creases and splitting, butter papers and acid-free papers in the form of sausages may be used at the folds of the artefact.

The museum curator stated that new recruitments were not done by the government and the posts were demolished. It was found that gallery attendants were 34 in the past and now only 13 were left due to retirement. Some of the pictures of the storage at Baroda Museum and Picture Gallery have been presented in plate 4.20.



a

b

c


d


e


f


g


h

i


j


k


l

Plate 4.20j: The exhaust inside the store in order to keep up the ventilation.

Plate 4.20k: The accession number written over the textiles in white.

Plate 4.20l: The accession number written over the roller and the textile.

Plate 4.20 (a-l): The storage of textiles at the Baroda Museum and Picture Gallery, Vadodara, Gujarat

5. The Crafts Museum, Delhi.

The National Handicrafts and Handloom Museum (NHHM) is also known as Crafts Museum. On probing the conservators, it was found that cotton and woollen shawls were slightly damaged whereas silk shawls were badly damaged. The total numbers of shawls in deteriorated condition were 110. The total numbers of shawls in good condition were 100. The total numbers of woollen shawls in the collection were 70. Shawls made of mixed wool were 4 and they were badly damaged. Shawls made of Shahtoosh were 6 and

they were also badly damaged. The deteriorated condition of shawls in the museum reflected that there was no textile conservator to take care of these shawls. There were total 60 pashmina shawls and they were slightly damaged.. The shawls on display were mostly Kashmiri shawls of the 19th and 20th century with paisley motifs, most of them were conserved and sourced from purchase and donation. The display method used for shawls was folder type mounting technique and materials used for display were wood and polyethylene. The conservators also revealed that from the past one year no instrument was used to collect daily temperature measurements. The reason for not maintaining the temperature stated by one of the keeper was that the technical advice was not available and required instruments were not easily available. The lighting and air circulation was observed in the museum and it was found not satisfactory (plate 4.21). The shawls needed urgent conservation. The researcher observed that shawls were damp and had water stains because the building leaked during monsoon. The macro climate was not being maintained in the galleries.

a b

Plate 4.21a: The view of the lighting system, air ventilation vents, and windows.

Plate 4.21b: Window for the air ventilation and natural lighting inside the galleries. Seepage was noticed below the wall of the window.

Plate 4.21 (a & b): Lighting and air ventilation system inside the textiles' gallery at Crafts Museum, New Delhi.

It was stated by one of the keepers at the museum that multi-tasking staff (MTS) was in charge of the galleries. The weavers were being promoted as the curator of the gallery. The researcher observed the display section of shawls and restoration work over the shawls which has been presented in the plate 4.22.

a b c

Plate 4.22a: Square shawl displayed at museum**.**

Plate 4.22b: The date of purchase/storage no./s. no. written on the stretcher of the shawls

Plate 4.22c: The shawls display at the museum

d e f

Plate 4.22 (d-f): Close up of the conservation work done over the shawl and its conserved areas.

Plate 4.22: Textiles Gallery, Crafts Museum, New Delhi

6. The National Museum, New Delhi

The curator of the textile's gallery revealed that the number of shawls' collection was not known as the project named 'JATAN' was under process wherein the collection was being reviewed by the museum professionals. On further probing about the shawls, it was found that the shawls such as pashmina, jamawars and shahtoosh were in the museum collections. The artefacts in the gallery were either gifted or they were purchased. The shawls were dated 17th, 18th or 19th century. The researcher observed that once the object was taken by the museum, it was kept in the quarantine area for the further action. The researcher found that the present textiles gallery was under renovation. Some of the photographs of the shawls from the display section have been presented in plate 4.23.

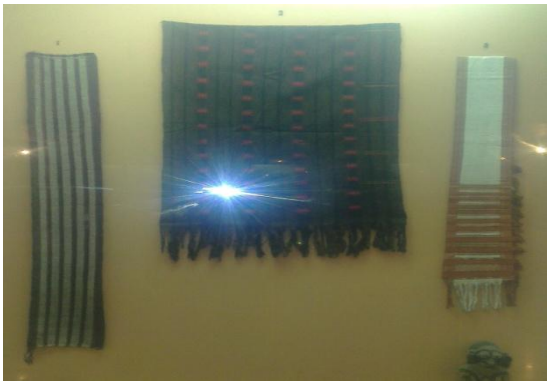

a b

Plate 4.23 (a & b): Shawls displayed at National Museum, New Delhi




c d e f

Plate 4.23 (c-f): Shawls displayed on the mannequins at the museum




g h

Plate 4.23 (g & h): Shawls displayed in the folded manner at the National Museum, New Delhi

Plate 4.23: Display of shawls at National Museum, New Delhi

The curator opined that in order to protect the shawls from moisture and dust, tyvek is being used by the museum in the storages. It absorbs the moisture and protects the shawls

from dust. It was investigated that the Central Public Works Department (CPWD) was given the responsibility to collect the daily temperature measurements of the galleries in the museum.

7. City Palace Museum, Jaipur

The researcher interacted with the curator of the museum regarding the display and storage. It was found that they were not in a good condition and the staff was working very hard to bring it to the right condition. The collection had a number of 18th and 19th century shawls. It was found that most of the shawls in the collection were from Punjab, Kashmir, and Bikaner which were categorized into three categories: damaged, badly damaged and slightly damaged.

Three shawls were observed on the display. One of the shawls on the display was named Char bagh whose four corners were in red, black, blue and green colours. It was embroidered with kalabattu. It had been acquired through the courtesy of Lord Mayo in 1870, Punjab. Its size was L. 185 x w. 180 cm. Labelling of the display section was done in English and Hindi languages.

In this shawl, visible retouching/stitching work was done. In the dark area light coloured thread was used and in the light area, dark coloured thread was used. Patchwork was done with the dark coloured cloth on the lighter cloth. The conservation work done was mainly stitching, darning and patchwork in order to mend the tears, holes, cuts, etc. The curator revealed that the preservation of shawls was mainly done by using naturally available sources such as clove oil, tobacco leaves, etc. Readymade sources such as odonils and naphthalene balls were used. On further probing it was found that there were no curatorial measures on the shawls from 2002 till 2013. Most of the museum's artefacts were given to private conservator for its restoration.

It was observed that conservation laboratory of the museum was under the process of maintenance. The researcher found that for preservation in storage area, naphthalene balls wrapped in tissue paper were kept in the corners of the almirahs. The shawls were folded in acid-free tissue paper and then wrapped in polythene sheets which showed that the museum staff was well aware of the detrimental effects of environment on the shawl collections. The folds of the shawl collections were changed in 2010 and then changed in 2014. It was observed that the textiles were kept directly on the steel almirahs. The shawls

were tagged by using the cloth (square shaped) on which name of the museum, type of textiles, category no. and article no. was written.

8. Albert Hall Museum, Jaipur

Discussion with Mr. Rakesh Chholak, curator, Government Central Museum, Albert Hall, Jaipur regarding the preventive conservation revealed that ajwain, dried neem leaves and phenalene cloth was used for the shawls. Sometimes silica gel was used in the display area to absorb the excess moisture content in the air during monsoon. The researcher photographed few shawls on the display which have been presented in plate 4.24.

a b c

Plate 4.24a: A shawl folded and hanged
Plate 4.24b: Nails noticed at the corners of the artefact.
Plate 4.24c: The stains were also noticed on the shawl.

Plate 4.24: The display of shawls at Albert Hall Museum, Jaipur

It was observed that raw silk and refined jute were used in display showcases as the background. Plastic hooks were used to tuck the cloth on display mainly from the sides and corners. In some displays, the cloth was tied to the back by making small stitches to the sides and corners. One of the shawls was folded lengthwise and displayed (Its parts were lost form the edges). It was observed that the labelling on the showcases was not done properly.

The observations regarding the shawls on display: It was found that shawls were badly damaged and lost from the corners, due to fungus and moisture. Brown coloured spots were also seen on the cloth. The cloth became brittle and very fragile. One of the cloths was clipped by iron nails so strongly that the threads were getting apart. Wrinkles were also seen on it. The impression by the plastic fixers was also seen at the edges. The condition of the shawls on display reflected that the museum staff was unaware of the

proper display technique for the shawl collections. In this matter the researcher suggested that the usage of these iron nails and plastic fixers should be avoided on the museum collections as nails may harm and stain the shawl collections on display.

It was noted that the museum building was renovated between April 2007 to June 2008. The museum officials undertook the measure to repair the building to prevent the seepage, flooding and general wear and tear. The measures turned out to be of great value to the museum. Outdated facilities were upgraded such as introducing the lighting of international level and bus bar lighting apparatus throughout the museum. CCTV cameras and unbreakable glass for showcases were installed to enhance the security measure. Special care was taken to display the objects in the aesthetic environment with carefully chosen cloth lining and pedestals. In order to control the pests, hanging nets were being used to keep pigeons out. Fencing was reconstructed and pavements were also repaired around the museum building.

9. Bharat Kala Bhavan, Varanasi

The shawl from Kashmir was observed in the display section. This was the only shawl displayed. It was found that direct light was falling on the surface of the shawl which was un restored and had lots of damages. The shawl needed urgent restoration. It is always recommended to avoid direct, intense, uneven and uncontrolled lighting on the artefacts. It was found that no textiles conservator was present to look after the collection. The museum official disclosed that the museum once faced termite attack. It was being treated by the national agency for termite treatment which gives the guarantee for ten years. The reorganization of the storage was under process. It was revealed by the museum official that the remedial conservation was being done at INTACH, New Delhi for which the museum has made memorandum of understanding (m.o.u.). On further probing it was revealed that Mr. Dharmendra Mishra is contacted from INTACH, New Delhi in order to conserve the collection. There was no recruitment for the staff from the past few years to take care of the collection.

10. State Museum, Lucknow, Uttar Pradesh

Textiles gallery of the State Museum, Lucknow, Uttar Pradesh was closed from the past 6 and half months and it was found that the curator of the textiles gallery was on leave. According to the attendant of the other gallery, the textiles were only displayed whenever

any exhibition is organized. The researcher photographed some of the security features and heating, ventilation and cooling (HVAC) features inside the museum which have been shown in the plate 4.25.

a-Fire alarm panel

b- Sign board

c- Fan for air circulation

Plate 4.25: The security and HVAC features inside the State Museum, Lucknow

11. Dogra Art Museum, Jammu

The researcher observed five shawls on display. The problems observed on displayed shawls were holes, tears and fading. The reason for the fading was found to be direct and intense lighting on the shawls surfaces' which reflected lack of awareness amongst the staff on the preventive measures. This kind of lighting should be avoided as far as possible. The display of shawl collections at the museum has been shown in plate 4.26.

Plate 4.26: The display of the Pashmina shawls at Dogra Art Museum, Jammu

12. Salar Jung Museum, Hyderabad

The discussion with museum conservators revealed that conservation laboratory will be constructed in collaboration with National Research Laboratory for Conservation (NRLC), Lucknow. It was found that shawls were displayed differently in the two different galleries of the museum. The shawls were displayed through stitching technique in the Kashmir Gallery and the shawls were displayed on the rollers in the Printed Textiles Gallery. It was

observed that only English language was used for labelling and information boards. The researcher has presented the photographs from the display section along with some of the lighting and HVAC features inside of the museum (plate 4.27).

a

Plate 4.27a: Silk shawl embroidered to represent elongated leaves. Turanj patterns and flowers all over Textile, 19th Century, India (Kashmir).

b

Plate 4.27b: Woollen shawl: Hanging vertical panels in different colours. 18th Century.

c

Plate 4.27c: The display of Kashmir shawls in the Kashmir gallery

Plate 4.27: The display of shawls at Salar Jung Museum, Hyderabad, Telangana.

a b c d

Plate 4.28a: Usage of dehumidifiers in the gallery.
Plate 4.28b: The lightening system, open vents and smoke detectors installed in the gallery.
Plate 4.28c: The use of signages all over the galleries.

Plate 4.28: Lighting, HVAC and other features inside the textiles gallery at the Salar Jung Museum, Hyderabad, Telangana

It was also found that there were only two conservators for conserving the museum collection. On probing about the cleaning of shawls it was revealed that good condition shawls can be washed by the immersion method and that it can be cleaned by the petroleum ether.

13. Indian Museum, Kolkata

The discussion with head of the conservation department revealed that around 100 shawls were restored in the museum. On observation, the display of the shawls was not found satisfactory. It reflected that the museum staff required proper understanding of display methods and techniques which were the lacking. Researcher found that the infrastructural facilities were also lacking so as to take care of the shawl collections. It was observed that three languages Hindi, English, and Bengali were used for labeling in the display section. The photographs of the display section have been presented in the plate 4.29.

Plate 4.29a: The shawls display section inside the textiles gallery

b

c

d

Plate 4.29b: Shawl, Wool and embroidered, Amritsar, Punjab, 19th Century, C.E.

Plate 4.29c: Shawl with Kalka motif, Kashmir, 19th Century, C.E.

Plate 4.29d: shawl, wool and embroidered, Kashmir, 1908 CE

e

f

g

Plate 4.29e: Shawl, Wool and embroidered, Kashmir, 19th Century, CE

Plate 4.29f: Shawl, Wool and embroidered, Kashmir, 19th Century, CE

Plate 4.29g: Shawl with Kalka Motifs, Wool and embroidered, Kashmir, 19th Century CE

Plate 4.29: Display of shawls at the Indian Museum, Kolkata

14. Chhatrapati Shivaji Maharaj Vastu Sangrahalay (CSMVS), Mumbai

The mission of this museum is to be recognised Internationally as a leading example and resource for the best people centric museum practice, education and management. On probing the textile conservator, it was revealed that the woollen shawls were in the slightly damaged condition. The pashmina shawls were more found in the collection. Textiles Gallery presented the glimpse of Indian textile traditions based on a small but significant collection from the CSMVS museum & 'Tapi Collection of Praful and Shilpa Shah'. Hindi and English languages were found used for labelling in the gallery. The collection of shawls in the museum was found to be in a less deteriorated condition as compared to the other museums. The researcher found that shawls were also properly displayed in the textiles' gallery as compared to the other museums which have been shown in the plate 4.30.

a b c

Plate 4.30(a & b): Shawl: Pashmina wool with jari embroidery, Punjab, late 19th, CE.

Plate 4.30c: Alfidar shawl: Pashmina wool, Kashmir, late 18th Century, CE. The means a shawl with motia (off white) field decorated with simple butti or springs.

Plate 4.30: The Display of Shawls at CSMVS, Mumbai

15. Sri Pratap Singh Museum, Srinagar

The researcher found through the discussion with curator that there were total 62 shawls in the collections. These were all pashmina shawls. The 50% of shawls were in slightly damaged condition and the rest 50% were in badly damaged condition. It was found that very few shawls from the collection were in good condition. The thymol crystals and naphthalene balls were being used as repellents for the protection against bio-

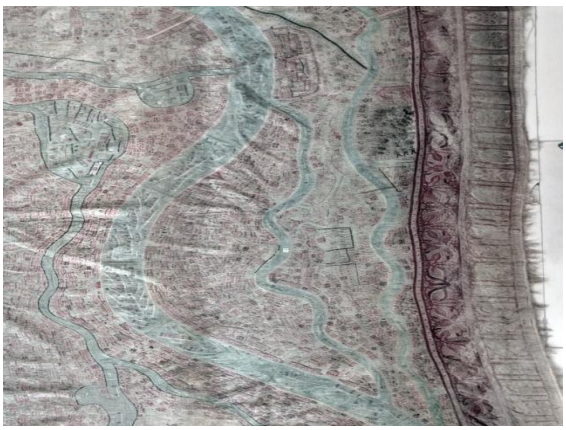
deterioration. This museum once faced the disaster i.e. flood in 2014. The curator revealed that the damages caused due to flood were deposition of mud, dirt, mold growth, water stains, increased fragility, distortion, shrinkage, swelling, insoluble dyes and pigments. It was also noted that the flood affected textiles will be treated by the National Museum, New Delhi. Mtr. Ulfat (museum assistant) will be trained by the National Museum, New Delhi on the textile's conservation. The collection of shawls was still waiting to be conserved and there was no trained conservator to look after the precious museum artefacts.

A

B

C

D



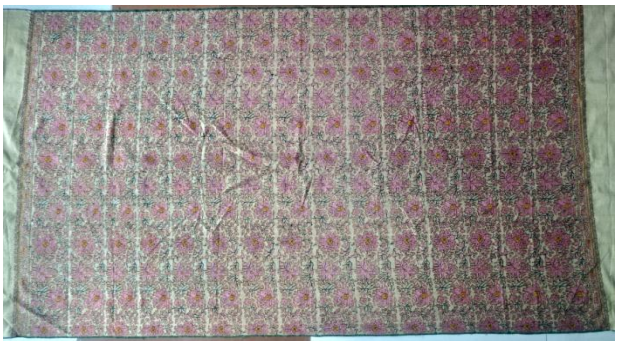
E

F

G

Plate 4.31 (A-G): The square shawl showcasing the map of Srinagar from the reserve collection, SPS Museum, Srinagar

The above presented shawl (plate 4.31) was affected due to the flood in 2014. The shawls was kept in the storage in the folded manner which reflected an example of poor storage. The mud stains at the lower portion of the map and at the back of the shawl were very much visible.



A

B

C

C

D

E

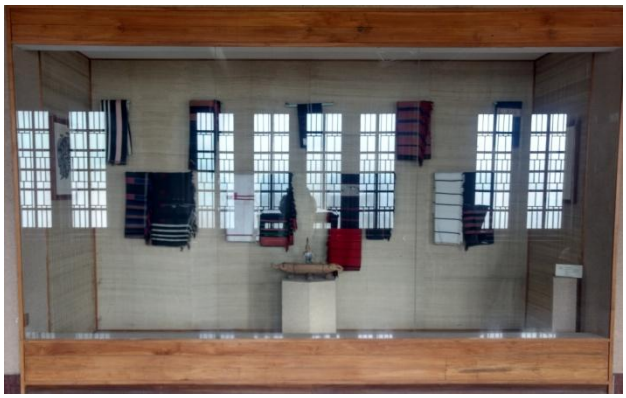
Plate 4.32 (A-E): The woollen pashmina shawl from the reserve collection, SPS Museum, Srinagar

The curator revealed that only preventive conservation was being practiced in this museum. No shawls were on display because the renovation work was under the process in the galleries. The artefacts were being shifted from the old museum building to the new museum building because the old building and the museum collections got affected due to the flood in 2014. It was noted that the museum doesn't had the well-equipped conservation laboratory.

16. Nagaland State Museum, Kohima

In this museum, remedial conservation laboratory was under consideration by the museum authorities. The shawls were found to be in the good condition on display. The researcher has presented the shawls from the display section in the plate 4.33 and plate 4.34 mentioned below.

Display of the collection



A

B

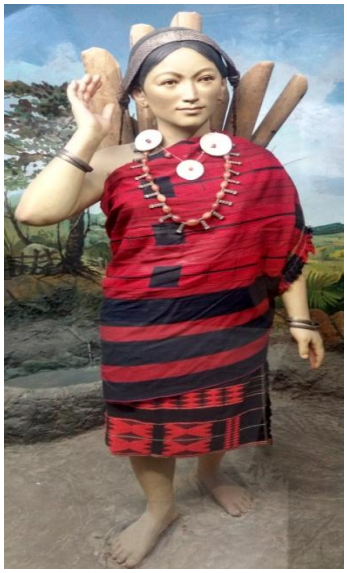
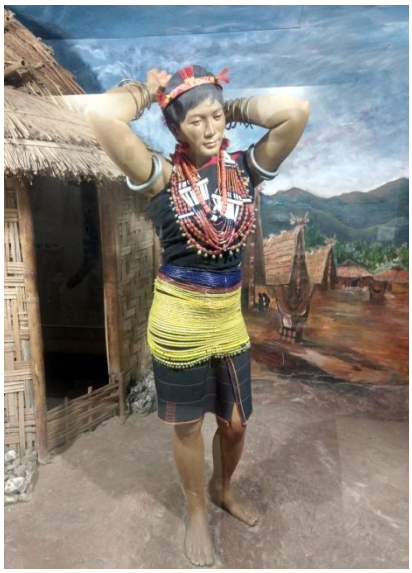
C D

Plate 4.33 (A-D): The display of shawls on plastic rollers.

E F G

Plate 4.33 (E): A Zeliang lady in her traditional finery, striking a pose while performing the "Butterfly Dance". The Zeliangs have outstanding dances which can be on par with any other fine dance movements outside the state.

Plate 4.33 (F &G): The black and white picture of the girls wearing the traditional attire.

H I J

Plate 4.33(H): A Phom Damsel in her traditional outfit.

Plate 4.33(I): A Sangtam woman carrying water in bamboo barrels.

Plate 4.33(J): A rich sumi belle posing in her fineries. The extra rows of beads in her girdle symbolizes her rich status in society.


K L

Plate 4.33(K & L): Yimchungru: A family engaged in the art of weaving textile the traditional way. Locally grown cotton was processed, dyed using colours obtained from vegetables and plants, then woven using the back- Tension Loin loom.


M N

Plate 4.33(M): A Naga warrior performing a victorious war dance.

Plate 4.33(N): Chakhesang: A craftsman weaving bamboo basket. While at work he occasionally sips rice-beer from the bamboo mug. The ornaments and ivory armlet speak of the man's wealth.



O P Q

Plate 4.33(O): An Ao lady in her rich traditional outfit, on her way to attend a festival.

Plate 4.33(P): A Rengma woman busy in her Jhum field. Also known as Shifting cultivation, the soil is ploughed, broken to fine granules and levelled. Then with the help of bamboo rake besides her, the weeds are gathered and burned for manure.

Plate 4.33(Q): A lotha woman husking paddy on a pounding table. After pounding, the husk separated from the grain by winnowing. The forefront of a naga house is normally used for various domestic works.



R S T

Plate 4.33(R): Khiamniungan: A Khiamniungan lady setting out for field work. In her basket, she carries her rain shield, lunch and agricultural implements.

Plate 4.33(S): An Angami couple visiting relatives in neighbouring village during 'Sekrenyi' festival. Carrying meat, rice-beer and traditional cuisine. This polite gesture is reciprocated. Sekrenyi also called 'Phousanyi' is a ceremonial feast of purification for the men folk. This expensive festival lasts for 10 days.

Plate 4.33(T): This shawl was donated by E.T.D. Lambert, S.D.O. Mokokchung, (1933-1935) and it is displayed in the museum.

Plate 4.33: The display of tribal shawls of Nagaland

a b c

Plate 4.34 (a-c): Sangtam: A couple in their outfit. The wife's mekhela/skirt with intricate design and colour combination depicts that sangtam women were expert weavers. The shawl on display was richmen's wear.

d e f g

Plate 4.34(d-g): Zeliang: A well to do Zeliang couple from Benreu. The threads of the white shawl were spun by the weaver cum donor herself. Zeliang were known for their dance.

h i j

Plate 4.34 (h-j): Lotha: A couple in casual wear. The husband's shawl was known as Longpensu. The young couple delightfully posing with their wedding gift, opvuram a women's wear woven by an expert weaver.

k l m n

Plate 4.34 (k-n): Phom: An adult couple in their casual outfit. The wife's shawl was woven by elderly women. Dancing sash, a skirt and rich men's' wear on display.

o p q

Plate 4.34 (o-q): Rengma: A couple in traditional finery. The wife's cowries shawl was the symbol of the family status. The man's apron was ornamented with very fine jobs tear. Rengmas were expert in this field. Warriors shawl and dancing sash on display.

r s t u

Plate 4.34 (r-u): Yimchunger: A couple in traditional finery cowries shawl was worn after giving feast of merit. The square design shawl on display was men's wear. One was entitled to wear only after participating in social event. The display on the left was tikhers of Yimchungers' wear.

v w x y

Plate 4.34(v-y): Angami: A couple in traditional outfit. Zhathopfe with unique stitches was worn by a person who has done feast of Merit. The black stipe on off-white background was made with the combination of cotton and stinging nettle known as Khweru.

z 1 2

Plate 4.34(z, 1, 2): Chang: A couple in casual outfit. The shawl displayed was exclusive of men's wear of Yangpe and Noksen villages of Tuensang district.

3 4 5 6

Plate 4.34(3-6): Sema: A couple in traditional sunday wear. The shawl on the scroll was used by poor people made out of stinging nettle known as Nusuphi.

Asukudaphi, the cowries shawl was worn only by one who has completed all the existing series of feast of merit.

7 8 9

Plate 4.34(7-9): Khiamniungan: Traditional outfit of Khiamniungans. Shawl decorated with cowries was worn only by one who has performed 'Feast of Merit'.

10 11 12 13

Plate 4.34 (10-13): Ao: An Ao couple in their outfit. The man has draped himself with an Aotsungkotepsu (Warrior's shawl). Prestigious shawl on display, especially 'Rongsusu' with thick bunches of dyed goat's hair edged with tassels of red and black goat's hair ornamented with cowries. This shawl was sued by a person who has done the full series of feast of merit and whose father and grandfather likewise.



14 15 16

Plate 4.34 (14-16): Chakhesang: A young couple in their casual outfit posing with their wedding gift "Thipikhu/Thipikhwu". The reputed shawl was entitled to be used only by wealthy persons who has done feast of merit three times.

Plate 4.34: The shawls displayed in the dress, ornaments and wood carving gallery at the State Museum of Kohima, Nagaland. It has been developed by the Indian Museum, Kolkata as nodal agency of the Department of Culture, Govt. of India.
Source: Nagaland State Museum, Kohima, Nagaland

18. Allahabad Museum, Allahabad

The study revealed that around 22 shawls were conserved in the museum. It was found that the natural repellents used for preservation of collection were neem leaves, chandan powder, snake slough, turmeric, ajwain, and peppermint. It was also revealed that chemical repellents such as thymol, PDCB, pyrethrum extract, pyrechloro lindane and benzene hexachloride monophosphate were being used by the museum authorities.

It was observed that the museum had financial constraints due to which they were not able to procure the advanced types of necessary equipments for the conservation and preservation of the shawls. It was also seen that the museum had the very limited staff to look after the collection and there was no recruitment of the staff. The required positions were not filled up by the government and therefore, after few years of unfilled posts, those posts were being demolished by the government. It was found that only one person was handling the number of tasks at the same time.

4.2.1 Analysis and interpretations of the preservation practices adopted by museum curators

Data procured through the responses received from the curators of the museums were analysed and has been presented below in the tabulated manner. The percentage-wise data has been shown for each museum which was calculated on the basis of the answered questions.

Table 4.14: Distribution and analysis of museums according to the availability of staff in museums for preserving artefacts

Staff availability	Distribution of museums N-17	
	f	%
Sufficient	7	41.18
Insufficient	10	58.82
Not answered	0	0
Total	17	100

Data shown in table 4.14 revealed that most of the museums still didn't have an adequate staff for the preservation of artefacts in museums. The sufficient staff as compared to the insufficient staff was in 41.18% museums. Staff was found inadequate in 10 museums. It is important to create the posts for the preventive conservation and preservation of the artefacts. The posts for multitasking staff were found more as compared to the technical staff in government museums.

Table 4.15: Distribution and analysis of museums according to the origin of shawl collections in different museums of India

Shawls divided on the basis of their origin	Distribution of museums N-17	
	f	%
Kashmir	11	64.71
Kullu	2	11.76
Kinnaur	1	5.88
Gujarat	1	5.88
Bikaner	1	5.88
Punjab	4	23.52
Nagaland	1	5.88
Not found	0	0

According to the table 4.15, it was observed that most of the shawls in museums were from Kashmir, which got the highest percentage of 64.71, followed by the shawls from

Punjab with the percentage of 23.52%. Kullu shawls were found in 11.76% museums. The Shawls from Gujarat (5.88%), Bikaner (5.88%), and Nagaland (5.88%) were found to be the area specified shawls and they were found only at the places of their origin.

Table 4.16: Distribution and analysis of museums on the basis of the documentation of shawls.

Division of data on the basis of	Distribution of museums N-17	
	f	%
Museums which have done the documentation of artefacts	10	66.67
Museums where documentation is under process	5	33.33
Museums which did not answer the question of documentation	2	11.76

Table 4.16 revealed that only 66.67% of museums have done the documentation of artefacts while in 33.33% of museums, the process of documentation was found under process.

Table 4.17: Distribution and analysis of museums on the basis of the digitization of shawls in museums.

Division of information on the basis of	Distribution of museums N-17	
	f	%
Museums which think digitization effects textiles in terms of digitization	6	75
Museums which thinks no it does not affect the textiles in terms of degradation	2	25
Museums which did not answer the question of digitization	9	52.94

It was seen that most of the museums (52.94%) did not answer the question of digitization and its effects on shawls. It clearly revealed that digitization and its importance is still a legging field in Indian museums. Only 25% of museums were of the opinion that digitization doesn't affect the shawls in terms of degradation because the damage caused by digital equipment is bare minimum i.e. 0.1 lux. One of the museums also opined that if the photo is taken without flash then it won't affect the

shawls in terms of its degradation. Moreover, their exposure is for the time being and only for once. By documenting, the permanent record is created which is an advantage to the museums. It should be understood that digitization does not affect textiles in terms of its degradation. Shawls should be allowed for digitization in order to offer visibility to indigenous traditional artisans and crafts-persons. This will contribute to the promotion of Indian art and will keep their skill alive leading to successful livelihoods as well as it will enhance the recognition of Indian histories, culture, and crafts through knowledge and participatory exercises amongst youth.

Table 4.18: Analysis of the problems found in the shawls collection

Name of the Museum	The types of deterioration seen in the shawl collections
Government Museum and Art Gallery, Chandigarh	Dust, dirt, fugitive dyes, mould growth, insect attack, stains, splits, tears, losses, fading
Himachal State Museum, Shimla	Dust and dirt
Bhuri Singh Museum, Chamba	Dust and dirt
Kangra Art Museum, Dharamshala	Dust, dirt, mould growth and insect attack
Baroda Museum and Picture Gallery, Vadodara	Dust, dirt, powdering threads, stains, splits, losses, creases, warping, fading
Kutch Museum, Bhuj	Shawls not found
National Handicrafts and Handlooms Museum, Delhi	Mould growth, insect attack, stain, splits, tears, losses
National Museum, New Delhi	Dust, dirt, mould growth, tears, losses, stains, creases, fading
Bharat Kala Bhavan, Varanasi	Dust, dirt, holes, tears,
State Museum, Lucknow	Shawls not found
Shri Pratap Singh Museum, Srinagar	Dust, dirt, fugitive dyes, powdering threads, stains, adhesive residues, fading, foxing marks, folds/ creases.
Salarjung Museum, Hyderabad	Dust, dirt, losses, tears, folds, creases, fading
CSMVS, Mumbai	Powdering threads, stains, adhesive residues, splits, tears, losses, fading, folds and creases
The Indian Museum, Kolkata	Dust, dirt, creases, folds, tears, losses
The Albert Hall Museum, Jaipur	Stains, folds, losses, creases, splits, mould growth
The City Palace Museum, Jaipur	Folds, dust, dirt, creases, stains
Nagaland State Museum, Kohima	Dust, dirt, folds, creases, tears, stains, losses, fading.

Data on the types of deterioration was observed in shawls on display. The researcher analysed that dust and dirt were the common problem amongst shawls even if it is stored or displayed in the pollution free environment.

Table 4.19: Distribution and analysis of museum according to the supplies used for handling and moving objects

Supplies used for handling and moving objects	Distribution of museums N-17 f	%
Flatbeds	3	20
Carts	3	20
Dollies	1	6.67
Pallet Lifters	1	6.67
Polyethylene tote pans	0	0
Object support trays	13	86.67
Clean cotton and plastic gloves	12	80
Padding materials	9	60
Tissues or fillers	13	86.67
Not answered	2	11.76

Table 4.19 showed that object support trays, tissues or fillers (86.67%) followed by clean cotton and plastic gloves and padding materials were amongst the most used supplies for handling and moving objects. Dollies and pallet lifters were the least used supplies in 6.67% museums. Trolleys were used for the heavy textiles in museums. Flatbeds and carts were used by 20% museums. The shawls should only be moved and handled in the horizontal position or flat position in order to protect its fabric from distortion. In one of the museums it was found that the curator wasn't even aware of this term 'supplies'. This showed the lack of awareness amongst curators working in such reputed museums of the country.

Table 4.20: Analysis of museums according to the awareness towards technical terms related to textiles and lighting.

Terms	Distribution of museums N-17 f	%
Anoxic Storage for textiles collections	3	25
Blue wool standard fading cards	3	25
Crepeline Stabiltex (Tetex)	3	25
Sensor lighting	8	66.67
Optical fibre lighting	9	75
Not Answered	5	29.41

Table 4.20 showed that 25% museums were aware of the terms such as anoxic storage of textiles collections, blue wool standard cards, crepeline and stabiltex. Whereas 29.41% museums did not answer this question due to the lack of awareness towards these terms. Sensor lighting (66.67%) and optical fiber lighting (75%) were the terms mostly understood by the museum professionals.

Anoxic environments or anoxicators or deep freezing (below -20^{o}C) are the terms generally associated with the removal of micro-organisms. To keep them at bay oxygen absorbers or oxygen scavengers can also be also used. These are used while creating the anoxic micro-environment. Normally a two-week exposure at room-temperature with the concentration less than 1% is required to kill the insects. It was observed that the microclimate within the galleries could be suffered by the irregular monitoring, inadequate HVAC's systems and a number of visitors within the galley. The motion sensor switches are recommended inside the galleries when no visitor is in the gallery as it detects the motion and the lights switch off automatically. These integrated motion sensing systems are being made by the company named "Larsen and Toubro".

Table 4.21: Distribution and analysis of museums according to storage methods used for keeping the shawls collection

Storage methods	Distribution of museums N-17 f	%
Flat file cabinets	5	33.33
Archival rolling tubes	6	40
Costume wardrobe cabinet	7	46.67
Costume box	3	20
Dust covers	5	33.33
Shelving units	7	46.67
Specialized containers	2	13.33
Not Answered	2	11.76

Table 4.21 clearly revealed that shawls were stored mostly in shelving units, costume wardrobe cabinets followed by the archival rolling tubes. There were certain measures necessary for the protections of shawls that these should preferably be kept in the rolled storage. Flat file cabinets and dust covers shared the same percentage of 33.33% superseded by costume boxes whereas specialized containers were used by the least 11.76% museums.

Since in some of the museums where storage space was less, shawls were kept in the folded manner. While keeping the shawls in the folded manner the usage of acid-free tissue sausages at the folds is necessary in order to save the shawls from forming lines or creases. This kind of preventive action taken towards shawls was not seen in any of the museum's storage. The folded shawls were stacked in the cabinets and drawers. On observation, the results pertaining to the storage methods practiced by the museum curators revealed that whenever the shawls were taken out, the museum professionals were not changing its direction or folding from the other side. It should be considered that refolding is required for the shawls kept in the folded manner at regular intervals. The shawls should be rolled in the warp direction. In the case of hanging shawls, it should be known that they should have the strength to withstand it and shawls should be stable enough.

Table 4.22: Distribution and analysis of museums on the basis of the instruments used for relative humidity and temperature measurements and their control in the galleries

Instruments	Distribution of museums N-17	
	f	%
Thermo hygrographs, Data loggers/ Digital meters	11	73.33
Dehumidifiers	2	13.33
No instruments used	3	20
Not answered	2	11.76

The data pertaining to the type of instruments used by the museum professionals for measuring R.H. and temperature revealed that hair hygrometer psychrometer, whirling hygrometer, thermo hygrograph or data loggers and digital climate meters were being used for measuring R.H. and temperature. Table 4.22 showed that thermo hygrographs, data loggers/ digital meters were mostly used in 73.33% museums whereas only 13.33% museums used dehumidifiers to control relative humidity. Dehumidifiers were

being used to dry out the moisture from the air. Data loggers which record the lux/hours were being used by the museums. The researcher observed that the shawls at one of the museums were placed near the windows. The windows had no curtains or shade. The air was directly falling on them which was found to be the main reason for pests. High-efficiency particulate air (HEPA) vacuums should be recommended inside the galleries as well as in the storage areas. For the elimination of dampness and for environmental control no instruments were found inside the 20% museums. One of the museums opined that electronic thermo hygrometer of Okaton brand was being used by them to collect daily temperature measurement in the textile's gallery of the museum.

Table 4.23: Distribution and analysis of museums according to the biological growth and tools used to manage pests in museum

Biological growth and tools used to manage pests in the museum	Distribution of museums N-17	
	f	%
Termite attack	7	41.17
Rat menace	6	35.29
Insect/micro biological attack	7	41.17
Fumigation	11	64.70
Use of insect repellents	12	70.59
Implementation of IPM plan	0	0
Regular housekeeping	17	100
Not answered	0	0

According to table 4.23, it was observed that termite attack and insect/microbiological attack were more common in museums as compared to the rat menace. The researcher found that in order to identify the insects, an entomologist was not consulted by the museums. Insects can be identified by analyzing the damages such as holes and insect stains as they are surface feeders. For controlling rodents, trapping, repellents, rodents proofing and lidded garbage bins should be used. For birds, anti-roosting nets, spikes or gels can be used and they were being used in museums also.

The data procured on management of pests in museums revealed that regular housekeeping was being done in all the museums. Use of insect repellents was in 12 museums followed by the fumigation methods which were being done by 11 museums. Fumigation should be done before documentation of an artefact. Fumigation is mainly to eradicate insects or microbial growth. For this paradichlorobenzene (PDCB) can be used. It is always recommended to keep it in the upper shelf of the fumigation chamber

as it is heavier than air. The quantity is 50 gm/per cubic meter for 7-10 days or longer depending upon the microbial growth. Fungicidal/insecticidal paper can be prepared in order to keep it between the textile folds or over the textile itself. This can be made by preparing a 5% solution of thymol in methanol. These sheets can also be laid in the drawers. After fumigating, it is necessary to clean the textile in order to remove the unwanted insect residues, eggs, larvae, etc. The literature reviewed stated that encapsulation can also be done by keeping the shawl flat and PDCB may be kept inside the muslin cloth. It was investigated that Integrated pest management (IPM) was still not implemented in all the museums. An IPM should be implemented wherein the stages of control should be kept in mind as advised by Dr. A.K. Mishra: These are avoid, block, detect, respond, recover and treat. The pest's traps should also be emptied on the daily basis in order to prevent them from being bitten again by another biological species.

Table 4.24: Distribution and analysis of museums according to the methods and materials used for housekeeping

Methods and materials used for housekeeping	Distribution of museums N-17	
	f	%
Periodical cleaning	15	88.23
Use of door mats	14	82.35
Green environment	15	88.23
Use of eco-friendly materials	16	94.11
Not answered for methods	0	0
Vacuum cleaner	7	43.75
Wet mop	16	100
Broom	7	43.75
Not answered for materials	1	5.88

It was observed from table 4.24 that the use of eco- friendly materials was found more in 94.11% museums as compared to the other methods of housekeeping such as periodical cleaning (88.23%), use of doormats (82.35%) and green environment (88.23%). Housekeeping should take into account the practical considerations involving recording and maintaining the heating, ventilation, and air conditioning (HVAC) wherever necessary along with the light, temp, R.H. readings and pest control. Cleaning of the galleries should be at regular intervals. The researcher found that wet mop was preferred in all the museums whereas the use of a broom and vacuum cleaner was in 43.75% museums. It is recommended to remove the dust with the vacuum cleaner

instead of dry mops. The damp mop should be used only if very necessary (once in a week only). Museum curator in one of the museums stated that wet mop also causes humidity in the air and therefore, it should be avoided.

Table 4.25: Data on inspection, duration of changing the collection on display and cleaning of the showcases was procured and has been interpreted in the table 4.25a, 4.25b and 4.25c.

Table 4.25a: Distribution and analysis of museums on the basis of cleaning of showcases from inside

Cleaning of showcases from inside	Distribution of museums N-17	
	f	%
Once in a week	3	25
Twice in a week	1	8.33
Once fortnightly	1	8.33
Once in month	2	16.67
Alternate days	1	8.33
Once in four months	1	8.33
Thrice in a year	1	8.33
Cleaning done only when dust is seen	2	16.67
Not answered	5	41.67

Table 4.25a indicates that showcases were being cleaned once a week which was done by the highest percentage of museums. 16.67% museums were of the opinion that cleaning from inside the showcases in done only when the dust is seen inside showcases. The researcher observed that 41.67% museums were reluctant to answer this question. In one of the museums, the curator answered that showcase couldn't be cleaned from inside because the wood of the frame got warped and the glass got stuck resulting in non-opening of the showcase. The dust was very much visible in most of the showcases of museums. In order to save the collection of artefacts from deterioration, it is important to keep them away from dust and dirt. In one of the museums, the investigator observed that cleaning is done annually as scheduled and whenever dust particles are found inside the showcases.

Table 4.25b: Distribution and analysis of museums on the basis of inspection of collection on display and in store

Inspection of collection	Distribution of museums N-17	
	f	%
On display (daily)	12	100
On display (no answer)	5	29.41
In store (once in a fortnight)	1	8.33
In store (daily)	6	50
In store (when open)	3	25
In store (once a year)	1	8.33
In store (when ever free)	1	8.33
In store (no answer)	5	29.41

Table 4.25b revealed that the collection on display was being inspected daily by 100% museums as compared to the inspection of the stores' collection which was inspected by only 50% museums. 25% museums agreed that the collection in store is inspected when it is open and 29.41% respondents did not answer the above-mentioned question on 'inspection of collection on display and store'.

Table 4.25c: Distribution and analysis of museums according to the duration of changing the collection on display

Duration of changing the collection on display	Distribution of museums N-17	
	f	%
Once in a year	3	23.07
Not changed and it is a permanent display	3	23.07
Every six months	2	15.38
Not changed because textiles are fragile	1	7.69
Did not specify the duration but changed	3	23.07
Changed in 3-4 months	1	7.69
Not answered	4	23.52

The results for the data procured for the duration of changing the collection on display revealed that most of the museum did not prefer to change the collection on display and it was a permanent display (23.07%). The museum which changed the collection once a year and the museums which changed the display but did not specify the duration were reported to be 23.07%. The condition of shawls on display in most of the museums reflected that these were the permanent kind of display in the galleries. The researcher found that in order to prolong the life of the shawls, it was important to change the collection from display to storage thereby enhancing and keeping the visitors

interest/curiosity alive for the longer duration in the galleries. So that whenever the visitor comes to visit the galleries, they find something new. The shawls should not be displayed permanently in the galleries in order to protect them from heat, light and overall environment. The display should be changed after three months and let the textiles rest for the entire period. When hanging is not the option for shawls on display it is better to mount them and display diagonally as it was done at the Govt. Museum and Art Gallery, Chandigarh. The museums which changed the collection every six months were found out to be 15.38%. The museums which changed the collection every 3-4 months were 7.69%. One of the museums revealed that the collection on display had become so fragile due to the permanent display that it might be damaged while changing the collection. Therefore, to overcome this problem, the collection on display should be changed periodically and a trained textile conservator should be consulted.

Table 4.26: Distribution and analysis of museums on the basis of museum activities

Activities	Distribution of museums N-17	
	f	%
Training	14	82.35
Exhibition	14	82.35
Publication	9	52.94
Workshop/ seminars	14	82.35
Research	12	70.59
Slideshows	9	52.94
Craft demonstrations	1	5.88
Outreach activities	1	5.88

As mentioned in table 4.26, workshops/seminars, training, and exhibitions were being extensively organized by the 82.35% museums. Research as one of the museum activities was being done by 70.59% museums followed by slideshows and publications by 52.94% museums. Crafts demonstrations and outreach activities were organized only in specific museums.

Table 4.27: Distribution and analysis of museums according to the measures used to prevent fire/flood/theft in the museums

Measures used to prevent disasters in museum	Distribution of museums N-17 f	%
Proper maintenance	15	88.23
Trained and motivated staff	14	82.35
Upgraded physical and electronic security	13	76.47
Collections and facilities recovery plan	5	29.41
Chemical type fire extinguishers, fire blanket	13	76.47
Emergency response procedures	5	29.41

The measures used to prevent fire/flood/theft in the museums were collected and results have been stated in table 4.27. It was revealed that 88.23% museums opt for proper maintenance followed by trained and motivated staff (82.35%). Upgraded physical and electronic security as well as chemical type fire extinguishers and fire blanket shared the same percentage of 76.41%. The least used measures were reported to be collections and facilities recovery plan and emergency response procedures. Museums should be prepared for any type of disaster. Fire detectors and smoke detectors should be placed at appropriate places inside the museums. Fire extinguishers should be placed inside the galleries as well as in the storage areas. Disaster management plan (DMP) should be displayed in every museum.

Table 4.28: Distribution and analysis of museum on the basis of the remedial conservation facilities in museums

Remedial conservation facilities in museums	Distribution of museums N-17 f	%
Yes, the facility is present	10	62.5
No, the facility is not present	3	18.75
Private conservators are consulted	3	18.75
Not answered	1	6.25

Table 4.28 clearly revealed that 62.5% museums had the remedial conservation facilities whereas the facilities were not present in 18.75% museums. It was also observed that 18.75% museums consulted the private conservators for remedial conservation treatment. In one of the museums, it was revealed that the conservation work was being done in memorandum of understanding (m.o.u.) with Indian National

Trust for Art and Cultural Heritage (INTACH), New Delhi. Therefore, for the well being of the artefacts, it is important for each and every museum to have an equipped conservation laboratory.

Table 4.29: Distribution and analysis of museum on the basis of the lighting system used in museums.

Artificial lighting system used in the museums	Distribution of museums N-17	
	f	%
Fluorescent tubes	11	64.70
Incandescent bulbs	2	11.76
Optical fibre lighting	1	5.88
Led's	4	23.52

The results for the lighting systems used in the museums revealed that 64.70% museums preferred fluorescent tubes followed by 23.52% museums which preferred leds. LED lights or light emitting diodes used little energy and long lifespan. These lights produce U.V. and I.R. in a very small amount. Light is a form of electromagnetic energy. Excess light produces heat and it emits rays. Higher the intensity higher the damage caused. Therefore, dyed and highly sensible textiles should be kept less than 50 lux. Photochemical degradation is also caused by light. U.V rays should not be more than 75 mW/lumen. U.V. content is measured by U.V. meter or U.V. monitor. U.V. filters, polyester films are used if it is more than 75%. 11.76% museums were reported to use incandescent bulbs according to the data shown in table 4.29. These emit less U.V. rays and high I.R. as compared to fluorescent lights which emit more U.V. rays and low I.R. Therefore, zinc oxide and titanium dioxide films should be used to cover the glass from top to absorb U.V. rays and reduce its intensity. Acrylic sheets should also be used over the glass which filters more than 90% harmful rays.

Quartz-halogen lights emit high U.V. and high I.R. but their lifespan is more. It was seen that only 5.88% museums had the fiber optic lighting system. Fiber optic lights have a long life, the filtered U.V. rays, and it has no I.R. It can also be placed away from the shawl on display.

Blue wool standards and colorimeter or colour measuring devices are some of the devices used to measure the changes in the colour of the artefacts. Polycarbonate sheets, Frosted glass, and the glasses of lights are painted with TiO_2 and ZnO to minimize rays.

It is better to avoid direct intense and uneven lighting as it was in one of the museums, the light was falling directly over the shawl which was unrestored and had lots of damages. No textiles conservator was present to take care of the collection.

Table 4.30: Distribution and analysis of museums on the basis of the display accessories used for shawls

Display accessories used for shawls	Distribution of museums N-17	
	f	%
Showcases	8	53.33
Rollers	5	33.33
Models made using wires	2	13.33
Mannequins	3	20.00
Folder type mounting	1	6.67
Tables	1	6.67
Not found	2	11.76

The data on the display methods used for shawls was obtained and results have been stated in table 4.30. It was observed that showcases were found to be the most preferred way of displaying shawls by 53.33% museums followed by the rollers which were used in 33.33% museums. Mannequins display was used in 20% museums whereas tables and folder type mounting were found to be preferred by the 6.67% museums. In one of the museums rollers were used wherein the falling part of shawl was stitched to overcome the undue pressure on it. The padded slopes at 45-degree angle were kept for display. While in another museum plastic hooks were used to fix the shawls from all four sides.

The shawls which were not stable enough to stretch from one end, were installed on the wooden structure called a strainer above which mounting cloth was stretched as it can be observed in the display section of Calico Museum of Textiles, Ahmedabad. The shawl was then stitched to the stretched fabric in such a manner that it contributed to the overall support of the shawl. It was observed by the investigator that in this case the sewing balance and arrangement of stitches should be properly selected and administered.

4.2.B. Private Collectors and Private museums

The researcher in this section has discussed the private museums which had shawl collections along with data procured either with the help of interview schedules or by

the observatory method. This section presents an individual report of the museums pictographically which was made on the basis of the documentation and condition of the shawl's collections on display and storage. Only that information has been stated which was revealed by the museum staff. Therefore, there may be variations in the data stated for each museum. Personal survey of each museums undertaken by the researcher is as follows.

1. Ahmedabad Trunk- House of M.G., Ahmedabad, Gujarat

The mission of this organization through the displayed collection in the galleries is to save the heritage, textile collection of Gujarat and to save the identity of Mangaldas family. There were around 36 shawls in the collection out of which six woollen shawls were on display. All the shawls were in good condition. Only one shawl out of collection was found to be shahtush shawl. The curator of the gallery elicited that hairbrushes and feather brushes were being used for cleaning the shawls. First, the fine net cloth is placed over the back of an artefact then the mini vacuum cleaner is used. A thick gauze is also placed at the nozzle of the vacuum cleaner.

The display section was segregated into different parts such as woven, embroidered, tufted, beaded & appliquéd and dyed, printed and painted. The curator revealed that research on shawls was still going on so as to identify the shawls and write the caption for each shawl on display.

The shawls were found displayed in the standing position. The soft wooden board which has been sprayed with the insecticidal spray supported the shawl. P.V.C pipes covered with the de-starched cloth were used for rolling some part of the shawl and displayed rest part in the falling position. The lining had been given to the shawl from the back. The matching coloured cloth (matching the colour of the shawl) dyed naturally was stitched from all four sides of the shawl.

2. Tapi (Textiles and Art of the peoples of India) textile collection, Surat, Gujarat

It is a collection of Praful and Shilpa Shah who invested their 30 years into the Tapi collection. The curator of the gallery was probed regarding the documentation of shawls and it was analysed that software documentation was under process. On further probing for the digitization of the collections the curator was of the opinion that collections were

being allowed for digitization. It is beneficial because it minimizes the need to take out the object from the collection every time and it protects the health of the object also.

The researcher observed that shawls were kept in storage and not displayed. It was elicited by the curator that the shawl collections were exhibited occasionally. One of the shawls was under the conservation treatment in the conservation section, it was observed that the lining was being given to the deteriorated shawls from the back. The matching coloured cloth (matching the colour of the shawl) dyed naturally was being stitched from all four sides of the shawl in order to strengthen it.

The researcher found that the storage was placed in a well-ventilated space, which reflected that the staff was well aware of the fact that shawls being organic in nature, also need to breathe in the environment. Specialised storage space had been created. Powder coated steel containers were being used to store the shawls. Malmal cloth, polyvinyl carbonate pipes, and acid-free tissues were used to keep the shawls in the storage. Silica gel was used to control R.H. within the store. Therefore, it was found that this organization was well aware of the detrimental effects of hazardous emitted gases on the shawls.

The reorganization work of Surat museum was being done due to the flood in 2006. During the flood, the water level was 1 ft. There were cockling, dirt depositions and insect attack on wet collections. There was bad smelling too. Fumigation was done through paradichlorobenzene (PDCB) which acted as a repellent for biological growth. Insecticide was sprayed. Mud stains were removed. The museum was of the opinion that for the remedial conservation only stitching work is performed at the lost and torn areas for which tracing sheet is used for reinforcing the losses. It was seen that glass weights wrapped in plastic, then cloth of different kinds were used for keeping the pressure at different places on the shawl being treated. Dust and dirt removal were not being done in the remedial conservation. The skilled workers were referred for the restoration of shawls in this organization.

3. Calico Museum of Textiles, Ahmedabad, Gujarat

Approximately 14 shawls were exhibited in the same manner as they were housed in the Shreyas Folk Museum, Ahmedabad. The researcher noticed that the rugs and carpets were laid on the floor owing to the fact that in order to protect the collections from the

dust and dirt which may be passed on from the uncovered feet of visitors. The museum had been made in such a way that the relative dampness inside the museum does not alter too much. All the masterpieces are well displayed and preserved with a plastic film (polypropylene film). This sheet is carefully tested to ensure that it is chemically inert. The display section was absolutely different from what was found in all the museums. The display here creates a surge as the page of the book gets unfold one after the other. The protrusion has been given to the textiles altogether as no single object endures out of the collections. It was observed that the spectators were not allowed to touch the display, which reflected that they were strictly against vandalism which might harm the collection. The flooring, thick walls, wooden structure, and the green surroundings helped in maintaining the museum climate. The floor was made up of mud and cow dung. Footwear was not allowed inside the galleries as they might transfer the dust and dirt throughout the museum galleries. This museum also had the entry for limited number of visitors inside the galleries, being very well aware of the fact that suitable environmental conditions are required for our heritage also, so as to preserve them till posterity. The photographs (plate 4.35) from the display section of the Calico Museum of Textiles, Ahmedabad have been presented below.

Plate 4.35: Display of shawls in the book form at the Calico Museum of Textiles, Ahmedabad

Source: http://calicomuseum.org/?page_id=173

4. Arts and Crafts Museum, Bhavnagar, Gujarat

The researcher observed that this museum was closed from the past three years. On requesting the in-charge of the museum revealed that since there was no recruitment in the organization, there is no one to take care of the collection. The condition of the museum was not satisfying. The floor was covered with dust, dirt, bird's excreta and

feathers. The collections and the objects inside the showcases were lying unheard. As if, no one was listening to objects that these artefacts also need care and attention for the posterity. The mannequin was observed in the display section wearing a ghaghro, choli, and a woollen veil over the head. The shawls collection was found showcased on the stretcher and covered with the plastic which had got torn over the years. The researcher photographed some of the photographs from the display section which have been presented in plate 4.36.

a

b

c

d e f



g h i

Plate 4.36 (a-i): Glimpses of the Arts and Crafts Museum, Bhavnagar from inside.

5. Shreyas Folk Museum, Ahmedabad, Gujarat

The curator of the museum regarding the shawls collection in the museum revealed that shawls made up of camel, goat and sheep wool were present in the museum. When enquired about the museum collection it was elicited by her that the museum collections were divided in the following category:

A. Rare collection of textiles

B. Little available textiles e.g. Ludi

C. the collection whose replicas were available

D. Deleted i.e. the collections which were damaged and deteriorated.

B and C were used for the educational purpose.

A, B and C were mostly displayed in the galleries.

D was kept conserved in the storage

The responses regarding the documentation of the artefacts were procured and it was unveiled that for documentation, photo printing of each and every object was being done and the book was being made along with its accession no. called as accession audit register.

It had been made up for the physical verification of the objects whether they are present in the gallery or not. It was signed by the curator after verification of individual object separately. Random verification was also done by the outside auditor. After every five years, the outside auditor does the final auditing of each individual object and signs the register. It was revealed by the curator that the file maker pro is software wherein the documentation of object was being done at the Shreyas folk museum.

The observations and results pertaining to the display methods practiced by the curator revealed that for display, they used wooden board covered with de-starched cotton cloth, over which the lined shawls have been placed stitched from all four sides and it is then covered with the polypropylene plastic. On further probing it was found that this plastic is changed every 10 years. Padded boards were used to display the shawls in the vertical position by lining the shawl with the backing. The display was also in the redesigning phase to attract more visitors. As opined by the curator, 25 years ago, plywood was used to hang the textiles because of which yellowish colour used to come up on the textiles. Shawls were also seen folded and then hanged on the P.V.C. tube covered with the madarpat and plastic wires were used for hanging it from the sides.

The woollen veil cloths displayed in the galleries were:

1. Ludi, a veil cloth: Wool, Rabari, Kutch. Contemporary.

   Length: 280 cms, width: 103 cms.

   Materials: Woollen cloth. Silk and cotton threads and spangles in embroidery.

   Description: The rectangular woollen veil cloth had stripes of extra weft at both the ends. The field was adorned with red tie-dyed trellis and triangular patterns. The large embroidered circles in the middle and in each of the four corners had mirror discs and spangles. The colours of embroidery were orange, yellow, white, pink and green. When worn, one central embroidered circle fell on the head and the other on the back.

2. Kanadi, a veilcloth: wool. Charan. Porbandar to Gir forest area, Saurashtra. Contemporary.

   Length: 208 cm. Width: 108 cm

   Materials: Black woollen ground. Broad woven bands of golden (synthetic) thread.

   Description: This veil cloth consisted of two woven pieces. Each piece had a width of 54 cm. They were joined together to form the full piece. Each end of the width has a deep maroon coloured band. Above this, there was a broad golden band of twill weave with stripes forming an arrowhead pattern. The uppermost band had a woven row of camels on the upper side and small circular flowers on the lower side. The

maroon portion was slightly broader than the golden one, thus on either side, an irregular maroon band could be seen. The rest of the ground was black.

3. Dhabali, a veil cloth: wool with embroidery. Bharvad. Kutch. Mid 20th century.

This tie-dyed piece had woven stripes at both ends. Between the stripes and along the central seam there was embroidery with mirror discs.

There was separate storage area for textiles. Small woollen artefacts were kept one over the other by inserting the sheet of acid-free tissue paper between each textile. The curator opined that for the flat textiles rolled storage was being generally preferred. The process of rolling shawls was observed for which de-starched cotton cloth was used to cover the PVC pipe by first inserting the cotton inside the pipe. Acid-free tissue paper was then laid over the shawl. Then it was rolled over the pipe. A strip of malmal cloth was used to tie the roll from two ends very gently.

On observation researcher found that storage boxes were named on the type of artefacts stored in them. The boxes had been divided into the categories wise: such as textiles, ornamentations, etc. Heavier works such as zardozi, were placed at the bottom and the lighter ones were kept over it. If the weights were found very much heavier then the articles from above were removed. and kept separately at the different place. The metal shelves were used for keeping the shawls and piled one over the another. Auditing of collections in storage was done once a year to check the missing artefacts (if any).

For labelling, the canvas cloth was used which was stitched to the back of the shawls and pen was used to write accession no. The thread used was of the same colour as that of the artefact. The researcher has presented the labelling and the rolling of an artefact in the plate 4.37 as follows.

a

b

Plate 4.37 (a & b): The labelling of the artefact by stitching technique and the rolling of the artefact at Shreyas Folk Museum, Gujarat

On probing Shyama ben, the museum staff, about the lighting, it was revealed that they use acrylic sheets in order to control light rays in the galleries. There was a cabinet from where the voltage of light was controlled. To stop the light coming in the galleries, oil paint of matt finish was used instead of U.V. filters so that the visitors can see outside the gallery also for the beautiful environment.

Para-dichlorobenzene (PDCB) for fumigation and naphthalene balls were being used inside the showcases to control insects but now none of the fumigating agents are used.

For the housekeeping purpose, wet mop and broom were used to clean the galleries but they made sure that the mop shouldn't be too wet as it could cause more vapors in the air. At most kerosene (half drop) was mixed with water and wet mopping was done. Malmal cloth was used for cleaning purpose (plate 4.38).

a

b

Plate 4.38a: The regular cleaning of the showcases inside the museum gallery.

Plate 4.38b: The storage cabinet

c d

Plate 4.38c: The thick cotton cloth and the malmal cloth used for the cleaning of showcases. This 100% cotton cloth is known as Madarpat in local language.

Plate 4.38d: This cloth is being used over the wooden boards for display purpose.

Plate 4.38: The housekeeping equipments and storage cabinet inside the Shreyas Folk Museum, Gujarat

a b

Plate 4.39 (a &b): The display of the artefacts at the Shreyas Folk Museum, Gujarat

Pratistha Din 2016 and Shreyas Darshan Kishor were some of the activities organized in the museum. Along with these, staff also prepares outreach programmes for school students (Shreyas and other schools). The museum publications observed were Folk Art and Culture of Gujarat (English) by Jyotindra Jain; Darshika (Gujarati) by Ramshingji Rathod; P.C. (colour) Museums' Art objects, Textiles, Lokayatan; Posters and flyers.

It was revealed by the museum curator that for the conservation treatment of woollen shawl: Soft brushes such as squirrel hair brushes were used for the cleaning purpose. The simple localized wash of *reetha* is given along with little agitation if it is found dirty. The places from where the threads were falling apart, those places were darned by using similar kind of threads. The threads used for darning were made to match with the colour of the shawl being restored, by mixing threads in haldar, tea, indigo, etc. as

per the need. Sometimes the net cloth is also used over the shawl in order to secure the superficial damages.

This museum was noted to be one of the cleanest and well-maintained museums in India without professional staff. Some of the shortcomings observed were inadequate publicity, lack of detailed labelling and photography was prohibited.

6. Living Learning and Design Centre, Kutch, Gujarat

This museum complex has 3 galleries, library and crafts studios. Their mission is to train, educate and support the crafts persons to practice their traditional crafts for contemporary markets so that they can earn a dignified and prosperous livelihood.

The display of shawls was mainly done over the mannequins. The display of the shawls could be seen in the plate 4.40.

a b c d

Plate 4.40 (a-d): The display of shawls at Living Learning and Design Centre, Ajrakhpur, Kutch.
Source: Shrujanlldc.org

7. Sanskriti Museum, New Delhi

The unique environment of the museum houses three specialized museums namely the Museum of Everyday Art of India, Museum of Indian Terracotta and Museum of Indian Textiles.

The museum curator revealed that the total number of shawl collections in the organization were 20. Types of shawls in the organization were of cotton, silk, and wool. Total no. of woollen shawls were 3 and the total number of shawls in good condition were 7. On probing about the documentation of the shawls collection it was found that the databases were created for the documentation of collections such as catalogue cards, excel files, general accession register and file maker software. One of the shawls on display was Kani Jamawar of 1850 (plate 4.43) which was sourced through purchase. It was observed that the method of display of shawl was done through mounting it on the wooden board and covering it with polythene. The equipment for environmental control, dehumidifier was found in the textiles gallery which have been shown in the plate 4.41.

Plate 4.41: The dehumidifier maintaining the room temperature and relative humidity inside the textiles gallery.

Plate 4.42: Strap loom, Rabha tribe, Assam, 1980s.

Plate 4.43: The Kani, Jamawar, 1850.

The information elicited by the curator on the museum activities revealed that they organize artists and writers' residency programme, ceramic centre, enamel centre, workshops, and programmes with school children. The museum also disclosed the data regarding the disaster that was faced by them. The damages due to fire and flood caused to the collection were mold growth, water stains, increased fragility, distortion, shrinkage, swelling, and warping.

4.2.2 Analysis and interpretations of the preservation and conservation practices of shawls adopted by the private collectors and private museums

Data procured through the responses received from the curators of the private museums and private collectors were analysed and have been presented below in the tabulated manner. The percentage-wise data has been shown for each museum which was calculated on the basis of the answered questions.

Table 4.31: Distribution and analysis of organizations on the basis of the availability of staff for the preservation and conservation

Availability of staff for the preservation and conservation	Distribution of organizations N-7	
	f	%
Sufficient	0	0
Insufficient	5	71.43
Not answered	2	28.57

Table 4.31, revealed that 71.43% organizations had an insufficient staff for the preservation and conservation whereas no answer was received from 28.57% organizations. It reflected that shortage of staff and lack of recruitment is a major issue in the country.

Table 4.32: Distribution and analysis of organization on the basis of the type of shawl collections

Type of shawls collection based on origin	Distribution of organizations N-7	
	f	%
Gujarat	5	71.42
Punjab	3	42.85
Kashmir	4	57.14
Not found	0	0

The data on the type of shawl collections was obtained and the results were tabulated. It was found that 71.42% organizations had shawls from Gujarat followed by 57.14%

organizations which had Kashmir shawl collections. Only 42.85% organizations had Punjab shawl collections.

Table 4.33: Distribution and analysis of organizations according to the documentation of the collections

Documentation	Distribution of organizations N-7 f	%
Organizations which have done the documentation of artefacts	6	100
Not answered for documentation of artefacts	1	14.28

Table 4.33 clearly revealed the data pertaining to the documentation. It was seen from the results that 100% organizations had done the documentation of the collection.

Table 4.34: Distribution and analysis of organizations according to the digitization of the collection

Digitization	Distribution of organizations N-7 f	%
Organizations which think digitization does not affect the textiles in terms of degradation	3	100
Not answered for digitization of artefacts	4	57.14

Table 4.34 unveiled that all the organizations agreed that digitization does not affect the textiles in terms of degradation. It was also noted that 57.14% of organizations were reluctant to answer the question on digitization of artefacts.

Table 4.35: Analysis of the deteriorations in shawls collection in organizations.

Name of the Museum	The problems/deterioration seen in the shawl collections
Calico Museum of Textiles, Ahmedabad, Gujarat	Dust and dirt
Shreyas Folk Museum, Ahmedabad, Gujarat	Dust, dirt, tears, holes, folds and creases
Ahmedabad Trunk- House of M.G., Ahmedabad, Gujarat	Dust and dirt, holes, split ups, mould growth
Tapi Collection, Surat, Gujarat	Dust, dirt, foxing marks, mould growth, tears, holes, fold marks and acidity
Sanskriti Kendre Museum, Delhi	Dust and dirt

Arts and Crafts Museum, Gandhi Smriti, Bhavnagar	Dust, dirt, foxing marks, mould growth, tears, holes, fold marks and fragility due to acidity
LLDC, Bhuj	Dust

Table 4.35 showed that dust and dirt were the common problem found in the shawl collections in all the museums and organizations.

Table 4.36: Distribution of organizations on the basis of the extent of deterioration of shawls

Extent of deterioration of shawls	Distribution of organizations N-7	
	f	%
Slightly damaged	2	28.57
Badly damaged	1	14.28
Good condition	4	57.14

According to the table 4.36, 57.14% organizations had shawl collections which were found in good condition whereas 28.57% organizations had shawl collections in the slightly damaged condition. Only 14.28% organizations had the shawl collections in badly damaged condition. The data pertaining to the extent of deterioration of shawls reflected that the major collection of shawls was in good condition owing to the fact that their degradation rate is slow as compared to other textile artefacts.

Table 4.37: Distribution and analysis of organizations according to the supplies used for handling and moving objects

Supplies used for handling and moving objects	Distribution of organizations N-7	
	f	%
Flatbeds	1	25
Carts	0	0
Dollies	0	0
Pallet Lifters	0	0
Polyethylene Tote Pans	1	25
Objects support trays	4	100
Clean cotton and plastic gloves	4	100
Padding materials	3	75
Tissues and fillers	4	100
Not answered	3	42.85

Table 4.37 clearly revealed the results from data pertaining to the supplies used for handling and moving objects. It was observed that all the organizations (100%) were

using objects support trays, clean cotton, plastic gloves, tissues and fillers followed by 75% organizations which were found using padding materials. 25% of organizations were using only polyethylene tote pans and flatbeds for moving objects.

Table 4.38: Distribution and analysis of organizations on the basis of storage methods used

Storage methods used	Distribution of organizations N-7	
	f	%
Flat file cabinets	3	60
Archival rolling tubes	1	20
Costume wardrobe cabinet	3	60
Costume box	0	0
Dust covers	4	80
Shelving units	5	100
Specialised containers	3	60
Not answered	2	28.57

The data regarding the storage methods used in organizations was procured and the results have been presented in table 4.38. It was seen that all the organizations were using shelving units to store the collection followed by 80% organizations which were using dust covers. The flat files cabinets, costume wardrobe units and specialized containers were being used by 60% organizations. It reflected that organizations were getting more aware of the deteriorating agents present in the environment, therefore, the storage units and methods were more developed and were still developing.

Table 4.39: Distribution and analysis of organizations on the basis of the awareness towards the technical terms

Awareness towards the technical terms	Distribution of organizations N-7	
	f	%
Anoxic storage for textile collections	2	66.67
Blue wool standard fading cards	1	33.33
Crepeline, Stabiltex (Tetex)	1	33.33
Sensor lighting	3	100
Optical fibre lighting	2	66.67
Not answered	4	57.14

The results tabulated in table 4.39 showed that all the museums were aware of term sensor lighting followed by 66.67% organizations which were aware of terms such as optical fiber lighting and anoxic storage of textiles. Only 33.33% organizations had awareness towards terms such as blue wool standard fading cards, crepeline and

stabiltex (Tetex). Out of all the organizations around 57.14% does not answer this question. It reflected the staffs' lack of awareness towards these terms.

Table 4.40: Distribution and analysis of organizations according to the device used for R.H. and temperature control

Devices used for R.H. and temperature control	Distribution of organizations N-7	
	f	%
Digital meters and thermo hygrograph	4	66.67
Dehumidifiers	1	16.67
Not found	2	33.33
Not answer	1	16.67

The data pertaining to the device used for R.H. and temperature control was obtained and has been presented in the table 4.40. It was found that digital meters and thermo hygrographs were used in 66.67% organizations for R.H. and temperature control followed by 33.33% organizations which did not use any device for controlling R.H. and temperature. It was observed that 16.67% organizations did not answer this question.

Table 4.41: Distribution of organization on the basis of the biological growth and tools used to manage pests

Biological growth and tools used to manage pests	Distribution of organizations N-7	
	f	%
Termite attack	0	0
Rat menace	1	16.67
Insect/micro biological attack	0	0
Fumigation	1	16.67
Use of insect repellents	1	16.67
Implementation of IPM plan	3	50
Regular housekeeping	6	100
Not answered	1	14.28

Data on the biological growth and tools used to manage pests was procured and it has been presented in table 4.41. It clearly revealed that only 16.67% organizations had damage caused due to the rat menace. It was also found that 100% organizations had regular housekeeping followed by implementation of IPM which was only in 50% organizations. Fumigation and use of insect repellents to manage pests was in 16.67% organizations.

Table 4.42: Distribution and analysis of organization according to the methods and materials used for housekeeping

Methods and materials used for housekeeping	Distribution of organizations N-7	
	f	%
Periodical cleaning	6	100
Use of door mats	6	100
Green environment	6	100
Use of eco-friendly materials	6	100
Not answered for methods	1	14.28
Vacuum cleaner	1	20
Wet mop	3	60
Broom	4	80
Not answered for materials	2	28.57

The data procured on the materials and methods for housekeeping revealed that the organizations which answered the question on housekeeping, were found using all the methods such as the use of eco-friendly materials, periodical cleaning, the green environment around surroundings and use of doormats except for the 14.28% organizations which did not answer this question. It was also revealed that 80% organizations used the broom for cleaning the galleries whereas 60% used a wet mop. Only 20% of organizations were recorded to clean the galleries with a vacuum cleaner.

Table 4.43: Data on the inspection of collections on display and in store as well as duration of changing the collection on display was procured and has tabulated in the table 4.43a and table 4.43b for further analysis.

Table 4.43a: Distribution and analysis of organization on the basis of inspection of collection on display and in store

Inspection of collection	Distribution of organization N-7	
	f	%
On display (daily)	4	66.67
On display (monthly)	1	16.67
On display (not found)	1	16.67
On display (no answer)	1	14.28
In store (daily)	1	16.67
In store(once in a week)	1	16.67
In store (every month)	1	16.67
In store (2-5 years)	1	16.67
In store (no answer)	1	14.28

The data was obtained through the observation and analysis of museums' display and store. The results have been tabulated in Table 4.43a. Data showed that 66.67% organizations inspected the collection on display daily as compared to the collection inspected in the store which was only in 16.67% organizations. 16.67% organizations were found inspecting the collection on display monthly, in-store (once in a week), in-store (every month) and in-store (2-5 months). It reflected that there was no standardised management for the inspection of the collection on display and store.

Table 4.43b: Distribution and analysis of organizations according to the duration of changing the collection on display

Duration of changing the collection on display	Distribution of organization N-7	
	f	%
Once in a year	1	25
Occasionally	1	25
Every six months	1	25
Did not specify the duration but changed	1	25
Not answered	3	42.85

The data pertaining to the duration of changing the display revealed that around 42.85% organizations did not answer the question whereas it was found that 25% organizations changed the collection on display once a year, occasionally and every six months along with organizations which did not specify the duration but they change the collection on display. Therefore, it was observed that most of the organization still do not prefer changing the collection on display.

Table 4.44: Distribution and analysis of organization according to the activities organized by them

Activities	Distribution of organizations N-7	
	f	%
Training	6	100
Exhibition	4	66.67
Publication	6	100
Workshop/ seminars	6	100
Research	5	83.33

Slideshows	4	66.67
No answer	1	14.28

Table 4.44 indicated that training, publication, and workshops were being organized by the all the organizations followed by the research which was being preferred by 83.33% organizations. Exhibitions and slideshows were the activities which were organized by 66.67% organizations.

Table 4.45: Distribution and analysis of organization on the basis of measures used to prevent fire/flood/theft in the organization

Measures used to prevent disasters in organization	Distribution of organization N-7 f	%
Proper maintenance	6	100
Trained and motivated staff	6	100
Upgraded physical and electronic security	6	100
Collections and facilities recovery plan	1	16.67
Chemical type fire extinguishers, fire blanket	6	100
Emergency response procedures	5	83.33
No answer	1	14.28

Table 4.45 showed the results for the measures used to prevent fire/flood/theft in the organizations. It was observed that proper maintenance, trained and motivated staff, upgraded physical and electronic security as well as chemical type fire extinguishers and fire blanket were being used by 100% organizations. 83.33% organizations were using emergency response procedures also to prevent fire/flood/theft in the organizations whereas 16.67% organizations were using collections and facilities recovery plan.

Table 4.46: Distribution and analysis of organizations according to the preservation methods used.

Preservation methods	Distribution of organizations N-7 f	%
Indigenous/ natural methods (sekhand, neem leaves, kapur, ajwaiin, clove oil, tobacco leaves, black pepper)	6	100

Man-made procedures (paradichlorobenzene, odonil, naphthalene balls, other fumigants)	3	50
Both of them	3	50
Not answered	1	14.28

Table 4.46 presents the data pertaining to the preservation methods used by organizations. Around 100% organizations agreed for using indigenous/natural methods whereas only 50% of organizations agreed for using man-made procedures and both the methods of preservation. Traditional fumigants and repellents used were kapur, cloves powder, sarifa seeds or custard apple seeds, sweet flag powder and black cumin seeds. In both the preservation methods, the repellents have to be wrapped in the muslin cloth and kept near the collection for about 3 months. These are required to be changed when these become inactive. The data reflected that natural methods were used more as compared to the chemical methods for preservation.

Table 4.47: Distribution and analysis of organization on the basis of the artificial lighting system in the galleries

Artificial lighting system used in the museums	Distribution of organization N-7 f	%
Fluorescent tubes covered with acrylic sheets	2	28.57
Incandescent lighting	4	57.14
Halogen light	1	14.28
Cove lighting	3	42.85
Sensor lighting	1	14.28
Optical fibre lighting	0	0
Led's	2	28.57

The data on the artificial lighting system reflected that incandescent lighting was most preferred by 57.14% organizations followed by the cove lighting which was used by 42.85% organizations. Fluorescent tubes covered with acrylic sheets and led's were equally used by 28.57% organizations. Halogen lights and sensor lighting were least preferred by the organizations. Sensor lighting was found to be the new concept which still has to be introduced in the organizations.

Table 4.48: Distribution and analysis of organizations according to the category of conservator for treating damage on shawl

Category of conservators for treating shawls	Distribution of organization N-7 f	%

Freelance conservators	0	0
Conservation professionals in museums	1	16.67
Darners	3	50
Conservators in NGOs	0	0
Skilled workers	1	16.67
No answer	1	14.28

Table 4.48 shows the results for the category of conservators for treating the damage to shawls. Data revealed that 50% organizations preferred darners for treating the damage. It showed that still there are lack of textiles conservators in our country. Museums were either dependent to get the conservation work done privately or they were hiring services from the other museums. 16.67% organizations either hire the professionals from museums or train their own workers skilfully and call them as skilled workers.

Table 4.49: Distribution and analysis of museums on the basis of the display methods used for shawls

Display methods of shawls in various museums	Distribution of organization N-7	
	f	%
Showcases	1	14.28
Rollers	2	28.57
Mannequins	3	42.85
Framed and mounted on walls	2	28.57
Folder type mounting: Framed and mounted on wooden boards and stuck in the folder type display	1	14.28
Tables	0	0

Data on the display methods used for shawls was obtained and the results have been presented in table 4.49. The data clearly revealed that maximum 42.85% organizations preferred mannequins display followed by the rollers, framed and mounted on walls techniques which were used by 28.57% organizations. 14.28% organizations were recorded to be using the method of showcasing and folder type mounting technique as it is in Calico Museum of Ahmedabad, Gujarat.

4.3 Conservators in Museums and in private practice

4.3.1 Analysis and interpretations of the conservation practices of shawls adopted by Museum conservators

Data procured through the responses received from the conservators of the museums were analysed and have been presented below in the tabulated manner. The percentage-wise data was calculated on the basis of answered questions.

Table 4.50: Distribution and analysis of museums on the basis of the availability of staff for conservation

Staff availability	Distribution of museums N-17	
	f	%
Sufficient	9	56.25
Insufficient	7	43.75
Not answered	1	5.88

The data pertaining to the staff availability showed that 56.25% museums had sufficient staff for the conservation of artefacts whereas 43.75% museums had an insufficient staff for the conservation. Therefore, the data reflected that there is a lack of staff in the museums of the country and it is important to create the posts like the chief conservator, conservator, assistant conservators, chemists, etc.

Table 4.51: Distribution and analysis of museums according to the conservation documentation in museums

Conservation documentation	Distribution of museums N-17	
	f	%
Museum which think Documentation in conservation is important	16	100
Museums which have created a database for conservation documentation	6	40
Not answered	1	5.88

Data on the conservation documentation was procured and the results have been tabulated in table 4.51. The museums which think the documentation for conservation is important were 100%. This showed that each and every museum was aware that documentation is an important part of conservation but it was found that only 40% museums had created the database for the conservation documentation.

Table 4.52: Information and analysis on the deterioration seen in the shawls

Name of the Museum	The deterioration seen in the shawls

Government Museum and Art Gallery, Chandigarh	Dust, dirt, fugitive dyes, mould growth, insect attack, stains, splits, tears, losses, fading.
Himachal State Museum, Shimla	Dust, dirt, mould growth, insect attack, powdering threads, stains, adhesive residues, splits, tears, losses, fading, warping, folds/creases
Bhuri Singh Museum, Chamba	Not found
Kangra Art Museum, Dharamshala	Dust, dirt, mould growth, insect attack, powdering threads, folds/creases
Baroda Museum and Picture Gallery, Vadodara	Dust, dirt, creases, folds, insect attack, stains
Kutch Museum, Bhuj	Dust, dirt, creases, folds, insect attack, stains
National Handicrafts and Handlooms Museum, Delhi	Dust, dirt, fugitive dyes, mould growth, insect attack, powdering threads, stains, tears, losses, folds/creases
National Museum, New Delhi	Dust, dirt, powdering threads, rust stains, naphthalene stains, fading, foxing marks
Bharat Kala Bhavan, Varanasi	Dust and dirt
State Museum, Lucknow	Not found
Dogra Art Museum, Jammu	Dust, dirt, fugitive dyes, mould growth, insect attack, powdering threads, stains, adhesive residues, splits, tears, losses, fading, warping, foxing marks folds/creases
Salarjung Museum, Hyderabad	Dust, dirt, stains, tears, losses, fading, folds/creases
CSMVS, Mumbai	Dust, dirt, fugitive dyes, powdering threads, stains, adhesive residues, splits, tears, losses, fading, foxing marks, folds, creases, inappropriate previous repairs.
Indian Museum, Kolkata	Dust, dirt, folds, creases, tears, stains, fading, insect attack, losses, foxing marks, adhesive residues, splits, fugitive dyes, powdering threads, brittleness.
Albert Hall Museum, Jaipur	Dust, dirt, powdering threads, wrinkles, foxing marks, folds, splits, stains, tears, holes, insect attack.
City Palace Museum, Jaipur	Dust and dirt, mould growth, stains, tears, folds/creases
Allahabad Museum, Uttar Pradesh	dust and dirt, folds and creases, tears, stains, fading, mould growth, insect attack, losses foxing marks, adhesive residues, splits, fugitive dyes, powdering threads

Table 4.52 reflected that dust and dirt were the common problems encountered in the shawl collections whether they are in any State of India.

Table 4.53: Distribution and analysis of museums on the basis of the threats to shawls

Major threats to shawls	Distribution of museums N-17	
	f	%
Improper lighting	1	6.25
Fluctuating temperature	1	6.25
Improper housekeeping	1	6.25
Improper handling, display and storage	1	6.25
Biological growth	2	12.5
All of them	13	81.25
N.A.	1	5.88

Table 4.53 clearly revealed that 81.25% museums agreed that the threats to shawls were improper lighting, fluctuating temperature, improper housekeeping, improper handling, display, storage, and biological growth. Only 6.25% museums agreed that improper lighting, fluctuating temperature, improper housekeeping, improper handling, display, and storage were the main causes of damage to shawls and harms them. Biological growth was mentioned by only 5.88% museums for damaging shawls.

On probing the conservator in one of the museums it was found that in order to add humidity in summer and to provide the cooling effect they used khas curtains, air coolers and ice cubes in the gallery and to decrease humidity in monsoon, dehumidifiers were installed inside the galleries. In some of the museums, $Ca(OH)_2$ lime lumps and silica gel were placed at the bottom of the showcases to reduce moisture. These were not visible to the visitors. Silica gel blue, 500gm per cubic meters was used. It was blue in colour (due to the presence of cobalt chloride) which is the indicator for dryness and pink, the indicator for absorbed moisture. It can be regenerated by means of heat. It was changed periodically in one or two museums. In Summers moistured silica gel was also being used. It was opined by one of the conservators that desiccant bags of silica gel also be used for the elimination of moisture in storages and exhibition halls. If the shawl is in the hanging display without any support it may get the permanently deformed due to the expansion and contraction of yarns and fibers with the variation of temperature and humidity. Therefore, this kind of display should be avoided. Chemical reactions might occur within the artefact if placed under the higher temperature. If the shawls were mounted on the strainer then also they are at risk. This can be due to the fact that both, shawls and mounts will act differently due to the changes in R.H. and temperature. Therefore,

it is recommended to use the buffering material such as acid-free tissues as the separation between them. Recommendations should always be made for the improvements in the present as well as in the future. Embrittlement may occur at low relative humidity. Currently, the advisable range of temperature is 15-20^{o}C and R.H. 40-60%.

Air Pollution is caused by the SO_2, oxides of nitrogen, H_2S, particulate matters such as dust, sand grains, and soot which enters the museum from the surroundings. Therefore, it is recommended to close the vents, doors, and windows in order to protect the artefacts from pollution.

Table 4.54: Distribution and analysis of museums on the basis of the bleaching method used on shawls

Bleaching method on shawls	Distribution of museums N-17 f	%
Yes	13	100
No	0	0
Not answered	4	23.52

Table 4.54 shows the data which stated that all the museums who answered this question were very much aware of the harmful effects of bleaching method on shawls.

Table 4.55: Distribution and analysis of museums according to the conservation methods adopted for shawls in museums

Conservation methods adopted for shawls	Distribution of museums N-17 f	%
Dry cleaning and mechanical cleaning	15	93.75
Wet cleaning (aqueous and solvent)	7	43.75
Stains removal	11	68.75
Reinforcing and strengthening	14	87.50
Mounting	9	56.25
Bleaching	1	6.25
No method used	1	6.25
Not answered	1	6.25

The data obtained on the conservation methods used for shawls revealed that mechanical cleaning and dry cleaning were the most preferred method used in conservation by 93.75% museums followed by the reinforcing and strengthening which was being preferred by 87.50% museums. Wet cleaning treatment on shawls was being done by 43.75% museums. 68.75% museums preferred stains removal and 56.25% museums preferred mounting technique on shawls. While two museums were found using bleaching method for stains removal on the shawls and this finding contradicted with the statement where all the museums agreed that bleaching method is harmful for the shawls (table 4.54).

Table 4.56: Distribution and analysis of museums according to the methods of scientific investigation used for shawls

Methods of scientific investigation of shawls	Distribution of museums N-17 f	%
Burning test and solubility tests for fibre identification	0	0
Microscopy	9	52.94
Infra-red spectroscopy	1	5.88
Blue scale textile fading cards	0	0
No method used	6	35.29

Table 4.56 revealed that microscopy was the most preferred method of investigation of shawls by 52.94% museums. Only 5.88% museums were found using infrared spectroscopy whereas 35.29% museums used no method for scientific investigation. XRF and U.V. fluorescence was used by only one museum as the method of scientific investigation. It reflected that proper scientific investigation was not being performed by all the museums. Few museum conservators also elicited the constraints such as lack of time, money and resources for scientific methods and materials.

Table 4.57: Distribution and analysis of museums on the basis of the preservation methods used.

Preservation methods	Distribution of museums N-17 f	%
Indigenous/natural methods (neem leaves, kapur, ajwaiin, cloves, cinnamon, vaikhant, sekhand,	15	88.23

snake slough, turmeric, pepper mint, chandan powder, tobacco leaves and black pepper)		
Man-made procedures (PDCB, odonil, naphthalene balls, thymol, pyrethrum extract, pyrechloro lindane and benzene hexa chloride monophosphate)	12	70.59
Both of them	10	58.82
Not answered	0	0

The data was procured and the results have been shown in table 4.57. According to the data Indigenous/natural methods have been used by 88.23% museums whereas man-made procedures (chemical repellents) were used by 70.59% museums. The museums which preferred using both the preservation methods were 58.82%. It showed that museum preferred natural methods more as compared to the chemical methods to control biological attack.

Table 4.58: Information on the materials used for remedial conservation in museums

Name of the Museum	Materials used for remedial conservation
Government Museum and Art Gallery, Chandigarh	Cleaning agents, solvents for stains removal, lining materials, adhesives, respirators masks, magnifiers, watch maker's glasses, steamers, steam table, vacuum hot table, trays, boards, tanks and tables
Himachal State Museum, Shimla	Cleaning agents, solvents for stains removal, lining material, adhesives, natural dyes, respirator masks, magnifiers, thread counters, watch makers' glasses, steamers, trays, boards, tanks and tables
Bhuri Singh Museum, Chamba	No conservation lab
Kangra Art Museum, Dharamshala	Cleaning agents, solvents for stains removal, lining material, magnifiers, thread counters, watch maker's glasses
Baroda Museum and Picture Gallery, Vadodara	Cleaning agents, solvents for stains removal, lining material, adhesives, threads, nylon net, spotting table, respirator masks, magnifiers, water purifiers, tanks and tables.
Kutch Museum, Bhuj	Cleaning agents, solvents for stains removal, lining material, adhesives, threads, nylon net, respirator masks, magnifiers, water purifiers, tanks and tables.
National Handicrafts and Handlooms Museum, Delhi	Cleaning agents, solvents, lining materials and adhesives.
National Museum, New Delhi	Cleaning agents, solvents for stains removal, lining material, adhesives, synthetic dyes, respirator masks, magnifiers, thread counters, watch makers' glasses, steamers, trays, boards, tanks

	and tables, water purifiers, nylon net.
Bharat Kala Bhavan, Varanasi	No conservation lab and materials used for conservation
State Museum, Lucknow	Cleaning agents, solvents for stains removal, adhesives,
Dogra Art Museum, Jammu	No restoration of textiles
Salarjung Museum, Hyderabad	Cleaning agents, solvents for stains removal, lining materials, nylon net, threads, trays tables, tanks, magnifiers, water purifiers,
CSMVS, Mumbai	Cleaning agents, solvents, lining material, klucel G, maida paste, dyes (only to dye lining material, if required), cotton, silk, polyester, thread, silk crepeline, curved needles, entomological pins/ stainless steel pins, respirator masks, blue wool standards, magnifiers, thread counters, watch maker's glasses, spotting table, M.F. table, water purifiers, trays, boards, tanks, tables, washing table, transmitted light table with rolls
Indian Museum, Kolkata	Cleaning agents, solvents for stains removal, lining material, adhesives, threads, nylon net, curved needles, respirator masks, magnifiers, thread counters, watch maker's glasses, steamers, steam table, water purifiers, trays, boards, tanks and tables..
Albert Hall Museum, Jaipur	Conservation lab not fully equipped. cleaning agents, few solvents and adhesives.
City Palace Museum, Jaipur	Conservation lab was not equipped. It was under construction.
Allahabad Museum, Uttar Pradesh	cleaning agents (aqueous and non-aqueous solutions), Solvents for stains removal, lining material (purchased from market), adhesives such as beva 371, paraloid B72, polyvinyl acetate (PVA), polyvinyl alcohol, sodium carboxy methyl cellulose (SCMC), CMC, maida paste, gum arabic, and fevicol, dyes (both natural and synthetic), threads (which ever necessary), nylon net, crepeline, stabiltex (depends), respirator masks, magnifiers, thread counters, watch maker's glasses, water purifiers, trays, boards, tanks and tables.

Table 4.59: Distribution and analysis of museums on the basis of the code of ethics used for conservation

Staff availability	Distribution of museums N-17	
	f	%
Yes	16	100
No	0	0
Not aware	0	0
Not answered	1	5.88

Data pertaining to the code of ethics revealed that all the museums agreed on the usage of code of ethics while conserving any artefact i.e. they all agreed for the minimum intervention on the artefacts while conserving it and that they use reversible treatment.

Table 4.60: Distribution and analysis of the museums according to the use of dyes for the restoration

Dyes used for restoration	Distribution of museums N-17 f %	
Natural	5	55.55
Synthetic	4	44.44
No retouching	1	11.1
Not answered	8	47.05

Table 4.60 showed that 55.55% museums were found using the natural dyes for the restoration as compared to the synthetic dyes which were being used in 44.44% museums. While 47.05% museums did not answer this question. Only one museum conservator stated that no retouching is done while restoring.

Table 4.61: Distribution and analysis of museums on the basis of the duration of inspection of textiles galleries and stores by the conservators.

Duration of inspecting the textiles galleries and stores	Distribution of museums N-17 f	%
Daily (Galleries)	7	46.67
Within 15 days (Galleries and stores)	2	13.33
Daily (stores)	3	20
When open (stores)	1	6.67
Pre monsoon and post monsoon (For both)	2	13.33
Once in a week(Galleries)	2	13.33
Once in a week (Stores)	1	6.67
Within a month	1	6.67
When a conservator is free (not specify the duration)	1	6.67
Not answered	2	11.76

The results pertaining to the table 4.61 revealed that 46.67% museums inspected the collection daily in galleries followed by 13.33% museums which were found inspecting the collection within 15 days in galleries and stores. It was seen that the 20% museums agreed to inspect the collection in stores as compared to the 6.67%

museums which inspect the collection in stores only when they are open. 13.33% museums were found inspecting the collection in galleries once in a week while 6.67% museums inspected the collection in stores once in a week. Therefore, the overall data reflected the lack of standardization for inspecting the collection on display and stores in all the museums.

Table 4.62: Information on the general problems faced by the museums

Name of the Museum	General problems
Government Museum and Art Gallery, Chandigarh	1. No technical staff for textiles conservation 2. No specialized laboratory for textile conservation
Himachal State Museum, Shimla	1.Lack of resources and infrastructure for conservation
Bhuri Singh Museum, Chamba	1. No technical staff for treating textiles
Kangra Art Museum, Dharamshala	1. Lack of specialised laboratory for conservation 2. No trained staff for dealing with textiles
Baroda Museum and Picture Gallery, Vadodara	1. Lack of storage space. 2. Lack of technical staff. 3. No specialised conservation facilities
Kutch Museum, Bhuj	1. Lack of specialised conservation facilities
National Handicrafts and Handlooms Museum, Delhi	1. No fully equipped conservation laboratory. 2. No technical staff for textiles conservation 3. Technical advice not available 4. Required instruments are not available.
National Museum, New Delhi	1. Lack of staff for remedial conservation of textiles. 2. Lack of specialised equipment for conservation of textiles
Bharat Kala Bhavan, Varanasi	1. No fully equipped conservation laboratory. 2. Technical advice not available. 3. No technical staff for treating textiles.
State Museum, Lucknow	1. Lack of financial support. 2. Lack of staff for remedial conservation of textiles. 3. Lack of fully equipped laboratory
Dogra Art Museum, Jammu	1. Lack of technical staff for remedial conservation of textiles.
Govind Ballabh Pant Government Museum, Almora	1. Lack of funds 2. No staff for remedial conservation
Shri Pratap Singh Museum, Srinagar	1. Lack of technical staff. 2. Lack of specialised conservation laboratory for remedial conservation of textiles.
The Salarjung Museum, Hyderabad	1. Conservation laboratory not fully equipped.
CSMVS, Mumbai	1. No problems found.
The Indian Museum,	1. Lack of technical staff.

Kolkata	2. Lack of fully equipped laboratory
The Albert Hall Museum, Jaipur	1. Lack of staff for textiles conservation.
The city Palace Museum, Jaipur	1. Conservation laboratory not fully equipped.
Nagaland state museum, Kohima	1. Lack of technical staff. 2. No conservation laboratory.
Allahabad Museum, Uttar Pradesh	1. Financial constraints. 2. Non- availability of advanced conservation laboratory equipments. 3. Insufficient staff.

The data shown in table no. 4.62 reflected that except a few laboratories in the country, most of the museums did not have well- equipped laboratory and trained staff. As far as the conservation of shawls is concerned, most of the museums did cleaning and restoration within their reach. No research was being done to improve and develop the conservation laboratories. Authorities have to sanction sufficient budget and also impart training to the staff. It was observed that one of the museums has purchased the conservation instrument for the cleaning of the museum collections named Artiny Laser but no training had been imparted on operating the equipment. It is high time to understand that conservation is a prime function of a museum and if it is neglected the collection cannot survive for long.

4.3.2 Analysis and interpretations of conservation practices of shawls adopted by conservators in private practice

Data procured through the responses received from the conservators in private practice were analysed and have been presented below in the tabulated manner. The percentage-wise data was calculated on the basis of answered questions.

Table 4.63: Distribution and analysis of conservators according to the conservation documentation

Documentation in conservation	Distribution of conservators N-4	
	f	%
Conservators who think documentation in conservation is important	4	100
Creation of database for conservation documentation	2	50
Not answered	0	0

The data pertaining to the conservation documentation revealed that all the conservators agreed that conservation documentation is very important but only 50% of respondents created the database for conservation documentation.

Table 4.64: Information and analysis of the deteriorations in the shawls collection

S. No.	Conservator	The problems/deterioration seen in the shawls collection
1.	Conservator 1	Dust and dirt, folds/creases, losses, fading, insect attack, splits.
2.	Conservator 2	Dust, dirt, insect attack, powdering threads, stains, splits, losses, fading, folds/creases.
3.	Conservator 3	Dust, dirt, fugitive dyes, mould growth, insect attack, powdering threads, stains, adhesive residues, splits, tears, losses, fading, foxing marks, folds/creases, highly fragile and weak due to acidity.
4.	Conservator 4	Dust, dirt, fugitive dyes, insect attack, tendered, stains, adhesive residues, splits, tears, losses, fading, foxing marks, folds/creases.

Data in table 4.64 revealed that dust and dirt, folds/creases, losses, fading, insect attack and splits were the problems seen in the shawl collections by the conservators in private practice.

Table 4.65: Distribution and analysis of conservators on the basis of the major threat to shawls

Major threats to shawls	Distribution of conservators N-4	
	f	%
Improper lighting	0	0
Inadequate R.H.	0	0
Fluctuating temperature	0	0
Air pollution	0	0
Improper housekeeping	1	25
Improper handling, display and storage	1	25
Biological growth	1	25
All of them	3	75
Not answered	0	0

Table 4.65 revealed the data on the major threats to shawls collection. It showed that 75% conservators agreed that improper lighting, inadequate R.H., fluctuating temperature, air pollution improper housekeeping, improper handling, display, storage and biological growth were harmful to shawl collections. 25% conservators agreed

that only improper housekeeping, improper handling, display, storage and biological growth were harmful to the shawl collections and not all of them. It reflected that though all of them are harmful but each conservators' point of consideration was different in view of the shawl collections.

Table 4.66: Distribution and analysis of conservators on the basis of the bleaching method used on shawls

Is Bleaching method harmful for shawls	Distribution of conservators N-4	
	f	%
Yes	4	100
No	0	0
Not answered	0	0

Data procured in table 4.66 revealed that all the conservators opined that bleaching method was harmful to the shawls.

Table 4.67: Distribution and analysis of conservators on the basis of the conservation methods used for shawls

Conservation methods used for shawls	Distribution of conservators N-4	
	f	%
Dry cleaning and mechanical cleaning	1	33.33
Wet cleaning (aqueous and solvent)	3	100
Stains removals	2	66.67
Bleaching	0	0
Reinforcing and strengthening	3	100
Mounting	2	66.67
Not answered	1	25
Any other	Darning, lining, embroidery, beading on loss area.	

The data pertaining to the conservation methods used for shawls was obtained and it has been tabulated in table 4.67. It was found that all the conservators agreed with wet cleaning (aqueous and solvent), reinforcing and strengthening treatment used for shawls. 66.67% conservators stated that they preferred stains removals and mounting

technique whereas 33.33% conservators preferred dry and mechanical cleaning for the conservation of shawls. However, no conservator disclosed the procedure/methods used to conserve the shawl collection in detail.

Table 4.68: Distribution and analysis of conservators according to the methods of scientific investigation used on shawls

Methods of scientific investigation	Distribution of conservators N-4 f	%
Burning test and solubility tests for fibre identification	1	25
Microscopy	4	100
Infra-red spectroscopy	1	25
Blue scale textile fading cards	0	0
Ph meters	1	25
Not answered	0	0
Any others	Portable microscope	

Table 4.68 revealed the results pertaining to the methods of scientific investigation used on shawls. It was found that microscopy was most preferred way of scientific investigation by the textile conservators. 25% conservators preferred using burning tests and solubility tests for fiber identification (only if the broken fiber is available or only if the client/owner allows for same) along with testing by pH meters and infra-red spectroscopy. One of the conservators stated the usage of portable microscope which could be taken to area of conservation work.

Table 4.69: Distribution and analysis of the conservators on the basis of the preservation methods used

Preservation methods used	Distribution of conservators N-4 f	%
Indigenous/natural methods	4	100
Man-made procedures	4	100
Both of them	4	100
Not answered	0	0

The data in table 4.69 revealed that all the conservators agreed to use indigenous/ natural methods as well as man-made procedures for the preservation of artefacts.

Table 4.70: Distribution and analysis of conservators according to the code of ethics used for the conservation

Code of ethics followed for the conservation	Distribution of conservators N-4	
	f	%
Yes	3	75
No	1	25
Not aware	0	0
Not answered	0	0

Data shown in table 4.70 revealed that around 75% respondents consider the code of ethics for the conservation whereas 25% respondents do not consider the code of ethics for the conservation of artefacts.

Table 4.71: Distribution and analysis of conservators according to the dyes used for restoration

Dyes used for restoration	Distribution of conservators N-4	
	f	%
Natural	2	66.67
Synthetic	1	33.33
Not answered	1	25

The data pertaining to the dyes used for restoration have been presented in the table 4.71. It was found that 66.67% conservators preferred natural dyes for restoration as compared to the synthetic dyes which were preferred by around 33.33% conservators while 25% conservators did not answer the question.

4.4 Practical Approach to the Conservation of Woollen Shawl

In view of the last objective no.6 stated as 'To develop suitable method for conserving traditional shawls", the researcher conducted an experimental research process. In this

section the experimental procedure for the remedial conservation of the woollen shawl which was in the damaged condition has been presented. Prior to the conservation technique, the researcher performed few tests so as to ascertain the methods and techniques to be carried out on the woollen shawl. The test 1, was carried out to find out the suitable cleansing agents for treating woollen shawls and test 2, was done to determine the suitable protective coatings over the woollen fabric. These experiments have been presented in the section 4.5.1 as follows.

4.4.1 Woollen samples

4.4.1.A. Test 1: Assessment of the sample test fabric for tensile strength, colorfastness properties, and visual characteristics by using *Sapindus mukorossi* and Synperonic 91/6 as cleansing agents for woollen fabric

1. Introduction

Cleaning of the textile plays a very important role in conservation. Prior to any treatment, it is necessary to investigate the materials and methods which will be used during conservation process. The cleaning helps in the removal of dirt, dust debris and harmful soiling from the textiles and therefore, ensures sanitization of the material. The different techniques of cleaning might hamper the woollen artefact to the certain extent in terms of tensile strength and visually as well. The dyed artefacts may be subjected to change/ alteration in the colour also. Therefore, an approach was made to examine the tensile strength, colorfastness of dyed samples and visual analysis by the very indigenous method of wet cleaning with *Sapindus mukorossi* in comparison with the scientific method of wet cleaning with non-ionic detergent Synperonic 91/6 for the cleaning of wool fabric.

It has been observed during washing that wool gives heat on wetting and shrinks which happens only if the wool is 100% pure, whereas when the wool blends are washed the fabric gives the much better results while washing. It is quite contradictory to state that whether woollen fibers be blended with the synthetic fibers or not. It has been studied that various synthetic finishes e.g. acrylic finishes are used in order to improve the wool quality by making it shrink-resistant and abrasion-resistant.

Reetha, scientifically known as *Sapindus mukorossi* is a deciduous tree. Its fruit is also known as Indian soapberry or washnut. It is mostly used in the cleansing and medicinal

purposes. These soapnuts are composed of saponin which is useful for the cleansing of wool, hair and articles of clothing, etc. These saponins produced foam when shaken in the aqueous solutions. These have anti-microbial, anti-fungal and anti-bacterial properties. The pH of this solution was found to be little acidic by 6.7.

The Synperonic 91/6 is a non-ionic surfactant. It is a highly effective water-soluble wetting agent available at low cost which has low environmental impact foaming agent (www.crodaoilandgas.com). According to the study by Fields *et. al.* (2004), on "Finding the substitute surfactants for Synperonic N" it was noted that Synperonic N could be replaced by Synperonic 91/6 which can yield the best cleansing properties on woollen fabric. The pH of the solution was found to be 6.5 which was slightly acidic.

2. Procedure for cleaning of the sample:

The assessment of the test samples for cleaning the woollen fabric was done on the basis of standardized testing for the fabric strength and visual analysis. The parameters used for the cleaning were based on the cleaning time and concentration of the cleaning solution. The cleaning time was 1 hour. The samples were agitated firmly with the help of the rollers or brush at the interval of 20 minutes. The samples were agitated three times at each interval. This made total nine times the wool fabric samples agitated in the duration of one hour. The samples were then rinsed in the distilled water until the surfactants were fully removed from the fabric. The samples were then laid flat on the white towel in order to dry them under the normal environmental conditions.

3. Dyeing process of the samples

Indigo as a vat dye, methyl orange as an acid dye and Procion Red M 25B was used as the reactive dye to dye the samples. The size of the samples for dyeing was 5"x5" inches for colorfastness testing of wool fabric samples.

Acid dyes are so called because they contain acidic molecular groups such as SO_3H and work in a low pH environment with a mildly acidic "fixative" like white vinegar or citric acid. The bond between the dye and the fiber occurs between the basic amino group and acidic -SO_3H groups. Acid dyes were fixed to fibers by hydrogen bonding, van der waals forces, and ionic bonding.

The dyeing of wool fabric sample was carried out with reactive dyes. It required a very little amount of dye into a cup and some cold water was added. It was stirred well with stainless steel spoon. This was added to the dye bath at the temperature above 60^oC. To

this salt was added half the quantity of the dye. Now the fabric was added and water was filled in so that fabric gets immersed in the dye bath properly. After heating for 15 minutes, the citric acid was added and stirred at regular intervals for another 10-15 minutes. The fabric was then rinsed in hot water and washed. Rinsing is done until it gets completely free from the dye.

Vat dye needed a reducing agent to solubilize it. The usual reducing agent sodium dithionite ($Na_2S_2O_4$), which transforms the dye to its "leuco" form may be used which is water-soluble. Once added to the fabric, the leuco colorant is then oxidized to the insoluble nature which is strongly coloured. Synthetic reactions such as oxidation, reduction and pH regulator were required; even the dissolution process required measuring out appropriate quantities of caustic soda and sodium hydrosulfite in order to complete the reduction. The dye was water-soluble. The fabric was immersed repeatedly in this oxygen-free dye bath, then exposed to the air, whereupon the water-soluble reduced form changed colour as oxygen turned it into the water-insoluble form.

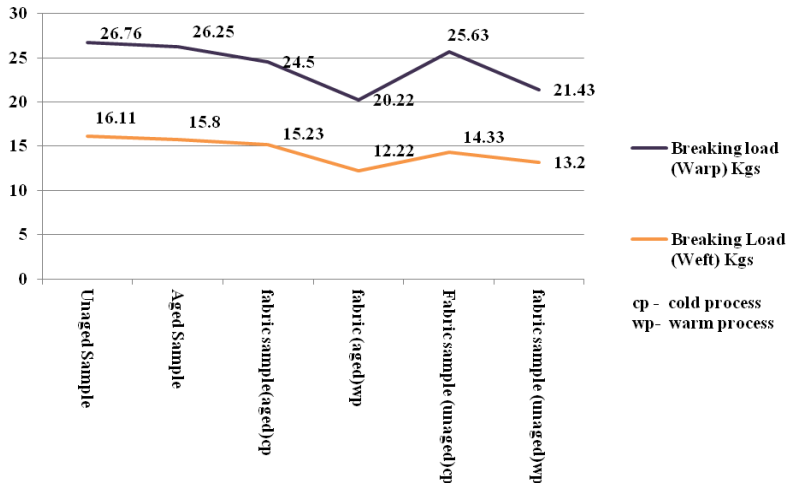
Plate 4.44: Dyeing of the woollen samples

3a. Observations during dyeing of the samples

Dyeing of the woollen samples resulted in dis-organization of the woollen fibers. The mechanical and physical stress was observed in the matrix of the woollen structure. The increased temperature affected the structure of the fibers in terms of tenacity, colourfastness and it was found that it does age the wool fibers to some extent. The marked decrease in the stiffness of the fibers was observed with increased temperature.

4. Readings and observations

I. Washing of the fabric by using 5% *Reetha* Solution

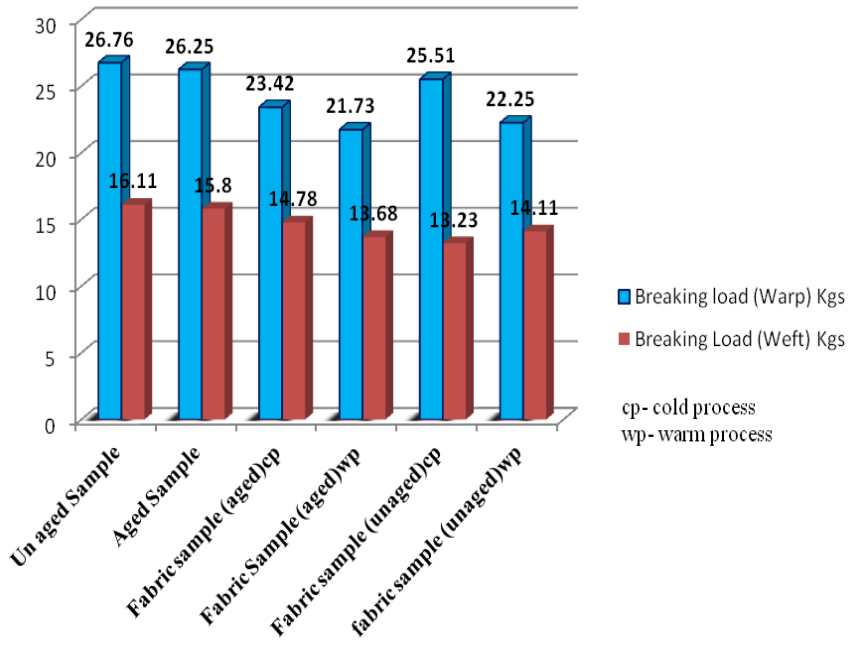


Graph 4.1: Breaking load measurements for aged and un aged woollen samples washed with *Reetha* solution

Before initiating the washing process the dirt was mechanically removed from the samples with the help of a scalpel. It was observed that the absorption of *Reetha* solution inside the fabric sample was less in case of cold water as compared to the warm water. Time for dirt removal was more by fifteen minutes in case of washing the sample by *Reetha* dissolved in cold water. Dirt was still observed on the surface of the woollen fabric samples when washed with cold water whereas the cleaned surface was observed of the sample when washed with the warm water.

It was noticed that the dirt penetrated the aged samples more as compared to the unaged samples. A very slight decrease in the strength of the fabric was observed in the aged samples. It was observed that wool underwent the least strength loss during ageing according to the values shown in Graph 4.1. On the basis of the further tests, it was analyzed that *Reetha* solution could be best used when warm. It penetrated well into the fabric. Less decrease in the tensile strength of the fabric was observed in case of unaged samples. Overall readings showed that washing of the woollen fabric with *Reetha* solution does not cause any harm to the fabric thereby maintained the strength of the fabric as well.

II. Washing of the fabric by using 5% Synperonic 91/6 (non-ionic detergent)



Graph 4.2. Breaking load measurements for aged and un aged woollen samples washed with non-ionic solution

It was observed that the detergent solution penetrated more and dirt came out easily in case of the washing the samples through the warm process. Moreover, it was also noticed that the dirt came out more easily in the case of the unaged samples as compared to the aged samples.

The decrease in the strength of the fabric was observed in the case of the aged samples. A very slight decrease in the strength of the fabric samples was observed in case of non-ionic detergent dissolved in warm water as compared to the fabric samples washed by using the detergent solution made in cold water.

Washing the samples with non-ionic detergent did not further affect the tensile strength of the woollen fabric samples. In both the cases, they were considered safe to use for washing. It was also observed that loose fibers of woollen fabric washed away during rinsing and washing process. Therefore, when the textile cannot bear the load of the washing, it should be avoided as far as the possible.

Readings for the colourfastness to washing

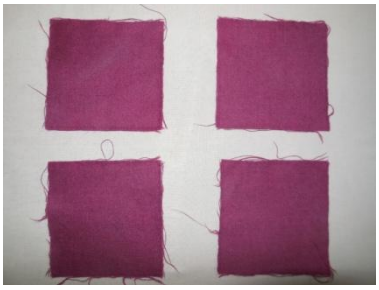


Plate 4.45a: Reactive dyed samples

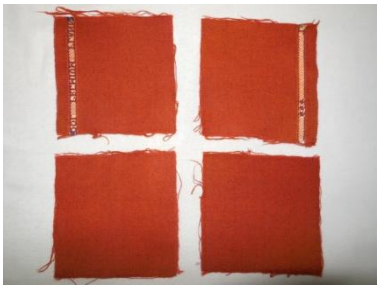


Plate 4.45b: Acid dyed samples

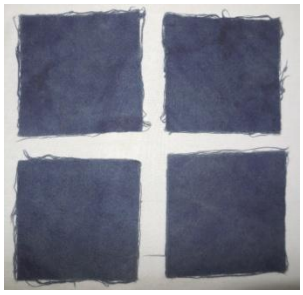


Plate 4.45c: Indigo dyed samples

Plate 4.45: Acid, reactive and vat dyed samples

III. Washing of the coloured fabric samples by using 5% *Reetha* Solution

Table 4.72: Colour strength of un washed and washed fabric samples with *Reetha* solution

S. No.	Fabric samples	Colour strength of the unwashed fabric	Colour strength of the washed fabric
1.	Indigo dyed (unaged)	5	3-4
2.	Indigo dyed (aged)	5	3-4
3.	Acid dyed (unaged)	5	1-2
4.	Acid dyed (aged)	5	1-2
5.	Reactive dye (unaged)	5	4-5
6.	Reactive dye (aged)	5	4-5

(The above results were obtained from ATIRA, Ahmedabad. Original document enclosed as appendix VII)

In case of washing the samples with *Reetha* solution, not much difference was found between the unaged and aged samples colour strength. The colourfastness to washing was tested by ISO 105 C10 Test: 2, (50^{o}C). It was found that acid dyed samples showed poor rating as compared to the vat dyed samples which showed good rating codes. The reactive dyed samples were considered excellent while washing.

IV. Washing of the fabric by using 5% Synperonic 91/6 (non-ionic detergent)

Table 4.73: Colour strength of un washed and washed fabric samples with non-ionic detergent

S. No.	Fabric samples	Colour strength of the unwashed fabric	Colour strength of the washed fabric
1.	Indigo dyed (unaged)	5	3-4
2.	Indigo dyed (aged)	5	3-4
3.	Acid dyed (unaged)	5	1-2
4.	Acid dyed (aged)	5	1-2
5.	Reactive dye (unaged)	5	4-5
6.	Reactive dye (aged)	5	4-5

(The above results were obtained from ATIRA, Ahmedabad. Original document enclosed as appendix VII)

The vat dyed sample showed some loss of colour in the non-ionic detergent solution. Both the solutions were considered safe to use over the woollen fabric.

V. The visual analysis before washing and after washing of the fabric with *Reetha* and Synperonic 91/6 solution:

The visual analysis showed that there was scattered dust among the yarns of the weave while washing with the *reetha* solution. The *reetha* solution was quite rough as compared with the Synperonic 91/6 solution as it was the very smooth solution and didn't hamper the woollen fabric during washing.

Plate: 4.46: The dyed woollen fabric samples washed with *Reetha* and Synperonic 91/6

Plate 4.47: The whole set-up while testing samples

4.4.1.B. Test 2: Assessment of the sample test fabric for tensile strength, moisture regain, bending, stiffness and visual characteristics by using lanoline and glycerine as protective coatings over the woollen fabric.

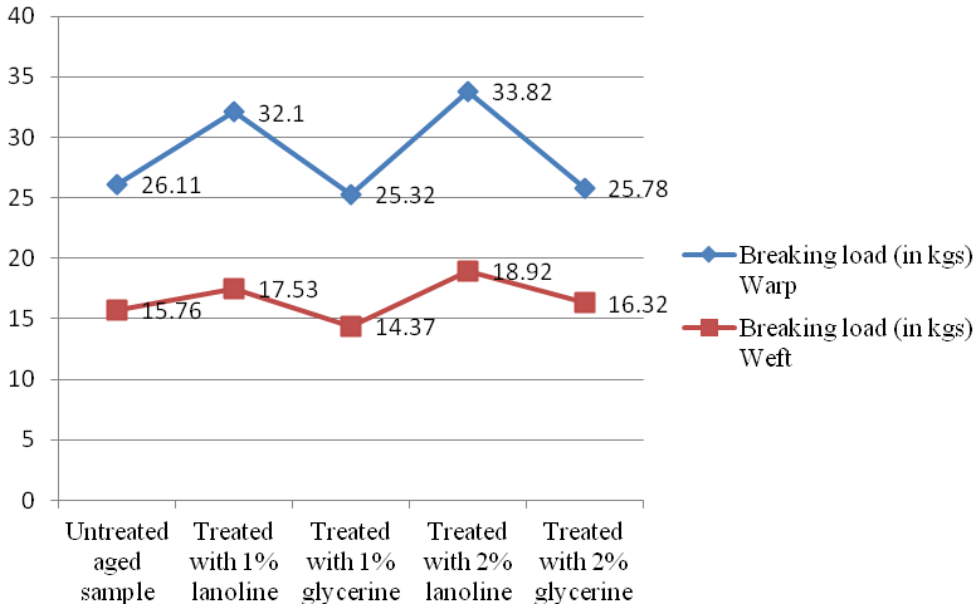
The protective coatings are given in order to improve the quality of the artefact to some extent. The protective coatings can be in any form of wax or oil. These are applied over the artefact for the improvement and maintenance of the present condition of the artefact. In this experiment two agents have been used over woollen fabric samples in the concentration of 1% and 2% and have been analyzed under the different parameters of tensile strength, moisture regains, bending or stiffness and visual characteristics.

Lanoline is a yellow waxy substance secreted by the sebaceous glands of wool-bearing animals. Lanoline is removed from wool before it is made into yarn. Lanoline is derived from German, Latin Lana, meaning wool and oleum, meaning oil. It is also known as wool wax or wool grease. It is a thick and waxy oil. Lanoline has a water retention property. Its waterproofing property helps the sheep to shed water from their surface and hence keep them dry. It was found that with time the wool loses its oiliness and sometimes through frequent washing. Therefore, this natural oil might be used to relanoline wool by soaking it in the diluted solution of lanoline now available in local markets as well or by providing the coating of the same.

Glycerine is a colourless, odorless, viscous liquid that is sweet-tasting and non-toxic. Glycerol has three hydroxyl combinations that are bound for its solubility in liquid and its hygroscopic essence. Glycerine is also recommended for the same purpose for keeping the wool soft and conditioned. It is hygroscopic in nature and holds on the moisture. It has been seen that the use of glycerine makes the wool less scratchy or tender.

Therefore, the researcher has taken up these two agents as the protective coatings for the tests over woollen samples. The samples were treated with two agents i.e. Lanoline or wool wax and glycerine in order to check the fabric for tensile strength, moisture regain %, bending length for determining the stiffness of the fabric and visual analysis in order to determine the transparency and translucency properties of the wool fabric. The glycerol was used as the preservative coating over the surface of the fabric. It was dissolvable in methanol.

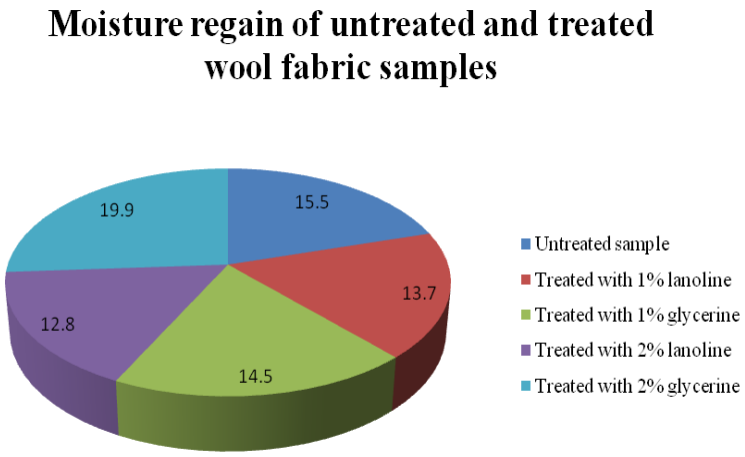
1. Assessment of the woollen fabric for tensile strength



Graph 4.3: Breaking load measurements for un aged and aged woollen samples treated with lanoline and glycerine

According to the readings, it was observed that lanoline increased the tensile strength of the fabric as compared to the glycerine, whereas glycerine helped in the formation of hydrogen bonds and the penetrated into the fabric structure.

2. Assessment of the woollen fabric for moisture regain



Graph 4.4: Moisture regain values of untreated and treated woollen samples

It was observed that the fabric samples treated with lanoline were lighter in weight as compared to the glycerine treated samples. It was found that lanoline acted as the coating over the fabric i.e. the wax coating whereas the liquid glycerine penetrated the fabric completely thereby increasing the fabric weight. It was noted that wool absorbed around 35% of its weight in moisture without the feel of dampness inside it.

3. Assessment of the woollen fabric for bending and stiffness

This was done through visual analysis

Table 4.74 : Bending length description of untreated and treated woollen fabric samples

S. No.	**Woollen fabric samples**	**Bending length description of untreated and treated fabric samples**
1.	Untreated sample	Bended well
2.	Treated with 1% lanoline	The fabric was soft to touch and it strengthened the fabric. Appeared smoother.
3.	Treated with 1% glycerine	Few bending marks were noticed
4.	Treated with 2% lanoline	Stiffness was noticed in the fabric
5.	Treated with 2% glycerine	Fold marks occurred and the colour of the fabric appeared darker

4. Assessment of the wool fabric samples for visual analysis in terms of transparent and translucent properties.

Both the samples were compared for the transparency properties and it was noticed that the sample treated with glycerine appeared darker as compared to the lanoline treated fabric.

It was found that in order to make wool clothing less itchy liquid glycerine could be used in order to soften it up and make the wool less scratchy. According to the study of the samples, the lanoline appeared more transparent, the fabric felt soft and the weight of the fabric was maintained. Therefore, it was found more preferable for the woollen fabric than glycerine.

4.4.2 Woollen Shawl

1. The selection of the material

The shawl selected was of the pure woollen fabric from the state of Himachal Pradesh. The shawl was 50-60 years old. The shawl had designs on both the sides of the shawls which could be identified as the patterns of the Kullu shawl. The shawl had the holes, split-ups, fading and fold marks, and hence it was kept under the 'high' treatment priority. The overall condition of the shawl was rated as 'poor' as per the condition rating code.

2. Examination of the material

The materials used for the preliminary examination were a magnifying glass, binocular, camera, microscope, watch glass, swab stick, cotton, distilled water, and optivisor. The equipments were first laid on the work table in order to minimize the frequent movements during conservation. The things such as soft brushes, petroleum ether, steam vaporizers, spray bottle, blotters, melinex, swab stick cotton, threads, needles, mini vacuum, thickness gauze, camera, hand microscope, conservation treatment record, pencil, scale and tweezers were also kept. The shawl was laid on the large table covered with the white cotton sheet.

Examination of shawls was done under the following lights: normal light, raking light, transmitted light, and UV radiations.

Before conservation treatment, the efforts were made to examine each and every aspect of the shawl. The shawl was closely examined visually. It was identified for the patterns and designs. Hence, it came out to be from the state of Himachal Pradesh. The fibers and yarns were taken for the analysis. It was analysed that these fibers were very hairy in structure and revelations were made as the merino wool. The photographs were taken by the researcher during the conservation treatment.

Two borders of the shawl were embroidered with herringbone stitches in the red, orange, dark red and white colours by using the cotton threads. There were around six holes at less regular intervals, that were present equally on either side of the shawls.

As viewed under the microscope, there were no biological damages noted in the fibers, however, it had physical and chemical damages. The weave was identified to be the twill weave pattern. Both the warp and weft yarns had the "S" twist pattern. The shawl was constructed on the throw shuttle loom.

3. Visual examination

It was observed that the shawl was fully covered with the dirt and debris in the depth of the yarns and fibers of the shawl. Yarns had become very frail from some of the edges and they were ready to get apart.

4. Documentation of the shawl

Examination of shawl was done prior to the treatment on the basis of the condition report. The following is a detailed condition report for the woollen shawl.

Complete Condition assessment report for woollen shawl

1. Accession no.:1 Examiner: Deepti
2. Name of the shawl: Kullu Shawl
3. Owner: unknown
4. Date of examination: 5/12/2017
5. Provenance: Kullu District, Himachal Pradesh
6. Date/ period: 20th Century
7. Material: Wool (Merino wool)
8. Shape and size: Rectangle
9. Colours visible: Light grey coloured shawl.
10. Colours over design: Orange, white, red, green, black, dark brown
11. Ornamentation: T pattern, chasham and chomukha pattern over the two sides of the shawl which have designs.
12. Brief Description/Case history (if known): The signs, feel of dampness, and smell from the fabric revealed that it was kept under the very bad storage conditions where the relative humidity was high.
13. Thread count: 50-60
14. Classification of Shawls

Classification	
Woven shawl	Yes

Embroidered shawl	Yes
Dyed shawl	No
Printed shawl/Painted shawls	No
Any other	

15. Condition:

A. Physical damage

- front surface and encrustations: Dirt and dust seen on the surface of the shawl
- back surface and encrustations: Dust all over the surface.
- tears/ cuts: These were noticed on the right side of the shawl and the one near the centre of chasham design
- splits: Split up seen over the chomukha design
- holes/ dents: These were noticed on the upper part of the shawl
- loosening of joints/ stitching:
- opening of seams:
- fold marks/creases: Present all over the surface. Major fold marks were seen on the upper left part of the shawl
- missing part/ losses: Small holes were present on shawl which could hardly be seen by naked eyes
- pilling: Yes, it was present at some places.
- abrasion marks: Yes, these were present due to the usage.

B. Chemical damage

- acidity:
- powdering threads:
- adhesive residues:
- spots/stains:
- fading of dyes: Yes, due to bleeding of dyes and ageing.
- discolouration: It was present. May be due to the moisture
- brittleness due to ageing:

C. Biological damage

- spots/stains:
- mould and mildew attack:
- insect attack:
- pests damage:
- rodents:
- holes:
- soiling:
- stains:
- dirt:
- deposits:
- discoloured adhesives:

- discoloration:
- fading:

15. Are the dyes fast to washing/ fugitive dyes: Yes, grey colour was found bleeding by distilled water and ethanol.

16. Does it require another support? No

17. Can it take needle or thread? Yes

18. Condition of ornamentation: Design on the right side of the shawl had split up from the centre.

19. Previous restoration/old repair: No, because it has been received for conservation treatment for the first time.

20. Others recommendations:

21. Photographic record: Available, before, during and after photographs
    - Photographs locating the damage
    - Photographs including the back and front view
    - Details of damage
    - Before during after photos of the conserved areas
    - Detail shots of the conservation treatment

22. Treatment Proposed/planned:
    - Detailed documentation report: Written and photographic representation
    - Ink solubility test
    - Mechanical cleaning of the shawl followed by dry cleaning.
    - Stains removal
    - Flattening of the shawl
    - Reinforcing or strengthening of the shawl
    - Rolling of the shawl for storage.

1. Degree/Extent of damage:

2. **Condition rating**:
    - good
    - fair
    - poor yes
    - do not handle

3. **Treatment priority**:
    - urgent
    - high yes

- medium
- low

5. Photographic Documentation of Shawl

a

Plate 4.48a: Front of the shawl

b

Plate 4.48b: Back of the shawl

c

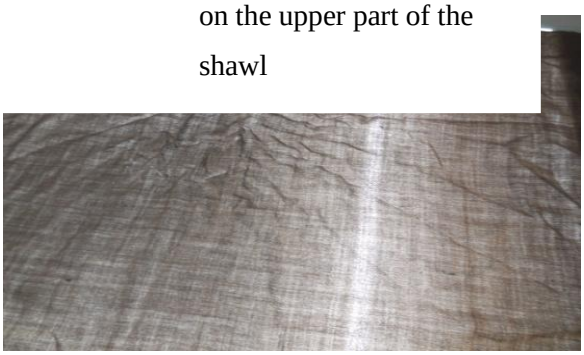
Plate 4.48c: Small holes on the right area and fold marks on the left noticed in the shawl

d

Plate 4.48d: Another view of the holes on the upper part of the shawl

e

Plate 4.48e: View of the holes as seen under the light table



f

Plate 4.48f: View of the fold marks on the upper left area of the shawl

g

Plate 4.48g: The fold marks and waviness seen in the shawl.

h

Plate 4.48h: Enlarged view of the hole in the centre area

i

Plate 4.48i: Another enlarged view of the hole in the centre part

j

Plate 4.48j: Two holes can be noticed in the enlarge view of the shawl

k

l

m

Plate 4.48k: Closed view of the shawl showing the weave pattern

Plate 4.48l: Fading of the colour was noticed on the upper part of the shawl

Plate 4.48m: Split up was seen over the design of the chomukha in the centre.

Plate 4.48: The photographic record of physical and chemical deteriorations in shawl

4.4.2.A Remedial conservation of woollen shawl:

1. Checking for colourfastness and fixing the dyes

pH reading was taken in order to specify the hydrogen ion concentration to detect the acidity and hydroxyl ions in order to detect the alkalinity. This scale ranged from 0-14 wherein 0 represented the most acidic, 14 represented the most alkaline and 7 was neutral.

Mylar was placed under the woollen shawl to be tested for pH reading. The area chosen was from the corner of the shawl being quite invisible to the viewer was wetted locally first to take the pH of the fabric. When the dyes did not bleed with slight wetting the fabric, then the pH strip was placed by applying the little pressure by keeping the white blotter at the top of it. The reason being the white blotter will absorb the excess water as well as the dyes which bleed will be visible easily on it. The colour of the pH strip was then compared with the colour coding chart given at the top of the pH pack. It was observed that the pH of the wool was 14 which should not be the case. It should range from 5 to 8. Spot tests were also done to check the colourfastness. This coloured shawl was checked for the colourfastness. Each colour was checked separately by using cotton swabs. Solubility tests of dyes were performed using: distilled water, ethanol, methanol and petroleum ether. Grey colour was found soluble in distilled water and ethanol according to the tests conducted by the researcher. Fugitive dyes were fixed by application of the solution of 0.5% common salt. These results have been shown in table 4.75 below.

Table:4.75: Solubility tests for colours used in the shawl

S. No.	Colours	Distilled Water	Ethanol	Methanol	Petroleum Ether
1.	Grey	Yes	Yes	No	No
2.	Red	No	No	No	No
3.	Dark Yellow	No	No	No	No
4.	White	No	No	No	No
5.	Black	No	No	No	No
6.	Dark Brown	No	No	No	No
7.	Green	No	No	No	No

Yes: Soluble **No:** Not Soluble

Plate 4.49: Checking the colourfastness by keeping the blotter beneath the shawl.

2. Cleaning process:

Aqueous cleaning of the shawl was avoided keeping in mind some of the points. Since the woollen fabric is hygroscopic in nature, and it may take a longer time to dry. According to tests performed in section 4.5.1, it was found that the washing affected the filaments, yarns and matrix of the fibres. Deformations and breakdown in the woollen fabric structure might be observed in the poor conditioned shawl if washed. Considering the fact that the abraded areas and the affected areas might tend to dry quickly as compared to the whole shawl, thereby causing deformations while drying up. Therefore, the wet aqueous cleaning of the shawl was circumvented.

Mechanical cleaning on the shawl was performed. The shawl was first placed on the cleaned table by placing the white blotter and then the mylar beneath the shawl. The unwanted materials such as dust, small particles of soiling and large contaminants were removed physically from the fabric by using tweezers, soft brushes and vacuum cleaner. The brushes were used in the weaving direction to remove the contaminants. The vacuum cleaning was done from the back side by keeping the suction at low pressure and using the gauze cloth at the nozzle of the vacuum cleaner. The polyester netting was used to cover the area which was under vacuum cleaning. One should not use the vacuum cleaner directly on the shawl which has fragile parts. Proper care should always be taken while handling shawls. This artefact was then dry cleaned by using petroleum ether. When there was no other alternative to remove stains/accretions and dirt, the organic solvent was used. Enough care should be taken while using them.

In this case petroleum ether was used on shawl. Petroleum ether was used only after experimenting it on the woollen samples. The sample study was done to ascertain the procedure and results of the organic solvent on the woollen sample. The procedure followed on the woollen sample gave good results and found satisfactory. Some of the advantages of dry cleaning found over wet cleaning were:

- Dry cleaning protected the fabrics' brightness, colour and softness.
- Since dry cleaning involved the cleaning with the solvents, therefore, it removed and dissolved the unwanted oil, dirt, grease and stains.
- Woollen fabrics when washed in water were subjected to the loose their shape, size, colour and sometimes got shrunk.
- Last but not the least, dry cleaning helped preserve the fabric from biodeterioration also, as the moths and insects didn't respond due the smell of the cleaning solvent.

The whole procedure of experimentation carried out by the researcher has been presented in the plates no. from 4.50- 4.61.

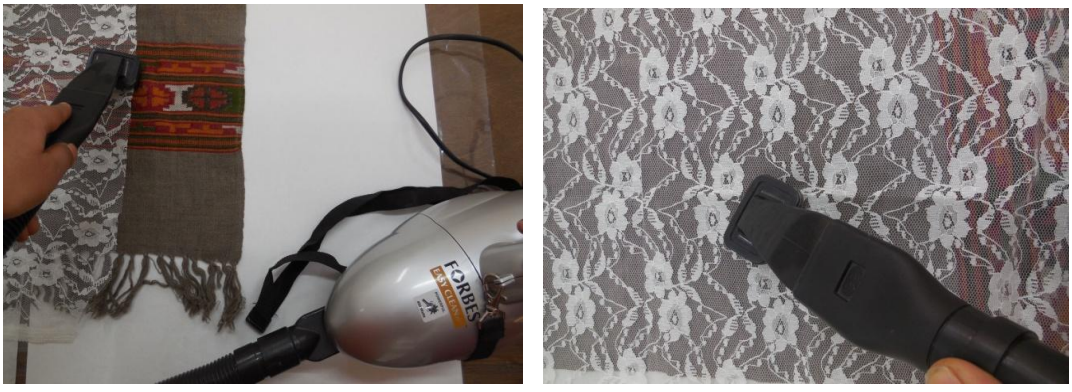


Plate 4.50: Usage of polyester netting and mini vacuum cleaner for cleaning the contaminants from the shawl

Plate 4.51: The application of petroleum ether over the shawl by dabbing method. The cotton was put inside the muslin cloth and tied from the top of it. Then it was dipped into the petroleum ether solution and dabbed over the shawl evenly.

Plate 4.52: The residue left over the white blotter after solvent cleaning

Plate 4.53: The shawl during conservation

3. Stains removal

It was seen that protein fibers have more proximity towards dyes, therefore bleeding of natural dyes is quite possible. Therefore, for performing spot cleaning, or stains removals, the preferable equipment was a suction table. Due to the lack of this resource, hand held hair dryers set on cool or fans might also be used as hot air drying can cause shrinkage for the spotting process. Blotter and tissue paper can also be used wherever necessary. Here, vacuum suction table was used to reduce staining. For removal of the grease stain, trichloroethylene was used. As far as the bleaching of the shawl is concerned it was avoided as much as possible. Stains removal was performed till the shawl could withstand the pressure caused by reagents used for stain removal. Mudstain was cleaned mechanically with the help of the scalpel.

4. Flattening of the shawl

Plate 4.54: Flattening of the shawl

Plate 4.55: The shawl during flattening

Flattening of the shawl was done by using luke warm ironing. This was done by keeping the muslin cloth over the shawl and providing the moisture by using the spray bottle. The iron was set on wool in order to provide it the required temperature.

5. Reinforcing and strengthening of shawl

5a: Stitching technique

Stabilization of a shawl was done through the stitching technique. The yarns chosen for the repairing work were found compatible with fabric. The threads used were cotton sewing threads. Polyester sewing threads might also be used because of their stability over the long period of time and strength as compared to the cotton threads and linen threads. Filament threads and threads pulled out from the stabiltex might also be used for repairing purpose. Synthetic threads should be avoided as they are too strong and may harm the fragility of the traditional woollen shawl. The process took

into account the hand stitching (by a thread of the same thickness) on the area to be treated by stitching in the direction of warp and weft continuously till it covers the entire affected area of losses. Therefore, the holes and losses in the shawls were repaired by the darning process. Generally, the single filament is used for sewing purpose. In this shawl also single strand of the thread was used for the tensionless weaving to fill in the losses.

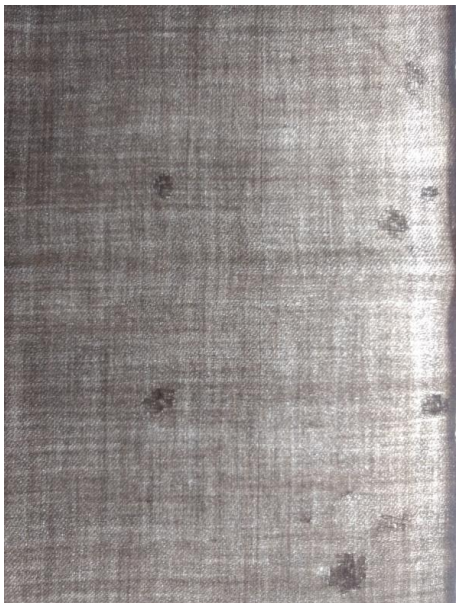


Plate 4.56: Visible damages (small holes) were repaired by using stitching technique. Photograph taken under the light table in order to see the fineness of the stitching technique as it was invisible when seen by the naked eye.

After the strengthening process, application of lanoline (1% in water) was applied as the protective coating over the woollen fabric.

6. Rolling of the shawl

After the whole conservation treatment, the shawl was kept by rolling technique. For rolling of the shawl, the poly vinyl chloride pipe little larger than the width of the shawl was taken, so that their ends projected beyond the shawl.

Plate 4.57: The poly vinyl chloride (PVC) pipe was first covered with the mylar and then covered with acid-free tissue over mylar.

Plate 4.58: The rolling process while keeping the pile outside

While rolling the shawls, the right side is always kept inwards. Rolling is done against any pile and the folds should not creep in.

Plate 4.59: Inserting the acid free tissue paper or neutral pH tissue inside the shawl while rolling

Plate 4.60: Covering the shawl with prewashed cotton cover and fastening with cotton tapes

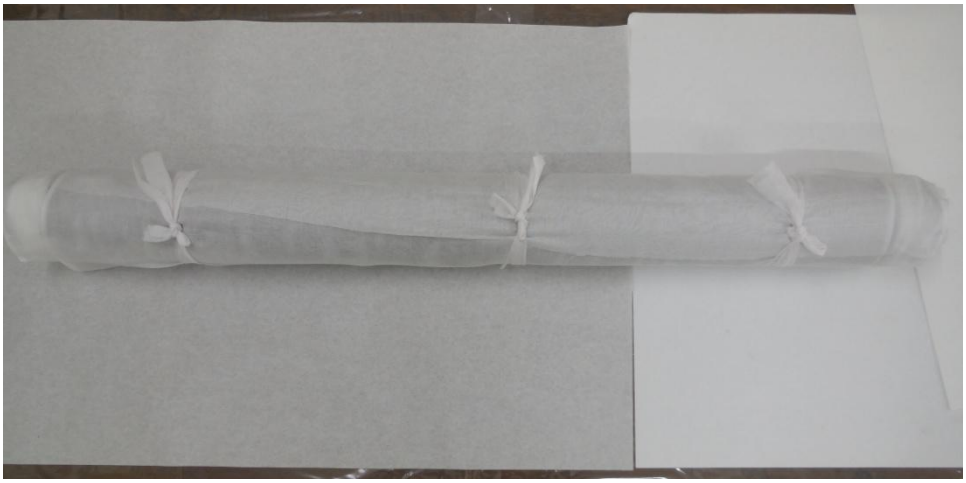


Plate 4.61: Rolled shawl ready to store

Conclusion

The conclusions attained from the study of the profile of the artisans from different states revealed the weavers' socio-economic problems and lack of knowledge towards the preservation of shawls' collections. The data related to shawls in museums, private collectors, or individuals revealed the lack of shawl collections in the museums of our country. From the results related to preventive and remedial conservation practices, in museums, with private collectors and conservators in private practice, it was found that conservators in private practice were more technically advanced as compared to the conservators in museums. The investigator also suggested the suitable method for conservation of traditional shawls at the end of the chapter which further enhanced practical skills of the researcher.