Restoration of Muslin Yarn and Fabric Artisanal Practice as a Living Cultural Heritage in Tarabo, Narayanganj, Bangladesh

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ABSTRACT

Among many, Muslin is the living fossil and symbol of cultural heritage in the history of Bangal textile. It still upholds the territorial identity, community engagement, transmission of cultural knowledge, social cohesion and sustainable urban development as the historical periods. About 200 years ago Dhaka Muslin was one of the most priceless and cherished good in this globe. This delicate and a little more than transparent yarn was manually made by the local weavers, spinners and farmers of Bangal than it was lost forever. But now Bangladeshi scientists and researchers have conducted intense research for almost ten years to revive Muslin Yarn and Fabric and partially succeed which is now established in the specific study area near Shitalakshya riverbank in Tarabo Municipality, Narayanganj District, Dhaka, Bangladesh named Dhakai Muslin House. In this study, we have explained the prime methods and factors of crafting Muslin as it was in the earlier times and still in the current period. As, it is the only method of crafting pure Muslin yarn and fabric. So that, we can acknowledge, bring back and restore our history, culture, traditional artisanal practice and restore cultural heritage (intangible). To achieve this purpose, we have gone through various reference materials and primary records. According to our information, this data archive is currently the only data archive which has merged all the additional values with the mainstream research and enhanced the revival of Muslin Yarn and Fabric under the microclimatic aspects at the same time. The deliberated outcome of our discussion will not only put impact in the future research and training process of Muslin Yarn and Fabric revival and restoration but also mark it as a living cultural heritage all around the world and recognize as a cultural fingerprint for our future generation.

Keyword: Muslin, Yarn And Fabric, Cultural Heritage, History, Community

INTRODUCTION

It is very evident that, if a community lives under a particular cultural landscape for a huge amount of time and able to put a strong impact through their social harmony and cultural sustainable development, which also controls the economical and urban graph of that area or microclimatic zone, then it becomes a part of cultural heritage or living tradition (Suprapti et al., 2019). Traditional craft, historical architecture, culinary traditions, festivals, celebrations are also part of it (Elyasi & Yamaçli, 2023). Culture is essential as it carries the identity of that community and social structure (Scaffidi, 2022), which is on the other hand, provides social sustainability and creates new flows and growth in the urban sustainability and development (Lami & Mecca, 2020). The evolved understanding between a community and culture, that has inherited the highlight of heritage restoration. Welcoming the modern fusion is great, but not with the consequences of forgetting the past. Heritage usually represents how the past is valued today (Lin, 2024).

Muslin craftmanship or artesian practice is also one of the symbolic examples of our cultural heritage, not only in Bangal (especially Dhaka origin and some surrounded areas) but also all around the world. Ages ago weaving was a very comprehensive act in almost every village in Dhaka division, but only some of those were famous for manufacturing superior quality of Muslins. As, Sonargaon (now Narayanganj District), Dhamrai, Teetbady, Junglebary and Bajitpur was mostly famous. Though, the mapping of Dhaka District was not same as the current but one thing was common, the Shitalakshya riverbank and the branches of it which indicate a specific microclimatic area containing culturally influenced weaver community (Hossain, 2023). The process of creating pure Muslin was so complex and delicate, that the entire weaver family had to engage in the

practice (Karim, 1965) and soon after becoming famous for the craftmanship all around the globe, it become a unique part of our cultural heritage and urban stability. Still now, Bangal is known for Muslin artesian practice.

The revival of Muslin yarn and fabric is not only about creating Muslin, it is about crafting the exact one as it was in the earlier periods and to do so the process must be the same, as the old ways (recommended by the scientists and researchers involved in the Muslin revival project at 'Dhakai Muslin House' in the stated study area). That is how it would be restored and lived as a cultural heritage at the same time. It will also preserve our history, pried, knowledge, glory and describe the social and communal integration. Moreover, this cultural sustainability will bring positive impact on ecological, economic and social dimensional factors without compromising the welfare of our future generation (Liu et al., 2025).

THEORETICAL BACKGROUND

Social Sustainability and Community Development

Social sustainability is about how a community is capable of controlling or manipulating a quality life and wellbeing for the future generation. Without this, community development is impossible (Lami & Mecca, 2020). These two objectives are integrated as community resilience, which is dependent on the social and economic impacts. The study subject Muslin is also an important element which will ensure this codependence, that will express the concept of territorial heritage. It is something refers as intangible heritage. Such as, the elements of culture, nature, values and sustainability (Miguel, 2017).

Historical Overview of Muslin

Provenance of the word 'Muslin'

There are multiple opinions and assumptions about the origin of 'Muslin' word. It is hard to find the right one. As, it is not a Persian word, nor Sanskrit, nor Bengali (the major import-export areas of Muslin) (Hossain, 2023). Henry Yule and A.C. Burnell (prominent British colonial scholars) use to believe that Muslin came from the word Mosul. Mosul is one of the industrial areas in Iraq. As Muslin was made in Mosul the Europeans use to call every fine cotton fabric Mosuli, Mosulin or Muslin. Moreover, In the Pre-Islamic period cotton fabrics were named according to the color, size, weaving style and many more. Such as, Ab-E-Raone, Sabnam, Jamdani etc. Among them the finest and delicate cotton fabric was called Molbus Khas or Malmal Khas Which was also can be address as the origin of Muslin (Karim, 1965; Mamoon, 2005).

Archival narratives

In earlier times Bengali cotton fabrics were exported to many ancient empires like Roman, Persia, China and many other European countries (high demand among the high rank people). Although, the reference of Muslin (especially) has been found in many. Such as, Rig Veda (1500 BCE), Asvalayana Srauta Sutra (800 BCE), Megasthenes's Indika (300 BCE) or in Ptolemy's Geographia (1st century CE), Periplus of the Erythrian Sea (1st century CE) and many more (Hossain, 2018). Even near, 4th Century, Fa Hian, a Chinese Buddhist monk and traveler mentioned Muslin trading between Ceylon and Bengal. Another Chinese traveler Yuan Chwang, of the 7th Century (629-45 CE) referred Muslin as "the light vapors of dawn" because of its extreme transparency.

Muslim travelers and scholars have also mentioned about it (from the Middle East during 7th-8th Century) (Hossain, 2020; Threads, 2023), which explains, it was never lost from the historical accounts. It was always there either in the physical form or in the stories or historical documents.

Imperial Interpretation

Dacca in 17th to 18th and beginning of 19th century, during the time period of Mughal Emperor Jahangir and Subedar I slam Khan Chishti or Sheik Allaudin Chishti, Dhaka Muslin became famous and attracted foreign and transmarine buyers after the establishment of the Mughal capital (Dhaka) (Karim, 1965; Rahman, 2023). However, after defeating Siraj-ud-Daula the last independent Nawab of Bangal (1757), the British finally took control and established colonial power in Indian Sub-continent and Bangal. During that time, the British were

in the leading role of Muslin trade for the next century, then after the industrial revolution, the story of Muslin took a dramatic change as the practice of manufacturing Muslin suspended. The specific plant species behind the finest quality of Muslin had become extinct forever (Hossain, 2020; Bhowmik, 2018). Then by the period of time it is spreaded worldwide by The British Colonial Government which indicates, basically the Muslin textile industry of Dhaka (that time Dacca of Bangal) received patronage from the Mughal emperors, the Mughal nobility and mostly the British East India Company.

Diversity of Muslin fabric

In the historical period, the costly price of Muslin had always separated it from the common cotton cloths. People who could afford fine clothes specially, it belonged to the rich society. Surprisingly, riches had their own categorizations. According to that category, Muslin had been categorized. Each type of Muslin had a different making process, prices and indicate different classes (Mamoon, 2005). The quality and design pattern also changes with those categories. That is why Muslin had got so many initials. Some names seemed to have an influence on classical Persian poetries (Hossain, 2023; Simoneruthauthor, 2013). This artistic manner in the Muslin name was given by the Mughal emperors in person. Such as, the major ones were,

1. Mulmul Khas: Around the time of 16th century, a very unique Muslin had been invented in Indian Subcontinent. It was special and solid. It was considered the best in nature, called Mulmul khas. Those kinds of cottons were made only for the royal families. Even, the king himself and the people who were related to royal families were allowed to use this fabric. Mulmul was 10 yards long and had 1-yard width. But it had weighed only 6 to 7 tola (1 tola = 10 grams). An entire piece of Mulmul could be passed through a ladies' ring. With this much delicacy, the Mulmul Khas had succeeded in impressing people at that time (Alam, 2025). Sometimes it was mentioned as Malmal Shahi or Malmal Khas by foreign travelers. It was costly and the weavers spent a long time. Sometimes six months to make a piece of this sort (Hossain, 2023; Karim, 1965).

2. Abb-E-Rawan: It means flowing water. It is a Persian word. The length of Abb-E-Rawan was 20 yards and it was 1 yard wide. The light texture, made it weighted less. A full length of cloths weighted only 20 tolas (Alam, 2025).
3. Shabnam: It was a beautiful and soft cotton fabric. It was compared to the dew of the early morning for being so light and smooth. It was said that if the wet "Shabnam" leave on the grass to dry, it would be completely invisible (Alam, 2025; Hossain, 2023).
4. Jamdani: During that time Jamdani was the least famous category of Muslin fabric. It was affordable and less costly for the common people (Karim, 1965). It is the only type which has not been lost and still thriving among us.

There was total 20 types of Muslin cotton in earlier times. Without these major four there was Jhuna, Sarkar-E- Ali, Khassa, Tanjeb, Nayan Sukh, Sarbanda, Duria or Doria, Charkona, Rango, AliBali, Tan-zeb, Tarandam, Badankhas, Sor-Buti, Kachim (Karim, 1965; Alam, 2025; Hossain, 2023; Anik, 2021).

Analytical and technical framework of Muslin revival project

The revival of Muslin yarn and fabric constitutes a heritage industry regenerative phase, that contains technical reconstruction, socio-economic developments and cultural reclamation to merge with the past. Additionally, multi-phase strategy, inter disciplinary research infrastructure and most importantly artisanal centric economic model represent an innovative hybridization of traditional craft and contemporary industrial parameters.

Project inception and staged implementation

In 2014 the Ministry of Textiles and Jute was asked to revive Muslin by the government of Bangladesh. They launched a project of a seven membered team including scientists, researchers and scholars. There was not any sample of Muslin, so the first challenge was to find a source of the particular karpas cotton to produce yarn (Abul Kalam Muhammad Azad & Abul Kalam Muhammad Azad, 2021; Anik, 2021). After that, In 2016 February Muslin fabric (the historical period collections) was exhibited in an international way in Dhaka by

Drik (Bangladesh National Museum in Dhaka and the exhibition was named "Muslin Revival") which was authorized by a London-based research group (Islam, 2016; Report & Today, 2022).

Rediscovering the Phuthi karpas plant and yarn technology The investigation of bringing back Bangal Muslin which is now rare and possibly extinct has begun with a painful and time intensive five to six-year search for the specific flower used for weaving the fabric which only grows near the capital Dhaka and Shitalakshya riverbank area (French Press Agency - AFP, 2022). The most important task of the team was to match the DNA of Muslin yarn with the DNA of exact Phuthi karpas plant. But there was neither a sample of Muslin fabric nor of a Phuthi karpas plant. But with the help of books written by Swedish researcher Carl Linnaeus, titled 'Species Plantarum,' and Dr. Abdul Karim titled 'Dhaka Muslim' (1965) had ease the process. Publishing advertisements (11 December 2016), drawings, assistance from National Museum, Victoria and Albert Museum in London (2017) supported the team to collect the sample of pure Muslin fabric (Abul Kalam Muhammad Azad & Abul Kalam Muhammad Azad, 2021; French Press Agency - AFP, 2022). After a while Phuthi karpas was found in Gazipur, Bagerhat, Lalmonirhat, Kurigram and Rangamati districts. Then with some scientific examination the genetically matched sample was found in the riverside town of Kapasia north of the capital (exact by a botanists) which was a 100 percent match (Abul Kalam Muhammad Azad & Abul Kalam Muhammad Azad, 2021; Habib, 2021; Rahman, 2023).

Standard and quality assurance

The crafting of Muslin is compared as, doing prayer. Though, Dhaka is now home to countless bustling factories of the global fast fashion trade with no shortage of garment workers, but the Muslin revival project needed to source artisans from the small cottage industry of spinners and weavers working with fragile threads. They were found in villages around Dhaka where small workshops (Jamdani village) made intricate Jamdani sarees, Muslin is produced in same way and must be expert in weaving Jamdani and jamdani was one of the types of Muslin (French Press Agency - AFP, 2022). They also had arranged some technical training sessions for them to make them expert in spinning and weaving Muslin in 'Dhakai Muslin House,' so that they can also train other weavers (Abul Kalam Muhammad Azad & Abul Kalam Muhammad Azad, 2021). But as the common weavers do not know the crafting methods, so they had to go throw multiple training sessions. After, many trials and errors, challenges and time-consuming practices it was finally succeeded (Rudro, n.d; Sabanta, n.d.).

Commercial prospects and market dynamics

'Dhaka Muslin' is now a GI product of Bangladesh. Now the price of a length of this traditional fabric is Tk 360,000 or 7,00000-10,00000 (730-758 counts). But the price will gradually reduce. The project team have woven six sarees till 2021 and will be able to launch the muslin saree in the market for everyone in the next two years. Though the pure Muslin fabric from the past were over 1000 counts. It almost takes six months-one years to craft a plain or embroidered Muslin saree at a time. The project team want to expand this craft through more training and research. Meanwhile, commercializing Muslin will remain it as the living cultural legacy (Habib, 2021; Anik, 2021).

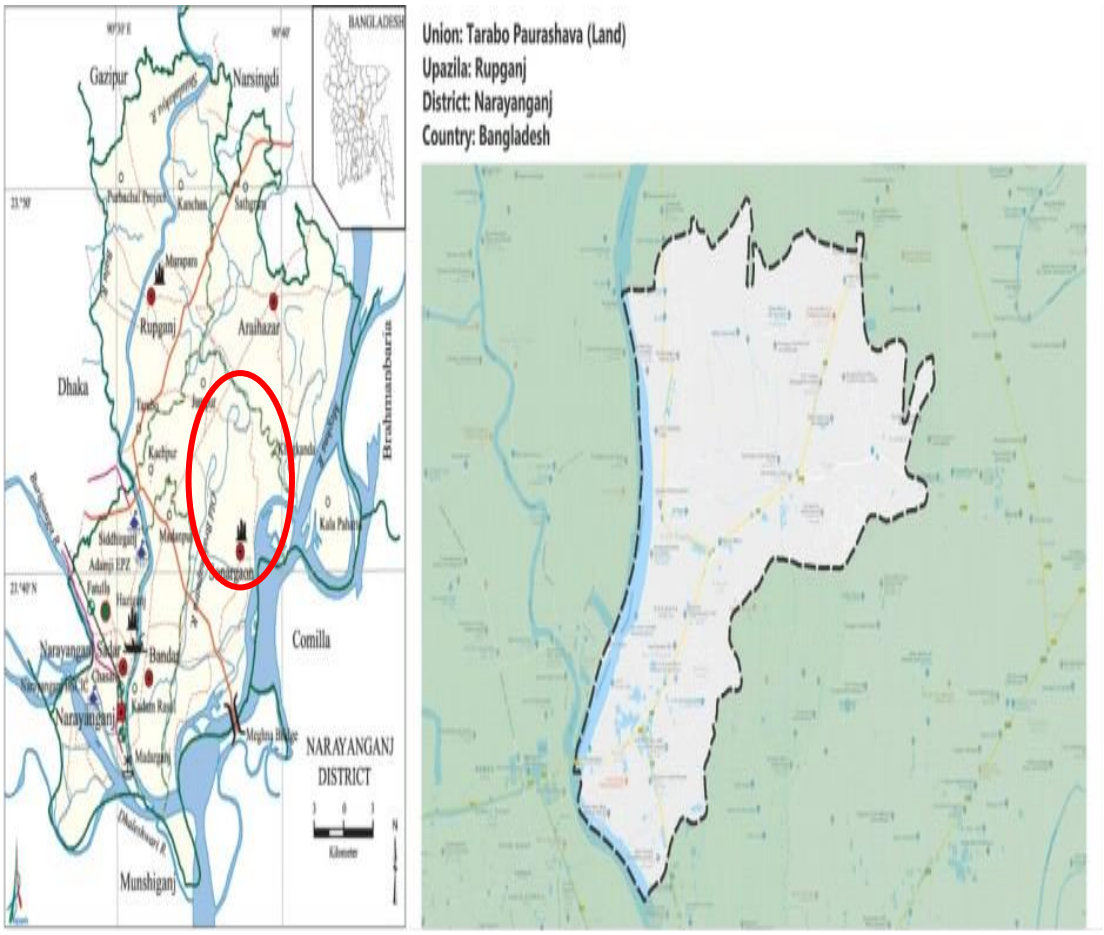
METHODOLOGY

This study has been performed with a mix method procedure (qualitative and the qualitative data), containing major four stages. Stage one, collecting the historical and contemporary records which include archival studies from various references. Such as, books, news portals, websites, journal articles, reports, personal blogs, field notes and exploring relevant various documented historical overviews. Stage two, observed and recorded through the physical survey, interviews with weavers, researchers, historians, workers, organizers, locals. Stage three, combining stage one and two elements together which includes multiple time-consuming methodological experiments, frameworks and decisions, as connecting all the missing pieces of a forgotten and unknown lost story. Stage four, the final potential theoretical output of each and every detail with documented illustrations which will express a semi draft of inclusion that how traditional craftmanship was managed in earlier times. Besides, it will strategically support in the cultural heritage restoration process in current period.

Study area

The particular study area is the Tarabo Municipality (a microclimatic zone) is under Rupganj Sub-district, Narayanganj District in central Bangladesh, in the capital Dhaka Division area. It is connected to the Shitalakkha river and the Dhaka-Sylhet highway has passed through the town. Under the last few decades, this town has been turned into an industrial zone of more than 300 medium to large scale businesses. According to the population of 2020 by the Bangladesh Bureau of Statistics (BBS), the Tarabo Municipality population was 253,900 where the urban population growth in Bangladesh is 3.5% per year (considering 20% floating population) such as, industrial workers, businessmen, suppliers and traders, comes to the city every day. Same goes for this town as well. According the topography of Bangladesh, the municipality area is made of low and medium high land. Shitalakshya river is the main source of the town. The city area and surrounding area are experiencing a tropical monsoon climate. It is characterized by warm, humid summers and cool, and dry winters. There is no climatological station in the town the closest meteorological station of Bangladesh Meteorological Department is located in Dhaka which is about 28 km away from the town. As a result, the climatic record of Dhaka and Narayanganj is considered as countable data for the Tarabo Municipality area (SFD Lite Report Tarabo Municipality, Narayanganj Bangladesh, 2021).

Fig. 1. (From left) Narayanganj District map including Rupganj Sub-district (*Narayanganj District - Banglapedia*, n.d.), Tarabo Municipality boundary map (*Tarabo Paurashava, Narayanganj*, 2020)



Thematic analysis

Questionnaire

Table. 1. A questionnaire measuring the Interviews, documentation outlines, observations and field notes of the specific study subject and the related surrounding aspects with it (Source: Author)

Questionnaire questions	Percentage of answers
1. Have you ever heard of Muslin yarn and fabric?	a) Yes: 85% b) No: 10% c) May be: 5%
2. If you, then would be it positive?	a) Yes: 90% b) No: 2% c) Neutral: 8%
3. In your opinion, should we bring back Muslin yarn and fabric as it was in the historical periods?	a) Yes: 98% b) No: 0% c) Neutral: 2%

Table. 1 (continued) (Source: Author)

Questionnaire questions	Percentage of answers
4. What do you think how much of this restoration project is worth it or not? (As it cost a lot of money, hardship and time)	a) Yes: 80% b) No: 9% c) Neutral: 11%
5. Should we go with the old practice method?	a) Yes: 88% b) No:2% c) May be: 10%
6. In your opinion, will they be able to do it as the climatic condition of our country is not same as before?	a) Yes: 70% b) No: 20% c) Neutral: 10%
7. Should we train more spinners and weavers in this field?	a) Yes: 80% b) No: 15% c) Neutral: 5%
8. Is the cost of Muslin saree of fabric too high?	a) Yes: 99% b) No: 0% c) May be: 1%
9. Would you like to see Muslin in your wardrobe collection?	a) Yes: 100% b) No: 0% c) Neutral: 0%
10. Are you proud to be a part of this cultural heritage?	a) Yes: 100% b) No: 0% c) May be: 0%

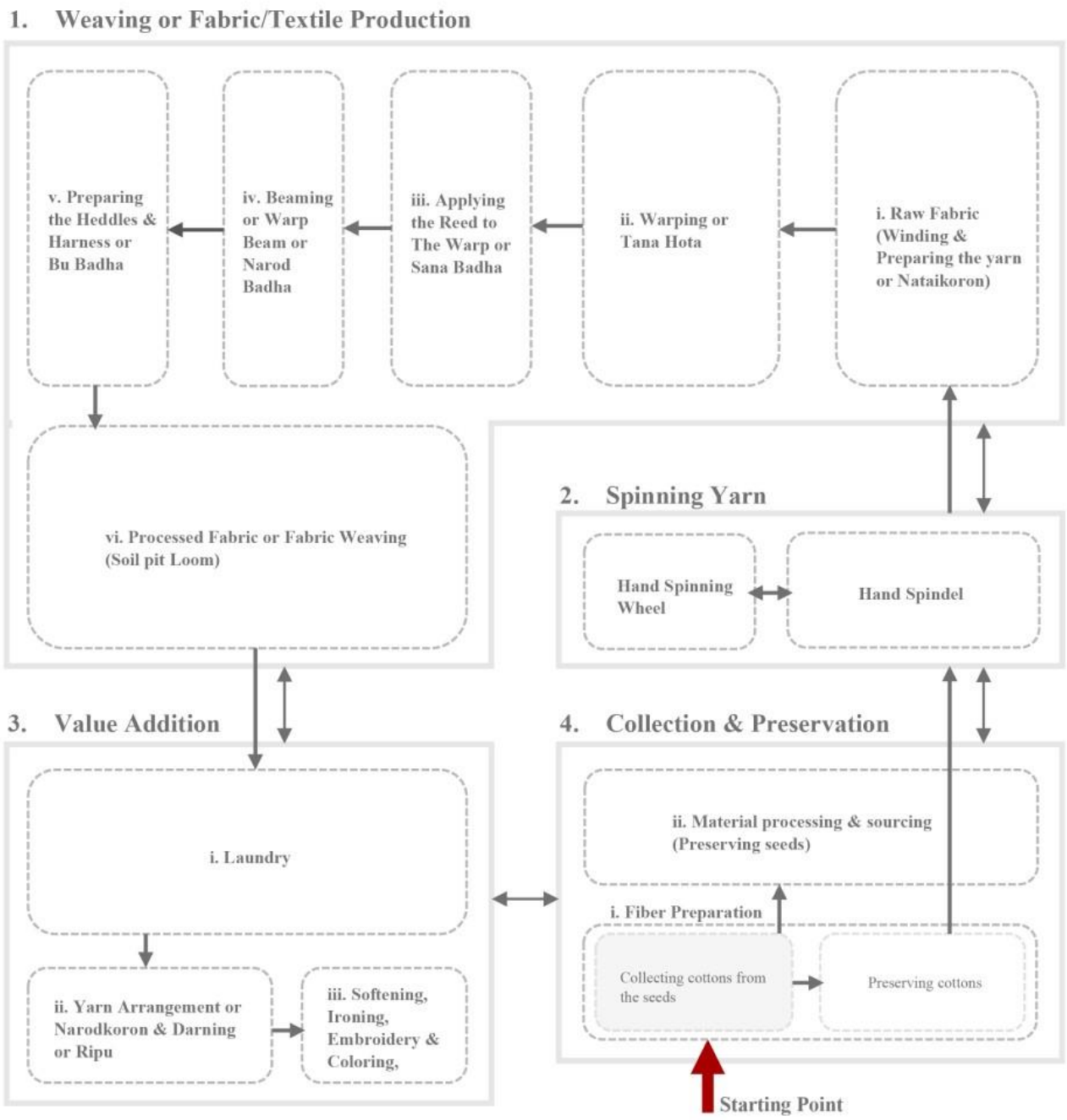
Artisanal practice

The farmers were included in the process of cultivating Karpas cotton. After harvesting the cotton there was collection and preservation. The collection or fiber preparation workflow was divided into two parts as collecting cotton from the seeds and preserving the cottons. Then preserving the seeds or material processing or sourcing. The next step was spinning the yarn which had two types, one preparing the yarn with the spinning wheel and other was with the spindle. Mostly women were expert in those works (Karim, 1965; Hossain, 2023).

Then there comes weaving or fabric production or textile production. The entire weaving method was separated into major six steps. It starts with raw fabric or winding or preparing the yarn or Nataikoron. Second, warping the yarn or Tana Hota. Third, applying reed to the warp or Sana Badha which includes making reeds or Sana, drying the Sana then jointing reeds or Sana with the warp yarn or Tana Suta. Fourth, Beaming or warp beam or Narod Badha which explains attaching the joint of reeds or Sana and warp yarn or tana Suta with Narod or wooden roll, especially the end roll and making the Sana warp horizontal. Fifth, preparing the heddles and harness or Bu Badha that involves first creating the harness and heddle then jointing the heddle and harness with the reeds or Sana attach to tana Suta or warp yarn and Narod or warp beam. Sixth step was processed fabric which contains the data of making the pit loom framing and storing the fabrics according to the yarn category. The third, fourth and fifth each step needed two weavers at a time. Finally, value addition that holds laundry process, yarn arrangement or Narodkoron, darning, softening, ironing, embroidery and coloring. After all of these a piece of Muslin fabric was made which was not less than an act of art or craftmanship itself (Karim, 1965; Mamoon, 2005).

The exposer of artisanal practice aims to discuss the importance of innovative historical cultural movements for the development and the reactivation of cultural heritage Considerations. This research examines specific detailed documentations, where socio-cultural and economical actions have been the driving force behind the creative regeneration of productive assets (Scaffidi, 2022).

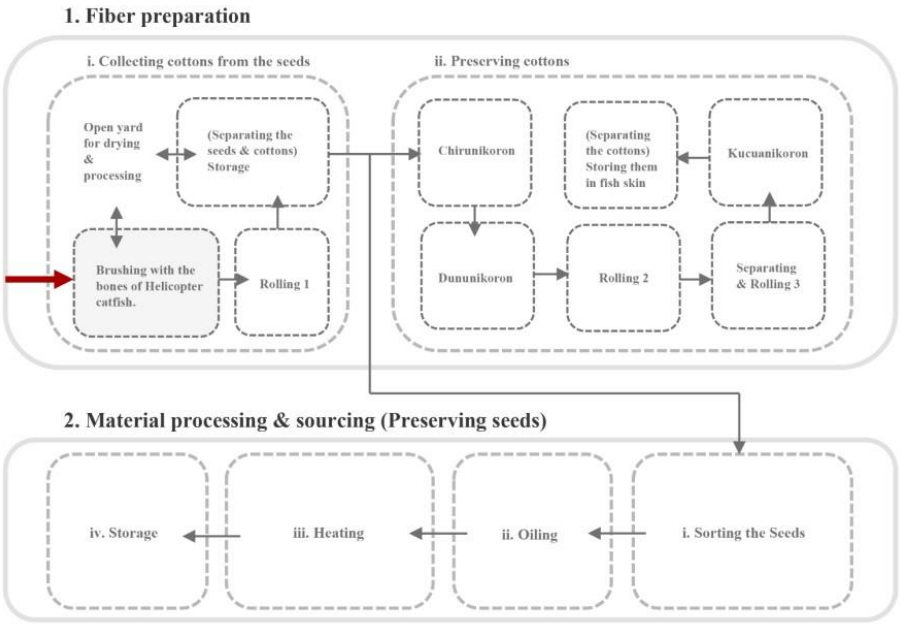
Fig. 2. Step by step functional flow chart (Source: Author)



1. Cultivation, Collection and Preservation

Phuthi karpas seeds were used to cultivate twice a year. Once in spring and second in autumn but the best ones were cultivated in spring. Because of the balanced temperature and humidity of Bangal. Before cultivation the seeds were soaked in water. After collecting the cotton balls with seeds, they use to brush them with the bones of helicopter catfish then spread the cottons in a wooden plank and roll that with an iron stick (rolling 1). That's how the seeds were separated from the cotton. Then there was Chirunikoron and Dununikoron which were similar to brushing just the brushing elements were different from the regular ones. Again rolling 2 and 3 similar to rolling 1 that separates the seeds from the cotton properly. Then comes the Kuchunikoron, where the weavers use to resize or cut the cottons in pieces and put them into a bag made of fish skin. Ultimately when the cotton was preserved and fiber preparation was done another group of weavers start the seed preservation process or material processing and sourcing which start with sorting the seeds then putting them into an earthen pot filled with oil and hung that over the fireplace or cooking hearth to keep the humidity level low. Then store the seeds for cultivation. 14,400 square feet cultivating land can provide 933.1-gram amount of seed and 38.32-kilogram cotton in which 1/3 ideal cotton was found for weaving Muslin fabric (Alam, 2025; Islam, 2016; Karim, 1965).

Fig. 3. Collection and preservation flow chart (Source: Author)



This flow of activity and every other activity chart included in the process is essential to understand the prospects of Muslin craftmanship. As, it was in the past and to maintain the exact standard in the present era. Besides, the notion of living heritage adheres to principles when heritage interacts with human experiences. Here, cultural heritage appears as public goods, which have an effect on the increase of private goods, as well as the quality improvement of life of the community life. It is the practical example of social and cultural mechanisms through the comparison and restoring process. The illustrations of historical listing are to create effective impact on understanding the entire process. As, each part and details matter (Lin, 2024; Suprapti et al., 2019).

Fig. 4. Muslin cotton plant Phuthi Karpas, cultivation and piece of Muslin cotton (from left) (Source: Author)

Fig. 5. Collecting the Muslin cotton, brushing with fish bone, rolling and separating the cottons form the seeds (from left) (Source: Author)

Fig. 6. Chirunikoron (brushing 1), Dununikoron (brushing 2), Kuchunikoron (partially chopping) (from left) (Source: Author)

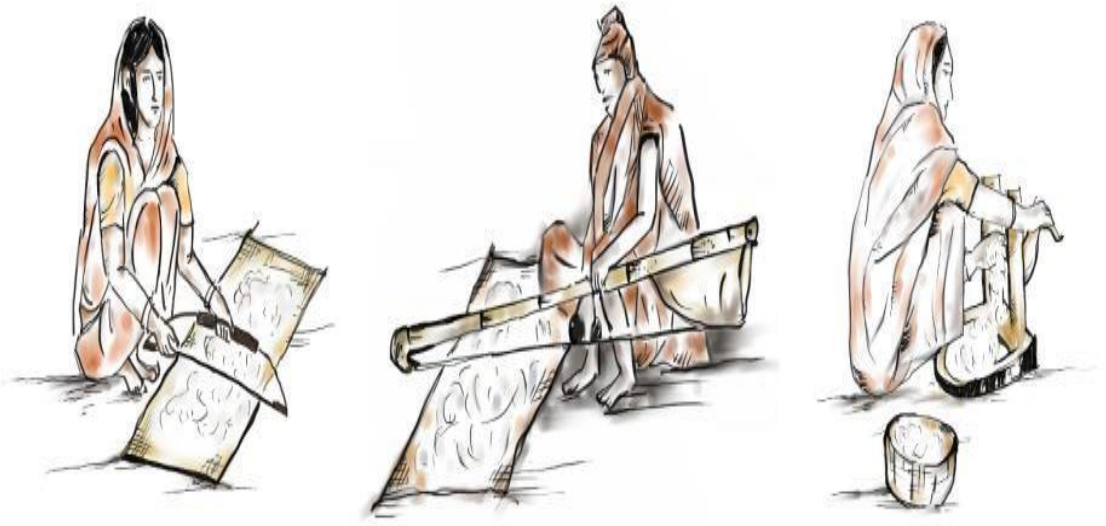


Fig. 7. Kuchunikoron equipment, preserving cottons in the fish skin, preserving seeds in the oil, heating and keeping the seeds dry (from left) (Source: Author)

2. Spinning The Yarn (Hand Spindel and Hand Spinning Wheel)

A hand spindle was like a large wooden pin with a pointy and blocked end. It was mostly like a spinner wrapped with the cotton as the spinner spin(roll) the spindle with hand the cotton starts to convert into yarn then store the yarn by rolling them in a wooden stick. In Bangal they were known as Suta katunies. Middel aged women from most of the families were engaged in spinning (Karim, 1965; Mamoon, 2005).

A hand spinning wheel was made of wood and it was used later on for weaving Muslin fabric. At the beginning most weavers were comfortable with the hand spindle as there was less possibility of yarn breakage. The spinning wheel and the yarn both were made by the weavers. At present time the spinning wheel for Muslin is made and it is a bit different from the regular hand spinning wheel. Back then there was no specific scale for measuring the thinness of Muslin yarn. If the yarn was enough lengthy and less weighted at the same time then they consider it delicate. The most delicate Muslin yarns were 150,160,175 hand length long or 250 mile (The hand size of their leader was the prime scale for measurement) and weight was 0.1457 gram or 1 pound. Moreover, the diameter of the yarn was like a single hair as 1/1000-1/1500 inch (Alam, 2025; Hossain, 2023).

Fig. 8. Spinning yarn flow chart (Source: Author)

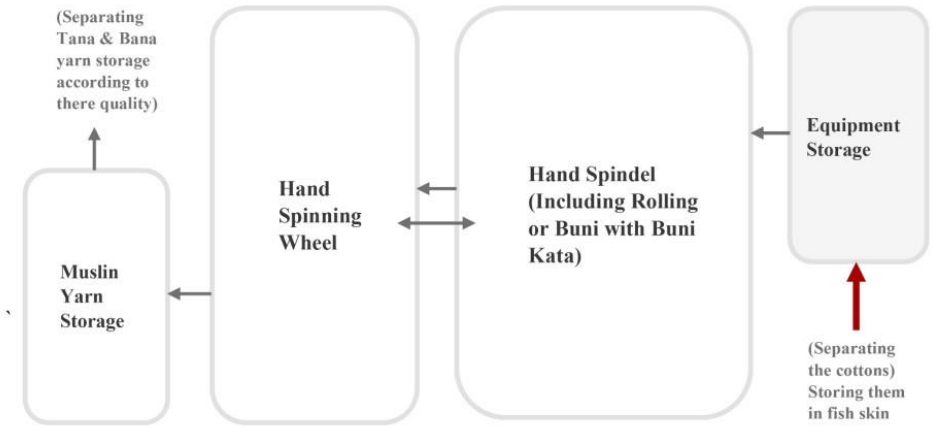


Fig. 9. Rolling cotton or Buni, Buni kata, Spindler, spindling yarn (from left) (Source: Author)

Fig. 10. Hand spindling yarn, hand spinning wheel, Natai or warping the yarn (from left) (Source: Author)

3. Weaving or Fabric Production or Textile Production

The entire process of weaving is divided into six crucial steps. Each step is significant equally in the way of crafting pure Muslin and each of them must be followed parallelly one after another.

• Raw Fabric/ Winding/ Preparing the Yarn/ Nataikoron

While weaving on a loom there were two types of thread patterns one is warp yarn (Tana Suta) which refers to the vertical or lengthwise threads and weft yarn (Bana Suta) refers to the horizontal or crosswise threads woven over and under the warp. Nataikoron was all about preparing the two types of yarns for further steps that includes four times of twisting, washing, drying and warping. First of all, the warp and weft yarns were divided and separately twisted then washed into pure river water (Specifically Shitalakshya river) and dried in an open yard (twice the whole process). Again, repeat the entire process twice just the washing materials were different. In third, washing the water and mixed with wood and charcoal crumb then in fourth step, washing the water mixed with starch and lime mix. Then finally, both type of yarn was divided according to the thinness as left warp and weft yarn, right warp and weft yarn and middle warp and weft yarn. After each twisting, washing and drying the yarns were warped in a wooden stick with wide end which was known as Natai (made by the weavers) (Karim, 1965; Islam, 2016).

Fig. 11. Raw Fabric or Winding or Preparing the yarn or Nataikoron flow chart (Source: Author)

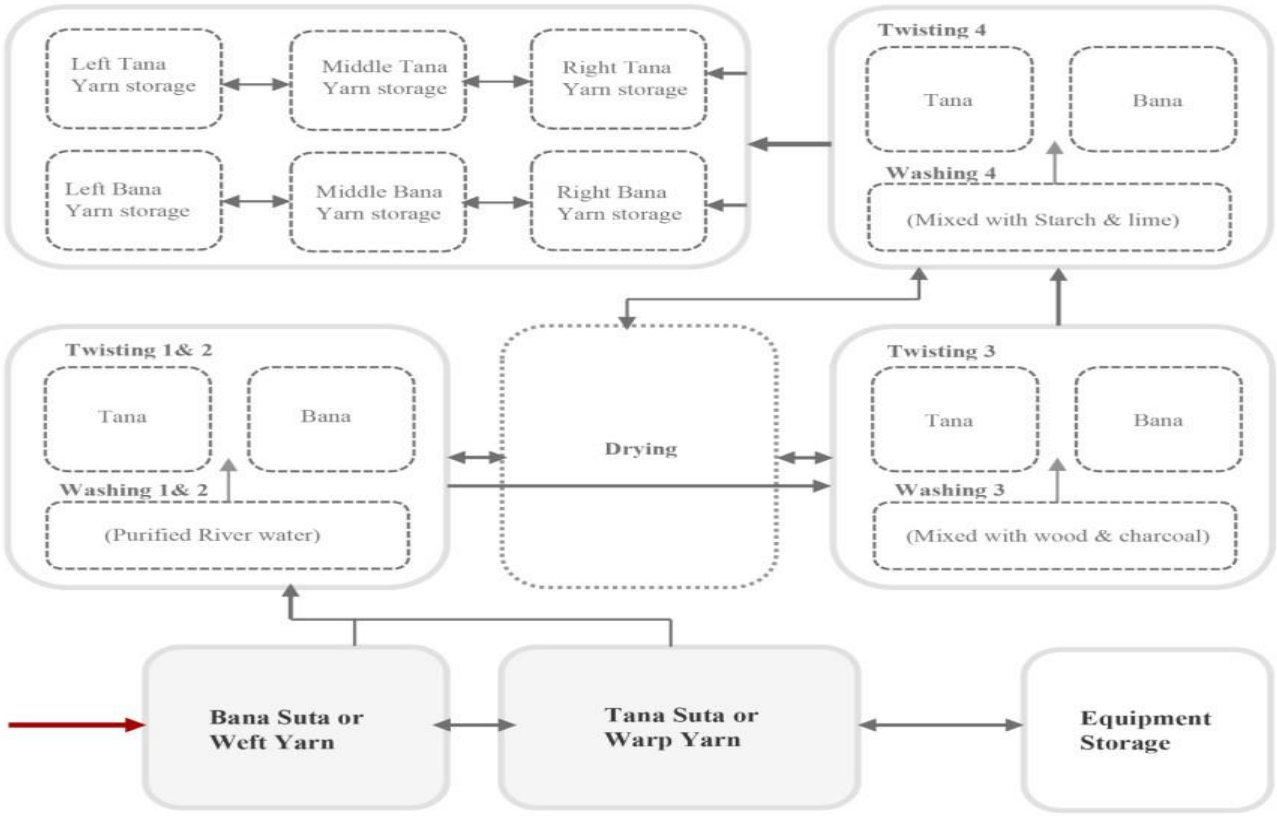
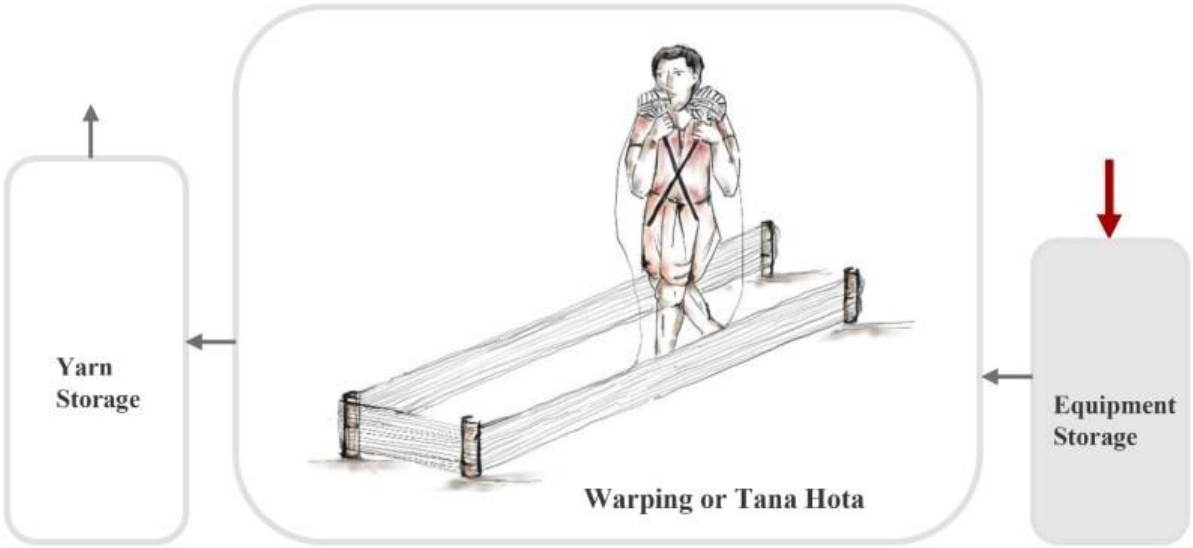


Fig. 12. Overnight dipping in water, twisting the yarn multiple times, Winding or Nataikoron (from left) (Source: Author)

Fig. 13. Washing the yarn multiple times, drying and brushing or smoothing them (from left) (Source: Author)

- **Warping or Tana Hota**

Tana Hota was about warping the yarn according to the amount or length of cloth. It was basically done in an open yard where short wooden sticks were pitched into the ground and the weaver use to walk around it holding a 'Kanch Gura' which was like a wooden Natai only there was a glass ring in it that helps the yarn pass through it easily. The yarn warped in the pitched wooden sticks and in the 'Kanch Gura' in the weaver's hand were attached. The main job was to keep the attachment in between the two set of yarn and warp them (Karim, 1965). Fig. 14. Warping or Tana Hota flow chart (Source: Author)



- **Applying the Reed to The Warp or Sana Badha**

Sana or reed was a framing made of small and thin twig of a bamboo. The weavers use to made these. It was said that there was almost 2800 twig of bamboo in one frame of Muslin weaving. First, they use to made the Sana or reed then dry them in the roof of their house same as that they use to dry the warp yarn. Later on, vertically joint the reed or Sana with the tana or warp yarn which needed two weavers at a time sitting face to face (Karim, 1965; Mamoon, 2005).

Fig. 15. Applying the Reed to The Warp or Sana Badha flow chart (Source: Author)

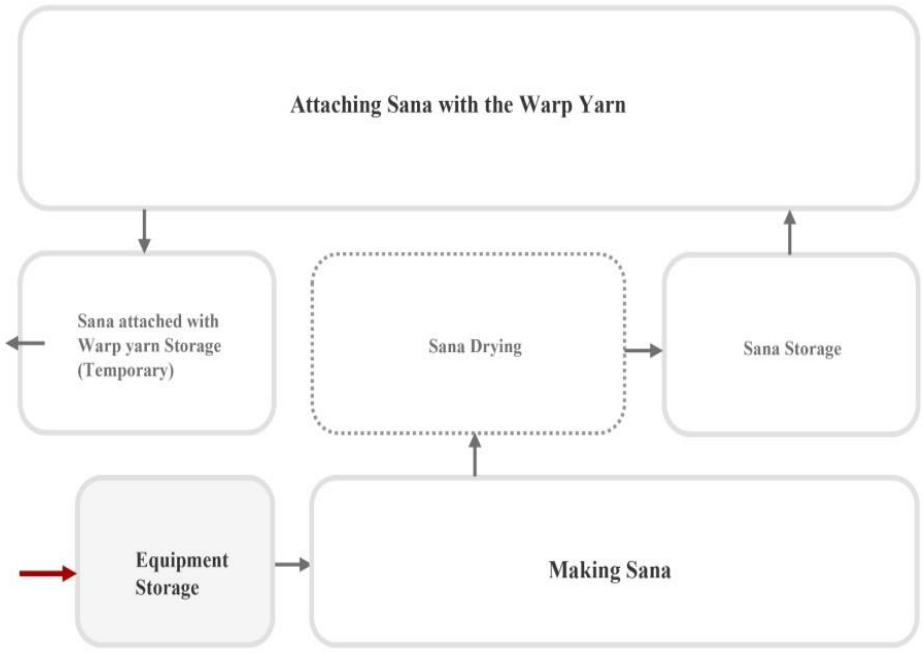
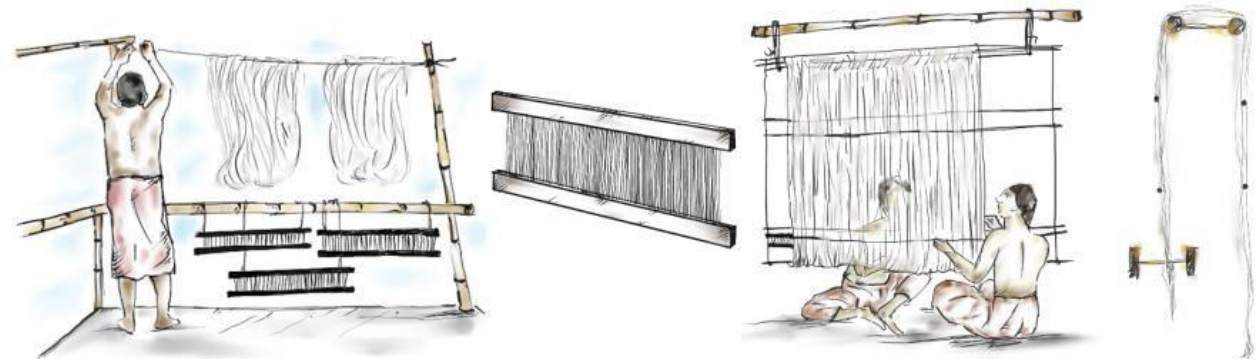


Fig. 16. Making Sana or reeds with bamboo sticks, drying the Sana and yarn, Sana Badha (Source: Author)



• **Beaming or Warp Beam or Narod Badha**

There were two types of rolls in a Muslin weaving frame the front one was called breast roll and the end one was called end roll then store them which was also made by the weavers. In beaming (horizontally) the weavers attach the Narod (end roll) with the warp yarn then brush or smoothen the yarn (Karim, 1965; Mamoon, 2005).

Fig. 17. Beaming or Warp Beam or Narod Badha flow chart (Source: Author)

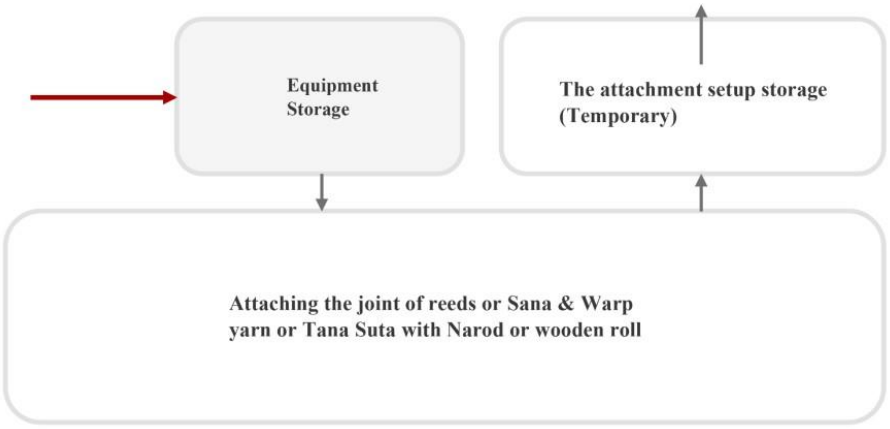
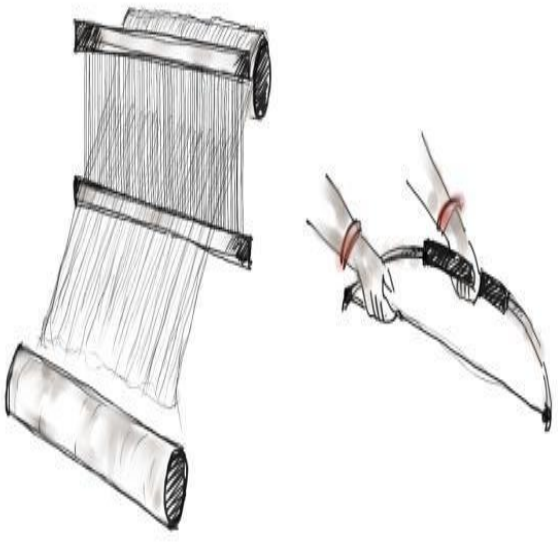


Fig. 18. Attaching Sana with the yarn, Chiruni koron or brushing (Source: Author)



• **Preparing the Heddles and Harness or Bu Badha**

In the first place, the weavers made the harness frame and the heddle bar. Then horizontally spreader the warp beam and joint the warp yarn of the beam with the threads of the heddle bar with the Bu (a red colored thin

rope or thread). The Bu was warped in a Natai and attached to a shuttle which moves accordingly how the weaver wants it to be. It had to be done in both sides of the Narod or rolls (Karim, 1965; Mamoon, 2005).

Fig. 19. Making the harness and heddle, jointing the harness and heddle with Sana (Source: Author)

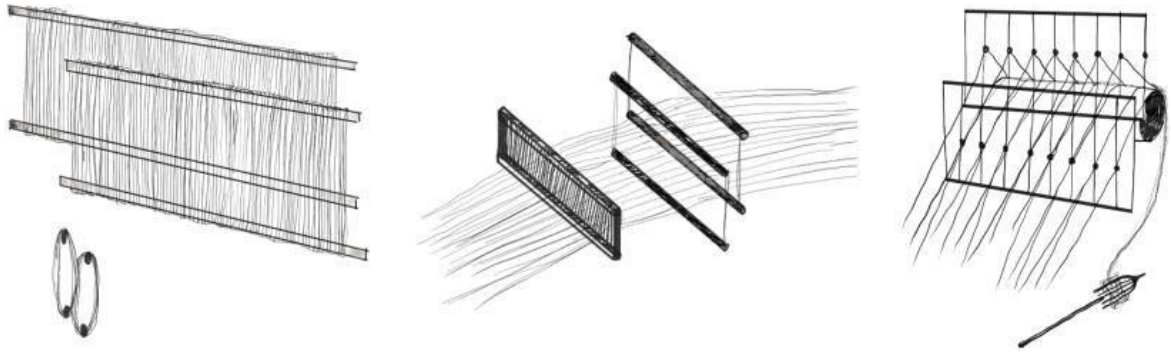
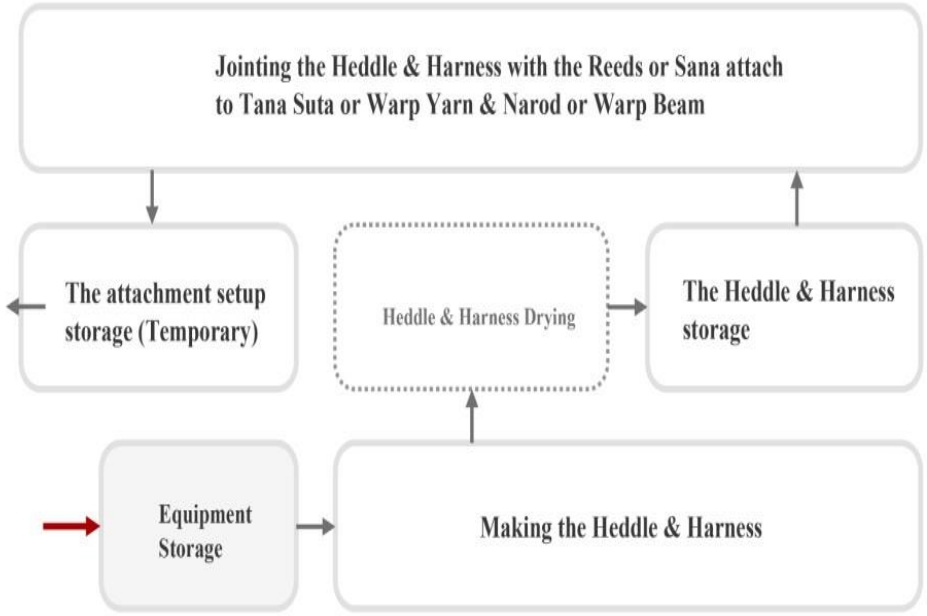


Fig. 20. Bu badha, Narod badha, balancing the Narod with Natai (Source: Author)

Fig. 21. Preparing the Heddles and Harness or Bu Badha flow chart (Source: Author)



• Processed Fabric or Fabric Weaving

Major weaving phrase starts with a soil pit loom based fixed setup which was a square framing made with four large bamboo pitch and parallelly more four of them over that. Next attaching the previous entire setup including Sana, warp beaming and Bu with heddle and harness with the fixed setup. The soil pit loom had a different mechanism. The two-foot machines in the pit loom were also made of bamboo. Following that, the weavers use to made a twist in between the weft yarn and the warp yarn that is how Muslin fabric was crafted (Karim, 1965).

Fig. 22. Jointing the yarns with red threads, Pit loom mechanism, Maku, Nataing (Source: Author)

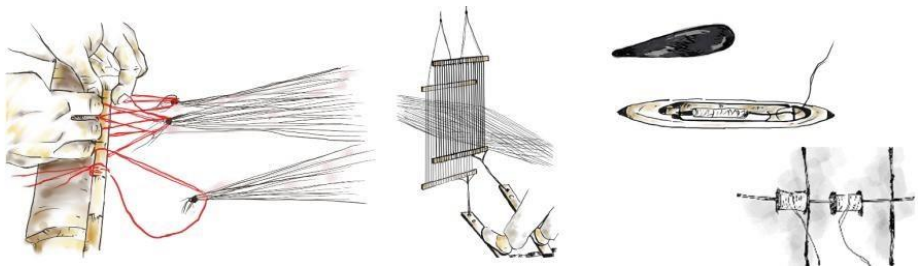


Fig. 23. Weaving Muslin fabric (Source: Author)

Fig. 24. Processed fabric or Fabric weaving flow chart (Source: Author)

4. Value Addition

The additional values were divided into three steps. Starting with the basic cleaning and ending with the yarn softening process (Specifically Shitalakshya river water).

• Laundry

In 1778 after the invention of chlorine there were many changes in the laundry work in ancient Bangal textile industry. The cleaning or laundry elements were also fabricated by the weavers and further workers included in the process. It was done in few steps as first, dipping the fabric in pure water then into the liquid mixture of soap and impure carbonate of soda or soda ash. Next the special air earth oven as Muslin fabric was so delicate that it had to be washed in a very heedful manner with the heat of steam (twisting must be avoided). Then dry them. The steaming and drying process continues for almost 10-12 days then wrung with lime juice. The laundry works were mostly done around July-November. The most delicate Muslin fabric use to take 45 minutes, medium delicate took 1 hour 15 minutes and less delicate took 3 hours to dry (Karim, 1965; Alam, 2025). Fig. 25. Chulli mechanism step by step (Source: Author)

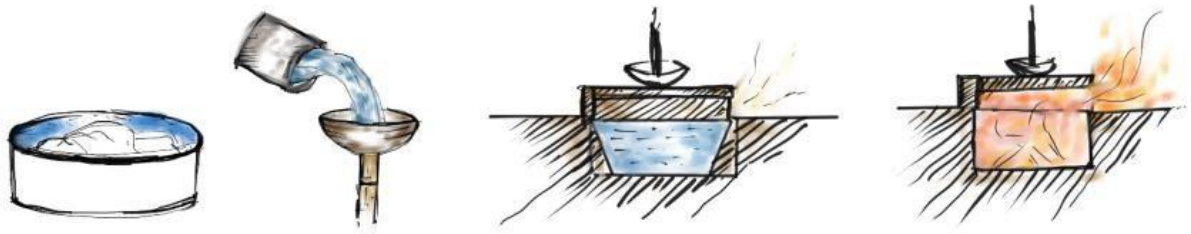


Fig. 26. Chulli, warped Muslin fabric with bamboo while washing, drying Muslin fabric in open yard (Source: Author)

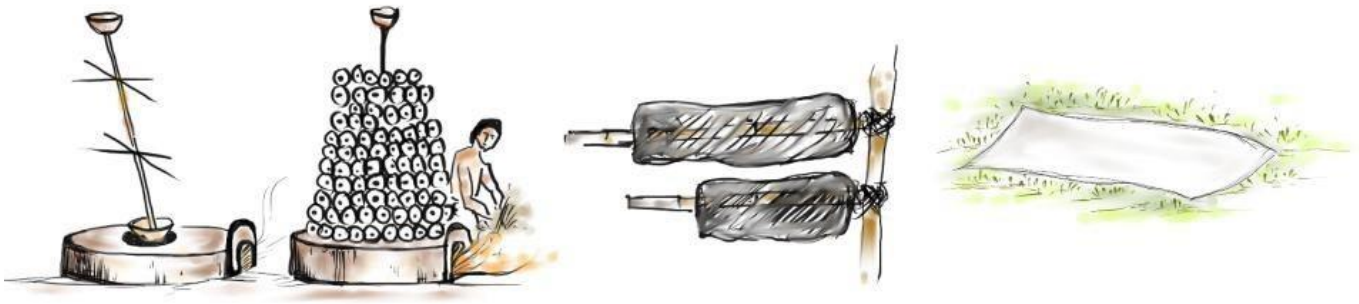
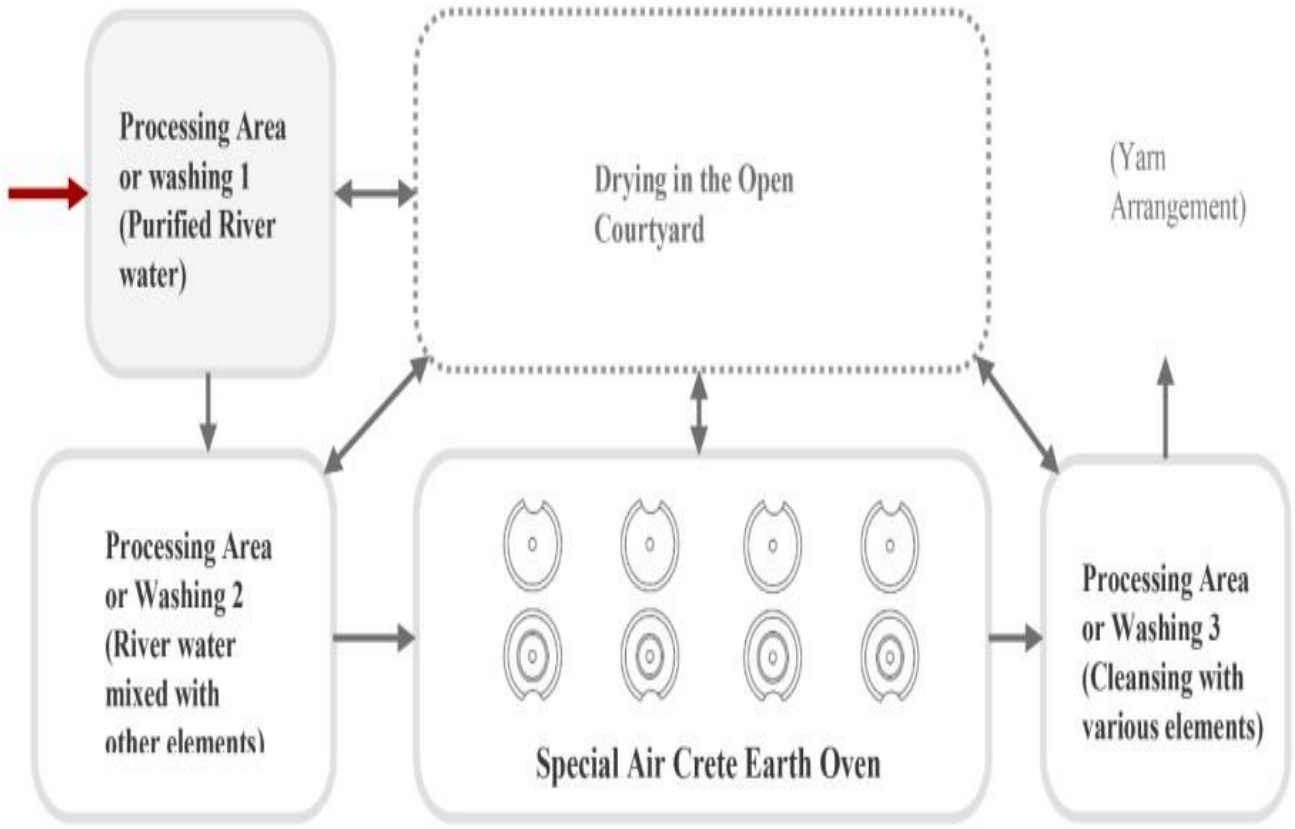


Fig. 27. Laundry flow chart (Source: Author)



- **Yarn Arrangement or Narodkoron and Darning or Ripu**

Sometimes after washing, the yarns of Muslin fabric become misplaced then the weavers use to roll the one end of the fabric in a wooden roller or Narod and tie up the other end with two small bamboo or wooden sticks pitched in the ground. Thereafter, smoothen the fabric with small wooden bar. They were known as Nurdia or Nardia. If the yarns were damaged then the weavers would repair them. They were known as Ripukar (Alam, 2025; Mamoon, 2005).

- **Softening**

The fullers were also engaged in the softening process. Conch shells were used in softening the Muslin fabric and lime and sorrel juice, clarified butter, soda was used in removing various type of stains (Mamoon, 2005). Fig. 28. Softening flow chart (Source: Author)

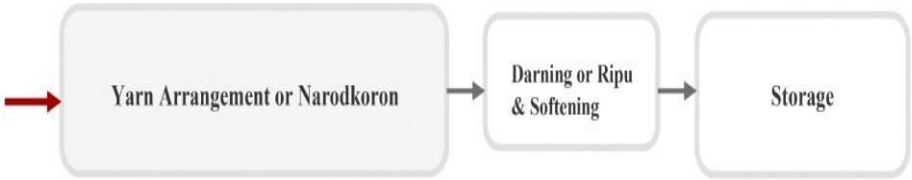
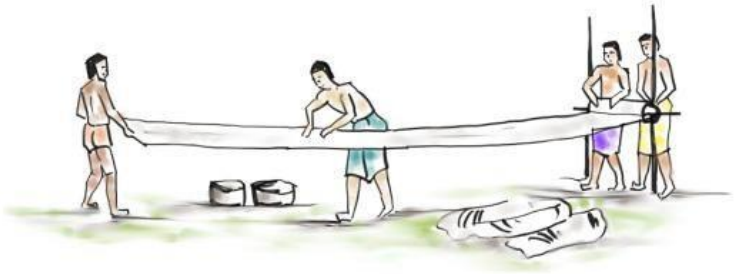


Fig. 29. Softening the yarn (Source: Author)



5. **Ironing, Embroidery and Coloring**

As Muslin fabric was so delicate the ironing use to done in a very cautious manner. It was covered in paper while ironing, as it could be damaged in direct heat of iron. Moreover, to make it more valuable the weavers use to do fine embroidery, coloring and decorative work with gold-silver. It was done not only in sarees also in turban, shoe, hats and many more (Karim, 1965; Mamoon, 2005).

6. **Knotting (Before Shipment)**

Before shipment Muslin fabric was pressed by two wooden planks, that is how it was placed one after another and then it was taken to the local market or exportation (Karim, 1965).

Challenges And Oppurtunities

A prime challenge of restoring Muslin in previous manner lays within the entire artisan practice or technique as it is mostly part of intangible cultural heritage. Though it is also a matter of fact that pure Muslin yarn and fabric cannot be generated through modern weaving techniques and machineries. It must follow the old ways which is already tested and justified by scientists and researchers engaged in this reviving project. For instance, interview of the spinners and weavers of 'Dhakai Muslin House' have reviled various factors. When they first started, the count was barely 10-15. But now it has reached a count of 550. The spinners have to do this on hand spinning wheel, manually. They cannot do this on a machine as it is too delicate and the thread will snap if the spinner gets distracted even for a moment. It takes 3 to 4 days to spin 1 gram of thread. There are a lot of things one needs to maintain while working on Muslin. A sharp eyesight is very crucial, as is the light. They need to work for long hours sitting at the same spot and if the light is not exactly right, there will be headaches. Moreover, if they get distracted by any other thought then the progress is impeded. They cannot even work under a fan because of the nature of the work. Besides, they need to care for their hands and keep them soft through a number of rituals and caring procedures which is quite a challenge (Rudro, n.d.; Utsa, n.d.; Hossain, 2023).

To overcome the factors such as, difficult practice, time-consuming, being highly expensive, incapability of any ordinary weavers, always needs the observation of experts which are very common for any other developing restoration or reviving craft-based project, the entire project must develop some extended policies.

That will amplify the social, economic, sustainable scopes and balance the cultural heritage opportunities at the same time.

Prioritizing research and training-based aspects

It was eventually very evident that research and training both are necessary to enhance the development and preserve the historical values. For that, after successfully crafting 95% pure Muslin fabric (six sarees) the project team ahead with the 100% Pure Muslin fabric which lead to more research. It will assist in creating more efficient yarn and fabric (Habib, 2021). The project researchers expect that the costs will gradually decrease in the future through technical training and various other process optimizations. Moreover, the training process in not only for weavers, it is for spinners too. Making 500 counts of yarn from cotton was quite complicated as the yarn will not be in modern machinery. It has to be spined in a spinning wheel (new spinning wheels have to be designed to cut so many counts of yarn). In this accordence, spinners who can cut thick yarn on a spinning wheel were found in Chandina, Cumilla. So, the training procedure is not limited to only 'Dhakai Muslin House' (Anik, 2021). Researchers found ageing artisans still producing low-count yarns on foot-powered spindles. Through rigorous training and patient mentoring, many have now reached counts as high as 731. Respecting the context, beyond historical and cultural restoration the project has offered a lifeline to hundreds of rural women who had little or no access to income. Most of them are from small villages near Narayanganj. Almost 327 women trained so far had previously been engaged in unpaid domestic work. Now there is more than 400 weavers and spinners. This project has made those women economically independent which is important for the economic growth and engagement of that community and social cohesion (Utsa, n.d.; Rahman, 2023).

Fig. 30. (From left) Image (a) Shitalakshya riverside area near the 'Dhakai Muslin House', Image (b) and (c) the exterior of 'Dhakai Muslin House' physical survey (Source: Author)

Fig. 31. (From left) Image (a), (b), (c), (d) parallelly showing customized hand spinning wheels, Natai or warping the yarn, the customized Muslin weaving frame, the closer view of Muslin fabric warped in the waving frame in 'Dhakai Muslin House' (Source: Author)

Publicizing

Scientists and researchers who are engaged with this project want to make it a top global fashion item as it has a great history. They are also eager to include private sectors to make it more global (French Press Agency - AFP, 2022). Furthermore, the project members believe that Muslin sarees will soon be in public market. The cost reduction of Muslin fabric production will commercially evolve it on a massive scale, then the cloth produced in Bangladesh will regain as it was 200-years ago. Restoring the tradition all around the world and as well as play an important role in the GDP and overall progress of Bangal. The rebirth of Muslin is beneficial for Bangladeshi textile, garments, fashion industries and common civils (Anik, 2021). This living heritage also contain the aspects of economic development and sustainable tourism (Osman & Farahat, 2021).

Environment friendly

The traditional craftmanship of Muslin fabric and yarn uses local and natural materials which are environment friendly and less harmful for the ecosystem. It is also, positive, sustainable and climate friendly for such industrial zone. Besides, the manual practice includes, vernacular architectural aspects in the modern structures (the exposers of present 'Dhakai Muslin House') as well and contain the sustainable urban development (Vidyullatha et al., 2023; Mahcar et al., 2024).

FINDINGS AND RESULT

The significant finding of this study is not only about how restoring traditional artisan practice (Muslin yarn and fabric artisanry) can rescue history, culture, heritage, past glory and lost knowledge. As a result, it is justified as a crucial intangible cultural heritage and within balance the factors connected to that. For instance,

- The territorial identity and community engagement: To preserve the territorial and cultural identity, cultural heritage acknowledged as the most potential territorial asset which at the same time enhance the urban and cultural resilience of a community (Kyvelou, 2025). It also maintains and manages the factors of a community based local life (Hsu & Lai, 2015; Kolb & Dumreicher, 2008).

- Social cohesion: Cultural heritage is essential for social cohesion not only for the protection and safeguard of community people but also for encouraging the diversity of cultural expression in a society. It varies from generation to generation as the study subject. Even, the number of UNESCO documents on architectural heritage was significantly higher after 2000 than before. Moreover, *The Convention for the Safeguarding of the Intangible Cultural Heritage* in 2003 and the *Convention on the Protection and Promotion of the Diversity of Cultural Expressions* in 2005 emphasize the importance of culture for social cohesion. In some aspects social cohesion is not only for one region rather it is appliable all around the globe (Liang et al., 2023; Suprapti et al., 2019).

- Economical: A living heritage not only insists of continuity to conserve a historical site and core community, it also ensures creating sustainability in local economic development, creativity and sense of globalization (Osman & Farahat, 2021).

- Elimination of the critical threats (Physical environmental): Factors as global warning and climate change are most direct threats for cultural heritage of a community, especially those who are under a microclimatic zone as the study subject Muslin yarn and fabric. But the impact of keeping the cultural and traditional elements alive can also reverse the negative climatic outline (Kyvelou, 2025).

CONCLUSION

The final study results show that, the prospects of living cultural heritage (intangible) are expanded through the restoration process of Muslin yarn and fabric artisan practice and the expression of regional identity which serves the potential urban heritage and sustainable urban development at the same time. Here, the changing scale explores from local value of heritage assets to local social life and cultural context (tradition, knowledge, skill, history, moral values, dignity and expressions passed down from generation to generation) then from local community identification to regional collective memory and finally from microclimate specified sustainable development to sustainable urban development. In human history, it is an important relic of historical city and human culture.

This paper makes a valuable contribution, through the systematic literature river and mythological perspective explaining the fact that, only restoring an artisan practice or traditional craftmanship is not enough, it must be cured, preserved, practiced and passed to our next generation as the exact original traditional way as it is from the beginning, that is how it will be an undeniable international asset and trend. Creating something new or being open to the modern technology is always evolving but when it is about heritage, culture and history then it must be preserved and remembered in the initial form. The subject study Muslin is very justified objective in that case. As, the craftmanship must be done under the exact microclimatic zone and through exact traditional method. Without these major two aspects it is impossible to create pure Muslin yarn and fabric as the earlier times. The study may seem constrained to only Muslin yarn and fabric-based aspects but the core parameters

of cultural heritage is same for every other traditional, historical skill and craftmanship. As, different origins have different cultural balance, physical and geographical forms which will maintain their cultural, heritage, identity, management and achievements in various and divisive ways. Additionally, it is recommended for the future researches to analyze the scopes as the capacity of existing cultural heritage asset, knowledge and practices in innovative and more evolved manner to create awareness, increase participation and stability.

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