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RE-ESTABLISHING THE LANGUAGE OF TRADITIONAL BY-PRODUCTS THROUGH E-TEXTILES.

By Mr. UMAIR AHMED KATMANI.



NANOTECH RE-CYCLING
**RE-ESTABLISHING THE LANGUAGE OF TRADITIONAL BY-PRODUCTS
THROUGH E-TEXTILES.**

SUBMITTED BY

KATMANI UMAIR AHMED BASHA

A REPORT

Submitted in partial fulfilment of the requirements for the degree of Bachelor of



University of Mumbai

Architecture.

2020-2021

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ABSTRACT

Owing to industrialization the textile industry changed its long and tedious hours of job to a simpler and more promising policies and machines. These policies not even boosted the fabric demands but also gave an opportunity to industries to increase their grounds with respect to Fashion Technology. This industrialization is the reason for which recyclable yarn became a catalyst in the fashion technology. Power looms have modernized the tools and techniques of weaving but every aspect progresses with a bit of a disadvantage. Power looms are the sectors utilizing the largest amount of water than any other business sector In India. Due to which waste re-cycling is not a factor .This is due to the use of synthetic fibers over natural fibers. Handloom community recognizes different natural fibers in the process of spinning and weaving. Due to which in order for the material to remain safe and eco-friendly. Communities practicing natural dyeing and weaving have their own propaganda and principle respect towards their own material. Moreover, communities prefer mill-spun yarn over hand-spun yarn in order to reduce the time slot in manufacturing a product. Natural dyeing and weaving itself is an art which depends on the availability of resources in a particular area. That is the reason why different regions develop different variety of product from qualitative aspect. Being from different region yet "Ikat fabric" remains the most common sustainable product manufactured.

When these tangible natural resources are converted into fabrics through long and tedious process, the final product remains astonishing. Keeping in mind the properties of these fabrics, which has a limited lifetime, is either re-used for an alternate purpose or re-cycled into some other product. These can be classified as pre-consumer waste and post-consumer waste. Based on this segregation the re-cycling process for both the aspects are different. The products under pre-consumer waste are either utilize for a social cause or rather what industries prefer is re-selling. Irrespective of what the re-cycled product turns out to be, there is hardly a benefitting factor for the weavers and the artisans. The industries remain the primary benefited body and the consumers remains the secondary benefited body. Weaving community live by a principle factor of organizing their work with respect to art, science and social aspect.

“ Textile arts are versatile and can transition from use to use, and that is their true genius “

- Sandra Aspinet,

The Well-travelled home.

The quote itself determines that the nature of the textile is to entangle itself with the surrounding aura. It changes accordingly fulfilling its desired purpose. Textile has evolved in a way that it became the common element in all the fields possible. Like the shoddy yarn which is a used fabric, has found its application in weaving clothes for military applicants. E-textiles are the new relief fabric for rehabilitation centers, bio medicinal

use of textile through better and advanced outfit for doctors and patients is another highlighting application. Ikat fabrics are classified according to the orientation of warp and weft. Warp is the woven fabric and weft is the yarn inserted perpendicularly. Double ikat as compared to single ikat is much more complicated and time consuming. The sole purpose of practicing such a fabric is due to the consumption of natural fibers and recyclable waste. The importance of a fabric is determined by its workmanship, properties and its by-products. Textile Industrial waste contributes to about 2% of the entire waste generated in the industrial sector. Communities that are practicing natural weaving and dyeing are utilizing the waste for certain agricultural purposes but aren't utilizing it for themselves. The main agenda of natural weaving and dyeing is to manufacture products that are eco-friendly and have a sustainable perspective towards textile management. That is the sole contribution of weavers towards a better ecological and safe environment.

Natural weavers and dyers have carried their traditions through generations and have contributed to the society with varieties of fabrics that we benefit in our day to day agenda. Keeping in mind the pre and post-consumer waste the weavers try to alter their methodology in order to make more sustainable and long lasting fabrics. Yet due to their hard and striving methodologies, they are still left with some technical difficulties which does not allow them to further benefit the consumers. At this point, the textile science comes into picture.

AIM:

To eliminate the gap between the manufacturer, retailer and the consumer by catering them under the same roof on the basis of E-textile fabrics generated through treating pre-consumer and post-consumer waste.. The potential value of by-products are negligible until and unless it can be re-used. So this research is based on different by-products that is generated by different textile communities.

OBJECTIVES:

- Understanding the nature and properties of pre-consumer and post-consumer fabric.
- Understanding the different resist dyeing techniques.
- Studying the different communities practicing resist dyeing techniques.
- Studying different parameters of waste treatment adopted by different communities.
- Understanding the boundaries with which Nano technologies can be used with respect to fabrics.
- Understanding the parameters of E-textile Nano-technology.

LIMITATIONS:

- Research would be based on both natural weaving and synthetic weaving fabrics.
- Research would be based on both pre consumer and post-consumer waste generated by both factory and from resist dyeing communities.

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CHAPTER 1: OVERVIEW ON TEXTILE WASTE.

1.1 INTRODUCTION

Bombay till 1837 was a cluster of 7 islands, by 1838 these islands were amalgamated into a single functional body. This movement united all sectors of land with respect to their culture, traditions, occupation and lifestyle. Bombay became the center of all trade having major commercial sector background. This is the reason why we see the city developing from all sectors.

Land reclamation plays an important role in uniting all the sectors. In 1858, the first textile mill was established giving the city an economical hub. When the city began developing more and more textile industries evolved. The workmanship and the economy grabbed a lot of attention, which lead to migration of population to this sector.

Initially the textile industries had more space because of handlooms. Later on as the sudden demand and innovation in textile lead to more machine spaces and less worker space. When this occupancy issue came into picture workers



Fig. 1 the seven islands of Mumbai,

Murder of the mills, April 2000

started developing their own platform to make the ends meet. It was around 1881, that working class sexual discrimination was revoked. Women's were allowed to work in the textile industries. By 1991, women working class sector constituted to about 20 – 25% of the entire textile industry workforce. This not only formulated a work free environment but also broke the barrier of social interaction. Mills were actually in a closed proximity, this is the reason how a district was formulated. Communities began to formulate, cultures were honored and thereby celebrated irrespective of the caste, open spaces were used for small activities in order to get acquainted with different communities, unions were formulated in different regions in order to report and act against indiscrimination.

By mid-1980, textile workforce were supervised to be of approx. 2,50,000 workers, which is almost 2/3rd of the entire civil population of the city. According to Ar. Neera Adarkar, an activist in urban residential struggle, globalization is the first sign of de-industrialization.



Fig. 2 Fabric Solid Waste, Bangalore Metropolitan Transport Corporation, 2012.

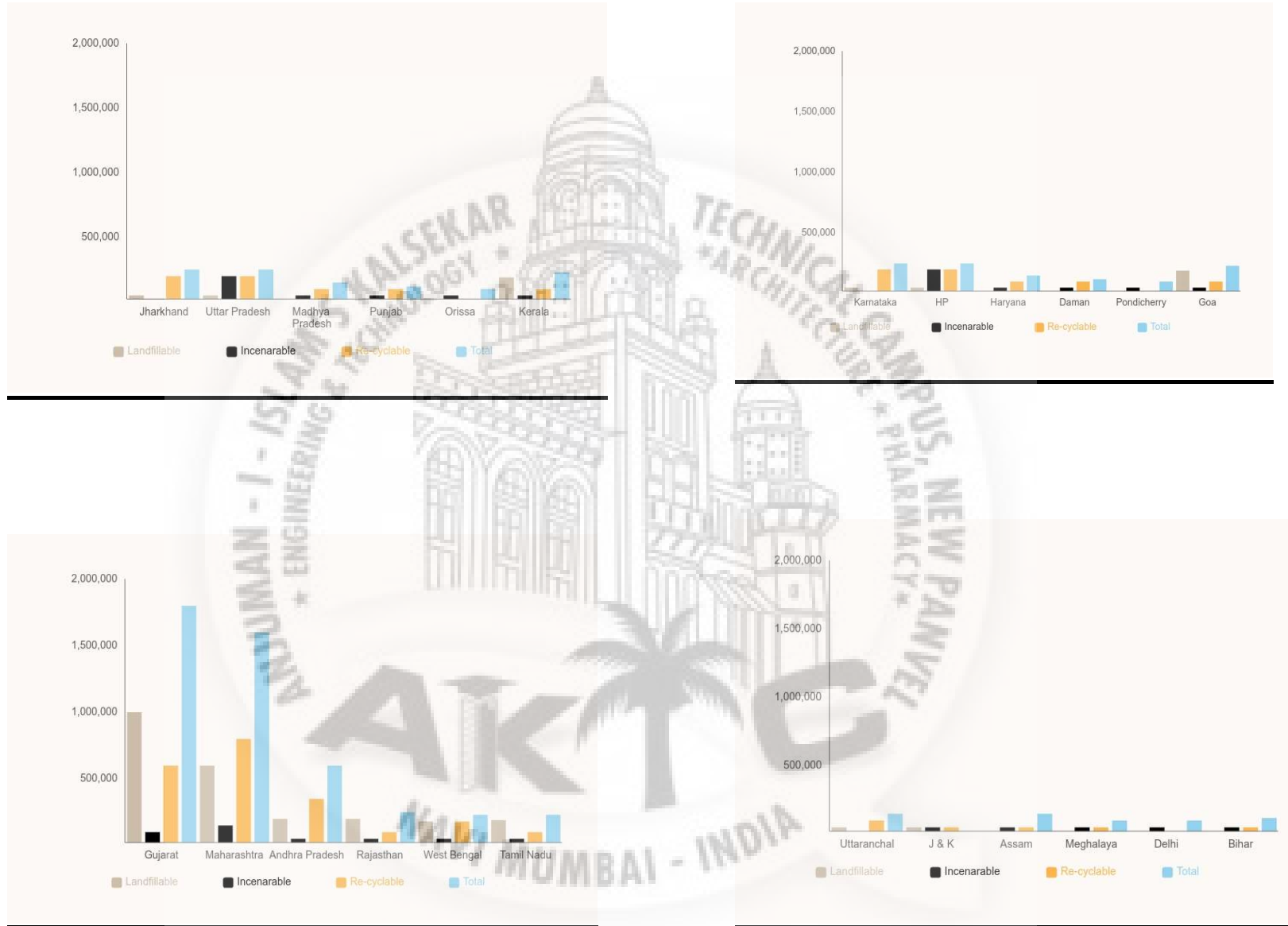
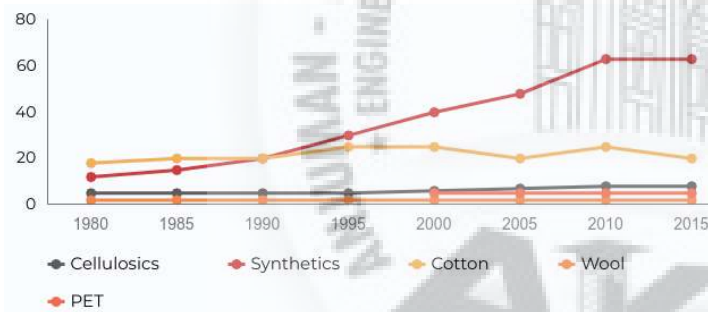


Fig. 3 Waste Generation Situation in India 2019, Central pollution control board.



Textile as an apparel comes with a life, this is completely based on the nature and behavior of a fabric. From a period of 1980 - 2005 there was a gradual increase in textile demands due to the growing fashion. That led to the industries using synthetic fibers in combination with natural fiber thereby decreasing its life cycle by 35%.

Fig 4. Fiber production globally, Textile recycling processes, and state of the art and current developments: A mini review, Jan 2019.



- Frame loom



- J.M. Jacquard



-Carpet pattern 1970



- 1947
'Khes' and 'Durries' of course hand spun cotton yarn were manufactured
- 1948
The National Textiles and the General Company of Panipat purchased Jacquard from Joan Harlekar and for the first time introduced it in the Panipat industry
- 1960 - 70
New designs were developed and the carpet business evolved as a result of yarn dyeing of woolens.
- 1975 - 80
Central cotage industries began developing under the guidance of Mr. D.C. Bhatia.

Fig 5. EVOLUTION OF KHES & DURRIES, PANIPAT: GLOBAL CITY OF SHODDY, VIDEO DOCUMENTATION, JAN 2013.



- Chindi Durries



- Shoddy industry, 1990



-Carpet pattern 1970

1985 - 86

'Chindi durries' were introduced in old second hand power looms under the guidance of Mr. D.C. Bhatia.

1984 - 90

Shoddy industries began developing international trade due to the closure of mills.

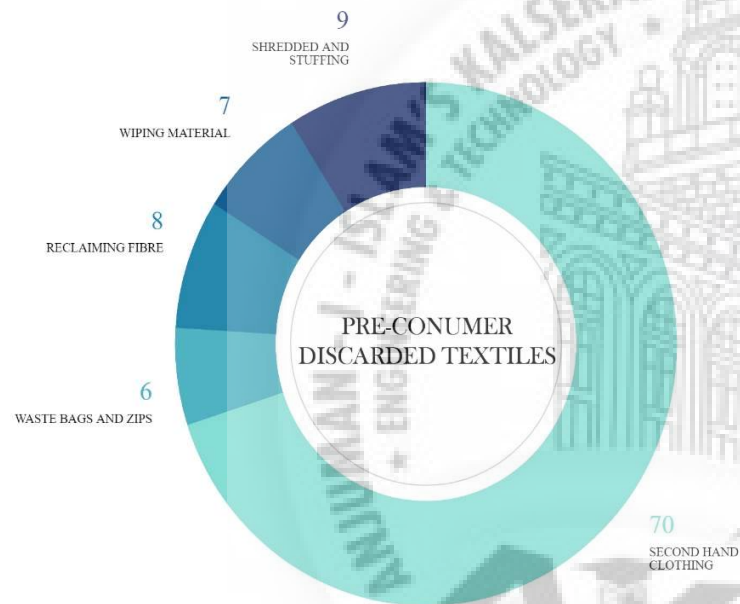
1991 - 91

Hand tufted carpets and handloom carpets were introduced under the guidance of Mr. Om Bhatia.

1975 - 80

New kinds of embellishments and designs were developed in durry fabric for both indian and international markets

Fig 6. EVOLUTION OF KHES & DURRIES, PANIPAT: GLOBAL CITY OF SHODDY, VIDEO DOCUMENTATION, JAN 2013.



1.2 PRE-CONSUMER WASTE

Pre-consumer waste can be defined as the waste that is segregated while processing a particular material. These are mostly discarded and abandoned cloth pieces which when stitch together forms a yarn in itself. But due to its composition and dye pattern these pieces are to be segregated with their respective dye subordinate in order to eliminate the re-processing of fabrics.

Fig. 7 PRE-CONSUMER DISCARDED TEXTILES.

Source: *The textile world.com*



Fig. 8 Spain-based S.Vilarrasa offers a recycled cotton yarn made using pre-consumer cotton garment waste.

Source: The textile world.com

Sr.NO	ELEMENT	REDUCTION
1	WATER	4800kg
2	CHEMICALS	16.5kg
3	CO2	233.8kg
4	WATER CONTAMINATION	3500kg
5	ENERGY CONSUMPTION	500kW/hr.

Table 1. Quantity and quality of textile waste treating elements.

Source: The textile world.com



Fig. 9 Pre-consumer denim product insulation.

Source: textilefocus.com

Pre-consumer wastes have a property of stiffness when clubbed together which makes them vibrant and aesthetically pleasing. These fibers are clubbed together using Nano particles through Nano technology. It is also called as natural fiber cotton insulation, which has an application in both residential and commercial structures.

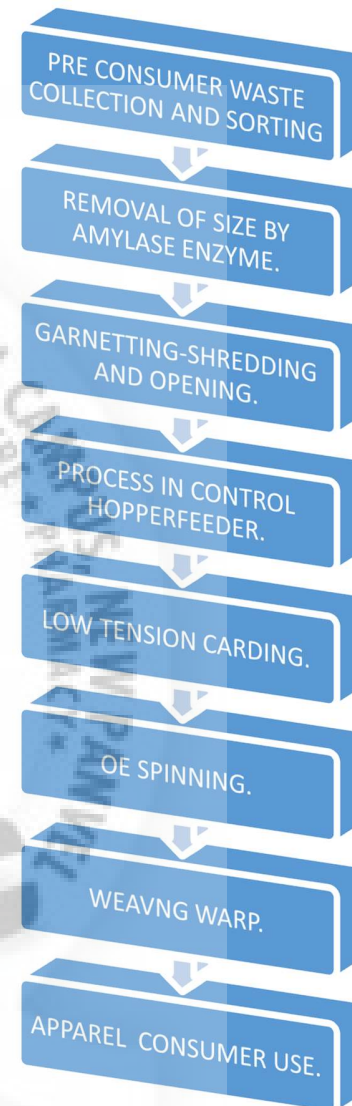


Fig. 10 PROCESS FLOW FOR RE-CYCLED FIBRE

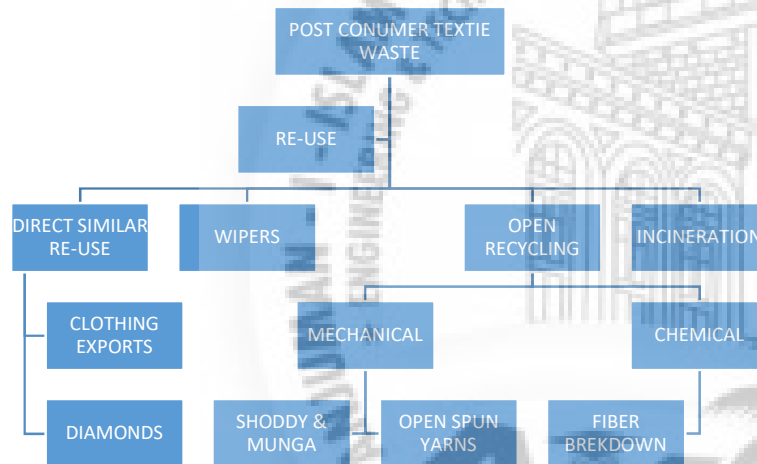
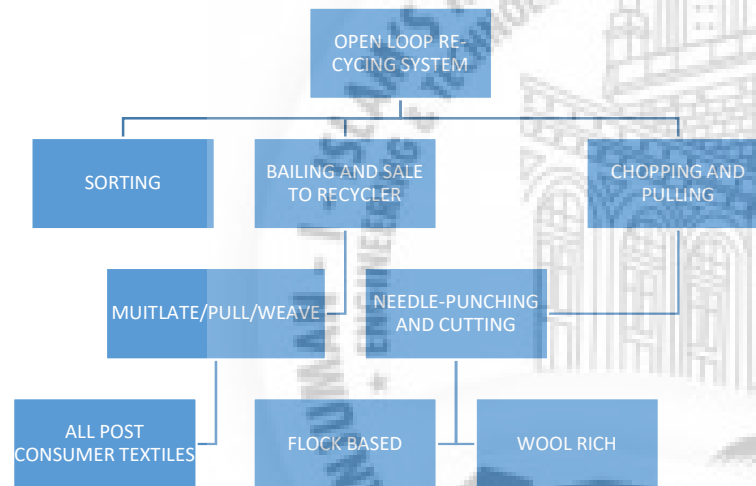


Fig. 11 POST CONSUMER TEXTILE CYCLE, HAWLEY, 2006.

1.3 POST-CONSUMER WASTE

Post-consumer textile waste can be of any category of cloth which has fulfilled its lifelong purpose and has been discarded. It can range from any resist dye material or any synthetic fiber procured apparel.



1.3.1 OPEN-LOOP RECYCLING SYSTEM

This process involves the inclusion of mechanical compressors which compresses the overall raw wool into sustainable fibrous form which can be further used for industrial purposes. A secondary apparel life is induced through this process, the fiber length are considerably small in order for its small scale applications.

Fig. 12 TEXTILE RECYCLING TECHNOLOGIES, COLORING AND FINISHING METHODS, KATHERINE LE, UBC SUSTAINABLE SCHOLAR, AUGUST 2018.

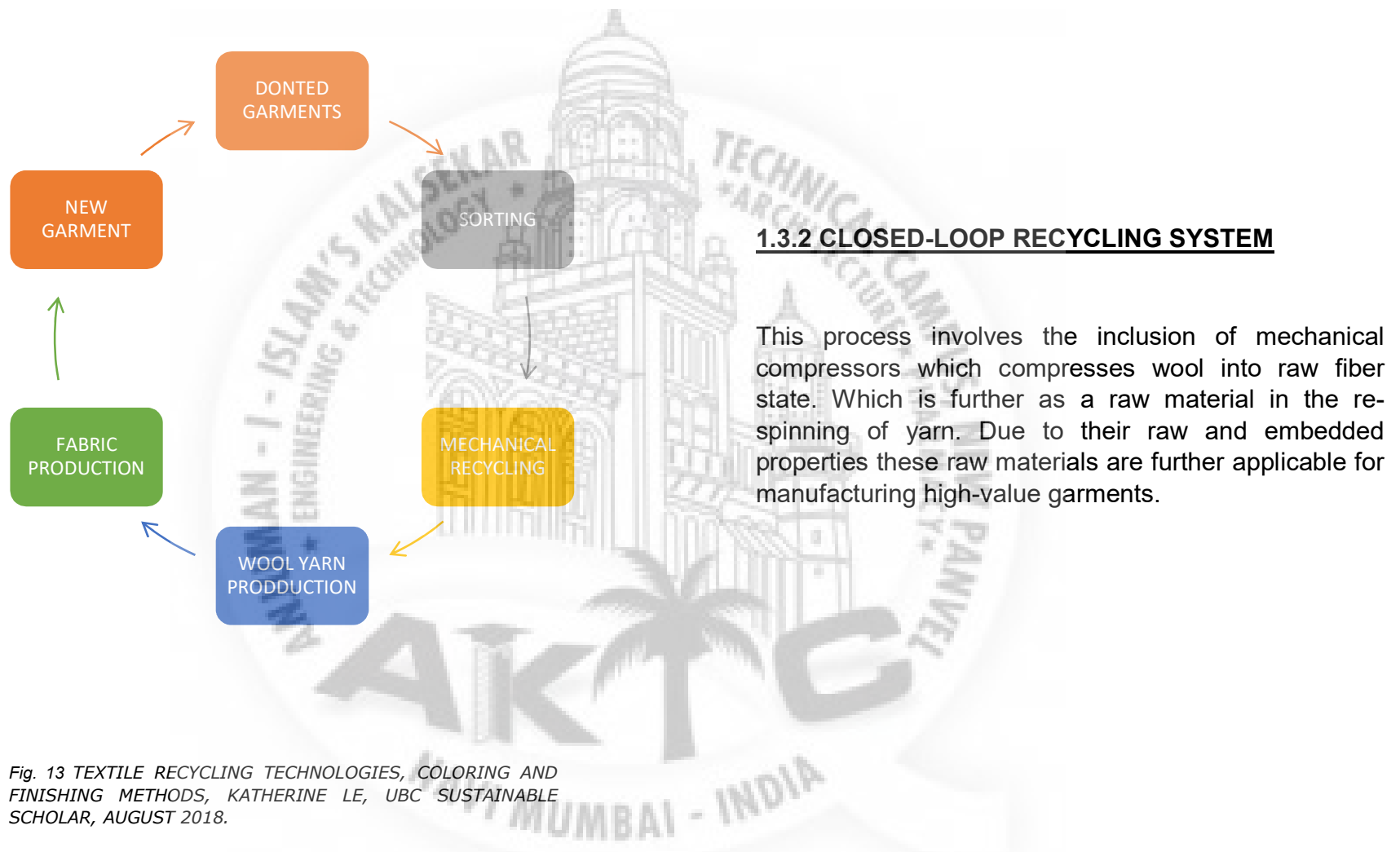


Fig. 13 TEXTILE RECYCLING TECHNOLOGIES, COLORING AND FINISHING METHODS, KATHERINE LE, UBC SUSTAINABLE SCHOLAR, AUGUST 2018.

1.4 INTROUCTION TO SHODDY YARN.

“In between 1919 n 1982 mill workers went on mini strikes and protests due to dissatisfied wages. And this was the start of the Great Strike of 1982. Dr. Samanth led the protests and strikes and won over the mill workers through his dedication and determination for fighting for their demands.”

- Murder of mills , Shekhar Krishnan , 26th April 2000

The generic ideology behind any movement or any revolution is to take the responsibility of identifying and portraying the conflict resolution in a way that it improves the current condition. Improvement is due to the change in lifestyle, a change in methodology, a change in the pattern of social aspects. Our society is a cluster of cultures and traditions, which always leads to a room of improvement for adapting and improving. These traditions and cultures are the means of communication which is practiced since ages and is handover from our fore fathers to us. Our society comprises of artisans, businessmen, entrepreneurs and they all their own way of communication.

Mumbai was the heart of artisans and weavers which conveyed their language through patterns in fabrics. These textile products originated from **KHADI** and then by the collaboration of various mixtures of patterns and weavers mills were formed. This lead to a phase of Industrialization because textile was the center of all economic trade.

TEXTILE INDUSTRIES

1870 - 2018

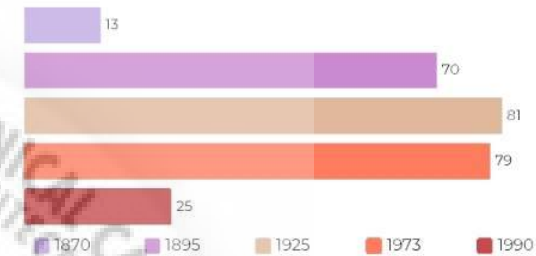


Fig. 14 UNDERSTANDING THE ORIGIN AND EVOLUTION OF TEXTILE MILLS IN INDIA, MURDER OF MILLS, APRIL 2000.

Mills originated and developed on certain government policies. Mainly because the manpower which was dedicated for work didn't have a proper firm economical background. All the policies from the government was for the people solely. But the weavers and artisans felt a loop hole in the policies, which lead to the formation of unions all over the country. The formation of these unions was we can say for the people and by the people themselves. The motives of these informal organizations was to form alliances which might help others to adapt to the revolutionary changes around. The revolutionary changes were the modernism in lifestyle. Even though Phoenix mills was substituted to Phoenix mall, its essence of accommodation in the humongous structure is still present. The stories of Mukesh mill still remains the emphasizing character of that structure.

As textile industries were the major catalyst for middle class income group, the sector ultimately became a center of investment. Through ages it has been providing the society with numerous tactics in order to meet our respective demands. When a phase of industrialization emerged, it affected the import of textile products drastically, but on the other hand it gave rise to export of unwoven or used fabrics called as shoddy yarn.

During 1980s, when the industrialization began in the middle of a crisp war in UK territories, scarcity of uniform for military troops began developing. At that phase, Panipat was one of the biggest textile recycling plant among other nations. Exporting of shoddy yarn happened with view of creating awareness in the textile sector globally.

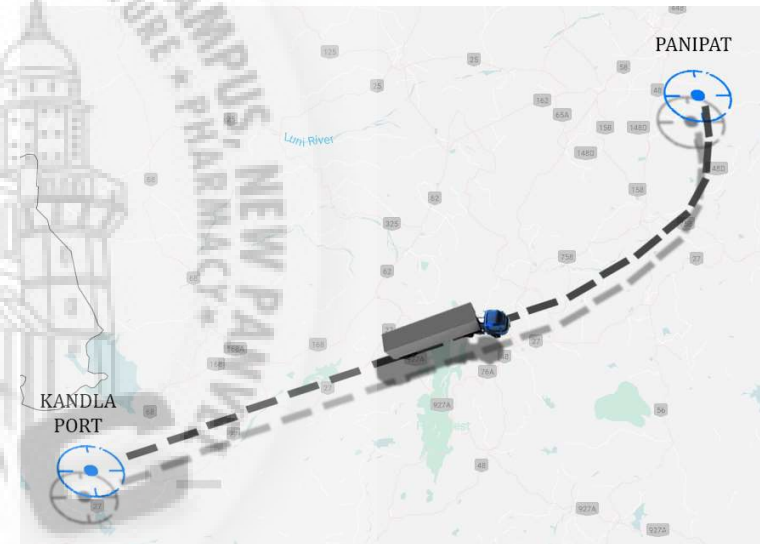


Fig. 15 PANIPAT: GLOBAL CITY OF SHODDY

VIDEO DOCUMENTATION, JAN 2013.

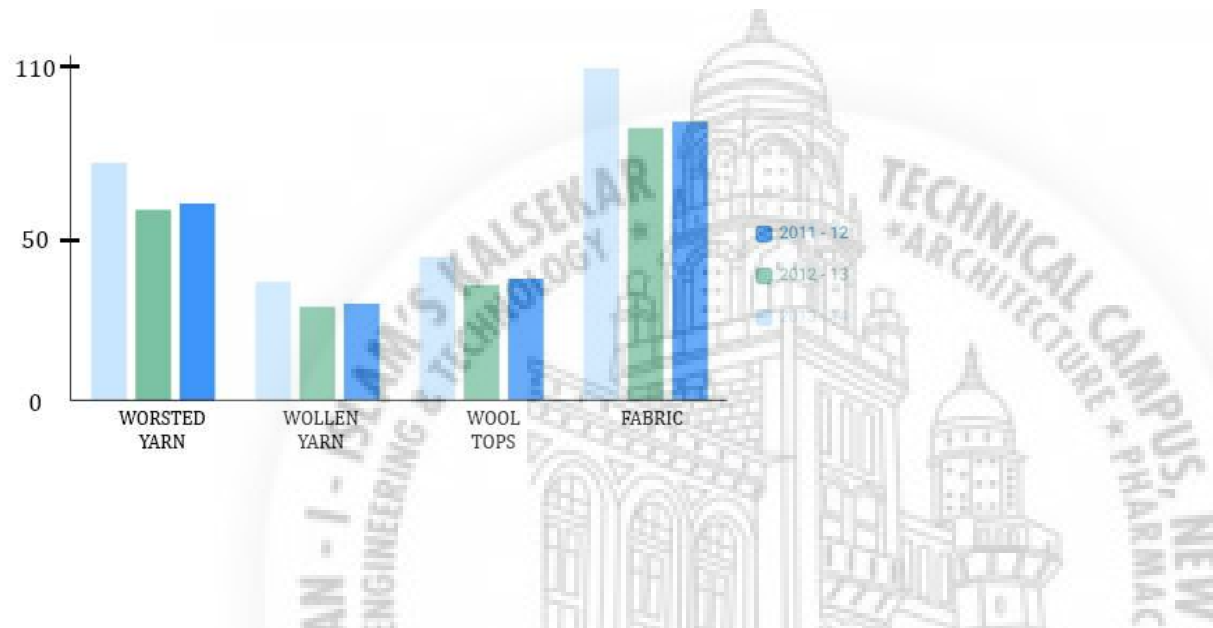


Fig. 16 PANIPAT: GLOBAL CITY OF SHODDY
VIDEO DOCUMENTATION, JAN 2013.



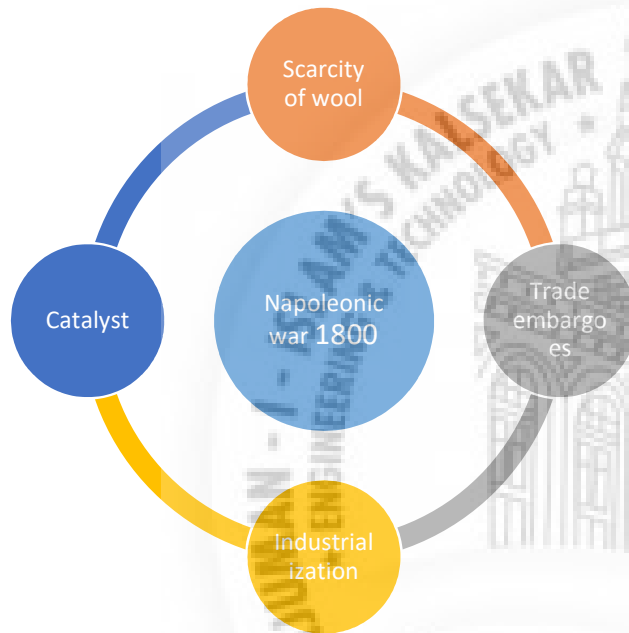
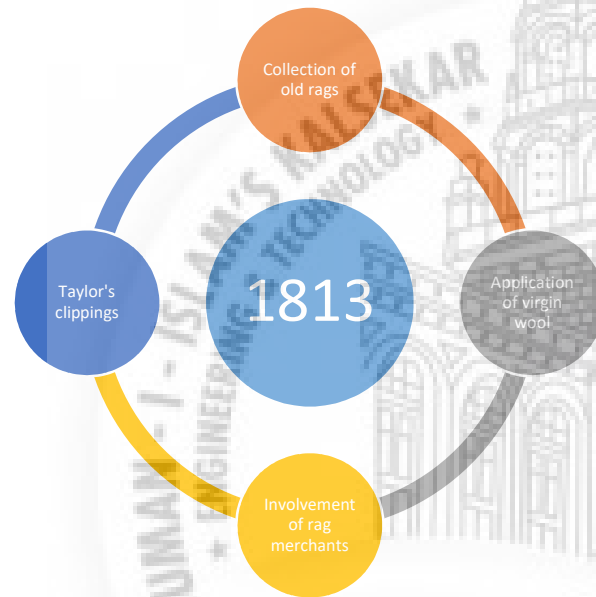


Fig. 17 History & origination of shoddy yarn.

Shoddy-new fabric from re-cycled wool, 2004.

England in 1800, became the center of trade for shoddy and mungo yarn. The typical difference between a shoddy and a mungo yarn is that shoddy is a low quality post-consumer yarn whereas mungo is a good quality fabric made up of pre-consumer and post-consumer yarn. England wasn't a leading producer of cotton, and on the brink of war the demand for military cotton yarn became an expensive vision. This led to a composite fabric material called shoddy by Benjamin Law.



By 1813, the main propaganda of the entire country was to push the motive of re-cycling the old textile rugs into new ones. Thereby, it began by collecting old and worn out rugs and handing over them to the rug merchant with a view for an incentive.

Fig. 18 History & origination of shoddy yarn.

Shoddy-new fabric from re-cycled wool, 2004.

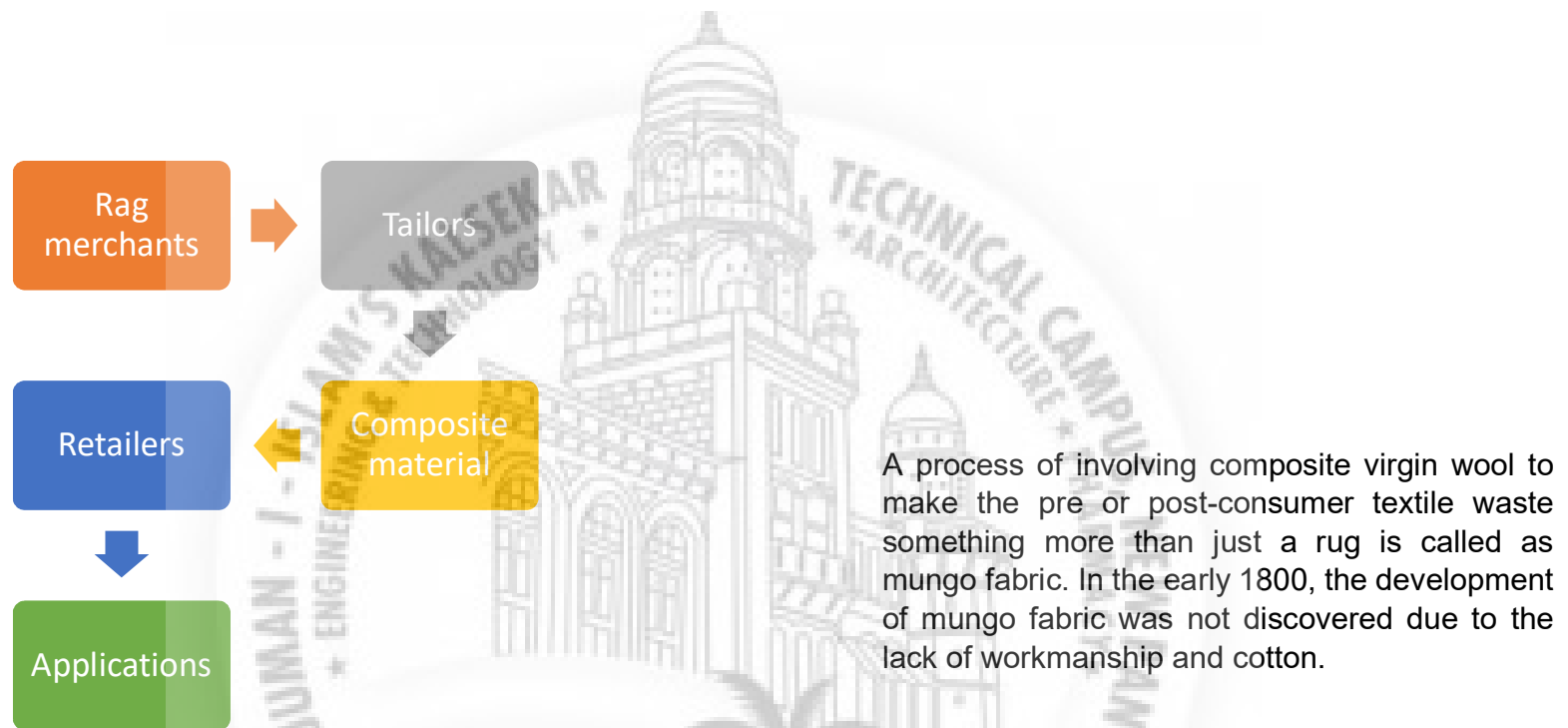


Fig. 19 Process of Mungo fabric.

Shoddy-new fabric from re-cycled wool, 2004.

1.5 FORMATION OF COMMUNITIES

Fabric is composite in nature. Due to its ability to form a desired shape, pattern and a sense of nature of the yarn it is distinguished according to the methodology a community adopts. Accordingly when we talk about a fabric it is distinguished on the basis of the yarn used to produce it. Different materials of yarn have different molecular behavior or nature with the natural or synthetic weaving. On the basis of the yarn so manufactured communities are formed which are segregated with respect to weavers i.e. natural weavers and dyers and synthetic weavers and dyers.

"...the downfall of the mills inverted the city's employment pattern. India has always had a large share of the so-called unorganized sector, but until the 1970's Mumbai was different; in the city, the organized sector had always been the predominant employer. That changed as the textile industry withered..."

- *International journal of current research, Volume 10, August 2018.*

The strike of 1982 was the depiction of the rage of unemployed sector for their rights. The policies that were inculcated and the accommodations or the facilities that were provided, was implemented keeping in mind a certain group or a community. With respect to time the

quality of life changed, hence, making the government policies incapable of catering such a difference. When

the government policies were not able to control the particular area it was eventually considered as unorganized sector.

The organized sector was considered as predominant because it was an employed and sophisticated sector. Most of the strings were attached to the textile industry because it was the major source of growth in the city. Whenever a change is implemented in a society, it isn't monologue, it affects the entire civilization. When the mills were closed their lands were further put into use for accommodation purposes. Even though the structures were replaced their essence were restored, such as phoenix mills, in order to preserve it. When we talk preserving resources, Girangaon is an exceptional example because the chawls that were implemented for the need of workers working in the mill is still there and gives an ideology as to what their lifestyle was. These massive acts created a havoc which affected the working women class too. The dabba system which was an ongoing and progressive means of income was put on hold because of the tension around.

1.5.1 SYNTHETIC WEAVING

Synthetic weaving is a combination of

Yarn Twisting : A process of strengthening the yarn by twisting the fabrics together.

Warping : After twisting the yarn the base of the yarn is assembled throughout the length of the fabric.

Weaving : It is the process of interfacing the components of the fabric i.e. warp and weft.

Finishing : This process involves the finishing of the fabric through synthetic dyes.

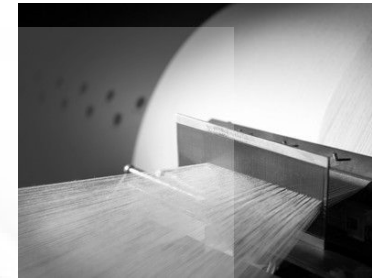


Fig. 20 WARPING, WEAVING PROCESS

www.ARVILLE.COM.

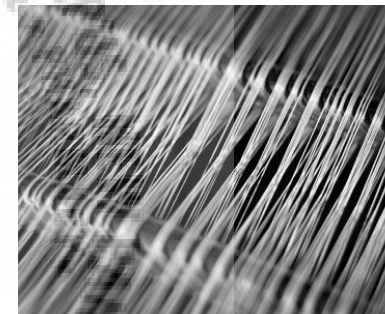


Fig. 21 WEAVING, WEAVING PROCESS

www.ARVILLE.COM.



Owing to the segregation of man-made fibers the most productive and efficient man-made fibers can be classified as organic and inorganic fibers.

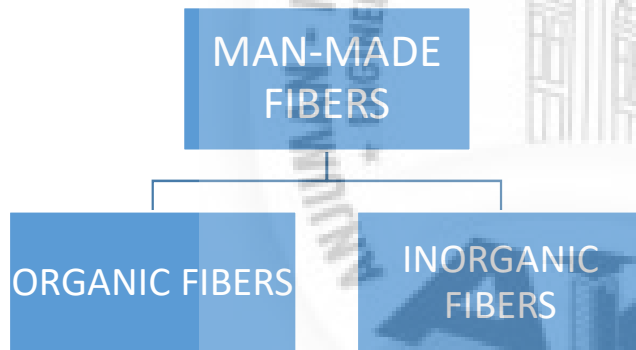


Fig.22 Textile recycling processes, state of the art and current developments: A mini review, Jan 2019.

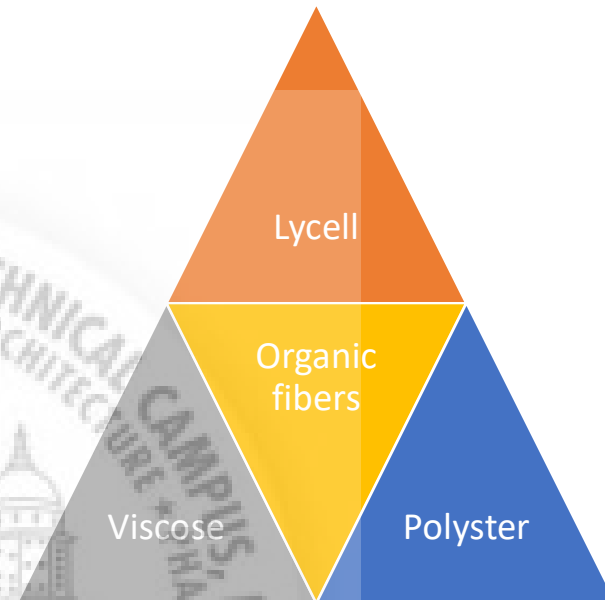


Fig.23 Classification of organic fibers, Textile recycling processes, and state of the art and current developments: A mini review, Jan 2019.

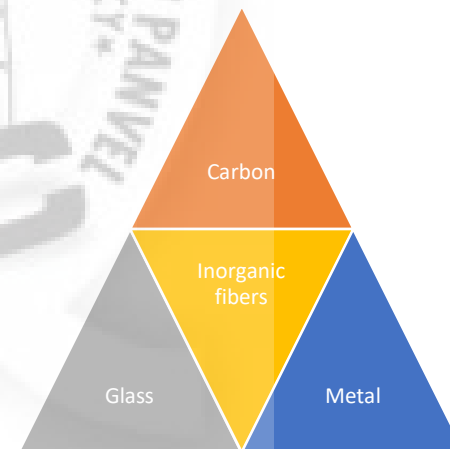


Fig.24 Classification of inorganic fibers, Textile recycling processes, and state of the art and current developments: A mini review, Jan 20

1.5.2 NATURAL WEAVING

Natural weaving is a combination of

Pattern design : A particular craft is designed on a graph paper so as to divide the fabric into respective portions.

Warp patterning : In order to resist the dye, a rubber strip is wound around the secondary weft before vertical pattern is laid on the fabric.

Warp dyeing : Further the undulations in the weft portion is resisted by laying the dye on warp which forms the base of the yarn.

Weft patterning : In order to resist the dye, a rubber strip is wound around the primary warp before vertical patterning is laid on the fabric.

Loom preparation : To weave the bond between the warp and the weft in order to form the interfacing of the components the loom is further prepared.

Weaving : The resisted dye has achieved the respective appearance so in order to strengthen the fabric the yarn is weaved on a handloom or a powerloom.

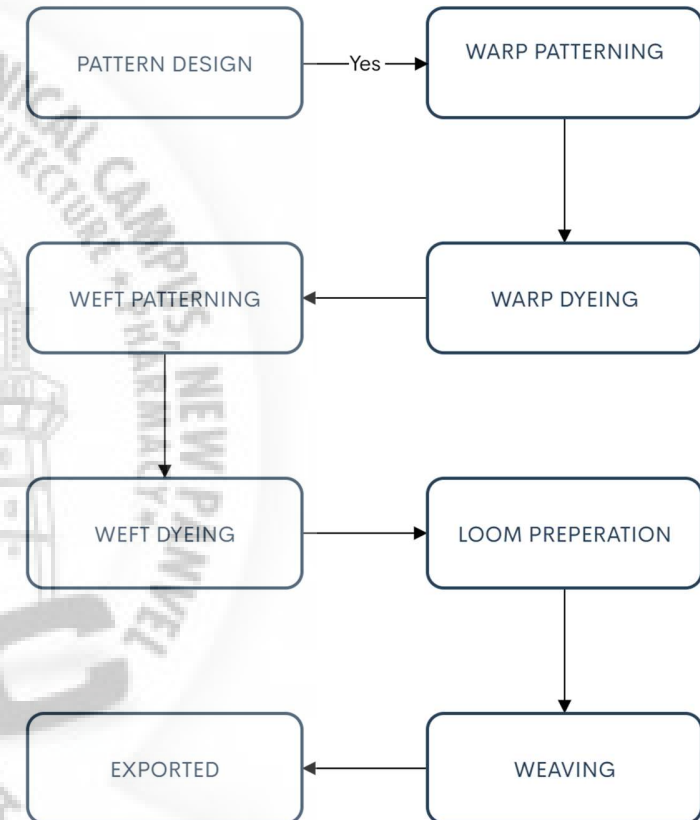


Fig. 25 NATURAL WEAVING PROCESS

www.SARASU.IN

Owing to the segregation of natural fibers the most productive and efficient natural fibers can be classified as crop and animal fibers.

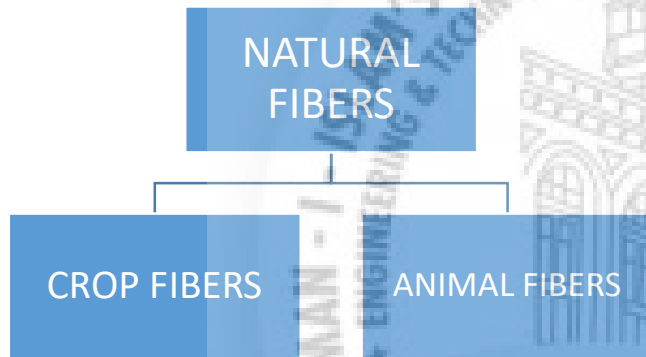


Fig.26 Textile recycling processes, state of the art and current developments: A mini review, Jan 2019.

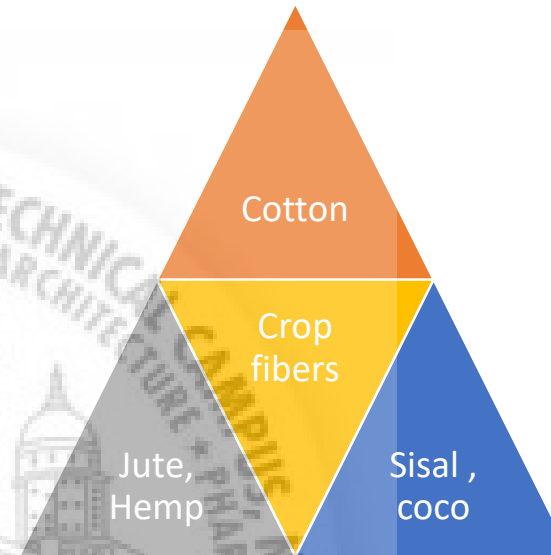


Fig.27 Classification of fibers, Textile recycling processes, state of the art and current developments: A mini review, Jan 2019.

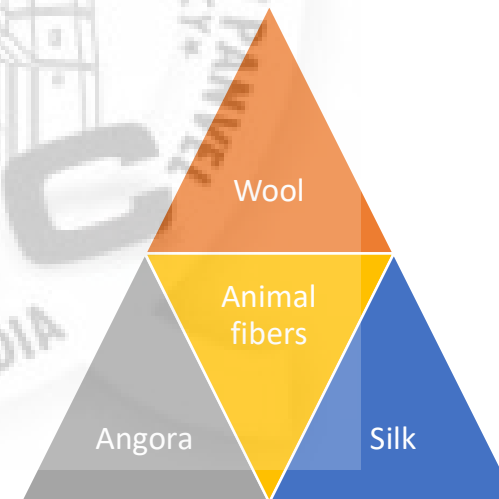


Fig.28 Classification of fibers, Textile recycling processes, state of the art and current developments: A mini review, Jan 2019.

CHAPTER 2: SEQUESTRATION OF NATURAL WEAVING & DYEING METHODOLOGY

Weaving has always been a community activity forming the backbone of textile industry. Natural weaving is a set of skills that a weaver performs from his/her house itself. Natural weaving and dyeing is a process in which no synthetic dyes or any chemical dyes are involved making the product and by-product sustainable to be recycled.

2.1 KHADI WEAVING

“Yarn spun by hand is known as “hand spun yarn” and yarn spun by machines is called “mill spun yarn”. Fabrics woven out of hand spun yarn on handlooms are called “khadi”, while mill spun yarn woven on handlooms are called “handloom” fabrics.”

-DAMA handloom community, 2001.

Basically a fabric is considered to be khadi if it is through natural weaving and dyeing process of a hand spun yarn.

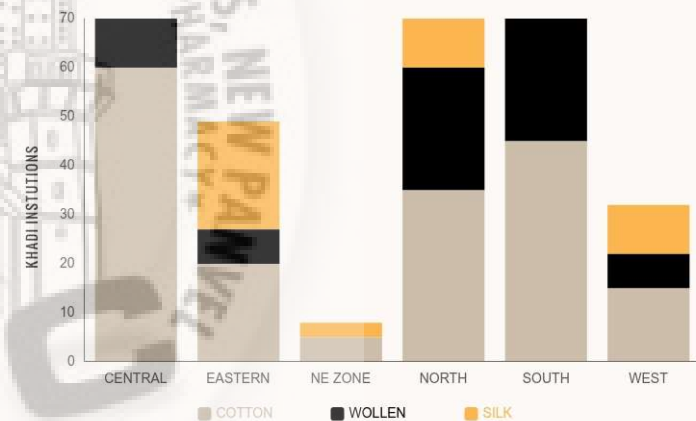


Fig. 29. KHADI & VILLAGE INDUSTRY: A CASE STUDY OF KHADI INSTITUTIONS OF INDIA, PESALA PETER, JAN 2014.

2.2 HANDLOOM WEAVING

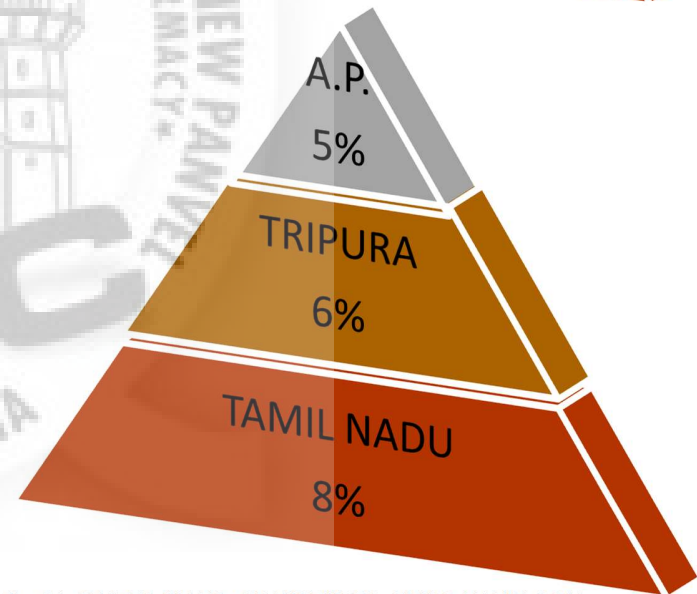
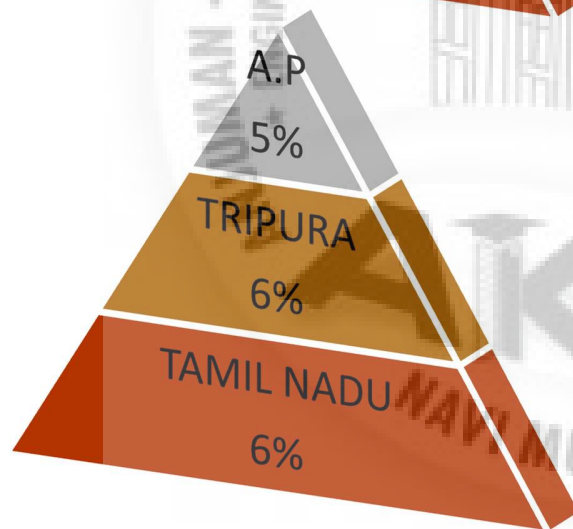
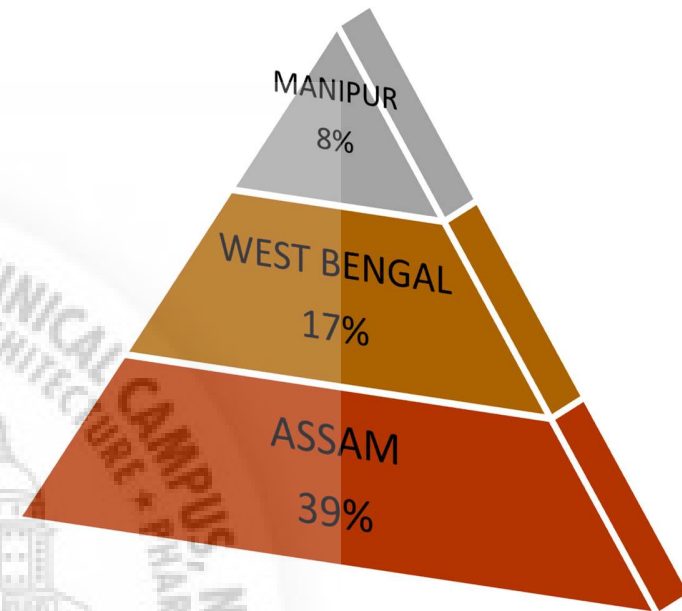
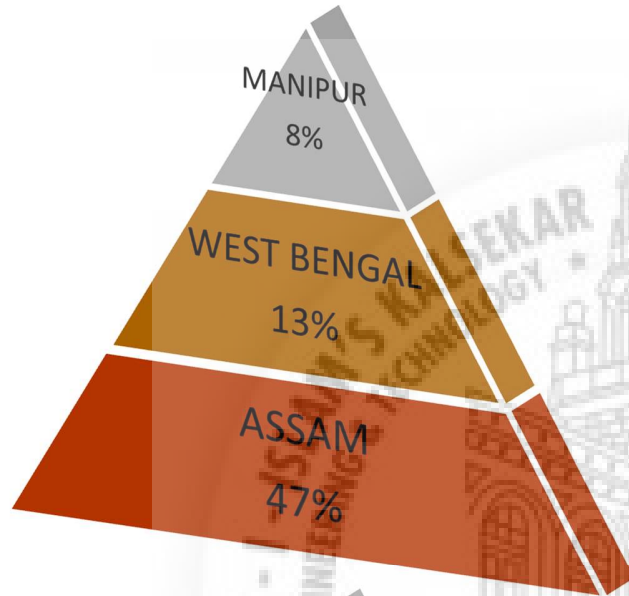


Fig. 30. STATES BY NO. OF HANDLOOMS, THIRD HANDLOOM

Fig. 31. STATES BY NO. OF WORKERS, THIRD HANDLOOM



*Fig. 32. HANDLOOM WEAVING PROCESS,
THECOTTONHANDLOOMS.IN.*

CHAPTER 3: SEQUESTRATION OF NATURAL WEAVING & DYEING COMMUNITY

According to the ministry of textiles, the segregation of power looms and handlooms led to the formation of different communities with respect to fabric, availability of resources, methodology and culture. It also depends on which zonal code the community falls under. The primary application of natural weaving and dyeing is that it gives the fabric a flexible application after fulfilling its life span.

3.1 KHATRI COMMUNITY

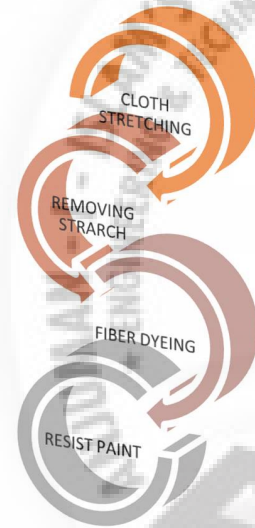


Fig. 33 Khatri 1st print process, Source – Sufyan Khatri, 9th generation Khatri weaver.

Since generations Khatri community has been practicing resist dyeing technique. This technique solely focusses on the parameters of utilizing only natural ingredients for dyeing. Firstly a white cloth is soaked in water and dried for the entire night. Then a patch of camel dung, soda ash and castor oil is mixed and soaked the cloth in it in order for it to remove the starch from the cloth. Then a mixture of chuna and lime powder is applied in order to make it resistible to the paint or textured applied.

The second print the cloth is induced in a mixture of tamarind and vitamin c.

The third print is of clay and alum for the cloth to make it stable for the texture to take place.

The cloth is then washed and boiled using 200 liters of water at a temperature of about 100 degree Celsius in a vessel of about 12' x 6' x 6'. The whole process is carried out in 4 plots. Each process is carried out in open space in order to be fully ventilated from all sides. The process of dyeing involves all the natural herbs and spices in order to achieve the desired color. In this community ikat is practiced by stamp painting in order to achieve the texture.

The water waste so generated in this process is used for agriculture purposes. As the process doesn't involve any harmful chemical dyes, it can be used for agricultural purposes. The cloth waste so generated is used for preparing small

bags and as for right now it is used for making face masks.

In order for the water to be re-cycled and used again by them, there are certain NGO's which are helping them to establish a facility.

- Sufyan Khatri,
Khatri community,
Kutch, Gujarat.

The waste so generated is not being utilized themselves, such as water which is being used at a quantity of about 200ltrs for one process. This might create a problem in the coming years because being in Gujarat region it is likely to re-use the waste so as to be on a positive side.



Fig. 34 Khatri 2nd print process, Source – Sufyan Khatri, 9th generation Khatri weaver.

3.2 BHISHNOI COMMUNITY

“It was fascinating to watch the primitive method of weaving carried forward through generations. It was amazing how they created these delightful carpets with a spectrum of vibrant colors. The community has around fifty skilled artisans who are involved in this durry weaving business.”

- *Bishnoi Village Safari – A Glimpse into the Rural Communities of Rajasthan.*

Bishnoi community follows the 29 principles which they implement in their day to day life. That is the reason for natural weaving community involvement.



Fig. 35 Bishnoi weaving process, sahapedia.org.

3.3 KHAMIR COMMUNITY

“Khamir community not only serves the society as a resist dyeing textile hub but is also an NGO which helps to establish a facility for weavers to collect their pre and post-consumer waste.”

- *Sufyan Khatri, 9th generation Khatri weaver.*

Khamir is the collaboration of weavers and artisans from different backgrounds. It is a resist dye practicing community which often manufactures ikat fabrics.



Fig. 36 Khamir weaving process, khamir.org

3.4 DEVANGA COMMUNITY

“The golden zari work on the saree border shows that the women of Kerala’s royal family were trying to use gold for fashion in ways other than just jewelry.”

- Meenakshi Soman, Kannadiga community of weavers.

The originality of simple white saree and golden embroidery was not only of art and culture but it also depicts the royal opportunity that was the reason of origination of devanga community.



Fig. 37 Devanga weaving process, Kannadiga community of weavers



Fig. 38 Devanga weaver, Meenakshi Soman, Kannadiga community of weavers.

3.5 PANIKA COMMUNITY

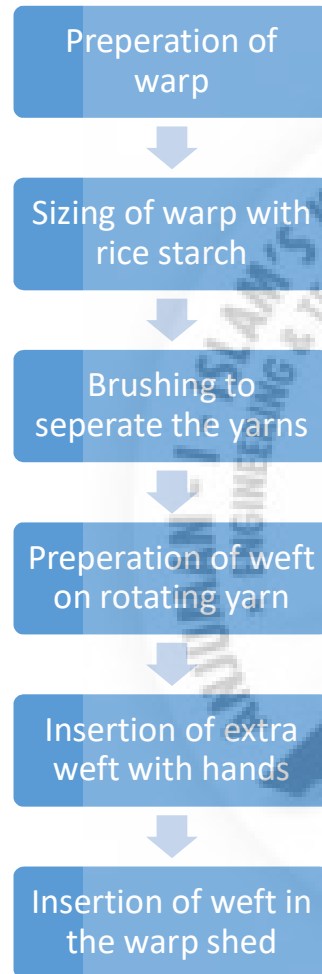


Fig.40 Panika weaving traditions of bastar, Dr. Sudha Dhingra, Sahapedia, 2018.

Fig. 39 Panika weaving process, Kotpad community & environment, Dastakari Haat Samiti, 2017

CHAPTER 4: OVERVIEW OF CURRENT TEXTILE WASTE SEGREGATION.

4.1 QUALITATIVE ANALYSIS

In order to determine the structural analysis of the waste, a number of spectroscopic experiments are conducted on synthetic fibers. The composition and property of fabrics wear and tear is analyzed by passing a controlled wave.

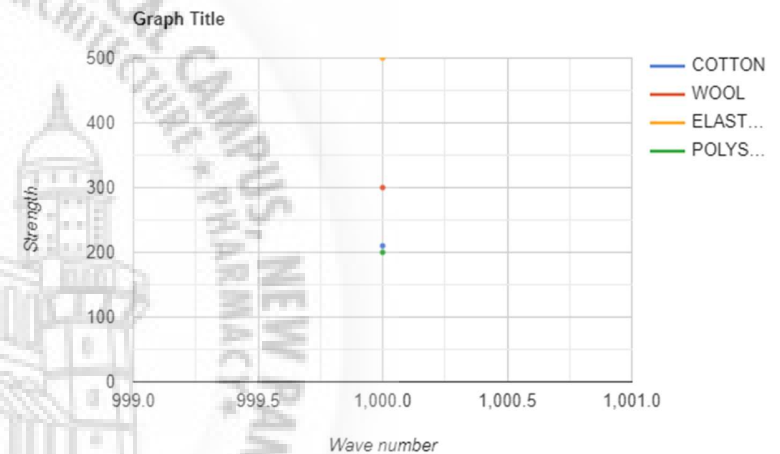


Fig. 41 Qualitative analysis of waste fabric,
Towards Recycling of Textile Fibers, ANNA PETERSON
Department of Chemistry and Chemical Engineering
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2015.

CHAPTER 5: CASE STUDIES

5.1.1 PALLAVADA TECHNICAL TEXTILE PARK

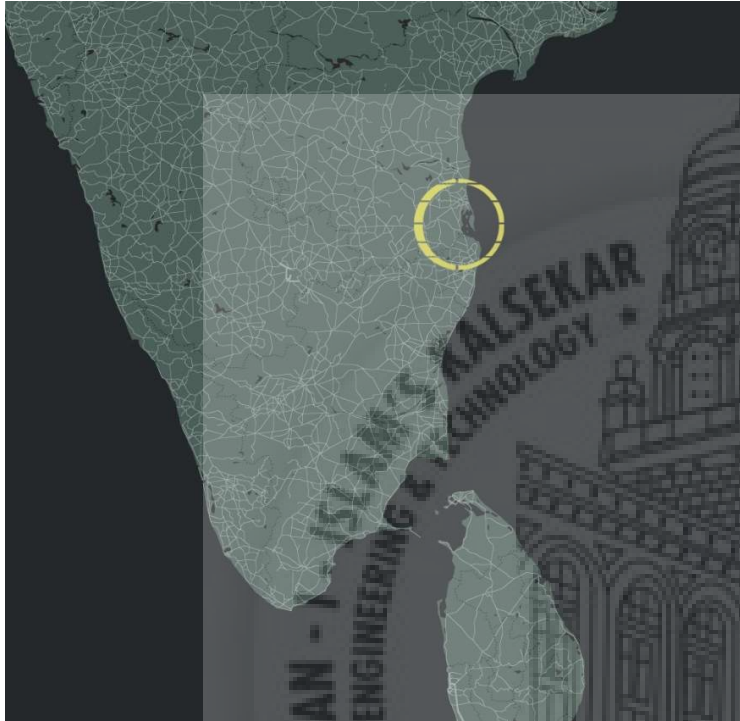


Fig. 42 Map showing location of Pallavada technical textile park, Tamil Nadu.



Fig. 43 Overall textile park layout, <http://apparelpark.co/play.php>.

- OPEN SPACE
- SEMI-OPEN
- CLOSED SPACE
- HARDSCAPE
- SOFTSCAPE
- PRIVATE SPACE
- PUBLIC SPACE
- SERVICES
- WASHROOM
- WORKERS DINNING HALL
- STAIRCASE
- CRECHE
- DOCTOR'S CABIN
- LOADING AND UN-LOADING AREA

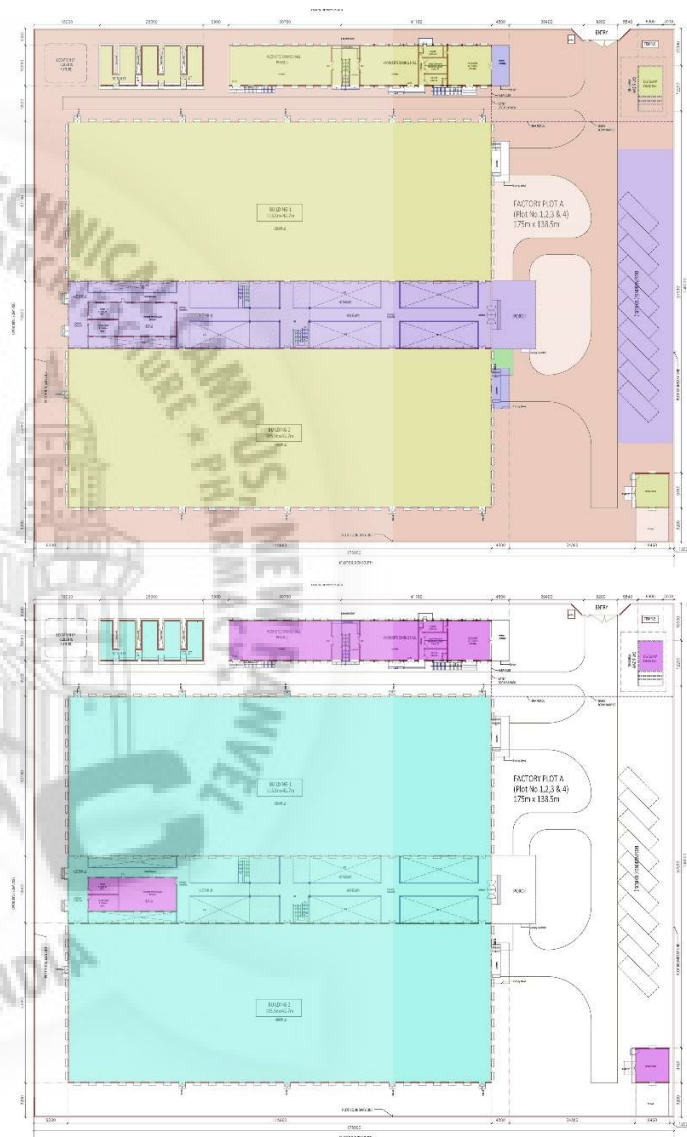


Fig. 44 Overall textile park layout, <http://apparelpark.co/play.php>.

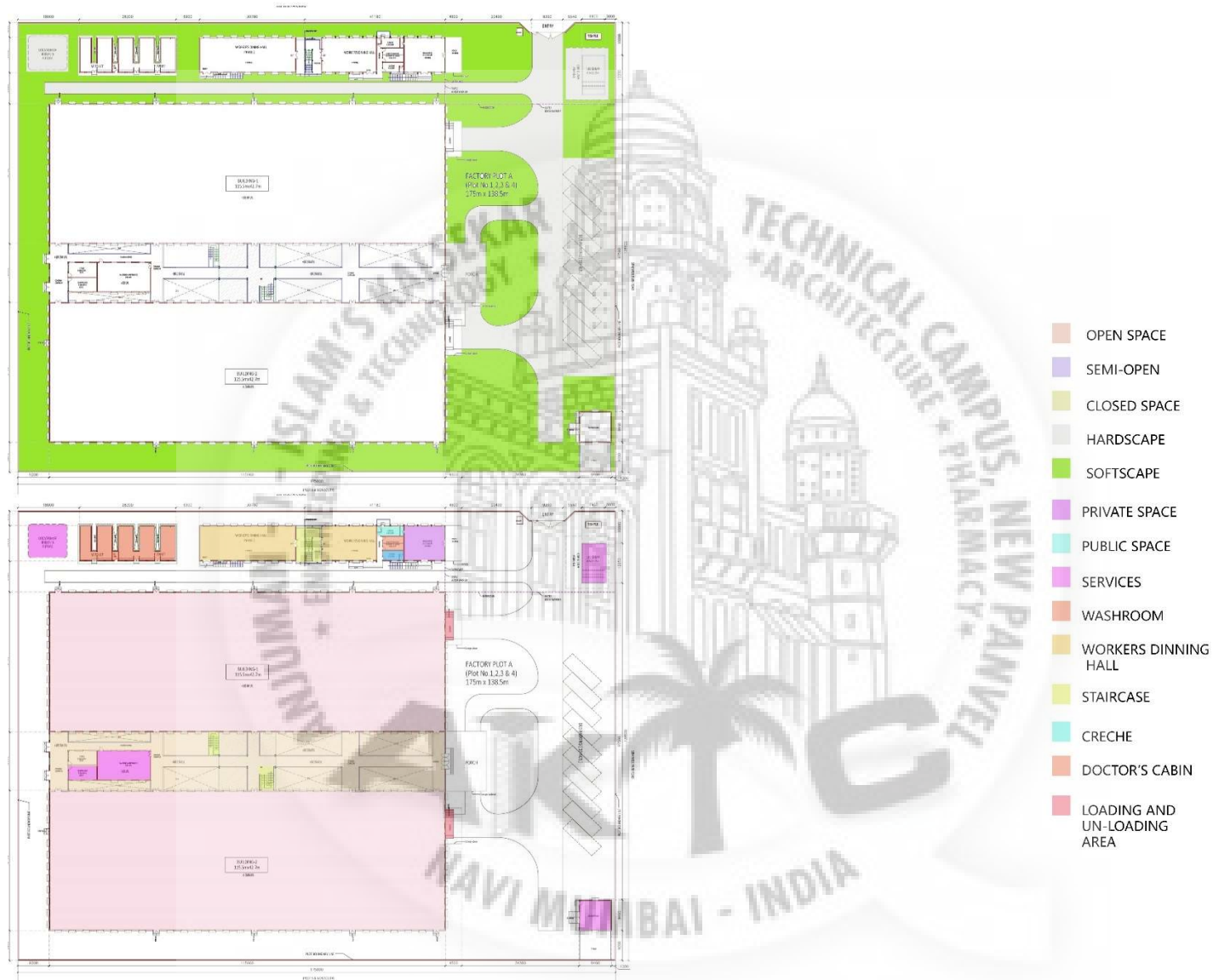


Fig. 45 Overall textile park layout, <http://apparelpark.co/play.php>.

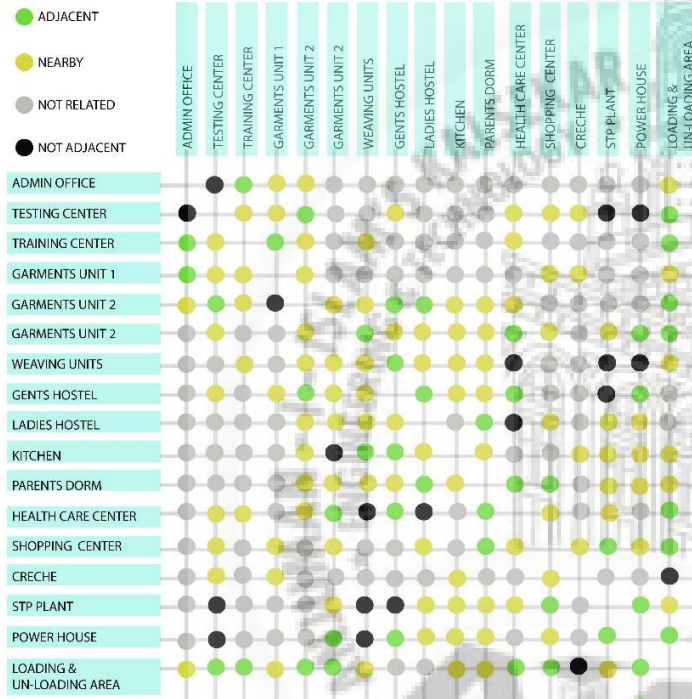


Fig. 46 Proximity analysis of internal spaces.

Source: <http://apparelpark.co/play.php>.



Fig. 47 Proximity analysis of internal spaces.

Source: <http://apparelpark.co/play.php>.



Fig. 48 Road connectivity pattern, Pallavada technical textiles.

Source: <http://apparelpark.co/play.php>.

AIKTC
NAVI MUMBAI - INDIA

Approach road

Vertical communication blocks

Loading & un-loading access.

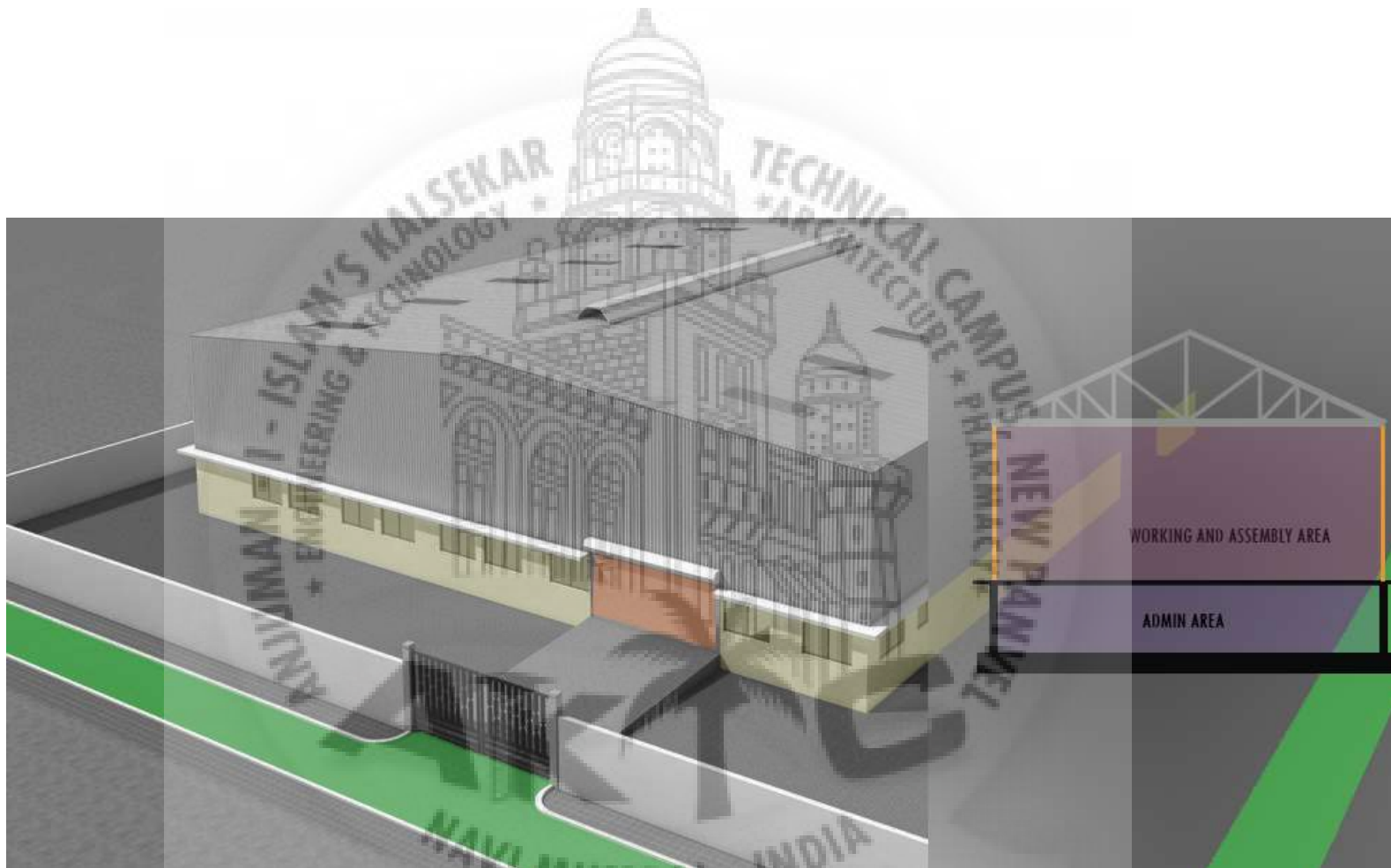


Fig. 49 Typical arrangement of working & assembly area.

Source: <http://apparelpark.co/play.php>.

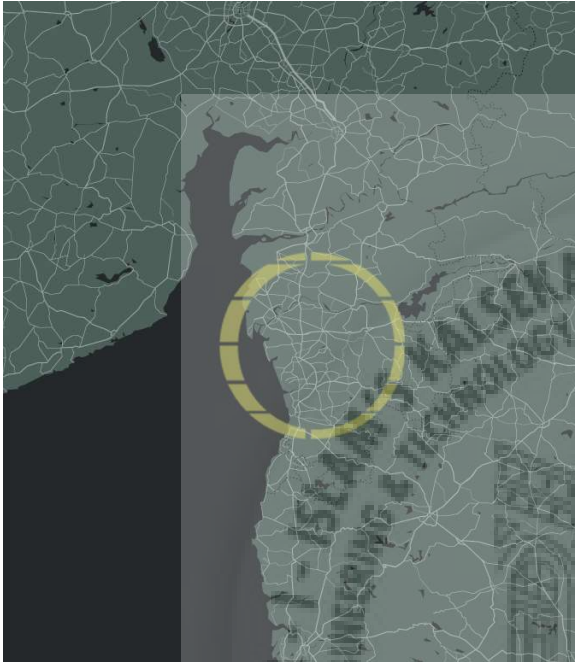


Fig. 50 Map showing location of Baramati hi-tech textile park.



Fig. 51 Overall textile park layout,

Source: <http://www.bhtpl.com/companymember.aspx>

5.1.2 BARAMATI HI-TECH TEXTILE PARK

Baramati hi-tech textile park is a collaboration of 18 broad companies with 5 sector division located in Pune city, Maharashtra.

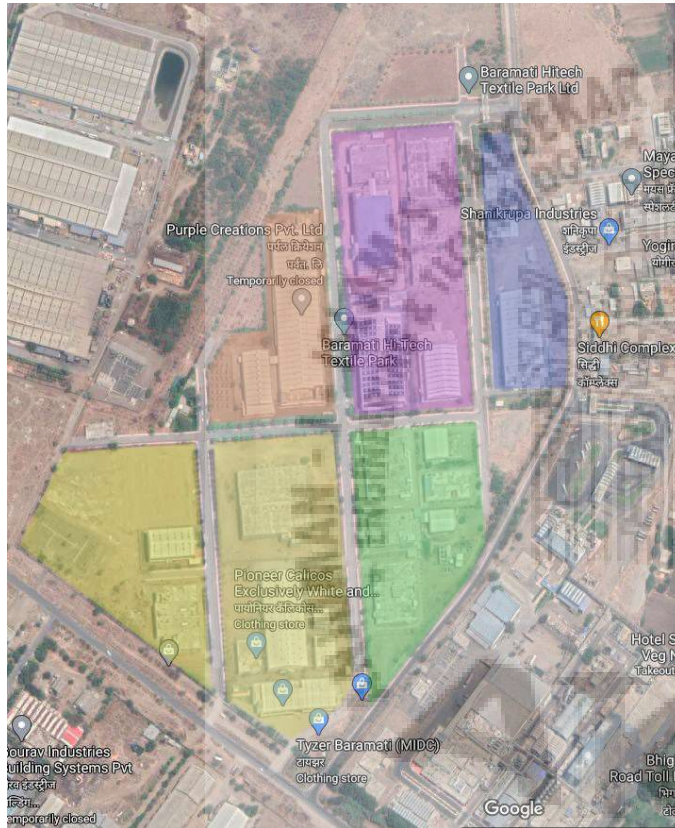


Fig. 52 Map showing 5 major sector division in park.

Source: <http://www.bhtpl.com/companymember.aspx>



Fig. 53 Map showing internal and external accessible roads.

Source: <http://www.bhtpl.com/companymember.aspx>



Baramati Textile Park is divided into 9 companies. The orientation of all the units is towards south west in order to fulfill the proper ventilation, but the difference in all the units is of the building material. The manufacturing units need a long span column free adjustment in order to accommodate 2000 workers. The managing units on the other hand are overall rcc structures. Accordingly internal road pattern is dependent on the location of etp plant. ETP plant is a water purifying unit which was used to treat around 9000L/day. The water which was so treated was used up by the plant itself in washing and laundry purposes. This makes the plant integrated.

Fig. 54 Integrated plan of baramati hi-tech textile park

Source: <http://www.bhtpl.com/companymember.aspx>



Fig. 55 Image showing the arrangement of manufacturing unit..

Source: <http://www.bhtpl.com/companymember.aspx>

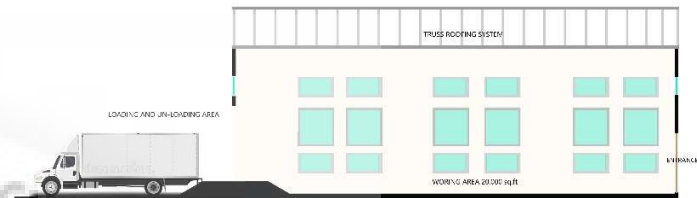


Fig. 56 Section displaying loading and un-loading dock with working area.

Source: Video documentation, Baramati Textile Park.

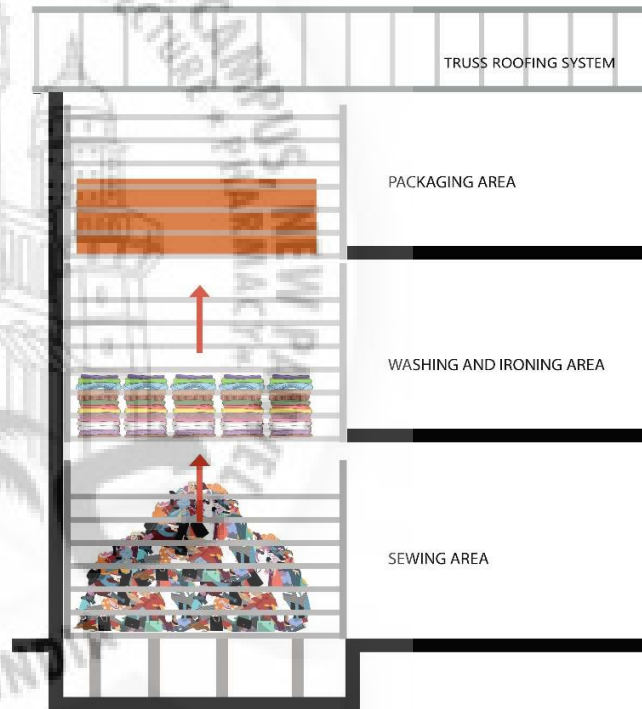


Fig. 57 Section showing the inter-relation between spaces.

Source: Video documentation, Baramati Textile Park.



5.1.3 KOTON EXIM

Koton Exim is a facility where pre-consumer waste yarn is collected and treated mechanically to be functional furthermore.



Fig. 58 Layout of Koton Exim, Gujarat.

Source: <https://kotonexim.com>



Segregation of cotton according to the typology of pre-consumer waste.

Fig. 59 Category of pre-consumer waste

Source : <https://kotonexim.com>

TYPES OF COTTON TEXTILE WASTE		
TYOLOGY	DESCRIPTION	APPLICATIONS
COTTON COMBER NOIL	Cotton Comber or Comber Noil is a by-product of the cotton yarn spinning industry produced when cotton is combed.	Used in making cotton balls, cotton pads and cotton buds O.E spinning Mill Surgical items Cosmetics
COTTON WASTE LICKERING	Lickerin is also a by-product obtained during yarn manufacturing. Being a carding waste product, it is low in cost and fiber.	Open end spinning Towel Yarn Denim Yarn
CLEAN COTTON WASTE	Clean Process Cotton is good raw material used for rotor spinning (OE SPINNING). Being fibre-rich and low cost, it is valuable.	Multiple industrial applications
COTTON WASTE FLAT STRIPS	Cotton flat is a by-product of the yarn spinning industry produced in the first carding machine. The fiber has higher trash.	Used in making cotton balls, cotton pads and cotton buds Used in 10's to 20's counts in O.E Used as cotton substitute
COTTON WASTE DROPPING	Cotton dropping is obtained during yarn manufacturing. Its low cost and less fiber content makes it ideal for spinning low.	Use in open end spinning yarn 7's to 20's counts
COTTON YARN WASTE	Cotton yarn waste is widely used in automotive, car manufacturers, printing, marine, hardware, textile Industry.	Highly water-absorbent, soft and affordable, cotton yarn waste is ideal for making mats, mops, wiping cloth and cloth dolls It is used in Ring spun yarn

Table 2 : Types of cotton textile waste.

Source : <https://kotonexim.com>



Fig. 60 Map showing Statex Industries.

Source : <https://statex.de/en/>

5.2.1 STATEX METALLISED TECHNICAL TEXTILES

Statex Industries is a facility which converts natural and synthetic fiber into smart textiles.

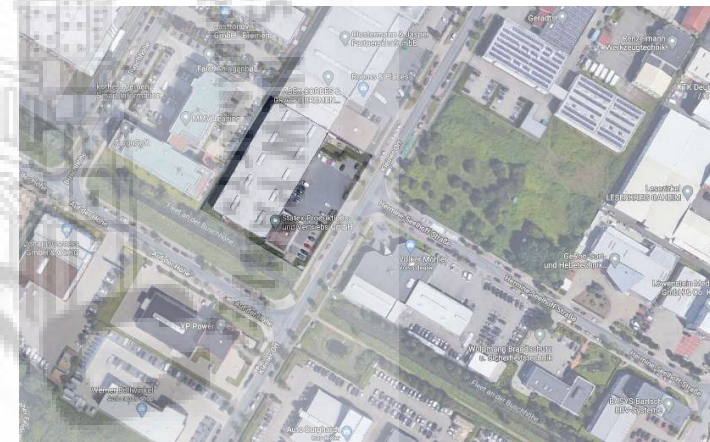


Fig. 61 Map showing Statex Industries.

Source: <https://statex.de/en/>



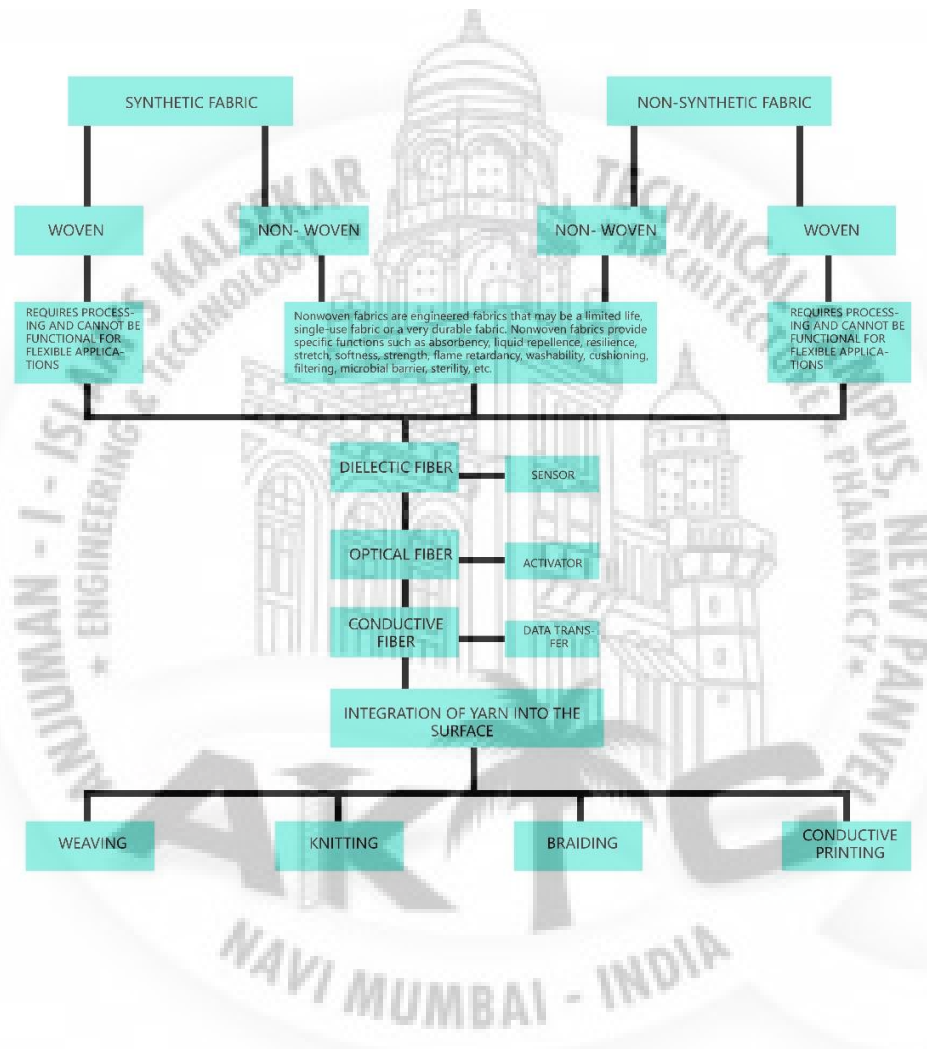


Fig. 62 Process

Source : <https://statex.de/en/>

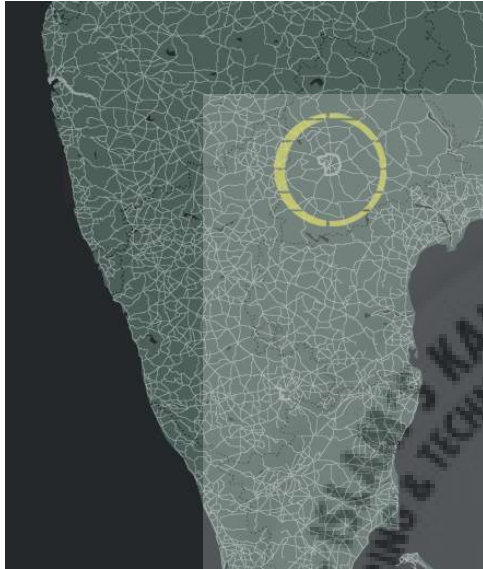
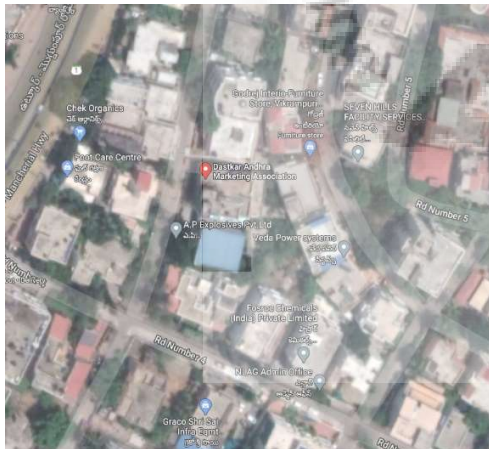


Fig. 63 Map showing location of Dama weaving community, Secunabad

Source: <https://www.dacottonhandlooms.in/a-community-activity>



5.3.1 DAMA WEAVING COMMUNITY

Dama weaving community is the collaboration of different weaving communities and a platform where natural weavers display their fabric art.

YARN THREADS

Yarn threads are tied and treated.

MAKING SPINDLES

Cotton bolls are wound through spindles which are treated that feed the weft threads on a loom.

SPINNING WHEEL

Cotton is wrapped in a banana stem leaf to form a grip with the spinning wheel.

STRETCHING YARN

Stretching of yarn to its full length with bambo rods and thick twine.

Fig. 51. KHADI WEAVING PROCESS, DASTAKHARI HAAT SAMITI,

B.CHANDRASHEKHAR.



Fig. 64. KHADI WEAVING PROCESS, DASTAKHARI HAAT SAMITI,

B.CHANDRASHEKHAR.

WATERING THE YARN

The yarn is watered in order to make it stiff enough to run smoothly while weaving.

DYEING YARN

The yarn is dyed using naturally available colours from plants and vegetables.

WEAVING KHADI

Khaadi is weaved on a handloom which requires purely manpower.

FINISHING

Washing, drying and ironing the fabric to make it

ready for exporting.



Fig. 65. YARN STRETCHING, DASTAKHARI HAAT SAMITI,
B.CHANDRASHEKHAR

MILL SPUN YARN

The yarn used for any fabric in a handloom technique is usually mill spun yarn.

DYEING YARN

Textiles have the flexibility to be dyed rather in yarn stage or finished fabric stage.

NATURAL DYE

Textures and colours available in nature are implemented on the fabric to make it recyclable and sustainable.

BOBBIN WINDING

In order to convert the hank form to linear form yarn is wound on the bobbins.



Fig. 66. HANDLOOM WEAVING PROCESS,
THECOTTONHANDLOOMS.IN.

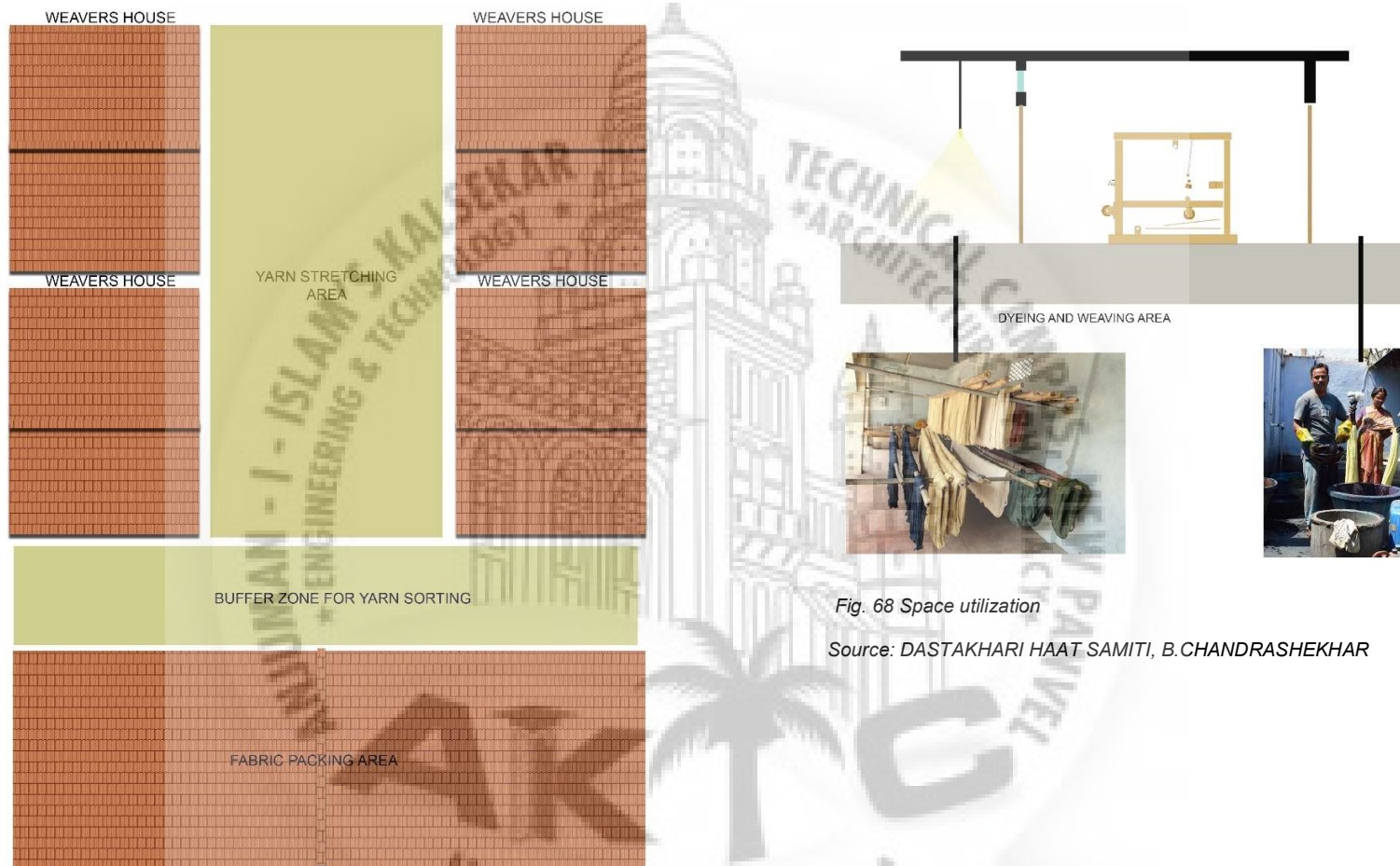


Fig. 67 Arrangement of houses

Source: DASTAKHARI HAAT SAMITI, B.CHANDRASHEKHAR

Fig. 68 Space utilization

Source: DASTAKHARI HAAT SAMITI, B.CHANDRASHEKHAR

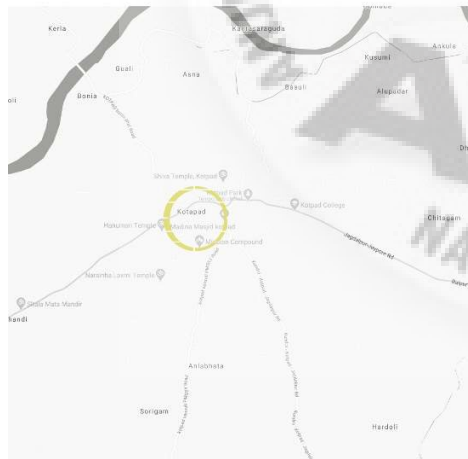


Fig. 69 Map showing location of Kotpad weaving community, Odisha

Source: <http://craftisan.in/craft-kotpad-weaving>

5.3.2 KOTPAD WEAVING COMMUNITY

Kotpad weaving community is a community weaving activity. They are a sub category of Panika weaving community.



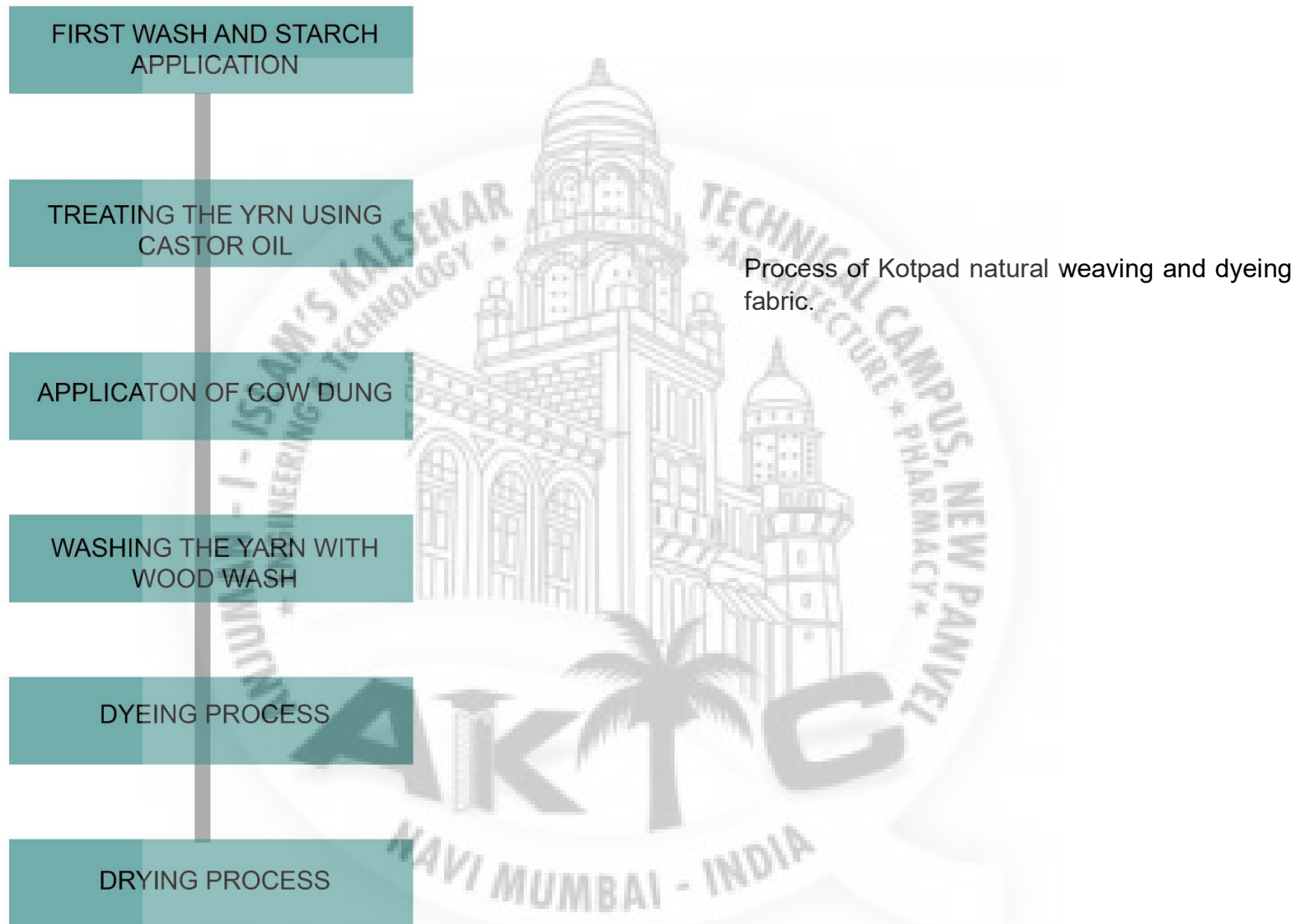


Fig. 70 Chart showing natural Kotpad community weaving process.

Source: <http://craftisan.in/craft-kotpad-weaving>

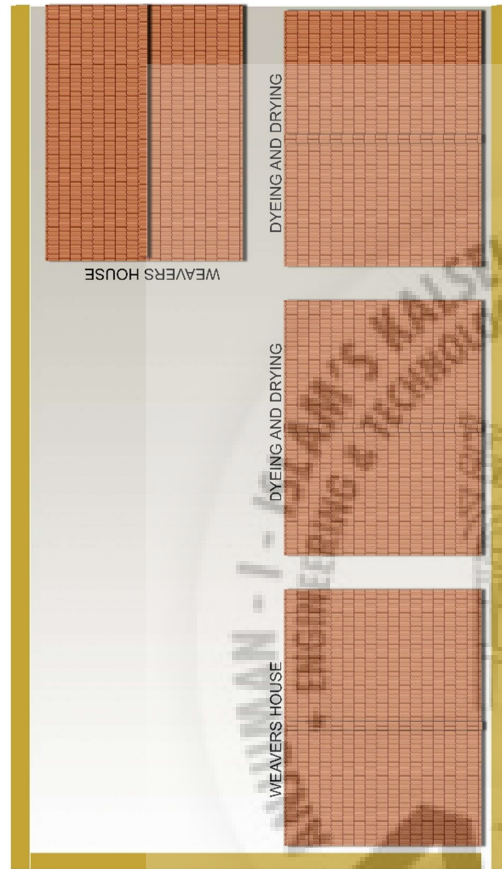


Fig. 71 Arrangement of weavers houses.

Source: <http://craftisan.in/craft-kotpad-weaving>

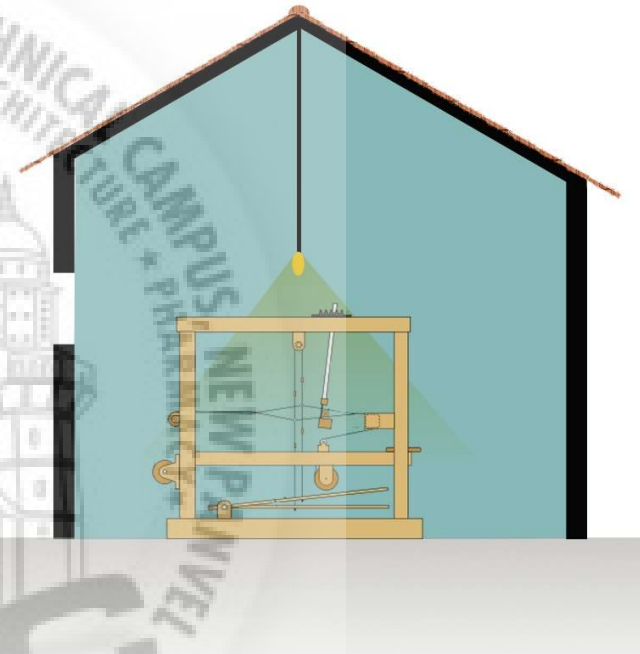


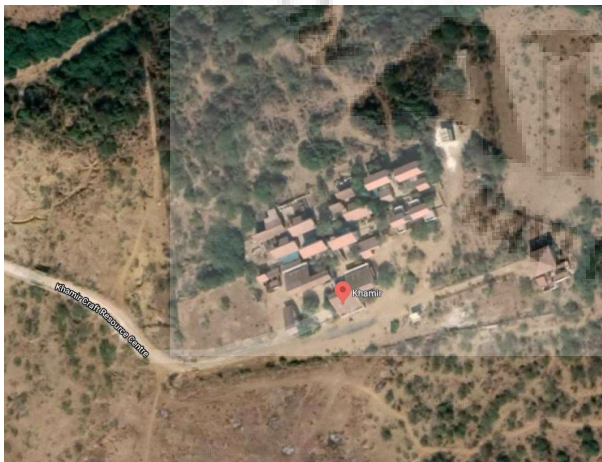
Fig. 72 Ventilation pattern of weaver's house.

Source: <http://craftisan.in/craft-kotpad-weaving>



Fig. 73 Map showing location of Khamir weaving community, Gujarat.

Source: <https://khamir.org/crafts/kachchh-weaving>



5.3.3 KHAMIR WEAVING COMMUNITY

Khamir weavers are today 9th generation weavers which has given the society block printed natural fabric products

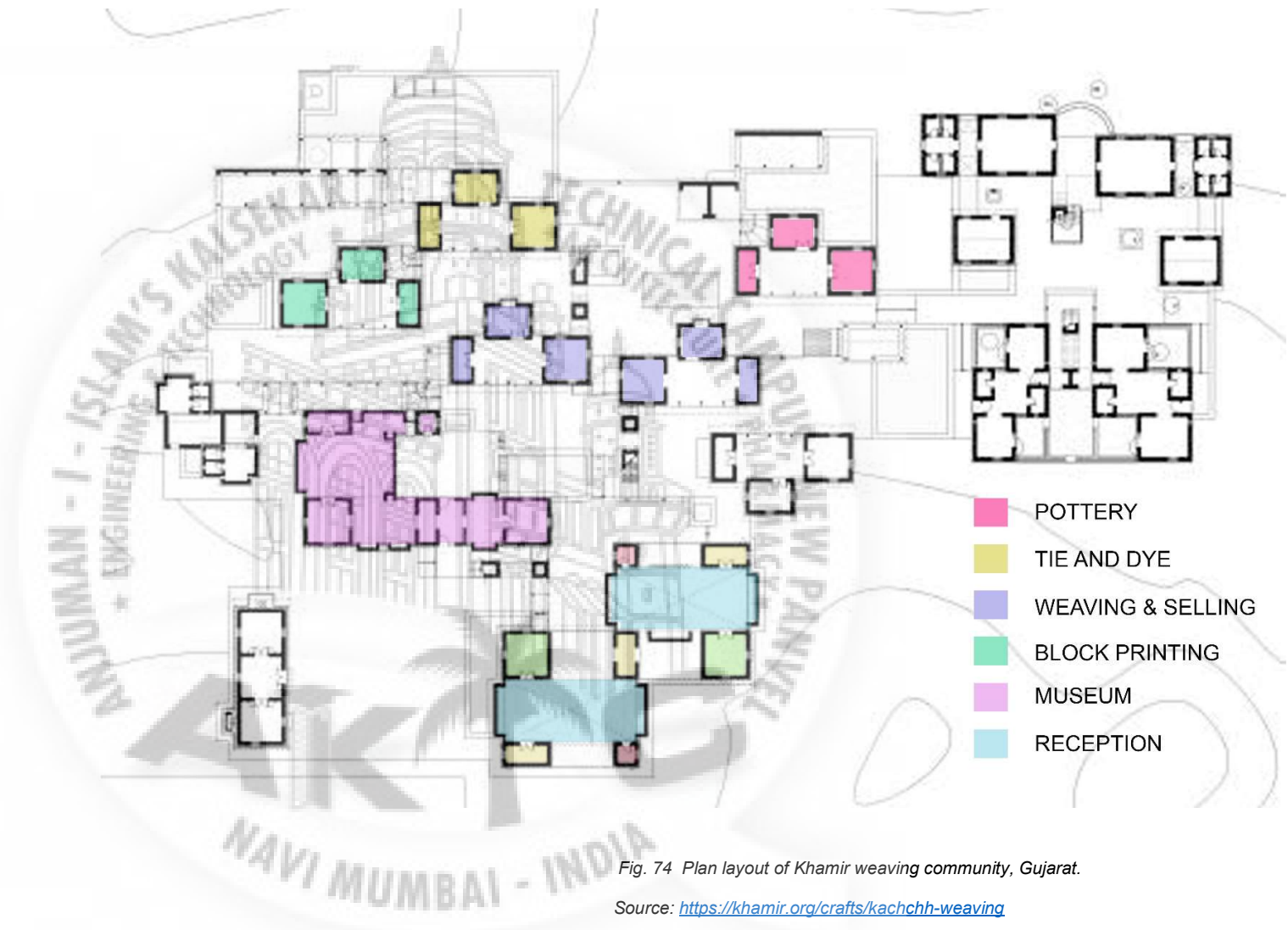




Fig. 75 Inter-connectivity between units of Khamir weaving community, Gujarat. Source: <https://khamir.org/crafts/kachchh-weaving>

The arrangement of khamir community has been segregated with respect to showcasing the storage and manufacturing units and then the respective residential dwellings.



Fig. 76 Emphasizing vertical communication of Khamir weaving community, Gujarat. Source: <https://khamir.org/crafts/kachchh-weaving>

Other than emphasizing, vertical staircase is designed in the open so as to establish a monitoring element for the entire structure.



SITE ANALYSIS

SITE 1 : PANIPAT, HARYANA

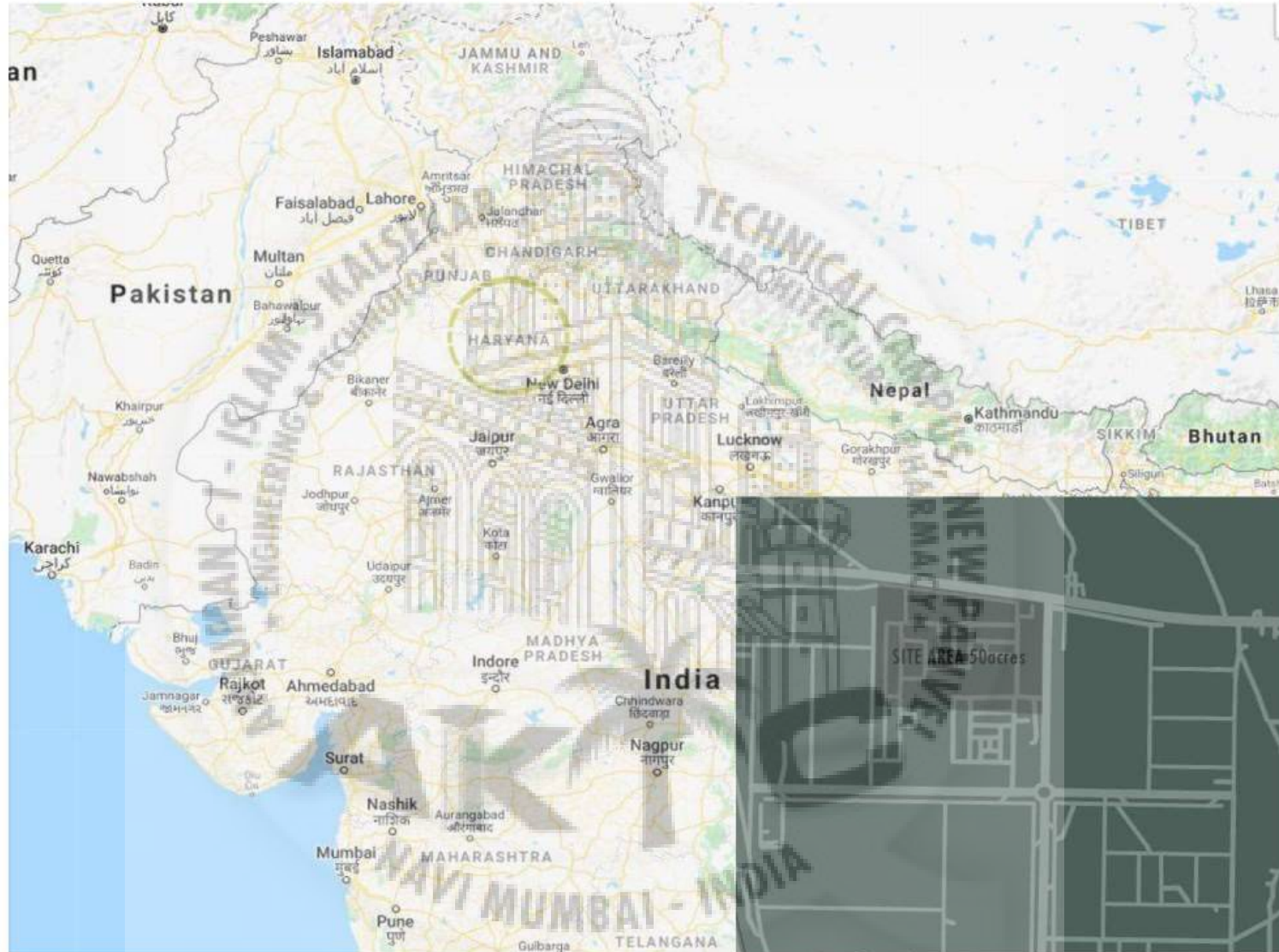


Fig. 77 Location of site, Panipat.

Source: Google earth.



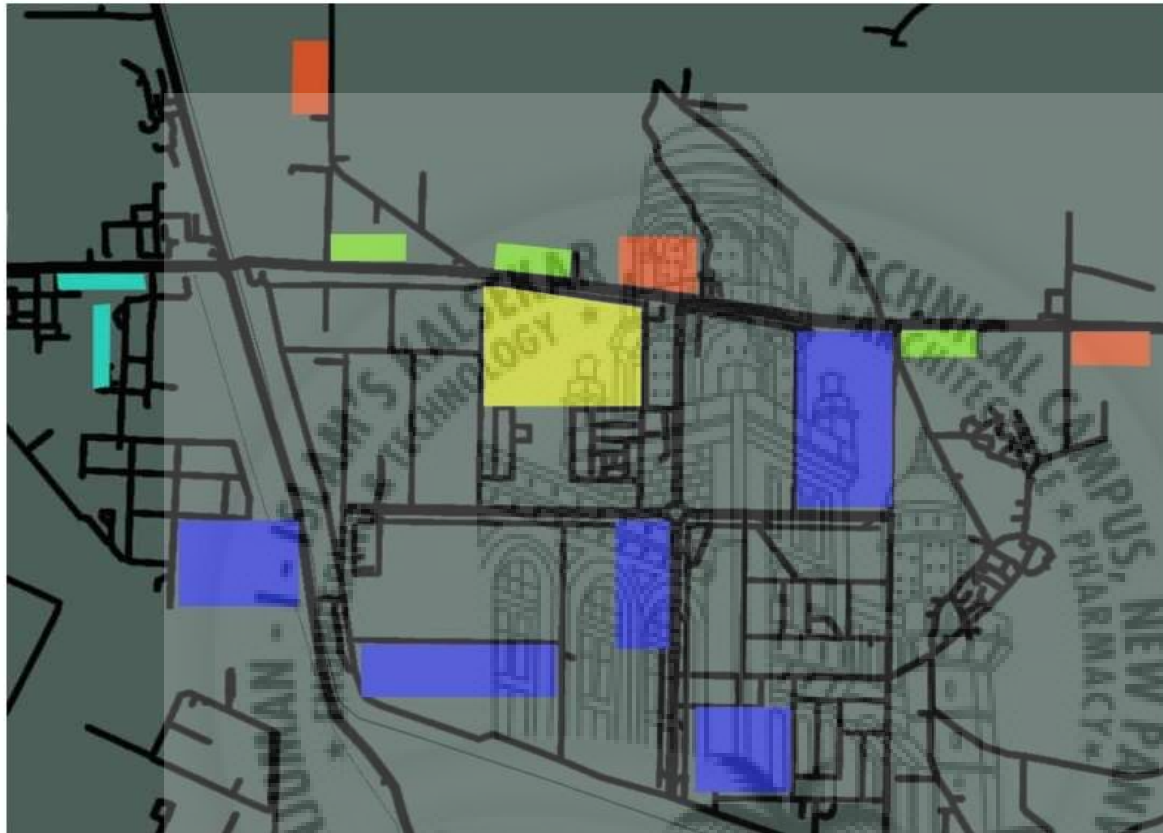
Fig.79 Surrounding land-use.

Source:
https://tcpharyana.gov.in/Development_Plan/ColouredCopy/Panipat_FD_P_2021.pdf



Fig.80 Neighborhood context

Source:
https://tcpharyana.gov.in/Development_Plan/ColouredCopy/Panipat_FD_P_2021.pdf






- SITE 
- PETROL PUMP 
- HOTELS 
- INDUSTRIES 

Fig.81 Neighborhood context

Source:
https://tcpharyana.gov.in/Development_Plan/ColouredCopy/Panipat_FD_P_2021.pdf

