

INTRODUCTION TO THESIS

AIM

Research journey of glass industry from craft to industrial heritage.

OBJECTIVE

- To study the historic evolution of glass industry in India and Firozabad.
- To document craft of glass making and its various products.
- To identify traditional knowledge behind glass making.
- To study the interrelationship between craft, community and industries.
- Understanding the paradigm shift from craft to industries.

SCOPE

The scope of the thesis is to study the Traditional knowledge system of making various glass products in Firozabad in the present context. Understanding the network and requirements of glass industry. Study of the community, process and spaces related to glass craft.

LIMITATIONS

- The thesis will be limited to recommendatory framework no proposals will be suggested.
- There is no much literature material about craft and history of Firozabad.

NEED OF THESIS

Firozabad glass work was a house hold work initially, the first industry setup happened in 1910 before that the glass work was done in houses and time unremembered. The skill and efforts of the labors had been passed to generation to generations. The detail study of interrelation between craft and industry is required to understand the future of glass making in Firozabad.

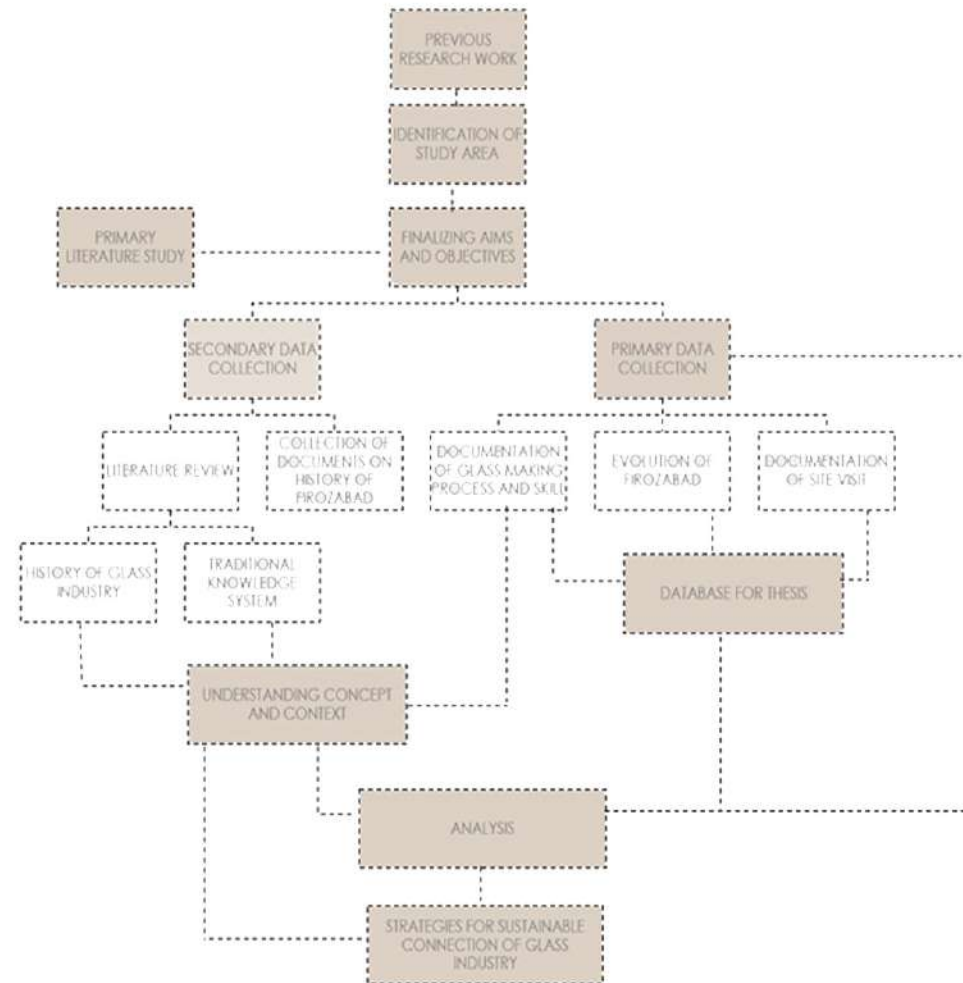
THEORETICAL FRAMEWORK/APPROACH

- To study traditional glass making skill of Firozabad by various site studies.
- To study the historical evolution of glass in global, India and Firozabad timeline.
- Evolution of craft into full-fledged industry, which is a major economic asset to the city.

EXPECTED OUTCOME

- Documentation of networks and connections of glass cluster via site study.
- Significance of glass industry in Firozabad as industrial heritage.
- Recommendatory framework of sustainable development of glass cluster of Firozabad.

METHODOLOGY



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INTRODUCTION TO SITE



27°12'30"N 78°27'30"E
Base map

Firozabad is Uttar Pradesh's district headquarters. Firozabad district was established on 5 Feb 1989. The industry of creating glass bangles is well-known in the city. The towns of Shikohabad and Tundla are located in the Firozabad district. Tundla is situated to the west and east of the city is Shikohabad. It shares a boundary with four districts Etah, Mainpuri, Etawah and Agra. Etah district in the north and Mainpuri and Etawah in the East. Glass bangles are the primary business in the area. The river Yamuna is in the southern direction of the district. The space of the locale is about 0.8% of the all-out space of U.P. Furthermore, the population is 1.1% of the all-out populace of U.P. Around 73.6% population is living in a rural territory. It has extreme winter and summer seasons. For the most part, an area is a plane and its slope is from northwest to south. National Highway 2 passes through the city. The city is well connected with railway and bus services. Its proximity with Agra helps to flourish glass business among tourists.

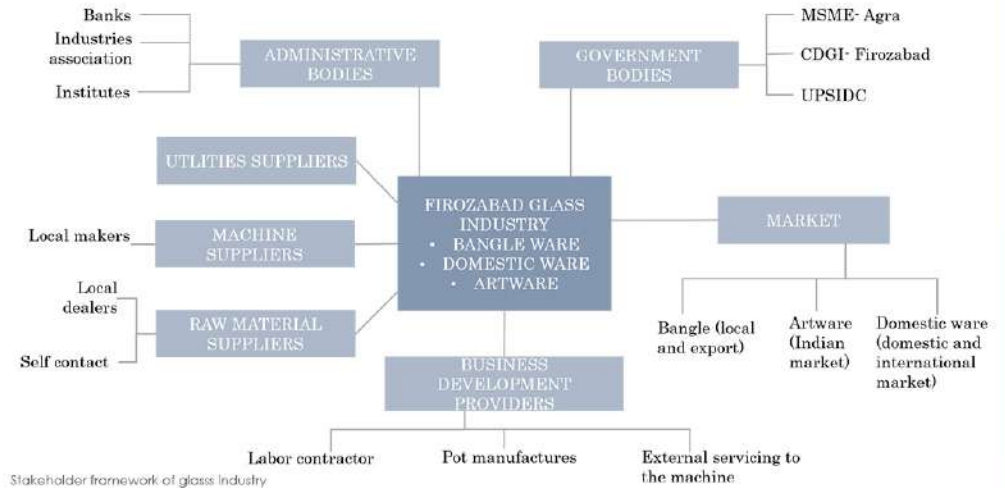


DEMOGRAPHICS



INTRODUCTION TO GLASS INDUSTRY

Firozabad city is also called the Glass City of India or the city of bangles. The city produces a multi-range of glass items and related items on shifted plans and styles to enhance the domestic and decoration collection. The city is one of the driving producers and exporters of glass; about 50% of the glass production is exported. The glass manufacturing business comprises major businesses, little scale businesses and Gail units. Different glass items manufactured by these industries were bangles, kada, kangans, containers, glasses, candle stands, bloom vases, decorative lights and numerous more. Glass craftsmanship products and glass household products are the sorts of glass items fabricated in Firozabad glass businesses. The show businesses utilize natural gas as fuel. The glass blowing is done through a pot heater and glass displaying is done through a regenerative tank heater.



Stakeholder framework of glass industry

FESTIVALS AND SOCIAL GATHERING

A variety of religions can be seen in the city. Religions like Hindu, Muslim, Jain, Arya, Christian, Sikh and Parsi. The population of Parsi's is almost extinct so is that of Christian. The majority of the people are from the Hindu, Muslim and Jain communities. Main social gathering events in the city are Moharam, Ramleela, Dushera, Holi, Mahadev, Ram Navami, Sawan mela, Jain mela, Diwali mela, Sufi ka mela. All these events are celebrated over the year. These events are mainly religion based but it had been witnessed that everyone despite any religion or community participates in every event with utmost respect and enthusiasm.



Ramleela mela, Jain mela, Moharam celebration

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PHYSICAL FEATURES

LOCATION



Firozabad location

Source: <https://i.imgur.com/6booh-pah-download.com/wr-oc>
<https://www.india.com/2002/07/Bank-Political-Map-of-India-gif.html>
[www713802c837a3d1](https://www.india.com/2002/07/Bank-Political-Map-of-India-gif.html)



Firozabad boundary

Source: Google earth

Firozabad lies on the south west end of Uttar Pradesh at 27 ° and 27 ° 24' (north) latitude and 77 ° 40' and 90 ° 4' (East) longitude. To the north lies the district Etah, in the east lies Etawah and Mainpuri. In the south there is river Yamuna and boundaries of Agra district and in the west it touches the boundaries of Agra district. It covers an area of 2407.0 Sq.km

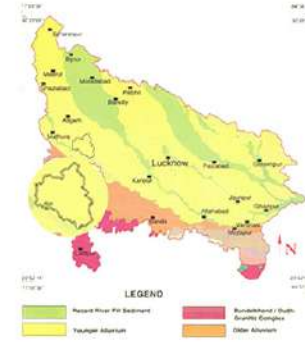
Source: District census handbook



Firozabad topsheet 2011

Source: Survey of India

GEOLOGY

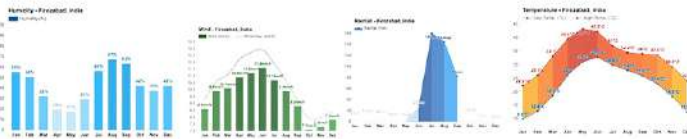


Source: DNVP Centre: Uttar Pradesh Status of Environment and Related Issues

The area has alluvial soil giving rise to agriculture in the region. Soils of Firozabad are typical of those in the upper Gangetic alluvial plain. The diversity is mainly Porosity and texture of alluvial soil provide good drainage and other conditions favorable for agriculture. Due to the influence of various drainage, canals and partially due to the presence of Yamuna river. Alluvial soils remove sediments and nutrients flowing in the adjacent water. They can also remove other contaminants from rivers and improve water quality for downstream communities

Source: District census handbook

CLIMATE

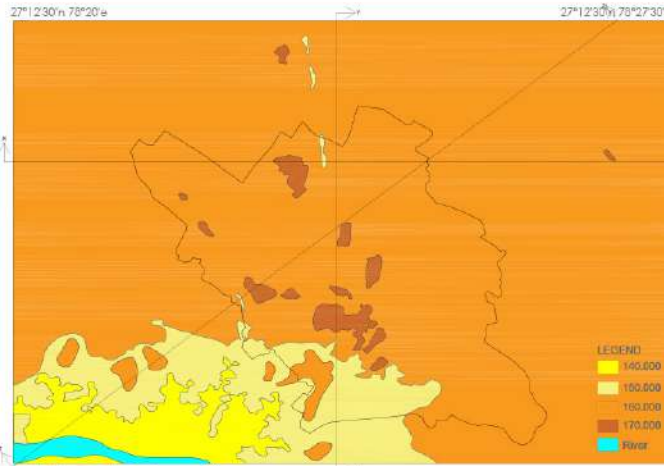


Source: Weather atlas

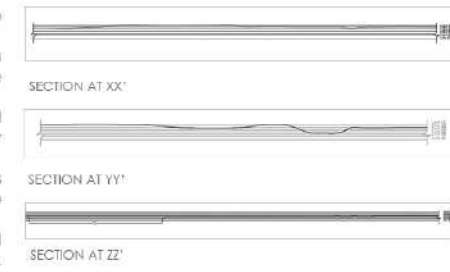
Maximum humidity recorded in the region is 67%. High humidity results in verandha planning of the residences. Highest wind rate which is 11.6km/hr. results in courtyard planning for better ventilations. In many residences these courtyards acts as working space for whole family. Maximum rainfall is recorded in month of July which is 160mm. Due to not proper drainage in the area in rainy season water clog is the major issue. The main sources of irrigation are government and private small irrigation system. Maximum recorded temperature of the city is 43.3°C in the month of June. The artisans find it really difficult to work in this weather as the use of fire is involved in every stage.

Source: District census handbook

CONTOUR MAP



LEGEND
 100,000
 100,000
 100,000
 170,000
 River



CONTOUR ANALYSIS
 Contour range from 140 to 170m. The major difference in the contour is visible near the river bank area. The majority of the area is flat land making it feasible for built structures. Flat land shows that contours had been altered as per the demand of the land. Drainage is according to slope of terrain, the course being North- West to South-East.

WATERSHED MAP



WATERSHED MAP

Source: BHUVAN

WATERSHED MAP ANALYSIS
 There are total of 18 watersheds. The flow of the water is towards the river Yamuna as studied through contours of the area. Majority of the area is flat land which lead to accumulation of rain water in certain areas within the city due to lack of slope. Well irrigated by the river Yamuna and its tributaries.



COMMUNITY

ROLE OF COMMUNITY

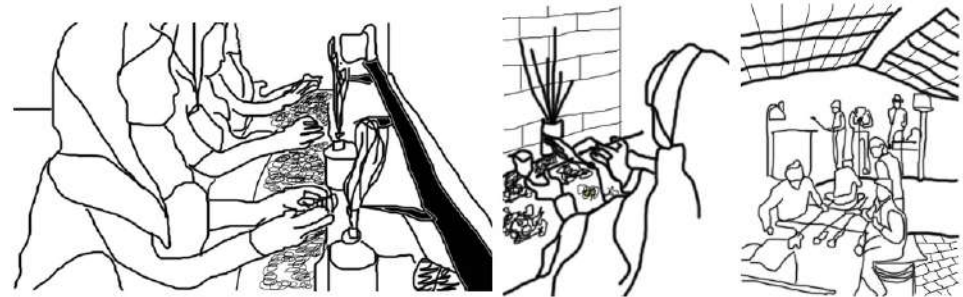
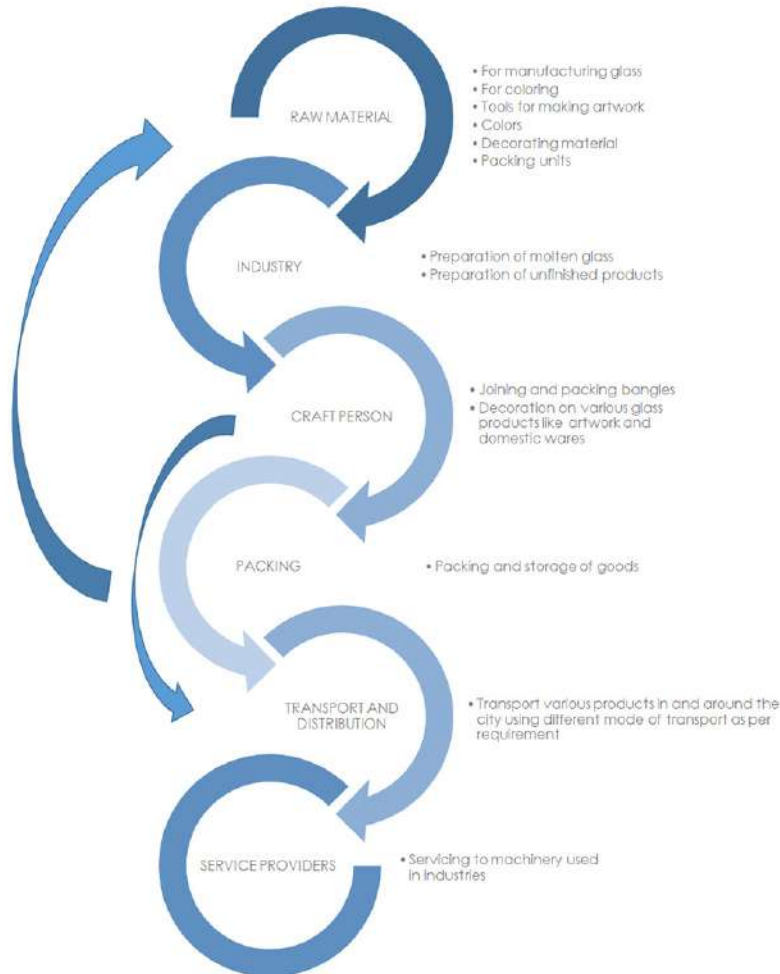
Firozabad's glassworkers explain how their collective subjectivity, their craft consciousness has been shaped by their link to the glass, to the tool of production and its evolution, and by the city's social and political context. In the factories, the workforce is normally monitored and recruited according to the thekedari system: skilled and trusted workers are given the possibility to recruit their teams among their relatives, from the city's labour market, or from the surrounding villages. There are almost no managers who have got a formal degree, especially in the bangles industry; and in the bigger automated factories, only a few engineers. It is the skilled workers, often from the Sheeshgarh community, who also do the jobs of overseer and supervisor to check the production, even invent new chemical batches, or of the specialists who design bangles and glass samples. Except for the very few engineers and managers who work in the big companies, the merchants, and of course the industrialists, almost all the inhabitants of Firozabad belong in some way to the glass working classes. Their social position within Firozabad's working classes is determined by their level of skills.

To learn, a worker needs to be linked to a 'master' (Ustad) with whom he will develop an unequal relationship of patronage, which is typical of the skilled segments in India's informal working sector. That ustad can be someone from the field or from the family.

The identities at work can be either linked to a common confrontation of the working conditions, to the belonging to a company, or to the belonging to a corpse possessing a certain craft.

Their *mohallah* (locality) is full of small glass-sculptors' workshops, and a strong solidarity can be noticed between workshop owners and those who can't afford to buy a gas-driven burner machine and thus must pay other craftsmen's sheds to work their glass, for the cost of gas and raw material. Therefore, many of these sheds used to work night and day almost every day. Women are employed in home based craft setups.

The community of practices becomes a tool of solidarity, of mobilization and defense of the collective interest around the way of life and the business implied by the craft.



Women working in home-based setups

A basic industrial setup

Hierarchy of workers working in bangle making sector	
Gundivala	One who takes molten glass out of pot furnace
Bhattivala	Who color the molten glass for bangles
Sikaia	One who reheat the molted glass
Pattivala	Who takes care of the reheating oven
Tarvala	Who draw glass wire from molten glass
Tora vala	Who cut and pack bangles and process is called chaklai
Judaiya	Who join bangles over burners
Zarivala	Person in charge for decoration of the bangles

Hierarchy of workers working in bangle making sector

Common terminologies in glass manufacturing industry	
Fire man	One who takes care of furnace 24/7. It require 2 people
Blowing wala	Person who takes molten glass and gives shape by blowing
Chatiya	One who remove all the irregularities from the semi finished product
Blowing Adda	Area where process of blowing is done
Adde vala	Manager of decoration firms
Putaiya	One who color the products
Khilone vala	One who make art works

Common terminologies in glass manufacturing industry

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Hierarchy of work in glass cluster

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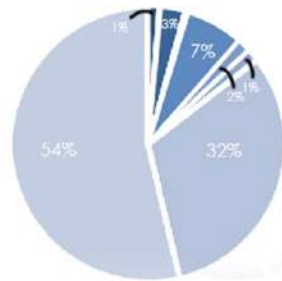


SOCIO-ECONOMIC

District Firozabad ranks 38th in terms of population in the state. The percentage share of urban population in the district is 33.4 percent as against 22.3 percent of the population in urban areas of the state. Firozabad district has population density of 1,038 persons per sq.km. which is more than the state average of 829 persons per sq. km. Firozabad district ranks 18th in literacy with 71.9 percent which is higher than the state average of 67.7 percent. There are 414,266 households in the district accounting for 1.2 percent of the total households in the state. The average size of households in the district is 6.0 persons.

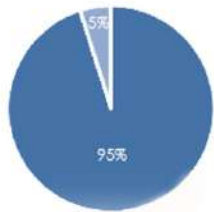
Firozabad have 2 auditorium/community halls for social gatherings. There are 25 nationalized banks, 4 private commercial, 2 co-operative and 2 number of agricultural credit societies.

NUMBER OF UNITS



- AGRO BASED
- WOOD/WOODEN BASED FURNITURE
- LEATHER BASED
- RUBBER, PLASTIC AND PETRO BASED
- METAL BASED (STEEL)
- ELECTRICAL MACHINERY AND TRANSPORT EQUIPMENTS
- GLASS AND GLASSWARE
- READYMADE GARMENTS AND EMBROIDERY
- PAPER AND PAER PRODUCTS
- CHEMICAL/CHEMICAL BASED
- MINERAL BASED
- ENGINEERING UNITS
- REPAIRING AND SERVICING
- MISC.

EMPLOYMENT STATUS

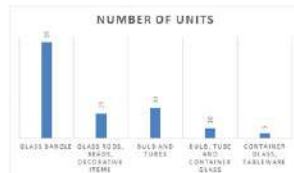


* ESTIMATED AVG. NUMBER OF DAILY WORKERS EMPLOYED IN SMALL SCALE INDUSTRY
 * EMPLOYMENT IN LARGE AND MEDIUM INDUSTRIES

Furnace type	Registered Units	Production (tonnes)	Value (crore)
POT FURNACE	240	75000	150
TANK FURNACE	36	75000	120

Production and value statistics by UNIDO

70 per cent of the total glass production in the unorganised sector in India is contributed by Firozabad glass industry, which is India's biggest glass cluster (as per reports by ASSOHAM)



More workers are employed in small scale industry rather than large industries. From various employment areas maximum are employed in bangle industry and related works.

RAW MATERIAL

Glass manufacturing units at Firozabad procure raw materials such as silica sand, soda ash, calcium carbonate and other chemicals and pigments from local dealers and wholesalers. Soda ash is primarily sourced from Gujrat and Silica sand from Rajasthan. Few huge containers and silverware units to get raw material straightforwardly from the primary provider

Raw materials required are:
 Broken Glass (Collect from local traders)
 Soda Ash
 Silica
 Calcium

The dye used for molding has been imported from Gujrat (Rajkot) and, Uttar Pradesh (Allgarh) where it is manufactured in CNC (computer numerical control) machines.

INDUSTRY

Firozabad is the central hub for many glass manufacturing industries and is one of the leading manufacturers and exporters of glass products. 70% of the total glass production in the unorganized sector in India is contributed by Firozabad glass industry.

It is estimated that Firozabad has close to 4000-5000 manufacturing and household units that generate employment for more than 5,00,000 people. The glass industrial units in the region are spread across different areas and can be broadly divided into 3 major categories which are household type, pot furnace type and tank furnace type of units.



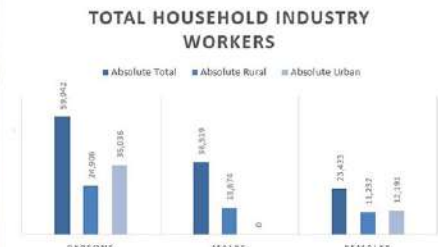
Tank furnace
 Source: Firozabad Glass Cluster Diagnostic Study Report



Pot furnace
 Source: Firozabad Glass Cluster Diagnostic Study Report



Household type
 Source: Inflation times



Statistics for household workers
 Source: alishah census report 2011

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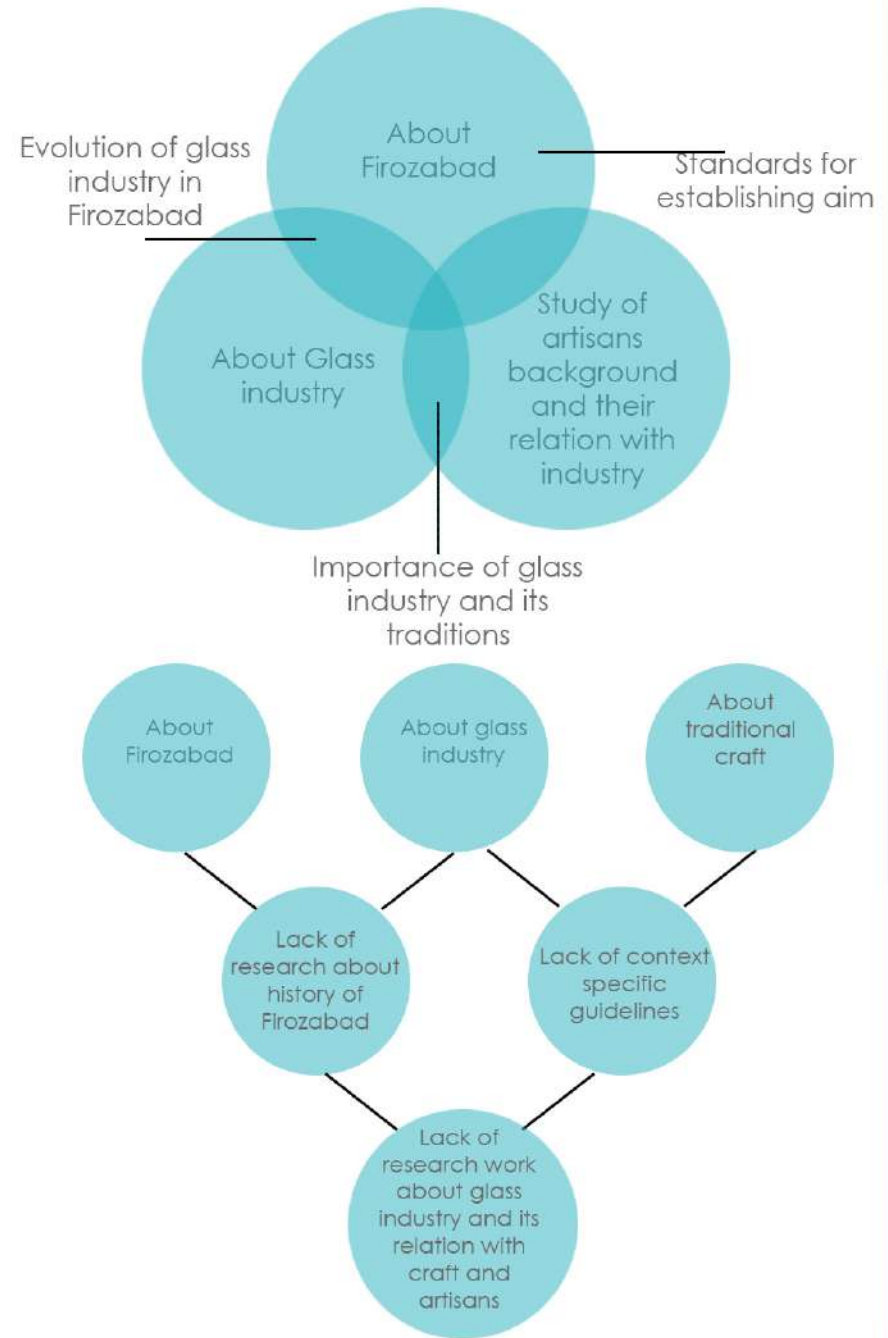
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LITERATURE REVIEW

YEAR	NAME	AUTHOR	TYPE	THEME
1966	Firozabad ka pracheen itihās	Ratan Lal Bansal	Book	Detailed (assumed) history of firozabad
1980	The technique of glass making in India	Mamata Chaudhuri	PDF	History of glass making in India
1980	Prospects and problems of glass industry in India	Sharma Kailash Kumar	PDF	economical aspect of glass industry
2001	Urban history of firozabad	Anil Yadav	PHD thesis	Gave insight about industrial background of the city
2009	Intangible Cultural Heritage and Intellectual Property: Communities, Cultural Diversity and Sustainable Development	Toshiyuki Kono	Book	About ICH and its operational guidelines
2011	District census handbook 2011	Directorate of census operation	PDF and book	Details about demographics and socio-economic data
2012	Product development program for export on glass at Firozabad	Santosh Shah	PDF	Document on glass industry of Firozabad
2014	Industrial Relations in the Glass Industry of U P	Garg, Rahul	PDF	Industrial relations with employees and modernisation
2017	the socio-economic plight of artisans in the bangle industry - a comparative study of north india firozabad (glass bangle) and south india hyderabad (lac bangle)	Gunjan Sharma	PDF	To study and compare the socio economic existence of artisans in both the industries
2018	Glass apart: the story of 200 year old Firozabad's glass industry	Anushruti Singh	Article	Glass industry of Firozabad and its working conditions
2018	traditional method of attar	Chandra Prabha	Thesis	Thesis on similar topic
2019	industrial heritage of central india	AJINKYA AVINASH VEKHANDE	Thesis	Thesis on similar topic
2020	UNESCO Creative Cities Network for sustainable developmen	UNESCO	PDF	Defines and explains UNESCO creative city network
2020	List of glass blowing tools	Working the flame	Article	Complete List of Glass Blowing Tools, Supplies & Their Uses
2022	Government of uttar pradesh	District administration	District website	About the city
2016	FIELD VISIT REPORT ON BANGLE FACTORY, FIROZABAD, UTTAR PRADESH, INDIA	Teri university	PDF	About bangle industry of Firozabad
2015	Cluster Profile Firozabad glass industries	TERI supported by the Swiss Agency for Development and Cooperation (SDC)	PDF	Overview on glass cluster of Firozabad
2010	Glass Work of Firozabad	Sakshi Gambhir	Available in Dsource	Document on process of making different glasswares
2012	Assessing the Impact of Local Socio-Cultural Milieu on Social Upgrading and Challenges to Inclusive Development of Glassware Cluster Firozabad	Nasiruddin	Research paper	Gve insight on social culture of glass industry of firozabad
2021	OF GLASS, SKILLS AND LIFE: CRAFT CONSCIOUSNESS AMONG FIROZABAD'S GLASSWORKERS	Arnaud Kaba in collaboration with Shankare Gowda	PDF	About work culture and skill of glass industry
2003	Story of Glass in India & the World	Pankaj Goyal	Online article	About the history of glass in India and world

The craft work of the city has not received much attention in literature. When it comes to glass industry the global description of bangle production process, child labor, pollution and health hazards had been talked about. Nothing underpin the story of a craftsmen and artisans, and how Industries and artisans are interdependent on each other.



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HISTORY

HISTORY OF GLASS IN INDIA



Historic sites marked

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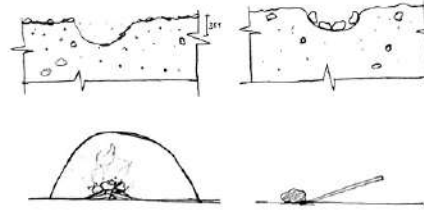


HISTORY

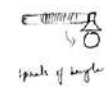
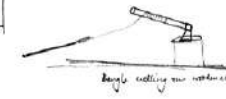
HISTORY OF GLASS IN FIROZABAD

BEFORE 16TH CENTURY

- GLASS WAS MADE FROM LOCALLY AVAILABLE SAND CALLED REH
- MAJOR PRODUCT WAS BANGLE
- BEFORE THE NAME OF FIROZABAD IT WAS THE COMBINED LAND OF 7 VILLAGES WHICH WERE: RASOOLPUR, MOHAMMAD GAZAMALPUR, SUKHMALPUR, DATAJI, AKHBARABAD, PEMPUR AND JAHANPUR



Technique of making glass



Technique of making bangles

16-17TH CENTURY

- VARIOUS GLASS ITEMS LIKE JARS, CHANDELIERS, PERFUME BOTTLE WERE MANUFACTURED FOR ROYAL COURT
- FIROZABAD GOT ITS NAME FROM AKBAR'S MANSABDAR FIROZ SHAH (1566) WHO WAS THE FOUNDER OF THE TOWN AND TOMB OF FIROZ SHAH IS ALSO THERE
- GRAND TRUNK ROAD WAS CONSTRUCTED BY SHER SHAH SURI PASSING THROUGH FIROZABAD
- SADULLAH KHAN WAS DEAD IN 1655 TILL THEN FIROZABAD WAS IN DEVELOPING STAGE (as per Mathura gazetteer 1968)
- PERSIAN ARTISTS CAME AND SETUP A CENTER AT FIROZABAD



Glass work in mughal courts: perfume bottles, chandeliers, colored window pane and mosaic glass work

18TH CENTURY

- IN 1737 WHEN FIROZABAD HAD BEEN DEVELOPED ENOUGH, A PART OF IT WAS LOOTED AND BURNT BY A PART OF BAJIRAO PESHWA'S ARMY

19TH CENTURY

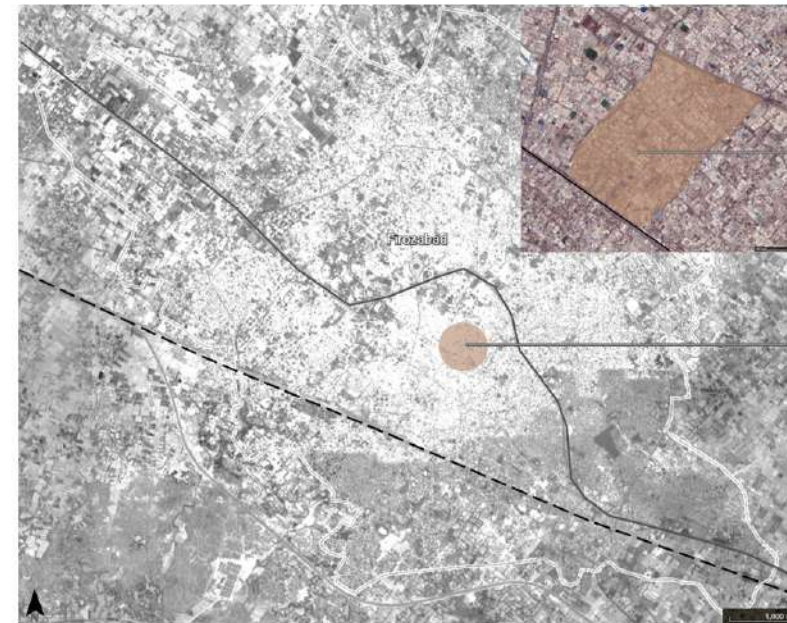
- FIROZABAD CAME UNDER THE TERRITORIAL BOUNDARY OF AGRA IN 1833
- RAILWAY WAS INTRODUCED IN 1862
- FIROZABAD HAD ITS FIRST NAGAR PALIKA
- IN 1989 IT WAS ANNOUNCED A DISTRICT

20TH CENTURY

- LOOKING FOR THE DEMAND OF BANGLES A FACTORY WAS SETUP BY NANDRAM IN 1910
- MORE THAN 1000 FAMILIES WERE INVOLVED IN GLASS WORKS WHETHER IN HOUSES OR FACTORIES TILL 1924 (as learned from Anil Yadav sir)
- MAJOR RAW MATERIAL CAME FROM KOLKATA

21ST CENTURY

- NOW RAW MATERIAL IS TRANSPORTED FROM GUJRAT AND RAJASTHAN
- MANY GLASS PRODUCTS LIKE DOMESTIC WARE, ARTWARE, BANGLES AND HARWARE PRODUCTS ARE MANUFACTURED.



Firozabad map

Blow up of nagar palika location (as known from oral narrations).

Earlier location of Nagar palika and bus stand which is now a market

Now NH2 earlier Grand trunk road
Railway line

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HISTORICAL EVIDENCE



Location map showing archeological evidence



1. Chadami Lal Jain temple



2. Tomb of Firoz Shah built in 16th century



3. Gurdwara



4. Storage space at railway line



5. Temple complex by Ranilwala



6. Shri Ramchandra Kanhaiyalal College (SRK College) was established in 1919



7. Residence of Rambabui



8. Ram Lal Arora memorial was built in 1952 by Ramji Arora



9. Chaubey ji ki Haveli



10. Residence of Mushtaq Ali Khan. It was built before 90 years ago (around 1920s)



11. Residence of Mehboob Ali Khan. It was made for residence purpose in 1939



12. Residence of Gopi Nath Aggarwal. It was made for the purpose of residence in 1947



13. Atta vala mandir



14. Remains of tehsil



15. Residence of Chadamilal Jain has two parts and built with rock cut detailing in columns, rolling and decorative places like entrance and mosaic art.

Observations
 All these structures are over 50 years old. None of the structures is protected, they are either privately owned or owned by a group of people. Detailed rock-cut elevations, arches, use of German tiles, and influence of Islamic architecture and mosaic were commonly seen. Hence it can be inferred that historic core lies in center of the city.

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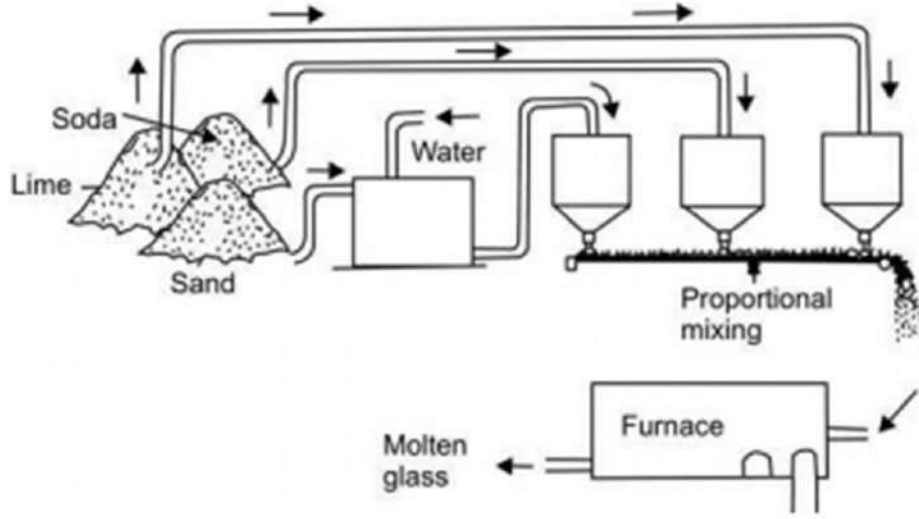
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CONTEXUAL

WHAT IS GLASS?

The term 'Glass' refers to a specific state of matter, regardless of its chemical composition, gets solidified from the liquid state, without forming any crystals, and thus at the atomic level, lacks the regular ordered structure of normal crystalline solid material. So, glass can be said that, one in which there is no orderly pattern or arrangement of atoms. It is usually formed by the rapid cooling of a viscous liquid, where the atoms have insufficient time to align into crystal structure. It has been used as a decorative material throughout history and created aesthetic wonders.

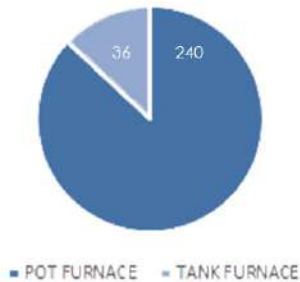


Glass making process

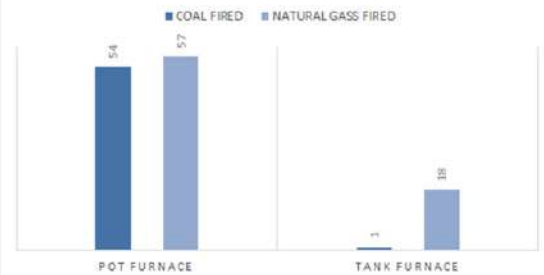
Source: Researchgate

There are two type of furnace used in Firozabad glass cluster which are pot furnace and tank furnace depending on the amount of production. These furnace are locally made and maintained. There are total of 276 furnace. These furnace use coal and natural gas as there fuel type. After coal banned in 1996 when Firozabad lied under Taj Trapezium zone all the furnace shifted to natural gas.

TYPES OF FURNACE USED



FUEL TYPE USE



ARTISAN'S BACKGROUND

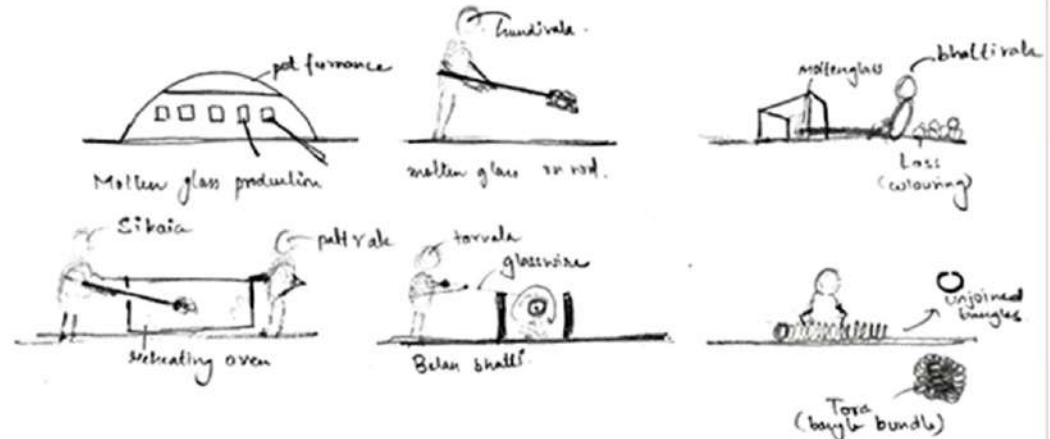
Firozabad was chosen to be fit for Glass Industry due to availability of skilled labor. A regional craft clan of bangle experts are known as sheeshgarhs. The industry does not have nay proper training and engineering in curating glass products. Its just the skill which is been passed on by generations to generations. Some children learn it just by observing their families.

Traditional skills prior were obtained at a youthful age as a disciple in domestic endeavors or beneath ace artisan in workshop. The aptitudes obtained in workshop utilized to be way better. But with limitations on child labor in workshop. The interns are presently permitted after 15 years of age.

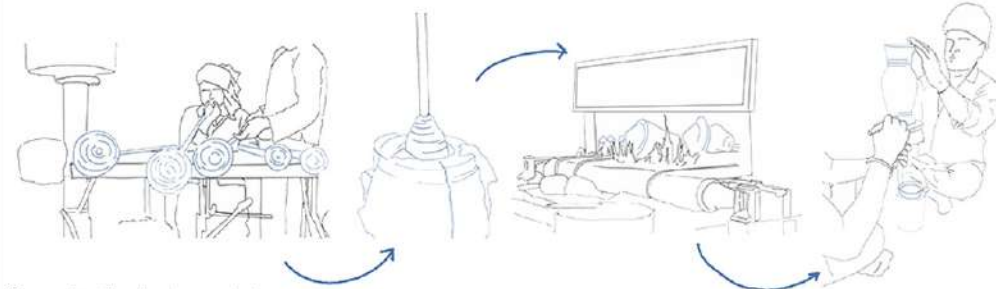
The artisans feel that upcoming techniques in the feild not cost effective and it will will not succeed in the feild. This will also reduce the demand of local artisans.



PROCESS OF MAKING GLASS PRODUCTS



Process of making glass bangles



Process of making other glass products

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SITE DOCUMENTATION

NETWORK MAP OF DOMESTIC WARE



LEGEND

- INDUSTRIAL AREA
- TRANSPORTATION HUBS
- MARKET HUB
- VISITED SITES

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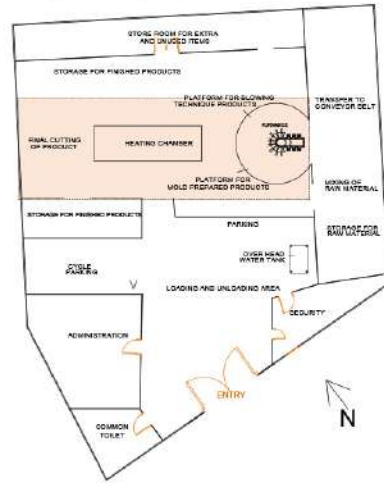
SITE DOCUMENTATION

DOMESTIC GLASS WARE PREPARATION

Process of making glassware

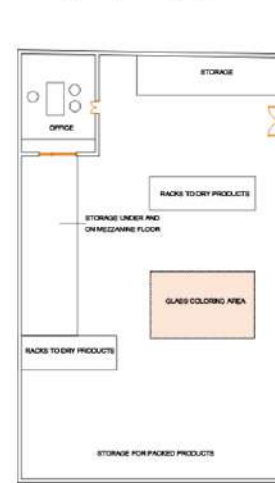


Manufacturing of clear glass product.

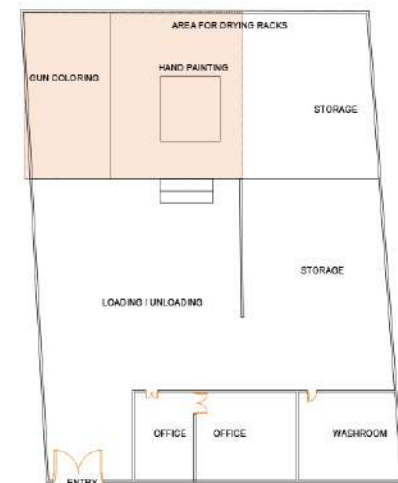


Site 1

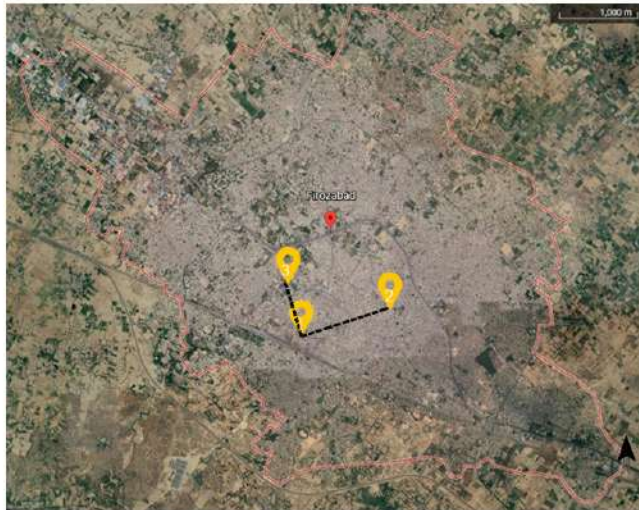
Coloring and packaging of clear glass product.



Site 2



Site 3



Location

There are two types of industrial setups which are required to produce domestic ware before it comes to market. Location 1 is the production unit from where it is sent to locations 2 and 3 for decoration and final packaging. From 2 and 3 product is further sent to wholesalers and retailers.

Process name	Related picture	Tools required
Mixing of raw material		
Grinding on conveyor belt		
Raw material from conveyor belt to furnace		
Molten glass from furnace		
Molten glass transferred to molds		
Annealing (cooling and further heating for strengthening of the		
Cutting and finishing		
Finished product stocked and ready for transport		

Process name	Related picture	Tools required
Preparation of color		
Coloring the clear glass product with various designs		
Drying of prepared product		
Packing and storage of final product		
Final products display		

Final products display.

Observations
 From site 1:
 All the raw material is imported. It is the skill which is keeping the tradition alive in the region. The artisans work in harmony with each other. It is a combination of permanent and daily wages for workers hired by the manager of the factory. The artisans are well versed in the type of work they are doing despite the lack of cleaning and lack of lighting in the working area. Despite low wages, artisans are continuing working as this is the knowledge they had been transferred.
 From site 2 and 3:
 Decoration on glass product does not require a big setup as a manufacturing unit. The artisans do the painting sitting on the ground. The drying and packaging unit require bigger spaces as per the capacity of the factory.

Process name	Related picture	Tools required
Unpacking and preparation of clear glass		A cloth to clean the surface and a basket to make a batch ready for coloring
Gun spray painting to prepare the surface for further		
Hand painting		
Drying of prepared products		
Final product		
Packing and storage of final product		

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NETWORK MAP OF DOMESTIC WARE



LEGEND

- TRANSPORTATION HUBS
- MARKET HUB
- HOUSEHOLD SETUPS
- VISITED SITES

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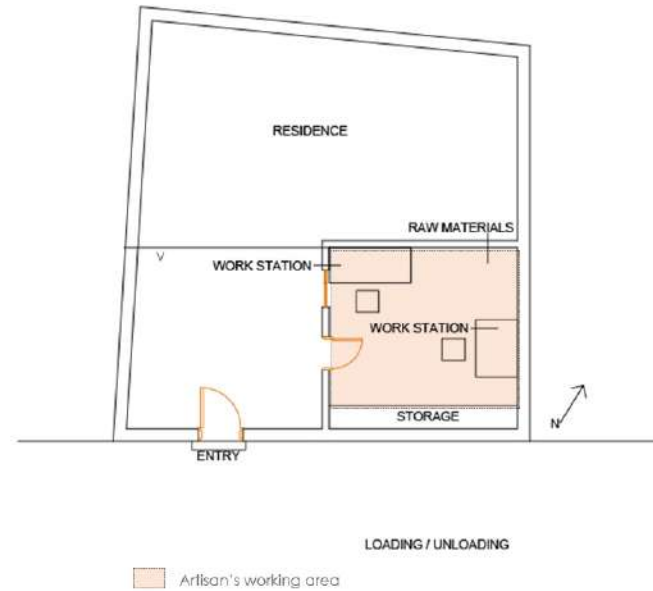
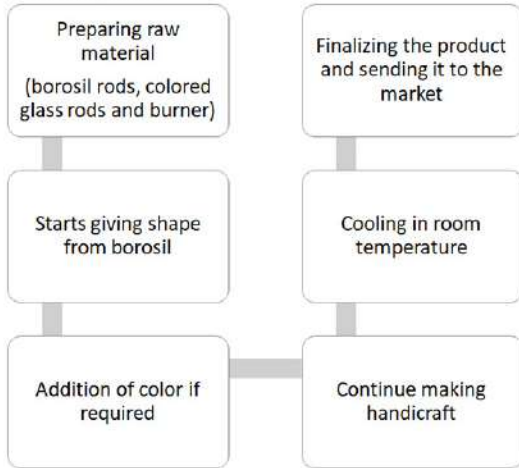
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GLASS ARTWARE PREPARATION

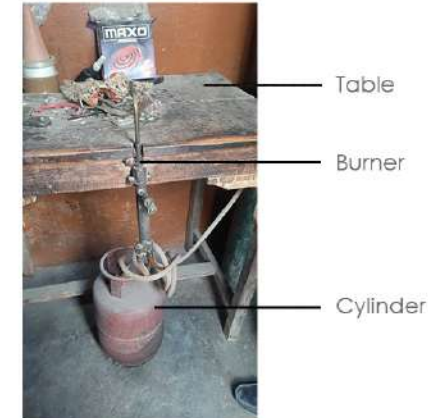
Process of making artware



Observation

The main artisan works with whole family including his wife and children.

He is in the profession since 35 years and learned the skill from his elder brother who learned it from an artisan from Mumbai. The locality is involved in artware work in their households. The setup does not require large space or many tools. Borosil the key material is imported from Mumbai, rest gas cylinders and colored glass rods are available locally. A table and chair is required to make these artware. Transportation of these artware is through road. There was no proper storage of finished products.



A standard setup



Final artworks



Location

The artware manufacturing is household unit. Artware work is majority done in labor colony as marked in the map.

Process name	Required pictures	Tools
Preparation of raw materials		
Start shaping from borosil rods on burner		
Addition of colors		
Continue producing the design		
Cooling in room temperature		
Finalizing the product		

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NETWORK MAP OF MARRIAGE WARE



LEGENDS

- INDUSTRIAL AREA
- TRANSPORTATION HUBS
- MARKET HUB
- HOUSEHOLD SETUPS
- VISITED SITES

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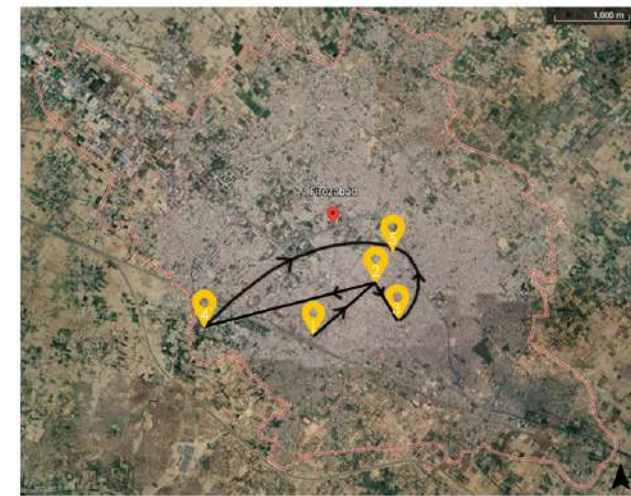
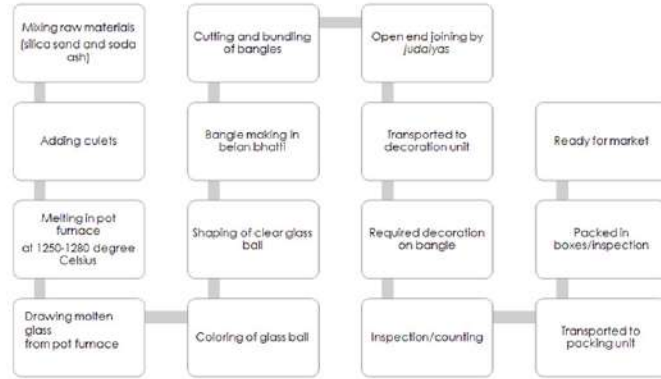
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MARRIAGE WARE PREPARATION

Process of making bangle



Location

Source: Author

Location 1 is industrial setup of bangle where unfinished bangles are prepared and transported to location 2 for judai (closing ends of bangles). From there it is shifted to locations 3 and 4 for decoration and further sent to location 5 for packing and from there to market.

Manufacturing of bangles.



Site 1

Artisan's working area

Process name	Related picture	Tools required
Melting raw material in pot furnace		
Drawing molten glass from furnace		
Coloring the molten glass		
Bangle in belan bhatti		
Cutting of spiral bangles		
Packing and storing bangles		



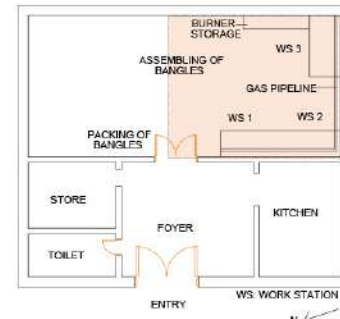
Final product ready to transport.

Observation

Site 1: Bangle manufacturing is the oldest traditional skill in the city. 320 bangles are packed in the bundle which is called tora locally.

Site 2: The workers who do the joining of bangles are called judaiyas and the process is called judai. It is done on kerosene lamps and workers of all age groups are involved. It is mainly done in small household setups where the whole family is involved in the process.

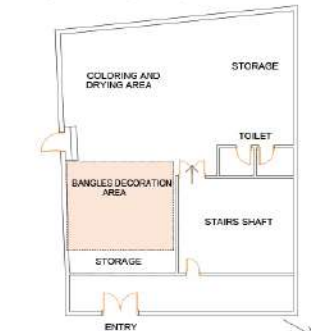
Bangle joinery setup



Site 2

Process name	Related picture	Tools required
Unpacking of bangles		
Judai of bangles		
Chatai (checking) of bangles		
Final packing of bangles		

Bangle coloring setup



Site 4

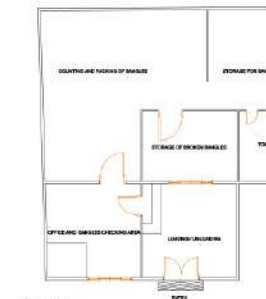
Process name	Related picture	Tools required
Assembling bangles for coloring		
Decoration on bangles		
Drying the bangles		

Bangle coloring setup



Site 3

Process name	Related picture	Tools required
Storage and checking of bangles		
Color preparation		
spray gun paint on bangles		
Drying bangles		
Bangle decorations		
Drying bangles before packing		
Inspection and packing of final products		



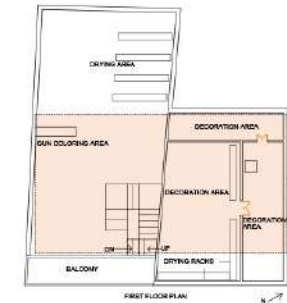
Site 5

Observation

Site 4: It is a home based decoration unit where all the family members and neighbours were involved.

Raw material like paint and brushes were need to complete the process. Site 5: This was a packaging unit which bring product to the market. The bangles are packed in group of 12 and 24 numbers depending upon the requirement.

The broken glass from the site is sent to industrial setup for recycling purpose.



Observation

Site 3: The whole colouring unit is set up on the first floor of the residence. Inspection for broken bangle and quality of colouring is done frequently.

From here bangles are packed and sent to packaging units. All the transportation of the bangles is by hand pullers called thela.

Process name	Related picture
Storage of bangles	
Checking and counting of bangles	
Final touches to the bangles	
Labba (box) packing in group of 24 and 12	

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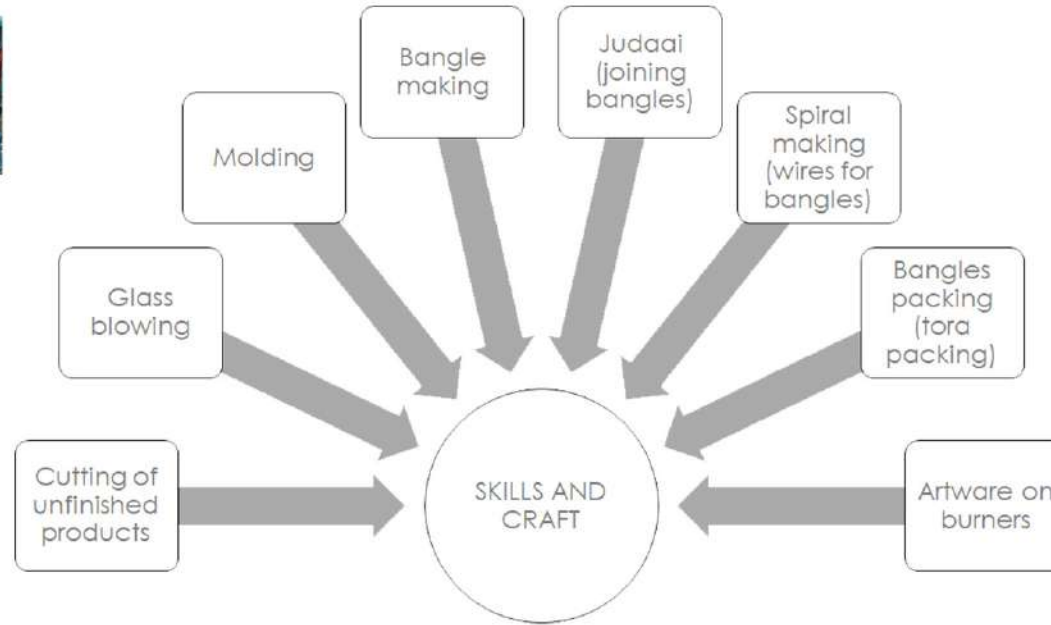
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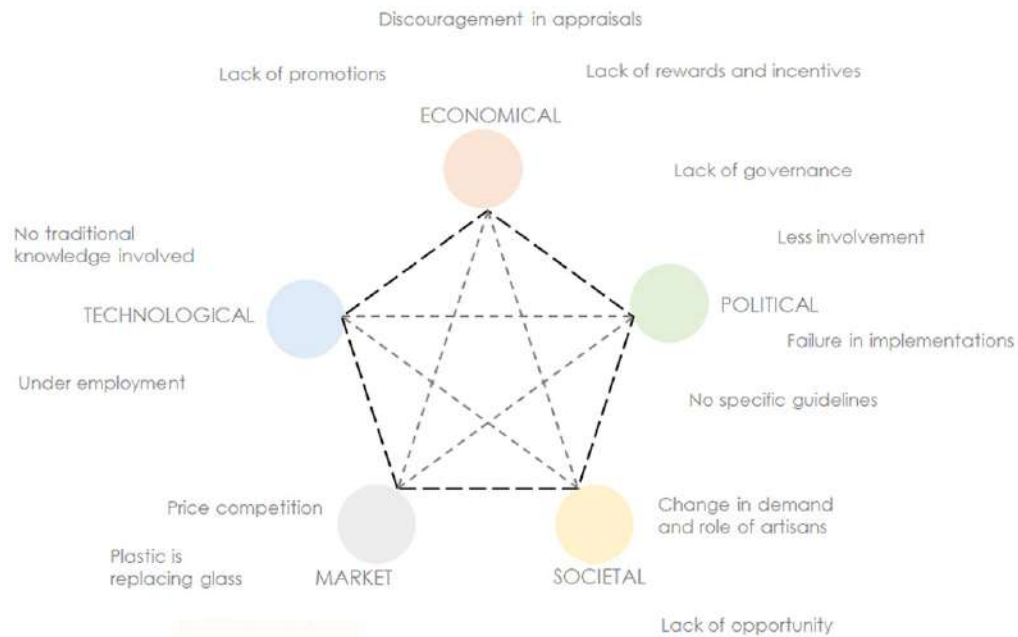
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SITE OBSERVATIONS



Industries are heavily depended on manual skills but there are some gaps noted in existing system.



ECONOMICAL

- Lack of rewards and incentives
- There is no proper incentives other than daily wages for workers.
- Discouragement in appraisals
- While appraisals no proper appreciation/acknowledgement of work.
- Lack of promotions
- There are no promotions, an artisan can be doing same work for years and there would not be any promotions or acknowledgement

POLITICAL

- Lack of governance
- No proper government body takes care of glass cluster
- Less involvement
- Political parties lack in involvement for any help for the community
- Failure in implementations
- No specific guidelines

SOCIETAL

- Change in demand and role of artisans
- Change in architecture, material and techniques
- Lack of opportunity
- Opportunities are lacking for artisans to showcase their knowledge and skill

MARKET

- Plastic is replacing glass
- Plastic is involved in the process of packaging and also replacing glass. Being a non sustainable material it is replacing glass which effects the market of glass.
- Price competition
- The products are available in every price from highest to lowest

TECHNOLOGICAL

- Under employment
- Machine work require less labor and more managing team resulting in under employment of local labor
- No traditional knowledge involved
- Machines and advance equipments do not require any traditional knowledge

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ANALYSIS AND RECOMMENDATORY FRAMEWORK

ANALYSIS

The importance of these craftsmen communities and centers depends upon the betterment on the industries. Skills contributes to shaping these cultures, and to transmitting them to other communities alongside skills, and to forming the bulk of a social consciousness related to the belonging of communities sharing similar relations with the craft. For artisans it is the only industry where they find work but because as a low-tech and labour-intensive industry it is heavily reliant on skilled workers to organize the production process. This is only skill they have learned while growing up. The industries will reduce workers being the assistant of the machine does not suit well in this case as industries are dependent on artisans for finished products which cannot be done by machines like juddal work on bangles, decoration on various products, artwork curation and many more. There could be machines to ease work but not to complete it.



■ Not followed ■ Implemented

Rules and regulations in the factories



■ Not suitable ■ Suitable

Suitable building environment

Spatial analysis:

Industries- Lack of facilities like no resting space, lack of lighting, in bangle industries the order of the work is not arranged in a spatial manner and there is no proper standards of working spaces.

Household setups: No furnitures for decoration setups, no proper working environment they just work in their homes, and lack of storage spaces.



Working in factories and homes



APPROACH TO CONSERVATION

To protect and manage existing skill in a sustainable manner considering all parameters.

To extend and build upon a knowledge with the existing information for its successful implementation.

Approach to understand these skills present today for its betterment and learning experience for future.

Documentation and recognition

Preparing database of the traditional knowledge system.

Understand the values and significance.

Participation and involvement

Interaction and collaborations between the artisans of similar interests which helps enhance knowledge. Provision to improve incentives and appreciation of the craft and work.

Strategies

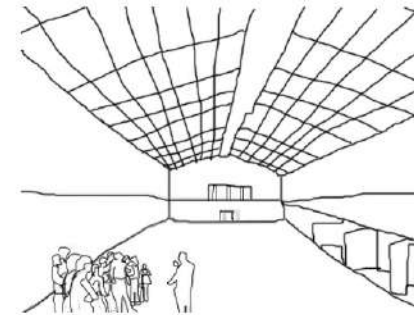
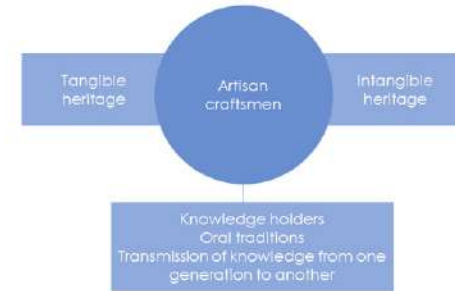
Suitable working condition for men and women. To sustain their livelihood with increase in income and readily approachable market by everyone. Support of legislations and implementations which helps enrich economic status.

Approach

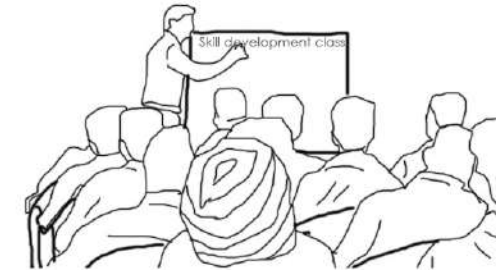
Motivate coming generations by small talks, lectures and seminars for sustainable future of craft. Artisans, craftsmen and industry experts as co participants in shaping the future practices.

Action

To increase awareness improve safety and security for the artisans by providing necessary facilities. Updating information about schemes, incentives through different mediums for more participation. Provide guidelines for all the categories of works.



Visitor engagement



Interaction with next generation to uplift the craft along with industries

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