



Skill Mapping Study

- Firozabad Glassware Cluster



Skill Mapping Study

Undertaken by
Development Alternatives

For the
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Abbreviations and Acronyms

CBOs	Community Based Organizations
Cr	Crores (INR) (equivalent- 10million)
CGDI	Centre of Glass Development Industries
DA	Development Alternatives
DCLSs	District Child Labour Societies
DGET	Director General Employment and Training
DIC	District Industries Centre
FGD	Focus Group Discussions
GAIL	Gas Authority of India Limited
GoI	Government of India
IIT	Indian Institute of Technology
ILO	International Labour Organization
ICSDIG	Committee of the Skills Development Initiative for Glassware
MHRD	Ministry of Human Resource Development
MoLE	Ministry of Labour and Employment
MES	Modular Employable Scheme
NGOs	Non-Governmental Organizations
NID	National Institute of Design
NIFT	National Institute of Fashion Technology
NSSO	National Sample Survey Organization
SHGs	Self Help Groups
SME	Small and Medium Enterprises
SSI	Small Scale Industries
TERI	The Energy and Research Institute
TTZ	Taj Trapezium Zone

Disclaimer

This report has been prepared by the team assigned by Development Alternatives on behalf of International Labour Organization, Subregional Office for South Asia. The views, findings, recommendations and options are those of the team's. Development Alternatives and International Labour Organisation do not necessarily endorse these views nor are they, in any way, bound to accept them.

Executive Summary

Introduction

Firozabad, a town near the famous city of Agra, houses the oldest glass industry in India. In the recent past, key indicators suggest that the industry is witnessing difficult times. Realizing the fact, the International Labour Organization (ILO) and the Government of India (GoI) have started taking steps to lend a hand to the industry to overcome its present downslide. This Skill Mapping Study initiated by the ILO essentially aims to examine the Glass Industry in Firozabad, in particular and focuses, on skill demand of this Industry for the future.

Skill development is pivotal to improving productivity. This study examines the challenges faced by the industry and seeks answers to its problems from a skill development orientation.

Background

Under the Skills Development Initiative (SDI) of the Government of India, the ILO aims to contribute to the development of the entire glassware cluster as a whole by strengthening its skill base. The project, by identifying the employment and skills need in a cluster, seeks to overcome problems of skill mis-match. In order to do so in the glassware cluster of Firozabad, Development Alternatives, a not-for-profit organization, was commissioned by the ILO to carry out a skill mapping study as the first step towards the initiative.

Objectives

The Study has taken stock of the current situation and helps in drawing an action plan for substantive intervention. It aims to:

- ✍ Contribute to improving productivity and competitiveness by overcoming skill gaps and skill mismatch
- ✍ Improve the mobility, career prospects and employability of workers through Skill Acquisition, upgrading and/or certification.
- ✍ Contribute to the prevention and elimination of child labour.
- ✍ Contribute to the GoI Skills Development Initiative on a national scale.
- ✍ Promote energy efficient and environment friendly practices in production

The conceptual basis adopted by Development Alternatives for the Skill Mapping survey was based on the hypothesis that the extent and rate at which change can take place in livelihood conditions is dependent on – access to technical, institutional and financial support frameworks

The study was undertaken in collaboration with the Glassware Research Institute in Firozabad and under the overall guidance of the Implementation Committee of the Skills Development Initiative for Glassware (ICSDIG).

Methodology

After initial consultations and research work done for the Firozabad cluster, a study team belonging to Development Alternatives along with the support of a local NGO in Agra carried out a field study and a baseline survey over a period of two months with sample size of 600 workers, 30 employers, 25 exporters and other key stakeholders.

The Development Alternatives team with its experience in analytical documentation with the able support of the ILO has made a sincere effort to come out with findings/recommendations. These would have a bearing not only on the livelihood needs of the cluster but also help to improve and strengthen the value chain of the glass industry.

Summary of the Study

In Chapter I, this study presents an overview of the industry, its evolution and struggle to keep with the demand and supply of the global market. Defining the category of skilled workers has been a notable feature of this exercise. A worker in this industry is described as being either skilled or unskilled depending on his/her risk-taking ability and his/her proximity to the furnace.

Chapter II brings out the realities of the industry through statistics the conditions of the workers. The glass industry is experiencing difficult times and the Chapter is suggestive of the decay that is setting in the sector and that needs to be addressed collectively.

Survey findings, elicited in considerable detail by the study team, are highlighted with statistics that aptly portray the condition of the Workers. Other stakeholder groups, like those of the Employers, have also been discussed in this Chapter and the stark contrast between the employers and their employees is more than self evident. A graphical mapping of value chains in the Firozabad cluster suggested by the study will help bridge gaps and eventually enable the industry to stand on its feet and to take on the challenges of a rapidly changing national and global market.

Chapter III defines the distinction between skilled and unskilled workers in the glass industry and discusses the skills that need to be classified in greater detail. The study clearly suggests better productivity measures thus encouraging entrepreneurs to think of better options for its workers. The study suggests strong and pro-active steps required in the area of refined energy saving technology and skill-building. The group conducting the study advocates training that explains to the stakeholders the benefits of safe work and new scientific applications in existing production and manufacturing processes. The necessity of training was never felt by the workers and employers as the industry follows the traditional way of handing down skills from father to son.

Key Conclusions

The study brought forth some remarkable facts and also the dilemma of the industry. It suggests the necessity of training for the upward mobility of the labour force. It further tries to link skill development systems not only to the current needs of the labour market but also to the future context of newer environment and development strategies, technological innovations and a changed market.

The Study team recommends certain interventions to be made in the sector, broadly speaking the major areas are skill development of workers, improvement in the working areas, technology related interventions and capacity building of other stakeholders like the employers, contractors and other institutions. A detailed chapter on recommendations discusses the various interventions suggested. There are certain interventions that need to be implemented with immediacy while some are long term. Customised awareness programs for workers and employers will help in creating decent work environment. Technological interventions too need to be met with urgency for the betterment of the industry.

In order to improve the mobility, career prospects and employability of workers through skill acquisition, upgrading and/or certification, it would be essential to move from the traditional style of functioning to the modern and eco-friendly ways. The industry presently needs to get in tune with the global market and possess know-how about the techniques for its up-gradation.

The prominence of the Bangle sub-sector is brought out in the study. The number of people involved in bangle making is comparatively high and consists of pre-dominantly women. It offers tremendous opportunities for techno-social interventions that will have far reaching consequences on the condition of workers in Firozabad.

There is an urgent need to generate awareness and build capacity of artisans and provide an access to government schemes and facilities. It will also be important to understand the market needs and explore other avenues of products. It is necessary to try technology and design interventions. An institutional set up that provides training on all the steps of production thus becoming a major contributor to the supply chain.

The study has made an effort to bring the condition of the Firozabad glass industry to readers and policy makers with facts and figures compiled in one document. It remains to be seen how the way forward as suggested by the study, actually transforms the Indian Glass Industry and gives it its past glory.

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chapter

1

Background of the Study

- a. Context
- b. Need of the Study

Glassware Industry - An overview

- a. Profile: Growth Rate, Export Rate etc
- b. Existing Trades , Opportunities

Definitions (defining skill attainment)

- a. Skilled, Semi - Skilled, Entry Level Skilled

Survey Methodology

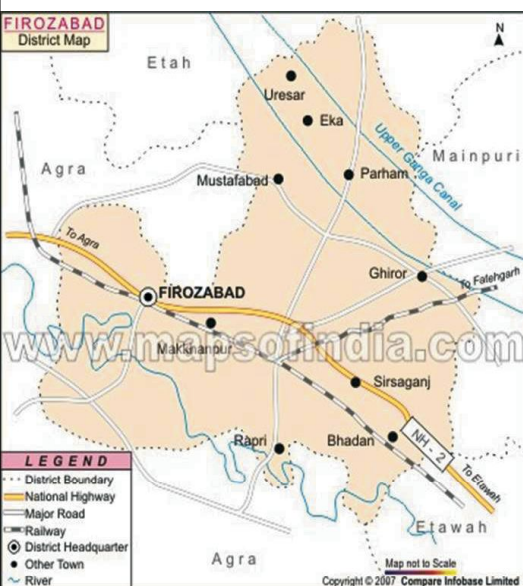
- a. Sample Size and Selection Process
- b. Adopted Tools and Processes
- c. Stakeholders Involved, Locations Covered



Background of the study

A. Context

Firozabad, aka Chandwar Nagar, was renamed by Akbar in 1566, during his reign. It is said that Raja Todarmal was passing through this town, on a pilgrimage to Gaya, where he was looted by robbers. At his request, Akbar, sent his Mansabdar Firoz Shah here. The tomb of Firoz Shah and the ruins of Katra Pathan stand evidence to this fact. Today, Firozabad is known across the world for its glass industry.



In the ancient period, invaders brought many glass articles to India. These glass articles, when rejected, were collected and melted in a locally made furnace, called the "*Bhainsa Bhatti*". This was the start of the glass industry in Firozabad. In this furnace, wood was used as a fuel. These old traditional furnaces are still in use in Sasani near Aligarh and at Purdal Nagar. At that time only small bottles and bangles were made. Only one bangle could be made at a time with no joint. These bangles were called "*Kadechhal Ki Chudi*". Since then Firozabad has been the home of the glass industry. White and coloured glass pieces were manufactured for the purpose of assembling jhad and fanus (chandeliers) which were much in demand by royal courts and nobles for decorating their assembling and drawing rooms. Later on phials for *Itra*, scents, and other cosmetic products were also

produced here. Slowly and steadily Indian Wedding items like bangles, kangans, etc. were produced in bulk for the general public. Today it is nicknamed Suhag Nagri because it fulfills almost all the bangle, *kada* and *kangan* demands of *suhagins* (married women).

Since 1989 Firozabad started the production of artistic glassware in different colours and shades. Approximately about four hundred glass industries are registered with the Firozabad Administration. Natural gas is the main source of energy used as compared to the earlier source of energy, namely coal. Almost 50 % of the production of these units is exported to different countries. Blowing/modeling is the recently introduced technique accomplished by the pot re-generative tank furnishing process in factories. The Indian glass industry has a rich

history. From mouth-blown and hand-working processes, it has now switched to automation in a big way, although traditional manufacturing processes have not been abandoned. Mouth-blown and handcrafted glassware have a dominant role in decorative and table glassware products which are exported in large quantities.

Firozabad is located in Uttar Pradesh a state in North India It is the largest production centre of glass bangles in India. It is estimated that nearly 90% of all the glass bangles in the world are produced at Firozabad. In the recent past, however, the bangle, producing cluster has been experiencing a decline on account of various reasons like the poor technology that is used in glass factories; the rising price of inputs required by the glass industry; and the limited skill-level of workers (Most of the workers in Firozabad have not received any formal training).

To understand the glassware industry at Firozabad it is essential to understand traditional business and globalization on the one hand, with different external factors, on the other. There are technological challenges as well as socio-economic barriers faced and overcome at the cluster level. Traditional and cultural barriers make it extremely difficult to access the workers in household level units, especially as a sizeable proportion of the workforce is comprised of women and children. Household involvement is in evidence only in the bangle-making processes like sidhai (straitening), jodai (joining), and in decorating the bangles.

Existing skills and technology in the glassware industry in Firozabad are limited. Skills have been handed down from generations and it has been mostly learning on the job. This may be an important way to transfer skills but it restricts the use of new technology and methods to upgrade production quality. The ceramic pot, for example that is used to melt the glass, is also designed by unskilled people and hence its longevity is lower than that which is used abroad and is designed by skilled workers. Tata Energy Research Institute (TERI) had initially designed the furnaces after the switching over to the use of gas as a fuel but the people of Firozabad did not receive any training for this. Even the firemen, who run these furnaces, have not been trained to use fuel in a more efficient manner. There is thus a scarcity of trained technicians and electricians.

Apart from the above, nearly 80,000 women work in the bangle industry and they are mostly home-based workers. The home-based production brings up the issue of child labour in the glass industry of Firozabad. Though it is true that children are not involved in glass factories, they are often engaged at home in helping their mothers. These women are mostly illiterate and should be provided with at least functional literacy, according to the ILO.

Studies point out that, 75% of the workers in the glassware industry of Firozabad obtain less than the Minimum Wage and earn about INR 50-70 /-per day, whereas the minimum wage other wise is about INR 104/- per day. It was also pointed out, however, that each job in the

glass industry had a different wage rate and factors like the age of the employee were not in, any way factored in.

The inadequacy of the skills supply has contributed to a vicious circle of lack of firm demand orders resulting in low revenue and leading to inability to invest in marketing, product development and technology upgrading. Lack of adequate technology and posts of skilled workers make it difficult for producers to meet quality standards, delivery schedules and customer requirements. All these in turn result in the declining competitiveness of Indian-made glassware abroad.

To improve the competitiveness of the sector, strengthening the skills-base would certainly be the most important step forward. Making people self-reliant and independent of external support would be just the kind of approach needed. This can be achieved only by having a plan of action which is futuristic and aims at providing training and the right technological intervention. While basic literacy is a must, skill development is important for the holistic growth of the industry.

B. Need of the study

Recently, the Government of India launched the Skills Development Initiative (SDI) to train 1 million persons on demand-driven vocational skills over the next five years and 1 million each year after that to support skills training, certification and upgradation in the unorganized sector. A central approach used is the implementation of Modular Employable Skills (MES) training implemented by MoLE/DGET this offers flexibility to those who have limited education and cannot afford to remain unemployed for a long period of time. The ILO along with the MoLE, in an attempt to operationalise the Skills Development Initiative (SDI) of the Government of India, is providing technical assistance towards the consolidation of the SDI's implementation framework and methodologies through pilot projects in selected clusters. A pilot project is being implemented in Firozabad with the glassware cluster for up-scaling and replication of the framework and methodologies at the national level.

To take the initiative further, ILO has sought the opinion of various organizations including Development Alternatives and CDGI through an advice-giving meeting.

The members of the meeting were of the unanimous view that a study to understand the needs of the FGD be taken up. Subsequently a team, for pre-project reconnaissance of the sector, was sent to Firozabad in the month of November 2008.

The team, comprised of ILO and DA members, visited Firozabad. They came up with suggestions of further strategies in getting a skill-mapping exercise organised for the glassware sector of Firozabad. The team found inadequate skill supply and low technical

penetration on ground as an evident malady of the industry.

Major Focus Areas of the exercise were –

- ✍ Skill-enhancement (capacity-building) of the workers
- ✍ Technological intervention at all the levels
- ✍ Forging good inter-personal ties between manufacturers and take-holders like DIC, CDGI and others.
- ✍ Establish a healthy employer-employee relationship.



Glassware Industry - An Overview

A. Profile: Growth rate, export rate etc

The Glass Industry in India is concentrated mainly in the states of Maharashtra, West Bengal and Uttar Pradesh. Firozabad, in Uttar Pradesh, is recognized as a major production center for bangles of various designs and colours. About 70 per cent of glass and glassware industry in India is unorganized and belongs to the cottage industry.

Structure of Glass Industry: The present day glass industry in India can be classified into two segments, viz. industrial glass product and consumer glass products. Industrial glass items- such as plate glass, sheet glass, figured and wired sheet glass, toughened glass, container glass, fiber glass, glass wool and laboratory glass wares- are produced in the organized sector.



A picture of workers at work in a glass factory of Firozabad.

The glass industry in India, which is centuries old, today manufactures almost a complete range of glass items. These inter-alia include: flat glass (including sheet glass, float glass, figured and wired glass, safety glass and mirror), glass hollow wares and containers, vacuum flasks and refills, laboratory glassware, fibre glass and other items such as bangles, beads and pearls, optical lenses, scientific glassware lamp wares, ash trays, etc. For most of the glass products, the technology adopted is of international standard. Technological up-gradation is required in sectors like safety glass,

pharmaceutical glassware and glass fibre composites. The annual turnover of the glass industry is around INR 2000 crore. Glass products are manufactured both in the large-scale and small-scale sector. The major segment of tiny and small-scale sector is concentrated in Firozabad. However, the large units are spread throughout the country. The major exports are taking place in vacuum flasks and refills, flat glass, glass bottles, glass beads, fibre glass and ophthalmic lenses, etc.

Demand for value-added glass products during the recent years has been growing

Interesting fact:

Countries have very different economic and social conditions and different levels of skills and competences. Effective development processes are forged from a social contract of shared objectives to propel the economy forward, expand decent work opportunities and raise living standards. The design, sequencing and focus of their policies need to respond to their different levels of development. However, experience shows that all countries - that have succeeded in linking skills with productivity, employment growth and development - have targeted the skill development policy towards three objectives -

Objective 1. Meet skills demand in terms of relevance and quality. Skills policies need to develop relevant skills, promote lifelong learning, deliver high levels of competencies and a sufficient quantity of skilled workers to match skills supply with demand

Objective 2. Mitigate adjustment costs. Training policies and programmes lessen the costs for workers and enterprises that are adversely affected by technological or market changes.

Objective 3. Sustain a dynamic development process. At the level of the economy and society, skills development policies need to build up capabilities and knowledge systems which induce and maintain a sustainable process of economic and social development.

The first two objectives of skills matching and cost mitigation take a labour market perspective and focus on skills development as a response to technological and economic changes; they are essentially short- and medium-term objectives. By contrast, the developmental objective focuses on the strategic role of education and training policies in triggering and continuously fuelling technological change, domestic and foreign investment, diversification and competitiveness.

continuously at a faster rate than the demand for basic glass has. Value added products are also becoming increasingly important in the automotive sector.

The All India Handicrafts Board was established in the year 1952 to look after promotion and development of handicrafts in India (The bangle industry of Firozabad is looked after by the Board).

Exports of glass and glass products from India have increased from Rs. 313.30 crore in

1998-99 to Rs. 840 crore in 2002-03 to Rs. 940 crore in 2004-05. The Chemicals and Allied Products Export Promotion Council, under the Ministry of Commerce, Government of India, has been engaged in promoting export of glass and glass products from the country for several years now.

B. Existing trades, opportunities

World Scenario

(i) World Imports: World imports of glass and glassware products in 2003 registered a growth of 14.18 per cent over the previous year when the same reached a level of US\$35,489.9 million as against US\$31,083.2 million. Glass continues to be the major item of import. In 2003, it accounted for a share of 64.36 per cent, and had shown a growth of 13.35 per cent during the period.

(ii) World Exports: World exports of glass and glassware products in 2003, registered a growth of 13.91 per cent over the previous year when the same touched a figure of US\$35,344.6 million as against US\$31,029.8 million. Glass continues to be the major item of export and in the year 2003, it had accounted for a share of 63.29 per cent of the total global exports of glass and glassware products. On the other hand, the glassware products during the period registered a higher growth of 17.25 per cent.

Recent Developments

In recent months, glass companies in Firozabad have been under tremendous pressure due to the increasing price of natural gas, a key input in the manufacturing of glass. Relief is, however, on its way, with the Gas Authority of India (GAIL) planning to increase the supply of gas to this region.

(i) Centre for Development of Glass Industries (CDGI): To help the glass industry by providing them with technical assistance and specialized training in Firozabad, a technical centre has been set up with assistance from UNIDO. The Centre initially named as the Centre for Improvement of Glass Industry, was established in the year 1991. The Centre later came to be known as the Centre for Development of Glass Industries is located at Jalesar Road, Firozabad.

(ii). Import of Glassware and its impact on the industry: The glass and glassware industry has been severely hit by cheap and unrestricted imports of a wide variety of glass and glassware e.g. tableware, ornamental objects, lights and chandeliers from

China, Indonesia, Malaysia, Japan, Turkey and Belgium on the one hand and plummeting customs duty on the other. This has been aided by the removal of quantitative restrictions on imports, which India has been forced to implement under the World Trade Organization (WTO) rules. Imported items are priced lower not only due to low custom, duty but also because of the availability of cheap raw material, labour, and fuel saving production methods prevalent in these countries.

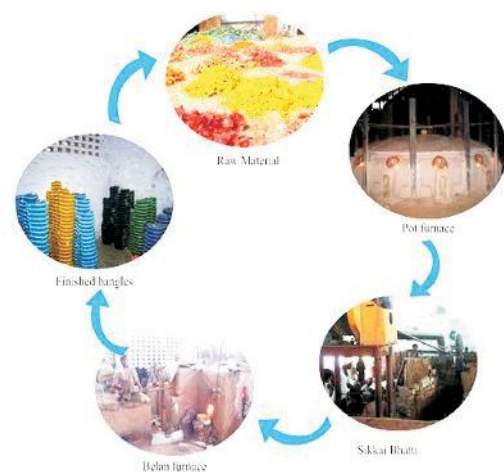
(iii) Glass Gives Way to Plastic: In a significant strategic initiative, Pepsi Co. India, is pushing together a plan to gradually replace returnable glass bottles (RGBs) with PET plastic bottles for carbonated soft drinks. Company sources say that change would be gradual and it could take the market nearly five years to shift to PET bottles.

(iv) Export prospects: Glass and glass products offer good potential for boosting India's exports. Concerted efforts need to be made to chalk out a concrete plan of action for modernizing the glass industry

Firozabad Bangle Industry

The Firozabad glass bangle industry provides direct employment to lakhs of people and indirect employment to thousands of artisans and craftsmen. This is one of the few sectors which creates such high levels of employment with low capital investment. Glassware manufacturing is the only household occupation of every citizen in Firozabad. The art, which was the defining feature of an upcoming generation, is now the only source of income of the city. The glass manufacturing units, it can be said, are embedded in every nook and corner of the city. Glass bangles is an important product of the city. Red, green, blue, yellow, gold-lined, silver-edged, bright and beautiful... you name it and you will find it. They are all there, in the loveliest of colours and design —crafted by labouring hands in hazardous conditions. Not many realize the sweat and blood that goes into crafting the colourful glass bangles which line the shelves of shops across the country. Each of these bangles passes through the hands of about 60 workers before it reaches the market.

To give shape to their imagination, artisans of glassware start working early in the morning, at about 4 o'clock and continue till late in the evening. The work is very tiring and needs a lot of concentration. As the glass takes shape only in the molten state any ventilation or air is an impediment to the work.





The jodai (joining process) being performed by a woman worker.

Workers, involved in the manufacturing of glass bangles, are also facing a lot of problems. Wages are very low. For joining a set of around 300 bangles, locally called 'Toda', an artisan gets only INR 2. An artisan earns not more than INR 25 to 30 per day. The problem here is that the workers get the raw material through a contractor, who in turn gets the bangles directly from the manufacturer. This mediator decides the wages by keeping his own profit margin in mind. Manufacturers, before giving out the worker, ask for a security deposit, which goes into tens of thousands. Poor artisans are not able to give this amount and hence have no option but to work for the contractor.

Many local residents say that the workers- particularly women and children- breathe in glass not air. They are engaged either in the work of Sadai (straightening out the bangle) or Judai (welding the joint of the bangle). Both activities pose a health hazard. Flames cause burns and gas fumes and glass dust blow right into the face of the workers.

"While working in front of the furnace, we have to put up with the heat. It is difficult, especially, in the summers. We develop a lot of ailments, like chest congestion, and consequent weakness," said Rafiuddin, one of the workers working inside the furnace. "We earn around INR 50 per day .If we roll out 100 bundles, we earn approximately INR. 450, which has to be evenly divided amongst the workers" said Mahendra Pal, an artisan engaged in Judai work.

Defining the Skill Defining Process

The skill defining process is highly influenced by what the workers actually do. For example in the bangle making sector, activities like Fireman and Tarman require skill and experience. The Labour Department classifies these as skilled workers. Their less fortunate counterparts in other sectors like baul wala and belaniya are classified as semi-skilled workers. The Judai and Ginai workers come in the category of unskilled workers. These classifications are made according to the risk-taking ability of the worker and his proximity to the furnace. Workers whose involvement is pivotal to making the final product are called - Skilled Workers (a fact that has emerged from the study).

Skill Definition

The definition of skilled, semi skilled or unskilled depends on two factors mainly the experience of the worker and the risk associated with his work. Formal education cannot be the applied criterion for the worker's skill to be defined, in case of Firozabad glassware sector. Thus wages have been decided accordingly.

The survey concludes as follows:

Efficiency and productivity of workers has nothing to do with his education. Time spent on the job is calculated as the knowledge and skill-set acquired, this is directly proportional to the wages/ efficiency of the worker. Semi Skilled profiles are often calculated on a comparative note of the experienced counter-parts or workers who are rationally exposed to the risk. Works which are highly risk prone, require specific skill-set thus the workers working on such trades should be skilled. The new entrants who start as helpers, are defined as unskilled or semi skilled. Workers believe that the furnace plays a vital role in defining the skill set of a worker. It outlines that the furnace is the heart and the works which are near/close or directly associated with the furnace are highly skilled jobs and as the distance/association from the furnace increases the skill requirement decreases. Thus the skill defining process is highly informal in Firozabad glassware cluster

Survey Methodology

- ✍ Pre-study Scan and Consultation
- ✍ Team formation including Technical Experts
- ✍ Designing of questionnaire and discussion templates
- ✍ Compilation of existing practices through secondary research
- ✍ Selection and design of the representative sample for each stakeholder
- ✍ Field Study and Baseline Survey; ground interactions with employees; employers and other stakeholders to understand the complexities of the glassware cluster
- ✍ Compilation of the state of art practices; findings of the baseline survey; and information from the field study
- ✍ Collation, Analysis and Synthesis of data into a report
- ✍ Interim Sharing of Study with Stakeholders, ILO and Government officials; draft report sharing with all stake holders

A. Sample Size and Selection Process

The sample size was determined with consultation with the ILO, in order to arrive at an accurate appraisal of the glassware industry.

The table below provides detailed information about the sample size of different stakeholders:

The sample size of 600 workers was distributed over a varied product range of the glass industry namely – bangles and decorative and general glass items.

Stakeholders	
Workers	600
Employers	30
Exporters	25
WareHouse	16
Master Craft Persons/ artisans	30
Intermediaries	25

Fig1: Total Sample size

Workers were selected as the most prominent stakeholders because the industry is highly labor intensive and more than half the population, associated with the glassware industry is that of workers. 300 workers were selected under the bangle industry and distributed across the various levels involved in bangle production, based on location of the process – factory, bhatti, household and warehouse. The samples were selected randomly amongst the various processes at each level of production.

Similarly, the sample size for decorative and general items was 125 and 175 respectively. This sample was further distributed over the different processes of each product range. A similar distribution process came into play for other stakeholders.

Workstation	Processes	Sample size
Factory Level	21	141
Bhatti Level	3	30
Warehouse Level	2	12
Household Level	15	121

Fig2 : Segregation of workers under bangle industry

B. Adopted tools and Processes

The major tools and techniques, employed for data collection, were questionnaires, Focus Group Discussions, discussion templates and stakeholder workshops.

- ✍ **Questionnaire surveys:** Questionnaire surveys were used to understand skill needs, skill availability and gaps in the industry. Detailed questionnaires were developed for major stakeholders like workers and employers.
- ✍ **Discussion templates:** These templates were designed to facilitate discussions with different stakeholders and obtain information on their roles and implications on the industry.
- ✍ **Focus Group Discussions:** Focus group discussions are an excellent tool with which to understand the problems of the stakeholders involved.
- ✍ **Stakeholder workshop:** The stakeholder workshop, conducted prior to the start of the survey, was aimed at getting all stakeholders to a common platform. The workshop helped in identifying different stakeholders and sharing the objectives and methodology of the study with them.

C. Stakeholders involved and locations covered

The glassware cluster, is a highly unorganized network of stakeholders, unit owners, local

Karkhanedar (small factory owners), contractors and workers. These groups have been interviewed during the survey programme. Many labor unions have also been covered since they give a voice to workers in the cluster. Syndicate of employers industry associations, government agencies like the DIC, labor department and CDGI have been visited and detailed discussions with them regarding the survey have been done. Workers were selected from various locations within 20-Kms-radius of Firozabad town. The details are as follows:

Bangle

Katra Mohalla , Kotla , Kashmiri Gate , Nagla Mohalla , Nagla Bari , Durga Nagar , Sant Nagar , Mashrurganj , Ajmeri Gate, Sailai , Uttam Nagar , Ambedkar Hospital , Ramgarh , Shyam Nagar , Khuswaha Nagar, Asafabad , Dak Bangla , Mangla Bari , Pameshwar Gate, Jatav Puri , Sheetal Khan , Mohammad Ganj , Kashiram Bihar and Humaupur.

General Glassware

Balai , Sadupur , Makhhanpur , Jebra , Chamrauli , Balai , Prithvipur , Dabbalpur , Sahupur, Mahua , Indumai , Nilahpur, SadaMai , Sikera , Phulrai , Biltigarh , Balai , Mau Ka Nagla , Nihal Pur.

Factory Process

Jatavpuri , Thakpura , Kodara , Nalai , Ram Garh , Sikera , Shital Khan , Galib Nagar, Hijipura , Bhaw Ka Nagala , Binti Garh , Makhan Pur, Billi Garh , Sadamard, Balai , Hajipura

chapter

2

Profile of Workers

- a. Demographic Details
- b. Nature of work, including specific job profile
- c. Recruitment Process
- d. Employment Conditions
- e. Education and Skills
- f. Aspirations of Workers

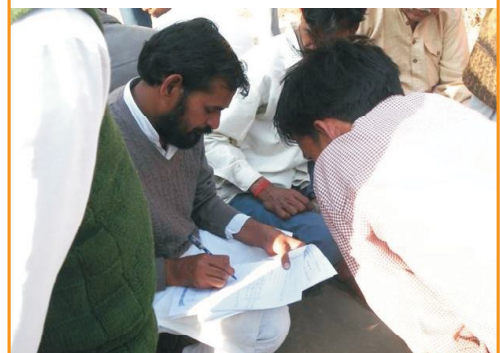
Profile of Employers

- a. Background
- b. Classification of Employers
- c. Nature of business
- d. Existing Practices

Graphical Mapping of the Value-chain

Market Linkages in Glassware Industry

- a. Study on Supply vs. Demand
- b. Production Inputs (Human Resource as a Variable)

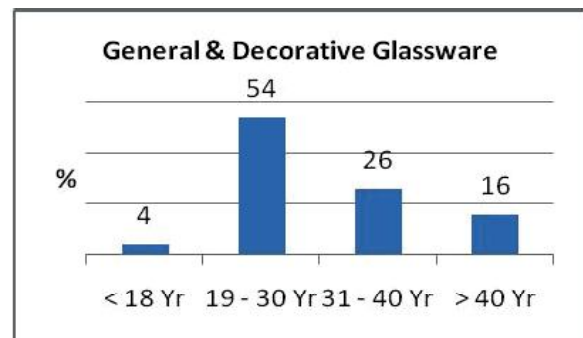
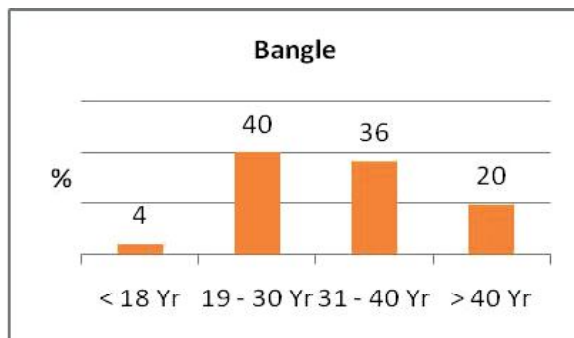


Profile of Workers

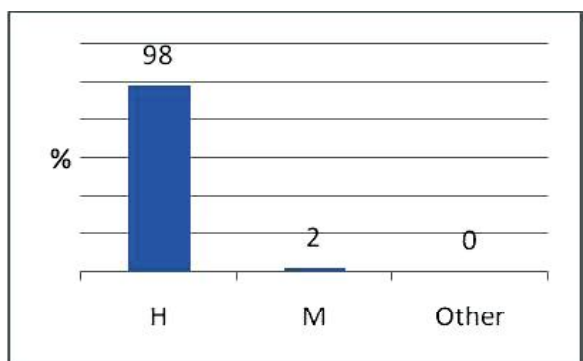
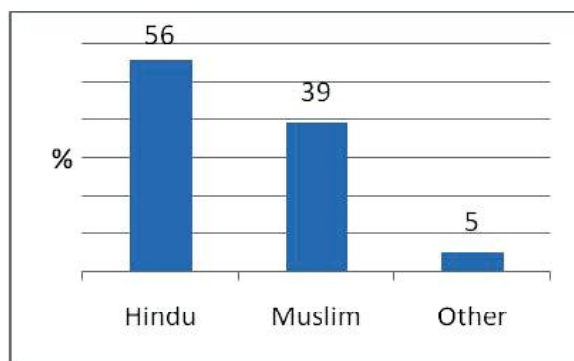
A. Demographic details

As mentioned a sample size of 600 workers was assessed by the survey team. The graphical representation of the demographic details are as follows:

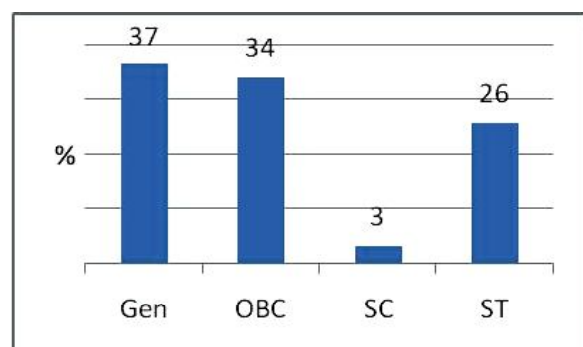
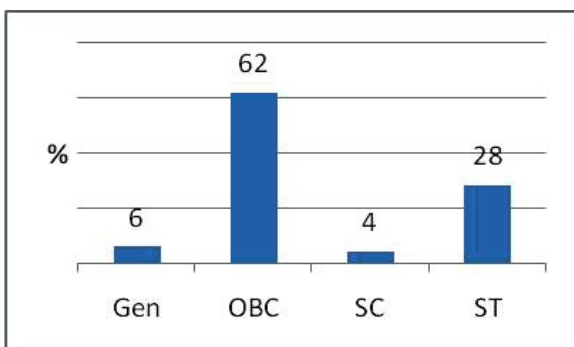
Age



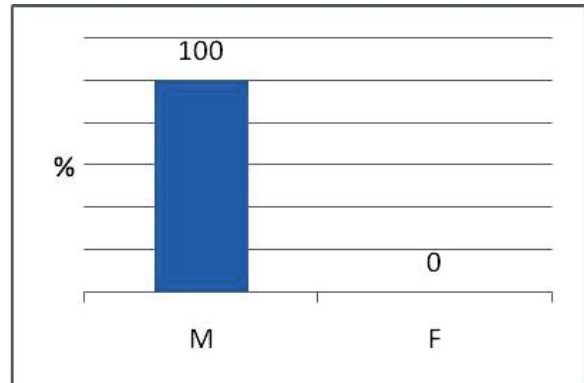
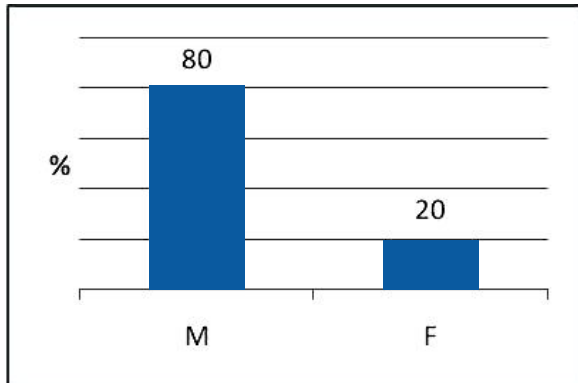
Religion



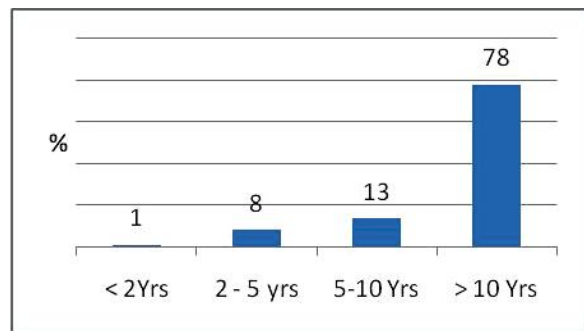
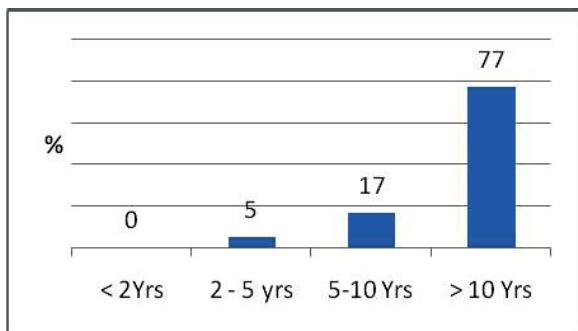
Caste



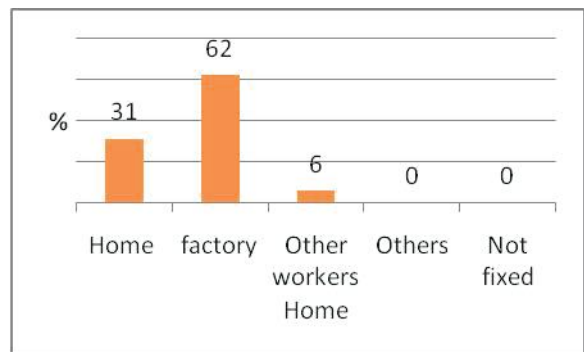
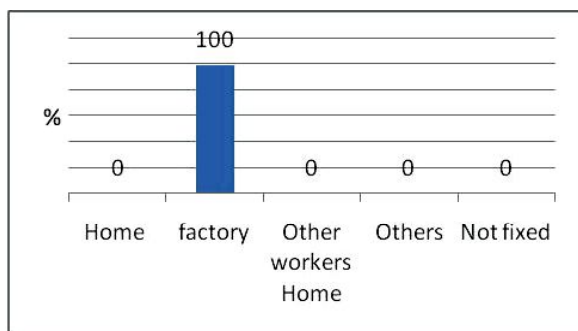
Gender



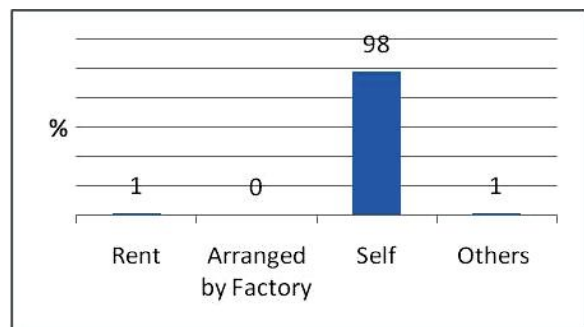
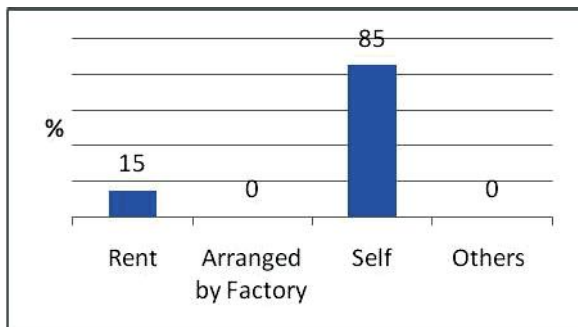
Age-wise population of respondents



Location of workstation [Factory]



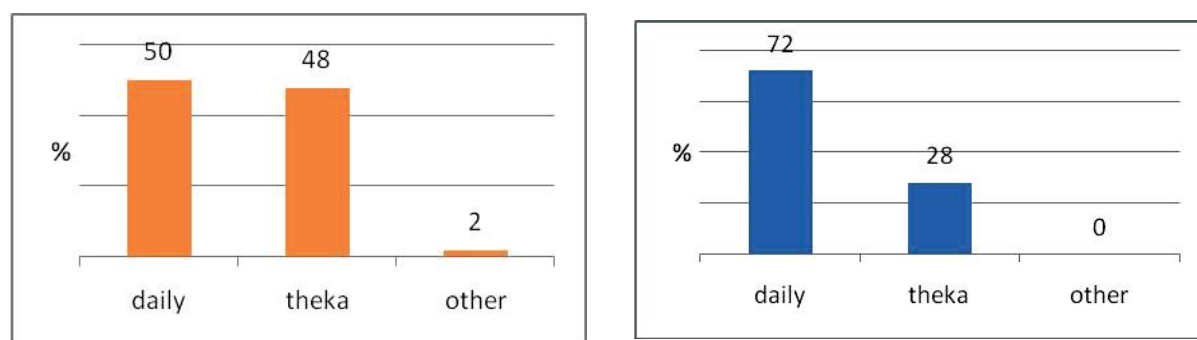
Status on housing



Along with bangles and other glassware, there is a small section of society involved in making decorative and other glass items by hand (handicrafts) at the household level. As many as 800 families around Firozabad are involved in this handicraft. This section of artisans is from a low socio-economic background primarily belonging to the Kushwaha caste of the Hindu families. The average income of an artisan household ranges from INR 3,500 to 5,000 per month.

B. Nature of work, including specific job profile

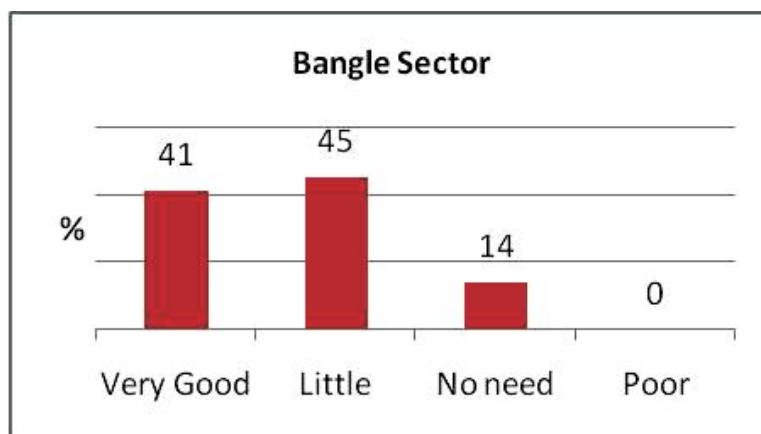
As many as 50% of the workers in the Bangle sector work on a daily wage basis, 48% of the workers work on the basis of theka (contract), a general work practice where worker(s) take the job order for specific terms (delivery of produce etc) and supply it back to the employer or other stakeholders. 72% of the workers in the general and decorative glassware sector work on a daily wage basis while 28% of the employees are hired in a contract series.



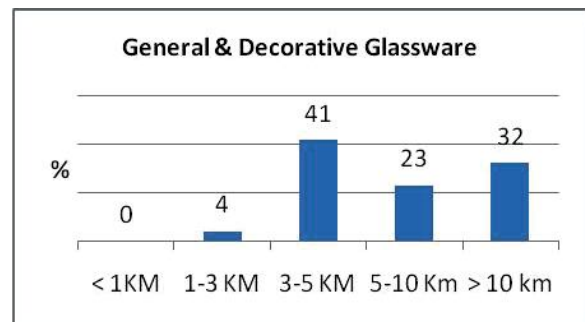
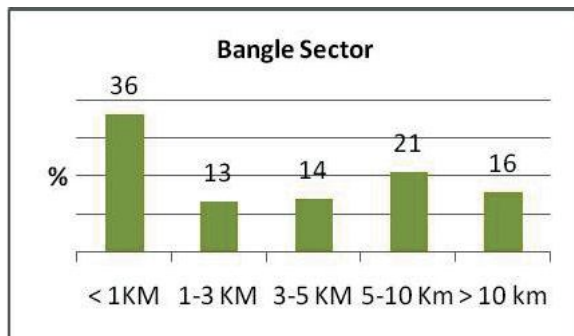
The average monthly income for a newly-appointed worker in the Bangle Sector is INR. 2,185. Whereas in general and decorative glassware sector the average initial monthly income is INR 1,889 only.

The survey of 292 respondents revealed that they worked from home. This is because work in this sector requires a pool of workers who work in a routine and fixed cycle.

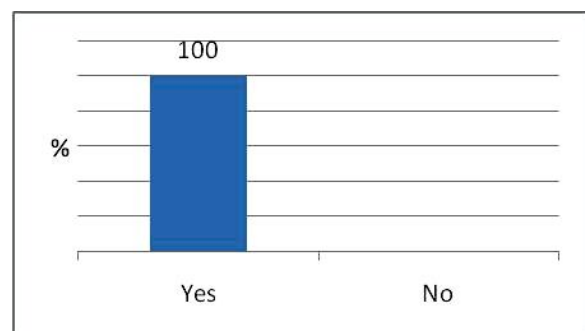
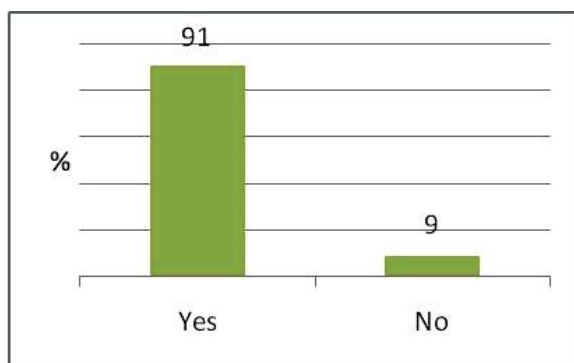
Level of family co-operation to worker in bangle sector



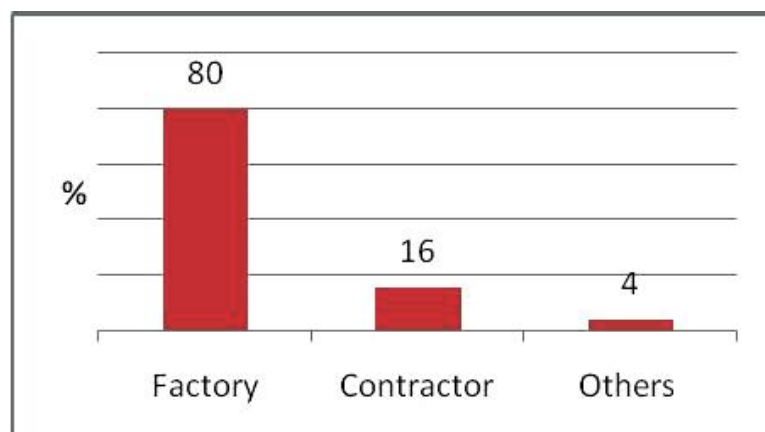
Commuting distance from home to the workstation



The expense incurred for travel: 91% of the workers pay their own travel expenses, whereas 9% workers are paid by other sources. However in the general and decorative sector, it's the worker who bears the transport cost.



Out of the surveyed workers, 91% workers do not pay their own travel expenses, 80% get an allowance for daily transport from the owner of the factory while 16% get the same through a contractor. This attribute is very important in terms of understating reimbursements given to workers. The workers living nearby save money on this account.

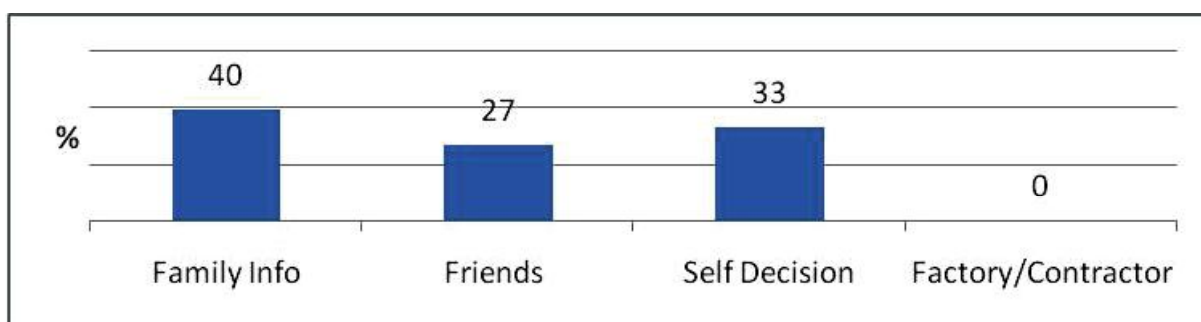
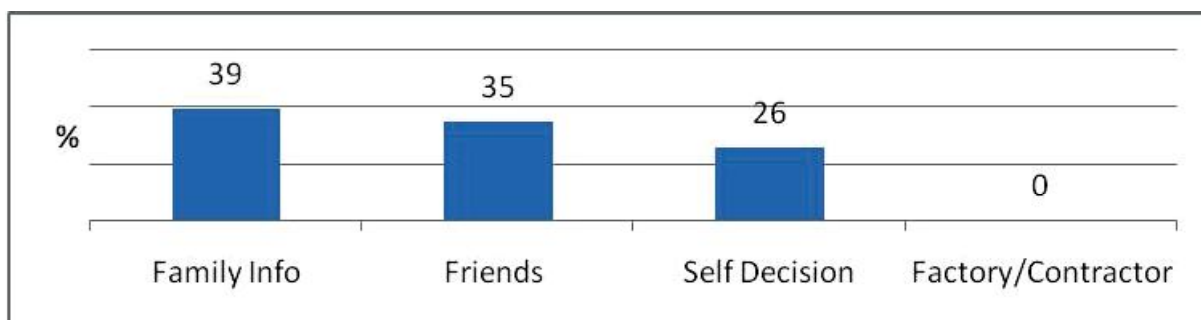


On an average only one member of a family works in the same profession in the bangle sector, while in the decorative and general glassware sector as many as three members are involved in similar work.

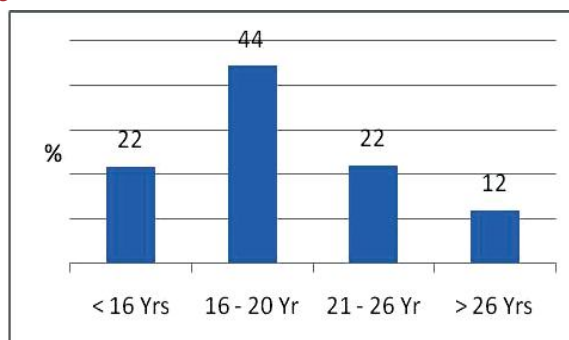
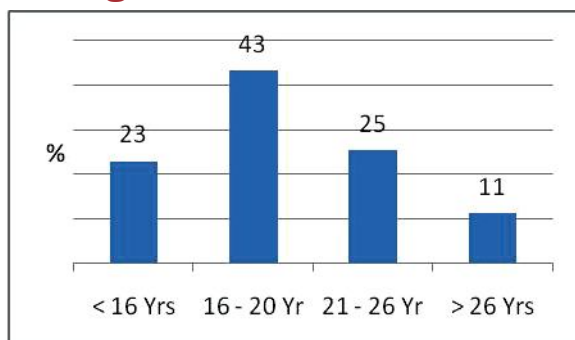
In the handicrafts sector, the manufacturing units are micro-enterprise units at household level. All the activities, from making items to coloring, are performed within the household and on an average two to three members are involved in the activities.

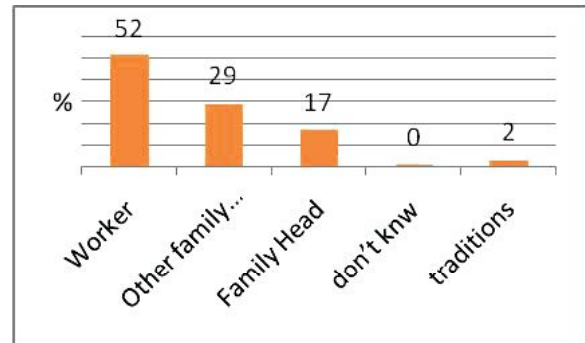
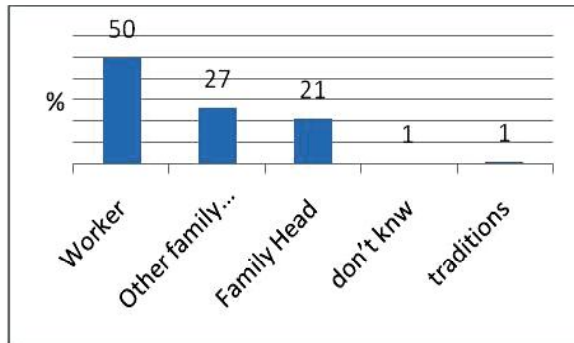
C. Recruitment Process

As far as choosing the glass industry as a profession is concerned the survey revealed that the workers are highly influenced by their family members who are somehow directly or indirectly associated with the sector. 39% of the workers in the bangle sector and 40% of the workers in the general and decorative glassware sector were advised to take up the profession by family members already involved in the trade.

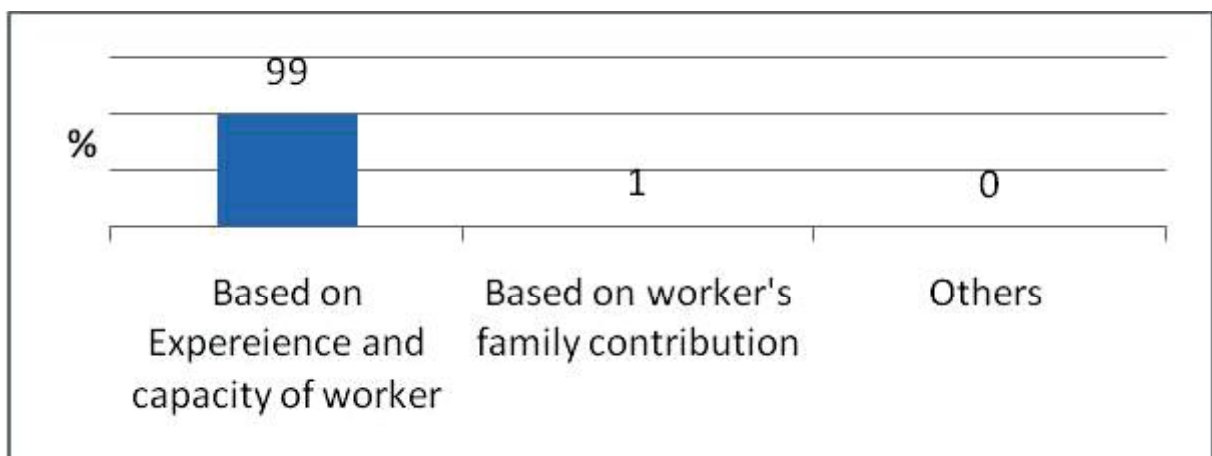
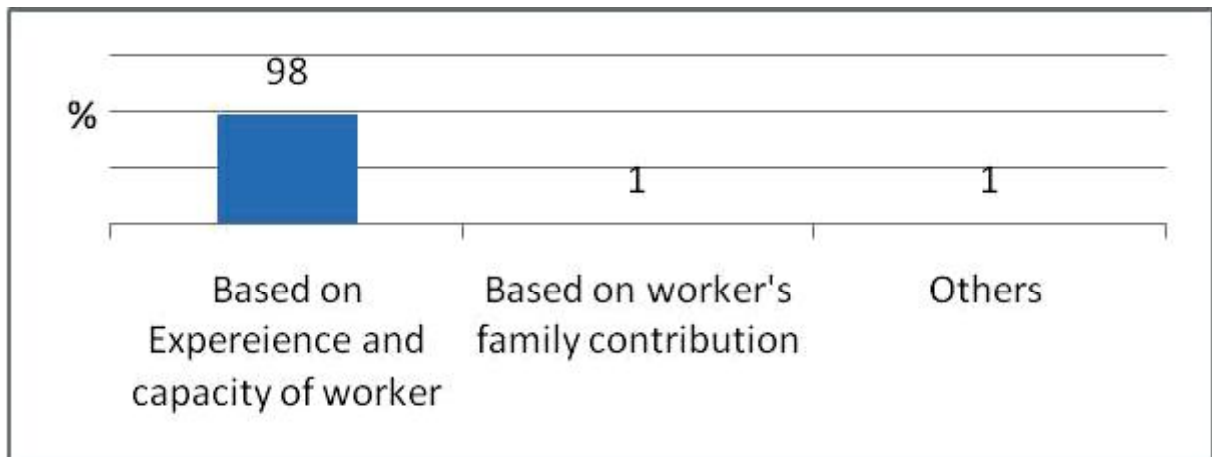


The age at which workers start the job





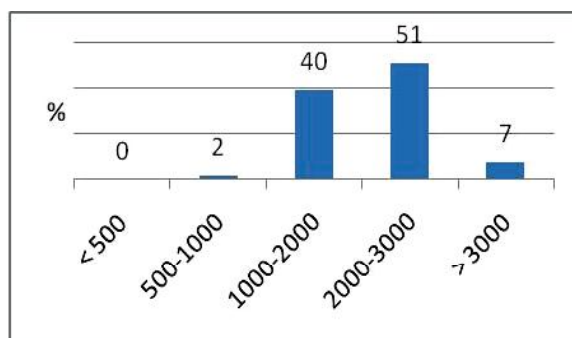
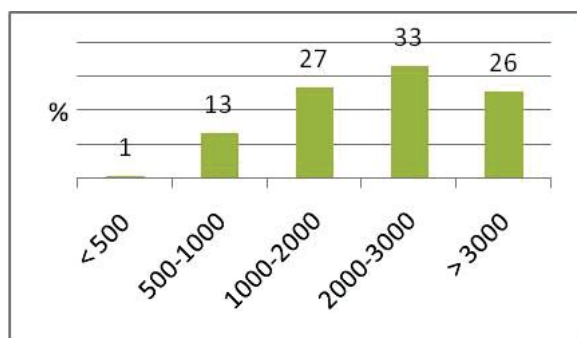
Even if the profession runs in families and is handed down from one generation to the next, it is now widely felt that skill capacity and experience should be the basis for recruitment.



In the handicrafts sector, the families usually do not employ other artisans, but however if they are training an artisan they usually teach free of cost but the trainee has to work for them till they recover their dues (raw material wastage and other costs). At other times, artisans, who are large entrepreneurs, outsource some components of the production, like the painting of small parts, to other artisans.

D. Employment Conditions

30% of the workers in the bangle sector earn INR. 2,000 to 3,000 per month. The percentage of workers, drawing the monthly wage of INR 2,000 to 3,000 is much higher in general and decorative glassware sector. Not more than 7% of the workers in the general and decorative glassware scheme earn more than INR 3,000 a month. The figures are slightly more encouraging in the bangle sector with nearly 26% of the workers earning more than INR 3,000 a month.



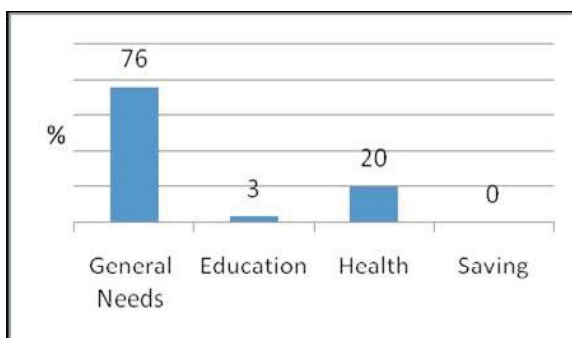
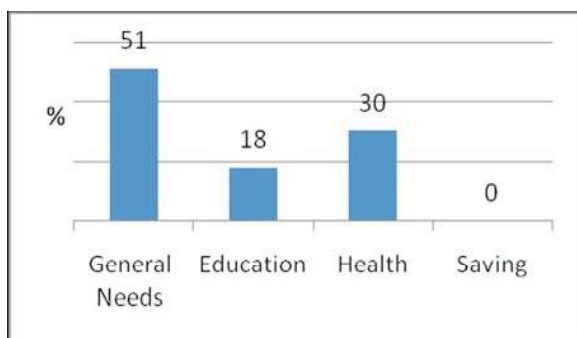
73% of the workers in the Bangle sector say that they get their wages in time. However in the general and decorative glassware 61% of the workers do not receive their wages in time.

Salaries in the bangle sector, are delayed by as many as two days. On the other hand, in the general and decorative glassware sector, salaries are not delayed beyond a week of the due date.

Workers were asked if they were satisfied with the offered wages. 96% workers in the bangle sector and 99% workers in the general and decorative glassware sector felt they deserved higher wages.

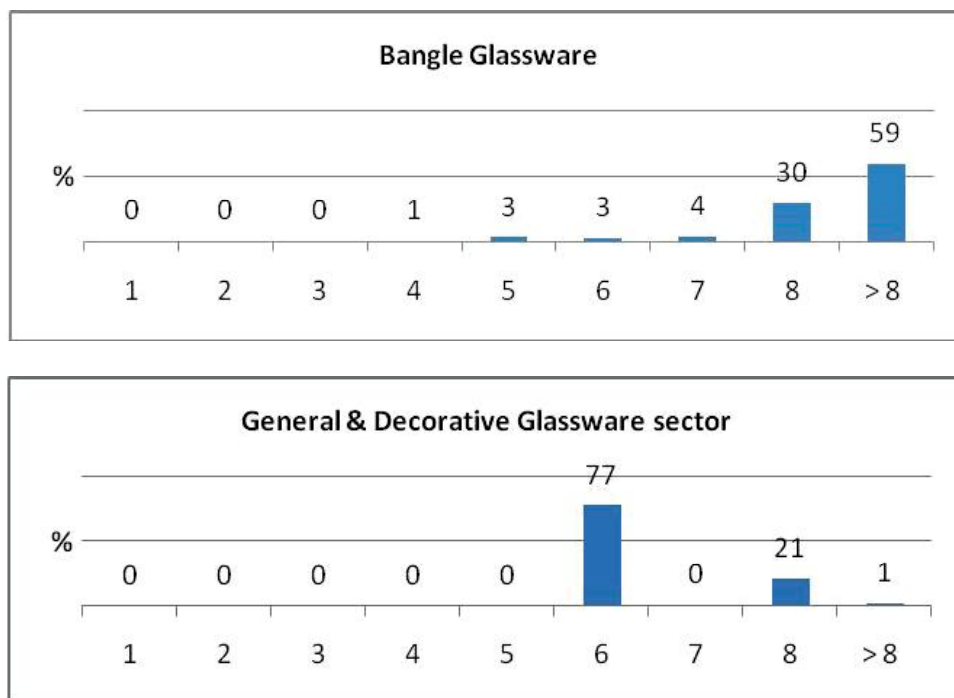
The survey found that wage expectations are hinged upon the skill domain of the workers. Workers, in the bangle sector, felt that the ideal expected wage for a month was INR 5,300 whereas in the general and decorative glassware sector, the minimum expected wage was INR 7,200.

Income/Expenditure distribution of workers

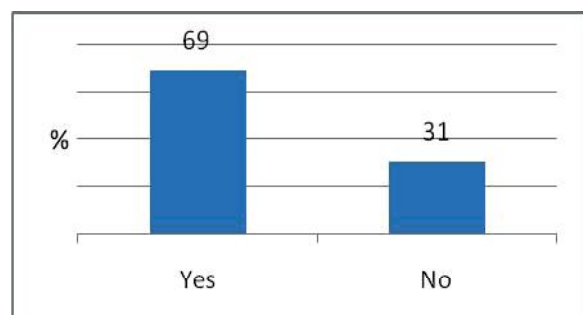
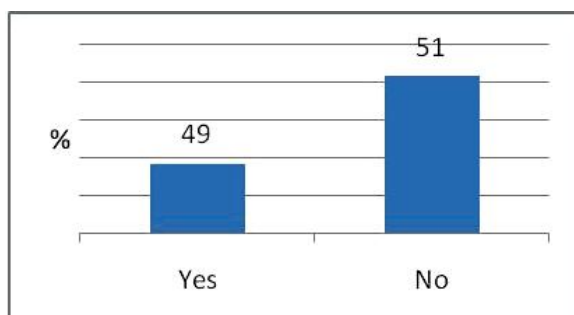


The survey revealed that workers, in both the sectors, had no specific saving plans. Workers, in the general sector and the decorative glassware sector, spent 20% on Health alone. This is primarily because this is a highly hazardous occupation. The workers demand immediate intervention here so that they can invest the money they spend on health on what concerns them more - children's education. In the general and decorative glassware sector, the investment on education is just 3% as compared to the 18% education investment in the Bangle sector.

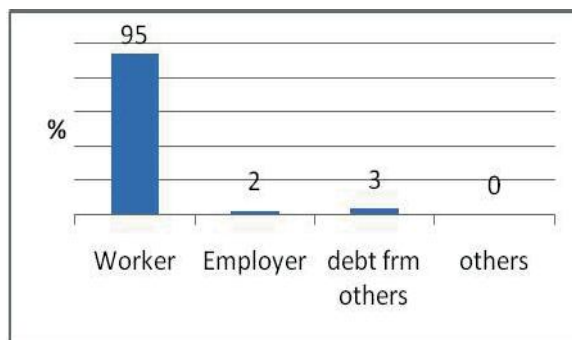
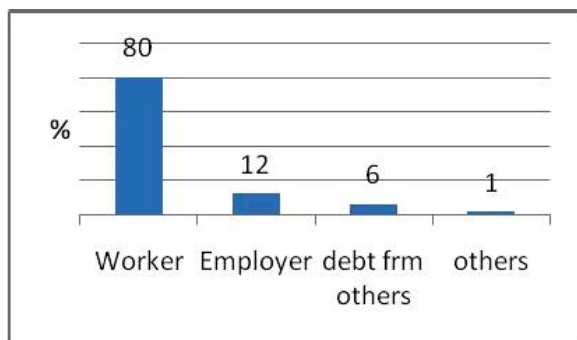
Work Hours a day: The maximum work shift extends to about eight hours a day. The study report, however, reveals the bitter reality. There are 59% workers in the Bangle sector alone who work much more than eight hours a day compared to the mere 1% in the general and decorative glassware sector. Since the Bangle sector employs most of the worker population and is home based some serious initiatives from the law & order front are a must.



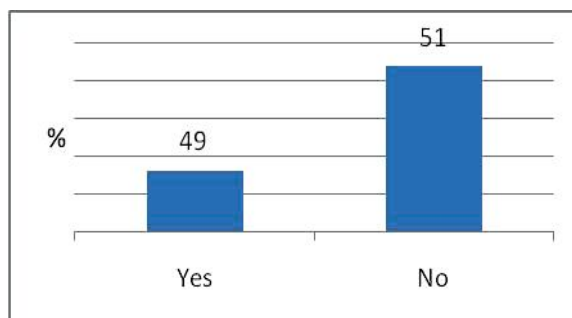
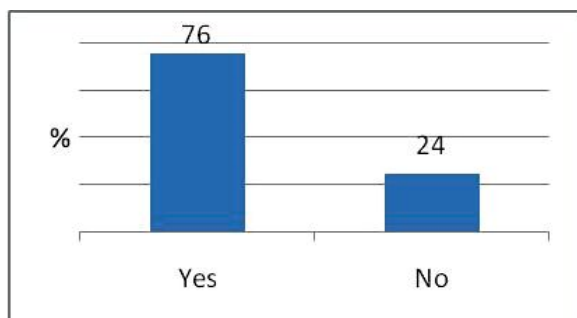
Work- related Accidents



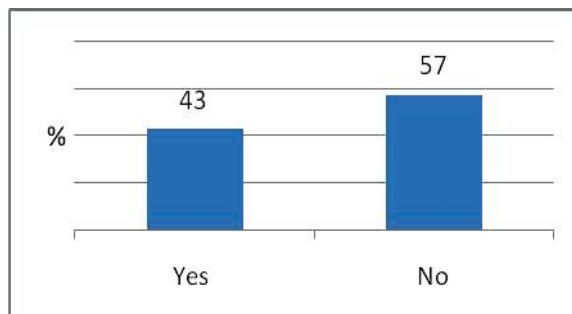
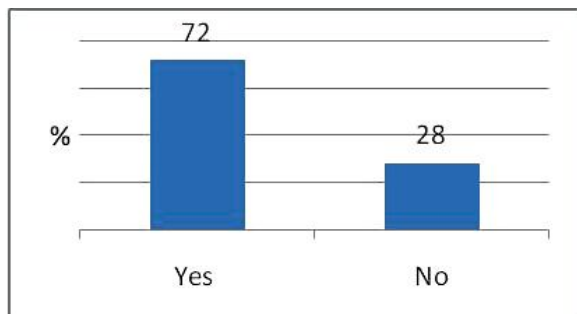
Workers largely pay their own medical bills. The survey suggests 80% of the workers in the bangle sector and 95 % of the workers, in the general and decorative glassware sector pay their own medical bills. 9% of the workers borrow money from others for a possible solution to their unending list of medical woes. The study suggests measures like medi-claim and health insurance to be a part of the interventions in the Glass-ware industry for the workers at large.



When asked about whether there is work load/pressure during the year, 76% workers in Bangle sector affirmed that this was indeed the case whereas in general and decorative glassware sector, 49% of the workers affirmed the same.



The same has been upheld by workers who were queried about a lighter work pressure/working load.



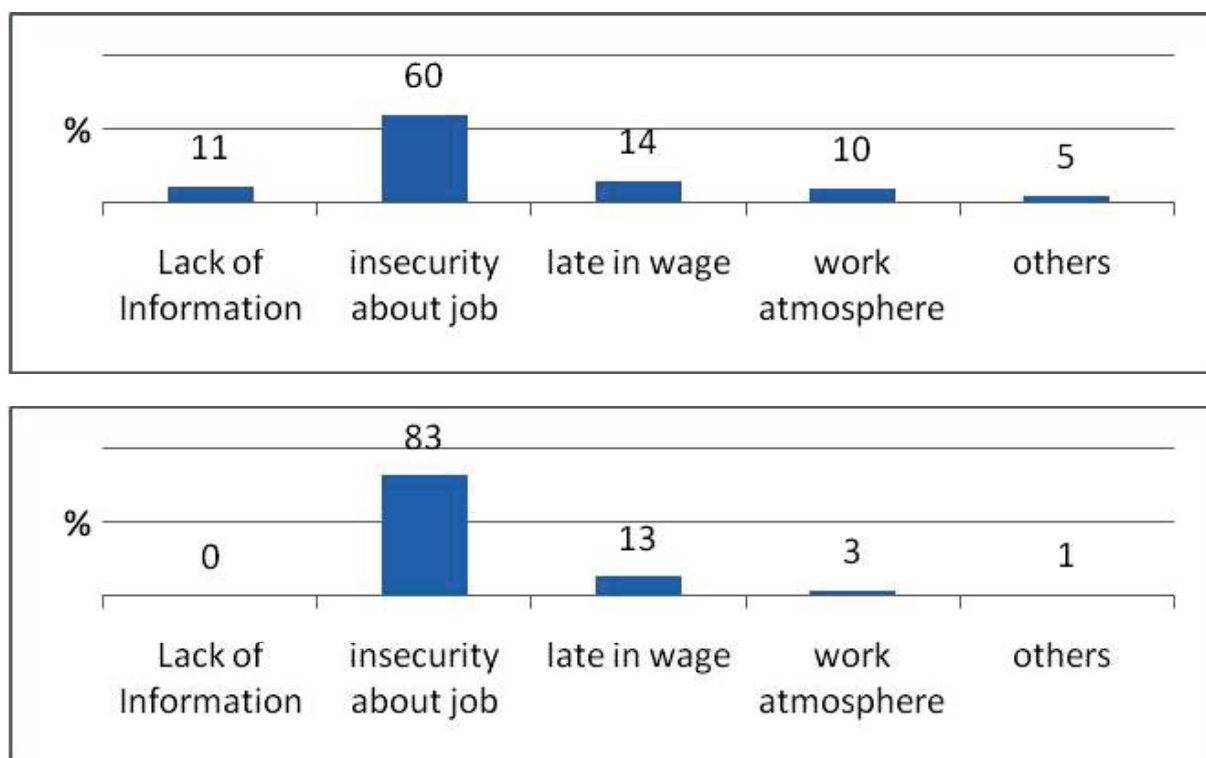
Trades with High Salary

Following are the trades which emerged as highly paid since the skill required by these workers are far above the rest for the specified trades.

General and Decorative Glassware		
Sn.	Trade/Skill Required	Trade Name
1	Using mouth pressure for putting air inside the melted glass	Blower
2	Controlling the shape and size of the glass and temperature of the machine	Machine Operator
3	Extracting melted glass from furnace and giving initial shape	Gulli Wala
4	Giving shape to melted glass	Kach ko rule karne wala
5	Applying color through mould	Press Man

Bangle Subsector		
1	Highly Skilled work profile, throwing melted glass on the Cylinder and giving bangle shape to glass	Tar Wala
2	Coordinating with the workers , Quality checking and control measurement, Information about the entire value chain	Manager
3	Extracting melted glass from furnace and giving initial shape	Gulli Wala
4	observation of the ratio of mixture in glass	Cementer
5	Beautification of Bangles (Coloring through Compressor)	Compressor Color
6	Furbishing the bangles	Foal Lagana

Problems/Difficulties expressed by workers on various attributes



In the handicraft sector of the glass industry all artisans receive payment only on delivery of finished items and that too not on a regular basis. Many agents pay them in installments. These agents enter into a contractual agreement with artisans on the basis of the number of items to be made. No advance payments are ever made, other than to some large artisans.

There are no training facilities available to these artisans. They are not in favour of trainings provided by CDGI or other agencies as they feel that they are not learning much anyway keeping in mind the new trends) and moreover, in the absence of a stipend they do not want to lose their daily earnings.

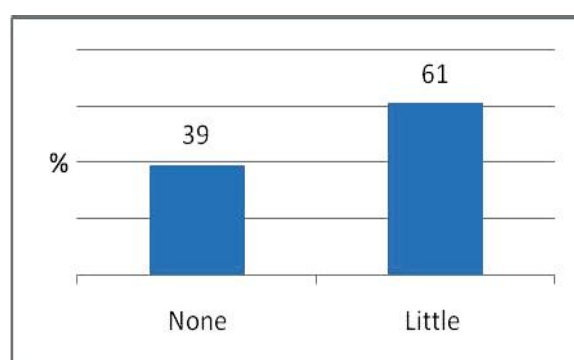
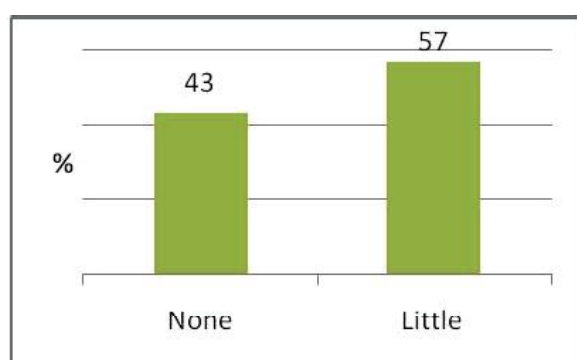
They feel that they don't need training, they know the art. A small section (20%) of artisans understand the need of training keeping in mind current designs and trends and are open to it. But they also demand that they be provided with a stipend.

There is no visible child labour in this sector. However, children from artisan families learn this art at an early stage and assist their elders. Many of the kids do not complete their education and join their elders in this sector or work with other artisans on a contract basis.

E. Education and Skills

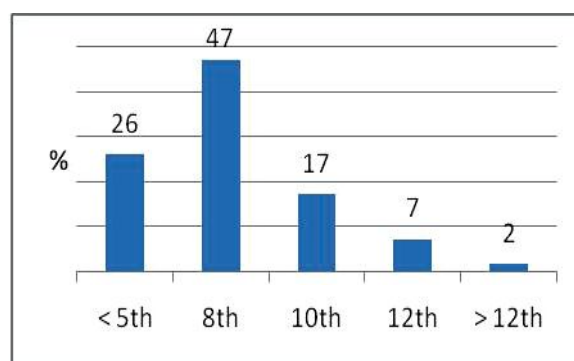
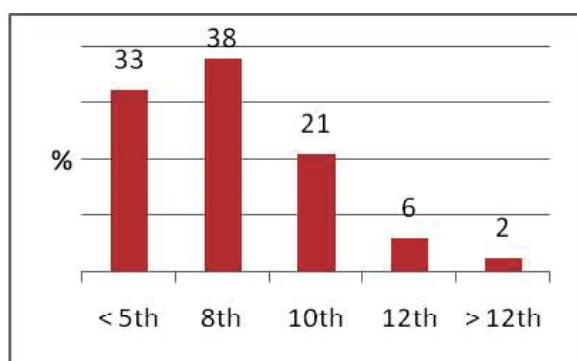
Literacy level

43% workers in the bangle sector and 39% workers in the general and decorative glassware sector are illiterate. However, it is not true that the rest of the workers are highly educated or just literate (literacy here means operational and functional literacy).



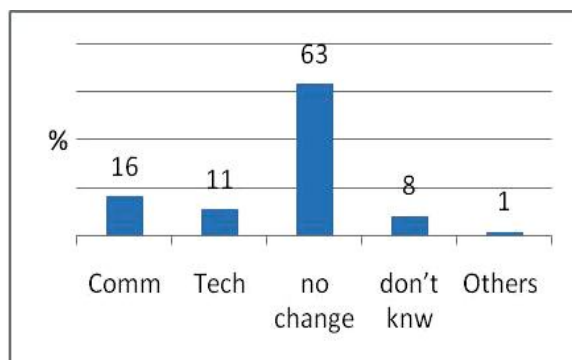
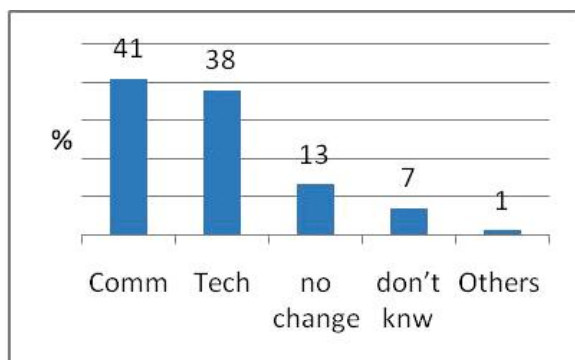
.It was satisfying to learn that 57% workers in the bangle sector and 61% in the general and decorative glassware sector can read and write also.

Formal Education among workers



38% workers in the bangle sector and 47% workers in the general and decorative glassware sector have completed the Plus Two level of the State Board for Education. On an average three members of a family are literate in the bangle sector, while two are literate in the general and decorative sector.

Workers also expressed their desire for education as it would eventually do them good. In the bangle the sector, 41% workers feel that education would improve their communication skills, 38% workers feel their productivity would improve with better access to advancements in technology. Whereas in the general and decorative glassware sector, the majority of workers disagreed with their counterparts in the bangle sector. 63% workers perceive no advantage is being educated; 13% of their counterparts in the bangle sector feel the same.



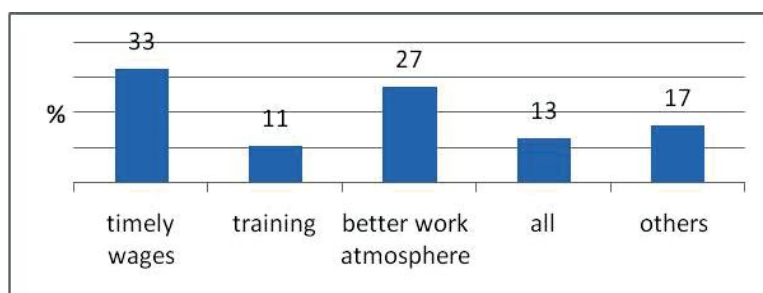
The education level of artisans from the glass industry is very poor, with 80% of them not educated above Class V. (Most of the artisans were reluctant to share their education status with us. They felt that it is not related to this study)

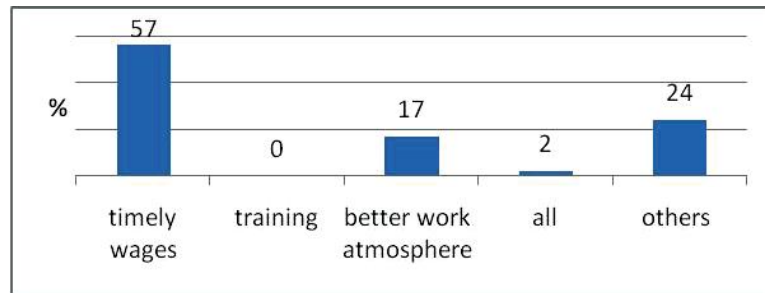
Some of the artisans are highly skilled and have access to market and better wages for their work. However, these artisans are reluctant to pass on their skills to other artisans as they fear losing their livelihood. The trained artisans however are ready to work for much less for similar items.

During the course of the study it was felt that most of the artisans are much too absorbed in their current work and are reluctant to try out new things. As clearly stated by an artisan, Ram Charan Sneh, “Yahan ke zyadatar log kuan ke maindhak hain, isse aage kuch dekhna nahi chahte”. (People are narrow minded here and do not want to learn more.)

F. Aspirations of workers

Workers spoke at length about the specified scale of identified attributes. The parameters are basically centered on timely wages. The fact is that not a single worker in the general and decorative glassware sector aspired for training and skill enrichment, though 11% workers in the bangle sector were interested in acquiring better training skills. Thus it's evident now that real and topical issues have a definite edge over clinical issues like training and a better work atmosphere





Workers showed anxiousness about what the government can do for them. 58% workers in the bangle sector expect better technology/technique intervention in their work systems as it would minimize risk, 16% workers in the general and decorative glassware sector feel the same. Also it is important to note that in general and decorative glassware sector not a single worker expects training/skill enrichment exercises from the government. Most workers (84% in the general and decorative glassware sector and 26% in the bangle sector) expressed a wish for higher wages and job security.

During the course of the study it was felt that, the artisans' main aspiration is to gain access to more markets and expand their operations. Not too many artisans aim at gaining better skills. Artisans expressed their displeasure with the current condition of the handicraft sector by saying that they did not want their future generation to choose this profession.



Employer Profile

A. Glimpse of the Profile of Employers

The Firozabad glass industry provides a source of livelihood to over 150, 000 people and produces an estimated 2,000 tonnes of glass products daily (estimates given by the industry veterans), including around 50 million bangles. These glass products are mainly low-value items. The bangle-making industry comprises tier-upon-tier of units whose activities are closely interlinked. At the apex are open pot furnace units that produce molten glass and “raw” bangles; below them are thousands of household-level units in which these “raw” bangles are processed and finally there are hundreds of muffle furnace (pakai bhatti) units in which the processed bangles are annealed to yield the finished products.

“Is shaher mein to chudi ka kam to pichale 250 se 300 varsho se ho raha hai, pahle to chudi hi banati thee per ab to aur bhee bahut kuch banane laga”. In this city bangle making business has been in existence for the last 250 to 300 years, earlier only bangles were being produced but now a variety of products are being produced, said 50-year-old Mr. Raghav who runs a small tea stall near Kohinoor bangles, and who was earlier working as a blower in bangles making.

About 200 glassware industries are currently in operation (production) at Firozabad. The number has decreased after energy switching over (due to TTZ- Taj Trapezium Zone*) from Coal to Natural Gas, as natural gas either not available at all or could not fulfill their requirements.

Islam khan, owner of Express Glass Work, was the first person to take an initiative in installing gas operated furnace says, "We had no experience of working on gas-based furnaces and the government certainly did not help us in the conversion." He is thankful to TERI, as he was the first person in the city to work with TERI in making the first gas operated furnace. Mr. Khan had to face initial financial losses. Not too many people applied for natural gas connection supplied by GAIL and had little information on how much gas would be required for consumption.

The overall product being produced in Firozabad can be broadly categorised under three heads-

- ✍ Bangles
- ✍ General glassware products (kitchenware, drinking glasses, beer glasses, wine glasses, dinner table set, bowls, plates, lemon-sets, pudding sets, different pots, head lights, scientific equipments etc.) and
- ✍ Fancy glassware items (table decorations, lightning, handicraft products etc.)

Most of the employers opined that it is only the bangle making business which will help them in survival where China has not stepped in as yet. Other products are facing a lot of competition in the global market, says Hanuman Prasad, President of a Syndicate and an owner of, Sarvodaya Glass Industry.

B. Classification of Employers

Employer classification depends upon:

- ✍ Type of work they are involved in (export houses or industries which are producing export products and are considered big industries/players)
- ✍ Number of workers working in their factory,
- ✍ Geographical size of the factory

There is no data available with the government, and related institutions like the District Industries Centre (DIC), on the exact number of household units undertaking various production activities in the glassware industry of Firozabad.

Glassware products go through a number of different processes before launched as a final product. Bangles go through 60 processes before finally reaching the market.

Earlier these factories were spread on the outskirts of Firozabad, but now they are very much a part of an industrial estate. Of the seven-lakh population of the town, it is obvious that, barring the factory owners, everyone else belongs to the working class.

Fig3 :

Total Registered Factories	
Under DIC: 3387	
Total Working Factories at Present	: 1914
Total Production	: 800 cr
Total Number of Exporter	: 47
Total Export	: 62 cr.
(Source: DIC, Firozabad)	

All the enterprises in the glassware industry of Firozabad can be said to be operating at three levels.

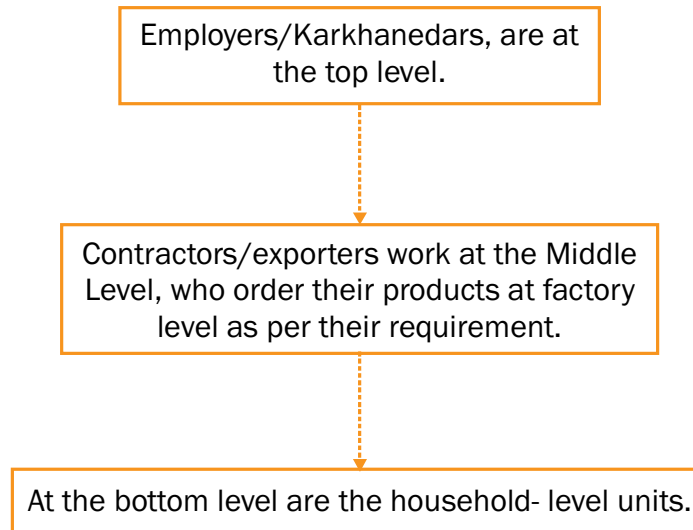


Fig4



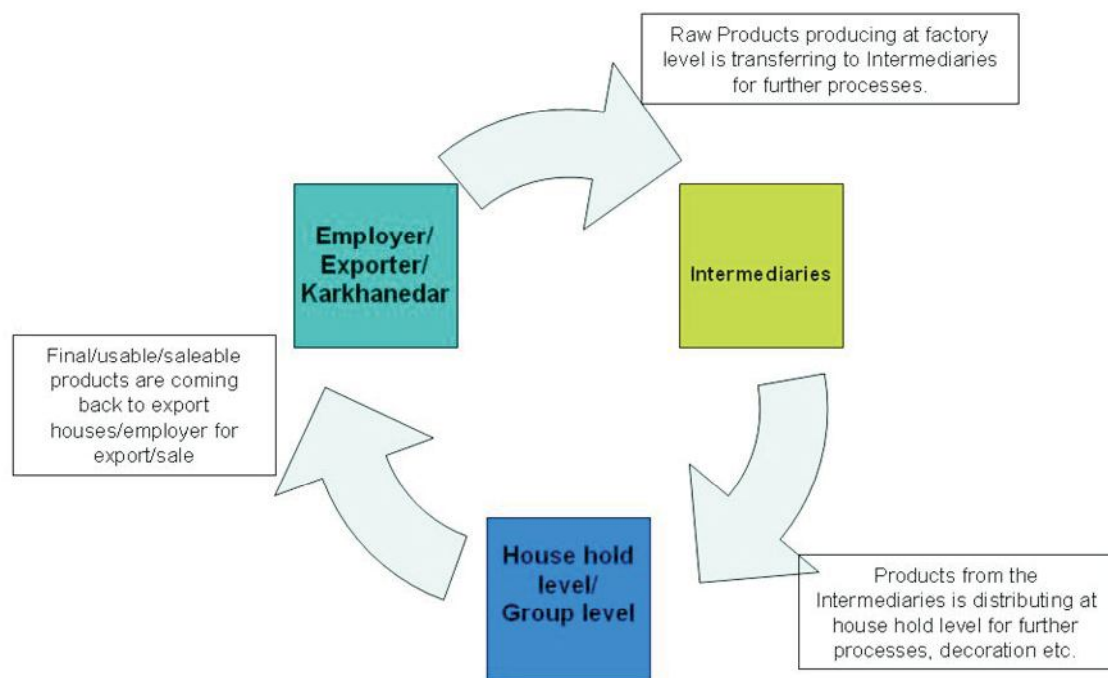
Taj Trapezium Zone (TTZ) is a defined area of 10,400 sq km around the Taj Mahal to protect the monument from pollution. The Supreme Court of India delivered a ruling on December 30, 1996 regarding industries covered under the TTZ, in response to a PIL seeing to protect the Taj Mahal from environmental pollution. It banned the use of coal/ coke in industries located in the TTZ with a mandate for switching over from coal/ coke to natural gas, and relocating them outside the TTZ or shutting down. The TTZ is comprised of over 40 protected monuments including three World Heritage Sites the Taj Mahal, Agra Fort and Fatehpur Sikri. TTZ is so named since it is located around the Taj Mahal and is shaped like a trapezium.

C. Nature of business

Firozabad produces an ample variety and range of products. The major players are the employers and exporters at the factory level. At the house-hold level, products are assembled and decorated before being sold.

Business relationship among different employers

Fig5



Product Profile :

Most Firozabad glass units are into producing soda lime silica glass. Some glass units add a percentage of chemicals like lead, potash, boron etc. to improve the quality. The product range includes tumblers, table wares, bangles, glass beads, block glass and vitrite glass, glass refills, glass art wares and decorative items. Of late some units have started producing containers as well.

Bangles - Bangle production is a monopoly at Firozabad.

Glass Art wares - Major products include toys, candle-stands, crosses, X-Mas trees, different fruits, mini-trees, images of birds, animals and gods and goddesses. These products are made for Indian and export market.

Glass Domestic wares - Since the 19th century drinking glasses and beer glasses, wine glasses, dinner table sets, have been manufactured in attractive cuts and charming designs based on modern emblems made in cottages as well as in factories.

Glass Scientific and Lab wares - In the last decade beakers, flasks, containers and other lab wares have been manufactured here. They are largely required by educational and research institutions for their laboratories.

Glass Automobile wares - Light bulbs, mine battery bulbs and other light and sight equipments are produced here for two-and four- wheelers.

Glass Street and domestic light wares - Many glass items like miniature bulbs and high-power voltage bulbs are products for urban and rural areas.

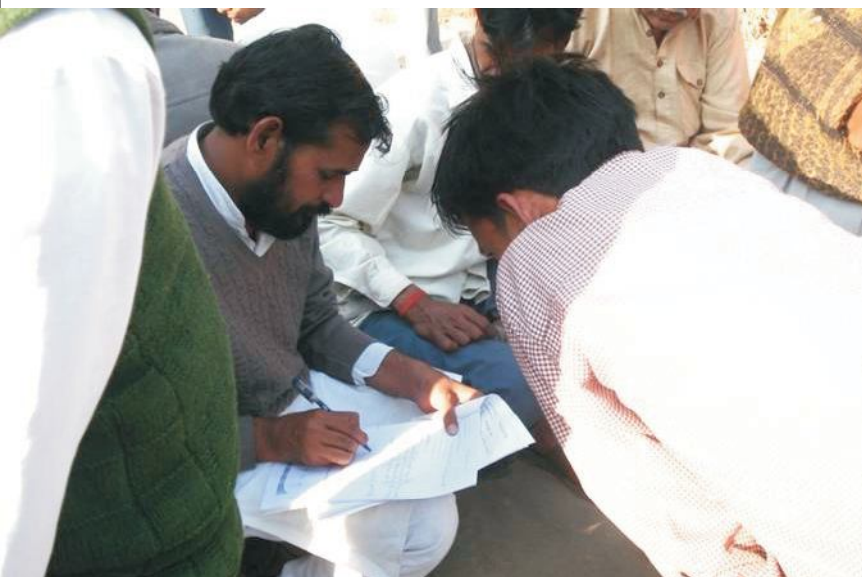
It is estimated that 6% demand of bulbs is being fulfilled from here said Senior Manager of Hind Lamps Ltd.

Glass Chandeliers - Since the Mughal period, Firozabad has been producing different shapes of hanging chandeliers. Now many geometrical designs have been added to suit modern tastes.

Glass Marriage wares - Bangles, kangans and karas are produced at Firozabad exclusively for women as part of married women jewellery. It is estimated that four new designs are added every year. Shapes, like pearls, seeps, and golden shades are being added in glasses - narrates r. Mansoor a shop owner of Chudi market, Laxmi nagar.

Production Processes:

The glassware industry is comprised of a large number of production units that undertake different production processes. Unfinished intermediate products to other units in the supply chain are passed on for further processing and value addition depending upon the buyers requirements.



D. Existing practices

Safety Measures

Working with glass is not easy at any stage, whether it is molten glass or rough glassware product. Most employers opine that workers have the necessary expertise in their job and they don't need any kind of safety equipment, says - Hari Mohan Gupta of Jain Glass Works.

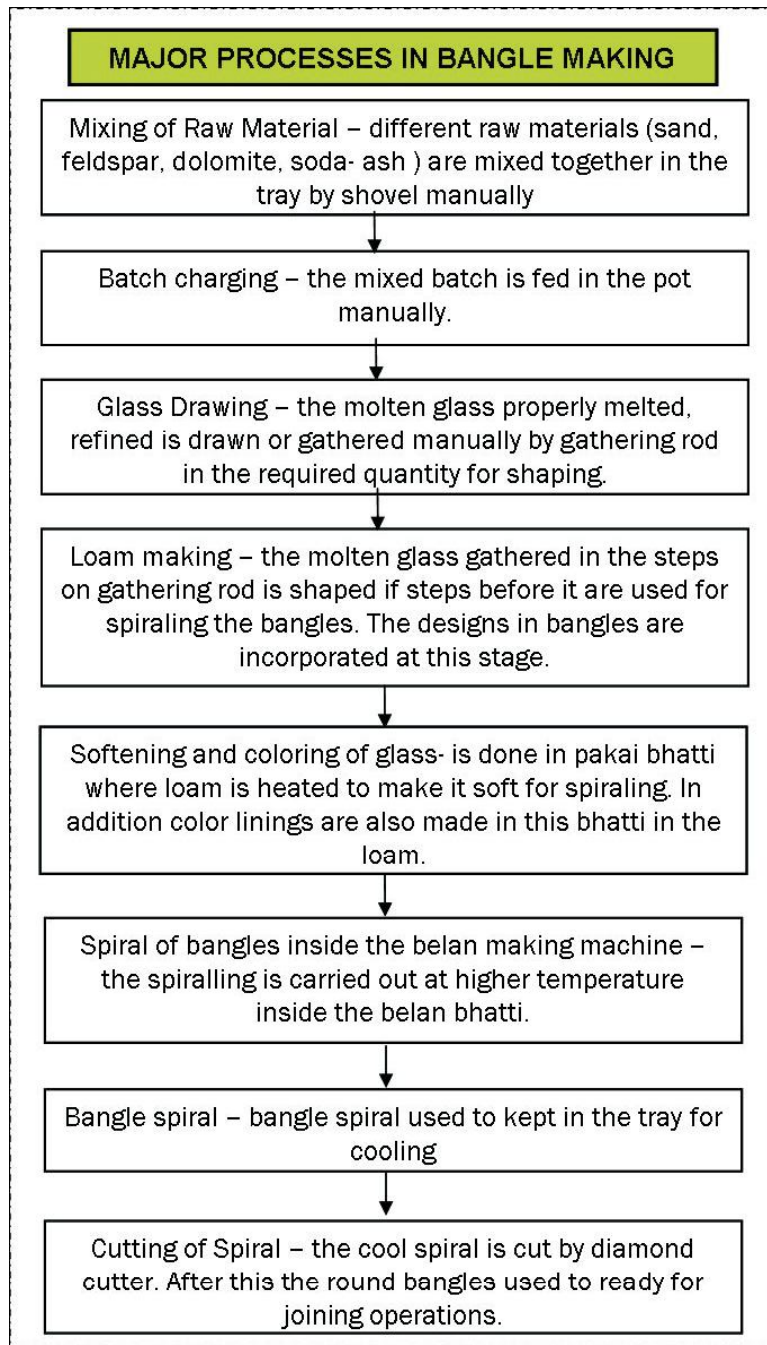


Fig6

The workers look pale and their eyes are deep yellow in colour. Their palms are yellowed and at some places the skin is hard and pallid green due to the skewer they use to hold to take out the molten glass.

"There is no pain but our palms are unfit to fondle the cheek of a child," says Suresh while having his tea near an industrial state.

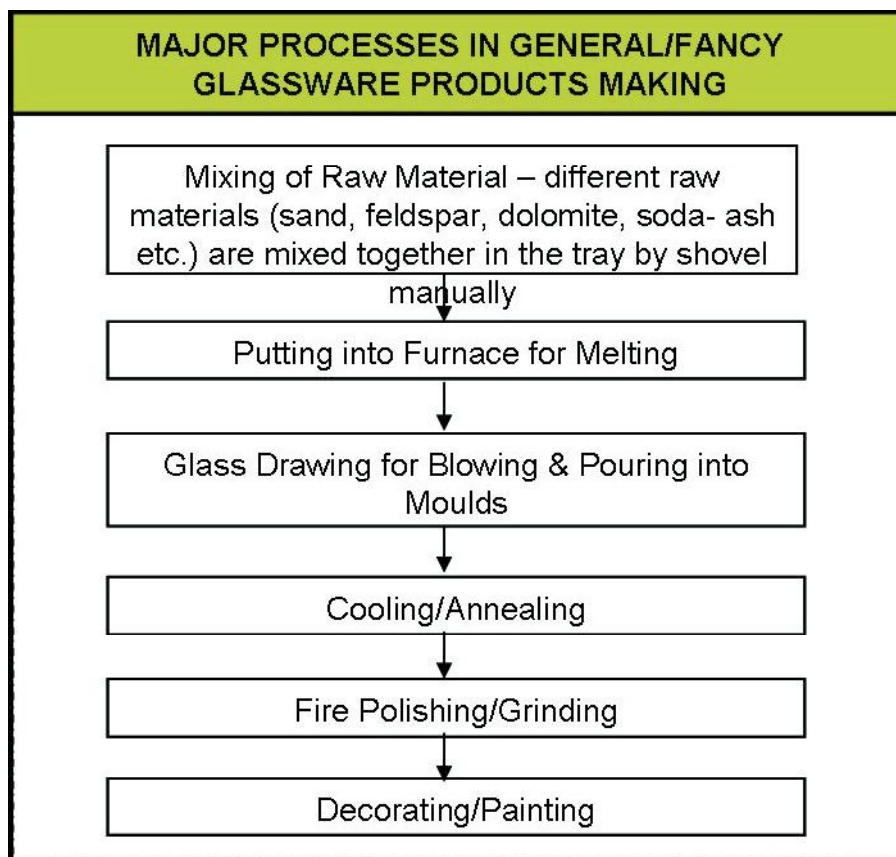


Fig7

Most employers do not feel the need to provide workers with safety gadgets. They feel there is nothing wrong with making employees work for unending hours before a hot furnace. They are quite used to working in such conditions, uipped Alok Gupta of Neelam Glass worker.

Not too many employers have cared to provide workers with better working conditions. “We are not forcing the worker to work. They work to fulfill their family needs. It is true that it is very hot inside the factories – but the workers have got used to it.” Says Mr. Mazhar of Soni Glass Works.

The handling procedures are very poor and unsafe. The molten raw material is handled without any safety measures and protective covers. Workers do not use any protective cover for the face, or for feet and hands while handling molten raw material at a very high temperature. In the process, their face, hands and eyes are exposed to a very high temperature. If while carrying and pouring molten raw material into the mould there is any negligence, it would be fatal for the workers. There is no provision for fire-fighting equipment in these units.

Child Labour

“Pankaj, a very smart boy of Kashiram Vihar village, who is studying in Class X, helps his

parents in bangle decoration once he is back from school. I asked him - “Pankaj Padhai ke bad kya karoge” (what will you do after your studies/what is your future plan). He replied - “Sir! Kuch bhee karoonga lekin choodi ka kam nahi karunga” (I will do any kind of job but not bangle making). I tried to know the reason but he said “accha kam nahi hai”. Pankaj said that it made him feel good to help his parents in their work but “Mai padhai karke aage koi doosra kam karna chahta hoon”

Several hundreds of girls are involved in the jalai or soldering of bangles in dark and dingy rooms in the lanes of Firozabad. Girls, in a group of four, solder 12,000 bangles a day, and earn between Rs.20 and Rs.35. They do this after school to meet their educational expenses.

Many children are also employed in the packing and sorting work, says Puthu Singh Rathore, Vice-President of the Kanch Udyog Krantikaari Mazdoor Sangh. It is said that child labour is rampant in this industry but I feel that the involvement of children in the work in a limited way, can help enhance a child's personality without interfering with schooling, recreation and rest”, says Madhur Singh, Assistant Labour Commissioner.

Value Chain - Bangle Mapping

Bangle-making is perhaps the most important economic activity in the Firozabad cluster. It therefore makes sense to come to a thorough understanding of the various stages of the bangle-making process keeping in mind the profile of the workers, their working conditions and the impact of the industry on their lives.

The study helped in coming to an understanding of the bangle-making chain, and the plight of workers engaged in the various stages of the manufacturing process. It revealed that nearly all the workers in the bangle-making chain are illiterate. Most of them come from Firozabad or its neighbouring districts. There are a sizeable number of migrants from Bihar as well. Most of them have no access to basic human needs such as clean drinking water, sanitation, health-care, and proper housing. In general, bangle workers live in tiny, ill-ventilated dwellings in highly congested areas of



Graphical Mapping

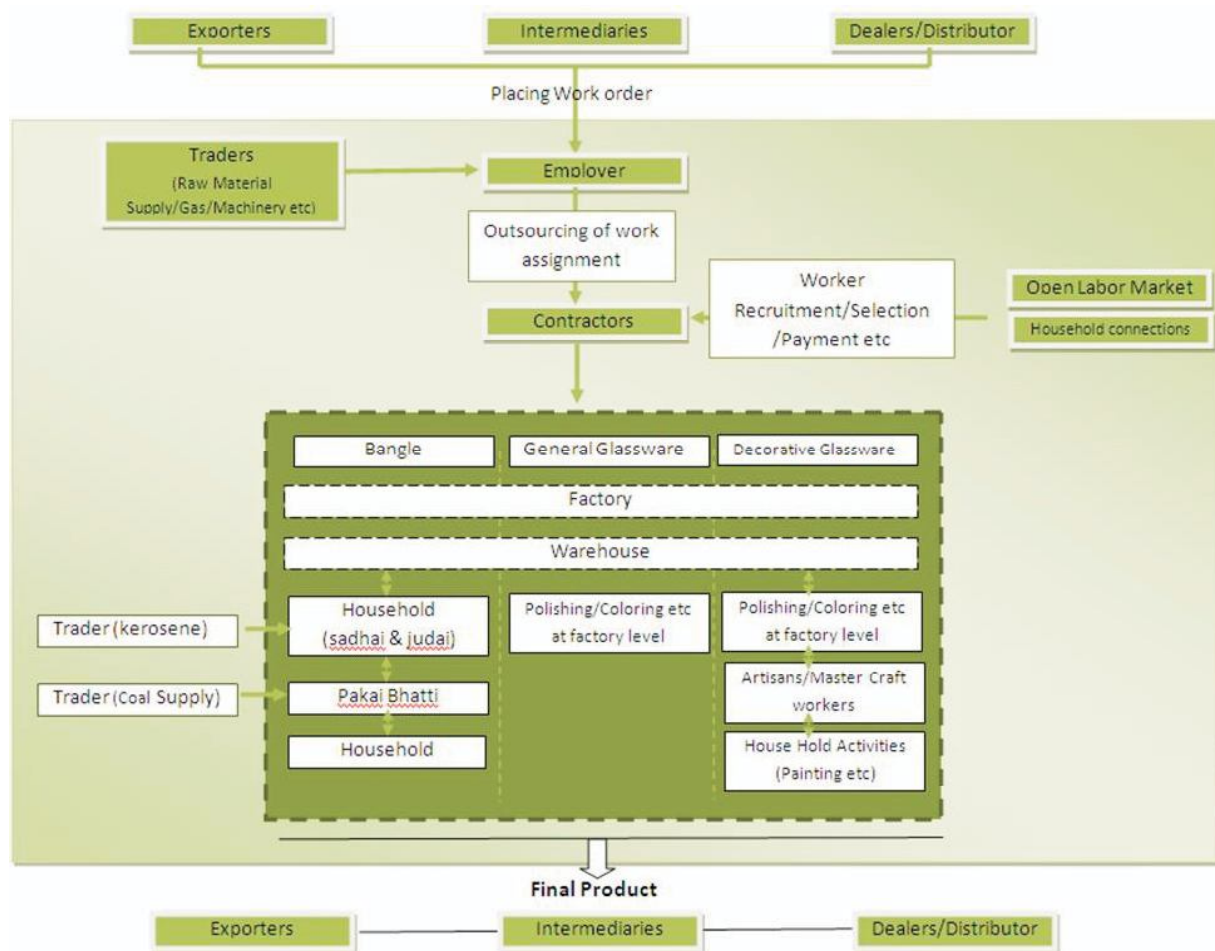


Fig8

Firozabad. Worse, their cramped living space is used for bangle-making operations as well. As a consequence, the workers, primarily women and children, are exposed to extremely high levels of pollution in their own homes. This makes them vulnerable to a variety of respiratory diseases, including tuberculosis. To add to this drudgery, the workers exposed to corrosive acids and other toxic chemicals while doing decorative work on bangles. Burn injuries and cuts are common; eye-related ailments too are widespread.

Bangle-Making Procedures and associated activities

Bangles are made from glass melted in open-pot furnaces (and sometimes, tank furnaces) in

a series of steps that involve special kinds of furnaces. The basic steps are briefly described below:

First, a worker (known as the gulliwalla) uses a long iron pole to scoop out a blob of molten glass from the pot furnace at a temperature of around 1,300 °C. He passes on the blob to a worker who gives it an appropriate shape (Somewhat resembling an ice-cream bar!). If necessary, he coats the glass with a small quantity of coloured block glass that is melted separately in a small refractory container called tali.

The shaped blob is then taken to the sekai bhatti—a furnace fired directly by coal. Here, a worker, known as the sekaiwalla, gives the semi-fused blob of glass a roughly cylindrical shape by rotating the rod.

The still-soft cylindrical mass of glass, now cooled down to a temperature of around 500°C, is then taken to a third coal-fired furnace, the belan bhatti. Here, three workers draw the glass into a spiral shape (Figure 8). The belanwalla rotates a belan machine – essentially a long iron rod – inside the furnace at a consistent speed. The tarkash draws a thin filament of glass from the melt and places it steadily on the rotating rod, so that the constant turning motion gives the filament a spiral shape. The muthia uses an abrasive tool to cut off lengths of the spiral at periodic intervals.

The spiral lengths of glass (still hot but now hardened) are collected and sent for cutting. The cut bangles are tied into bunches with strings. Each bunch contains approximately 320 bangles and is called a tora.

The bangle bunches are then sent to household units for further processing into “raw” bangles. Finally, the raw bangles are annealed in a furnace known as the pakai bhatti to yield the finished product.

Bangle-making is a complex chain of interdependent processes carried out by skilled workers at the household level with all the smoothness and precision of an assembly line akin to a large factory. The bangles, coming out of the glass-melting unit, are plain without any decorative work on them. Sedhai and judai are the crucial first stages in converting raw bangles from tank/pot furnace units into finished products. Both operations are carried out by workers in their homes. Sedhai means “straightening”. As the name suggests, in this stage the raw bangle is leveled or straightened by heating it over a small flame – usually from an LPG (liquefied petroleum gas) cylinder – and then pressing the heated bangle against an iron plate. Women and teenaged girls usually do sedhai. The two open ends of the now-straightened bangle are again joined together by heating over a traditional kerosene lamp. This process is called judai (literally, “joining”). Judai is usually done by women and, in some cases, also by teenage children. After sedhai and judai, the bangles are decorated according

to requirement. The decorative work is carried out in a series of steps or processes, with each step/process dependent on completion of the earlier step. The bangles are painted in different colours; intricate patterns and designs may be engraved or etched on them; silver and gold polish (hil) applied on their surfaces; and finally they are sent to the pakai bhattis for baking. Thereafter, the bangles are intertwined and strung together again, wrapped in brown paper, and packed into cardboard boxes, which are transported to godowns all over Firozabad by hand-drawn carts. A popular saying in Firozabad is: “A bangle passes through 50 hands before it finally adorns a lady’s wrist!” Interestingly, in Firozabad, the word “dozen” means 24 and not 12...because each one of us has two hands, and the bangle-maker counts 12 bangles per wrist! Broken bangles are not wasted. The shards are sorted out into separate piles according to colour (a process called chatai), and then the piles of shards are pounded manually into a fine powder to the glass melting factory.

Muffle furnaces or pakai bhattis

Pakai bhattis are traditional coal-fired muffle furnaces that are specifically used to bake or anneal raw bangles. A typical pakai bhatti has three horizontal tiers or “muffles” made of fireclay (Figure 10). Coal is burnt at the bottom of the furnace and hot flue gases flow upwards and around the muffles, heating them up in the process before leaving the furnace at around 700 °C. The lowest muffle is the hottest, followed by the middle and top muffles. The raw bangles to be baked are arranged in trays. Each tray is then placed in turn on the top, middle and bottom muffles for about two to three minutes at a time to bake the bangles. Pakai bhattis operate throughout the year. An estimated 100,000 tonnes of coal are consumed each year by pakai bhattis in Firozabad, generating very high levels of pollution in the form of CO₂, smoke and particulates. The effects of this pollution are all the more serious because pakai bhattis are located in the densely populated residential areas of Firozabad.

Raw bangles are baked for two main reasons. While going through the various stages in their making –particularly grinding – raw bangles lose the natural shine of glass. Baking the bangles in pakai bhattis restores their shine and at the same time helps in removing the internal stresses in the glass, thus providing a degree of strength to the bangles. The second reason is that while decorating raw bangles, gold polish (known as hil) is applied to their surface to make the end-product more attractive. The polish is invisible when applied but its lust appears when the raw bangles are baked. Pakai bhattis usually operate in three daily shifts of eight hours each. A unit typically has five workers: three at the furnace, and two to transport raw bangles and finished bangles.

There are three basic stages in the operation.

1. The raw bangles are arranged on a tray

2. The trays are picked up and transferred from muffle to muffle in the furnace by the pakaiya—the most skilled worker in the unit and therefore also the most highly paid.
3. After baking, the trays are removed from the furnace and the bangles are placed on the ground and allowed to cool. The ginnaiya then counts them and bunches them in toras. A typical coal-based pakai bhatti burns 0.5 tonnes of coal daily to bake around 400 toras of bangles.



Market Linkages in Glassware Industry

A. Study on Supply vs. Demand

Firozabad plays an important part in the economy of India with more than 50% of its glass products being exported to countries all over the world. Glassware is admired by foreign as well as domestic nationals. The cluster is facing a tough time in export trade. The domestic market has also dwindled alarmingly with most unit owners importing bulb shells and glass products from China and selling them in Delhi and other markets in Uttar Pradesh.

BANGLE MANUFACTURING PROCESS

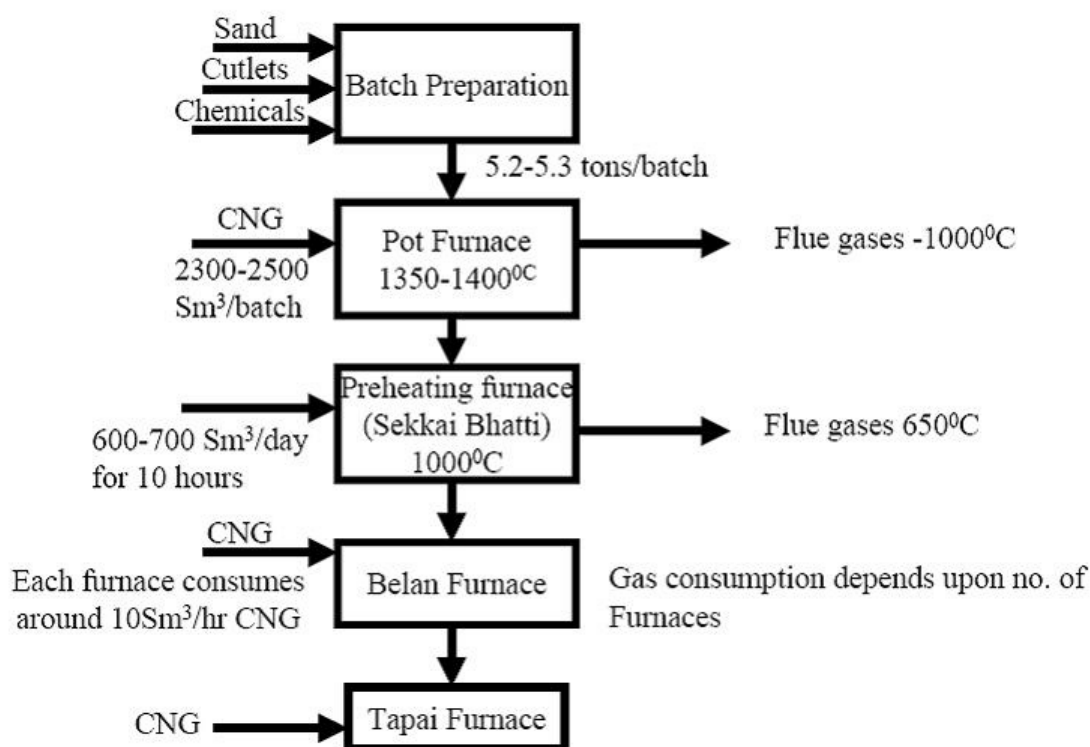


Fig. 9

In the absence of any authentic data on the Firozabad glass business, one has to believe the industry veterans. Two years ago, Firozabad supplied 80% the country's glassware

requirements as compared to today's 30%. Many entrepreneurs are not able to float new range of production; some have dumped as much as three months of produce in the market.

A look at the statistics evidently goes on to say that Firozabad with its 400-odd glass units does not stand a chance against the imports that are being made. In India, natural gas, which accounts for 25% of the cost of production, is twice as expensive as that available in China (despite being of a lower calorific value). Also, the most important raw material, soda ash, which constitutes 35% of the manufacturing expenditure costs over Rs 11,000 per tonne, compared to INR. 4,000 per tonne in China. One has to consider the repercussions on the labour market.

Firozabad manufactures all types of glass hardware that is used for house decoration. In addition to this, Glass Scientific and Labs has been producing flasks, test tubes and other scientific wares for use in laboratories.

Automobile accessories like light bulbs, battery bulbs and other light-and-sight equipment are produced here for use in two-and-four wheelers. Firozabad is also famous for miniature bulbs and high voltage bulbs which constitute about 6% of bulbs provided to the market.

However the cluster is witnessing tough competition from China. Though the industry was not totally problem-free prior to the Chinese onslaught, the entry of cheap glass products from China has given a death blow to the glass makers of Firozabad.

Cheap Chinese glass products - like shells required for making electric bulbs, vases, tableware, glass tumblers and other home accessories - have flooded Indian markets. And they've been an instant hit as they are 40-50% cheaper than similar wares from Firozabad factories.

The study team was of the opinion that entrepreneurs faced financial crunch to invest in new technology and found it difficult to access credit from banks and other financial institutions for technology up-gradation. The team however found out after asking questions pertaining to this to entrepreneurs, employers and other institutions like DIC and CDGI in order to formulate and suggest the framework which can assist the employers and other small glassware entrepreneurs with suggestive interventions but they were unable to get any commitment from the entrepreneur's side.

Nevertheless, the pattern and responses reveal that; contrary to the initial belief of the project team, a section of the entrepreneurs in Firozabad - at least, those who own/operate larger plants such as pot furnace units - do not lack the financial resources to invest in improved technology. Surprisingly, all replications of TERI-designed pot furnaces have taken place without assistance from banks and financiers. Entrepreneurs have financed it entirely themselves.

However smaller entrepreneurs in Firozabad such as pakai bhatti operators and glass artisans in the household-level processing units, operate on thin margins. These entrepreneurs will need financial assistance to acquire improved technologies, even if these technologies are not too expensive.

In general, banks appear to be extra cautious in providing loans to entrepreneurs in the SME sector. Most banks would want to be assured of the entrepreneurs' credit-worthiness; they take the new equipment/machinery itself as security for the loans, and often ask for additional collateral in the form of factory shed or land mortgage. This “security-driven” approach leads to an ironical situation. Banks are only too eager to extend loans to well-to-do entrepreneurs who own large, well established units who do not really require financial assistance.

B. Production Inputs

The inadequacy of the skills supply has contributed to a vicious circle of lack of orders resulting into low revenue, leading to an inability to invest in marketing, product development and technology up gradation. Without adequate technology and skilled workers to operate such technology, it is difficult for producers to meet quality standards, delivery schedules and customer requirements. All these in turn could result in the declining competitiveness of Indian-made glassware abroad.

To improve the competitiveness of the sector, strengthening the skills base would certainly be the most important step forward. Models of successful technology adaptation and integration should be showcased so that more and more stakeholders can start following the new idiom of intervention and its benefits.

Skill Mapping

- Skill required for each trade/value-chain
Segregation of skills/trade based on socio-economic background of Workers (skill profile)
- Wage Defining Process
- Scope of Skills Standardization
- Career Progression

Current level of Skill Supply

- Vocational and technical Skills at different stages of the Value chain
- Soft and Life Skills

Current Skill Demand and Gap

- Vocational and technical skills at different stages of value chains
- Soft and Life Skills
- Current Skill Gap

Future Skill Demand

- Growth scenarios of the Glassware Industry with possible Technological intervention employment opportunities
- Implications for Future Skills demands

Requirement of Initiatives for various stakeholders

Skill Acquisition Process

- Current Practices
- Scope of Process Formalization



Skill Mapping

A. Skill set required for each trade/value-chain

Segregation of skills/trade based on the socio-economic background of workers

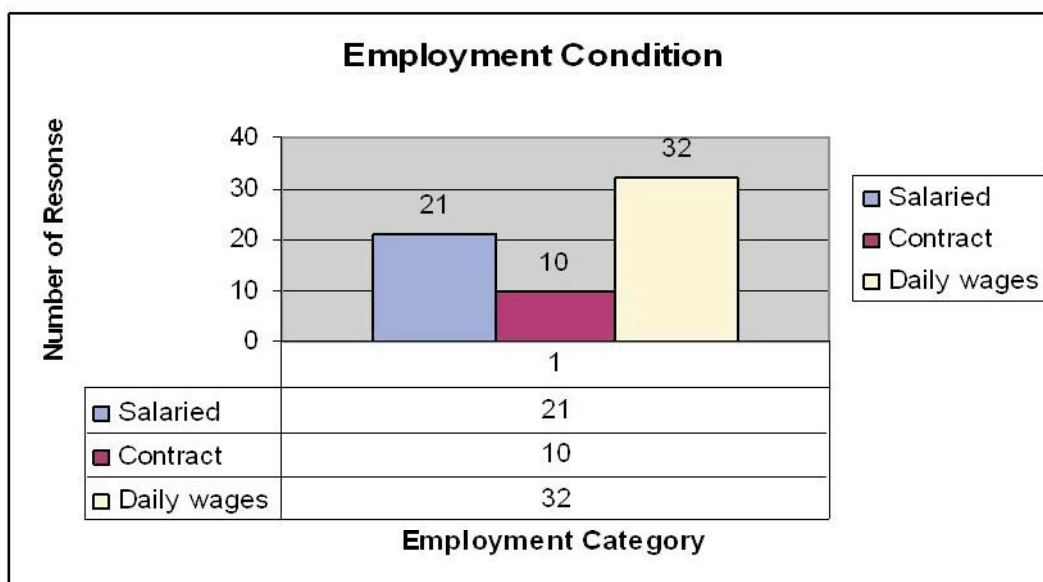
The artisan community is a close-knit community with members primarily belonging to the Kushwaha caste. This is the traditional art of this caste and is transferred from father to son. However, over the years people from other castes have also joined the handicraft sector.

There is a very small section of artisans who are economically stable and who can control the market. These artisans are highly skilled in handicrafts and have good market linkages. However, this section of artisans is reluctant to transfer their skills to anyone outside the immediate family. Most artisans are from a low socio-economic background.

B. Wage-Defining Process

Workers are paid wages varying from INR 70 to INR 250 per day. The nearer they are to the furnace, the more they are paid. tar man is a highly paid person in the bangle factory earning somewhere between INR 600 to 1000; stated Sanjay Agrawal of Advance Glass Works.

Employment Condition: Employees are of three kinds. They are either contractually employed or are daily wage earners. A small minority receives a regular salary.

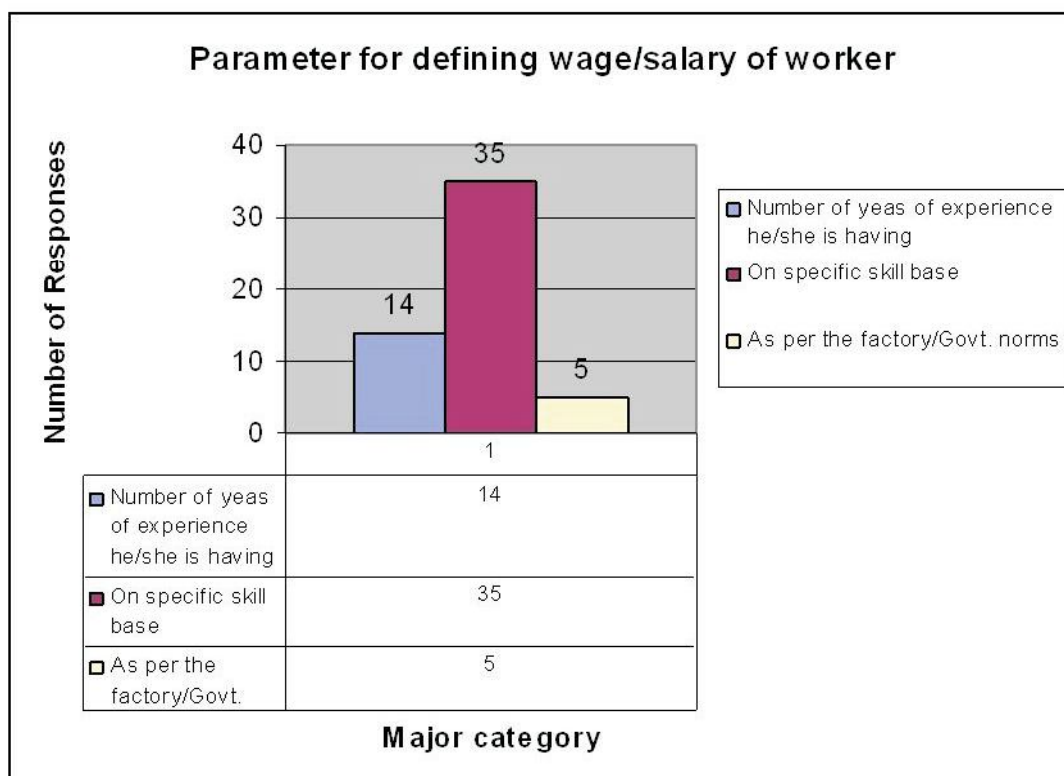


Of the 63 respondents (51%) have employed workers on daily wages; 33% are on salary and remaining 16% are on contract.

Employers also pay workers wages on a daily, weekly or monthly basis and also pay advance if they are in need of money.

Parameters of defining the wage/salary of worker: Employers usually go by the following parameters when defining workers wages:

- Number of years of experience he/she has;
- A specific skill base ;
- As per the factory/ Govt. norms.



Employers moreover hire and pay workers for a specific skill and experience required for a particular job.

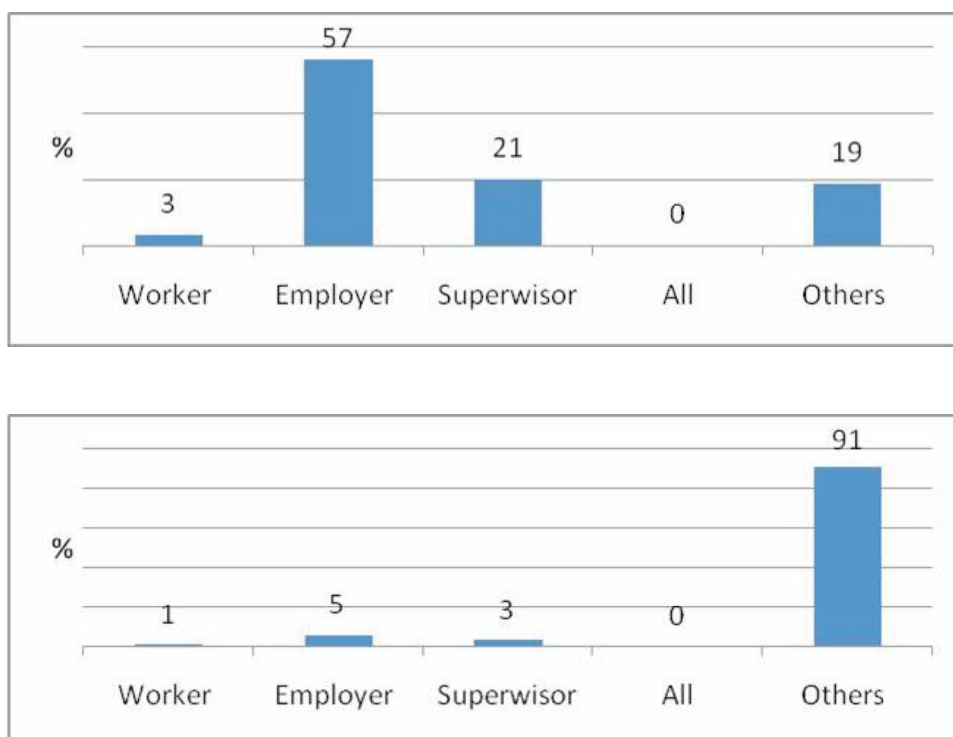
The wage of artisans depend on two factors – demand of decorative items and the skill set of the artisan. The artisans are mainly paid according to the volume of business they acquire. Usually, the profit margins are less in small orders.

There are some artisans (4 artisans, with whom we interacted) who are highly skilled and command a better price than others do. These artisans are however few in number and are highly creative in their art. Their ability to replicate all kinds of samples helps them gain better profits and hence this small section of artisans is better placed economically.

C. Scope of Skill-Standardization:

Workers in the glassware sector feel that their performance and work productivity is judged

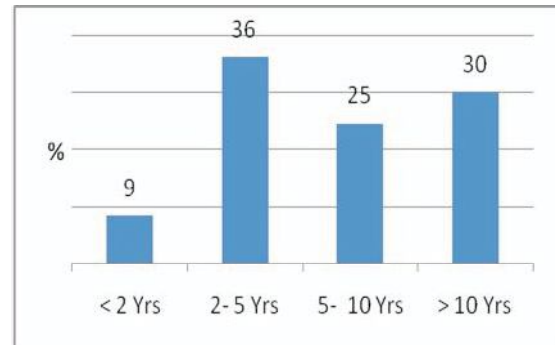
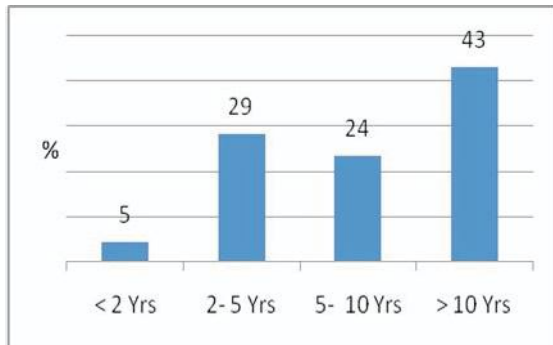
by their respective experienced workers/employers. The attribute is important in terms of who gets to define skill and productivity. In the longer run when skill development initiatives would be launched for the glassware workers, it will be necessary to take these key stakeholders into account since it is they who decide process of the skill standardization. In the bangle-making sector, 57% workers said that wages were decided upon by employers alone. 91% of the workers in the general and decorative glassware sector say that the Trade Unions play an important role in the decision.



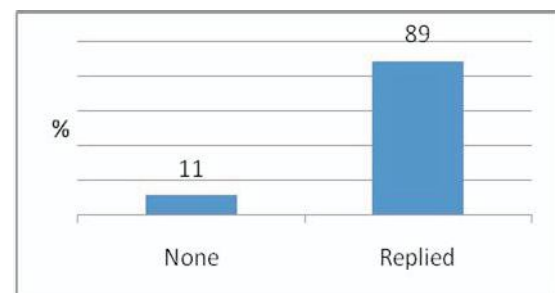
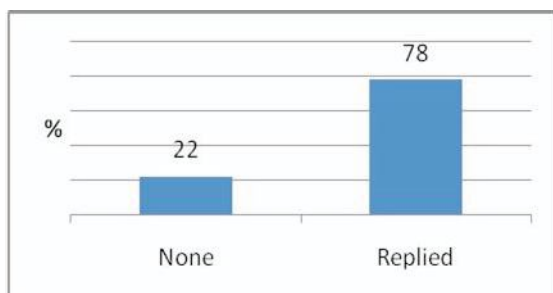
Most products of the handicraft sector are decorative items. There is potential for skill standardization in maintaining the quality of the items produced. The artisans are producing products which are not in tune with the current design and market trends. Avenues for skill standardization need to be explored keeping in mind the export market and current design demands.

D. Career Progression

43% of the workers in the bangle sector have spent as many as 10 years in the trade. 36% of their counterparts in the general and decorative glassware sector have spent 2 to 5 years in the industry. It is observed that workers in the bangle sector have more loyalty in terms of staying in the same work profile.



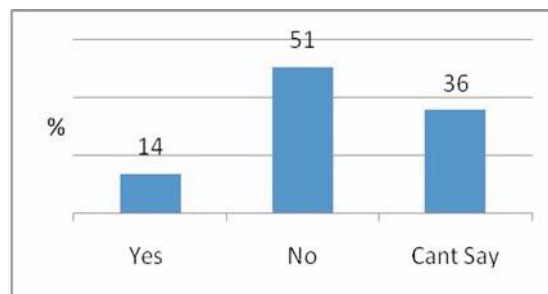
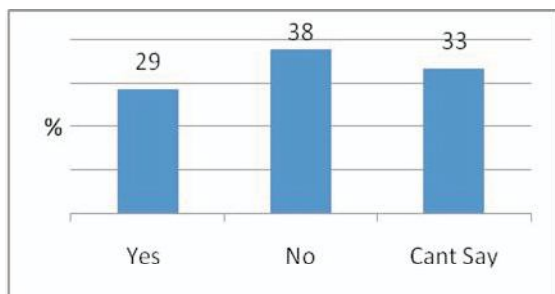
22% workers in the bangle sector started their career from bangle making activities only whereas 78% workers were associated with other jobs (besides the glassware sector). Only 11% workers begin their career directly from the general and decorative glassware since majority of workers (89%) came to the sector from other jobs. The fact also reveals that starting a fresh career in the bangle sector is easier since the bangle making sector is a house-to-house affair and thus attracts many new entrants.



On an average workers have changed their job profile at least twice till they came in for the present job. In the general and decorative glassware, the average number of job change within the sector is only once. This implies that the workers in bangle sector have to spend their career time in two respective work stages within the bangle making sector in order to reach what they are doing now. While in the case of general and decorative glassware is just one change. It also emphasizes the fact that possibilities of vertical career progression are much higher in the bangle making sector.

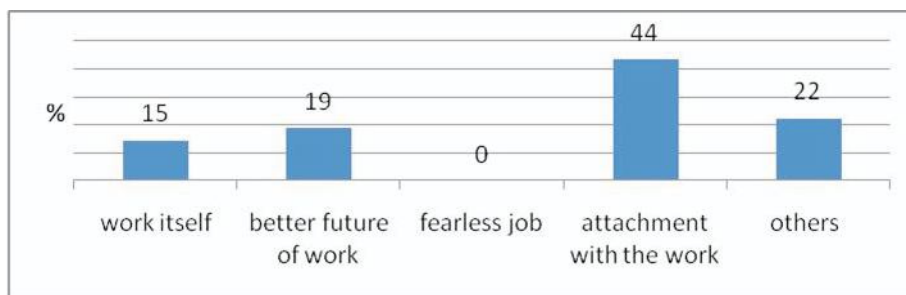
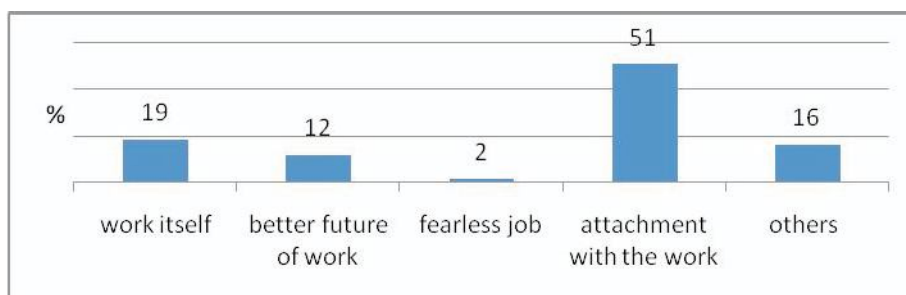
In terms of horizontal career progression, 29% workers in bangle making sector and 14% workers in the general and decorative glassware will be making a job shift in activities other than those in the glassware sector. However the majority of workers - 38% in bangle making activities and 51% in general and decorative glassware - have no intention to look for job change; they would be doing what they are doing now.

On an average; a worker would leave the bangle making sector in a year's time; whereas his



counterpart, in general and decorative glassware sector; would invest three years or so before leaving the trade.

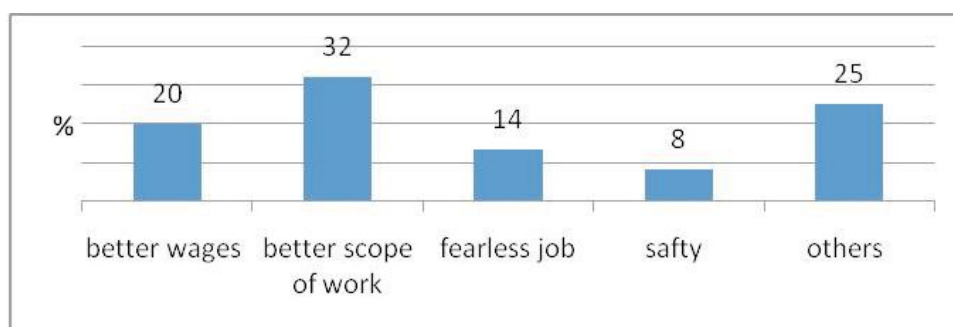
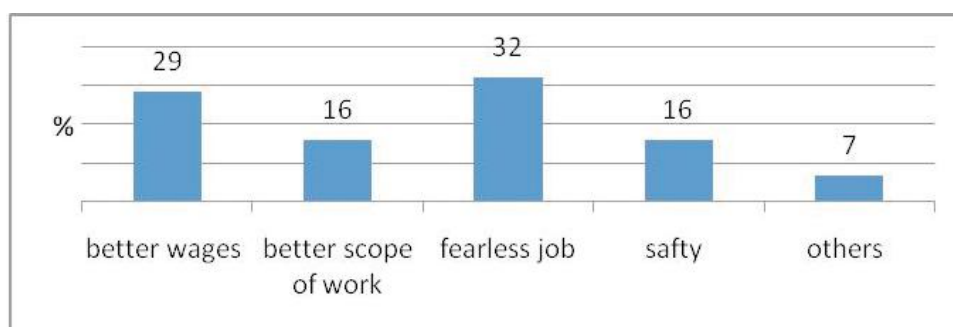
The reasons which are vital in keeping workers attached to their present employment –



It emerges that most workers (51% in the bangle making sector and 44% in the general and decorative glassware) would never leave their present job because they are so attached to their work. In many cases; the problems of the workers are addressed by themselves in their job profiles. Whatever their progression in terms of wages may be, workers generally want to continue in their jobs, as they hope there is scope of growth and economic progression.

Job security is the main area of concern of the workers if they desire to move on. (32% workers said this was their only reason for coming into bangle making.)

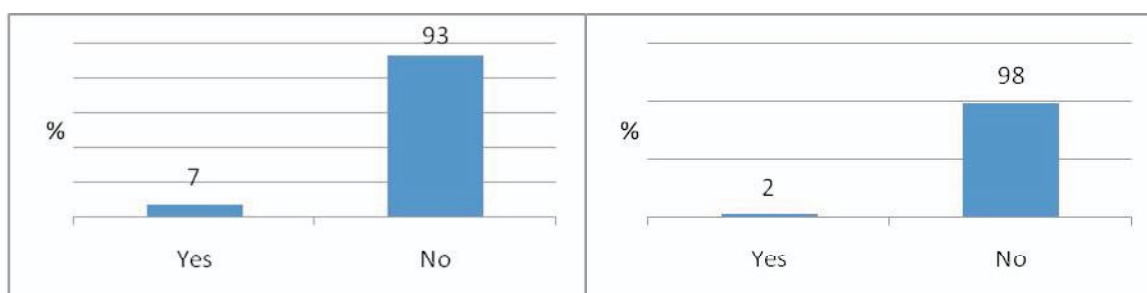
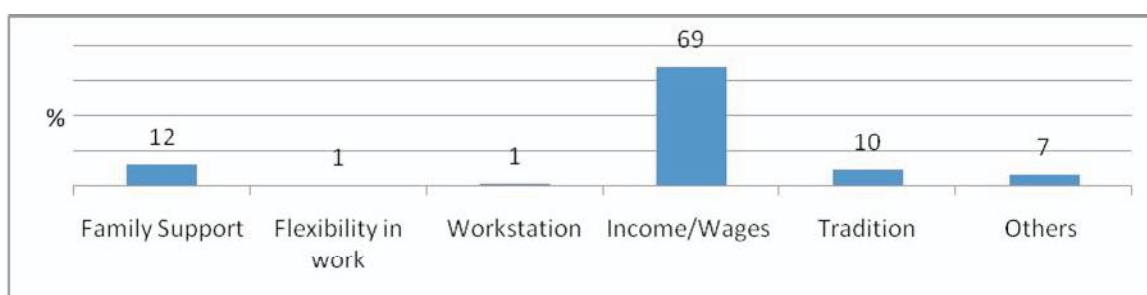
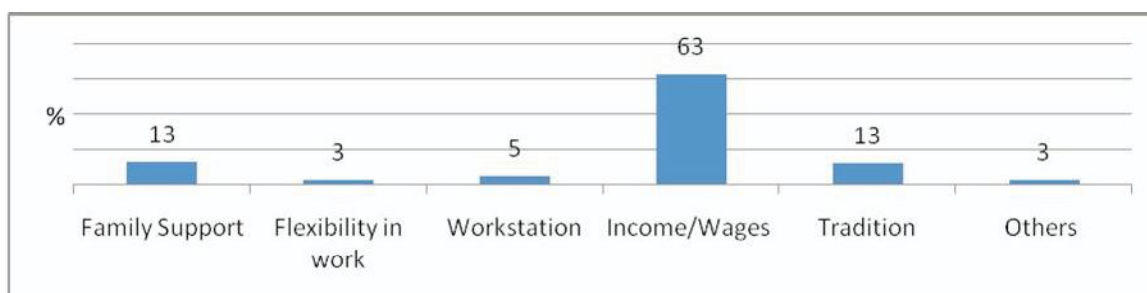
In the general and decorative glassware sector, the majority of workers (32%) are considering the possibility of better work prospects.



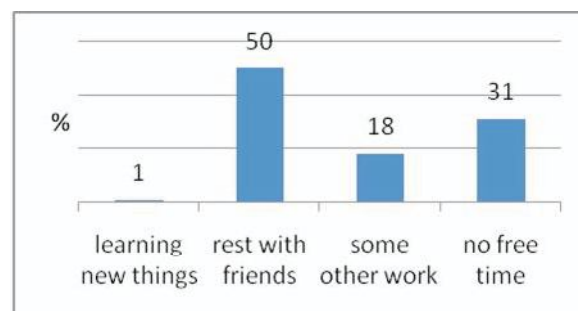
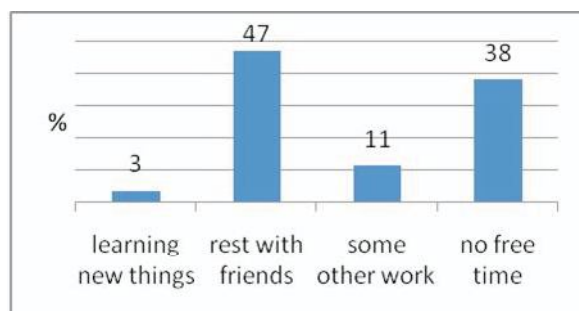
Current Level of Skill Supply

A. Vocational and technical skills at different stages of the value chains

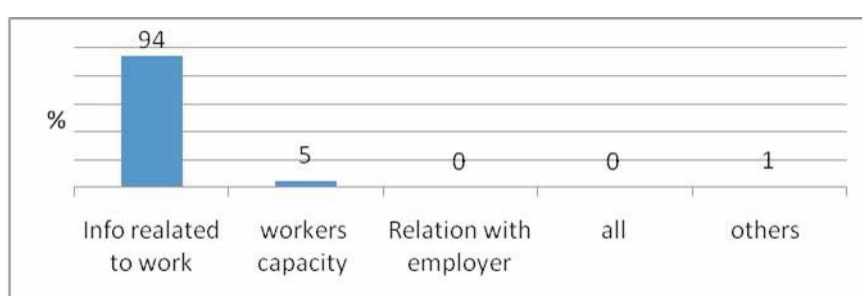
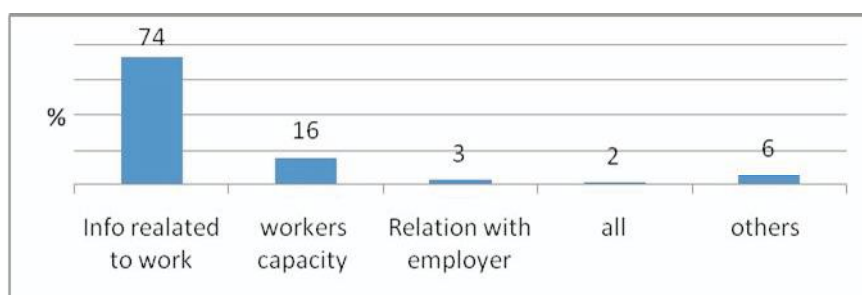
The number of workers in the glassware sector and their supply is highly influenced by certain attributes. The supply of workers in the bangle making sector is dependent on the wages offered. The study reveals that the supply ratio of workers in the bangle sector is decided on the basis of workers workstation preferences, level of family support, flexibility in work etc. 63% workers in the bangle making sector feel that worker supply is dependent on income/wages; whereas in the general and decorative glassware; it is 69%.



In the survey conducted it was seen that most workers had no desire to learn anything new. Nor were they interested in acquiring vocation and technical skill training. Only 3% workers in the bangle making sector and 1% in the general and decorative glassware sector were keen on learning and acquiring new skills.

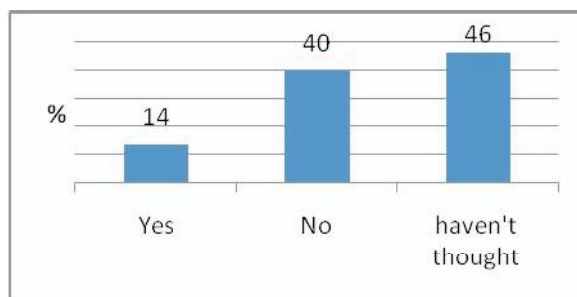
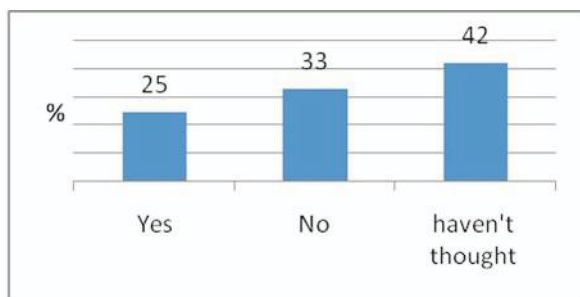


In terms of employment security, 74% workers in the bangle making sector said that information and technical knowledge gave them a degree of employment security. 94% of their counterparts in the general and decorative glassware sections agreed to the same.

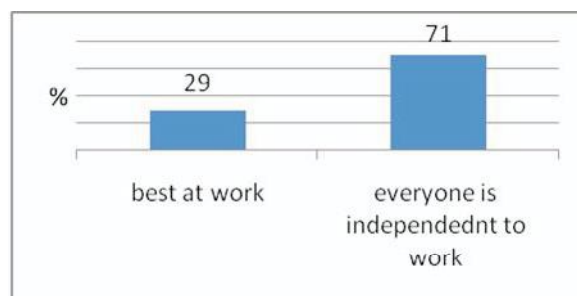
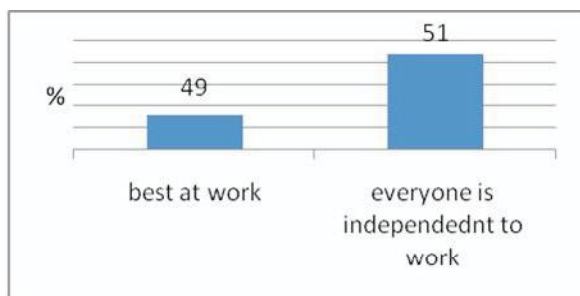


This suggests that the vocational and technical skills among workers are very high since they prefer this option over other attributes. However the skill supply is very much traditional in nature and it needs to be groomed and developed

When asked about whether workers feel challenged or threatened by well-trained workers on technical and life skill approaches, 25% workers in the bangle making sector agreed ; whereas in the general and decorative glassware only 14% workers felt the same.



Of these 33% workers in the bangle-making sector and 40% workers in the general and decorative glassware sector said they didn't feel insecure or threatened in the face of trained and skilled workers. 71% workers in the bangle sector and 51% workers in the general and decorative glassware sector feel there is no scope for insecurity as the sector offers open employment to all. As per their opinion, everyone is free to work and earn their employment



Skill supply in artisans is not a matter of concern as they argue that all of them are skilled enough anyway but expect better opportunities from the market. This is more manifested after the inflow of Chinese products in the national and local markets.

B. Soft and Life Skills

Workers do not feel the need to acquire soft and life skills as they feel confident of their existing technical skills. Workers therefore feel there is no need for intervention in the matter. Skill supply in the bangle making sector has never been an issue of concern; however in the general and decorative glassware sector, some need skill specialization.

There is high demand amongst artisans for gaining soft skills like language as they feel that this enhances their chances of getting better marketing in other bigger cities like Delhi, Gurgaon, etc. However, they feel such training programmes are expensive and their present situation disallows any scope for learning more skills.

C. Career Progression

75% of the artisans have been with this industry for nearly 20 years. The other 8% have been

working in this sector for 5 or more years and around 17 % artisans have been associated with this industry for less than 5 yrs. These artisans were previously associated with other glass sub-sectors like those of bangle and decorative items.

Of 28 artisans, only one artisan would be engaged in making decorative items for 4-5 hours in a day. In his spare time, he would operate from a snack stall he had put up in the area as an alternate source of income.

With regard to horizontal progression, most artisans had no desire to shift from the area of work because they do not have the skills to work in any industry other than glass. However, only 35 % want their children to come into this sector.

The demand for products by highly skilled artisans is unaffected by the intrusion of Chinese products and the downfall of the economy. These artisans have created a niche market for their products.

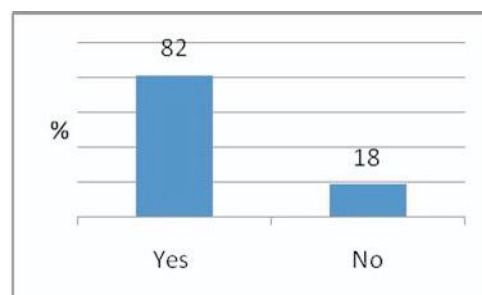
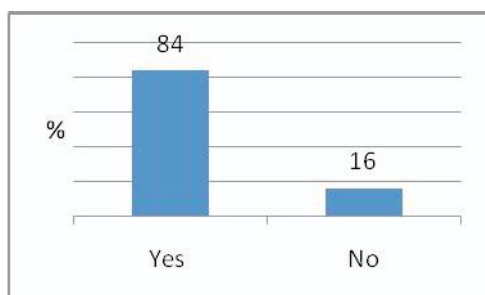
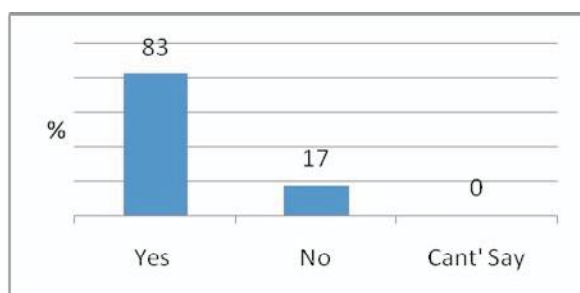
Skill gap has also been observed in techniques like hand-blowing and table-blowing which are in great demand with designers in the international market. These techniques are the monopoly of a few artisans who are reluctant to transfer this to others.



Current Skill Demand and Gap

A. Vocational and technical skills at different stages of the value chains

Workers aspire for better job opportunities with increased incomes. Their career progression is in a vertical mode, where they can take their career ahead in the same field of work. When asked whether they possessed the required skills for their expected job profile, the response from both the sectors was almost similar; they aspire to have better jobs, this signifies the demand and skill gap in terms of both number and quantity.

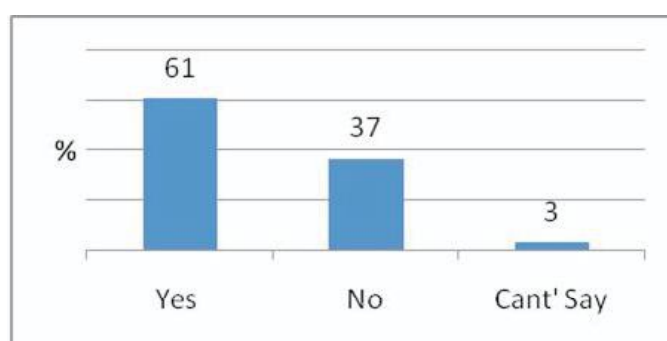


84% workers in the bangle making sector and 82% workers in the general and decorative glassware sector said they were skilled enough to move into other work profiles within the sub-sector, which are in demand, since they offer good wages. This also signifies that there isn't much of skill gap in terms of proceeding to new work profiles

When asked if workers were putting their complete skill set to optimal use, 38% workers in bangle making sector responded in the negative, whereas this case is was not relevant to the general and decorative glassware sector.

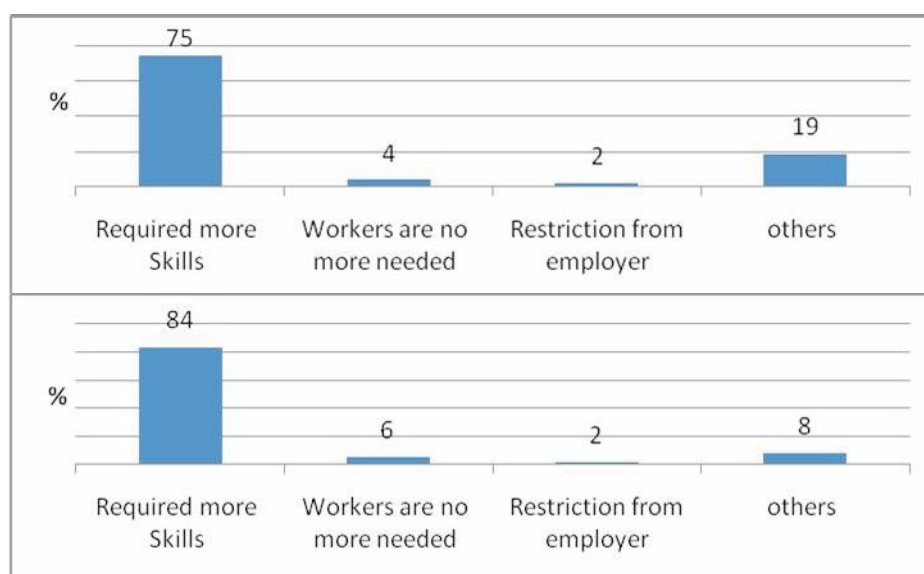
B. Soft and life skills

Soft and life skills are very important in terms of uplifting the social and economic standards of the workers. These skills help workers in attaining better living conditions. Many a times workers face some general difficulties like those of mathematical calculation, communicating with others, understanding new technology which requires an improved level of understanding things like machines etc. Most workers would only be too glad to acquire training in soft and life skills. 61% workers in the bangle making sector and 83% workers in the general and decorative glassware sector want training in soft and life skill programmes.



C. Current Skill Gap

Workers, in both segments, responded well in terms of skill development programs, 75% workers in bangle making sector and 84% workers in general and decorative glassware expressed that they welcome any interventions on skill development so that they can shift towards the desired job profile within the sub sector. 4% workers in bangle making sector and 6% workers in general and decorative glassware feel that they can't make shift to their desired job profile which is in very much need among workers, due to certain restrictions from their employers.



Future Skill Demand

A. Growth scenario of the glassware industry with possible interventions

Introduction of better quality and low priced Chinese products into the market is posing threat to the handicraft industry. However, artisans are of the view that the introduction of better technologies and raw materials should help them in creating a niche market for their products.

The Firozabad experience highlights the fact that small-capacity users of energy, such as pakai bhatti operators and household-level processing units, find it very hard to access cleaner fuels at affordable prices. It is important to start looking at the glassware cluster from a social perspective, as it provides employment opportunities to so many and also functions as a commercial hub of the country. Greater attention must be paid to the technological and R&D (Research and Development) needs of various stakeholders of the cluster, so that higher energy and environmental standards become an integral part of the nation's economic growth process.

The fire in the year of 2007, in a little over 300 glass units has left evidence of mud furnaces that have crumbled from disuse and the topography resembling an abandoned and deserted piece of land. Thousands of laborers went jobless as their employers went bankrupt during this period.

Glass industry estimates suggest that exports have gone down by 50% and the domestic market has dwindled alarmingly. The manufacturers, once-proud owners of large units, look dispirited as they search for alternative means to generate revenue. The city, that used to be dotted with skeins of coloured glass, has lost its sheen.

Many of the factory owners have turned to traders, in order to survive in the business. So what do some of them do for a living? Here's the irony. They are now importing bulb shells and glass products from China – the fact that has brought Firozabad's centuries old cottage industry to the brink of closure – and selling them in Delhi and other markets in Uttar Pradesh.

There are technological challenges as well as socio-economic barriers to face and overcome at the cluster level. Interactions with entrepreneurs are often inhibited by the walls of wariness so commonly encountered in the MSME sector. Not much information is available on the construction practices followed in glass units, or on the nature of their operations ? and gathering such information is difficult in the closed, fiercely competitive environment of the cluster. When pot furnace units were made to stop using coal following the Supreme Court verdict on the matter, there were no readily available gas-fired technologies for them to adopt; nor did units know exactly how much natural gas they would need. The muffle furnace units were, and still are, unable to obtain gas connections at their existing locations. Traditional and cultural barriers make it extremely difficult to access the workers in household-level units, especially because a sizeable proportion of the workforce is comprised of women and children. At the policy level, these difficulties have been further compounded by dearth of natural gas; an uneven pricing formula for gas; and the continued availability of coal, in the Firozabad cluster, at relatively affordable prices.

Each stakeholder, in the glassware cluster, has a special role to play; each one of them is working according to their individual agenda. There is reason to believe that their combined efforts will result in more sustainable cluster space. Also the inclusive approach of all stakeholders would definitely contribute towards the growth of the sector.

Another important component is that of the energy options for the glassware sector. The glass industry is highly energy intensive with fuel cost accounting for over 40% of the product cost.

The immediate interventions in order to secure the growth of the cluster are –

1. Introduction of GAIL's stride is one of the most important value stages in the bangle making pakai bhattis. The adoption of the gas-fired muffle furnace, and its benefits to the pakai bhatti operators, would be severely restricted until pakai bhatti operators can directly obtain gas from GAIL. The pakai bhatti operators were very keen on getting gas; but from GAIL's point of view it was neither feasible nor economically viable to supply gas to small individual pakai bhatti units. Sector specialists says that each furnace required a gas supply of around 220 Sm³/day in order to produce 400 toras or more per day (the average bangle production level of the traditional pakai bhatti). Informal discussions with GAIL officials indicated that a minimum gas demand of 2000 Sm³/day is needed if a gas connection is to commercially viable to GAIL. Eight gas-fired muffle furnaces could easily meet this level of consumption if they operated from a single location. In turn, this suggested that pakai bhatti operators should group together to form co-operatives and set up multiple gas-fired muffle furnaces at locations where GAIL could supply them with gas. The intervention

could be of exploring possibility of setting up a co-operative of pakai bhatti operators. But the biggest hurdle is that GAIL simply does not have enough reserves of gas to cater to fresh applicants.

2. Enabling small muffle furnace operators to access gas/R-LNG directly and on convenient commercial terms and at competitive pricing of gas/R-LNG compared to coal.
3. Breakthrough and independence from thekedar networks is another area of concern. Bangle makers in the household sector are paid piece-rate wages, that is, they are paid according to the number of bangles they process in a day. The wages are abysmally low; for instance, in mid-2007 workers were paid a mere INR 9/- per tora for both sedhai and judai work. The workers do not receive even this payment in full due to middle-men. In practice, contractors also known as thekedars hire the workers. The glass factory owner pays the thekedar a lump-sum amount for each batch of work that has to be completed. The thekedar pays only a portion of the amount he gets to the workers he has engaged. Furthermore, it is routine for thekedars to 'advance' money to bangle-workers at very high rates of interest, and to deduct the interest dues from the wages payable. The result: workers are trapped in an endless cycle of exploitation and debt. Their working conditions are both unhealthy and hazardous. Child labour still exists, minimum wage laws are often violated; indeed, the exact status and nature of household units and their operations are uncertain. Access to the workers is severely restricted by walls of community orthodoxy. The thekedar network is very strong and hard to break.
4. Mobilizing and strengthening workers in the form of a co-operative. The co-operative route offers an avenue for better margins and improved working conditions but this will require sustained interactions with NGOs, factory owners and workers' representatives, backed by active and sincere support from the government.
5. Similarly, concerted efforts will be required to develop the technological solutions that will make household workers' jobs easier and less hazardous. Furthermore, delivery of these solutions to the workers must be facilitated at low cost by the government or under state-sponsored schemes. Helping the cooperative to develop market linkages for raw materials and products could be an added advantage.
6. Pakai bhattis are operated at temperatures of around 480 °C. Pot furnaces emit flue gases at temperatures of around 950 °C. If pakai bhattis could be conveniently located in the vicinity of pot furnaces, it might be possible to use hot flue gases from the latter to heat up bangles in the former, thus saving considerable amounts of coal.

7. Managing cluster dynamics: high competition, low technology. Considering the steady demand in the country for such products, logic suggests that the Firozabad glass industry could well dictate prices to the market if individual units joined to form a cartel. However, such unity of purpose is yet to be found in the Firozabad glass units. There is reason to believe that the very nature of the small-scale glass manufacturing industry – in particular, the fiercely competitive nature of the industry, the lack of control over market forces on both raw materials and product sides, and the narrow profit margins within which unit owners had to operate – makes it difficult for unit owners to work together in common interest.
8. In general, the Firozabad glass units did not sell their products directly to retailers or customers. Instead, it is an established practice for units to sell their products to dealers or their agents. Usually, there was little to distinguish the glass products made by one unit from those made by another and hence unit owners routinely resorted to under-pricing their products in order to get rid of accumulated stocks. Indeed, products were sometimes sold by the kilos! Dealers and middlemen took full advantage of this situation – in effect, it was a buyers' market – and dictated prices for glass products that were totally unrelated to product prices in the retail market. Consumers did not benefit from this situation, because the middlemen did not pass on the benefits of low procurement prices to them. As a result, most units in the Firozabad glass cluster were trapped in a never-ending cycle of vicious competition in which the only beneficiaries were the middlemen. In such an environment, the unit owner was constantly worried about the viability of his operations. His profit margin was thin and unpredictable. Because his melting furnace had to be operated non-stop, he was constantly under pressure to offload accumulated finished products. The only way of garnering more returns was by cutting down on production costs; but here too he had limited options. His glass factory worked day in and day out, and required a certain minimum number of workers at any point of time. Therefore, he could neither cut down on his workforce strength and nor could he reduce the wages of workers. To cut down on fuel (coal) costs he would have to reduce coal consumption: that is, increase the efficiency of his melting furnaces. However, he did not have the contemporary technical knowledge or technical skills to do so; the mistries (masons) who built the furnaces were even more ill-equipped. . Besides, coal availability was itself a constant source of concern and the price and quality of the coal too were often beyond his ability to control.
9. Removing the fear of many entrepreneurs to adopt already available technology (Like TERI furnace etc)
10. Rigid cultural and socio-economic barriers make it very hard for workers in the

household-level units to interact with the project team and other “outsiders”. While drawing up plans for intervention in this sector, ILO should build upon the lessons that have been learnt in the skill mapping exercise. The workers in downstream glass-finishing operations – *sedhai*, *judai*, and other household-level activities – continue to toil in appalling conditions and there is desperate need for measures that can reduce health hazards as well as bring socio-economic benefits to their lives. The measures could be aimed at providing workers with opportunities to improve their existing skills and acquire new skills; and at developing and disseminating simple, affordable technological device. Also, their products should be better linked with markets; for this holds the key to generating a regular source of income and helping their business.

Once the successful implementation of specified interventions is achieved, the sector, for sure, will regain its market value. The increased adaptation of better practices would certainly bolster the productivity of clusters thus encouraging entrepreneurs to think of better options for workers. This will enhance the employment conditions for workers since better profits for the cluster is a win-win situation for all stakeholders. Such interventions would also stand the Firozabad cluster in good stead in terms of world competitive standards, the increased rate of export and better penetration in global market. The employment conditions and employability areas are directly influenced employer capacity and the trend of growth. Such interventions would also ensure the inclusive growth of the cluster not for the big factory owners or for a few people. A serious thought and policy formulation would be an important must-take step in order to transform the findings and suggestions into a reality. These interventions would help both workers and employers.

B. Implications for future skills demand according to the different growth scenario

Opening the international market and providing greater access to metropolitan cities would increase the demand for skill up-gradation of artisans especially in quality issues. These artisans would need to understand designs and aesthetics better, keeping in mind the urban market.

The study revealed the formidable economic, social and cultural barriers that have to be negated to make such initiatives meaningful in the long term. The workers, in the household bangle processing units, are primarily women and children.

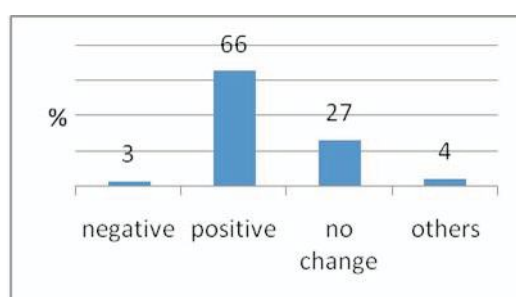
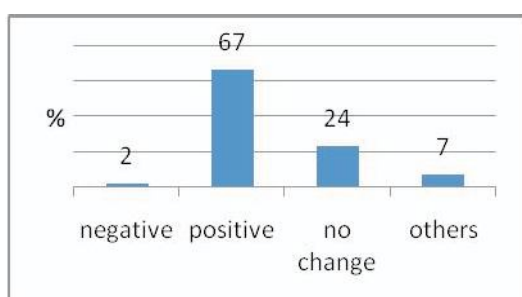
The cluster is home to countless workers, artisans, entrepreneurs and other associated stakeholders. The glassware industry is their livelihood; it provides employment to thousands of people and has the biggest potential to drive the national and local economy.

Some strong and pro-active steps are urgently required in the area of technology-refinement and skill-building. People should be initiated into the benefits of safe work and new scientific applications in the existing production and manufacturing process. If addressed the cluster would be able to regain its worth. It is also evident that the refining and manufacturing processes and introduction of skill-building exercises would definitely help the Firozabad cluster to evolve into an international market. It is also important that without the synergy of the government, enterprises and other stakeholders, one cannot bring back the glory of this cluster.



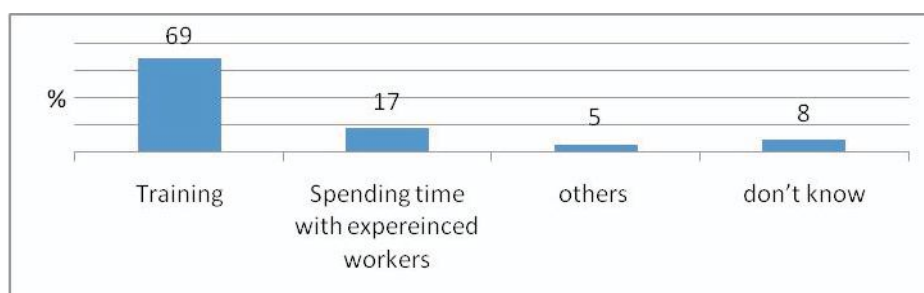
Required Initiatives for Various Stakeholders

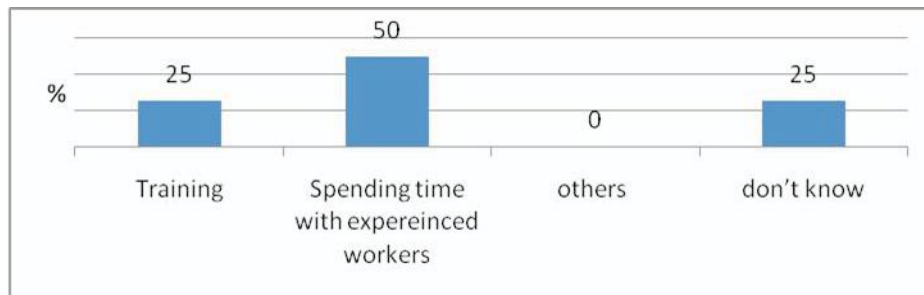
The present situation in the glassware sector and the difficulties shared by the workers has to be taken stock of, particularly as the workers are the main force of the industry. The survey team asked them how they perceived the present condition of the glassware industry. It was interesting to understand that despite the huge problems and challenges faced; particularly in terms of employment opportunities most workers felt they were hopeful of a better future. 67% workers in the bangle making sector and 66% workers in the general and decorative glassware sector shared this view of a happier better future. There is every reason to believe that the sector will close down and employment will crash. In spite of the imminence of sector collapse; workers feel that most problems will get resolved if serious interventions are made. Still others believe that nothing will ever change and things will always be the way they were.



The statement is very useful in terms of understanding the fact that most workers are optimistic about possible interventions, which provides the base for futuristic solutions.

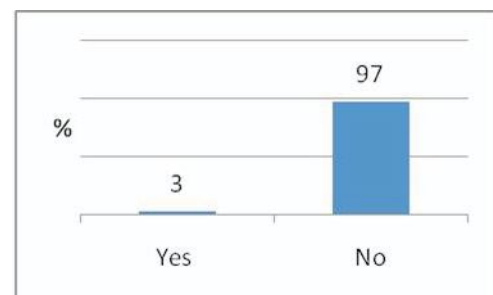
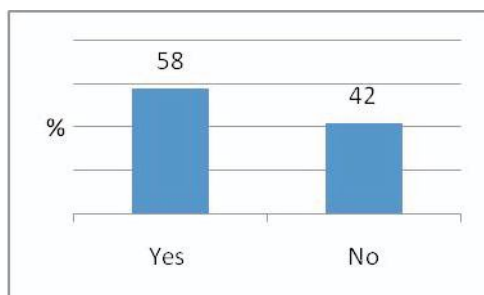
As a part of the possible solution Firozabad needs to overcome the challenges which emerge from the study. So what would bring better skill enhancement and productivity among workers? Most workers (69%) in the bangle making sector said that better training practices would help; training should be imparted to them.





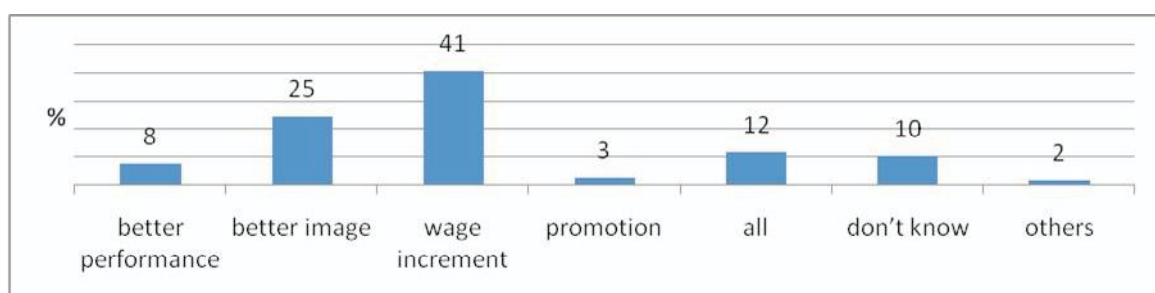
Most workers (50%) in the general and decorative glassware sector prefer the traditional model of skill enhancement.

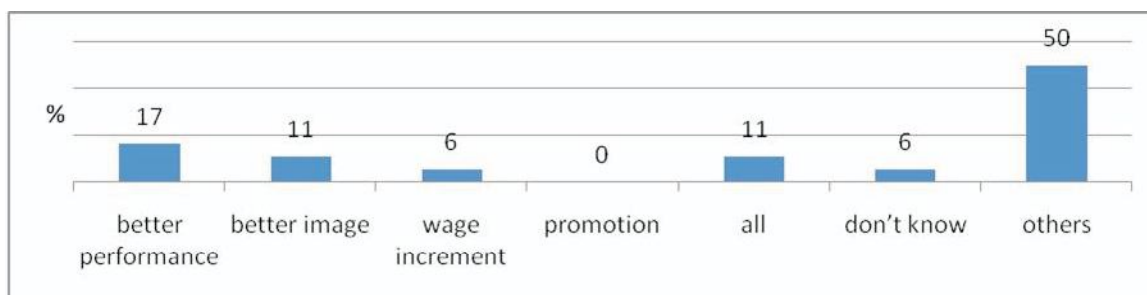
When the survey team asked workers if formal kind of training over skill enhancement training would be of use to them, 58% workers in bangle making sector answered in the affirmative.



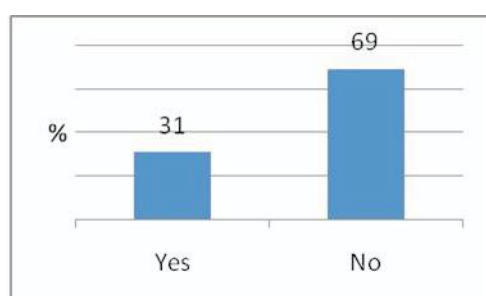
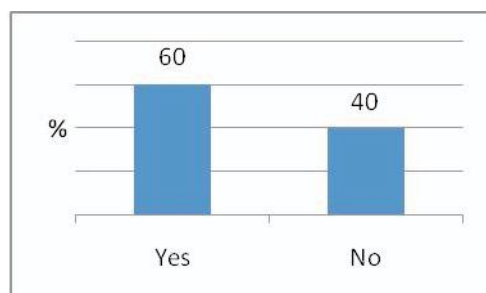
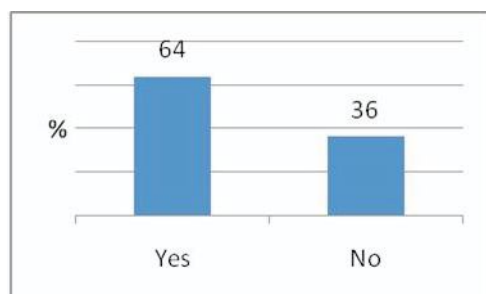
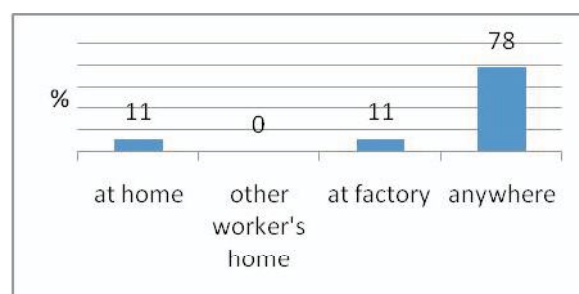
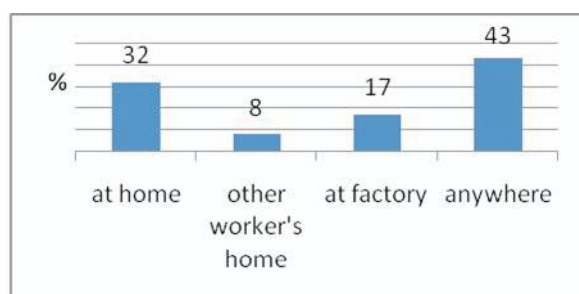
The response in the general and decorative glassware sector was not the same. 97% of the workers in this sector replied in the negative. They were of the view that training would be of no use to them. Spending times with more experienced workers would be of greater use to them.

When asked about how the training could benefit them, the survey team has some identified specified implication of training which is depicted in the following drawing. In the bangle making sector, most workers (41%) said that training would help them in getting better wages than what they are getting now.





Adding to the possible interventions in training, workers were asked where they would prefer the training. Most workers - in both the sectors (43% in bangle making sector and 78% in general and decorative glassware) - felt they had no particular location preference and were open to receiving training anywhere possible.



Since the bangle making sector is largely a household activity, this is where 32% workers prefer to be trained.

In terms of problems and challenges on the technology side of the work, 60% workers in the bangle-making sector face problems. This percentage is much lower in the general and decorative sector where only 31% workers face technological problems. The reason is that workers in the general and decorative sector have already exposed to automation and better technology. This is not really the case with the bangle making sector and workers still face a lot of problems. This strengthens the case for more technological interventions.

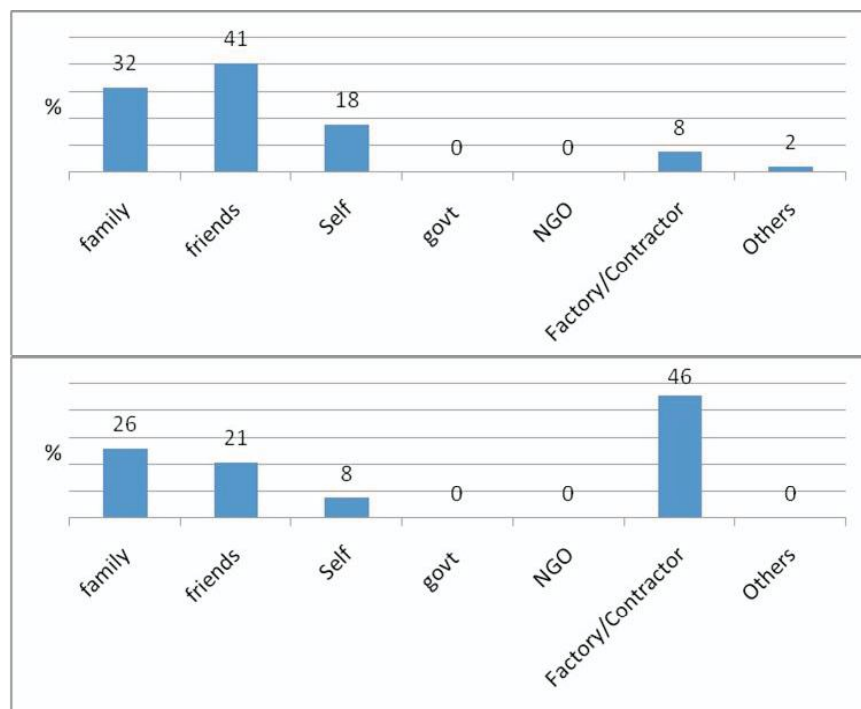
Considering all possible interactions, worker initiatives are identified in terms of skill enhancement and better technical training.

Skill Acquisition Process

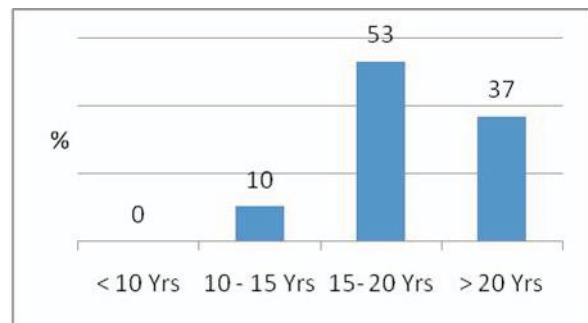
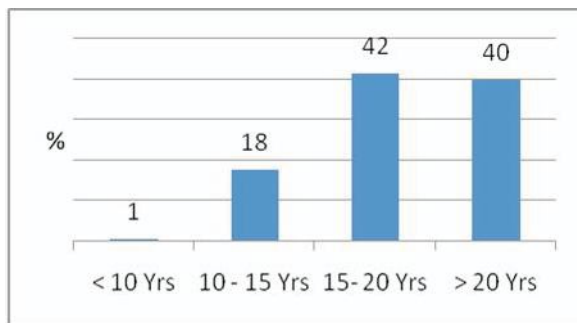
A. Current Practices

In Firozabad, workers work for free until they acquire the necessary skills, as there is no formal recruitment or training. Workers told the survey team that earlier a lot of the furnace-related activities were done manually. Now technological innovations ensure that in 8 hours a worker produces more than what he did in 12 hours. Has the work become easier? The reply is an emphatic no.

Workers follow the traditional route of skill development. When asked where workers acquire their skills from, 41% workers said that they learn from their friends, while 32% workers said that they had acquired skills from their family members. It is important to note that government and social organizations play no role whatsoever. 18% workers learned the skills by just observing and understanding what others are doing. In the general and decorative glassware sector the majority of workers had acquired the skills through contractors. Basically here a worker starts working as a helper under the observation of a contractor and from here on workers get used to the skills needed to perform the task.

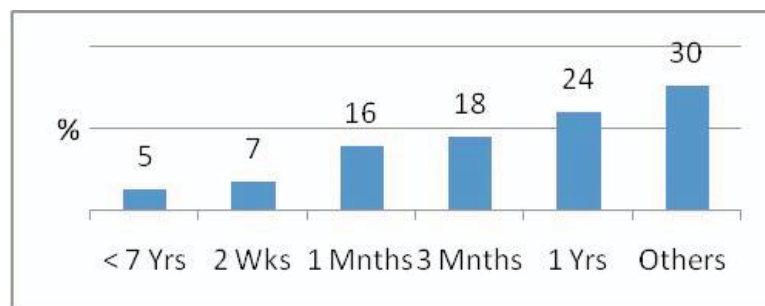
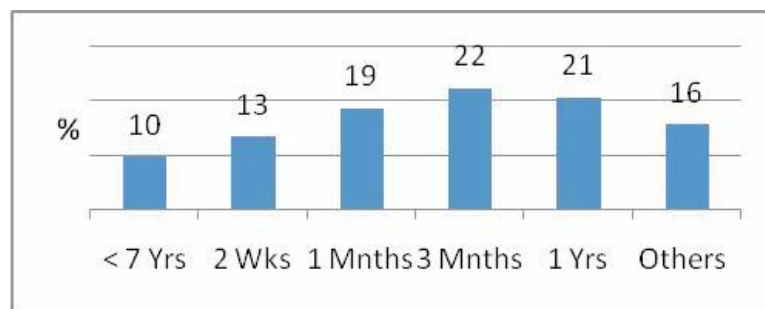


Age at which workers acquire skills



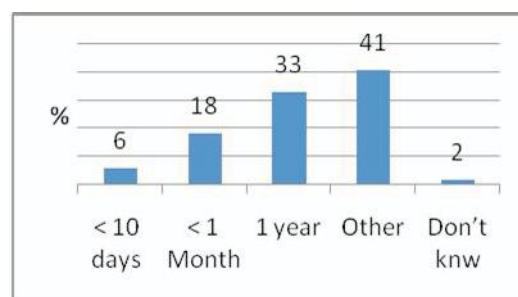
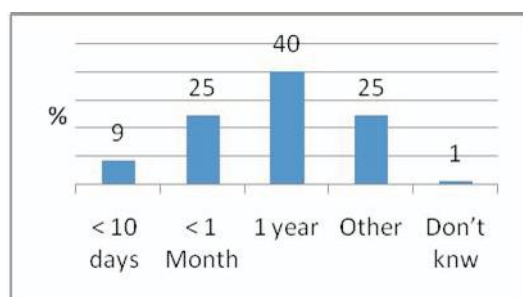
It emerges that the age group located between 15 to 20 years of age is the ideal traditional age when workers are exposed to the job and start acquiring skills. It is interesting to note that not one worker below the age of 10 has hired in the general and decorative glassware sector.

The time incurred during the skill acquisition practice



It took workers in the bangle-making sector three odd months to acquire the required skills. Their counterparts in the general and decorative glassware sector almost two years to acquire the requisite skills.

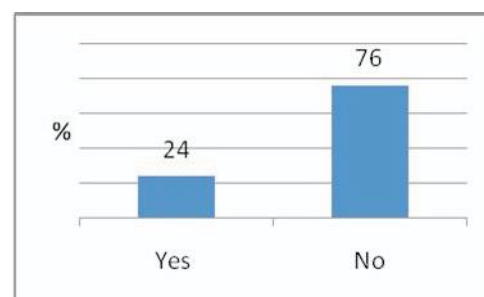
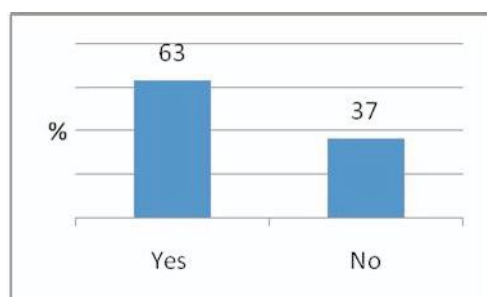
After being trained in traditional skills, it takes time for workers to put the acquired skills into practice. Most workers make major errors and are exposed to the hazards related to work. 40% workers in both sectors, feel it takes them one year or so to attain skill perfection. In the general and decorative glassware, the time taken on an average for a worker to be called skilled in the said job is almost one and a half year.



Skills are primarily handed down from one generation to another. This community legacy is passed from one artisan to another at the workplace. The young artisan starts by assisting his seniors with activities like colouring and making small decorative items. Over a period of about six months to about a year, the artisan is fully trained to start independent work.

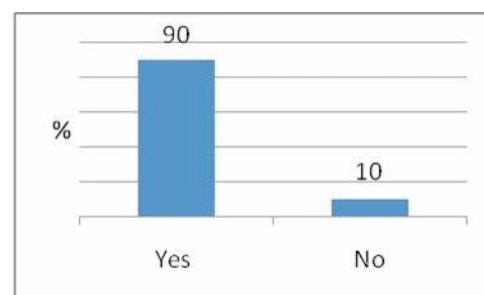
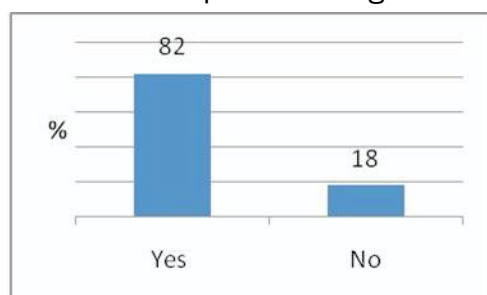
B. Scope of Process Formalization

In Firozabad, almost all workers follow the traditional school of skill acquisition. This includes learning and acquiring skills under the guidance and observation of some existing workers in the way of being helpers. Workers were asked if their training, which is traditional and highly informed at present, can be made more formal and organized in the future. The answer of most workers was in the affirmative.

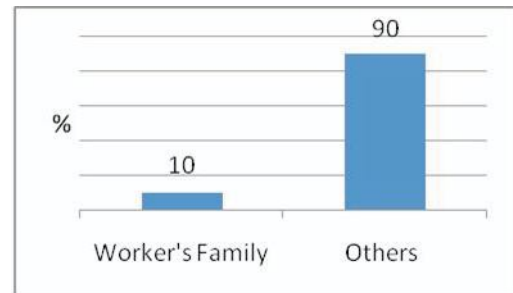
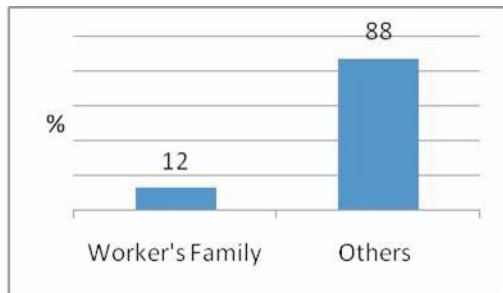


63% workers in the bangle making sector feel that the model by which they have acquired skills can be processed for formalization. In the general and decorative glassware sector, workers did not party to what their counterparts said about process formalization

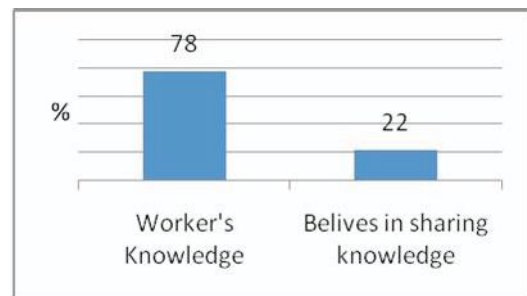
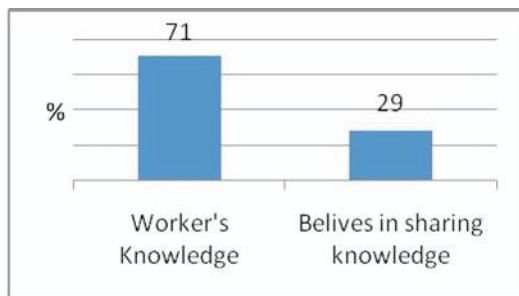
Workers were asked if they would be willing to impart training to others. In response, 90% workers in the bangle making sector said they would be only happy to share knowledge with others. The response in the general and decorative glassware sector was the same.



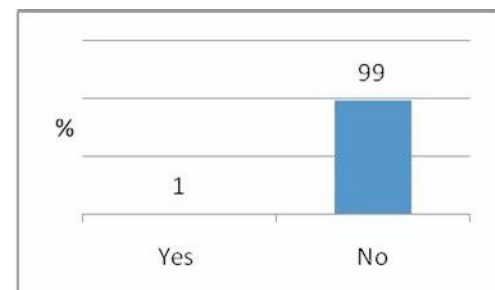
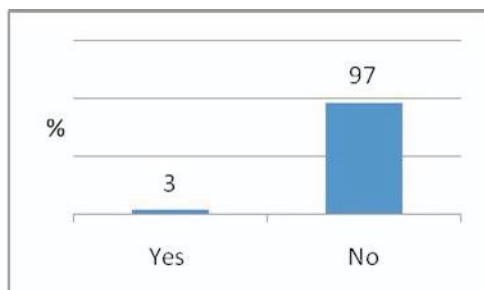
Workers were then asked if they would impart skill-based training to people other than immediate family members. To this 88% workers in the bangle-making sector and 90% workers in the general and decorative glassware said they would willingly share their skills with any willing learner.



Workers were asked why they would impart skills to others. Their reply was that sharing information would enhance their skills in the matter.



In the traditional model of skill acquisition the trainer usually shares skills on a volunteer basis and the selection is extremely random and highly unorganized in nature. Workers were then asked if they would charge a fee for sharing skills with others. The response was almost the same in both the sectors. 97% workers in the bangle-making sector and 99% workers in the general and decorative glassware sector said they would not.



Skill acquisition and knowledge building process is highly traditional in practice, workers used to work as helper in the initial tenure of their work and learn from the experienced workers. In many cases workers in such period are not being paid anything however they don't have complained regarding this since they learn and somehow equally contribute for

the work. This is the traditional and year old practice of learning and passing skills to generations in Firozabad. In the survey when the team asked about whether the traditional learning method can be institutionalized and made formalized, all workers expressed positively and welcomed the idea. The entry level training for several trades as specified in the skill and training table in the report can be imparted by transforming the traditional workstations into new age schools. Majority of the workers also expressed that they feel uncomfortable in going and attending training programs elsewhere (when briefed them about the govt. training programs) however if certain training programs could be organized in the workstation itself then they would definitely welcome it.

In order to make the learning and skill development initiative formal, seven pronged approach should be adopted –

1. Identify industry specialists (academicians/technologists/practitioners) in alignment with the various trade related training programs
2. Training curriculum/methodology and content design by specialists
3. Identify local experienced workers who can act as trainers (Calculating the opportunity cost and compensating them accordingly)
4. Organizing Training of trainers (ToT) where the experienced workers would be trained by the subject specialists
5. Identify workstation (any factory etc) in specific locations (considering the locality)
6. Community awareness and mobilization programme for the training (Involve workers in designing and planning of the mobilization strategy)
7. Training of workers

Employers' perspective on training and capacity building

During the skill mapping study at Firozabad the survey team interacted with all types (big, small and medium) of employers (Karkhanedars) to understand skill enhancement of the workers from the employers' perspective. Every employer has his own view as far as the capacity building and training of workers is concerned.

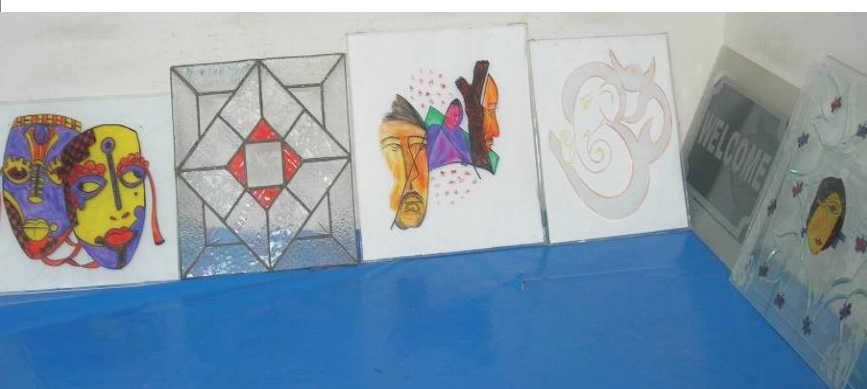
Being a very old and traditional business the knowledge is passed on through generations. Taking the case of the skills of the colorman the knowledge is being transferred only to a close relation (brother, son etc). In the city there are no formal training facilities available where people who are keen to learn the skill related to production of glassware products. The industry itself is the training school for the workers. The workers sharpen their skill and learn new skills while on the job, stated Mr. Dushyant Bansal of Om Glass Works.

Employers opine that workers are very callous regarding safety and security. Mr. Hari Mohan Gupta of Jain Glass Works said they have provided safety equipment to the workers and also make them aware about its importance.

Quality of export products is the area of concern for the employers as workers do not receive any formal training the products which are exported are not standardised. Mr. Yadav of Emky International said that the cutting of Indian glass products is poor as per the demand of international market. According to Mr. Yadav, training related to glass cutting, grinding and polishing must be provided to the workers to meet international quality standards. Training will also reduce the amount of wastage according to the employers.

Major areas of training and capacity building for the workers who are dealing with glassware product manufacturing as stated by employers (Karkhanedar) are-

- ✍ Life skill training related to health and hygiene
- ✍ Importance of safety and security
- ✍ Glass cutting and polishing
- ✍ Screen printing over the glass
- ✍ Artistic painting over the glassware products
- ✍ Hot cutting and grinding
- ✍ Sketching and designing for fancy glassware products



Rest of the training related to the trade is imbibed by the workers on the job. They start working in the factory as helpers and after working for years they upgrade themselves as semi skilled and later as skilled workers. “hey learn on the job” tated Mr. Hanuman Prasad owner of Sarvodaya Glass Industry.

Some of the employers feel that technology and related training needs to be introduced up-to some extent to minimize the wastage and maximize the production so that they can earn maximum. Some of the employers commented on Chinese products and said the proucts manufactured by China are having better finish as compared to Indian products.

The fact that stands out is that workers work for free or with very minimum wage until they

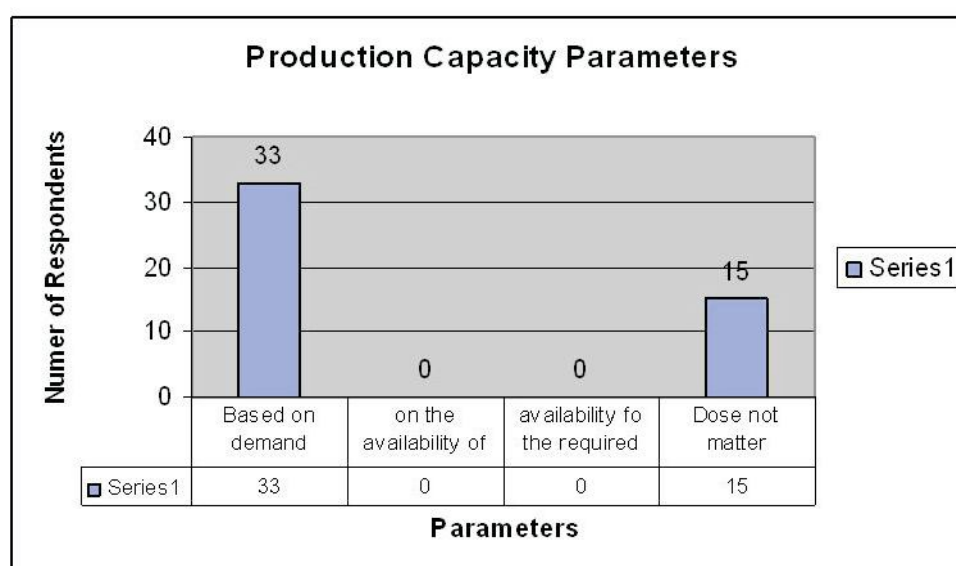
acquire the necessary skills, as there is no formal recruitment or training. Thus a formal course for the entrants also could make the industry efficient.

Production Capacity

The production capacity of an employer is based on the demand for particular products. Other parameters like the availability of workers and raw materials do not matter at all.

Some employers said that their industry runs from furnace to furnace and production would continue throughout the year as there is no way of switching off the Furnace. The process of production of handcrafted glass decorative items is simple enough and is divided into the two stages of manufacturing and decorating.

Better technologies and skill enhancement of artisans, in production of better quality output, can help in the formalization of the production process at a later stage.



It is rare for an employee to dump produce in god owns as their production is based on the demand from the client/customer. The manufacturing phase runs through the year and is also based on the working condition of the furnace.

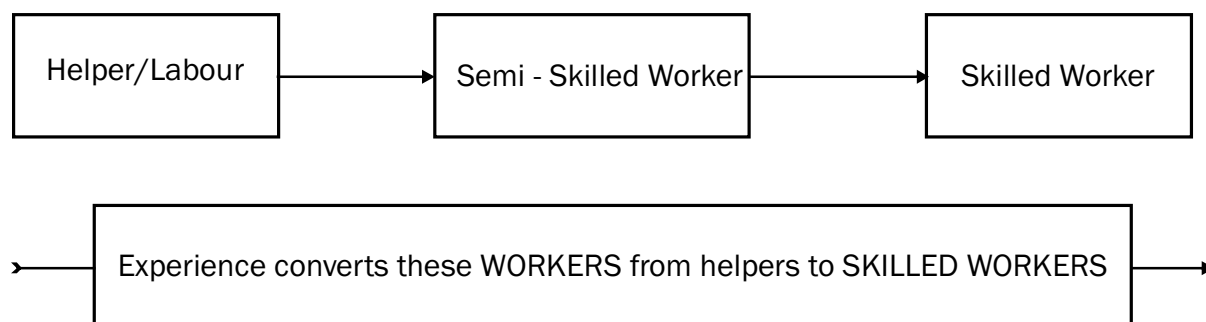
Workers and their exposure to training

The glassware industry in Firozabad as mentioned earlier is old enough and is very much traditional and family-based in nature

ITI' and Polytechnic Colleges provide no training in producing glassware products. A Polytechnic very close to the CDGI is providing handicraft training, but only to girls. It is not

possible to provide training on glassware products as it is a hot process infrastructure is the concern, said Mr. Satish Sharma of Anandipur, Jharkhi ITI.

Industry itself is the training institute for the worker stated Mr. Dushyant of OM Glass Work



Major issues in the Industry from the Employer' point of view-

Employers in Firozabad provided us with a list of concerns like rise in the price of raw materials, lack of sufficient gas and low technical/technological intervention at factory level, lack of formal training to workers and heavy customs and excise duties

Eventually, gas has reached only 50 % of the glass makers in the city. For starters, there's been a shortage of gas ever since GAIL started supplying it. The city gets 900,000 cubic meters of gas per day instead of the 11 lakh (1.1 million) that was promised.

In fact, the larger players got their quota on a first-come, first-serve basis while the remaining gas was evenly distributed among the mid-sized players. In most cases the allocation is not sufficient to fuel the furnaces,

Secondly, the Firozabad glass industry has never been cost-competitive. Both fuel and raw material costs are high – at 35 per cent each of the total cost of operations, the remaining being the labour cost. Gas, the glass-makers claim, is very expensive. Though it is subsidized, their argument is that it should be cheaper still.

"If Gujarat can supply it at a lower rate, why are we paying a higher price?" asks Rohit of Neer Glass Works. In Firozabad, gas costs INR. 6,500 per 1,000 cubic meters compared to INR. 3,600 per cubic meter in Gujarat. That's not all. "If we exceed our fixed quota of gas (which comes through the pipeline and is measured by the meter), we are charged for it at a whopping INR. 23 per cubic meters"

Soda ash does not come cheap either. In India, soda ash prices have escalated from INR. 8,000 per tonne a couple of years ago to INR. 13,000 a tonne today. In China, soda ash costs

INR. 4,500 a tonne. Glass industry representatives claim that only a handful of companies – such as Tata, Birla and Gujarat Heavy Chemicals – make soda ash.

“We are manufacturers and want to remain so,” says Mazhar of Sony Glass Work, who makes bangles. “I am busy trying to save this unit from closing down,”

Whatever its weaknesses, Chandwar Nagar, as it was called before being renamed Firozabad during Akbar's reign, needs urgent resuscitation if its traditional glass factories are to survive. Else the entire town will be inundated with glass accessories from hina as most of the exporters have already started importing Chinese products and selling them in India.

Exporter:

Exporters are a very separate entity in Firozabad. Most employers are exporters as well. Not too many separate export houses exist in the city.

The major products exported are-

- Glass Bottles & Decanters,
- Glass Candle Votive,
- Glass Tableware,
- Glass Flower Vases,
- Glass Handicraft,
- Christmas Decoration,
- Glass Lamps,
- Candle holders & lanterns,
- Chandeliers,
- Hanging lamps

The above mentioned products are exported to the countries like-

- America,
- Nepal,
- Sri Lanka,

- France,
- Italy,
- Czechoslovakia,
- US and UK countries,
- Kuwait,
- Thailand,
- Russia, and
- Gulf countries

Exporters feel that Chinese products are in greater demand than Indian products are. The export growth, as a consequence, has suffered a sharp decline, say the DIC officials of Firozabad. Incidentally, the current economic crisis in the world has already dalt a serious blow to the glass industry here with exporters failing to bag substantial orders at the annual trade fair held at Greater Noida on in October 2008.

chapter

4

Recommendations

Possible Opportunities/Interventions

Scope of Changes

- a. Technology introduction
- b. Production Process
- c. Product Diversification
- d. Implication for Future Skill Requirements

Required Synergy: Institution Building,
Technology Supply, Financial support

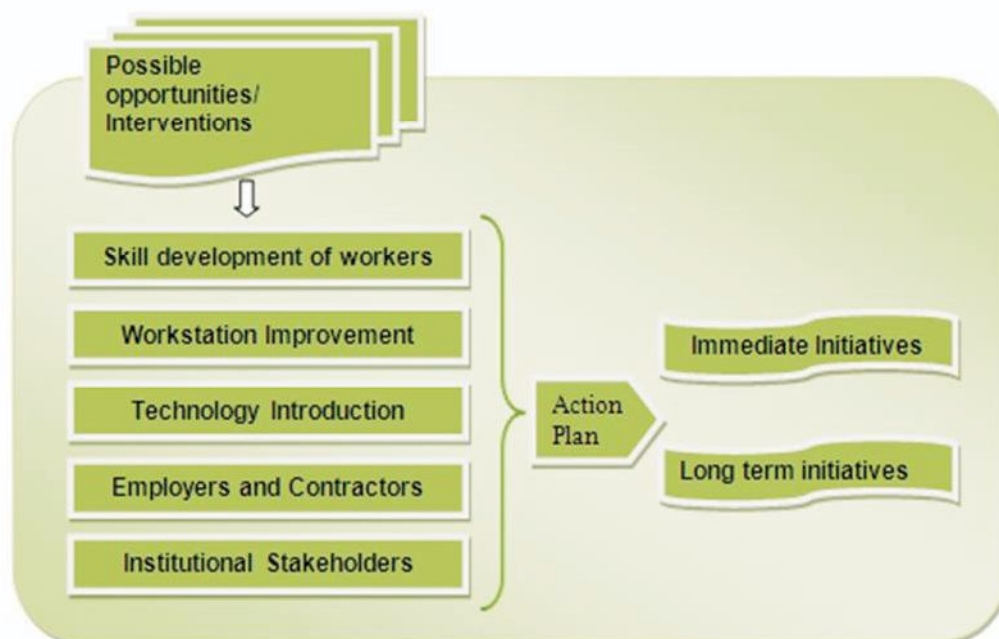
Framework Recommendations for
Strengthening Value - Chain



Recommendations

Possible Opportunities for Intervention

The study explores various spaces where interventions are possible in order to give a boost to the socio-economy of Firozabad glassware cluster. Interventions suggested are not just limited to the workers but include initiatives that can orient other stakeholders such as employers, government, intermediaries etc. towards a decent work agenda



Within the three subsectors studied namely Bangle, General and Decorative glassware, possible opportunities can be defined as:

A. Skill Development of Workers

Workers perform many trades associated with the studied sub-sectors using traditional knowledge. There is a need to update this knowledge as per the demand of the market and introduce new technology. It has come to light that the incompetence and ignorance on the part of the workers contribute to wastage of material and many health related problems. The study found that the employers were anxious to meet international quality norms but have

not been able to do so because of the unavailability of required skilled workers. The skill acquisition process is very much traditional and the study reveals that this process can be standardized (Refer Chapter III). Major areas of training and capacity building for the workers from the glassware product manufacturing sector as suggested by employers also known as *Karkhanedars* are:

- ✍ Designing skills
- ✍ Color mixing skills
- ✍ Furnace management (temperature) skills
- ✍ Training in safety and precautions during work
- ✍ Glass cutting and polishing skills
- ✍ Skills in screen printing on glass
- ✍ Skills in artistic painting over glassware products
- ✍ Hot cutting and grinding skills
- ✍ Skills in sketching and designing of fancy glassware products
- ✍ Fire fighting techniques and management skills

The need of life skill training emerged from the study, the curriculum should include -

- ✍ Knowledge of first aid
- ✍ Health and hygiene
- ✍ Communication skills
- ✍ Basic arithmetic for certain trades
- ✍ Yoga/ physiotherapy

Skill sharing and exposure visits to similar clusters for study purpose for the workers are highly recommended.

Areas identified for skill development and technology upgradation

Decoration of glass-ware: The decoration of glass- ware is very significant to enhance its aesthetic look. It helps in the value addition of the finished product.

The decoration practices followed by the Firozabad glass industry are as follows:-

Screen Printing: Flat conical or cylindrical glass-ware are printed with single or multi-coloured glass enamels with the help of screen printing. The process is well established in the industry. Skill development courses for working in this technique are suggested.

Decoration by hand painting: The demand of hand-painted is high in the international

market. Regular skill development courses to improve the art need to be organized. New techniques need to be introduced for better art work.

Glass Cutting: Skill development courses in glass cutting and acquisition of better machines by the industry is recommended.

Stained glass: The demand of decorative flat glass is increasing in the building and furniture industry. Some units are making designed flat glass by processes like beveling, corner cutting, engraving, frosting and cut work. However newer techniques of making art-flat glass by slumping and fusion are in use. The workers with flat glass in Firozabad need to be better trained since there is a huge demand for processed flat glass. Skilled workers thus may find better avenues in and outside Firozabad.

In the handicraft sector, the two major techniques which lack skilled artisans are table blowing and hand blowing. Training programmes in these skills are recommended.

Skill enhancement is needed in the cluster to ensure better quality products, keeping in mind the export parameters.

A detailed list of trades and areas where skill training programs are possible is available in the previous section.

Strategy for formulating the training programs for skill development –

- ✍ Validation of the identified training programs in the cluster (further to the training need assessment especially with the government and institutional stakeholders like government , employer syndicates and labor unions so that their suggestions and inputs for the design and development of training programme can be sought)
- ✍ Designing of customized training programme for worker mobilization which would ensure the participation and acceptance of training initiatives among worker community
- ✍ Identification of the experts for the content and training curriculum design
- ✍ Content and training curriculum development – participation from stakeholders should be ensured
- ✍ Identification of the training delivery mechanism – study explores the preferred delivery mechanism by worker community Pilot training programs with small size of workers in each identified delivery mechanism to ensure the selection of scale up model for training delivery
- ✍ Incorporating the findings from the pilot, applying necessary changes in the content

and curriculum of the training programs

- ✍ Implementation of training programs

B. Workstation Improvement

In the study the term workstation represents the place where workers perform their work, In the bangle sub-sector work is being done in four workstations namely at household level where 15 trades are performed, at factory level where 21 trades are performed, at small furnace (*bhatti*) level where 3 trades are performed and at warehouse level where 2 trades are performed. In the general and decorative where mainly work is done at factory level (collectively 23 trades are performed). The finding of the study reveals the critical part of the service availability in workstation workers aspire for decent work environment. Areas where improvements are possible are –

- ✍ Basic facilities like clean drinking water, toilets, canteen, lunch break, a place where workers can relax. These services should be made available in factories.
- ✍ Spacious working places so that, in order to avoid accidents and reduce the risk of burning from the moving rods of molten glass. It will also ensure minimizing the temperature inside the working hall and would allow enough fresh air to flow inside the working area.
- ✍ Availability of safety gadgets like mask, gloves, goggles for workers working in hazardous and risky trades like the fire man, mix man etc
- ✍ Availability of first aid and a trained attendant in the workstation is a must
- ✍ Better communication between workers and employers in workstation and better HR practices

C. Technology Introduction

Several technological interventions are possible in the studied sub-sectors, particularly in the bangle sub-sector where joining of the bangles (*jodai*) is still being done with the help of kerosene and the coal which is being used in the small furnace level operations (*pakai*). These two sections in the bangle sub-sector can be revolutionized by the intervention of gas operated small lamps for the *jodai* and gas operated furnace for the *pakai* trades. Having said that possible interventions would also require the institutional stakeholders like government and ILO to ensure the supply of gas made available to meet the raised demand. The furnaces which are operated through gas also lack in efficiency since these furnaces are of a short life-span.

Auxiliary furnaces like *belan bhatti*, *sikai bhatti*, need to be improved by introducing better design and combustion equipment, insulation and temperature control.

Sidhai & Jodai of bangle spiral rings: The straightening and joining of the two ends of the bangle by heating is known as the *sidhai & jodai* of bangles. The work is accomplished on contract basis by full or part-time workers. Most of the workers work from home. The activity of melting the two ends of the glass ring is carried out on kerosene lamps in closed rooms. Environmental conditions are uncongenial. Ventilation would impede the flames from coming straight upward. The room which is already badly lighted now gets full of un-burnt residual gases.

The entire process needs to be improved by way of developing low cost gas operated machines.

Cutting of bangles: The activity is carried out on cutting wheels fitted on the floor with a common shaft. There is high degree of vibration in the cutting wheels. The workers are made to sit in a kneel-down position. Sitting and working in this posture for long hours of time are unhealthy. Due to vibrations in the machine the percentage of bangles rejected increases. The fingers of the workers also get affected due to continuous work on cutting wheels.

Improved version of the cutting wheels is required for higher productivity.

Pakai Bhatti: The bangles are then put into re-heating furnaces for the purpose of surface shine improvement, melting of glass colors and annealing of the glass. The *pakai bhatti* are not efficient in fuel consumption. Improvement in the design and application of insulation and instrumentation combustion control systems is absolutely imperative. Muffle life, and its conductivity needs to be improved.

Sand Blasting: Sand blasting machines need to be improved to avoid dust generation. Better version of the stencil will help in improving the quality of products. There is scope of skill development in this area.

Cut-work: Cut-work is normally carried out on a table and art made out of potash and lead glass. However in Firozabad this activity is carried out on soda lime glass or semi-lead crystals by primitive glass cutting wheels fitted on the floor with a common shaft. High vibration in the machine impedes the attainment of quality art work on glass ware. Better quality can be produced by using tailor-made cutting machines and following better techniques.

Possible interventions are:

- ✍ Lack of creativity. The unit depends only on old designs and their replication
- ✍ Technology is primitive & inefficient

- ✍ Supply of inconsistent quality of bulk raw materials.
- ✍ Production is largely based on the experience of skilled people in the areas of batch making, melting, mould making, shaping and furnace construction without technical reasoning
- ✍ In rainy season and humid weather household level work in the bangle sub-sector is not possible, thus interventions are needed here.
- ✍ Chemicals which are used in the various processes like beautification of bangle & decorative glass products, joining the bangles and making bracelet, luster etc
- ✍ The length of the pipe used for extracting molten glass from furnace needs to be increased
- ✍ The furnace mouth from where molten glass is removed should not be open always, a tin window is required to prevent direct exposure to the high temperature

Detailed trade wise interventions are available in the initial part of this chapter..

D. Employer and Contractors

Employers and contractors should be encouraged to accept the recommendations related to the workstation, skill building of workers and technology introduction. The study team suggests a specific training programme for employers and contractors in the same context. All suggested inputs are related to the management practices and since workers are very much an integral part of the success of the business, the study team recommends the design and development of training programmes for employers and contractors

Their training curriculum should cover -

- ✍ Management practices – HR solutions
- ✍ Importance of hiring skilled and certified workers
- ✍ Wage defining process/work time schedule planning
- ✍ Effective cost cutting methods
- ✍ Importance of decent job environment
- ✍ New market trends and market linkages (designs, product differentiation)
- ✍ Safer and cost effective technologies around the other parts of glassware industries in world
- ✍ Export and linkage building methods – from website etc
- ✍ Good practices adopted by other Employers (Locally/globally)
- ✍ Information about various industry standards (ISO etc), financial schemes etc

E. Institutional Stakeholders

Each stakeholder, in the cluster, has a special role to play however it emerges that each one of them is working according to their individual agenda. There is reason to believe that their combined efforts will result in more sustainable cluster space. Also the inclusive approach of all stakeholders would definitely contribute towards the growth of the sector. The institutional stakeholders namely government departments like DIC, Labor office, Employer Syndicate, Labor Unions, local NGOs, CDGI should work on a common theme leading to inclusive and cooperative work. The study recommends creation of a mechanism where representatives of all such stakeholders can be a part of it as members. A forum comprising one representative from each specified stakeholder must be formed. This forum would also help in understanding the needs and preferences of the stakeholders and possibly help in making decent environment for inclusive development of the glassware cluster. Through this forum feedback, suggestions on any new interventions, new programs can be made. ILO should perform the role of a facilitator and nurture this forum. Such forums are the need of the hour for clusters like Firozabad this would provide a framework for cluster development.

Suggested Plan of Action

To drive the specified possible opportunities and interventions, two phase initiatives are suggested –

A. Immediate Initiatives

The study team believes that the training needs of the workers emerging from the survey will not have any meaning until sincere efforts are made by the employer community to implement the SDI programme. Specifically and strategically designed awareness programs for the employers too will help in creating decent work environment. Technological changes can contribute to the betterment of their business and growth of the glassware cluster. The awareness programme should not be just confined to the employers; it should also include other stakeholders.

Action Points –

- ✍ Identification of the stakeholders (Selection of the audience)
- ✍ Resource planning
- ✍ Strategy formulation for the awareness programme
- ✍ Designing of methodology
- ✍ Content design and medium selection

- ✍ Co-ordination with the stakeholders for the events
- ✍ Implementation of the programmes

Specific and section based awareness meetings need to be arranged for the stakeholders where they can be introduced to the benefits of the interventions and training programs. Study team also realized that there are many mis-understandings among various stakeholders especially between the employers and the worker unions. Both the stakeholders are very skeptical about the moves and intentions of each other. There is an urgent need of a facilitator or mechanism which can provide them common platform. Since the cluster is highly unorganized and the unions are moreover politically motivated there is very little genuine interest for the worker community. ILO should identify the possible facilitator and ensure that such mechanism can be made available.

B. Long term Initiatives

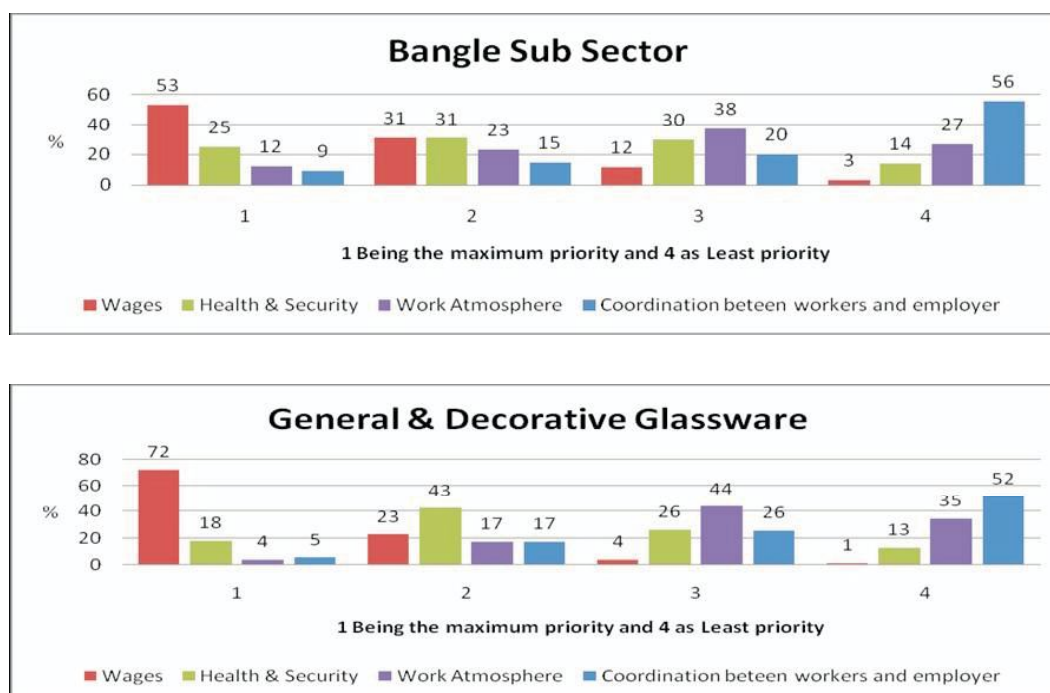
Implementation of the training programmes on ground is required. Continuous strengthening of the identified interventions by regular incorporation of suggestions and inputs from stakeholders is a must. Organizing regular mobilization and capacity building programmes and keeping stakeholders synergized over the long term will help. Also a consistent effort to work with the broader objective of cluster development is required. Facilitator should be identified by ILO to bring out the concepts to reality. As specified in the identified opportunities, the suggested strategy should be applied and its implementation ensured. Timely evaluation of the impact and response from the community should be organized.

C. Scope of Change

(i). Worker' Priorities

Workers select their preferences over a range of four attributes, which further details the present condition of Firozabad glassware. Their perception over attributes clearly outlines the possible level of recommendations for the stakeholders. The larger proposed framework, for strengthening the value chain and improving employment conditions for workers, is detailed in terms of worker preferences. Most workers said they wanted.

- a. Regular wages,
- b. Health & security benefits,
- c. A congenial work environment and
- d. Better coordination between workers and employers



The chart above depicts the possible approaches from the workers perspective.

53% of the workers rank wages as the most important attribute and 56% workers rank coordination between workers and employers as the least important attribute in the Bangle making sector. Workers do not attribute much importance to issues like health and security and congenial work atmosphere. The same can be said of workers in the general and decorative glassware.

(ii). Technology Introduction

Artisans are using outdated techniques and technologies for making decorative items. There is a need to explore possible interventions for up-grading existing technologies.

(iii). Production Process

Techniques like hand blowing are dying out due to the expensive production process involved. Hand blowing is a technique used for the production of pots and vases and other glassware. This technique requires use of small pot furnaces for production.

(iv). Product Diversification

There is immense potential for product diversification in the handicraft sector. There is a great demand in the market for painting, glass cutting and sand blasting techniques.

(v). Implications for future skill requirements

Match Making: The fundamental principle for batch making is the same for large size and small pot furnaces.

Skill development courses could be organized to adopt the best batch making practices for large and small batches alike. Introduction of essential low cost machines, advantage of raw material testing and its use for standardizing the composition is very important to obtain a consistent glass quality.

Glass Melting: Glass melting skills need to be improved in making bubble, cord & strain free glass. Such skill development courses could be organized by the CFC.

Furnace Construction: Masonry skills need to be improved for furnace construction. The life of the furnace not only depends on the quality and design of the furnace but also the accuracy with which the bricks and blocks are laid to construct the furnace.

Pot Making Skill: There are about 35 pot making units. The average life of the pot is only that of 21 days. Use of proper refractory material, and its composition plays a vital role in improving the life of the pots. Pot making and molding skills should be introduced by way of providing training to pot maker.

Pot Arching Skill: The average life of a pot is only that of 21-30 days in Firozabad compared to its life of about six months in developed countries. The pot arching practice is primitive and needs to be improved on scientific grounds. The firemen, engaged in pot arching need to undergo training on pot arching. (i.e. baking of pots before shifting to furnace at high temperature).

Mould Making Skill: Mould making needs to be improved. The maintenance of a mould in the glass industry also needs special technical inputs for obtaining better glassware surface. Skill development courses are required for making better moulds of suitable material.

Design Development: The glass industry is replicating old designs and designs available in the international market. Skill development is required in the area of designing newer products and moulds. Accordingly courses for creative designing of kitchen ware, table ware and art ware need to be introduced. It will bring in lot of value addition to finished products.

Introduction of fuel-efficient pot furnaces and tank furnaces: Large tank furnaces are developed by professionals whereas pot furnaces both closed and open are made by either furnace making skill masons. TERI has developed a gas -fired pot furnace which is relatively more efficient and is being replicated by the industry.

Required Synergy

Each stakeholder, in the Firozabad glassware cluster, has a special role to play however it emerges that each one of them is functioning according to largely individual agenda. There is reason to believe that their combined efforts will result in more sustainable cluster growth. Serious and concerted efforts are needed to upgrade the socio-economic status of artisan community in Firozabad. Integrated efforts are needed at various levels to obtain the objective. There have been some efforts by local NGOs in institutionalizing operations of the artisan cluster, but with little success so far. There is a feeling of intense competitiveness among artisans due to lack of access to market.

Synergy between various stakeholders can be promoted in the following domains:

a. Technical

Artisans are still working with very basic instruments (nozzle burner and air balloon) for making glass toys. Technological interventions are needed to enhance the production and working conditions of artisans. CDGI has made some efforts in this direction by introducing technologies from Czechoslovakia, but success still eludes them. TERI has initiated several interventions in designing fuel efficient *pakai bhatti* however the cost of technology is still not within the reach of many employers. The study also found that there is very less level of acceptance of CDGI initiatives among employer community hence the study team suggests to strengthen the inter-organizational exposure between employer community and CDGI. A holistic synergy of glassware stakeholders with other academic institutions like NID, NIFT, IIT are suggested.

b. Financial/Institutional Schemes

There is an increased demand for loan and other subsidies by artisans who plan to expand their work. A few loan facilities are available with the Development Commissioner (Handicrafts) but hardly anyone has been able to avail of these schemes. The artisan community is aware of some of the schemes but is unable to benefit due to the red tapism and the absence of an office in Firozabad. Artisans say that this is because there is no trade union or syndicate of artisans to take their demands to a higher level. Various programs of Ministry of SME and heavy industries to facilitate the adaptation of new technologies have very important viability for the cluster. The DIC needs to facilitate such programmes in the cluster. There are very less visible efforts made in the bangle sub sector particularly for the trades which are traditionally contractual based and performed in domestic level by the CDGI or any other government institutions however the bangle sector being the largest

employment generation sub sector in the cluster thus there is a immense need of taking the identified issues in priority by streamlining stakeholders like financial institutions, CDGI, DIC, GAIL etc.

c. Marketing

Cost of the decorative handicraft items manufactured in Firozabad are supplied in the local market. The items are not exported. Employers and artisans feel that the quality of the products is not good enough for export purposes. There is no design consistency in the products. The Chinese products, available in the market, are much better in quality and are cheaper in production. Artisans say that this is because of the low quality raw material available in the market. Training and capacity building of artisans is also an issue to be addressed. This highlights the need of intervention from Ministry of Trade & Commerce, DIC, NIFT, NID etc

d. Occupational Health and Safety

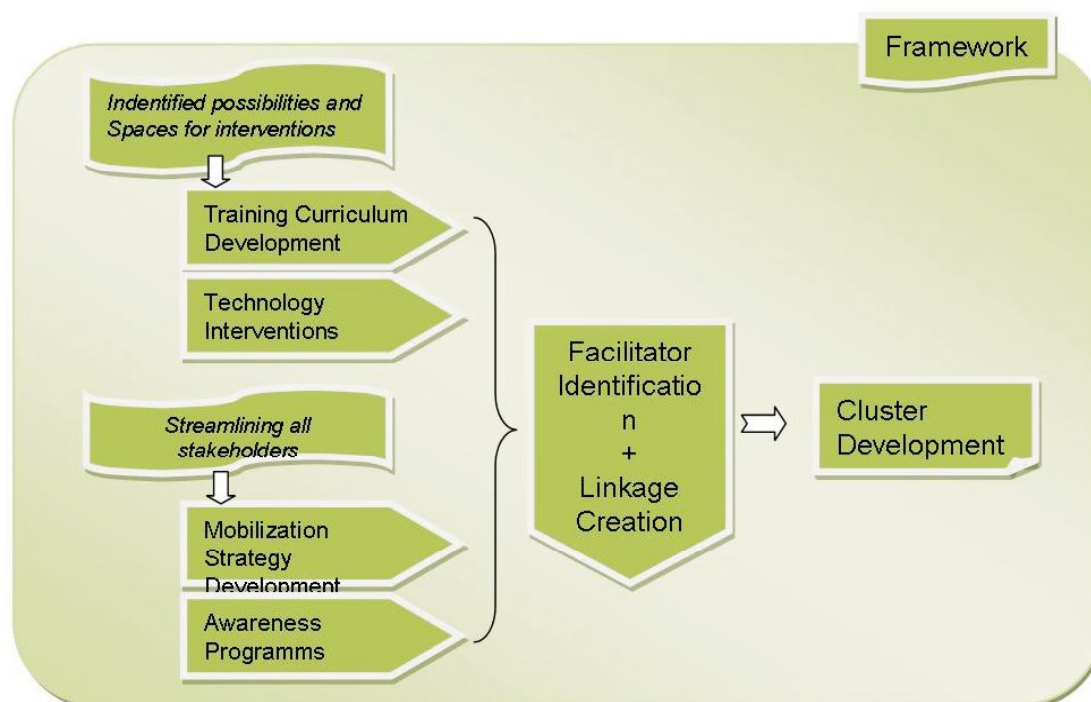
The need of decent job environment has emerged as one of the very critical attention area in the study undertaken by DA. The working conditions and facilities needs to be seriously addressed, stakeholders like local NGOs, Labor Unions, Employer Syndicates and local government administration of the cluster must take a concrete call on it and encourage the safety precaution and adaptations of better cleaner and safer technology . Stakeholder like Ministry of Women & Child Development, Ministry of Labor & Employment, Insurance institutions must exercises their expertise and programmes in the cluster



Framework of Recommendations for Strengthening Value Chain

There is a need for adoption of an integrated approach at cluster level with activities in several areas, for a programme to effectively ensure the social economical development of the cluster. The key components of such a programme would be to alleviate ignorance through information and strengthening working conditions thus reducing vulnerability and ensuring decent job environment. Activities, centered with the mobilization of the worker community, design and development of the mobilization programs and raining programs for skill development are some of the very critical components of the proposed framework.

The strategy for development of a programmatic approach is shown in the diagram below:



The studied sub sectors underline the need for focused attention to ensure qualitative raw material supply, technology availability, workstation improvements, training, market linkages and overall growth of the industry. Findings and suggestions are specified in the recommendation section of the report. One of the emphasized areas is enabling worker community (labor unions) and employer groups to align their objectives and work collectively for the cluster growth

chapter

5

Annexure

- a. Minutes of the Stakeholder Workshop
- b. Questionnaire
 - i. Workers
 - ii. Employers
 - iii. Other Stakeholders
 - iv. Consultative template
- c. Demographic Details: Survey
- d. List of Stakeholders
- e. List Organizations/Individuals

Reference



Annexure

A. Minutes of the stakeholder workshop

Stakeholder Consultative Workshop

Firozabad

21 November 2008

Venue: Hotel Monark, Conference Room

Members Present:

Mr. Singh, Additional District Magistrate (ADM), Firozabad

DIC, Firozabad: Mr. V.K.Sharma, Manager (Marketing)

Labour Department: Mr. Kumar (Deputy Labour Commissioner), Mr. Madhur Singh (Asst Labour Commissioner)

Ministry of Labour and Employment: Mr. Pravin Choudhary, Additional Director

CDGI: Mr. Devendra Kumar

ILO: Mr. Rit Chandra

Development Alternatives: Vijay Chaturvedi, Pravin Manikpuri, Madhuban Pandey, Tanushree

Welcome address by Vijay Chaturvedi, DA

The various stakeholders of the Firozabad Glass industry were introduced by Vijay Chaturvedi from DA. He briefed about the study and Skill Development Initiative of Government of India. He also briefed the audience about the activities and initiatives of Development Alternatives.

Presentation by Mr. Pravin Choudhary (ILO)

Mr. Choudhary elaborated on the Skill Development Initiative of Ministry of Labour & Employment. He stressed upon that the Skill Development Initiative of Government of India and development of Modular Employable Skills for gainful employment. The programme is targeted at unemployed youth, ITI graduates and school dropouts over the age of 14 yrs. The initiative aims to build capacities of these youth for better employment opportunities.

Under the initiative, Government and other ITIs will be provided funds for training youth.

These ITIs will be recognised by VTPs under the programme.

The presentation was followed by discussion with the stakeholders.

How to ensure quality of trainings? In response to it, Mr. Choudhary elaborated that the centralised development of Curricula and since the trainings are incentive based, the ITIs will be persuaded to provide training to their students.

Address by Assistant District Magistrate:

During the Workshop, Mr. Singh, Assistant District Magistrate (ADM) described the uniqueness of Glass industry in Firozabad in being the most localized industry in world for bangle making and hence has a large worker population. He elaborated that technological interventions can benefit both employer and the employee.

Presentation on Study Methodology by Praveen Manikpuri

Mr. Manikpuri, Development Alternatives, elaborated on the objectives and methodology of the study. He briefed the group on the general survey methodology and stakeholder groups with whom discussions will be conducted. The sample size for survey of each stakeholder was finalized within the session.

During the phase of discussions, several queries were raised especially with regard availability of gas, working conditions of workers, role of various associations and syndicate, etc.

Responding to a query, Mr. Madhur Singh, Assistant Labour Commissioner, and Firozabad indicated that trade unions and syndicates can give good insight into the processes of production, the skill gaps and needs of the industry. He reiterated that about 75% of the information can be gained from trade unions and associations like INTUC, CITU, etc.

Mr. Somesh Goswami from Chudi Judai Mazdoor Samiti, which works with household workers primarily women and children involved in bangle making. He stated that bangle industry is a unique feature of Firozabad and should be given more emphasis during the course of study.

During the course of discussion, following concerns were raised by the stakeholders:

- ✍ Glass toys are an area which can be looked into, as the issue of child labour is most prevalent here.
- ✍ Trainings to worker need to be provided in a practical atmosphere like factory, not classroom. This can be an issue to industry owners.

- ✍ Lack of availability of gas for fuel is a constraint. The entrepreneurs who want to expand their units are unable to do so because of it.

It was decided that the survey will start from 25th of November.

The trade unions and employer syndicates have conveyed their complete support in conducting the study.

B. Questionnaire Workers

Skill Mapping Study: Workers

Questionnaire No

Confidential For Research Purpose Only

Surveyor Name:

Location:

Date:

I. Demographic

1. Age of the worker

Less than 18 ☐ between 19 and 30 ☐ between 31 and 40 ☐ More than 40 ☐

2. Education

none ☐ below 5th ☐ up to 8th ☐ up to 10th ☐ up to 12th ☐ >12th ☐

3. Religion

Hindu ☐ Muslim ☐ Others Specify

4. Category

SC ☐ ST ☐ OBC ☐ General ☐

5. Gender

Male ☐ Female ☐

6. Monthly Income

Less than 1000 ☐ 1000-2000 ☐ 2000-3000 ☐ More than 3000 ☐

7. Residence (Years at Firozabad town)

Less than 2 Yrs ☐ 2 to 5 Yrs ☐ 5 to 10 Yrs ☐ More than 10 Yrs ☐

8. What is your workstation

Home ☐ Employer's Factory ☐ Other Workers Home ☐ Others Specify ☐

9. If not in home, then how far you have to travel (Mobility) for work

Less than 1 Km ☐ 1 & 3 Km ☐ More than 3 Km ☐

10. Home Ownership

Rent ☐ Owned ☐ Arranged by employer ☐

11. Extent of family support in the household level work :

Excellent ☐ Satisfactory ☐ Not good ☐ Their support is not required ☐

12. No. of literate members in the family

13. No of members in the family associated with the same work process

II. Work: General

14. Who brought/started the work at household level

You ☐ Head of the family ☐ Other family member ☐

15. Age when started working as worker

Less than 16 ☐ Between 16 & 20 ☐ Between 21 & 26 ☐ More than 26 ☐

16. Tenure of work in the same specified work level :

Less than 2 Yrs ☐ 2 to 5 Yrs ☐ 5 to 10 Yrs ☐ More than 10 Yrs ☐

17. Occupation before this work period

Nothing ☐ Other then the glassware job..... with in glassware.....

18. Amount/Income when you started the work

19. Maximum distribution of income in various activities

Saving ☐ Consumption ☐ Education ☐ Health ☐

III. Work: Specific

20. Specific job description

.....

21. Nature of work

Contractual ☐ Daily wages ☐ Others

22. How did you get into this job

Through Employer ☐ Self ☐ Through family ☐ Friends ☐ Others

23. Time spent in a day for the work

More then 10 hours ☐

24. What skills are required to fit into your work profile –

a. b.....

c. d.....

25. Who taught you the process of work

Employer ☐ Friend ☐ Self (By observation etc) ☐

Family Member ☐ Govt. ☐ Ngo ☐ Others Specify

26. Were you trained alone

Yes ☐ No ☐

27. If no then who were the others with whom you received the training

Family members ☐

Other participants you never met before training ☐

Other participants but you knew them ☐

28. Your age when you were taught about the work

Less than 10 ☐ between 10 & 15 ☐ between 15 & 20 ☐ More the 25 ☐

29. How much time you took for the learning:

1 day ☐ 3 days ☐ 5 days ☐ More then 5 days ☐

30. With which job/work you started your career

31. What attracted you to be in present job?

Flexibility in work ☐ Family support ☐ Work station ☐ Income ☐
regional tradition ☐ Other specify

32. How much time it took in the beginning for being perfect and accurate in the present job profile

Less then 10 days ☐ Less then one month ☐ A year ☐ Others specify

33. How have you been paid wages

Daily ☐ Weekly ☐ Monthly ☐ As per output/competition of work order ☐

34. What was the wage when you started your job career

.....

35. What were the difficulties when you started performing the work

a.

b.

c.

36. What are the conditions now?

The sector is facing big threats and no interventions can make it better ☐

Yes, there are problems in sector but it will be back on track soon ☐

Others

37. Are the wages paid on time

Yes ☐ No ☐

38. If No, then

a. How much time usually it takes

b. What elements do you feel cause such situation.....

IV. Work: Tools/Techniques

39. What are the tools/techniques you are using now for performing your work

.....

.....

.....

40. Are there any changes in the tools/techniques between now and when you started your job Y/ N

41. If yes , what are these changes

.....

.....

42. Do you feel any difficulties while using these techniques/tools Y/N

43. If yes, then in which areas

.....

.....

44. Do you know about any other tools/ techniques which can be used as replacement of existing practices

45. Do you think the present tools/techniques would be able to meet the requirement of quality and competitive future market Y/N

46. If no then what kind of interventions should be made in existing tools/techniques

.....

.....

.....

V. Work: Work Profile

47. Who decides the wage

Employer ☐ You ☐ Contractor ☐ Others specify

48. Factors which influences the wage define process

Work experience ☐ Individual capability ☐ Employers' capacity ☐

Supply of workers ☐ All ☐

49. Are you satisfied with the offered wages

Yes ☐ No ☐

50. What do you think should be the ideal wage as per your skills

51. How do you utilize your free time

Learning new things about the same work sector ☐

Rest With Family/friends ☐

Some other work (not related to the glassware sector) ☐

52. Disability (if any caused due to the work)

Yes ☐ No ☐

If caused during work then who paid for the health services

Self ☐ Employer ☐ Debt from others ☐

53. The challenges associated with the present job profile

Unavailability of knowledge ☐ Risk (job security) ☐

Unusual wages ☐ Work atmosphere Others

54. Are you satisfied with the associated job profile

Yes ☐ No ☐

55. What do you expect from employers

Timely wages ☐ Knowledge/training ☐ Better job atmosphere ☐

All ☐ Any other ☐

56. What do you expects from Govt.

Training ☐ Action on banning Chinese products ☐

Technology availability ☐

Regulation for employer/contractors ☐

Any other

57. are you thinking of change in job profile in future

Yes

No ☐

58. How many years would you like to be associated with the same job profile

59. what factors are responsible for this decision

Work itself ☐

Better future/no future threat ☐

Don't want to experiment ☐

60. If yes; what profile And reason behind it

Better wages ☐

Good Demand ☐

Less risk(health/job cuts etc) ☐

61. do you think present skills are enough to get into that job profile

Yes ☐

No ☐

62. If no then what kind of knowledge you will be required

a.

b.

c.

63. Do you think your job profile is secured in future

Yes ☐

No ☐

64. If not then what kind of skill set would be required to keep you secure in future

a.

b.

c.

65. If yes then what skills you are having which makes you secure

Understanding of work ☐

People knows your capability & trust your efficiency ☐

Good relation with employer ☐

All ☐

Others, Specify ☐

66. Do you think based on your existing knowledge you are giving your best in productivity N

Yes ☐

No ☐

67. Tell us what traits you feel you need at the moment to make your job profile more better

a.

b.

c.

68. Apart from the technical skill set, any other skill set do you feel important

a.

b.

c.

69. What are the factors in the existing job which keeps you motivated

Flexibility in work ☐ Family support ☐ Work station ☐

Income ☐ Regional tradition ☐ Other specify

70. Are you satisfied with your skill set

Yes ☐

No ☐

71. If no then what initiatives you feel is required to do justice with your skill set

Training ☐

Spending time with expert workers and learning from them ☐

Others, specify ☐

72. Which process in your work line pays more

73. Since it pays more; then what forces stops you to be a part of it and earn more?

Reluctance from other workers ☐

Restriction from employers ☐

Unavailability of knowledge to perform that task ☐

Others, Specify

74. What should be the ideal process of worker selection

Considering workers own knowledge and experience ☐

Considering workers family's involvement in the sector ☐

Both ☐

75. Who decides your outputs and performance

You ☐

Employer ☐

Others specify

76. How often you see increments in wages

Depends on the profitability of employer ☐

Depends on specific season ☐

Depends on labor shortage ☐

Others Specify

77. In overall , whatever challenges you have cited , do you perceive any advantage of being trained

Yes ☐

No ☐

78. What kind of training do you prefer

Fee based ☐

Free ☐

79. Which location would be better for training

Work station – Your or Any Workers' Home ☐

Work station – Employer's factory ☐

Any other place in the town ☐

80. Do you feel any competition / insecurity from trained and skilled workers

Yes ☐ No ☐

81. If no then Why

You know that at any cost you are the best ☐

Well, every body is independent to work and earn. You don't feel any problem ☐

82. Do you feel the methods by which you acquired the skills is better than the formal training

Yes ☐ No ☐

83. do you feel the model of "traditional method of acquiring skills" can be replicated and can be commonly followed

Yes ☐ No ☐

84. If you become trained how this is going to help you in existing job profile

More productivity ☐

Enhanced knowledge and certified status among employers and workers ☐

Increase in wages ☐

All ☐

Any other specify

85. Are you happy with your employer

Yes ☐ No ☐

86. Comment on the employer facilities

	Rank
Wages	
Safety methods	
Job atmosphere	
Attitude/care towards workers	
Other specify -----	

87. If you have been educated , then what changes it would have brought in your job

Better communication ☐

Better understanding of new technologies and work process ☐

Nothing much ☐

88. Where you would have been in that case (various processes of work profile or some thing else)

.....

89. According to you which process faces most problems in the value chain

.....

90. What skills do you feel needs to be more strengthen in order to make it more perfect

a.

b.

c.

91. Is there any season when you have more work pressure (productivity)

Yes

No

92. If yes, then period

.....

93. If yes then can you tell its reasons?

a.

b.

94. How many times in a year, you have no work?

.....

95. Period

.....

96. If yes then what are its reasons

a.

b.

97. According to you, adaptation and integration of technology by employers would result

Rank your opinion as 1 being minimum and 4 as maximum

Increase in productivity ☐

Labor loss ☐

Better wages ☐

Better health and hygienic ☐

98. In your present work profile, do you feel any importance of safe job environment

Yes ☐

No ☐

99. Are such arrangements available in your work station

Yes ☐

No ☐

100. Would you be interested in sharing your knowledge with some one else

Yes ☐

No ☐

101. If yes who will be the audience

Your family members ☐

Others ☐

102. Why people would come to you for learning

You have good knowledge about the work ☐

You believe in sharing knowledge ☐

103. Will you charge for this

Yes ☐

No ☐

Employers

Skill Mapping Study: Employer

Date:

Name of the Surveyor:.....

GENERAL INFORMATION- COMPANY/FACTORY RELATED

1. Name of the person interacted with

.....

2. Name of the Company/Factory

.....

3. How long factory is established/ operational (In years)

.....

5. Education level of an employer

.....

6. - 12th Standard - Graduate - Post Graduate

Any other.....

PRODUCT RELATED:

7. What are the product being produced in the factory dkj[kkus esa Bangles

Glassware Products (Pots, Scientific items etc)

Fancy Glassware Items (Lightning and other such)

In case any other please

Specify

8. How do you define your production capacity? based on demand on the availability of the labour

availability of the required raw materials

Does not matter

In case any other please specify.....

9. What is the manufacturing cycle
through out the years as and when get order from the clients Any other
specify.....
10. What are the raw materials leads to hazardous for workers?
.....
.....
11. What is the source of product design- who designs the products?
client gives the design client tell the requirement and you design the products
client work with you in finalizing the design
In case any other please specify.....
12. What are the different processes to get the final products? Also specify the
number of workers at every stages?
.....
.....
13. What kind of skills required in workers to perform the tasks?
.....
14. What is the production wastage %age?
.....%age
15. What could minimize the wastage in %age?
Skill enhancement through proper training
Technological interventions
Work environment improvement
In case any other

specify.....

Don't Know

16. Have you heard about any product quality /quality control standards?

Yes

No

17. What was the source of information?

.....

18. How do you major you product quality? Do you follow any quality standard like ISO and Six Sigma, 5 S etc

Yes

No

19. What kind of industry challenges do you feel at your own level?

.....

20. What would be your perspective on possible solution?

.....

19. Ever worked with customers to create or design a product, process or other innovation

Yes

No

20. What are the existing sources of energy?

Electricity fctyh

Gas

Both

In case any other please specify.....

21. Do you use any alternative energy sources to manufacture the products?

No

Yes, Which of the following alternative fuels are used at your facility? (Please check all that apply)

Biomass (e.g. wood or agricultural waste, byproducts) Solar power

Other (please describe).....

EMPLOYEE RELATED

22. How many personnel are working at managerial/supervisory level?

23. How many workers are working in the factory (other than managerial)?

.....

24. How do you define the skilled, semi skilled and unskilled worker?

Skilled

Semi skilled

Unskilled.....

25. How many workers are working at different levels?

Skilled () Semi skilled () Unskilled ()

26. Do you feel short of skilled worker in your company?

Yes () No ()

27. What kind of skill gap you feel in your workforce

.....

28. Have you made any efforts to fulfill this gap?

Yes (if yes, in what areas

No (if no, what was the reasons.....

29. Are you interested to fulfill the skill gap among the employees - Yes / No

30. What are the sources of getting workers for the factory?

from the labour market

through the local contacts or contractor

worker brings workers

If any other please

specify.....

31. What are the procedures you follow during worker recruitment?

Do interview

hire and supervise 2-3 days if he can work with you

hire only experienced

don't follow any such standard

If any other please specify.....

32. What skills you look into workers while hiring them Experience for that particular job

Young, dynamism etc (physical fitness)

Educational level

Matter

Doesn't matter

Less in salary demand

In case any other please

specify.....

33. Do you prefer trained worker? If yes, what skill you look in to your worker.

No Yes

34. Do you offer different pay/wage to the trained worker?

Yes No

35. Do you provide training to your workers (If yes, what are the major areas): ?

Yes ()

No ()

36. Who does the training?

You yourself provide training to them (internal training

Hire professional trainer/consultant and conduct training within company itself

Govt. provides training for your workers in

you send your worker out of the factory to attend training program

in case any other please specify

37. What is the employment condition?

Salaried () Contract () Daily wages () Any other please
specify.....

38. What is the nature of wage payments?

Daily

Weekly

Monthly

At the end of the particular process

in case any other please specify.....

39. On what basis you define the wages of the employees?

Number of years of experience he/she is having

On specific skill base

As per the factory norms (if applicable please specify)

.....

In case any other please ;.....

40. Do you provide insurance and any other such facilities to the employees

Yes

No

41. Do you provide the facilities like toilet, safe drinking water

Yes

No

42. Was employee gone on strike in the history of the company? If yes what was the reason for the same?

Yes

No

43. What is the educational qualification of your worker? (Give marks between 1 to 6 .
1 for Illiterate

5th Pass or Fail

8th Pass or Fail

10th Pass or Fail

12th Pass or Fail

12th Above

44. What short of skills you feel would be required in workers in order to stand in future competition/market growth.....

MARKETING & SALES RELATED

45. Does marketing of the products plays any role in your products?

Yes

No

46. Who does the marketing for the products?

you do yourself

marketing manager's responsibility

external agencies

through the pre established networks

suppliers are in case any other please specify.....

47. Where do you sell your products?

have your own outlets

through distributors

Any other please specify.....

48. Where do you get the maximum market for your products in %age?

Within/surroundings of Firozabad

UP and neighboring states

National

International

49. How you see the growth rate of the glassware products?

Increasing ()

Decreasing ()

50. Does Chinese market bother you on any aspects?

No ()

Yes (if yes, how would you like to handle the situation?)

.....

51. Does the fluctuation in the money market affect your business?

No () Yes (if yes, how so?)

GOVT. & OTHER SUCH STAKE HOLDER RELATED

52. Do you get any support from the govt. and other such stakeholders?

Yes

No

53. Who help you in your business form the Govt. side? CDGI

DIC

State Govt

If any other please ; specify.....

54. What do you expect from the Govt. to do for the well being of the glassware industry?

Training and other such related facilitation - Technology related facilitation - Gas or alternative source of energy

If any other please specify

OVERALL

55. Have you ever tried to focus on the Following points for the sustainable manufacturing of the products? In case Yes what was the degree of impact in turnover.(High, Medium, Low, Not Relevant) Increased variety of goods or services. (High, Medium, Low, Not Relevant)
- Improved quality of goods or services. (High, Medium, Low, Not Relevant)
- Improved flexibility of production or service provision (High, Medium, Low, Not Relevant)
- Increased capacity of production or service provision (High, Medium, Low, Not Relevant)
- Reduced materials and energy required per unit output (High, Medium, Low, Not Relevant)
- Reduced environmental impacts/improved health & safety (High, Medium, Low, Not Relevant)
- Improved employee satisfaction/reduced worker turnover (High, Medium, Low, Not Relevant)
56. As per your view, what are the extent of visible changes by bringing innovation in following areas (High, Medium, Low, Not experienced)
- Lack of qualified personnel (High, Medium, Low, Not experienced)
- Lack of information on technology (High, Medium, Low, Not experienced)
- Lack of information on markets (High, Medium, Low, Not experienced)
- Market dominated by established companies (High, Medium, Low, Not experienced)
- Uncertain demand for innovative goods or services (High, Medium, Low, Not experienced)
- Lack of funds, costs too high (High, Medium, Low, Not experienced)
- 57- Please can you indicate whether you use or plan to use technologies or techniques to improve the sustainability of the manufacturing processes at this facility in the following areas? (Check one option for each item.)

Supplier selection (good sustainability performance, practice) (Use Now, Plan to use in coming 1-2 years, No plan to use, not applicable)

Selection of raw materials (Use Now, Plan to use in coming 1-2 years, No plan to use, not applicable)

Product design (design to reduce resource use) (Use Now, Plan to use in coming 1-2 years, No plan to use, not applicable)

Design of manufacturing processes (waste reduction) (Use Now, Plan to use in coming 1-2 years, No plan to use, not applicable)

Facility design/planning (e.g., for energy efficiency) (Use Now, Plan to use in coming 1-2 years, No plan to use, not applicable)

Employee training in sustainability practices (Use Now, Plan to use in coming 1-2 years, No plan to use, not applicable)

58. Which of the following sustainability management activities are currently used at company level? If not currently used, please indicate whether there are any plans for use. Check one option for each item. (Use Now, Plan to use in next 2 years, No plan to use, Not applicable)

High efficiency lighting (Use Now, Plan to use in next 2 years, No plan to use, Not applicable)

Water recycling (Use Now, Plan to use in next 2 years, No plan to use, Not applicable)

Energy audits (Use Now, Plan to use in next 2 years, No plan to use, Not applicable)

Recycling of production materials (Use Now, Plan to use in next 2 years, No plan to use, Not applicable)

Questions Asked to Artisans

Name:

Expertise:

No of Workers:

Education level:

Training/exhibitions attended:

Scale of Operation:

Products profile:

Where have they learnt the art from?

Designing:

Basic skills needed:

Tools/ machines used:

Energy required:

Raw material procurement:

Rejections and over productions:

Problems and limitations:

Market:

Target buyers:

Skill Mapping Questionnaire

Objective:

The sole objective of this questionnaire is to understand the skills gaps and skills mismatch of Firozabad Glassware Cluster from the point of view of the Export houses.

Name of the Surveyor:

Date:.....

Name and Address of the Exporter:

Product Profile

1.

2.

Where are the products procured from?

own industry

Other manufacturing units.....

Product designing:

Internal

Designer

Client need based

Marketing

Who are the major target buyers.....

.....who provides marketing linkages

Self

Export associations

Govt. supports

Major process to get final product

.....

Major skill required to complete the process

.....

Do you feel short of skilled manpower in your industry? If yes what kind of skill gap is available?

No

Yes

What are the major challenges export houses or particularly your industry is facing.

.....

Any other points during the discussion

.....

C. Demographic Detail: Survey

See page no. 16 (Main document)

D. List of Stakeholders

SUHAG NAGAR

1. Rajesh Kumar
2. Ravindra Kumar
3. Harishankar Singh
4. Chakresh Jain
5. Inderjeet
6. Shahnawaz
7. Santosh
8. Kedar Singh
9. Sunil Kumar

KUSHWAHA NAGAR

1. Sonelal
2. Ramcharan Snehi
3. Raju
4. Sarvesh
5. Prabal Pratap
6. Dinesh Kushwaha
7. Kaushal
8. Ajay Kumar

DEOKALI VILLAGE

1. Balkishan
2. Chob Singh
3. Khyali Ram
4. Malkhan Singh 1
5. Malkhan Singh 2
6. Munna Singh
7. Nit Kishore
8. Pradeep
9. Pratap Singh
10. Raj Kishore
11. Sumitra Devi

List of Employers (interacted): Bangles		
Sr. No	Bangles	Name of Person
1	Sarvodaya Glass Industry	Mr. Hanuman Prasad
2	Ansar Glass Works	Mr. Murtaza
3	Neelam Glass Works	Mr. Alok Gupta
4	Durga Glass Works	Mr. Chandra Kr. Jain
5	Kohinoor Bangles Industries	Mr. Vishnu Agrawal
6	Express Glass Works	Mr. Islam Khan
7	Prem Glass Works	Mr.
8	Mahesh glass works	Mr. Arun Jain
9	Geeta glass work	Mr. Rajkumar mittal
10	Rachana Industries	Mr. Anil jain(Pinki babu)
11	Modren glass Makkanpur	Mr. Nitin gupta
12	Soni glass work	Mr. Mazhar
13	Anoop glass work	Mr. Nazim bhai
14	K C Glass Works	Mr. Hazi jamil
15	Pioneer Glass Works	Mr. Rohit

List of Employers(interacted) : General Glassware Product		
Sr. No,	General Product	Name of Person
1	Emky International Glass Work	Mr. Yadav
2	Kohinoor Bangles Industries	Mr. Vishnu Agrawal
3	Neelam Glass Works	Mr. Alok Gupta
4	Advanced Glass Work	Mr. Sanjay Agrawa
5	Jain Glass Works	Mr. Hari Mohan Gupta
6	Pooja Glass Works Pvt. Ltd	Mr. Nitin Agrawal
7	Nannumal Glass Works	Mr. K.P. Srivastava
8	OM Glass Work	Mr. Dushyant Bansal
9	Mahesh glass works	Mr. Arun Jain
10	Geeta glass work	Mr. Rajkumar Mittal
11	K C glass	Mr. Hazi Jamil
12	Pioneer glass	Mr. Rohit
13	Decent Lites	Mr. Ashish Agrawal
14	Chanda glass house	Mr. Sarad Gupta
15	Shiwali lits & Kraft Pvt. Ltd	Mr. Anil Gupta

List of Employer (interacted) : Fancy Glass Items		
Sr. No.	Fancy Items	Name of Person
1	Emky International Glass Work	Mr. Yadav
2	Akarshan Glass Industries	Mr. Chakrish Yadav
3	Irfan Glass Works	Mr. Ashok Kr. Upadhayay
4	Hind Lamps Ltd.	Mr. S.K. Sharma
5	Jain Glass Works	Mr. Hari Mohan Gupta
6	Mahesh glass works	Mr. Arun Jain
7	Geeta glass work	Mr. Rajkumar Mittal
8	Decent Lites	Mr. Ashish Agrwal
9	shiwali lits&Kraft PVT ltd	Mr. Anil Gupta
10	Govinda glass	Mr. Amit Gupta
11	ashoka industries	Mr. Sonu sharma
12	kaushal glass	Mr. Arvind Kumar Gupta
13	Imperial glass house	Mr. Sumit
14	Shiva lites	Mr. Rajesh Gupta
15	Gupta glass house	Mr. Pawan Gupta

List of Exporters (interacted)		
Sr. No.	Exporters	Name of Exportors
1	Pooja Glass Works Pvt.Ltd	Mr .Nitin Agrawal
2	Om glass works Pvt. Ltd	Mr. Dushyant Bansal
3	M/s Emky International	Mr. Yadav
4	M/s Glass India Export	Mr. P.K
5	Decent Lites	Mr. Ashish Agrawal
6	Imperial Glass Emporium	Mr. Sumit
7	Chanda glass export	Mr. Sarad gupta
8	Gupta glass Export	Mr. Pawan gupta
9	shiwali lits & craft Pvt ltd	Mr. Anil gupta
10	Garg glass Emporium	Mr. Sanjeev Agrwal
11	Ashoka Emporium	Mr. Rakesh kumar sharma
12	Lamxi glass works	Mr. Amit gupta
13	Yarrow Enterprises	Mr. Mahesh sharma
14	India Export(India)	Mr. Ram kumar Agrawal
15	Kaushal glass emporium	Mr. Arvind kumar gupta

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Development
Alternatives