



भारत सरकार



GOVERNMENT OF INDIA  
MINISTRY OF SMALL SCALE INDUSTRIES  
SMALL INDUSTRIES DEVELOPMENT ORGANISATION

DIAGNOSTIC STUDY REPORT OF BRASS & BELL METAL CLUSTER AT BALAKATI KHURDA 12005106

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## FOREWARD

The Phenomenon of large no. of SSI units manufacturing the same (or similar products) existing or historically developing in close proximity to each other (in clusters) has been observed in different periods and diverse industrial environments. "Clustering" as an engine of growth was noticed internationally in the well net worked clusters (usually referred to as Industrial districts") in developed countries especially in Italy. International experience shows that small firms are unable to face competitive pressures because of their isolation and ineffective linkages with relevant support organization and commercial service providers. This realization has lead to increased interest and research in clustering as well as attempts to replicate the process through planned intervention in the developing countries including India. Much of the research and interventions have been done by the UNIDO on the International Level particularly in India with the Ministry of SSI at the counterpart agencies and partner at the national level. The presently adopted approach for cluster development consists of drawing lessons from the experience of successful clusters and then replicating them through building of local capabilities with the active participation of various cluster actors such as small scale industrially units, industry associations, business development service providers, policy makers etc. The Ministry of SSI through its successful collaborative effort with UNIDO and also independently on its won has initiated and completed a series of cluster development initiative in a holistic approach spread all over the country. The ministry is the official counterpart of support agency in India for UNIDO Cluster development programme.

Orissa is endowed with varieties of crafts mainly linked with a number of festivals and rituals observed in the state. The handicrafts in the state due to their unique, original and creative characteristic offer a place of pride in the handicraft map of the country. The present cluster of **Brass and Bell Metal at Balakati** is unique for its varieties of products ranging from domestic utensils, luxury goods and icons of temples etc. This cluster being located in proximity to the state capital Bhubaneswar offers immense opportunities to grow into a potential manufacturing centre, subject to implementation of cluster development programme in line with holistic approach of UNIDO.

Before intervention, the diagnostic study of this cluster has been made through collection of information both from primary and secondary sources and this report has been prepared and presented in valediction session organised at Bhubaneswar in which officers from promotional agencies, banks and financial institutions were present and interacted on various points of action plan.

I wish to place on record my appreciation for the concerted and dedicated efforts made by Sri B.B. Panigrahi, CDE to conduct the survey work as per the guidelines received from EDII, Ahmedabad and to prepare this report for the cause of intervention in the cluster. I would also like to acknowledge the services of Sri S.N. Kuanr, Stenographer for providing secretarial assistance to bring out this report in this shape.

Cuttack,  
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Sd/  
( P. DASH )  
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## INTRODUCTION

### **History, Origin and Development of the Craft:**

The metal handicrafts owe a very ancient lineage in India. The genesis of metal handicrafts in India can be traced way back to Indus Valley Civilization. Even from those days or earlier the Indian People have retained their aesthetic appreciation for cultural values, creative ingenuity and the artistic genius of their remote ancestors.

Thus the evolution of metals helped the course of civilization and it is believed that the skill and knowledge necessary for utilization of metals into arts and crafts were acquired by the Indian people from historic times.

Most of the metal crafts that have come down to us seem to have been made of copper brass or bronze. The craftsmen of olden days were not only proficient in the working of precious metals, but they also used their skill and ingenuity even in the production of articles of daily use in brass, copper and other metals. The discovery of the small bronze statuette of a dancing girl at the ancient site of Mohenjo-Daro testifies the antiquity of Indian metal crafts 5000 years ago. The artistry and craftsmanship displayed on this statuette leaves no doubt that there must have been a long anterior period of development of the craft. Besides Mahenjo-Daro and Harppa, the oldest examples of metal sculpture date from the Imperial Guptas. During the reign of the Imperial Guptas in 4th Century, Indian metal sculpture received the classical perfection and displayed great artistic merit. The famous Chinese traveller Hiuen Tsang who visited India in 7th century found a stupendous copper image of Lord Buddha about 80 ft. high in Nalanda. The antiquity of use of non-ferrous metals is further testified by the famous statue of Lord Buddha in copper about 7.5 ft. high found at Sultanganj and now in Bermingham Museum and Art Gallery.

### **Myths and legends associated with the craft:**

Although the Mohenjo-Daro doll is made of an alloy like bronze, many other metals were also in use in the ancient times. The Mahabharat, the Ramayan and Vedas describe the use of costly metal by Prince and Princes such as ring and earring etc. which had miraculous effect to protect from hostile forces to control our thirst, hunger, sleep, unrituous activities etc. According to Dr. Anand Coomaraswamy, "Not only was iron worked at an early date (being mentioned with gold, silver, lead and tin in Yajur Veda) but there existed (and perhaps originated in India a very early knowledge of the art

of preparing steel, the steel of India was known to the Greeks and Persians and very probably to the Egyptians".

### **Rise and Fall in the Growth of the Craft during different periods:**

The craft witnessed its many rise and fall during different ruling dynasties. It received its highest perfection during the Gupta Period which is considered as the golden age of Indian art in the Indian history. After the fall of the Gupta empire in the 7th century Harsha of Kanauj followed by Ashoka the great and Kaniska of Kusan dynasty reigned over north India. Kind Harsha, a poet and dramatist himself patronized arts and encouraged the art of metal statuary and casting. During his reign many large metal figures were cast for temples and palaces of his kingdom.

The Chinese traveller Hiuen Tsang who visited India during this enlightened ruler mentions that he was able to bring back with him about a hundred and fifty pieces of Lord Buddha's bodily relics along with some statues of Buddha made of gold, silver and sandal wood despite losses on the way due to accidents and robbery.

However, at the end of the 10th century the Islamic rulers conquered and captured north India and put an end of the golden age of Indian art.

It is believed that the metal craft also developed and flourished in the Deccan plateau at the same time as in the north. In the Deccan plateau the art achieved its greatest development in the 9th century with the rise of Chola dynasty. With the fall of Chola supremacy sometimes in the 13th century, the Islamic rulers from north entered into Deccan plateau. During this uncertain period the craft received the royal patronage of Vijayanagar kingdom and reached the Zenith of artistic development in the reign of krushna Deva Roy. The fall of the mighty Vijayanagar kingdom paved the way for the Muslim rulers to capture the capital city of Vijayanagar in 1565 AD. And thus the craft began to perish and so also the artistic genius of the artists began to fritter away lacking the patronization of the Muslim rulers.

### **History of origin and development of metal craft in Orissa**

In Orissa, metal crafts reached a high level of perfection during the reign of Ganga Dynasty from 11th century onwards. The royal patronage brought extensive popularity of the products and in course of time the craft began to grow in range and variety. These kings developed a special penchant not only for construction of magnificent palaces and towering temples but also for patronizing figure arts and econometry in metal and stone as well. From the level of few domestic equipments which originally constituted the limited field of industry ,it spread in various directions of utilitarian and

ritualistic fields. And finally it trickled down to the households of well-to-do and common man of the society. In this manner a flourishing market developed. The excellence and universality of the products created opportunities for extensive extra territorial markets. The bell metal products of Orissa found a regular market in the neighbouring state of West Bengal and other areas besides meeting the growing demands at home. The industry was prosperous when raw materials were available abundantly and the competitions from other industries was less pronounced. But the craft experienced many vicissitudes during different periods of time and at present it comes across constraints on account of non availability of raw materials and unassured credit facilities.

### **Importance of non-ferrous metals**

Non-ferrous metals have great importance at all times and their use was extensive and varied. The non-ferrous metals as well as their alloys exhibit different properties and applications, which are beyond the scope of iron and its alloys. The most important property is lightness in weight compared to volume, resistance to corrosion and extensive range of chemical reactions.

In old days, the importance of non-ferrous metals was highly recognized from various considerations. The properties of these metals were studied in order to determine their effects on human system. Accordingly the metals were used in various forms such as plates, cups, bowls etc.

### **Versatility of alloy of Brass and Bell metal:**

Some of the non-ferrous metals have great commercial importance such as copper, gold etc. The production of a large range of alloys of these metals was intended to meet the specific requirements. Brass and bell metals are the products of a few out of many metallic combinations. These two metals offer a vast scope of utility. Starting from housewife's outfit to domestic utility they fulfill the choicest decorating accessories.

### **Names of Important craft centres in the state:**

Although the scope of the study is confined to Balakati only, the bell metal crafts had owed its origin in different parts of the state. The list of important brass and bell metal handicraft centres along with their location is given in Annexure-1.

### **Particulars of community associated with the craft:**

The community associated with the making of bell metal wares in Orissa is Kansari. The Kansari is an artisan caste in the socio cultural hierarchy of Orissa. As metal smiths, they specialize in bell metal, brass and copper and manufacture different kind of non-ferrous metal wares.

The particular caste obsessed with the bell metal handicraft is Kansari in all the units selected for study. The word Kansari literally means a worker in bell metal. It is true that some kansari families have already turned a new leaf because of the considerable decline of the craft in recent years. In Orissa, the communities practicing different non-ferrous metal wares constitute a caste cluster. The caste/community that practices with the work of bell metal is known as Kansari and that a copper is known as Tambera. There are also other copper and copper alloy metal craftsmen like the Kharuda (brass bangles) etc.

The Kansari are the higher professional and artisan castes and rank as Sudra. The Brahma Valvarta Puran locates the Kansyakara as one of the nine sons of Viswakarma, the Devine architect and are assigned with specific ritual duties (Seva) in the temple of Lord Jaganath such as Tamara Bisol Seva and Ghantua Seva under the Chhatish Niyoga.

The craft is so far exclusively practised by the Kansari caste in Orissa. In the past the participation of other caste fellows in the craft was strictly forbidden to maintain the trade secrecy of the craft. However at present, the participation by other caste fellows is allowed. The bulk of the work during the boom season requires the utilization of labour of the auxiliary work force on the basis of payment of wages. The hammering and shaping entails surplus labour which is usually drawn from the neighbouring non-Kansari caste groups. The craftsmen maintain the craft fidelity, notwithstanding the necessity of drawing auxiliary work force from other sources, by keeping the trade secrets undivulged. The Kansaris are widely known for their work in bell metal and brass. They earn their livelihood primarily as Brass and Bell Metal smiths. Through this, they maintain their own age old metal craft tradition. This has enabled them to form a single caste category with three more or less fused ethnic groups. They are distributed all over Orissa, but the chief concentration is in the vicinity of leading manufacturing centres.

The Kansari as a functional caste with simple tools, equipment and craft technology, manifest their dexterity and workmanship in producing domestic utensils and appliances, ritual objects, temple accessories, icons and art ware. Their age old metal craft is vitalized by the induction of selective technological innovations from time to time. Through their expertise, they cater to the needs of people, both in rural and urban areas, not withstanding the alarming competition by synthetic materials. With the unique value of imperishability, the metal ware is considered an object of wealth and enhances the processors social esteem. The Kansa-Kabat, the bell metal door, is a prestigious symbol of aristocracy. However old, unserviceable and battered due to use, the metal ware posses intrinsic value in exchange and during situations of adversity, bell metal and brass ware are mortgaged for

loans. In all important rituals, especially marriage, they are used as objects of gifts. Thus, the indispensability of the craft and the socio-economic values enshrined in it are rooted in the ancient past, justifying the prominent role of the Kansari as an artisan caste.

### **Number of households engaged in the craft in the state:**

In absence of any comprehensive survey of the bell metal craft in the state or any academic endeavour in this aspect, it is difficult to obtain the exact number of household engaged in the craft in the State. However, as per census report published, it is revealed that the state has about 24000 artisan families with a production base of about one hundred crores rupees per annum. And out of it about 3000 families are engaged in Brass and Bell Metal craft. The participation of females and children in the bell metal craft is high and the role is very much significant and is to the extent of engraving which involves physical labour.

### **Different handicraft objects produced at different centres:**

The bell metal wares manufactured in different craft centres are almost the same. From the level of a few domestic equipment, it spread itself in various directions of utilitarian and ritualistic fields. Presently, the types and varieties of bell metal products extensively cover a large number of objects. And each object, in turn is made in many different sizes and shapes. The more popular category of products include household utensils, temple accessories etc.

### **Different Bell Metal Products:**

The bell metal handicraft objects manufactured by different artisan household under survey are (1) Thali (Plate or Tray) (2) Thalia (Saucer of quarter plate) (3) Kansa or Bela (4) Tatia or big Gina (Cup) (5) Small Gina or Small Bati (Small Cup) (6) Parasa (7) Bell (8) Ghanta (Gong) (9) Jhanja (10) Kubuji and (11) Gini etc. And among the temple accessories, cymbals (Jhanja), Gini, Ghanta, Ghanti, Chakra, Trisula etc. Bells and Gongs appear prominent. The utilitarian wares are meant for serving food items and the temple accessories as mentioned above are used at the time of worship.

### **History of origin and development of the craft in Balakati (turning points in development of the cluster)**

While unfolding the history of origin and growth of the craft in the Grama Pachayat Pratap Sasan (Balakati), it is believed that the craft owes its existence since 1400 AD. The evidences of the existence of the craft in the village are conspicuous. If not an archeological venture, excavation of tube wells to the extent of 39 ft. from the ground level has shown the samples of burnt charcoals used as a fuel to manufacture the metal wares proving beyond doubt the remote antiquity of the craft

in the village. Even if the craft is believed to be existed before 1400 years or so, details of its history can be traced since 1887 in the village.

In 1887 about 100 braziers were engaged in this craft in the village. And every artisan was capable of processing about 2 to 2 1/2 seers of bell metal and about 5 to 6 seers of brass. A few middlemen operated in the village who provided the raw materials to the artisans and procured the finished products in payment of wages. During this period the craft was fully patronized by a few wealth middlemen of the locality. The involvement of braziers or the Kansaris, the craft practising community of the village in the whole process was simply to manufacture bell-metal products. These products were either sold in the local areas or were exported to Calcutta city of West Bengal for sell. The charge for processing 40 seers of bell metal alloys to bell metal products was only five rupees.

In 1905-13, the demand for bell metal products was excessively felt in West Bengal, Assam, Bihar and Orissa which resulted in the proliferation of manufacturing centres as well as the number of artisans in the neighbouring areas of Bhainchua, Hirapur, Bodhi, Balipatna, Chandanpur, Bheluri etc. The bell metal products created a passion among the people of these states to have a possession of these articles as because it was considered first among the movable properties. But the apprehension of the out break of first world war and sudden price hike of the raw material brought out a slump in the craft from 1914 to 1919. The flow of raw materials from London metal market to India was restricted. So the bell metal crafts that flourished since, doomed to fade away to a great extent during this period leaving aside a large number of craftsmen unemployed. But the bumper crops of jute and paddy in 1921 strengthened economic condition of the people and the demand on bell metal products began to rise again and the craft was in the highest development. About 500 craftsmen earned their livelihood and about 20 middlemen operated in the area. After 1929, the craft deteriorated vastly due to demand of the artisans for higher wages, increase in the price of raw materials which was beyond manageable on the part of the middlemen and from 1929 to 1934, the craft witnessed steady fall. But the introduction of cooperative society in the field of management raised a new hope among the craftsmen. In 1934 Rathijema Cooperative Society was established in the village. A building was constructed to house to Rathijema Cooperative Society at a cost of Rs.24,000/-. But this society failed to fulfill the goal of the craftsmen because of the mismanagement of the society on the part of the inexperienced secretaries. The financial position of the society reached such a deplorable state that the government was constrained to auction the movable and immovable properties of the craftsmen who were the members of the society to realise the money. At last the Co-operative Society building was auctioned also. Thus the Co-operative Society lost the confidence of

the craftsmen. Under this critical juncture, the local middlemen exploited the situation and monopolized the craft again and continued to operate successfully for quite sometime and came across heavy odds again during 1939-44 due to break out of the second world war and the fall of Japan in the hands of the allied powers. The war crippled the economy of the country and the purchasing power of the people as well. This accrued in abrupt fall of the price of bell metal products. These products which were sold three rupees a seer before the war became on rupee and twelve annas during the war period. The local middlemen sustained heavy financial loss owing to the abrupt fall of the price.

But in the subsequent period from 1945-52 the bell metal craft registered steady growth. In 1953, sales tax was imposed for the first time on bell metal products and about 500 craft practicing households were victims of this tax. Imposition of 15 percent sales tax on bell metal products and non supply of adequate quantity of raw materials on the part of the local government brought about slump in the craft. During 1953-60 most of the craft practising households engaged themselves as masons in the activities of building construction at Bhubaneswar, the capital city of the state which is about 12 kms away from the village leaving aside their traditional craft.

However, the implementation of the new industrial policy in 1961 and cooperative scheme in 1967 of the Government helped revival of the craft to some extent. Accordingly, cooperative societies were established in the areas mostly inhabited by bell metal craft practising households. Those are in Pratap Sasan, Bhatimnuda, Belaguntha, Rengali, Kantilo etc. with a view to providing financial assistance, raw materials etc. and to save the interest of the artisans from the exploitation of the middlemen. Such infrastructural facilities boost the trade to a considerable extent. But the advent of steel and aluminium in the early seventies posed a formidable problem to this craft. Because the steel and aluminium products attracted the well to do families who preferred to these products even if the bell metal products were selling at only Rs.13.50 per kilogram. But in 1978 the craft took a different turn. Because of the untiring zeal and cooperation of the benevolent politicians like Dr. Harekrushna Mahatab and Satyapriya Mohanty the sales tax on bell metal craft was abolished. Since 1979, the craft retried its former position to some extent and despite exorbitant price of the bell metal products which costs at present Rs.270.00 to Rs.300.00 per kg. the craftsmen dispersed in different locations of the state still hand on this traditional craft.

### **Geographical Location of Balakati:**

Village Pratap Sasan (Balakati) is substantially a large village and stands on the eastern bank of the Daya river, a tributary of the Kathajuri river and comes under the administrative control of Bilianta Police Station in the district of Khurda. The village is well known for bell metal products since

14th Century and is only about 10 kms. away from Bhubaneswar, the capital city of the state and is connected by all weather pucca roads over the Daya with the State capital, district, sub-division and tahasil headquarters. Although, Balakati does not act as a centre of termination of Bus services, a number of buses to Banamalipur, Bhingarpur, Konark etc. ply through this village. Moreover, the village can be easily approached from Uttarachhak, a place on the Bhubaneswar-Puri National Highway, which is only one kilometer away in the western side of the village. Besides, a number of mini busses, Trekkers engaged in the passenger traffic also operate through the village. The nearest rail station on the south eastern railway is Bhubaneswar railway station which is only about 10 kms away. The villagers also can avail of the air transport facilities at Bhubaneswar. There is one college in the village and one Engineering college only 2 kms. away from the village. The National level Research Institute of Central Institute of Fishery Aquarium (CIFA) is located near the village. The village is also well equipped with Telephone facilities, Educational Institutes, Post Office, PHC and Banks also. The Balakati (CT) has the following demographic particulars as per the 2001 Census:

a) No. of Households	...	2199
b) Total Population	...	11971
c) Male	...	6236
d) Female	...	5735
f) Scheduled Caste (Male)	...	1055
g) Scheduled Caste (Female)	...	968
h) Literates (Male)	...	4586
i) Literates (Female)	...	3263
j) Total Male workers	...	3186
k) Total female workers	...	736

### **Scope and objective of the study**

The Scope of the study is limited to Brass and Bell Metal Cluster at Balakati which is concentrated at Pratapsasan and Rathijema. The Diagnostic study has been conducted with an objective to find out the present status of this Brass & Bell Metal Cluster and to identify the problems being faced which hinders the process of growth of the sector. The strategy for intervention has already been chalked out which will be adopted after this report is presented and finalized at EDII, Ahmedabad.

**Methodology:**

The data and information has been got by interviewing the individual artisans/ SSI units, raw material suppliers, office bearers of cooperative societies, local banks and other stake holders and also secondary information has been collected from different offices and Organisations of Central and State Government and this report has been prepared as per the guidelines received during the training programme of Cluster Development Executives at EDII, Ahmedabad.

## EXECUTIVE SUMMARY

**Balakati** (Pratap Sasan) is located about 10 kms. away from State Capital Bhubaneswar and is having all potentialities to grow into a cluster under the Small Industry Cluster Development Programme.

Manufacture of Brass and Bell Metal Products is done in the scale of household industries mostly in the rural areas since its inception. It involves strenuous physical labour both Skilled, Semi-skilled and unskilled workers and is accomplished through indigenous tools and equipment. In the past this industry flourished and developed because of cheap availability of raw materials in the hands of limited number of artisans, easy and abundant availability of fuel and above all the demand of the people for these products for various reasons. The economic prosperity achieved as visualized bears testimony to the potentiality of the craft as a source of livelihood in the past. But during last decades the craft witnessed the disintegration and has to survive against rivals. The advent of factory made products like stainless steel, aluminium, ceramic and plastic wares into the households as utilitarian articles has brought about a serious challenge to these products. The views of the craftsmen in regard to the craft as a source of livelihood at present were divergent.

Therefore, visualizing its potentiality for future, Government of India, Ministry of Small Scale Industry has given the task to Small Industries Service Institute, Cuttack for making intervention after doing the diagnostic study of the present position of the cluster. The study has been done which highlights different aspects like description of the cluster, definition of the products and its various sub-activities, cluster actor, current institutional matrix, present cluster map, value chain analysis, analysis of business operation, current reality tree, industry structure analysis, SWOT analysis, strategy for intervention and action Plan with budgetary estimates for implementation of the action plan and time schedule of activities etc. The problems like scarcity of raw material, obsolete technology, lack of marketing support, poor background of the entrepreneur and their enterprise, lack of financial support and absence of net working among cluster actors has also been pointed out in this report. So this will help the Policy makers to find out the ways and means for a sustainable development of the Cluster.

A Special Economic Zone (SEZ) is going to be set up at Paradip which is only about 100 kilometers away from the cluster.

## DESCRIPTION OF THE CLUSTER,

### TECHNOLOGY AND ECONOMY

#### **Process of Manufacture:**

From the beginning to the end the process of manufacture of the bell metal products requires sensitive and technical brain. To start with, first collection of raw material is not an ordinary job. It takes much physical and mental power to collect the materials for manufacture of the products. It has already been described earlier how they collect the raw materials and source from where obtained.

In the workshop an artisan carefully takes the appropriate proportion of copper and tin by weighing in an ordinary weighing instrument. Keeping in view the finished products and number of products at the beginning the intelligent artisans measures these two elements cautiously to form the alloy. Thereafter both copper and tin are put in Koi which is heated in melting hearth.

The melting hearth is a unique and important requirement in the processing of manufacture of bell metal products. Though it is not a tool but is a heart of the processing. This melting hearth transfers the quality of an element to another quality of a compound. This melting hearth can produce the heat of about 1500 degree Celsius with the help of the leather bellow or technical rotary blower and charcoal. This melting hearth is generally placed below the ground level upto 50 CM. At the top of this furnace the Koi made up of earth is placed around which charcoal is covered. The copper and tin basic metals are kept inside the Koi and process of heating is carried on. As the melting point of copper and tin is less than 1100 degree C it is easy for the furnace to take care of melting the alloy. Till this process one man power Bhatia (blower operator) is generally employed. When melting after heating started, another skilled artisan is required to test the alloy with the help of Sal Ankuri by rotating the molten material in the heated Koi by visual metallurgical test (Jyoti Dekha) Sal Ankuri is iron stick of length of about 20 cm fitted with wooden handle. At the end of the sal Ankuri it is bent slightly to test copper and tin alloy. To form the best alloy skilled artisans also test it by bringing a small melted quantity of the alloy from the koi through ladle placing it on a stone anvil and beating it with a small hammer. After beating if it is seen that the compound alloy is separated into pieces the alloys is tested as not good. If it is flattened in place of being separated into pieces the alloy is good one to prepare bell metal products. This process is known as Chanakha or sample metallurgical test. Mostly the master craftsman is engaged in this type of test who has sufficient knowledge in processing of bell metal handicraft products.

### **Casting and Moulding:**

After the testing of the alloy if it is found suitable for preparation of the products the artisan makes ready Achhu for casting or moulding. The Achhu is prepared in different size keeping in view the quantity of the melted alloy is to be poured in it for different products. A small Koi called Dhal Koi is used for transporting the melted alloy from the Koi to pour into the Achhu which is previously sterilized with Mobil oil. The molten alloy is allowed to remain sometime inside the Achhu to be cold. During the process of cooling, Tashu (rice Head ) is used after pouring the molten alloy. The rice head makes processing of cooling slow of the alloy. This cooled alloy is called Ghati.

This process requires more skill to give the ingot proper shape and size. For this different size of hammers, pincers, pathara (stone anvil), iron anvil etc. are required. This beating process also requires simultaneously heating and beating. This beating process is divided into five parts such as (1) Chaki or Balha (2) Ganta (3) Kantika (4) Fulan and (5) Matha.

### **Chaki and Balha**

At the first state the craftsman Garha (the master craftsman) places the cold alloy over the melting hearth. When this alloy (ingot or billet) is heated near about 500 degree C the main craftsman takes out the billet through pincers (sandasi) left and right and put over the stone anvil (beating place). Generally two to three hammer men who are previously ready to beat the heated billet, beat it simultaneously one after another as per direction of Garha to form the Chaki in case of Thali and Chaki and Balha in case of Kanda. In the beating process the first hammer man or the front man to Garha is called Kora whereas the other hammer men are Pasia (left Pasia and right Pasia) and Bhatia (blower man). Very often the Bhatia hit the ingot from left hand side of the Garha.

### **Ganta:**

This alloy of Chaki is again hit by more number of hammer men to bring it into a proper size of a plate with desired diameter. It is needless to mention here that heating and beating is the simultaneous process for proper shape and size. In this process the alloy takes concave shape.

### **Kantika:**

This is a process in which more number of Ganta pieces are placed one over another and hold it carefully by master craftsman over stone anvil and beated by the hammer men to form a number of pieces of concave size. Among these hammer men the front man of the master craftsman (Garh who holds the alloy) is called Kora. Very often the Bhatia (blower man) hit the pieces of Kantika from left hand side of the master craftsman. There are other hammer man called Pasia.

**Fulan:**

This is a process of beating through which the metal is raised to certain height over the circumference of the circular base of the products. Under this process of Kora hammer man takes the leading part in hammering to bring the product into proper shape either Thali, Thalia, Kansa or Tatia and so on by beating carefully as per the gesture and posture indicated by the master craftsman. This indication is well known to Kora from the holding of the Kantika by Garha. In this process generally Garha and Kora only are engaged to get desired shape of the product. In some cases when Pasia and Bhata also join for hammering.

Matha is a process of smoothening the outer surface of the product. A milk hitting is necessary as and when required to bring the uniformity of the outer surface.

This type of hitting is made outside the stone anvil but over iron anvil (called Nehi). After this process of manufacture of any metal product no further heating and beating process is necessary.

**Scrapping**

For this process a wooden stick of about 30 cm long iron Nihan (Scrapper) of length of same size and an artisan called scrapper man are necessary. After the processing of Matha of the product a skilled artisan is to see whether any portion of the body of the product is unusually thick enough then and there he decides the necessity of processing of scrapping. The scrapper man is to remove the unusual materials from the thicked portion of the metal by scraping either from outer surface or from the inner surface of the product.

**Filling**

This is a process by which the edge of the product is to be smoothened by an artisans by a file. Under this process unwanted rough portion is removed from the edge of the product. For filling process each artisan performs the job independently.

**Finishing or Polishing**

For this process Kunda or hand driven wooden lathe is mainly required by the artisan. Under this process the product is to be fixed on Kunda after mild heating with the help of a paste made of Jaooo (Lac). Thereafter Kunda is allowed to rotate along its axis as a result of which the product of bell metal is also rotated along with the Kunda. This rotating process makes the article smoothening and the artisan takes the opportunity to put a desired scrap uniformly on the product with the help of a

scrapper. In this process two artisans (scrapper man and Kunda operator) are employed. Sometimes a beautiful design is also made by the help of linear curve through this proces..

### **Engraving of Designs:**

To attract the consumer and the users the beautiful engraving of design is made by the skilled artisans on the surface of the items of bell metal product such as floral, animal motifs scenery etc. by a drill or scrapper.

### **Designs:**

There are many designs adopted by the artisans of bell metal products. Among those designs some of them are scenery type indicating beautiful flowers, leaves and flowers of creeping plants shown in egg type plate, Petals of flowers shown in double edged Baleshwari, star mark on the plate which represent the symbolical development as indicated in Veda. The petals of lotus flower, the design of peacock, wave of water, the photo of national leaders like Mahatma Gandhi, Subhas Bose, Jawaharlal Nehru, Indira Gandhi

From these types of designs it can be ascertained that the artisans of bell metal can present any type of design starting from material object to human being through evolutionary beings such as plants, flowers, beasts, birds etc. The type of traditional designs are being adopted from generations, no new design is left out for the present artisans.

One of the finding of the survey was that ladies are devoting much time for such type of design than gents. It was observed that majority of the traditional designs are adopted by the households for twenty years and above. The shape of the plate is newly introduced which is of egg type and Chinese plate type for last ten years by households only. Out of 60 household manufacturing different bell metal items 35 are engraving one or more designs. Further of this 35 households engraving different designs 15 are engraving floral, 12 are engraving floral and animal motifs, 3 are engraving animal motifs, two are engraving Bhanar and one each engraving scenery Laheri, Madhupuri and Baleswari and egg type or Chinese type designs.

### **Raw materials:**

The raw materials used can be broadly classified into two categories i.e. the Primary and the Secondary. The Primary raw materials includes various kind of metals, both in pure and alloyed forms given as below:

- a) Copper
- b) Zinc

- c) Tin
- d) Bell metal (Alloys of Copper and Tin)
- e) Brass (Alloys of Copper and Zinc)
- f) German Silver (Alloys of Nickel, Copper and Zinc)
- g) Neri (Alloys of Bell metal and Brass)
- h) Phula Kansa (Alloys of Neri and Tin)
- i) Tau (Alloys of Copper and Zinc)
- j) Alloys of Copper, Zinc and Silver 890:110:100) for silversmithy.

The basic metals were procured abundantly in the recent past and were alloyed as per requirement. The Kansari artisans were familiar with varieties of copper locally known as Boitapata, Kandulu, Katura, Panchumisili and Thana and similarly, Pinaki, Joti and Kulinagar varieties of tin were used. The Mahajans, who dealt with trade and controlled it as entrepreneurs and business magnates, had established links with wholesale metal dealers and artisans and craftsmen did not have to worry about procurement of raw material. After independence, the supply of raw materials became scarce, consequent upon to the imposition of restrictions on import facilities and the declaration of these metals as essential and controlled commodities. The non-availability of raw materials in required quantities and at fair prices, adversely affected their economy. They, therefore, had to depend primarily upon scrap metal and the main thrust became on procurement of old, unserviceable and broken utensils. The alloying patterns subsequently underwent a transformation and the new wares (kama) were manufactured out of scrap Brass (Paturi) and scrap Bell Metal (Kanti). Thus one observed an essential difference between the use of basic raw materials and their alloys and that of scrap metal which supposedly contains impurities, leading to deterioration in the standard and quality of the finished products. The increasing frequency of the use of scrap metal has led to increased wastage (poda) when it is melted for the preparation of ingots.

Now the average price of Copper per kilogram ranged from Rs.150 to Rs.180, where it is Rs.500 to Rs.550 per kilogram for Tin and Rs. 140 to Rs. 200 per kilogram of Zinc depending upon the quality. As procurement at fair price is not always possible, the price tends to fluctuate, of course always showing a rising trend. Although the methods of alloying copper and Zinc show regional variations, the methods of alloying copper and tin for bell metal ingots remain almost constant, as any deviation would render the bell metal brittle upon the employment of the wrought metal technique. In Rathijemapatana, 1 bisa (equivalent to 20 pala or 1,333 grams) of copper requires 5 pala (each pala

weights 67 grams) and 2 Karasi (each karasi is equivalent to 4 madha or 17 grams) of tin for the preparation of bell metal ingots. In Bellaguntha 1 Madhanga (equivalent to 8 bisa or 10,666) of copper is mixed with 2 bisa and 5 pala of tin. In Sahajipatana (Remuna) 1 Kilogram of copper required 275 grams of tin and the same proportions are maintained in Bhuban, Bhawanipatna and Sambalpur. The ratio of copper and tin as used all over is roughly 100:28. For the alloying of copper and Zinc for Brass Ingots 1 bisa of copper mixed with 14 pala Zinc in Rathijemapatana, 1 madhanga of copper with 6 bisa Zinc in Rathijemapatana, 1 madhanga of copper with 6 bisa of Zinc in Bellaguntha and 100 grams of Copper with 700 grams of Zinc in Sahajipatana (Remuna). The ratio of 100:70 is also maintained at Bhuban, Bhawanipata and Sambalpur.

Unserviceable old and broken scrap brass is purchased at the rate of Rs.125 to Rs.130 per kilogram, where as the price of scrap bell metal ranges from Rs.152 to Rs.160 depending upon the quality per kilogram. It is apt to mention here that the procurement of scrap materials for transformation into finished products is not a new practice but was also prevalent in the past. While selling new wares, the scrap was obtained through exchange with turmeric of equal weight and the Kansari pedlar used to call out loud Kansa Pitala Haldi Badala, meaning that bell metal and brass ware could be exchanged for turmeric. At present, except in very remote villages this type of barter has also been thoroughly monetized.

As copper, a basic metal, is considered sacred, the coppersmiths enjoyed a better social status in the past than the braziers who dealt with Brass and Bell metal. At present, the kansari claim that the act of alloying is ritually pure and that their caste group is conversant with the art of alloying copper, symbolizing the Brahmin at the apex of Varna system and Tin, signifying the Chandala at the lowest round in caste hierarchy and categorised as Avarna, in spite of the Brahma-Chandal dosha.

The secondary raw material includes the following:

- a) Soldering materials (Pahana)
- b) Resin (Jau/rala)
- c) Polishing materials and
- d) Fuel

### **Soldering Materials:**

Borax (Tangana) in the powdered form is a necessary ingredient soldering compound, principally distinguished as the pitala pahana and the kansa pahana. The pitala pahana consists of borax powder and grains of Brass and Zinc (1:2) and the Kansa pahana include borax powder and grains of Bell metal

and Tin (7:2). These materials taken together in a water base, serve the purpose of the soldering compound and are utilized during the soldering operations.

### **Resin (Jau/Rala)**

The resin is purchased and mixed in powdered burnt brick, burnt cow dung cakes and oil. It serves the purpose of a kind of adhesive for joining the brass and bell metal ware to the lathe, for scraping and chasing works. It is also filled in the head portion of the Brass fish in order to provide a stable base for chasing and engraving works. After such works are over, the resin is heated and taken out in molten form.

### **Polishing Materials:**

For cleaning various wares, materials such as Sulphuric Acid in a diluted form, tamarind, tamarind leaves, stale rice water, etc. are usually necessary. In Sahajipatana (Remuna) the Bell metal cups are polished by means of rags, hair and Karanja oil. In Bellaguntha, the flexible brass fish is polished by means of a compound which is locally known as Kantana and Kalamali. At times BRASSO polish is also utilized. The polishing compounds are actually more necessary for Brassware than Bell Metal ware which when finished, automatically takes on the required lusture.

### **Fuel:**

Fuels are necessary for preparation of ingots in alloying basic metals or in melting scrap metal and also for the manufacturing process. The common fuels are charcoal and firewood. The fuels are purchased from local retail dealers. The folk metal artisans like the Ghantra and Thentari (Rana) procure firewood from nearby forests and do not depend upon charcoal.

### **Tools and Equipment:**

A large number and variety of tools, equipment and appliances are utilised by the Kansati craftsmen. On the basis of procurement, the tools etc. can be broadly classified into two types i.e. indigenous and imported. The former includes those which are made either by themselves or by the local ironsmith/carpenter, according to their specification and on order, whereas, the latter includes those designed and manufactured using machines, standardized and available in hardware shops. The tools and equipment are by and large hand operated. The number of tools and equipment appears large because utensils and wares are in multiple varieties and various sizes and shapes. The types of tools and equipment also vary from the Brass and the Bell Metal workshops and in each workshop, the requirement of tools is dependent upon the type of metal ware produced. At times, the names of those tools are used as a prefix to the names of artisans who employ them exclusively during the

manufacturing process, the kora hatudi, the pasia hatudi etc. Therefore, it is desirable to discuss here the basic type of tools, equipment and appliances used for the manufacture of brass, copper and bell metal ware.

### 1. Hammer (Hatudi)

There are various types of hammers used in a workshop. One is Iron with a wooden/bamboo handle and the other is a mallet made wholly of wood. Besides being used independently for beating and shaping, they are also used with chisels and engraving tools. The hammers used in brass workshop are heavier than those in bell metal workshop. The edge of the hammer may be square or round. The hammer bear different prefixes which identify the work performed or the worker using them e.g. Konta, Guma, Kachha, Kanamara, Phalia, Basana, Korapatasa, Kora, Mathana and wooden hammer such as Kadhamula goji, Dhamara, Telimara, Pasia, Korakachha, phalia, Olta goli etc.

### 2. Pincers (Sandasi)

A pair of pincers is made of iron and there are various varieties. In the wrought metal technique this tool is used for handling hot metal on the anvil. Hammer and pincers are so essential that they have been accepted as the insignia or emblem of the kansari caste. There are various types of pincers, such as Ghatibula, Balakara, Gohirukara, Phulanakara, Dahan, Kamara, Sanakodi, Koi-utha, Ghatidhala, Phalia dahana, Phalia baan, Kundali batapatria, Ostapatin etc.

### 3. File (Rugha/Ugha)

Irregular surfaces or edges of metal ware are smoothed and shaped by files made of iron. The files have wooden handles. There are different types of files e.g. Tinikonja, Chauansia, Gola, Mota, Saru, Munhaguna etc.

### 4. Scraper (Lihini)

After beating and shaping, the semi processed metal ware using the wrought technique, require proper scraping. The scrapers are made of iron and possess sharp working ends. They are also used for finishing when the utensils are put on the lathe. The various types of scrapers are Eka-Parastia, Dui-parastia, Guna, Ada, Dudhiari, Chuta, Saru etc.

**5. Anvil (Sandan/Nehi)** The iron anvil is used for further shaping after the hammering operation is over. It provides a stable platform and is placed firmly on the floor of the workshop. The weight may range from 5 to 50 kilograms.

## 6. Augur of Hand operated Drill (Bhanra)

Augurs are used for boring holes in metal ware wherever necessary. They are purchased from Iron and steel dealers.

## 7. Blower (Kalapankha)

Blowers are use for fanning the furnace. Mechanical and hand operated blower are purchased from hardware stores and are presently used in large numbers, especially in Brass workshops. The Sana Bhatia hammer man operates the mechanical blowers in addition to the hammering assigned.

## 8. Bellow (Bhati)

In some areas, bellow made of sambar leather are used for fanning the furnace. The bellows are considered ideal for Bell metal workshops for regulation of the heat required under the wrought metal technique.

## 9. Lathe (Kunda)

There are two types of lathe manually operated. One is the wooden late (Khjata/Otara Kunda) which is worked by the pulling of a thong by the operator. The other type is the rotary lathe (Bula Kunda) made of stone, wood and iron and which can be operated both clockwise or anti-clockwise. The former is suitable for Brass workshop and the latter for Bell metal workshops. This tools helps something and finishing the metal ware.

## 10. Stone Platform (Badia Pathara)

A stable platform is necessary for hammering and shaping the metal. A big block of granite (akarmashila) is used for the purpose, and it forms a part of the floor of the workshop.

## 11. Water Tub (Nandia)

An earthenware tub is required for storing water inside the workshop and is placed near the furnace on the floor. At times, such tubs are also sunk into the ground.

## 12. Crucible (Koi)

Crucibles are Graphite pots of various sizes used for melting basic metals for alloying or for melting scrap metal. There are two varieties indigenous and imported and the latter are more durable and sophisticated.

## 13. Graver (Puara)

These are Iron tools used for engraving designs on metalware. Some are known as Bunda, Khola, Kanachhinda, Gulusam etc.

**14. Pike (Sanakuri)** It is a longbar/rod of Iron with one end bent and is used for manipulating the semi processing metal in the furnace. At times, it is provided with a wooden handle.

### **The workshop**

Unlike folk metal artisans, who have temporary and open air furnaces or forges and a Verandah or part of the dwelling house utilized as workshop, the Kansari have their workshop in a permanent or semi permanent constructed house. The workshop (Sala) is usually located in a room with a rectangular ground plan, wattle and daub or mud walls, gable shaped straw thatch roofing with or without a wattle and a daub ceiling (attu-type) as a precautionary measures against arson. The workshop is situated at the front of rear part of the site but never in the courtyard for privacy. A suitable workshop is always provided with a verandah for better accommodation. It accommodates the artisans, furnaces, tools and equipment and follows a consistent pattern of orientation because of the systematized production process. There are variations in workshop plans as are required by different techniques of production.

A minute observation of the ground plan and of the operation of various stages of work under the wrought metal technique shows that there is also a definite orientation amongst the artisans both skilled and unskilled in the Brass and Bell Metal workshops. This orientation does not only represent the personnel organisation but also the inter personal relationship among the artificers. All Hammer men sit in front of the Garha artificer and the space between them accommodates the stoneanvil (akarma shila) embedded in the ground. The Kora hammer man occupies his seat in front of Garha, the Pasia, Maihi Pasia and Pardi Pasia hammer men towards the right hand side and the bada bhatia hammer man and sana bhatia hammer man cum below/ blower operator are at the left hand side of the Garha. The hammer man deliver blows upon the semi processed metal as directed by the Garha systematically to avoid any collision.

There are two types of furnaces, the metal melting furnace (auta sala/Kolami) and the metal processing furnace (sala). The latter lies at the left hand side of the Garha artificer and the former may be placed at any convenient place inside the workshop. The processing furnace is a hole, roughly 60 cms to 70 cms deep in the ground, the surface is circular in outline with a diameter of 15 to 30cms approximately. The bottom contains a network of iron rods or an earthenware pot and an earthenware pipe is used as the air duct or passage (bharanda gata) connected to the socket of the hand operated bellow/hand operated mechanical blower. A bowl shaped hole near the furnace, known as the angara gata is used for storage of charcoal. On the other side of the furnace, there is one earthenware pot (tada gata ) embedded into the ground, for storage of water used for quenching the heated metal.

The bell metal and brass workshop has various units, depending upon the manufacturing process, such as the melting furnace unit ( *Ghatt-autasala*), the metal processing unit (*harha sala*), the hammering and shaping unit where the stone anvil is embedded, the soldering (*Jhala-sala*) unit, the scraping (*maja*) unit and the lathe (*kunda*) unit.

The workshop is kept tidy and after a day,s work, the tools and equipment are arranged and cleaned. The wall and ground surface are plastered over with mud and cow dung . Walls are at times decorated with alpana marks, especially during festive occasions. A menstruating woman, who is considered ritually unclean is not allowed to enter the workshop.

In Rathijemapatna, one of the leading manufacturing centres data on a bell metal workshop producing trays and plates over a period of eight months, throw light on important aspects as given in the following table:

**TABLE-1**  
**Functioning of a Bell metal workshop**

Month	Days of operation of workshop	No. of workshop operated	Average number of workshop operated per day
July, 2004	11	109	9.90
August, 2004	9	104	11.55
September, 2004	13	36	2.76
October, 2004	14	85	6.07
November, 2004	13	71	5.46
December, 2004	10	77	7.70
January, 2005	12	65	5.41
February, 2005	13	103	7.92

### **Working hours**

Utensils and articles manufactured by the wrought metal technique or the heating and beating process, involves a lot of physical strain, skill and mental alertness. In a *Kansa/Pital sala*, a days work is performed over two sessions forenoon and afternoon. The forenoon session begins as early as at 6 or even 4 am and continues roughly for a period of six hours, till the lunch break. The afternoon session starts at about 2 or 3 PM and continues for a period of two to three hours, depending upon the quantum of work. The working hours vary seasonally. No work is normally undertaken after sun set. As such fixed and regular working hours are not maintained or insisted upon in the workshop owned and managed by a household unit for the production of artware or more sophisticated wares e.g. flexible brass fish and snakes or icons.

### **The Division of Labour and Specialization:**

The Kansari caste cluster in their pursuit of metal smithy requires a number of workers both skilled and unskilled. The bulk of manual labour is provided by adult males. The female workers constitute not more than 10 per cent of the total number. Moreover, female workers, primarily include elderly women and widows. The auxiliary workers, mainly unskilled labour, drawn from other caste groups, include no female workers, because of the arduous nature of work. The female workers are generally engaged in operating the hand operated lathe, in making earthen ware crucibles (Koi), clay moulds (Ghati/Pinda) and in engraving designs on metal ware. In rare cases, women can be seen performing the tasks of a garha artificer or scraping or chiseling semi processed metal ware. The boys between 10-14 years of age work as apprentices of helpers or lathe operators and perform the less strenuous jobs in the workshops. Similarly, old men between 60-65 years of age are assigned light work.

The complexity of the processes involved in the transformation of raw materials into desired finished products show the intricacy in the division of labour. The household utensils, temple accessories, musical instruments, icons, and artware, with ranges and varieties in each category, require specialized skills and technical know how and skilled labour with specific expertise ordinarily becomes non interchangeable . For example, the Garha artificer with expertise in the process of manufacture of Bell metal trays and plates knows not the art of the manufacture of large sized brass cooking pots (honda) or flexible brass fish and snake. One comes across a number of master craftsmen in their society who maintain some sorts of individuality and each is identified with a particular craft. Further, since the ethno science and the art of alloying of metals are not known to all, there are, also alloying specialists (auta Karigara or Bindhani). In spite of a considerable degree of technical specialization and the work undertaken stage by stage, there is a good deal of cooperation and interdependence. A craftsman with the aid of one helper or unskilled labourer in a small household unit where his workshop is situated, can produce a flexible brass fish or lamps and lamp stands, using the sand casting technique. Thus, the Brass and Bell metal crafts are both vertically and horizontally disintegrated, substantiating their status as household industry. A novice or an apprentice, through constant observation, attachment and training gradually learns to work as a sana bhatia and step by step may become a garha artificer or finally, a master craftsman. Conversely, a sana bhatia or a Kora hammer man may remain as such throughout his career. In the words of an old master craftsman, a metal craftsman has to learn till his last breath, yet he can not know all the techniques".

**Personnel Organisation:**

The manufacturing of bell metal and brass utensils and wares using the wrought metal technique, involves team work, division of labour and the collaboration between a number of skilled and unskilled personnel. The broad steps in the manufacture process are the alloying of metals, preparation of ingots, heating, beating and shaping, further shaping and finishing through hammering, turning, by lathe and scraping and filing, soldering and cleaning, polishing, colouring and engraving of designs. As the jobs are elaborate, and are conducted step by step, the organization of work pattern and personnel is of prime importance. The organizer is required to distribute the work in a manner that the right person is assigned with the right job and there is the achievement of labour efficiency. The alloying of metals is a specialized job requiring skill, expertise, and proficiency in the folk knowledge of metallurgy. The alloying personnel (ghati/auta karigarh) is, of course, assisted by a number of unskilled labours. The following categories of skilled and unskilled personnel are associated with the various type of jobs in a full fledged workshop.

- 1) The Garha artificer
- 2) Other artisans, Kora, Pasia, Bhatia
- 3) Labourers for cleaning, lathe operation, apprentice and page boys

**The Garha artificer:**

The Garha artificer is a skilled artisan who occupies the pivotal position in the Brass and Bell Metal workshop. He as, the prime mover, performs his vital role in the production process with superb workmanship, meticulous precision and extraordinary skill. As the head of the team, he exercises control and monitors the manufacturing process and his contribution is typically essential at the time of shaping. With outstanding knowledge, acquired through zeal, perseverance and sincerity, the ghar artificer becomes a master craftsman in an area of specialization. The garha artificer with two pairs of pincers, held in his two hands manipulates the semi processed metal at the times of heating, beating and shaping. Conversant with the minutest details of work, he acts as the friend, philosophers and guide of the workshop. While he works, one observes the eye, hand, brain coordination, even a slight lack in concentration would result in a great deal of loss. The application of heat and the shaping stage and the delivery of appropriate hammer blows are entirely under his supervision and control. By virtue of his unique position he enjoys the highest status in the production process and occupies the topmost position in the list of personnel of various categories.

**Other Artisans:**

The Kora/Koda, a skilled craftsman in the Bras and Bell metal works, performs such activities as beating the ingots for shaping, finishing, scraping, filing and the soldering of the semi processed wares. While shaping, he occupies the seat in front of the Garha artificer.

The Pasia is a hammer man in the workshop and faces the ghar artificer, sitting to his right. Besides, hammering, he is also entrusted with the work of further shaping and finishing. In a big workshop, there is need of other hammer man in addition to the Pasia, e.g. the pardi pasia and the Majhi pasia. The majhi pasia sits in the centre with the pasia and pardi pasia at his sides, all three to the right of the garha artificer and facing him.

The Bhatia, another category of hammer man also looks after the heating of furnace through the operation of bellows or the mechanical blower, as the case may be. A big piece of work requires the services of two such personnel, such as the bada bhatia and sana bhatia. In such case, the bada bhatia acts exclusively as hammer man, whereas the sana bhatia operates the bellows/blower in addition to hammering. While facing the garha artificer, both occupy the seat to the left of the garha, the sana bhatia being closer the furnace.

Certain odd jobs such as the supply of water for use in the workshop, the cleaning of ashes from the furnace, the supply of charcoal, cleaning of the floor of the workshop, cleaning and pickling of the utensils and wares, the operation of lathes and the like are performed by unskilled labourers, child labours, apprentices and page boys.

**Other Labourers:**

The art of engraving designs on various metalwork is a specialized job. Certain artisans, both male and female are conversant with the work, using either angurs(bhanra) or engravers (pugara). The master craftsmen or artisans who are specialists in the line are assigned work on job contract basis.

The specialized crafts like the manufacture of flexible brass fish and snakes, requires the services of a master craftsman and one helper in the workshop, there is no need for an elaborate personnel organisation.

**Typology of finished products:**

The articles manufactured by the Kansari of Orissa out of copper, brass and bell metal can be broadly classified into the following types.

- 1) Household utensils
- 2) Sacred or Ritual wares
- 3) Icons

#### 4) Ornaments, luxury goods and artware

Each type, again includes enormous varieties of article of different shapes, sizes and designs manufactured by the employment of various technique. Thus, one observes an intrinsic interrelationship between typology and technology on such metal ware and this can be comprehended under the typo technological sub complex of this craft. The typology is of articles manufactured exclusively using by copper or brass or bell metal or silver or other alloyed metals.

#### **Household Utensils:**

The household utensils include dinning trays (thali) of wide range and variety e.d. dera, chhecha, sadha bagi, padma bagi, balesiria, gesh, gachhobasa, kapura, sampur, katiphula, rebeni, kansi, parhi, athakonia, barakona, gebru, gebul, kuncha, kataki, tipa and gine base, plates, such as ishika, chidia, panna, gesh, tansi, cups, viz, balesiri, dhari kata, rebeniparasa, gine, palisi gine, nuangadi, pinchha, hatiguji, ramasai, karagina, maia gina, kala gina, balakati gina, gujari gina and baithi gina, bowls for serving watered rice, such as antabhanga bela, plain bela, monda kansa, nadia kansa, paninicha, puchha and balesiria kansa, and glass tumblers of various types and sizes. The household utensils further include cooking vessels such as handa, handi, dekechi, joba handi and chandralekhahandi, pichers, et. Kala garia maia, garia, dakhini gara, water phot (dhala) such as chaka, nawa and baithi, ladle (karachhuli/bela), perforated ladle,(Jali chatu), frying stick (chatu), spoon (samuka), frying pan (chakuli palama, Tawa, frying pan with handle (kadei), bathing tub (kunda/mandia), large tray, parata/chandhua, basin (tasala) bucket (balti), Kerosene oil lamp, paan container (pana batta), lime container (chunakhai) etc.

#### **Sacred wares**

The sacred wares manufactured by them are used as temple accessories and are also used in household for rituals. Such wares comprise patri for offering water to deities, small water pots (apukera/chhota dhala), pedestal (Khatuli) for installation of deities, trumpets(Kahali), pellet bells (ghanti), sonorous plates (Ghanta), musical instruments like gini and tala,, lamps (deepa) such as eka mukhi pancha mukhi, shara mukhi and saptamukhi and lamp stands viz; kundi, mayura, hati, S- design, Pilisaja, Pilirukha, dalirukha, incense stand and alati stand for waving the lamp before deities. There are other temple accessories, such as the trident naga, wheel, deula kalasha for the temple top which are manufactured by Kansari artisans. The Tamera Bishoiseva of the Kansari of Puri includes the manufacture and supply of senapata and bahuta (copper hinges)lifted at the back of the idols during the car festival of Lord Jagannath at Puri to ensure support to the body and hands of the idols of the Lord while these are transported from and to the sacred pedestal (ratnasinghasana) to the car (ratha).

**Icons:**

At present, the making of icons has declined to a considerable extent. However, rarely and on specific orders, icons of traditional Hindu deities are manufactured.

**Ornaments, luxury goods and Artwares**

The silversmiths of Tarbha includes the majority of the Kansari artisans who were engaged in the manufacture of large variety of ornaments such as mudi, angustha, tuda, painri, panjali/paijam, gunchui/quinchi, khagala, jiuntia, bandria, kalaria, chudi, kataria, tada, bahasuta and magmuri

The luxury goods which include fancy wares and artware are utilitarian as well as artistic and are manufactured in various parts of the state by the Kansari artisans with high quality of workmanship. These include containers for sandal paste (chandandan) for scented water (atar dan), for paan (paan dan), small decorative boxes and flexible fish and snake. They are so elegant that they also have enormous export values as curio items.

**Capital & Cost of production**

Although the Brass and Bell Metal industry in household based, it does require the investment of capital. The capital is required for acquisition of tools and equipment, purchase of raw material and to bear costs involved during the manufacturing process. There are Kansari and Non-Kansari financiers who purchase the primary raw materials and supply them to the owners of the workshops who manufacture metalware as per orders. The labour charges and the cost of the manufacturing process is paid as conversion charges (Karamula) immediately after the finished products are delivered to the financiers. The financiers and traders also advance loans to the artisans at the time of need. Financiers and artisans, who are tied up with each other through economic transactions, develop a sort of extra economic relationship. They are also bound by the regulations imposed on them by the guild like organization. On the Dasahara festival, the artisans presents new utensils to the financiers and in turn, receive food, cloth, cash, double than the commodity presented. Disagreement as in natural, do occur, but are settled amicably, though sometime only after protests/counter arguments are made and dispensed with.

Besides the co-operative societies also promote the industry. Very recently the commercial banks with a view to augmenting credit facilities in the rural sector, have made a slow but steady progress in providing capital to the artisans.

**Cost of Production:**

The cost of production of brass and bell metal utensils and articles shows considerable regional variations and fluctuations from time to time as the factors involved in determining the cost of production are not constant, referred to elsewhere in this volume.

In Rathijemapatana of Balakati region, the cost of production and the profit margin were calculated , taking into consideration the prevailing market price. The conversion charge (karamula) fluctuates keeping in view the prevailing market price, the wage rate, the cost of raw materials etc. The conversion charges also differ from one item to the other as all items manufactured do not involve the same amount of skill, labour and precision.

## COOPERATIVIZATION OF BRASS AND BELL METAL INDUSTRIES

The role of cooperative societies has been accorded a significant place in 5 years plans for ensuring rapid and balanced development of the crafts which occupies an abiding place in the economy of the state. Directorate of Industries promotes the development and looks after the day to day problems of the society. Subsidies, tools and equipment of improved varieties are also provided on behalf of this. It guides its members with regard to production and marketing of the products. There are five Cooperative societies which are presently functioning at Balakati with an objective to save the interest of the artisans from the exploitation of middlemen beside providing them the raw materials and extending marketing facilities of their finished products.

The first cooperative society for the development and promotion of the cause of these industries was established in 1948 at Jagamohana in Ganjam district. In Orissa as of May 1978 there were as many as 69 cooperative societies out of which 21 are concentrated at Puri district with 801 enrolled members. The Brass and Bell metal cooperative Industrial Society Limited has the maximum number of enrolment of 85 members with the maximum amount of share capital of Rs.12,110 at Bainchua in Khurda. A case study showing the functioning of three cooperative societies in a single revenue village has been given in the table below:

**TABLE-1**

### List of Cooperative societies in Balakati Cluster

Sr. No	Name and address of the Society	Registration No.	Members
1.	M/s Ambica Utensils Industrial Cooperative Society Ltd., At. Rathijema, Po. Balakati, Dist. Khurda	32/DIC/BBSR dt. 19-9-85	53
2.	M/s Bhagabati Non-Ferrous Metal Industrial Co-operative Society Ltd., At. Rathijema, Po. Balakati, Dist. Khura	96/PU dated 5-6-76	51
3.	M/s Netaji Non-Ferrous Industrial Cooperative Society Ltd., At. Rathijema, Po. Balakati, Dist. Khurda	17/PU/DIC dated 6-8-77	51
4.	M/s Madanmohan Utensils Industrial Cooperative Society Ltd., At. Rathijema, Po. Balakati, Dist. Khurda	27/DIC/BBSR dated 2-8-85	51
5.	M/s Rathijema Brass & Bell Metal Cooperative Society Ltd., At. Rathijema, Po. Balakati, Dist. Khurda	9/PU dated 29-8-69	51

**TABLE-2****Production and sale of different cooperative societies during last 3 years**

Sr. No	Name of the Cooperative Society	Production (in			Sale (Rs.)		
		2002-03	2003-04	2004-05	2002-03	2003-04	2004-05
1.	Ambica Utensils ICS	13,05,886	11,95,994	14,05,121	13,70,404	12,56,841	14,80,169
2.	Bhagabati NFMICS	5,08,014	6,88,084	8,65,120	5,55,808	7,34,840	9,30,000
3.	Madanmohan NFMICS	4,50,160	5,10,020	5,30,320	4,90,180	5,35,235	5,60,190
4.	Netaji NFMICS	35,000	3,40,060	4,50,900	3,85,167	4,20,300	4,95,167
5.	Rathijema Kansapital ICS	2,03,000	3,15,000	3,45,000	2,50,000	3,60,000	4,10,000

**TABLE-3****Bell metal cooperative society - Rathijema**

Sr. No	Name of the Society	Name of the President	Name of the Secretary	Show room-cum Go down (Rs.)	Assistance availed from Government		
					Share capital	Managerial Grant	Modernization equipment
1.	Bhagabti NFMICS, Rathijema	Sri Damodar Sahoo	Sri Babaji Sahoo	50,000	16,500	10,400	8,000
2.	Netaji NFMICS, Rathijema	Sri Bishnu Maharana	-	50,000	5,000	6,2000	-
3.	Ambica Utensils ICS, Rathijema	Sri Gangadhar Moharana	Sri Budhanatha Moharana	-	8,100	9,000	-
4.	Madan Mohan Utensils ICS, Rathijema	Sri Ugrasen Sahoo	Sri Gangadhar Sahoo	-	15,500	10,800	-
5.	Rathijema Kansa Pital ICS, Rathijema	Sri Sridhar Sahoo	Sri Ramesh Sahoo	-	5,000	5,400	-
6.	Chakadola BB MICS, Rathijema	Sri Biisnab Maharana	-	-	4,275	2,700	-
7.	Gourisankar Decorative ICS, Rathijema	Sri Narahari Sahoo	-	-	-	-	-
8.	Balakati NFMICS, Balakati	-*	Sri Basu Moharana	-	8,375	2,400	-

\* Election of the Cooperative Society has not been done.

**The Orissa Cooperative Handicrafts Corporation Ltd. (OCHC)** as an apex marketing organisation to widen the marketing horizon and to better the standard of living of artisans was established in 1959. The OCHC explores export possibilities and supplies handicraft goods to various export agencies and to the Handicraft and Handloom Export Corporation of India, New Delhi. Under the Integrated Rural Development Programme, it tries to establish the raw material banks, common facility service centres, the supply of improved tools and equipment to artisans and to assist cooperative societies through managerial subsidy, godown subsidy, share capital grant and margin money. The OCHC derives its finance from share capital investments of the government and societies. The all India Handicrafts Board, the State Government and Institutional finance under the Integrated Rural Development Projects. The Cooperative Training College in the states capital city at Bhubaneswar is imparting training for better management of cooperative societies.

However, the process of cooperativization of metal crafts need further strengthening and revitalization in order that diagnosis and remedy of various problems becomes easier.

## CLUSTER ACTORS

### CORE CLUSTER ACTORS

The players in the Brass Cluster at Balakati can be categorized as under.

**Category-1:** There are six raw material suppliers i.e. brass circles, who manufactures brass circles from brass scrap which is melted in foundry and rolled to sheets which are then cut circles of different diameters. Coke is locally available for small blower type furnaces the artisans use for soldering and annealing purpose.

**Category-2:** The Middleman (MAHAJANS) who actually purchases brass circles from re-rolling mills and then gives on job work basis to artisans to make final products. These artisans are paid on weight basis. The artisans of Balakati as mentioned earlier are poor and not having any strong financial background. They are mainly borrowing money from locally based money lenders who takes heavy interest @ 5% per month on borrowed money. Since the manufacturers are not organized neither they are keeping any record of their manufacturing activity they fails to borrow money from financial institutions and banks. There are around 20 such middlemen available in this area.

**Category-3:** This group comprise of merchant traders and marketing agents 80% of brass and bell metal products manufactured in this cluster are sold through these dealers and traders. Only limited number of manufacturers sells their products directly to customers. Substantial price addition takes place at this phase. There are around 50 small and medium traders who are involved in this business. The products are marketed in the state and neighbouring state and so far no export directly or indirectly observed in this cluster.

**Category-4:** In this category there are suppliers of tools, jigs, fixtures and sulfuric acid for pickling. These inputs are required in various stages of manufacturing and finishing process. Though the exact number of entrepreneurs engaged in this business is not known but it is estimated that there could be 15 such players.

**OTHER CLUSTER ACTORS:****Institution having direct stake in the cluster:**

- a) **Brass & Bell Metal Utensils Cooperative Societies:** There are five Brass & Bell Metal Cooperative Societies functioning at Balakati which provides raw material to the artisan and market their finished products. However, these societies should be strengthened to make the cluster more vibrant and effective.
- b) **Village Committee/ Association of artisans:** In this cluster there is Village Committee of different products some of which have been defunct and not working properly. So a strong association should be formed through the members of these committee which could provide better service for effective implementation of the cluster development programme.

**Institution having indirect relationship with the cluster:**

- a) **Small Industries Service Institute (SISI), Cuttack:** This Institute is a field office of Small Industries Development Organisation, Government of India, Ministry of Small Scale Industries which has been playing a pivotal role for all round promotion and development of small scale industries in the state. Presently, this Institute has taken up the cluster development programme and selected Brass and Bell metal cluster located at Balakati under Small Industries Cluster Development Programme with an objective to diversify the production, upgrade the technology, increasing productivity in quality and quantity, scale down the production cost to compete in the present globalized market, generation of more employment opportunities and exploring the possibilities of export potentialities etc.
- b) **Department of Handicrafts, O/o the Development Commissioner Handicrafts:** This department can play a very important role in this cluster as the cluster is mainly of artisans. During the visits it was found that one of the artisans is awarded either the state award for his best craftsmanship. It is understood that in 1990 this department has provided training to some of the artisans of this cluster. Presently, they have selected this cluster for interventions for the development of this cluster. However, they have shown keen interest to work jointly with SIDOs cluster development programme.
- c) **State Bank of India (SBI):** The State Bank of India is the lead bank of the district. Under the UPTECH programme this Institution has organized few entrepreneurship development programmes and in process of developing machines for the metal working operation which are presently being done by hand. By and large this Institution is found to

be having interventions in the areas of training and technology development. The machines that developed are manually operated without using electricity.

- d) **United Commercial Bank (UCo):** United Commercial bank plays a vital role in this cluster area by financing money to the entrepreneurs engaged in Bell and brass Metal industries.
- e) **District Industries Centre:** District Industries Centre is also an important organization for the development of this cluster. One Industry Promotion Officer has been posted in Baliana Block who is looking after the day-to-day activities of these small artisans and the cooperative societies. It was informed that in past on common facility centre and raw material godown were set up by Handicraft Corporation of Government of Orissa which was being looked after by this department also. At present the CFC is not working due to various reasons.
- f) **Directorate of Handicraft and Cottage Industries, Government of Orissa:** This department basically implements all the developmental schemes meant for the craftsmen from time to time lunched by Government of India and different departments. The Handicraft Corporation is presently also working under the supervision of this department. This has got direct liaison with all the craftsmen of this cluster through implementation of different schemes lunched by Ministry of Textile, O/o Development Commissioner Handicraft, Government of India.
- g) **Orissa Cooperative Handicraft Corporation Ltd.:** This Corporation, which is presently looking after the marketing of handicraft products manufactured by the craftsmen of different areas of the state. This has got its outlet for sale of the products in some of the important district headquarters of the state and some states capitals of the country. But there is a need to bring reform in the style of functioning of the department to make it to give a boost to the marketing of these handicraft products. This department established a raw material go down and a common workshop facilities at Balakati during 1981. However, this department also provides skill and design development training to the artisans through different workshops.
- h) **National Bank for Agricultural and Rural Development (NABARD):** This Institution has pioneered in the field of cluster development programme by taking up some clusters in different areas through formation of SHGs. Presently this has taken up the Brass & Bell metal cluster at Kantilo in Nayagarh district and Rengali in Sambalpur district for cluster development programme.

- i) **National Small Industries Corporation (NSIC)** : It is a Government of India undertaking and is located at Cuttack. This office provides assistance in supply of raw material and hire purchase of machinery and also conducts skill development programme for the workers of the small scale industries. So, the availability of raw material and machinery can be made through this institution for regular production and process.
- j) **Export Promotion and Marketing (EPM)**: This is an organisation under Government of Orissa which looks after the marketing of the products by rate contract. This can also provide the details and addresses of importers of different products for facilitating the export of handicraft products.
- k) **CESCO**: The Mechanization of the process of manufacturing requires increased use of electricity by the craftsmen. CESCO has given an assurance to give power supply to the Bell metal units as per their requirement, as there is surplus production of electricity in the state.
- l) **Small Industries Development Bank of India (SIDBI)**: This is a subsidiary of Industrial Development Bank of India which looks after the finance of small scale industries. This bank also is looking after the cluster development programme in some of the clusters in different areas. This has got some schemes for upgradation of technology of SSIs. So the association of this Institute in the cluster at Balakati will definitely give a boost to the cluster development programme in the area.
- m) **Office of the Commissioner, Commercial Tax**: Presently this department is looking after the administration of VAT in the state. The local manufacturers of handicraft products will take the benefits of this scheme.
- n) **Regional Research Laboratory (RRL)**: This is a premier research organisation under ICSR located at Bhubaneswar. This can provide consultancy in the field of energy conservation, waste minimisation and upgradation of technology in the cluster.
- o) **Local Banks**: Puri Gramya Bank and U.Co Bank are located at Balakati which have been financing the local artisans of the cluster for providing them working capital assistance. During discussions they have assured all sorts of cooperation for the development of cluster.
- p) **Industrial Development Corporation of Orissa Ltd.**, : This is a Government of Orissa undertaking which provides infrastructural facilities to set up small scale industries in

different localities of the state. This can assist in supply of industrial shed and land for use of local artisans for processing their production.

- q) **O/o the Director General, Census Operation:** This department has made survey of this Bell Metal crafts during different periods of the census to ascertain the exact position of the bell metal units and employment generated through these units, cooperative societies functioning for marketing these products etc. While taking of this cluster development programme this department could assist in providing statistical information on different aspects of this craft which is necessary for formulation of new policies for development of cluster.
- r) **Local engineering Colleges/ ITI in the vicinity:** There is a need to explore possibilities in the field of technology, product diversification and market avenues through these institutions to give a boost to the cluster development programme. They have their research wing which would look after these activities and take up for implementation.
- s) **Khadi and Village Industries Commission (KVIC) :** This is a government of India body which can provide finance to the local artisans through different schemes.
- t) **Orissa Khadi & Village Industries Board, Bhubaneswar:** This is a government of Orissa undertaking which provides financial assistance to the artisans through different schemes for all round development of the artisans in this cluster.



**CURRENT INSTITUTIONAL MATRIX**

	Directorate of Handicraft & Cottage Industries	DC Handicraft, GOI	HCO	<u>SBI</u>	DIC	NABARD	NSIC	EPM	GRIDCO	SIDBI	CCT	RRL	Banks/ FI	SISI	IDCO	Local Engineering Colleges/ ITI	KVIC
Directorate of Handicraft & Cottage Industries		4	5	0	3	0	0	1	0	0	0	0	1	1	2	1	2
DC Handicraft, GOI	5	-	4	2	2	0	0	1	0	0	1	0	2	1	0	0	2
HCO	5	3	-	0	4	1	0	1	0	0	1	0	2	0	0	1	2
SBI	1	1	1	-	2	2	1	2	0	3	0	0	5	3	0	1	2
DIC	4	2	4	3	-	1	1	3	2	1	2	0	3	4	3	1	3
NABARD	1	1	0	4	2	-	1	2	0	4	1	0	5	4	2	0	3
NSIC	0	0	1	2	2	0	-	3	0	1	2	1	2	4	2	1	1
EPM	3	2	4	2	3	0	1	-	0	1	2	1	2	2	1	0	1
GRIDCO	0	0	0	0	2	1	0	0		0	0	1	0	1	3	2	0
SIDBI	1	0	1	4	1	2	1	1	0	-	0	1	5	4	1	2	2
CCT	3	2	3	0	1	0	2	3	0	0	-	0	0	0	1	0	2
RRL	1	1	0	1	2	1	2	0	1	0	0	-	1	2	1	4	1
Banks/ FI	3	3	2	5	4	4	2	2	0	5	1	1	-	3	1	1	3
SISI	3	2	1	3	5	3	4	2	1	3	0	2	4		1	4	4
IDCO	2	1	2	2	3	1	1	1	3	1	0	1	2	1	-	0	2
Local Engineering Colleges/ ITI	0	0	0	2	2	1	0	0	2	2	0	4	2	3	1	-	0
KVIC	4	3	3	3	4	2	1	2	0	2	0	2	4	3	2	1	-



## CURRENT INSTITUTIONAL MATRIX

The current institutional matrix depicts various stakeholders in Balakati Brass & Bell Metal cluster. The nature of relationship among these cluster actors is not always very clear and direct. Some of them have very remote relationship and it is limited to the extent of organizing some programmes, providing some marginal services and sometimes conducting some seminars/training programmes.

There is only three cooperative societies which is active and providing the role of facilitator in marketing of the product manufactured by their members. There are some Institutions which are active and providing the role of facilitators in solving the problems and taking up issues to various government department. For example Department of Handicrafts, SISI,DIC etc. organize training programmes, help in conducting study. The nature of relationship has been developed based on the need of the artisans.

Based on the role of these various support institutions, associations and strength of their inter linkages and cooperation, they are given a score in a five point scale. The score-1 indicates that there is very little cooperation among the cluster actors whereas the score-5 indicates that there is strong inter linkages and responsiveness among the cluster actors. This cooperation may be expressed in terms of joint planning, bulk purchasing of raw materials and inputs, solving each other problems, taking up pertinent issues to various government departments, organizing seminars and conferences, implementing programmes jointly and reviewing & delineating the scores, is shown in the above table.

The Government department which have direct/indirect stake in the cluster but certainly can play a very significant role for the overall growth of the cluster are:

- 1) Brass & Bell metal Co-operative Societies
- 2) District Industries Centre
- 3) Small Industries Service Institute
- 4) National Small Industries Corporation
- 5) Small Industries Development Bank of India
- 6) Directorate of Handicraft and Cottage Industries
- 7) Development Commissioner (Handicrafts)
- 8) Export Promotion and Marketing
- 9) State Bank of India
- 10) United Commercial Bank

11)Khadi & Village Industries Commission

12)NABARD

13)Regional Research Laboratory

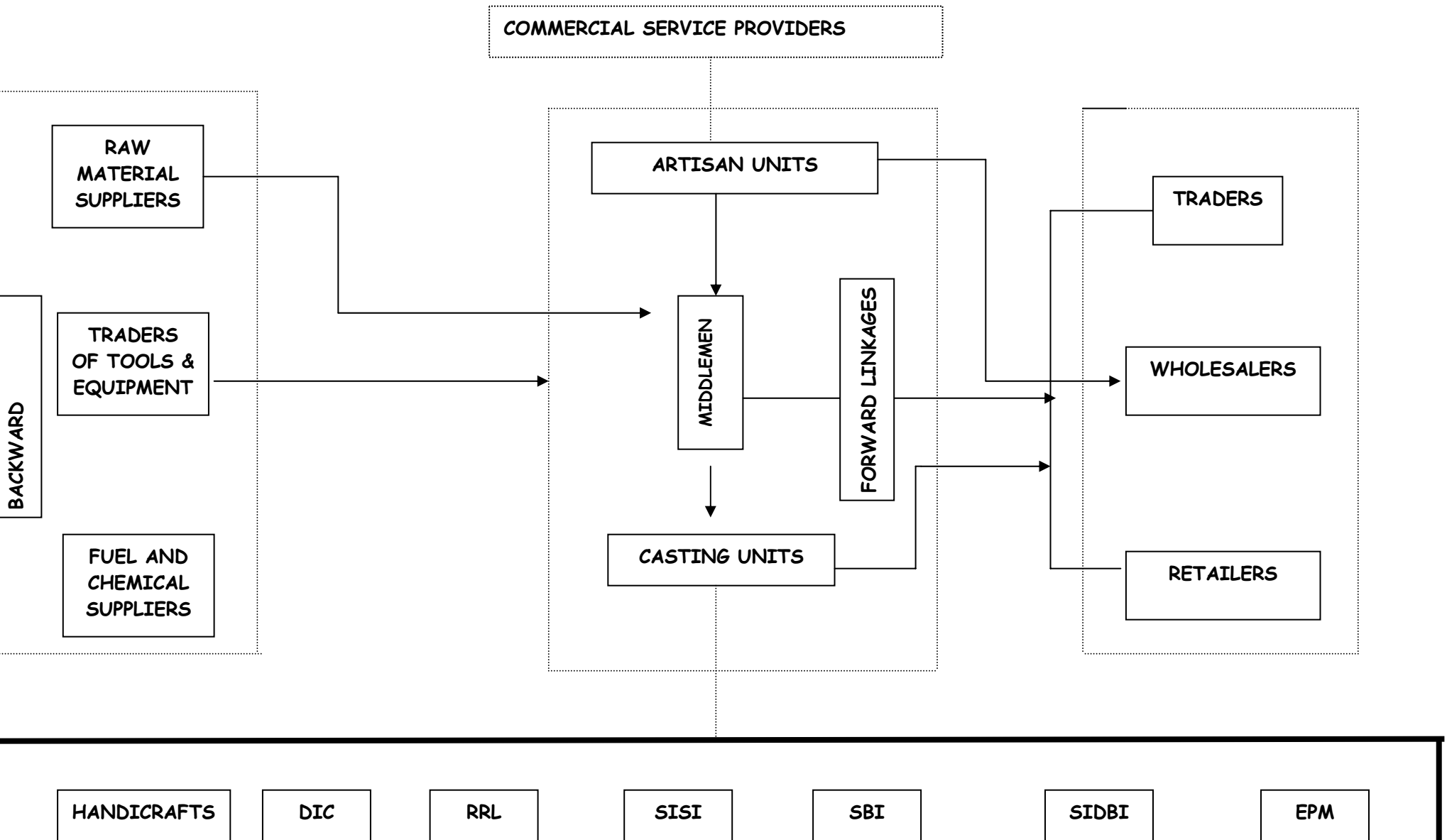
From the institutional matrix it is pretty clear that District Industries Centre has moderate linkages with local association. The relationship between District Industries Centre, SISI, NSIC, SIDBI is one on the higher side. But it has very weak/no relationship with other R&D Institutions. The associations of NSIC & SISI with local industry associations are limited to the extent of organizing one or two programmes and/or conducting few programmes. The brass part cluster requires a lot of technological intervention in the field of brass metallurgy. In spite of this, there is hardly any linkages between any R&D organization and local industries.

The current institutional matrix clearly shows that the relationship between these stakeholders is either minimal or moderate. This is one of the drawbacks of the Balakati Brass and Bell Metal cluster. All leading clusters world wide, which are widely quoted in various articles, journals and books and which also provides a model for the developing and emerging clusters, exhibit a very strong relationship among the stakeholders and the cluster actors. A strong relationship and inter linkages among stakeholders can not only solve the problem of the cluster but also could source technology, finance, marketing etc. for the overall growth and development of the cluster. It is therefore important that the inter-linkage among these stakeholders needs to be strengthened by organizing meetings and motivating each others. This can be taken up as a capacity building exercise for the cluster.

It is very clear from the diagnostic study that not only inter linkages among stake holding institutions needs to be strengthened but also the relationship between individual enterprises and associations needs to be improved. A win-win situation has to be created where all the cluster actors and stakeholder work in units. The Table in next page depicts the current Institutional matrix.



PRESENT CLUSTER MAP





The above cluster Map of Balkati Brass and Bell metal cluster indicates the various linkages and actors that exist in this cluster (the bold lines indicates the prevalence of organization where, dotted lines indicates the organization to be developed). So far Public Policy is concerned there are institutions like DC(SSSI), Central Excise and Customs, Sales Tax Department, Department of Factories and State Pollution Control Board. These organizations decide the policies which have direct repercussion on the activities of the industry.

There are Commercial Service Providers like chartered accountants, export consultants, and merchant bankers. The actors in this category provide valuable services on commercial basis. In Bhubaneswar, the availability of services are not omnipresent and efforts should be made in strengthening these Business Development services.

In the nucleus of the cluster Map there is artisans involved in manufacturing brass and bell metal products and the Middlemen who play a very important role while enjoying heavy profit. The linkage among these SMEs is job-specific and commercial oriented. Another important thing, which needs to be highlighted here, is the practices of sub contracting. Middlemen takes up jobs and get it done in some other firm. Sub-contracting is widely prevalent in this cluster and this gives flexibility in the operating system.

Among the constituents of backward linkages there are raw material suppliers and suppliers of machinery, tools and other inputs. There are around two large raw material suppliers who use brass scrap for remelting and then re-rolling. Among the forward linkage members there are marketing agents, exporters and large industries. Though most of the marketing activity around 80% is done through marketing agents, traders and exporters but there are enterprises who are supplying products directly to large industries.

The organizations which are providing support services are DIC, SISI, Development Commissioner (Handicrafts), Handicraft Corporation of Orissa, Director of Handicraft and Cottage Industries, NABARD. The role of these institutions and their inter linkages were described in the current institutional matrix.

## VALUE CHAIN ANALYSIS

### ANALYSIS OF BUSINESS OPERATION (PROBLEMS IDENTIFIED)

The following section presents an analysis of business operations for the Brass and Bell metal cluster. The analysis is built on the following factors viz,

- 1) Raw Materials
- 2) Machinery and Production
- 3) Products and Marketing
- 4) Background of the entrepreneurs and their enterprises
- 5) Finance and working capital
- 6) Training
- 7) Manpower requirement
- 8) Infrastructural facilities
- 9) Business Development Services

**Raw Material:** The raw material requirement of the Brass and Bell metal industry is met mainly from the following source:

a) Local recycled brass scrap to foundries and re-rolling mills. As a matter of fact, 90% of the raw material requirement of this cluster is met through the above source and rest is flowing from Kolkata.

Technically speaking brass is an alloy of copper and Zinc and the ratio of these product is 60:40 (60% copper and 40% Zinc). For getting the right products and good quality, it is important that this 60:40 composition is maintained. However, due to heterogeneous nature of the scrap and different alloying of the base metal, it becomes almost impossible to maintain this 60:40 ratio. As a result, the quality of the final product varies, defects are produced and the rejection rate increases.

The best method of getting the right quality and right alloying is using copper and zinc ingot. But because of higher price of ingot, scrap is used as the basic raw material. Because of cutthroat competition, manufacturers are not getting the right price for their products. This price war (on final product) compels them to use cheaper raw material.

- b) Bell metal is not a single element but an alloy of two important metal of copper and tin. This alloy is prepared with the proportion of 4:1 of copper and Ranga (tin). Copper has a special quality of moderately hard substance and enough strength to take shape of varieties of different structural products. The artisans have taken the facilities of essential qualities of copper to manufacture the desired products. Besides the copper has resale value as it is weather proof and very good conductor of electricity. The melting point of the copper is 1083 degree C. When it comes in contact with tin whose melting point is 232 degree C the melting point of the alloy comes down to below 1000 degree C. As the tin is highly plastic in nature this is also shared to alloy to take difference shape easily. With different proportion of these two elements of copper and tin an alloy is also prepared to manufacture the products of bronze.

Although for bell metal the copper is the main element of the alloy it is difficult to product different type of products from copper only due to its porosity.

All type of bell metal products described earlier are produced from the alloy of these two raw materials with the said proportion. Raw materials and basically procured from Calcutta.

### **Machinery and production:**

Units are working with traditional manufacturing techniques that are obsolete. Practically the tiny units of this cluster are not using any machinery and all operations are carried out by hand by the artisans. Three machines are operated without electricity. They are turning machine, grinder and head operated press for deep drawing. These machines will be made popular through the cluster development programme to make this cluster to convert into mechanization.

### **Product and marketing:**

There are about 300 brass and bell metal product manufacturers in the cluster. Whatever be the volume of orders, the entrepreneurs in this cluster are able to meet that. They are capable of handling orders, which are as small as 10 pieces. The sub-contracting arrangement is widely prevalent in the cluster.

The products are marketed within India. The products are marketed through traders/dealers. There is no export till date recorded from this cluster but if the products are diversified to decorative items on line with Moradabad cluster there will be potential for export.

In the area of globalization, the marketing activities of the entrepreneurs, needs to be integrated in order to capture the more market share. As the units are small it is almost imperative

that networking is done in order to capture largest orders. This will not only ensure economies of scale but also develop accountability of the entrepreneurs.

In the present scenario the entrepreneurs can join hand together, form consortium and grab large orders. There can be a brand building initiative where all the products can be projected under one brand name.

### **Entrepreneur and their Enterprises:**

A majority of the enterprises are family owned. The owner and other family members are the Manager, operator, marketer, technician and negotiator. There is hardly any qualified people recruited from outside. As a result no fresh idea came up and the process of manufacturing remained traditional. One needs to understand that there are several functional areas in an enterprise where qualified and experienced persons are required.

The level of awareness of the entrepreneurs, especially in technical and marketing areas, is not as high as it should be. Low level of education and inability to communicate in English has created a major problem for them.

### **Finance and Working capital:**

Finance has been a problem for the entrepreneurs at Balakati. Due to the illiteracy, ignorance and poor family background of entrepreneurs they are compelled to work on job work basis for Mahajans who purchases raw material i.e. Brass and Bell metal and give it to the artisans on piecemeal basis. If these tiny enterprises are strengthened to buy raw material from main source to produce the final product it will bring drastic change in the scenario of this cluster. There are banks that are ready to provide the financial assistance to them but these tiny units are accustomed to work on job work basis and not making efforts to borrow the money from financial institutions. This is also due to the reasons that these tiny units are not maintaining any record of these transactions which is needed for the government borrowings. There is a good scope for providing working capital to enterprises by organizing them.

### **Training**

There is no training facilities/institutions available in Balakati. The skill and the technique involved in the process of manufacturing and repairing is passed on by tradition from father to son. Even R&D institutes and quality testing laboratories are non-existent.

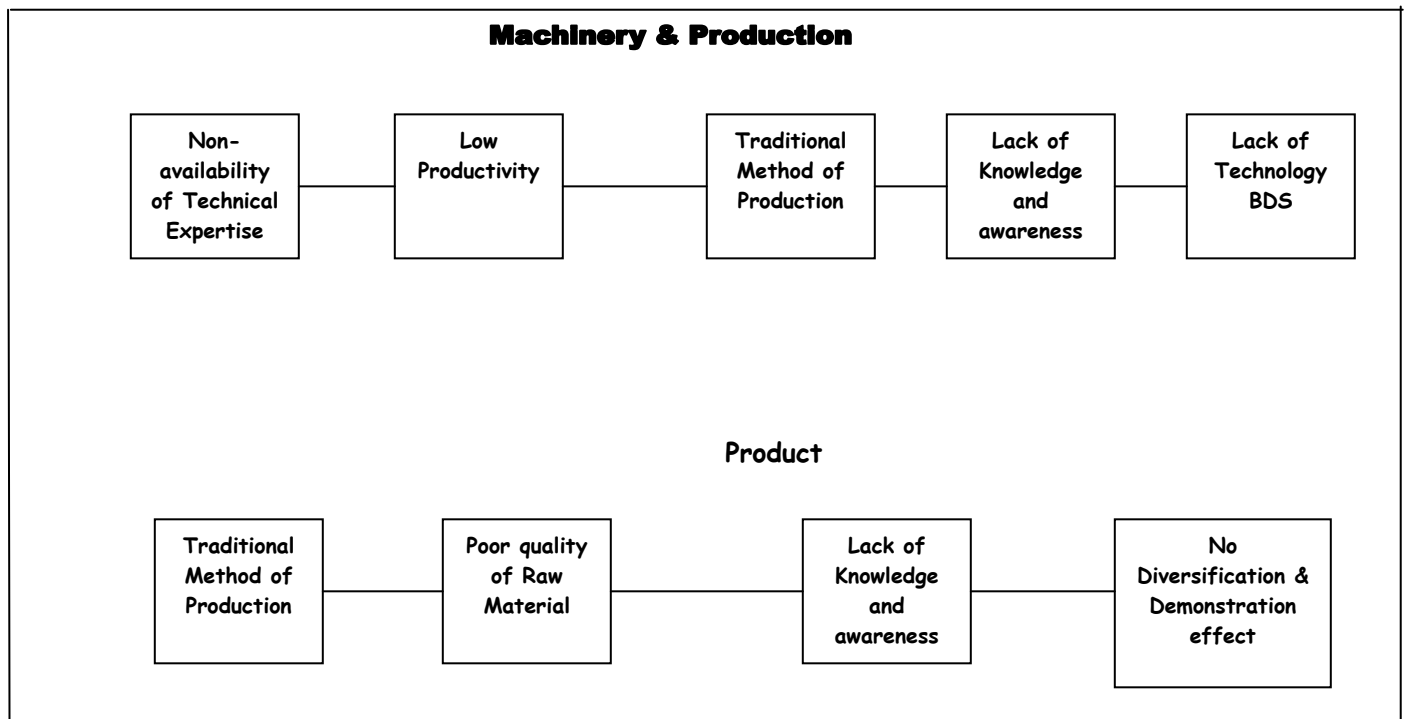
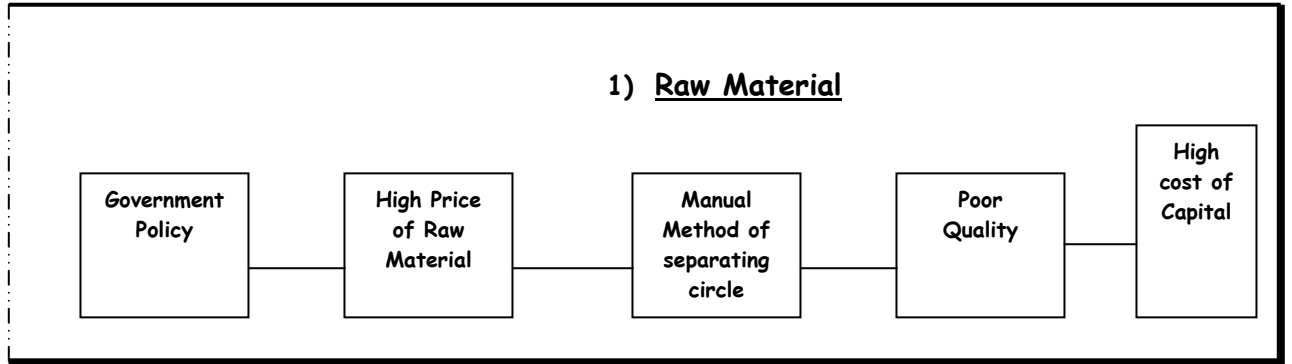
**Infrastructure:**

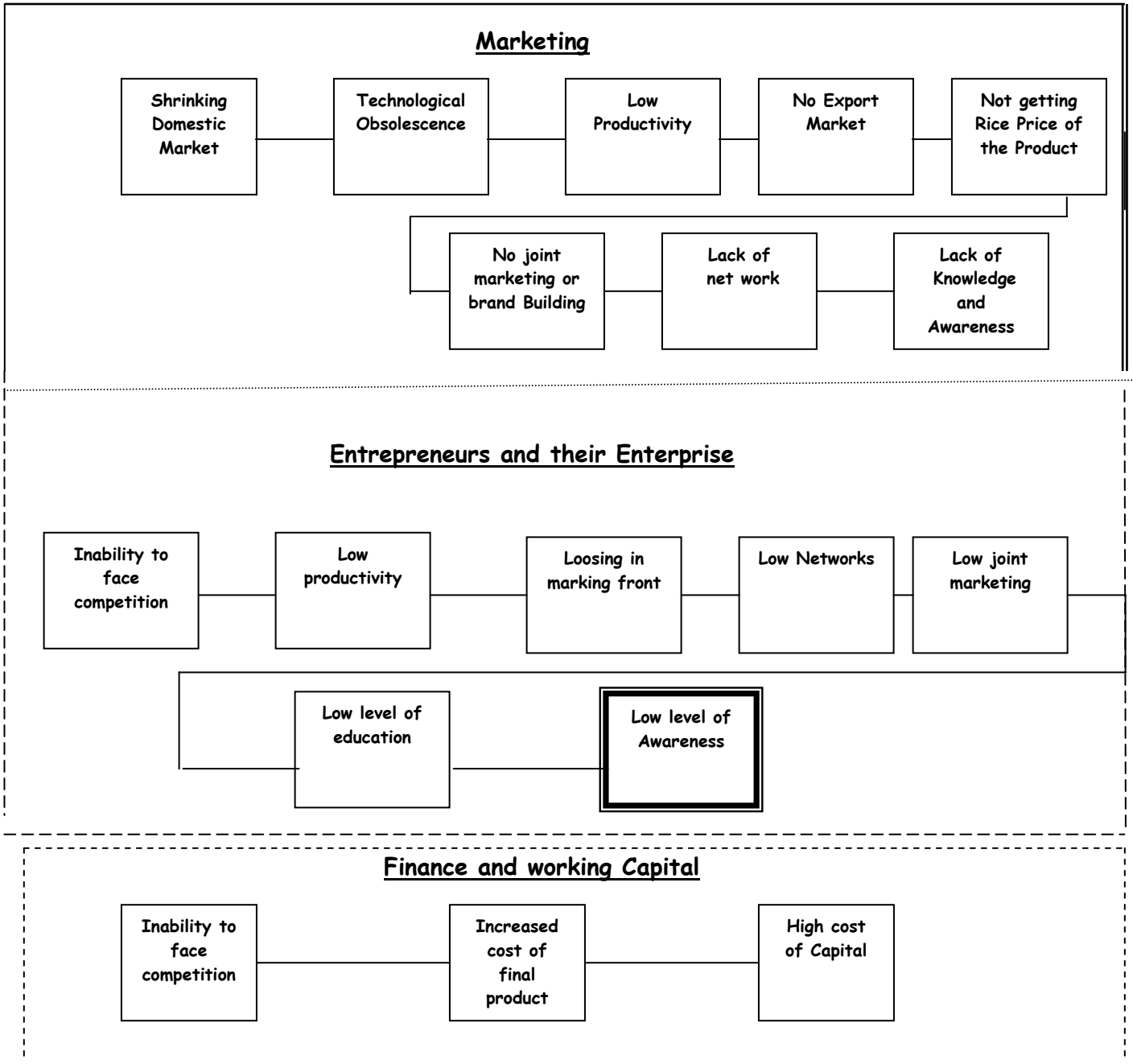
The enterprises are located in and around Balakati. Most of the units are set up in their houses and there are no working sheds or suitable infrastructure available with them. There is high scope that with the help of industrial infrastructure development organisation proper working sheds can be provided to them. Bank and CFC can provided raw material. Unused Government building which is available at Balakati could be used for setting up of their units. Bhubaneswar, the State Capital is only 10 Kms. away from Balakati. So many services and facilities if not available at Balakati can be available at Bhubaneswar.

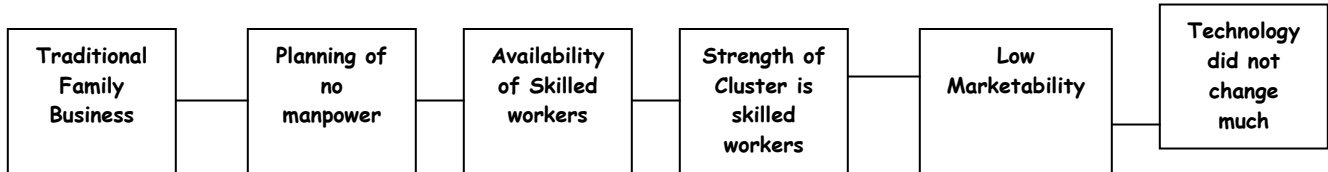
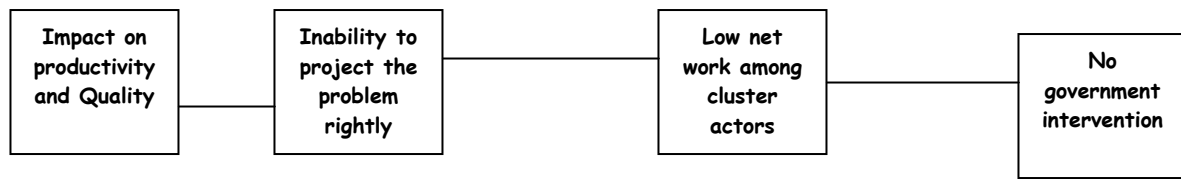
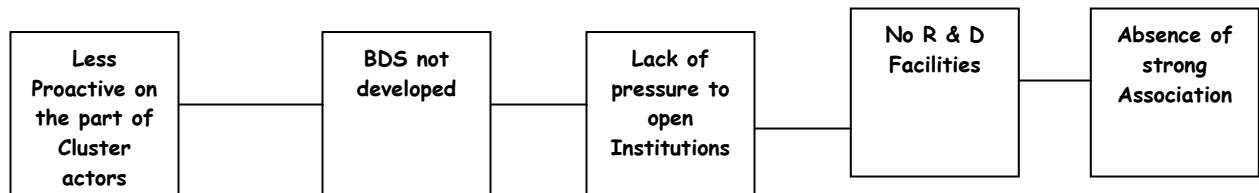
**Business Development services:**

The business development services have not grown in Balakati. There is no technical training institutions, no R&D laboratory, no management institutions, no testing facility, no marketing expertise, no design development institutes available at Balakati. It is difficult why these services have not developed in Balakati because in most of the cases these are demand driven. Probably, the requirement of the cluster is not properly projected. Therefore, there is a need to have networking and consortium among the SMEs in the cluster.

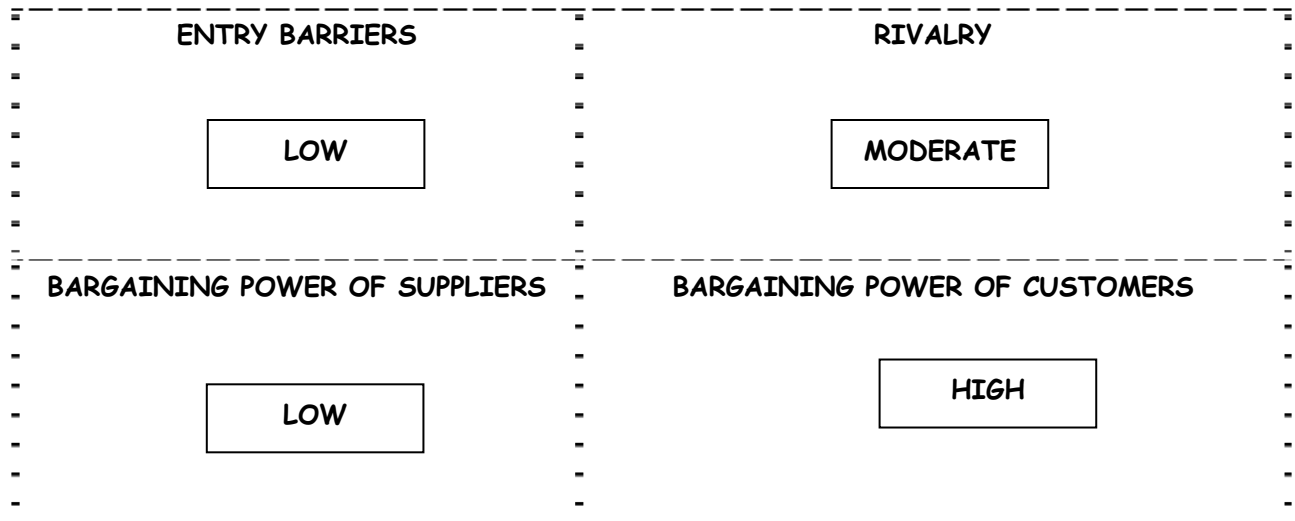
Technical training Institutes and testing laboratories can also be developed to fulfill the requirement of the enterprises. However, the cluster is only 10 kms away from Bhubaneswar city. As some of training facilities are already available at Bhubaneswar which could be availed by the artisans to develop their skill.

**CURRENT REALITY TREE**



**Man power****Infrastructure****Business Development Service**

## INDUSTRY STRUCTURE ANALYSIS



The above figure depicts the industry structure analysis of the brass and bell metal parts cluster in Balakati. This Industry structure analysis determines firm level profitability, competition, SME viability and prospects of growth.

The entry barrier in the above cluster is low because anyone can enter the industry with a minimum investment of Rs.30,000/- to Rs.50,000/- and inputs are available plenty. There is no proprietary skills/technologies and there is hardly any product differentiation and brand identification.

Another positive factor is the economies of scale which means the more you produce, the less is per unit manufacturing cost. These two factors (customers loyalty and economies of scale) pose some impediments for new firms entering into business.

The rivalry amongst firms is moderate. Though there is rivalry in the domestic market. Most of the producers have fixed clientele to whom they are supplying for the last many decades. There are large numbers of firms in the industry and the product differentiation is minimal. With the opening up of economy after globalization, the growth potential of the industry is tremendous, provided technology is upgraded, economies of scale is achieved and marketing consortia is formed. Rivalry among firms can be reduced by encouraging non-price competition and product differentiation, notional or real (may be with diversification). Rivalry is moderate by the fact that the exit barrier is also very low.

The bargaining power of the suppliers in the cluster is low and there are large numbers of suppliers available in the market. There is hardly any switching cost from one supplier to another and no input differentiation. Moreover, the brass parts industry is an important customer for the suppliers. There is hardly any evidence of suppliers forward integrating. Forming hard networks for common bulk purchase can further reduce the bargaining power of the suppliers.

So far bargaining power of the customer is concerned, it was found to be on higher side. There is hardly any product differentiation and the customers can switch from one suppliers to another. The switching cost is also very low. Moreover, customers are quality and price sensitive. However, for some enterprises, there is strong customer supplier relationship and the level of trust and loyalty is very high. Some customers of the large industries do not want to switch over to new suppliers on the fear of getting bad quality and not in time delivery. Forming of consortium and brand building can reduce the bargaining power of the customer.

## SWOT ANALYSIS

### STRENGTH OF THE CLUSTER

#### Market

- ✓ Locational advantage
- ✓ Strategically well placed, connected to other state by road, rail and air
- ✓ Strong presence in the domestic market
- ✓ Developing trust and relationship in the long run
- ✓ Product with adequate demand in Export market

#### Technology:

- ✓ Machines are available at Low price
- ✓ Demonstration effect

#### Raw material:

- ✓ Raw material is available in sufficient quantity
- ✓ Availability of other inputs at door step

#### Production:

- ✓ Easy and cheap availability of work force
- ✓ Locational advantages
- ✓ Availability of Engineering colleges/Technical institutes in nearby locality
- ✓ Availability of central and state government institutions for providing assistance at the time of need
- Utilisation of local resources

#### Finance:

- ✓ Availability of Banks and financial Institutions in nearby locality at Balakati and Bhubaneswar
- ✓ Implementation of different government sponsored schemes through DIC and Blocks
- ✓ Low level of investment with little gestation period
- ✓ High ratio of value addition to investment

### WEAKNESS

#### Market

- ✓ Absence of market intelligence

- ✓ Limited to local market only
- ✓ Not explored the potential for export
- ✓ Lack of exposure to different market segments
- ✓ Lack of marketing skill
- ✓ Unwillingness for cross-culture innovation

#### **Technology:**

- ✓ Use of traditional technology
- ✓ Lack of advanced Technology
- ✓ Wastage of man power and material
- ✓ Low productivity
- ✓ High cost of product
- ✓ Uncompetitive in the outside market

#### **Raw material:**

- ✓ Use of scrap raw material
- ✓ Insufficient availability from local Mahajans
- ✓ High cost of raw material

#### **Production:**

- ✓ Low productivity
- ✓ Low quality
- ✓ Highly unorganised and widely dispersed
- ✓ Inability of timely execution of large orders
- ✓ Lack of awareness and measures for quality assurance

#### **Finance:**

- ✓ Under utilization of financial facilities
- ✓ Poor coordination with local banks and financial institutions
- ✓ Poor background of the entrepreneur
- ✓ Ignorance of different schemes and incentives by government from time to time
- ✓ Inadequate Institutional credit flow leading to exploitative lending

### **OPPORTUNITY**

#### **Market**

- ✓ Vast opportunity inside the country and abroad of brass metal utensils and decorative Items

- ✓ Tariffs and non-tariffs barriers are depleting
- ✓ Quality and productivity is the rule of the game
- ✓ Exposure visits, participating in national and international trade fair may educated the Entrepreneurs about the expanding market opportunity
- ✓ Least impact of WTO on this sector

**Technology:**

- ✓ Advent of latest technology with the intervention of SISI,EDII and UNIDO
- ✓ Creation of technology awareness among entrepreneurs
- ✓ Tremendous enthusiasm on the part of the cluster actors
- ✓ Prospects of establishing common facility centre (CFC)
- ✓ Possibility of establishing ties with R&D Institutions / Laboratories

**Raw material:**

- ✓ Bulk purchase of raw material is going to make it cheaper and sufficient
- ✓ Prospect of establishing a raw material godown
- ✓ Option to have a choice for good quality raw material
- ✓ Availability of sufficient manpower

**Production:**

- ✓ Advent of latest technology going to increase productivity
- ✓ Availability of traditional Skill
- ✓ Scale down the production Cost due to availability of cheaper inputs
- ✓ Demonstration effect
- ✓ Increased awareness is likely to improve the skill of the workers
- ✓ Changing business environment can provide opportunities for enterprising firms

**Finance:**

- ✓ Improved coordination among the cluster actors will assure increased flow of credit to the entrepreneurs
- ✓ Availability of finance through cluster development approach
- ✓ Increased awareness among the entrepreneurs
- ✓ Ample scope of Govt. Schematic support for artisans under various schemes

**THREATS:**

**Market**

- ✓ Competition is going to increase in the globalize era

- ✓ Imports is going to increase in the coming years due to depleting barriers
- ✓ Overseas importers are smart enough to change their sourcing country
- ✓ Immitation by others due to lack of Patenting
- ✓ Survival of the fittest

**Technology:**

- ✓ Technology can impose a major threat unless it is changed or modernised
- ✓ Low level of technological development
- ✓ Sophisticated technology becoming a costly factor

**Raw material:**

- ✓ Difficulty in encountering competition unless raw material imports are made cheaper
- ✓ Quality of raw material
- ✓ Dependency on Government supply

**Production:**

- ✓ Skill base of the workers needs upgradation to adopt latest technology
- ✓ Changing business environment is always a problem for the less enterprising firms
- ✓ Stiff competition due to WTO norms and arrival of MNCs
- ✓ Commencement of product patent law in near future
- ✓ High illiteracy rate to adjust with changed scenerio

**Finance:**

- ✓ Irregular payment of dues to the financial institutions may lead to high cost of finance
- ✓ Complicated documentation procedures
- ✓ Changing business environment

## CLUSTER VISION

SUSTAINED EFFORTS FOR DOUBLING THE TURN OVER OF THE CLUSTER IN 3 YEARS BY MAKING IT VIBRANT, EXPLORING AND CREATING NEW MARKETS WITH EMPHASIS ON CREATION OF EXPORT MARKET AND SUPPLYING QUALITY PRODUCTS AT COMPETITIVE PRICE.

## STRATEGY FOR INTERVENTION

The Brass and Bell metal cluster in Balakati has enough growth potential provided strategic intervention is made in certain "Key areas". The clustering phenomenon was a natural process and it showed resilience in terms of encountering various problems in the past.

The Key areas in which the strategic interventions are needed are given below:

- 1) Technology upgradation
- 2) Networking among cluster actors
- 3) Skill Development Practical training for Diversification of products
- 4) Marketing support for products
- 5) Raw material support
- 6) Common facility centre
- 7) Developing BDS

Small Industries Service Institute, Cuttack would play a very vital role for providing practical training to the entrepreneurs of this cluster on diversification into decorative items. The existing common facility centre is already equipped with metal testing laboratory and machining workshop. Only few casting equipment are to be installed. It will be discussed in the Action Plan. In order to make the cluster development initiative sustainable in the long run, it is imperative to ensure capacity building of the cluster actors. An outside organisation intervention can not produce desired result, especially in the long run, unless efforts are made for capacity building of the cluster actors. The cluster actor should realize the changing scenario and initiate actions in order to solve their day to day problems to make themselves competitive. The important thing is that process of change should be internationalized rather imposed.

## ACTION PLAN

The manufacturing process of Brass and Bell metal products has remained mostly traditional. There is hardly any change in technology. The process of melting, casting, machining and plating have not changed much. As a result, the quality and productivity of the cluster is very low. There is high rejection rate and lot of time and labour is wasted in correcting defects. Some time 3/4 of the material is recycled because of not having the right technology (e.g. brazing technology).

In order to eradicate these problems, there is an urgent need to provide them skill development training and to popularize the machines which are on operation for such industries. The above technologies will help in.

- 1) Minimizing rejection rate
- 2) Improving productivity and quality
- 3) Saving labour and time
- 4) Eradicating dimensional distortions
- 5) Producing precision parts and components
- 6) Making the cluster competitive

Another thing, which is also lacking in the cluster, is diversification. These are the areas where the cluster can concentrate and demand of these products is going to increase in the coming years. Moreover, competition in this product segment is also limited.

The networking among cluster actors is very limited. Only when the entrepreneur faces pressing problems, they do interact in groups. A strong network has to be created among cluster actors so that they can jointly solve each others problem, pressurize government in liberalizing the rule and regulations. They even can jointly market their products in the global market in order to compete with the economies of scale approach of Chinese manufacturers. The Industry Associations need to be made proactive and networking has to be strengthened. This can be taken up as a part of capacity building exercise. The benefits of networking have to be explained to them.

Growth of business Development services especially technical and marketing areas are very limited. There is no technical training institute, no R&D and testing laboratory. As a result, the technology and the process of manufacturing have remained unchanged. Moreover, there are no consultant/experts who can guide them in international marketing, export procedures and documentation etc. Whatever the entrepreneurs learnt, they learnt it by doing it or from other entrepreneurs.

Therefore government rules and regulations have to be liberalized. The role of the government department should be a facilitator rather than regulator. An awareness workshop for the government officials in the form of department enterprise can be organised.

For enhancing the skills of the entrepreneurs and to make them capable of manufacturing diversified brass and bell metal products suitable skill development training programmes needs to be organized. This will enable them to sell their products in other domestic as well as international market. To facilitate this, pilot metal casting facility can be created.

For consistence and economic supply of quality raw material, facility of common raw material godown is required. This will eliminate the dependence on raw material suppliers. Based on the above analysis the following activities can be organized at Balakati.

- a) Establishment of Raw material Godown
- b) Adding new products in the existing product line
- c) Improving the quality and productivity through technology upgradation
- d) Net working among cluster actors
  - i) Net working artisan with traders of different cities
  - ii) Net working artisan with supporting institutions
  - iii) Net working artisans with BDS providers
- e) Organising exposure visit of artisans
- f) Training on diversification as a strategic option
- g) Joint participation in national/ international fairs/ Exhibition
- h) Study in understanding the present manufacturing process and identifying the scope for improvement
- i) Workshop on technology upgradation
- j) Personal counseling in solving technological problems
- k) Establishing common facility centre (CFC) for demonstration and adoption of technology
- l) Establishment of permanent show room
- m) Developing common brochure to promote Brass and Bell metal craft of Orissa
- n) Linkages with the local bankers
- o) Brand building
- p) Monitoring and evaluation of cluster development programme
- q) Documentation
- r) Market survey of Decorating and existing items

s) Capacity building of cluster actors

**TIME SCHEDULE OF ACTIVITIES QUARTER WISE**

Sr. No	Activity	1st Year				2nd Year				3rd Year			
		Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
1.	Four Awareness Seminar on Cluster Development	✓	✓	✓	✓								
2.	Three seminars on strengthening the associations and infrastructural facilities	✓		✓	✓								
3.	For training and Demonstration setting up of Pilot casting facility	✓	✓										
4.	Exposure visit of CDE to Brass and Bell Metal Cluster Thrissur and Moradabad		✓		✓								
5.	Exposure visit of entrepreneurs to Moradabad for diversification to decorative items			✓			✓						
6.	Skill Development training to entrepreneurs for diversification on decorative items in CFC				✓		✓		✓		✓		✓
7.	Three Seminars on the benefits of consortium approach for marketing and procurement of raw material				✓				✓		✓		
8.	Participation in domestic trade fairs				✓	✓	✓	✓	✓	✓	✓	✓	✓
9.	Four workshops on Technology upgradation				✓			✓			✓		✓
10.	Creation of common marketing website					✓	✓						
11.	Creation of common facility centre					✓	✓	✓	✓	✓			
12.	Raw Material Godown					✓							

**CONSOLIDATED BUDGETARY STATEMENT YEAR WISE TO BE FUNDED BY O/O DC  
(SSI), NEW DELHI AS PER THE ABOVE ACTION PLAN**

Sr. No	Activity	The DC(SSI), New Delhi			Supp. Instns/ Association etc.	Total
		1st year	2nd Year	3rd Year		
1.	Awareness Seminar on cluster development	80,000				80,000
2.	Seminar on strengthening associations and infrastructure for association	1,20,000			50,000	1,70,000
3.	For training and demonstration supplementing casting facility in existing common facility centre of SISI, Cuttack	2,50,000				2,50,000
4.	Exposure visit of CDE to Moradabad, Thrissure Brass & Bell Metal Cluster	50,000				50,000
5.	Two exposure visit of entrepreneurs to Moradabad for diversification to decorative items	50,000	50,000		50,000	1,50,000
6.	Skill development training programme for diversification to decorative items	60,000	1,20,000		1,20,000	3,80,000
7.	Three seminars on the benefits of consortium approach	25,000	25,000		25,000	75,000
8.	Participation in Domestic Trade Fairs	20,000	20,000	20,000	30,000	90,000
9.	Three workshops will be conducted on technology upgradation over a period of three years	30,000	30,000	30,000		90,000
10.	Creation of common marketing website		50,000		25,000	75,000
11.	Creation of common facility centre		5,00,000		10,00,000	15,00,000
12.	One Computer with laser printer, scanner and furniture etc.	1,00,000				1,00,000
13.	Printing and publicity materials, stationery and postage, other recurring expenses under OE etc. @ Rs.50,000/- per year	50,000	50,000	50,000		1,50,000
14.	POL for vehicle	30,000	30,000	30,000		90,000
<b>Total</b>		<b>8,65,000</b>	<b>9,00,000</b>	<b>1,30,000</b>	<b>13,00,000</b>	<b>32,50,000</b>
			<b>17,90,000</b>			

## CONCLUSION

The Brass and Bell Metal craft is traditionally being practiced at Balakati in the district of Khurda and this occupies a place of pride in the history of Orissa. The artisans are propagating ancient and modern method of manufacturing utensils and decorative items which are traditional set. In couple of decades this traditional activity has received a great set back because of shift of demand for steel, aluminium and plastic products. It has been observed during Diagnostic survey that there is a need for diversification of product in to Moradabad Patter (U.P.) in order to sustain in the present market. There is a need for modernisation of technology through setting up of Common Service Centre to facilitate production of diversified products having market demand. Since most of the artisans are very poor and unable to invest in infrastructure, so there is a urgent need for sufficient flow of credit to this sector of activity. There is a growing demand for the craft provided, modernization and designed development takes place. So it is proposed to conduct regular skilled development programmes for the artisans of this cluster to educate them on the latest design and technology. Further, steps should be taken to strengthen the associations of the artisans as well as stakeholders which will help the cluster for its consistent and sustainable growth. In this liberalized era efforts should be undertaken to have a common brand for these products to win the customers in the nook and corner of both domestic and international market. So this cluster being located near to Bhubaneswar which is the state capital as well by the side of National Highway connecting Bhubaneswar and Puri through which thousands of pilgrims pass every day, there is immense potentiality to develop this cluster into manufacturing hub for Brass and Bell Metal Products with common brand.

**ANNEXURE-1**

<b>Sr. No</b>	<b>Name of the Bell Metal Production Centre</b>	<b>District</b>
1.	Balakati	Khurda
2.	Bainchua	Khurda
3.	Muktapur	Khurda
4.	Kantilo	Nayagarh
5.	Khalisahi	Nayagarh
6.	Baidyarajpur	Jajpur
7.	Bhatimunda	Cuttack
8.	Bindhanima	Cuttack
9.	Kanpur	Cuttack
10.	Bhuban	Dhenkanal
11.	Pohali	Dhenkanal
12.	Jagamohan	Ganjam
13.	Belaguntha	Gajapati
14.	Kabisuryanagar	Gajapati
15.	Kantapali	Baragarh
16.	Ghantitikra	Bargarh
17.	Kutakara	Bargarh
18.	Bijepur	Bargarh
19.	Rengali	Sambalpur
20.	Tangarpali	Sundargarh
21.	Keonjhar	Keonjhar
22.	Magapur	Keonjhar
23.	Bhatabeda	Mayurbhanj
24.	Chitrada	Mayurbhanj
25.	Remuna	Balasore
26.	Dehala	Balasore
27.	Tarbha	Bolangir
28.	Binika	Bolangir
29.	Mantraguda	Nabarangpur

Annexure-2REGISTERED SSI UNITS FUNCTIONING IN BALAKATI CLUSTER, BALAKATI, KHURDA

PMT No.	Name of the SSI unit	Name of the product
1946	Jageswari Brass & Bell Metals, Nuapatna	Utensils
1267	Mamata Producers Metal Industries, Prop. Narhari Sahoo, At. Gopinathpatna, Balakati	Decorative Items
1418	Gopaljew Metal Industries, Rathijema	Brass Castings
1889	Prop. Harekrushna Moharana, Ashighan Sahi, Rathijema	Brass Work
1402	Bharat Mata Metal Industry, Prop. Arta Sahoo, Rathijema	Bell Metal
1403 dated 24-5-85	Mahalaxmi Metal Industry, Prop. Sri Damodar Sahoo, Rathijema	Bell Metal
1667 dt. 19-2-87	Jhilmill Brass & Bell Metal Industry, Prop. Sri Basant Kumar Sahoo, Nuapatana, Balakati	Bell Metal
2198 dated 31-3-94	Santosh Brass & Bell Metal Works, Prop. Sri Baisanab Moharana, Rathijema	Brass Utensils
2214 dated 6-11-90	Saroj Brass and Bell Metal Industries, Prop. Sri Narayan Moharan, Rathijema	Brass Utensils
2620	Padmini Metal Industry, Jhadeswari Patna	Tikili
3349	Mahabir Tikili Industry, Kulusahi, Rathijema	Tikili

# VALUE CHAIN ANALYSIS

