

# Production Process and Market Structure of the Ancient Craft Dokra of West Bengal

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## Abstract

The Dokra households are engaged in this craft production and almost everyone in the household participates at different stages of production, although the major parts are undertaken by the skilled artisans. The Dokra crafting families regularly initiate the process of production of lost wax casting by moulding the core of unique figurines. The artisans depended on the local market for their raw materials. The artisans, who sell their products in other markets rather than locally, mostly use hired labours for their work substituted and earn more among them.

**Keywords :** Production Process, Labour Distribution, Input and Output Market.

### Introduction

In the context of development, the handicraft sector assumes importance owing to its large workforce; all the more so, because it is a major site of exclusion. A study of this sector is, therefore, essential from the standpoint of the strategy of inclusive growth. Further, a wide divergence in firm-level characteristics and market linkages, and a variety of firm-dynamics within the informal sector posit a central question on the contemporary development process: Why cannot the informal sector have an inclusive progression involving all its segments?

As rural handicrafts of India constitute a very large and starkly heterogeneous part of this informal sector, a primary data based study of handicrafts should also add substantial value to the literature on informal sector. For an inclusive growth process, as mentioned above, the contribution of rural handicraft could be enormous and hence, we need to understand this sector thoroughly. Although there has been substantial research on the informal sector, in general and some contribution on the Indian informal sector too, study on rural handicrafts of India and especially that using primary field based data is really scanty. Hence, a field data based firm-level analysis on a variety of rural handicrafts considering the issues of production organisation (focusing on labour usage), and input-output market networks (focusing on presence/absence of intermediary and income distribution) is crucial not only from a theoretical perspective, but also from the perspective of inclusive growth, as mentioned above. Stated otherwise, a detailed study of the firm and market structures, firm behaviour/conduct and firm outcome/performance are essential to understand the specificities of crafts production and to identify the problems and prospects of this sector so that the conditions of such firms, which are millions in number in a country like India, could be improved upon.

### Objective of the Study

1. A detailed production process and participation of labour both household and hired in the rural handicrafts sector;
2. input-output market structures with income distribution.

### Review of Literature

The ancient craft of Dokra(*cire perdue*, or *lost wax*) metal casting was once widespread throughout India, but is now restricted to a small number of groups of traditional artisans in widely dispersed locations. One significant nucleus of my craft exists among related groups of families in Bikna village (Bankura) and nearby Dariapur village (Purba Burdwan), in West Bengal, India. The name 'Dokra' was formerly used to indicate a group of nomadic craftsmen, scattered over Bengal, Orissa and Madhya Pradesh in India, and is now generically applied to a variety of beautifully shaped and decorated brassware products created by the *cire perdue* or 'lost wax' process. The craft of lost-wax casting is an ancient one in India, and appears to have existed in an unbroken tradition from the earliest days of settled civilisation in the sub-continent. The traditional themes of these cast metal



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sculptures include images of Hindu' gods and goddesses, bowls, figures of tribal people or deities riding elephants, musicians, horse and rider figures, elephants, cattle, and other figures of people, animals, and birds.

The first detailed study of *cire perdue* work in the Bankura District was carried out in the early 1960s by Ruth Reeves (1962) This work has been the primary source for many subsequent reports and academic theses {see, for example,(Bose 2015), Bhattacharya (2011), Maiti (2005),Smith & Kochhar (2002), Sen (1994)}.

However, there has never been a detailed audio-visual record of the craft, and this current report aims to fill this gap in the record. It documents a period during which the people of Bikna are adapting their traditional way of working to the demands and possibilities of both a new technology and a new commercial environment. It therefore provides a unique contemporary record of a historic living tradition undergoing rapid and fundamental change. Although there is a small but increasing demand for Dokra work from urban Indian families, as well as in the tourist trade, the craft is threatened with extinction. Most of the remaining dhokra communities are extremely poor, and their economic condition has caused many families to leave the craft to find wage employment in local manufacturing centres or in metropolitan centres such as Kolkata.

### Hypothesis

1. These units are traditionally household based so family members are skilled and their participation is high.
2. As it is a traditional craft, the local market will be developed for raw materials and at the same time sophisticated so there is some demand on the open market also.

### Methodology

This study is based on primary data. West Bengal is purposively chosen. A large section of the industrial entrepreneurs are engaged in producing handicrafts items in West Bengal. A list of industrial units is prepared with the help of District Industrial Centres (DIC). We select one district specific handicraft industry, like Dokra in Bankura from the list of industrial units. A list of administrative blocks by types of industry is prepared in the same way. One block for this industry is purposively selected in stage two. Here we get the artisans of Dokra craft produce within a cluster in Bikna village. In this stage two sample 50 units of proprietor households are selected from the village for detailed survey using stratified random sampling method. Tabular, statistical and econometric methods are used for analysis of data mostly using STATA software.

### The Production Process Involves Different Stages

1. At first the artisans made a clay core by hand. The clay core is slightly smaller than the final intended size of the object. The core may be hardened by sun-drying.- this part is mainly done by both skilled and unskilled workers.
2. Then the skilled artisans put fine detail design on the object to be created and built onto the core using wax ('mom') with dhuna. Ideally, wax is the best modelling medium, but the artisans of Bikna prefer to use 'dhuna' and mom (bee wax) together. Dhuna is based on a natural plant resin extracted from the Sal tree (*Shorea robusta*) mixed with mustard oil.
3. The family members collected mud from the nearest river belt and dust it. The wax model is coated with a thin layer of very fine clay, which will form an impression of every detail of the model. When this layer is dry and hard, another layer of clay is added to the mould. One or more pouring channels are provided on the objects, through which molten metal can run to fill the mould. – this part was done by skilled workers.
4. After the earthen core is made ready for the final stage of production, molten brass is poured down the vent which takes the shape of the wax-decorated on the earthen core. The molten brass is prepared once in a week in a common furnace, where often three to four artisans melt their brass,
5. After cooling, the burnt moulds are broken by a nail and hammer by the male artisan of the household, to bring out the casted rustic Dokra craft. The artefacts are then polished by machine.

**Labour Uses**

In production, labour is the prime factor of production. This production is fully household base production, where more or less all household members are involved, so we consider the below table.

**Table: 1**  
**Family Member and Family Worker Distribution**

Number of Family Member	Number of Family worker					Total Household
	2	3	4	5	6	
2	7	0	0	0	0	7
3	6	1	0	0	0	7
4	9	6	5	0	0	20
5	2	1	1	2	0	6
6	0	2	2	2	0	6
7	0	0	1	1	0	2
8	0	0	0	0	2	2
Total Household	24	10	9	5	2	50

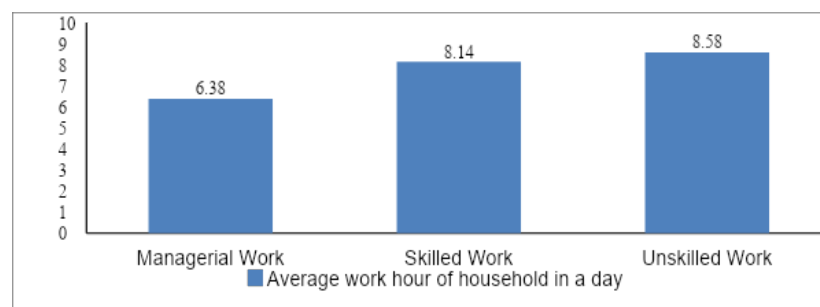
From table 1, it is clear that as family size increases, the number of family workers also increases. As production requires a good amount of involvement of family members, it is quite obvious. We have collected data from 50 households with family sizes 2 to 8. There are 15 families for whom all members are working. There is a high positive statistically significant correlation between number of family members and number of family workers.

Corr 1%	Family Member
Family Worker	0.758***

In the production process the work is basically divided in three categories like managerial work, skilled base work and other parts which can call unskilled base work. In the household there is no work division among the household workers but there is some skilled base work done by the artisans of the household. These artisans are traditionally engaged in this process. They know all the parts of the production.

The managerial work is mainly done by the older male person of the family. In managerial work the family worker chooses the input and output market, raw material quantity and hired labour and capital (cash)etc. The skilled worker is the artisan, who gives the final shape and design to the model. This is the main part of the production. Apart from this part the household workers also participate in many works which are unskilled base work. The artisans can involve skilled, unskilled and managerial work.

**Time-use Pattern**



Let us check the usage of total hours available to work per family. As a household, people are using 6.38 hours for managerial work, 8.14 hours for skilled work and 8.58 hours for unskilled work.

**Table: 2**  
**Family: Male and Female Worker Distribution**

Number of Family Male Worker	Number of Family Female Worker			
	1	2	4	Total Household
0	0	1	0	1
1	23	5	0	28
2	5	7	1	13
3	2	4	0	6
4	1	1	0	2
Total Household	31	18	1	50

In the discussion of the production process, we need to look into the male-female ratio among the workers. From table 2 we can have a clear view. There are 30 families where male-female worker ratio is 1:1. In 23 families 1 male and 1 female are in the production. In the other 7 families, 2 male and 2 female are doing the job. Some of the families have more female workers than male (7 such cases are there). Thirteen families have more male workers than female. These figures are showing that this Dokra craft production is not limited to male or female. It can be proved through a correlation coefficient also.

Corr 1%	Female Worker
Male Worker	0.2815

The correlation coefficient between male and female workers is 0.2815. It is a very low and statistically insignificant value. It is revealing the fact that neither male nor female are having any dominating position in the production process of Dokra craft.

**Table: 3**  
**Family worker and Family Skilled Worker Distribution**

Number of Family Worker	Number of Family Skilled Worker						Total Household
	1	2	3	4	5	6	
2	4	20	0	0	0	0	24
3	0	3	7	0	0	0	10
4	0	3	0	6	0	0	9
5	0	0	3	1	1	0	5
6	0	0	0	1	0	1	2
Total Household	4	26	10	8	1	1	50

Table 3 shows an interesting fact. When we check the proportion of 'skilled' to 'unskilled' workers, it is not at all 100%. Though no families are there for whom there is not a single skilled worker, but there are 4 families where the number of skilled workers is 1. There are 20 families with 2 workers and for which both the workers are skilled. All the three family workers are skilled in 7 families; all the 4 family workers are skilled in 6 families. Surprisingly, we got 2 such families where all the 5 or 6 workers are skilled workers. It is a very good finding that out of 151 workers from 50 households, 129 are skilled. It is indeed a very strong ratio. The correlation coefficient between family worker and skilled worker is 0.796. It is a strong positive correlation, it is statistically significant too. It is revealing the fact that these people are inheriting the skill generation after generation. Not only that, wives are also learning from their husbands. That is why Dokra craft became a family occupation.

**Table: 4**  
**Family worker and Family Unskilled Worker Distribution**

Number of Family worker	Number of Family Unskilled worker						Total Household
	1	2	3	4	5	6	
2	9	15	0	0	0	0	24
3	0	8	2	0	0	0	10
4	0	5	2	2	0	0	9
5	0	1	0	3	1	0	5
6	0	0	0	1	0	1	2
Total Household	9	29	4	6	1	1	50

Table 4 is showing the other side of the picture. From table 3 we got the information that 129 workers are skilled. It means 22 workers in our total sample of 151 are unskilled. There are 21 families where all the workers are involved in unskilled work. Each household has at least one unskilled worker. Here also, the relationship between the number of family workers and the number of family unskilled workers is statistically significant. They have a strong positive correlation.

**Table: 5**  
**Family: Skilled Male/Male and Female Skilled/Female Worker Distribution**

Ratio of Family Male Skilled Worker and Family Male Worker	Ratio of Family Female Skilled Worker and Family Female Worker			
	0	.5	1	Total Household
0	0	1	0	1
0.33	0	0	1	1
0.5	0	1	1	2
0.67	0	3	1	4
1	4	3	35	42
Total Household	4	8	38	50

To understand the production orientation thoroughly, we need to check the ratio of skilled to total workers among male and female separately. In 38 households all female workers are skilled. Similarly, 100% skilled male workers are there in 42 families. In 8 families, 50% of the females are skilled. This number is 2 in case of male workers. 35 out of 50 families have 100% skilled male as well as female workers. This is definitely something to be noted. There is 1 family where no male workers are skilled. On the other hand, in 4 families no female workers are skilled. It means there is no such difference in the skilled-unskilled ratio between male and female. We can say, women are empowered enough in this production process and due to that only they are getting almost equal opportunity to gather the relevant skill.

**Table: 6**  
**Family Worker and Hired Worker Distribution**

Number of Family Worker	Number of Hired Worker			Total HH who Hired Worker	Total Household
	0	1	2		
2	2	13	9	22	24
3	6	2	2	4	10
4	8	1	0	1	9
5	4	1	0	1	5
6	2	0	0	0	2
Total Household	22	17	11	28	50

From table 6, we are getting some idea about the employment generation through this production procedure. It shows the number of hired workers and total family workers. It is obvious that as the number of family workers increases, the opportunity to hire workers from outside falls. This fact is clear from the correlation coefficient between number of family workers and number of hired workers. It is negative and statistically significant. There are 22 households who are not using any hired workers. Seventeen families are using a single hired worker and eleven families are using two hired workers each.

**Table: 7**  
**Family Worker and Hired Skilled Worker Distribution**

Number of Family Worker	Number of Hired Skilled Worker				Total HH who Hired Worker	Total Household
	0	1	2			
2	10	13	1		14	24
3	9	0	1		1	10
4	9	0	0		0	9
5	5	0	0		0	5
6	2	0	0		0	2
Total Household	35	13	2		15	50

From the last table it is revealed that 28 out of 50 households are using hired workers. Now the question arises, whether those hired workers are skilled or not. Table 7 has the answer. Total 15 households are using skilled workers.

Corr 1%	Hired Skilled Worker
Family Worker	-0.4667***

There is a statistically significant inverse relationship between number of family workers and number of skilled workers. That is quite natural because to produce more one should need more manpower. If that manpower is skilled, then their marginal productivity would be more and production can be increased with fewer workers.

**Table: 8**  
**Family Worker and Hired Unskilled Worker Distribution**

Number of Family Worker	Number of Hired Unskilled Worker				Total HH who Hired Worker	Total Household
	0	1	2			
2	8	16	0		16	26
3	7	2	0		2	10
4	8	1	0		1	8
5	4	1	0		1	1
6	2	0	0		0	1
Total Household	29	20	0		21	50

Table 8 is the representation of scope of unskilled labour. The question is the families which are hiring workers, is there any scope for unskilled workers too to get hired! Answer is, yes. There are 21 households who are managing their jobs with unskilled workers. That means there is scope for unskilled workers also to be hired by some household. Table 7 and 8 are revealing the fact that there is some scope of employment generation through Dokra craft. It is a combination of family production as well as employment generation.

**Table: 9**  
**Distribution of per capita income of family and total household and hired worker**

Range of PCI of Family per Month (Rs)	Average PCI of Family per Month (Rs)	Total HH	Total HH Labour	Total HH Sk Labour	Total HH Unsk Labour	No. of HH who Hird Lab	Total Hr Labour	Total Hr Sk Labour	Total Hr Unsk Labour	Total Labour	Total Sk Labour	Total Unsk Labour
600-1000	836	77	15	15	11	7	8	3	5	23	18	16
1001-1500	1272	116	49	41	39	9	13	5	8	62	46	47
1501-2000	1716	115	52	43	38	6	9	5	4	61	48	42
2001-2500	2140	99	26	23	21	4	6	3	3	32	26	24

2501-2800	2588	43	9	7	5	2	3	1	2	12	8	7
Total Labour		50	151	129	114	28	39	17	22	190	146	136

**Table: 10**

**Distribution per capita income of family and average household and hired worker**

Range of PCI of Family per Month (Rs)	Average PCI of Family per Month (Rs)	Total HH	Average HH Labour	Average HH Sk Labour	Average HH Unsk Labour	No. of HH who Hired Lab	Average Hr Labour	Average Hr Sk Labour	Average Hr Unsk Labour	Average Labour	Average Sk Labour	Average Unsk Labour
600-1000	836	7	2.14	2.14	1.5	7	1.14	0.42	0.71	3.3	2.6	2.3
1001-1500	1272	16	3.06	2.56	2.4	9	1.44	0.55	0.88	3.9	2.9	2.9
1501-2000	1716	15	3.4	2.86	2.53	6	1.5	0.83	0.66	4.1	3.2	2.8
2001-2500	2140	9	2.8	2.5	2.3	4	1.5	0.75	0.75	3.6	2.9	2.7
2501-2800	2588	3	3	2.3	1.6	2	1.5	0.5	1	4.0	2.7	2.3
Total Labour		50	151	129	114	28	39	17	22	190	146	136

The research reveals that monthly PCI of the families engaged in 'dokra' craft lies between Rs 836 to Rs 2588. This distribution is almost symmetric. Most of the families lie in the median range of PCI. This data shows that there is a prominent gap in monthly PCI between family worker and hired worker. Similarly there is a wage difference between skilled and unskilled hired workers. Last two columns of table 10 reflect that fact.

Sustainability and long run development of a sector depends on various factors. One of the most important factors is employment generation. Thus, it is very important to judge the factors behind the number of hired workers. Here, an econometric model is formed as

Hired worker =  $a_1 + a_2$  (family PCI) +  $a_3$  (Household worker) +  $a_4$  (HH male-female ratio) +  $a_5$  (HH skilled-unskilled labour ratio) +  $a_6$  (Raw material cost) +  $a_7$  (Input market Dummy Local=1; other wise=0) +  $a_8$  (Output market Dummy Local=1; other wise=0) +  $U_1$ .

After using Tobit regression technique, following relationship has been found.

**Tobit regression**  
 Number of obs = 50  
 LR chi2(7) = 38.02  
 Prob > chi2 = 0.0000  
 Log likelihood = -45.534808 Pseudo R2 = 0.2945

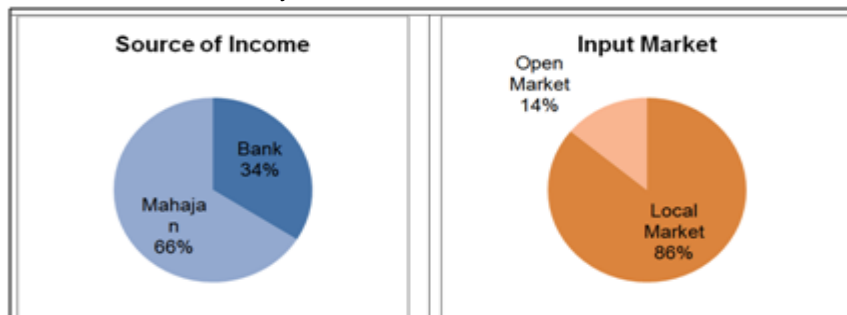
All_Hired_Lab	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
PCI_family	.0001554	.0003048	0.51	0.613	-.0004593	.0007702
HH worker	<b>-.7201672</b>	<b>.1901543</b>	<b>-3.79</b>	<b>0.000</b>	<b>-1.10365</b>	<b>-.3366846</b>
HH_male/Female	<b>-.7156699</b>	<b>.3407548</b>	<b>-2.10</b>	<b>0.042</b>	<b>-1.402868</b>	<b>-.0284723</b>
HH_Sk/unsk_lab	-.0864529	.315985	-0.27	0.786	-.7236976	.5507919
Raw_Mate_cost	6.09e-06	.0000267	0.23	0.821	-.0000478	.00006
Input_Market Dummy Local= 1	.0921875	.6821066	0.14	0.893	-1.283412	1.467787
Output_Market Dummy Local=1	.5583921	.3634281	1.54	0.132	-.1745306	1.291315
_cons	2.908763	1.265762	2.30	0.026	.3561102	5.461416
/sigma	.836662	.1208358			.5929735	1.080351

Obs. summary: 22 left-censored observations at All\_Hired\_Lab <= 0  
 28 uncensored observations  
 0 right-censored observations  
 Regression revealed that Number of hired workers has a statistically significant relationship with the number of family labour and household male-female ratio. It has an inverse relationship with both variables. It is quite obvious that as the number of family members increases, households have to cut down the number of hired workers. On the other hand, a decrease in male-female ratio implies more female members in the family. It is possible that the family requires more hired labour to compensate for the unavailability of male members. Other independent variables are not significantly related.

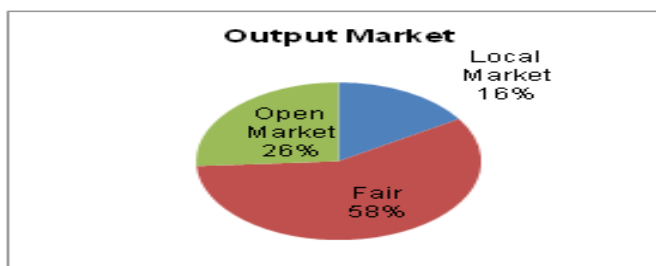
**Study of Input and Output Market Structures**

To analyse a production system properly, we need to go through the input and output market structure. In an earlier section we discussed the most important factor of production, i.e. labour. But other than labour, the households require many other inputs. Let us check their sources of those inputs. On the other hand, the last stage of production process is to sell it. So to end the circle, they need a market where they can sell their finished product.

Let us first find out the sources of the fund with which households can buy inputs. We got from the primary survey that they often take loans. Data shows 66% of their loan is from Mahajan and 34% from the bank. It means the financial inclusion rate in rural India is still very low.



The above pie chart shows people prefer to buy the inputs from the local market. Only 14% of the required inputs they buy from the open market. For the rest of 86% of the requirements they approach the local market. The advantages of the local market are many. It is easier to buy from known circumstances, from a known seller. They can borrow while buying. There can be a variety of buying options which can be changeable. Similarly, home delivery options are available in the local market.



The most important part of the entire production process is to sell the products. To sell their product, households look for three options; local market, fair and open market. The fair is the place at which the property would change hands between a willing buyer and a willing seller, neither being under any compulsion to buy or to sell and both having reasonable knowledge of relevant facts. They sell 58 percent of their product in the fair, 26 percent in the open market and 16 percent in the local market.

**Table: 11**  
**Distribution of monthly income of household and worker**

Input Market	Local			Open
	Local	Fair	Open	Open
Household	8	29	6	7
Average Labour	2.5	2.7	3.5	4.1
Net Income	4405.00	5727.00	7518.00	11750.00
Per capita income of household Month (Rs)	1775.00	2098.00	2273.00	3048.00
Per capita income of all worker Month (Rs)	1574.00	1886.00	2206.00	2998.00

The above table reveals the fact that households who are dealing in the open market have a larger scale of production. They have more labour, more income and more per capita income too. It is a kind of circular relationship. As these families have more income they can use more workers, they can buy improved inputs from the open market. Therefore, their production is more and of better quality. As a result, they can sell their products to the open market at a higher price. So their income is more. The circle starts rotating again.



**Conclusion**

Handicraft sector occupies a prime position in the Indian economy for its high employment prospects, low investment at a time and its unbelievable creative talents to develop tradition into modern culture. It is the largest employer next to agriculture. It is omnipresent with each state contributing through one or more crafts and has made tremendous progress during the last decade. All the family members are engaged in one production. But it is not possible that all artisans have the same and equal skill or the skill will be divided equally in all the household members from one generation to others. For this reason the skilled base work is divided among the household members. Small numbers of family members hire more workers whereas large numbers of families did not hire workers. The artisans who sell their products in other markets rather than local mostly use hired laborers for their work substituted and earned more among them. Households who are dealing in the open market have a larger scale of production. They have more labour, more income and more per capita income too. It is a kind of circular relationship. As these families have more income they can use more workers, they can buy improved inputs from the open market. Therefore, their production is more and of better quality. As a result, they can sell their products to the open market at a higher price, so their income is more.

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