

# PRODUCTION PROCESS, PRODUCTIVITY AND PROFITABILITY IN CONCH SHELL CRAFT OF BANKURA AND PASCHIM MEDINIPUR DISTRICTS IN WEST BENGAL

Anamitra Paul\*

## Abstract

*Our analysis based on primary survey of 120 sample households in the two districts of West Bengal, namely Bankura and Paschim Medinipur reveals that there is an admixture of different forms of production organization, namely independent, partially tied and tied units in conch shell craft. Majority of the artisans have been working in their own dwelling-cum-workshops or in workshops owned by them. The whole production process in this industry is indigenous and various stages of works are in general found, each using simple tools, cutting machines or grinder machines. It is employment, work hours, income of proprietor artisan families, monthly wage income per worker significantly vary across the units. The artisans prefer sticking to this art-based work and continue this craft as their primary occupation. Capital intensity, labour productivity, profitability constitute important dynamics of growth of this industry.*

**Keywords:** *Production process, Craft, Wage, Growth*

**JEL Classification:** L60, L68, L70, J31, L25

## Introduction

Conch shell mainly refers to the art of carving ornamental themes, attractive images on natural conch shells found from the ocean bed. Conch shell industry is an ancient folk craft in the country<sup>1</sup>. The sacred<sup>2</sup> conch shell is a fundamental part of Hindu symbolic and religious & social tradition. Even today, almost all Hindus use the conch as a part of their religious practices. In West Bengal, conch shell is mainly used in the custom of the *sankha* worn by married women.

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\*Assistant Teacher, Jhakra High School (H.S.)  
E-mail ID- raju82anamitra@gmail.com

The sites where conch shells are found in large quality are in the South India. The Crafts Council of West Bengal<sup>3</sup> mentioned (1986) that the conch shell industry now spreads exclusively in West Bengal, Assam and Bangladesh, though in the past it was in the Ramnad coast near Pamban and Kathiawar in Gujarat.

According to Directorate of Micro Small and Medium Enterprises<sup>4</sup>, Government of West Bengal, estimated number of artists in shell carving conch shell craft concentration districts include Bankura, Birbhum, Burdwan, Kolkata, Coochbehar, West Dinajpur, Hooghly, Howrah, Paschim Medinipur, Murshidabad, Nadia, Purulia, North 24-Paraganas, South 24-Paraganas, Purba Medinipur.

It is however worthy to note that very limited studies and documentation efforts have been completed in the arena of conch shell craft. Since this conch shell belongs to the industry from the economic, cultural, sociological point of view, it will be pertinent to study the pattern of labour process and capital formation of this craft. The present study attempts to throw light on the conch shell craft.

Sen and Sinha (1961) discuss economic behavior of craftsman and production process of conch shell product of West Bengal and Sikkim. Saraf (1982) observes that shell product of West Bengal is very antique. Chattopadhyaya (1985) discusses religious and social importance of conch shell, production procedure of sankha (conch shell), and diverse kinds of designed on conch shell (bangles) in India. Mandal (2003) reveals that the old-style cutting method is very laborious, done with a distinctive saw with a peculiarity-shaped, heavy, semi-circular blade with a minutely dented sharp edge, without the serrated teeth usual saw. Ranjan & Ranjan (2007) discuss the use pattern of conch shells in Bengali tradition and Conch shell carving procedure by the crafts-men belongs to the *Shankhakar* community. Mandal (2008) notes that over the years the artisans have been carving the image on conch shell replicating the social mythological and chronological expression with the help of the traditional folk facts based on folk knowledge. Dasgupta, Biswas and Mallik (2009) highlight that the shell craft of engraving in Bankura flourished mostly under the support of Malla kings of Bishnupur. Dutta (2011) notes that shell craft is neither unique, nor a new practice in India for creating marvels in decorative yet artistic pieces of utility items.

Thus, the studies on conch shell craft in West Bengal are few in number. Besides, the labour process and socio-economic conditions of conch industry artisans have scarcely been studied. The present work seeks to remedy many of the deficiencies in the existing literature.

There are some reports and editorials published in books, journals, magazines etc., which stressed the fact that the craft survives and serves different sections of the society. Secondary data are collected from different official and internet websites (conch shell work, production process etc. on Google search). For collection of primary data we have adopted the multi-

stage stratified random sampling method. Our sample survey covers two (2) districts namely Bankura and Paschim Medinipur and 60 household units of each selected district, i.e., total 120 household units for study on conch shell industry. Bankura and Paschim Medinipur districts are purposively chosen for the present study due to significant number of conch shell craft units and glorious crafts heritage in these districts.

### **Production process in conch shell industry**

Marx (1867) defines labour process as “human action with a view to the production of use-values, appropriation of natural substances to human requirements; it is the necessary condition for effecting exchange of matter between man and nature”. To him, labour process is not a peculiarity of capitalism; it’s a basic inevitable condition for human existence. Human beings, having imagination, interact with material world in a purposive way so that their imagination is reflected in an object at end of every labour process.

Conch shell industry comprise three types of production organizations - a) independent units, b) partially tied units and c) dependent or tied units. The conch shell artisans slice conch shells with simple tools and make bangles, bracelets etc.

Earlier conch shell work was done by hand with human touch. Nowadays machines are widely used in *Shankha* industry. Although much work is completed within a short time but creativity becomes limited within monotonous format. Sourcing, Cleaning, Shaping and smoothening, Washing, Filing and polishing, Tracing, Cutting, Engraving, Polishing are the steps for making an artistic shankha.

It is observed from Table 1 that the majority of conch shell units (86 per cent of 120 sample units) in sample districts of West Bengal are manufacturing Conch bangle (*sankha*) items. The production of decoration articles like blowing conch, and other by-products of conch shell is the distinctive feature of Bankura (18 per cent of 60 sample units) in West Bengal.

**Table 1 : Number of units according to line of manufacture by type of conch shell products in sample district**

| Districts        | Type of conch shell products   |               |                                  | Number of units |
|------------------|--------------------------------|---------------|----------------------------------|-----------------|
|                  | Conch bangle ( <i>sankha</i> ) | Blowing conch | Other by products of conch shell |                 |
| PaschimMedinipur | 54 (90)                        | 5 (8)         | 1 (2)                            | 60 (100)        |
| Bankura          | 49 (82)                        | 7 (12)        | 4 (6)                            | 60 (100)        |
| Total            | 103 (86)                       | 12 (10)       | 5 (4)                            | 120 (100)       |

*Source:* Field Survey

*Note:* Figures in parentheses indicate the percentage shares

A piece of unbroken conch shell is sold at Rs 200 - Rs 800, Rs 1000. Price of a gunny bag containing 70 to 100 pieces of whole conch shell is Rs 70000/ (Rupees seventy thousand only). Price of unbroken conch shell is dependent on the radius, size and quality. The radius of an unbroken conch shell varies between 2.5 inches and 3.5 inches. From a big conch shell 5 pieces of *Bauti* and 8 pieces of *churisankha* are prepared.

There are diverse types, sizes and quality of *sankha*. Number of *sankha* obtained per whole conch shell differs according to quality and size. It varies between 2 and 6 *cop*/pieces. Average number of pairs of *sankha* obtained<sup>1</sup> per piece unbroken conch shell is 2.92.

Price per pair *sankha* varies between Rs 50 and Rs 700, which depends on size and quality of *sankha*. Table 2 shows the prices of various types of *sankha*. Among different designs of *sankhas* the costly *sankha* is *Sonabandhanosankha*.

**Table 2 : Percentage of different types of *sankha* product from 360 pieces intact conch shell**

| Variety of <i>sankha</i>  | No. of pairs | Percentage of total <i>sankha</i> | Sale value per pair <i>sankha</i> (Rs) |
|---|--------------|-----------------------------------|--|
| <i>Sonabandhanosankha</i>                                       | 116          | 11%                               | 430-700                                |
| <i>Hangurmukhsankha</i>   | 63           | 6 %                               | 410-600                                |
| <i>Mantasankha</i>  | 242          | 23 %                              | 380-400                                |
| <i>Chursankha</i>   | 105          | 10 %                              | 230-250                                |
| <i>Brasetsankha</i>   | 179          | 17 %                              | 220-240                                |
| <i>Minichursankha</i>   | 53           | 5 %                               | 230-250                                |
| <i>SuruSankha</i>   | 95           | 9 %                               | 140-200                                |
| <i>Low quality sankha</i>                                       | 200          | 19 %                              | 50-120                                 |
| Total number of <i>sankha</i> from 360 pieces whole conch shell | 1051         | 100                               |  |

Source: Field Survey

### Household characteristics

#### Sex of owners of conch shell units

Out of 120 units, 95 per cent is predominately owned by males. Female owners account for only 5 per cent of total sample units (Table 3).

**Table 3 : Sex distribution of owners of conch shell industry in sample districts**

| Sample districts  | Male owners | Female owners | Total number of units |
|-------------------|-------------|---------------|-----------------------|
| Paschim Medinipur | 58 (96.67)  | 2 (3.33)      | 60 (100)              |
| Bankura           | 56 (93.33)  | 4 (6.67)      | 60(100)               |
| Total             | 114 (95)    | 6 (5)         | 120 (100)             |

Source: Field Survey

Note: Figures in parentheses indicate the percentage shares

### Caste of conch shell artisans

In West Bengal conch shell cutters originally were Hindus and belong exclusively as *Sankhari* Vaisyas or simply as *Sankharis* or *Sankhakar* community, claim this craft as their traditional occupation. *Sankari* (dealing with conch manufacturing) community artisans who are usually engaged in conch shell works belong to O.B.C.-B category and they constitute 96.10 per cent (Table 4).

**Table 4 : Caste dominance of artisans of conch shell units in sample districts**

| Caste category              | Sample districts  |          | Total number of artisans |
|-----------------------------|-------------------|----------|--------------------------|
|                             | Paschim Medinipur | Bankura  |                          |
| O.B.C.-B( <i>Sankhari</i> ) | 171 (91.94)       | 199(100) | 370 (96.10)              |
| O.B.C.( <i>Kumbhakar</i> )  | 15(8.06)          | 0        | 15 (3.90)                |
| Total                       | 186(100)          | 199(100) | 385 (100)                |

Source: Field Survey

Note: Figures in parentheses indicate the percentage shares

### Level of education of owners

Level of education of owners of sample conch shell units is shown in Table 5. Literacy rate of owners of sample conch shell units is 64.17 per cent.

**Table 5 : Level of education of owners of conch shell units in sample districts**

| District          | Level of education of owners of units |         |           |      |      |                  |                | Any formal training | Total number of owners |
|-------------------|---------------------------------------|---------|-----------|------|------|------------------|----------------|---------------------|------------------------|
|                   | Illiterate                            | Primary | Bellow MP | MP   | HS   | Graduate & above | Total literate |                     |                        |
| Paschim Medinipur | 21                                    | 11      | 18        | 5    | 4    | 1                | 39             | 6                   | 60                     |
| Percentage        | 35                                    | 18      | 30        | 8    | 7    | 2                | 65             | 10                  | 100                    |
| Bankura           | 22                                    | 12      | 20        | 3    | 3    | 0                | 38             | 16                  | 60                     |
| Percentage        | 37                                    | 20      | 33        | 5    | 5    | 0                | 63             | 27                  | 100                    |
| Total             | 43                                    | 23      | 38        | 8    | 7    | 1                | 77             | 22                  | 120                    |
| Percentage        | 35.83                                 | 19.17   | 31.67     | 6.67 | 5.83 | 0.83             | 64.17          | 18.33               | 100                    |

Source: Field Survey

Note: Figures in parentheses indicate the percentage shares

### Years of functioning of units

Duration of conch shell units varies widely by years of functioning. The units are classified into four categories: i) 10 years and below, ii) 11 to 20 years, iii) 21 to 30 years, iv) 31 years and

above. Table 6 indicates that most of the sample conch shell units (50.83 %) in the sample districts are functioning up to 21 to 30 years.

**Table 6 : Distribution of units according to the years of functioning units**

| District          | Years of functioning or duration of conch shell units |                |                |                    | Total number of units |
|-------------------|---|----------------|----------------|--------------------|-----------------------|
|                   | Up to 10 years  | 11 to 20 years | 21 to 30 years | 31 years and above |                       |
| Paschim Medinipur | 4 (6.67)  | 21 (35.00)     | 30 (50.00)     | 5 (8.33)           | 60(100)               |
| Bankura           | 7 (11.67)   | 14 (23.33)     | 31 (51.67)     | 8 (13.33)          | 60(100)               |
| Total             | 11 (9.17)   | 35 (29.17)     | 61 (50.83)     | 13 (10.83)         | 120 (100)             |

Source: Field Survey

Note: Figures in parentheses indicate the percentage shares

### 3. Economic conditions of conch shell artisans and units

#### Employment

Table 7 shows average number of conch shell workers per unit in sample districts. Average number of total workers (including household and hired workers) employed is 3.10 in Paschim Medinipur district and in Bankura district it is 3.32.

**Table 7 : Number of conch workers per unit in sample districts**

| District  | Paschim Medinipur | Bankura |
|---|-------------------|---------|
| Average number of total household workers         | 2.27              | 2.97    |
| Average number of total (household+hired) workers | 3.10              | 3.32    |

Source: Field Survey

Note: Figures in parentheses indicate the percentage shares

Conch shell craft manufacturing is a family profession, in which all the members of the family take an active part including the female members and even children. We now examine the number of the household workers on the basis of gender to know the extent of male-female participation (Table 8). It is observed that number of total workers including household and

**Table 8 : Distribution of household workers by sex in sample districts**

| District          | Number of household workers |             |             | Number of hired workers | Number of workers (household +hired) |
|-------------------|-----------------------------|-------------|-------------|-------------------------|--------------------------------------|
|                   | Male                        | Female      | Total       | Male                    |                                      |
| Paschim Medinipur | 104 (55.91)                 | 32 (17.20)  | 136 (73.12) | 50 (26.88)              | 186 (100)                            |
| Bankura           | 93 (46.73)                  | 85 (42.71)  | 178 (89.45) | 21 (10.55)              | 199 (100)                            |
| Total             | 197 (51.17)                 | 117 (30.39) | 314 (81.56) | 71 (18.44)              | 385 (100)                            |

Source: Field Survey

Note: Figures in parentheses indicate the percentage shares

hired workers of 120 sample household units is 385 which comprise 197 (51.17 per cent) male household workers, 117 (30.39 per cent) female household workers and 71 (18.44 per cent) male hired workers.

Frequency distribution of sample household units in terms of number of workers engaged in sample districts reveals (Table 9) that in conch shell industry 45.83 percent of total 120 sample units employ very small number of workers, ranging between 3 and 5.

**Table 9 : Frequency distribution of sample units by number of persons engaged in sample districts**

| District          | Number of units by workers size |            |            |              | Number of units |
|-------------------|---------------------------------|------------|------------|--------------|-----------------|
|                   | 1 to 2                          | 3 to 5     | 6 to 9     | 10 and above |                 |
| Paschim Medinipur | 23(38.33)                       | 30(50)     | 5(8.33)    | 2(3.33)      | 60(100)         |
| Bankura           | 26(43)                          | 25(42)     | 9(15)      | 0            | 60(100)         |
| Total             | 49 (40.83)                      | 55 (45.83) | 14 (11.67) | 2 (1.67)     | 120 (100)       |

*Source:* Field Survey

*Note:* Figures in parentheses indicate the percentage shares

### Work hours

Percentage share of male and female household workers by per day work hours is shown in Table 10. It is observed that most of the male (24.87 per cent) and female (40.17 per cent) workers work for 8 hours and 4 hours per day respectively.

**Table 10 : Percentage share of male (M) and female (F) conch shell artisans by per day work hours of sample units**

| District          | Male artisans |         |          |          |                  | Female artisans |         |         |              |
|-------------------|---------------|---------|----------|----------|------------------|-----------------|---------|---------|--------------|
|                   | Up to 8 hours | 9 hours | 10 hours | 11 hours | 12 hours & above | Up to 3 hours   | 4 hours | 5 hours | 6 to 8 hours |
| Paschim Medinipur | 16.35         | 17.31   | 25.00    | 21.15    | 20.19            | 9.38            | 46.88   | 31.25   | 12.50        |
| Bankura           | 34.41         | 19.35   | 22.58    | 13.98    | 9.68             | 24.71           | 37.65   | 22.35   | 15.29        |
| Total             | 24.87         | 18.27   | 23.86    | 17.77    | 15.23            | 20.51           | 40.17   | 24.79   | 14.53        |

*Source:* Field Survey

*Note:* Figures in parentheses indicate the percentage shares

Per day average work hours by per male household worker are 11.37 and by male hired worker 11.10 hours. Average working days per month per household unit are 27.29. Per day number of man-days by total workers (including household & hired) per unit are 3.96 (Table 11).

### Man-day

Conventionally eight hour working is treated as one man-day in the rural industrial work. They

**Table 11 : Mean of work hours, working day per month, and per day number of man-days per unit in sample districts**

| District  | Paschim Medinipur | Bankura | Total |
|---|-------------------|---------|-------|
| Per day work hours of male household worker                     | 11.43             | 11.30   | 11.37 |
| Per day work hours of male hired worker                         | 11.13             | 11.07   | 11.10 |
| Working day per month   | 26.52             | 28.05   | 27.29 |
| Per day number of man-days by total workers (hired & household) | 4.06              | 3.86    | 3.96  |

Source: Field Survey

Note: Figures in parentheses indicate the percentage shares

work on an average 11 to 14 hours during the peak season and 8 to 11 hours in the slack season. Table 12 depicts per worker daily man-day in sample districts. The size distribution of units by per worker daily man-day shows that 54 percent of total 120 sample units have daily man-day varying between 1.26 and 1.50 followed by those between 1.01 and 1.25 daily man-day (41 percent).

**Table 12 : Distribution of household units by per worker daily man-days in sample districts**

| No. of units/<br>District | Per workers daily man-days |           |           |           | Number<br>of units |
|---------------------------|----------------------------|-----------|-----------|-----------|--------------------|
|                           | 1                          | 1.01-1.25 | 1.26-1.50 | 1.51-1.65 |                    |
| Paschim Medinipur         | 0                          | 23(38)    | 36(60)    | 1(2)      | 60 (100)           |
| Bankura                   | 0                          | 26(43)    | 29(48)    | 5(8)      | 60(100)            |
| Total                     | 0                          | 49 (41)   | 65 (54)   | 6 (5)     | 120 (100)          |

Source: Field Survey

Note: Figures in parentheses indicate the percentage shares

### Production

Value of output per unit of production (pair of sankha) varies significantly across different types of production organizations. Table 13 shows that value of output (Vo) per unit of production (pair of sankha) across independent organization is highest in Bankura district (Rs 220) and in Paschim Medinipur district (Rs 217). The coefficients of variation of value of output from per unit of production (pair of sankha) of independent units are higher than those of tied units and partially tied units in all sample units.

Value added (Va) equals to value of output minus raw material costs. Average value added per unit of production (pair of *sankha*) of independent units is higher (Rs51.80) in Paschim Medinipur district. The coefficients of variation of value of output and value added per unit of production (pair of *sankha*) of independent units are higher than those of tied units and partially tied units in all sample units.



**Table 13 : Value of output and Value added (Va) per unit of production (pair of sankha) across organization in sample districts (Amount in Rs)**

| District/<br>Organization | Value of output   |          |         |          | Value added       |          |         |          |
|---------------------------|-------------------|----------|---------|----------|-------------------|----------|---------|----------|
|                           | Paschim Medinipur |          | Bankura |          | Paschim Medinipur |          | Bankura |          |
|                           | Mean              | C.V. (%) | Mean    | C.V. (%) | Mean              | C.V. (%) | Mean    | C.V. (%) |
| Independent               | 217               | 5.59     | 220     | 5.47     | 51.80             | 7.17     | 50.51   | 6.41     |
| Partially Tied            | 183               | 4.30     | 185     | 4.20     | 38.48             | 5.78     | 38.70   | 5.94     |
| Tied                      | 111               | 2.59     | 107     | 2.60     | 19.80             | 4.40     | 20.20   | 4.69     |

Source: Field Survey

### Productivity

Productivity is a crucial factor in production performance in conch shell industry. Productivity is an average measure of the efficiency of production. It can be expressed as the ratio of output to inputs used in the production process, i.e., output per unit of input.

The coefficients of variation and mean value of output per unit of total capital, value added per unit of fixed capital and value added per unit of total capital are seen to be higher in independent units than are in tied and partially tied ones (Table 14)

**Table 14 : Capital use efficiency across production organization in sample districts (Value in Rs)**

| District/<br>Organization | Value of output (Vo) / Total capital (Tk) [Vo/Tk] |          |         |          | Value added (Va) / Fixed capital (Fk) [Va/Fk] |          |         |          | Value added (Va) / Total capital (Tk) [Va/Tk] |          |         |          |
|---------------------------|---|----------|---------|----------|---|----------|---------|----------|---|----------|---------|----------|
|                           | PaschimMedinipur                                  |          | Bankura |          | PaschimMedinipur                              |          | Bankura |          | PaschimMedinipur                              |          | Bankura |          |
|                           | Mean  | C.V. (%) | Mean    | C.V. (%) | Mean  | C.V. (%) | Mean    | C.V. (%) | Mean  | C.V. (%) | Mean    | C.V. (%) |
| Independent               | 0.81  | 4.26     | 0.80    | 4.40     | 9.18  | 6.90     | 9.11    | 6.62     | 0.19  | 10.24    | 0.18    | 10.58    |
| Partially Tied            | 0.78  | 3.41     | 0.78    | 3.65     | 8.52  | 7.39     | 8.51    | 7.25     | 0.16  | 8.95     | 0.16    | 8.27     |
| Tied                      | 0.76  | 2.97     | 0.76    | 2.61     | 8.25  | 6.86     | 8.26    | 7.07     | 0.14  | 7.85     | 0.14    | 7.90     |

Source: Field Survey

### Labour productivity

Productivity of labour may be seen in two ways: i) value of output (Vo) per manday (M), and ii) value added (Va) per man-day (M). We measure labor productivity by value added (Va) per unit of wage (W) earned by artisan [Va/W] since wage represents labour. The average value added (Va) per unit of wage (W) earned by artisan is seen to be higher in independent units (2.90) than that in partially tied (2.60) in Paschim Medinipur district (Table 15). The coefficients of variation of independent units are higher than those of tied units and partially tied units in all sample units.

**Table 15 : Labour productivity [value added (Va) per unit of wage (W) earned by artisan (Va /W)] per unit across organization in sample districts (Amount in Rs)**

| District/<br>Organization | Paschim Medinipur |         | Bankura |         |
|---------------------------|-------------------|---------|---------|---------|
|                           | Mean              | C.V.(%) | Mean    | C.V.(%) |
| Independent               | 2.90              | 5.44    | 2.37    | 4.87    |
| Partially Tied            | 2.60              | 4.07    | 2.02    | 3.94    |
| Tied                      | 1.56              | 2.81    | 1.59    | 2.76    |

Source: Field Survey

**Table 16 : Test for differences in economic performance in independent, partially tied and tied units**

| Variables  | Organization   | df  | t Stat | F     |
|--|----------------|-----|--------|-------|
| Mandays per worker (M)   | Independent    | 123 | 1.52*  | 0.711 |
|  | Partially Tied |     |        |       |
|  | Independent    | 127 | -1.54* | 0.503 |
|  | Tied           |     |        |       |
| Labour productivity in terms of value added per unit of wage (W) earned by artisan (Va /W) | Independent    | 163 | 22.15* | 2.344 |
|  | Partially Tied |     |        |       |
|  | Independent    | 127 | 53.02* | 7.823 |
|  | Tied           |     |        |       |
| Value of output per unit of total capital (Vo/Tk)  | Independent    | 126 | 5.90*  | 0.664 |
|  | Partially Tied |     |        |       |
|  | Independent    | 127 | 7.94*  | 0.486 |
|  | Tied           |     |        |       |
| Value of added per unit of total capital (Va/Tk)   | Independent    | 163 | 8.97*  | 1.482 |
|  | Partially Tied |     |        |       |
|  | Independent    | 127 | 17.02* | 1.340 |
|  | Tied           |     |        |       |
| Value of added per unit of fixed capital (Va/Fk)   | Independent    | 108 | 6.51*  | 0.936 |
|  | Partially Tied |     |        |       |
|  | Independent    | 127 | 8.20*  | 1.284 |
|  | Tied           |     |        |       |

Source: Field Survey

Notes: Number of observations of independent units, partially tied units and tied units are respectively 21, 68 and 31.

\* implies significance at 1 per cent level

We have so far discussed employment, production and labour productivity differentials across organizations in conch shell industry. To check whether these differences are statistically significant, t-test is used. The comparison of estimated values of t-ratio with table value indicates that differences are significant in respect of each of those dependent variables between the independent, partially tied and tied units (Table 16). It implies that the pattern of production organization plays a significant role in employment, productivity, etc., in these units.

#### *Factors explaining production and productivity differences*

We now set out to explain the difference in the levels of output in the conch shell industry by identifying the factors that account for this difference and assess the relative importance of these factors. Multiple regression analysis is used for this purpose. The model that is developed for this purpose is of the following type:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + U$$

where, Y is the dependent variable and  $X_1, X_2$  are independent variables and U is the disturbance term that satisfies all the assumptions of classical linear regression model. The results of the linear regression models fitted to the conch shell industry output data for the sample units are shown in Table 17. Value of output ( $V_o$ ) are related to man-days per worker (M), total capital (Tk), fixed capital (Fk) and dummy variable (assuming a value 1 for independent units and 0 for non-independent units).

Our analysis based on these results reveals that variations in output are significantly explained by M, Tk, Fk and dummy (which stands for production organization) variables. From this analysis one may infer that an increase in output can be brought about mainly by increasing capital input, and intensity of work (M) given the type of production organization.

**Table 17 : Estimated linear regression equations in conch shell industry**

| Regression Equations  | R Square | Adjusted R Square | F         | Significance |
|---|----------|-------------------|-----------|--------------|
| $V_o = -107557.94 + 15.40*M + .77*Tk + 381537.69*D$<br>(-2.27) (2.04) (124.36) (6.41) | .998     | .998              | 35713.61  | .000         |
| $V_o = -7640.53 + 5.00*M + 40.02*Fk - 181356.59*D$<br>(-.51) (2.09) (396.92) (-9.37)  | .997     | .997              | 359606.57 | .000         |

*Source:* Field Survey

*Notes-*  $V_o$  = Value of output (in Rs); M = Man-days per worker; Tk = Total capital (in Rs); Fk = Fixed capital (in Rs); D = Dummy variable ( 1 for independent units and 0 for non tied units).

\* = Imply significance at 1 percent level.

Rate of profit<sup>1</sup> for *sankha* production across organizations of sample districts is depicted in Table 18. Rate of profit is highest among independent units (9.10 %) in Paschim Medinipur district.

**Table 18 : Rate of profit for *sankha* production and Net profit (NP)per unit of production (pair of *sankha*) across organizationin sample districts**

| District/<br>Organization | Rate of profit (in %) |         |         |         | Net profit (Amount in Rs) |         |         |         |
|---------------------------|-----------------------|---------|---------|---------|---------------------------|---------|---------|---------|
|                           | Paschim<br>Medinipur  |         | Bankura |         | Paschim<br>Medinipur      |         | Bankura |         |
|                           | Mean                  | C.V.(%) | Mean    | C.V.(%) | Mean                      | C.V.(%) | Mean    | C.V.(%) |
| Independent               | 9.10                  | 17.84   | 8.85    | 16.64   | 18.73                     | 16.91   | 18.57   | 15.44   |
| Partially Tied            | 6.25                  | 19.46   | 6.29    | 19.08   | 10.71                     | 17.72   | 10.78   | 17.54   |
| Tied                      | 2.53                  | 19.54   | 3.00    | 19.47   | 2.71                      | 18.30   | 2.90    | 18.35   |

Source: Field Survey

Net profit is measured by total revenue minus the total cost (including all types of paid-out cost and imputed cost for unpaid family labour & imputed interest on own capital). Net profit per unit of production (pair of *sankha*) is highest (Rs18.73) among independent units, it is only Rs2.53per pair of *sankha* for tied unit in Paschim Medinipur district.

To examine profitability two indicators are considered. These are: i) ratio of net profit to value of production or value of output, ii) ratio of net profit to total capital investment. Net profit margin is a ratio of profitability calculated as net income (net profits) divided by sales (revenue). It shows the amount of each sale rupees left over after all expenses have been paid. A higher net profit margin means that a unit is more efficient at converting sales into actual profit. Profitability in independent units is significantly higher than that in tied and partially tied units. Profitability in sample conch shell units across organizations is shows from Table 19.

**Table 19 : Profitability in sample conch shell units across organizationsin sample districts**

| District/<br>Organization | Net profit margin <sup>7</sup> (NP /V <sub>0</sub> )<br>(in per cent) |             |         |             | Net profit /total capital (NP/Tk)<br>(in per cent) |             |         |             | Net profit /fixed capital<br>(NP/Fk) (in Rs) |             |         |             |
|---------------------------|---|-------------|---------|-------------|--|-------------|---------|-------------|--|-------------|---------|-------------|
|                           | Paschim<br>Medinipur  |             | Bankura |             | Paschim<br>Medinipur                               |             | Bankura |             | Paschim<br>Medinipur                         |             | Bankura |             |
|                           | Mean  | C.V.<br>(%) | Mean    | C.V.<br>(%) | Mean   | C.V.<br>(%) | Mean    | C.V.<br>(%) | Mean   | C.V.<br>(%) | Mean    | C.V.<br>(%) |
| Independent               | 8.56  | 16.59       | 8.43    | 15.53       | 6.87   | 18.31       | 6.74    | 16.95       | 3.39   | 17          | 3.35    | 16          |
| Partially Tied            | 5.87  | 18.53       | 5.91    | 18.18       | 4.48   | 18.93       | 4.59    | 18.71       | 2.35   | 19          | 2.38    | 19          |
| Tied                      | 2.46  | 19.03       | 2.49    | 18.96       | 1.70   | 20.57       | 1.90    | 20.63       | 1.12   | 19          | 1.13    | 19          |

Source: Field Survey

### Income of proprietor artisan families

Table 20 shows that the conch shell industry accounts for the principal source of earning for 96.88 per cent of conch shell units household income, while other source as subsidiary occupation (agriculture & allied) accounts for 3.01 per cent and service sector 0.11 per cent.

**Table 20 : Percentage share of different sources of total household income of conch shell units in sample districts**

| District          | Percentage share of different source of total household income |                             |                |       |
|-------------------|--|-----------------------------|----------------|-------|
|                   | Conch shell industry   | Agriculture & allied sector | Service sector | Total |
| Paschim Medinipur | 96.51  | 3.27                        | 0.22           | 100   |
| Bankura           | 97.25  | 2.75                        | 0              | 100   |
| Total             | 96.88  | 3.01                        | 0.11           | 100   |

Source: Field Survey

### Monthly per capita income

It is observed that 36.67 per cent of the proprietor artisan families in Paschim Medinipur district belong to the per capita income class of Rs 4501 to Rs 8500, while 45 per cent of the proprietor artisan families in Bankura district belong to the per capita income class of Rs. 600 to Rs. 2500 (Table 21).

**Table 21 : Percentage distribution of proprietor artisan families by per capita income**

| District          | Per capita income of proprietor artisan families (Rs) |             |             |              |               | Total    |
|-------------------|---|-------------|-------------|--------------|---------------|----------|
|                   | 600-2,500   | 2,501-4,500 | 4,501-8,500 | 8,501-14,500 | 14,501-25,000 |          |
| Paschim Medinipur | 8.33  | 26.67       | 36.67       | 21.67        | 6.67          | 100 (60) |
| Bankura           | 45.00   | 36.67       | 18.33       | 0.00         | 0.00          | 100 (60) |

Source: Field Survey

Note: Figures in parenthesis indicate total number of household units.

### Monthly wage income per worker

In Paschim Medinipur district around 45 per cent of the total workers derive monthly income of Rs. 9000 to Rs. 11999 from the industry while around 57 per cent and 24 per cent of the total workers respectively in Bankura district derive monthly income of Rs. 4000 to Rs. 6999 and Rs. 9000 to Rs. 11999 (Table 22).

**Table 22 : Percentage distribution of total workers by wage income group**

| No. of workers/<br>District | Monthly wage income per worker (Rs.) |           |            | Total workers<br>(household +hired) |
|-----------------------------|--------------------------------------|-----------|------------|-------------------------------------|
|                             | 4000-6999                            | 7000-8999 | 9000-11999 |                                     |
| Paschim Medinipur           | 20                                   | 35        | 45         | 100 (186)                           |
| Bankura                     | 57                                   | 19        | 24         | 100 (199)                           |

Source: Field Survey

Note: Figures in parenthesis indicate total number of workers (household +hired).

### **Policy implications**

The conch shell industry under our revision reveals that it has a virtuous future. There is ample inland and external demand. The industry suffers from definite limitations such as lack of secure stream of raw material and capital and lack of motivations and poor managerial organization. The simple policy would encompass not only elimination of the above limitations but also structural restructuring in the development of labour and capital and product modification encouraging its outlook in the local and the extra-local market. Product variation could develop market demand which is again reliant on upon dexterity upgradation of labour.

### **Conclusions**

Conch shell units are predominately owned by males. Castes of conch shell artisans are known as *Sankharis* or *Sankhakar* community. Work experience of artisans is found in this industry to be more over 40 Years. Most of the male and female workers per day work for 10 hours and 7 hours respectively.

Capital intensity, labour productivity, profitability constitute important dynamics of growth conch shell industry across production organization. The values of these parameters significantly vary across the forms of production organization. Independent units show higher values than the tied and partially tied units. Results from regression indicate that variations in conch shell output are significantly explained by capital and man-days of employment and the type of production organization has also significant influence on output.

Profitability of the independent units is significantly higher than that of tied and partially tied units. Net profit is also significantly higher in independent units than that in tied ones.

The existing effort undergoes from various confines. A comprehensive study on the earnings of conch shell craftsman, about sources of raw materials, demand pattern of conch shell products and consumer attitude especially women's preference for conch shell products specially '*Sankha*' could be in future.

### **End Notes:**

1. <http://www.indianexpress.com/news/1500yearold-conch-shell-intrigues-historians/1086692/#sthash.I0wxEoxg.dpuf>
2. <http://www.religiousportal.com/SacredShankha.html> viewed as Sacred Shankha (Conch Shell)
3. Mahamaya, '*The Crafts and Craftsmen of Eastern India*', published by The Crafts Council of West Bengal, 1985-86, p111
4. <http://www.mssewb.gov.i>

5. In Bankura district *sankha* is produced from intact conch shell, side by side from *Lejpata* which is a part of intact conch shell. The owners of conch shell units of Bankura district collect this *Lejpata* from those districts. Average number of pairs of *sankha* obtained per piece *Lejpata* is 1.41.
6. Rate of profit = [(Value of output - Total cost) / Total cost] \* 10
7. Net profit margin = net profit / total revenue or value of output

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