Handloom Industry of Dhemaji District of Assam: A Study about Input Using Pattern and Factor Contribution to Production

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Abstract

Handloom industry has been playing a significant role in social linkage and rural urban technology in Indian economy since time immemorial. It is an ancient household cottage industry providing second largest employment opportunity next to agriculture. It is also playing a vital role in Assam economy also by providing employment opportunity and source of livelihood. The present study has been done on handloom industry of Dhemaji districts of Assam by considering one household as one unit of production tried to observe the inputs using pattern and factor contribution to production. In the study area yarn, man power and loom are found major inputs of production and there are two types of looms i.e., throw shuttle and fly shuttle are found. To see the factor contribution to total product Cobb-Douglas production function are done separately in case of both fly shuttle and throw shuttle industry. The study found man days and yarn expenditure are significant in throw shuttle industry and in fly shuttle all three factors of production i.e., loom expenditure, man days and expenditure of yarn are found significant. To find out the result the study also used statistical tools of average, percentage etc.

Key words: Handloom industry, Input Using Pattern, Factor Contribution, Dhemaji, Assam etc.

1.0 Introduction: Handloom industry has been playing a significant role in Indian economy since time immemorial in the rural urban technology and social linkage. Handloom is a part of our culture and heritage and it is the second largest economic activity having the capacity of absorbing large number of workers after agriculture. In India, handloom sector provides direct employment to more than 65 lakhs person in 2009-10 and 60.40% of them are women. In the country, this sector contributes nearly 19% of total cloths produced and adds to export earning substantially. In 2009-10, the ratio handloom to power loom in terms of cloths production was 1:5.55. In India 38.56% looms are commercial looms of total looms own while majority of them were domestic looms i.e., 61.44%. Among the looms of working order 59.10% looms were domestic looms and rest were used in commercial purpose. Moreover, 47.51% of total wearers were fulltime weaver out of which 60% work

independently, 18% under master weavers and 15% in cooperatives societies and the rest under private owners, khadi and village industries. On the other hand household of weavers were found to work for 197 days in years.

The repository of handloom skills is concentrated in North Eastern Region of India where together account for 16.86 lakhs of total 27.83 lakhs unit involve in the country. Handloom households account for Assam alone is 12.41 lakh (44.46%), where as Tripura and Manipur 1.21 lakh (4.3%) and 1.79 lakh (6.4%). However, in North East region of India only 13.4 % commercial loom of the country and contribution of them to total fabrics production of the country is merely 20%. In this profession, 1403484 weavers were found engaged in 2009-10.

In socio-economic life of Assam handloom weaving has an overwhelming presence since time immemorial. In the state, loom is a prizes possession and has a way of life. As one of the largest and oldest industry, it is also known equally because of it unequal charm and pristine simplicity. The weaving technique handed down over generation and illusions are available in Assamese scriptures and literature. Handloom industry of Assam basically silk oriented. The salutiferous climate of Assam is favourable for sericigenous flora and fauna. Most prestigious and prominent being muga, the golden silk. The silk of muga is not only beautiful and sensuous but also durable and strong.

2.0 Literature Review: Rao and Nagargu 2012) pointed out in an article entitle "A Critique on the Promotion of Handloom Industry" that government deserves all appreciation for designing the schemes of yarn supply at mill gate price but supply is short of requirements. Moreover the yarn supply cost through the scheme is much higher than the prevailing market price. Author pointed out that insurance scheme are appear to be holly stick but still there are large number of weavers yet to be cover and benefited.

Bortamuly, Goswami and Hazarika (2012), in their article entitle "Determinants of occupational choice of workers in the handloom industry in Assam" found that Education, Income, family size and access to modern education are the significant variables which help in transforming reelers to owners. Similarly education, access to formal credit and annual income are the significant factors which help the reelers to transformed handloom weavers. But authors confess that there is a limitation of the work. They considered only a few variables related to socio-demographic and economic issues.

While discussing about the different development schemes for socio-economic development implemented by the government, semi-government and other supporting agency in Jammu and Kashmir such as handloom and handicraft, agriculture, Sehgaland Mir (2014) found that though Kisan Credit Card (KKC) in first insurance took a gradual increase, but the achievement level decrease later. As far as handloom sector is concern, development schemes for handloom are shown an up down phenomenon. It was analysis in the beginning implemented schemes of handicraft sector did not show much improvement, but later achievement graft started rising rapidly.

In regards the problems of handloom weavers of Assam, Baruah and Kour (2015) in his study "A Study on Economics of Weavers' Cooperative Societies of Assam" concluded that the handloom sector is assaulted by many problems such as obsolete technology, unorganised production system, low productivity, inadequate working capital, overall stagnation of sales and production, weak marketing link, conventional product rang, above all competition from power looms and mill sector.

A study on "Problems of handloom weavers in Andhra Pradesh: A study of Krishna district." By Rao and Srudhar (2017) found that the study area is full problems such as financial problems, production problems, problems of machineries which decrease productivity, problems of marketing and health of weavers etc. Financial problems of weavers are most crucial one among all.

3.0 Objectives:

1. To study about the inputs using nature of handloom industry in the study area.
2. To examine the contribution of major inputs of handloom industry to total production in the study area.

4.0 Research Question:

Is there any significance influence of inputs on total production of handloom industry in the study area?

5.0 Methodology: The study is based on basically primary data. For the study purpose Dhemaji district of Assam has been selected, because it is with highest handloom workers among the all district of upper Assam in 2009-10. From the six sub-districts of Dhemaji district two are selected purposively i.e., Machkhowa and Sisiborgaon. Again from each sub-district two villages are selected and from each village 10% households are selected from total handloom worker households and total sample households are 148. Periods of data collection was 2017-18. As per the needs of study secondary data is also used which is collected from the Handloom Census Report 2009-10, Statistical Handbook of Assam, Superintendent of Handloom, Dhemaji District etc. For analysis of data statistical tools such as mean, percentage, Cobb-Doulas production function are used.

6.0 Analysis and Interpretation: Dhemaji is a backward district of Assam having low per capita income (Rs 17568) as compared to the state. Agriculture is a major source of livelihood for the population of the district. In the district development of industry is grass root levels and annual flood is crucial problems for the people of the district. At this juncture handloom sectors plays an important role as a source of livelihoods along with fulfil the household's requirement of cloths. For some households handloom is a primary source of livelihoods. In Dhemaji district, there are total six handloom demonstration circle which includes 669 village and total part time weavers in the districts is 88,738 and numbers of full time weavers are 1000 (Statistical Handbook of Assam 2016-17). The handloom and Textile department of Assam has two training centre of Handloom in Dhemaji district in which total trained weavers is 25 in 2016-17, and there are 4 weavers

extension service units where 1600 meter clothes produce in a day. There is also one handloom production centre where 135 meter clothes are produced per day in the same year.

6.1 Loom Use Pattern: In the study area, basically two type of loom are found - Throw shuttle and Fly shuttle. In throw shuttle loom, shuttle are thrown across the loom manually and fly shuttle loom is an improve type of loom in which shuttle is thrown by a mechanical picker. Following table-1, shows the use of looms in the study area.

Table 1: Loom use pattern of the study area.

Loom Pattern	No. of Households	Loom no.	Average loom
Fly shuttle	39 (26.35)	71 (33.49)	1.82
Throw loom	109 (73.65)	141 (66.51)	1.29
Total	148	212	1.56
Figures in parenthesis represent percentage			

Source: Field Survey.

The above table-1, shows that 39 household posses 71 Fly shuttle looms which is the 33.39 percent of total looms in the study area and 109 households posses 141 numbers of Throw shuttle looms which is 66.51 percent of total looms use in the study area. The average numbers of Fly shuttle loom is 1.82 and Throw shuttle looms is 1.29 percent.

6.2 Use of Gender Wise Family Member: Handloom industry is a household cottage industry and activities are done by basically family members. Though the other part of India in which females do the pre weaving and post weaving activities and males are performed the weaving activities, but in NER of India and Assam the picture is different where majority of Handloom worker are female. The picture is depicted by the study is also not exception from the existing picture which is shown by following table-2:

Table-2: Family member engage in Handloom

Sub-District	Male (above 18 years)	Female (above 18 years)	Female (below 18 years)	Total
Machkhowa	36 (36.36)	57 (56.57)	6 (6.06)	99 (45.83)
Sissiborgaon	0	106 (91.38)	10 (8.62)	116 (77.21)
Total	36 (16.74)	163 (75.81)	16 (7.44)	215 (100)
Figures in parenthesis represent the percentage				

Source: Field Survey

The table-2, shows that only in Machkhowa sub-districts male members are engaged in handloom industry which is 36.36% of total family members involve in handloom related

activities and percentage of females above 18 years in Machkhowa sub-districts is 56.57% and females below 18 years is 6.06%. In Sissiborgaon percentage females above 18 years is 91.38% and females below 18 years is 8.62%. No male members are found in Sissiborgaon related with handloom activities.

6.3 Use of hired labour: Though handloom household unit used family members in production process, but some unit are found using hired labour in the study area. Labour are paid on contract basis i.e., they get the remuneration on basis of unit they produce and it will vary in case of different product. In the following table-3, shows that only limited numbers of households are found using hired labour. Only Fly shuttle handloom owner use hired labour and the percentage of households is just 28.21% of total Fly shuttle handloom households and the rest 71.795 Fly shuttle owner do not use the hired labour. On the other hand no Throw shuttle owner households are found using hired labour.

Table-3: Use of hired labour in study area

Type of Industry	Use of hired labour		Total
	Yes	No	
Fly shuttle	11 (28.21)	28 (71.79)	39
Throw Shuttle	0	109 (100)	109
Total	11	137	148

Source: Field Survey.

6.4 Source of Yarn: In the study area yarn is the major input of production and without yarn no handloom production can be done. This study was trying to find out major source of yarn for handloom producer. It is found that 61.49 percent household buy yarn from open market and 33.78 percent household buy yarn from master weavers and only 4.73 percent household buy yarn from traders. In Machkhowa sub-district maximum households buy yarn from master weavers which are 73.44 percent and in Sissiborgaon majority of them buy yarn from open market which is 94.05 percent of total households in this area. Following table-4 shows the picture:

Table-4: Source of Yarn in the study area.

Sub-district	Open market	Master Weaver	Trader	Total
Machkhowa	12 (18.75)	47 73.44	5 (7.81)	64
Sissiborgaon	79 (94.05)	3 (3.57)	2 (3.38)	84
Total	91 (61.49)	50 (33.78)	7 (4.73)	148 (100)
Figures in parenthesis represents the percentage share				

Source: Field Survey

6.5 Factor contribution to total production: In this study to find out factor contribution to total production of handloom industry in the study area Cobb-Douglas production function is used. To run the production function three major inputs of production i.e., expenditure on looms, yarn expenditure and labour man days are regarded as independent variable and gross values of production is used as a dependent variable. In the present study one household is regarded as one unit and production function is done by considering Fly shuttle and Throw shuttle separately. In the study C-D production function can be written as:

$$Y_i = AX_1^{\beta 1} X_2^{\beta 2} X_3^{\beta 3} e^u \dots\dots\dots(1)$$

Where,

Y_i = Gross Production

X_1 = Expenditure on Loom

X_2 = Labor in man days

X_3 = Expenditure on Yarn

B_1, B_2, β_3 = The parameters to be estimated

The above production function is non-linear in nature. We can convert it to linear production function by taking log form of the function as belows:

$$\ln Y_i = \ln A + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + U\dots\dots\dots(2)$$

Now the above production function becomes linear one.

6.5.1 C-D production function for Fly shuttle Handloom Industry: The household using Fly shuttle for production is regarded as Fly shuttle handloom industry. The estimated production function for Fly shuttle handloom industry is shown by the following table-5:

Table-5: Result of C-D function for Fly shuttle handloom industry

Repressors	Co-efficient	t-score
Constant	2.28	2.76
Loom exp(β_1)	0.16	1.67*
MD (β_2)	0.78	6.16***
Yarn exp (β_3)	0.34	3.78***

$R^2 = 75$ Adjusted $R^2 = 77$

$N = 39$

***Significant at 1 percent level

*Significant at 10 percent level

The above table-5, shows that β_1=0.16 and it is significant at 10 percent level of significance implying that holding other input constant, one percent increase in expenditure on loom can increase on an average 0.16% of total output. Similarly β_2=0.78 and β_3= 0.34 which are significant at 1 percent level of significance implying that holding other input constant one percent change in man days can increase on an average 0.78 percent of total output and change in expenditure on yarn can increase on an average 0.34 percent of total output. R^2=75 implies that 75 percent of output variation can be explain by the all three repressors.

6.5.2 C-D production function for Throw shuttle Handloom Industry: Similarly household using Throw shuttle for production is regarded as Throw shuttle handloom industry. The estimated production function for Fly shuttle handloom industry is shown by the following table-6:

Table-6: Result of C-D function for Throw shuttle handloom industry

Repressors	Co-efficient	t-score
Constant	1.56	2.02
Loom exp(β_1)	0.02	0.21
MD(β_2)	0.29	2.14***
Yarn exp(β_3)	0.74	10.7***

$R^2 = 70$ Adjusted $R^2 = 68$

N = 109

***Significant at 1 percent level

From the above table it is found that β_1 is insignificant, which implies that change in loom expenditure on throw shuttle industry has no any significant influence on change output. $\beta_2 = 0.29$ and it is significant at one percent level of significance implying that holding other input constant, one percent increase in man days can increase on an average 0.29 percent of total output.. Similarly $\beta_3 = 0.74$, and it is also significant at one percent level of significance. $R^2 = 70$ implies that 70% output variation can be explain by the three repressors.

6.6 Return to Scale of Handloom Industry: Return to scale arises in terms of firm's production function which denotes the output changing behavior due to change in input in the long run. In the long run all factors of production are variable and it is subject to change because of change in given size of production. To find out the return to scale in the present study one size t-test is adopted on the parameters which is discussed as follows in case of both fly shuttle and Throw shuttle handloom industry.

6.6.1 Return to Scale for Fly shuttle industry: To see whether fly shuttle handloom industry exhibits constant, increasing or decreasing return to scale, on the parameters of above C-D production one side t-test is adopted. The hypothesis for the test is:

- Null Hypothesis: $H_0: \sum_{i=1}^{n} bi = 1$
- Alternative hypothesis $H_A : \sum_{i=1}^{n} bi > 1$
  The formula for conducted the test such as
$$^t\sum_{i=1}^{n} = \frac{b_1+b_2+b_3}{S.E.(b_1+b_2+b_3)}$$

Where the standard error of $b_1+b_2+b_3$ computed as

$$S.E\ (b_1+b_2+b_3) = \sqrt{Var\ b_1 + Var\ b_2 + Var\ b_3 + 2\ Cov(\ b_1\ b_2) + 2\ Cov(\ b_1\ b_3) + 2\ Cov(\ b_2\ b_3)}$$

By applying the above formula t-score is generated for fly shuttle handloom industry is 6.99 which is higher than the tabulated value 3.31 at 1% level of significance. Therefore the

alternative hypothesis accepted and null hypothesis is rejected. This implies fly shuttle handloom industry exhibits increasing return to scale.

6.6.2 Return to Scale for Throw Shuttle industry: Similarly, to check the return to scale for throw shuttle handloom industry again one side t-test is adopted for the parameters of above C-D production function for throw shuttle handloom industry. The hypotheses for the test are:

- Null Hypothesis: H_0: $\sum_{i=1}^{n} bi = 1$
- Alternative hypothesis H_A : $\sum_{i=1}^{n} bi > 1$

Again by applying the above formula t-score is generated for fly shuttle handloom industry are 2.86 which are higher than the tabulated value 2.61 at 1% level of significance. Therefore the alternative hypothesis is accepted and null hypothesis is rejected. This implies fly shuttle handloom industry exhibits increasing return to scale.

7.0 Conclusion: The handloom industry plays a significant role by absorbing unemployed people and providing source of livelihood to the people of the district. For some people this sector becomes the primary source of occupation. But in spite of having different government schemes, benefit received by the weaver section is limited. Moreover, limited marketing opportunity, weak organization, financial problems of weavers, old technology etc., are the major problems for the development of the sectors. So the concentration of the government authority is necessary to boost the sector stronger one.

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