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Income generation through agricultural and sericulture crops at farmers' level in two major districts of West Bengal: A Comparative study

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ABSTRACT

In India, Sericulture is generally practiced by small land holders and provides direct employment to numerous people. In one hectare of mulberry cultivation as many as 13 persons are engaged throughout the year in various activities of Sericulture viz, mulberry cultivation, silkworm rearing, silk reeling, silk weaving etc. Even the landless labourers can grow mulberry to feed the silkworms by collecting mulberry leaves from the roadside trees, open fields, backyards etc. and produce cocoons but the case with agricultural crop is different. Nadia and Birbhum are two major traditional districts for Sericulture practice. With respect to income generation, sericulture has been found to provide more income than others. In present study, we have made a comparative analysis of sericulture and agriculture incomes between two major districts of West Bengal i.e Nadia and Birbhum. Comparison was done on the income generated through paddy, wheat and mustard vs sericulture. Our survey report found that sericulture produce was significant and the figures were approximately Rs.90000/acre/year in comparison Rs 15000/- for paddy; Rs 9000/- for Mustard and Rs. 5000/- for wheat. Sericulture being the cash crop was found to be more profitable compared to agricultural produce in the region.

Introduction

Sericulture plays an essential role towards rural economy. This agro-based cottage industry in India has made its stride with the five year plan period since 1950s. Datta et al (1988) suggested various reasons behind the success of Sericulture. It being the labour intensive, avocation, eases the unemployment problem and it could be undertaken by the whole family. The state of West Bengal is having about 53911 acre of land under cultivation, of which, 26533 acre of land are cultivated with high yielding mulberry varieties such as S-1, S-1635, BC-259 etc. Sericulture is practiced in about 1625 villages and 4.01 lacks people are employed in this industry (Annual Report, Govt. of West Bengal, 2011-2012). One hectare of Sericulture land can create remunerative employment of 13 persons per year (Datta and Ravikumar, 1988), so this enterprise has been found to suit well in rural area where unemployment is a big concern. Jolly (1988) demonstrated that Sericulture is successfully practiced as viable rural industry because of two reasons. Firstly, it gives remunerative employment to family labour throughout the year and secondly, it ensures periodic income even to the small and medium

holdings. In India, the state of West Bengal stands as third largest silk producing state. The huge employment potentiality in sericulture made the farmers of Malda, Murshidabad, Nadia and Birbhum to adopt sericulture largely as a supplementary crop along with agricultural crops. However, before going multiple farming systems, it is necessary to study the comparative income generation potential in agriculture crops vis-a-vis sericulture. According to earlier researches and extension workers, the net income is known to be highest in sericulture as compared to other crop in a year under the irrigated conditions. Therefore, the present study was carried out at farmer's level, so that information can be taken from gross root level to compare the income generation and suggestions for the sericulture adoption by the farmers.

West Bengal is a traditional agricultural belt. Due to agro-climatic advantages almost all the agricultural crops are grown in the huge quantities. So this is not easy to change the tradition from agriculture to sericulture. Majumdar et.al reported that sericulture industry provides employment to approximately 8 million people in rural and

semi-urban areas in India. Out of these, substantial numbers of workers belong to economically weaker section of society, including women's. But due to high employment potential and profitable return in sericulture industry, farmers of agriculture and sericulture both are equally interested to take this profession simultaneously with other agricultural crops. Reddy (1985) reported that a farmer can earn Rs.19, 997 from one acre of irrigated land. Reddy et al (1986) reported that sericulture as an integrated enterprise with horticulture generates two times more employment than alternate enterprises.

Among these traditional districts we selected two traditional districts i.e. Nadia and Birbhum for our study. These two districts are selected due to high production of crop. A SSPC unit is established in Kolitha at Birbhum to develop the growth of sericulture industry. From the last few years this industry is being run smoothly due to some significant action taken from CSR & TI Berhampore, such as field demonstration, group meeting etc.

Objectives:

1. To understand the agricultural cropping pattern in a unit area of land, annually.
2. To study the comparative income in agriculture and sericulture.
3. To determine the cost production and return from agricultural crops and sericulture.

Methodology:

Personal interview with structured questionnaire was adopted to collect the data. A sample of 10 respondents each from Akalipur block of Birbhum District and Nakashipara block of Nadia District, West Bengal were interviewed personally. Data collection by interviewing the respondents is the simplest and cheapest way of survey study, but the accuracy of survey depends on the ability of respondents to provide the information requested and their willingness to reply truthfully (Dillion et. al,1989). The pre-tested questionnaire contained the land holding of the farmers, cropping pattern and intensity of cropping. Comparative income generated in agricultural and subsidiary crop and the return of the different crops. The interview was conducted individually and at the same time.

Agro-climatic conditions of the selected villages:

The agro climatic conditions in the surveyed area are:

Parameter	District	
	Akalipur Block (Birbhum)	Nakashipara Block (Nadia)
Soil	Alluvial, moisture % is good. Basically it is clay in nature, water holding capacity is more.	Alluvial, gangetic plants having good moisture% in soil and water holding capacity is more.
Rainfall	According to district weather office of Birbhum, rainfall ranges between 600 mm/year and 1400 mm/year. The distribution of rain is not uniform, resulting water scarcity during hot summer.	Rainfall ranges between 600 mm and 1400 mm per annum. Distribution of rain is not uniform and hence scarcity is experimented during the hot summer season.
Temperature	Temperature ranges between 8 to 42 degree centigrade with wide fluctuation.	Temperature is ranges between 8 to 42 degree centigrade with wide fluctuation throughout the year.(Reported the District weather office, Nadia)
Target Group	Farmers of the Akalipur block of Birbhum district, West Bengal.	The study was carried out among the farmers of the Nakashipara Block of Nadia district, West Bengal
Mode of study	Personal interaction and questionnaire. Collection of information from the available literatures.	Personal interaction and questionnaire. Collection of information from the available literatures.

The study was carried out in identified villages of Nadia and and Birbhum district in West Bengal. The results obtained are represented in following tables:

Findings & Data Analysis of Agriculture:

PADDY (in summer season):-

Area of land (1 acre)	Cost (Rs)	
	Akalipur Block (Birbhum)	Nakashipara Block (Nadia)
1. Cost of seed (25kg) @	1500.00 (60 Rs/Kg)	1375.00 (55 Rs/Kg)
2. Land preparation	2200.00	2200.00
3. Insecticide	550.00	500.00
4. Total labour (40 MDS)	14000(350/MDS)	14000 (350/ MDS)
5. Irrigation	8000.00	7000.00
6. Fym (3 tractor)	1200.00	1250.00
7. Manure and chemical fertilizer (Urea and Potas)	2600.00	2680.00
Total Cost	30050.00	29005.00

RETURN:

	Akalipur Block (Birbhum)	Nakashipara Block (Nadia)
Production of paddy 24 Quintals	Rs. 38400.00 (Rs. 1600/ Quintal)	Rs. 38520.00 (Rs. 1605.00/ quintal)
Paddy straw	Rs. 1350	Rs. 1400
Gross income	Rs.39750.00	Rs. 39920.00
Net income (Gross income – Total cost)	Rs. 9700.00	Rs. 10915.00

Table 1: The data indicates that planting of paddy for one acre requires Rs.30050.00 and 29005.00 in Akalipur & Nakashipara block respectively. Cost of production includes (i) Quantity of seed (25 kg) – Rs. 1500.00 & 1375.00 in Akalipur & Nakashipara. (ii) Insecticides Rs. 550.00 & 500.00 in Akalipur & Nakashipara (iv) Labour (Total labour 40 MDS) Rs.31500.00 in each block (v) Irrigation cost 8000.00 & 7000.00 in different blocks. (vi) FYM Rs.12000.00 & 12500.00 in two different blocks (vii) Manure & chemical fertilizer is Rs. 2600.00 & 2680.00.

Total return of one acre land is around Rs. 39750.00 & Rs. 39920.00 in these districts. So the net profit of two districts are Rs. 9700.00 & 10915.00

MUSTARD (in winter season) :-

Area of land (1 acre)	Cost (Rs)	
	Akalipur Block (Birbhum)	Nakashipara Block (Nadia)
1. Seed (3 kg)	450.00 (150 Rs/Kg)	450.00 (150 Rs/Kg)
2. Preparation of land	2000.00	1600.00
3. Irrigation	2400.00	1200.00
4. Manure and chemical fertilizer	3900.00	3500.00
5. Labour (24 MDS) (Rs 350/ MD)	8400.00	8400.00
Total Coast	17150.00	15150.00

RETURN:

	Akalipur Block (Birbhum)	Nakashipara Block (Nadia)
Production 6 Quintal	Rs.- 27000.00 (Rs. 4500/Quintal)	Rs.- 24000.00 (Rs. 4000.00/Quintal)
Gross income	Rs.- 27000.00	Rs.- 24000.00
Net income (Gross income – Total cost)	Rs.- 9850.00	Rs.- 8850.00

Table 2: It is cleared that for one acre plantation of mustard Rs. 17150.00 & 15150.00 are required as the cost of production in Akalipur and Nakashipara block respectively. Cost of production includes - (i) Seeds- Rs. 450 in each blocks, (ii) Preparation of land- Rs. 2000 & 1600 in two different blocks, (iii) Irrigation cost- Rs. 2400 & 1200, (iv) Manure and chemical fertilizer- Rs. 3900 & 3500. (v) Labour- Rs. 8400 in each block.

Total return from cultivation of one acre of land of Mustard is Rs. 27000.00 and 24000.00 and net profits are Rs. 9850.00 & 8850.00 in Akalipur and Nakashipara block respectively.

WHEAT (in winter season):-

Area of land (1 acre)	Cost (Rs)	
	Akalipur Block (Birbhum)	Nakashipara Block (Nadia)
1. Seed (60kg)	960.00 (Rs.16/kg)	900.00 (Rs. 15/kg)
2. Preparation of land	2000.00	2100.00
3. Insecticides	480.00	520.00
4. FYM	1000.00	900.00
5. Fertilizer (DAP+1026)	2910.00	2800.00
6. Irrigation	2400.00	2250.00
7. Labour charges (13MD)	4550.00 (Rs. 350/ MD)	4550.00 (Rs. 350/ MD)
Total Coast	14300.00	14040.00

RETURN:

	Akalipur Block (Birbhum)	Nakashipara Block (Nadia)
Production 11 Quintal	Rs.- 18700.00 (Rs. 1700 /Quintal)	Rs.- 18920.00 (Rs. 1720 /Quintal)
Gross income	Rs.- 18700	Rs.- 18920
Net income (Gross income – Total cost)	Rs.-4400	Rs.- 4880

Table 3: In case of wheat the amount to be invested is Rs.14300.00 and 14040.00 for one acre plantation of Akalipur & Nakashipara block. The total cost includes (i) Seeds -Rs. 960.00 & 900.00 in these blocks, (ii) Preparation of land- Rs. 2000.00 & 2100.00, (iii) Insecticides- Rs. 480.00 & 520.00, (iv) Fertilizer cost- Rs. 2910.00 & 2800.00, (v) Irrigation- Rs. 2400.00 & 2250.00., Labour charges- Rs. 4550.00 in these blocks.

Here, gross income of wheat is Rs. 18700.00 & 18920.00 in these blocks and the net profit are Rs. 4400.00 & 4880.00 respectively.

Findings & Data Analysis of Sericulture:-

In Sericulture different type of practice is done throughout the year such as mulberry cultivation, silkworm rearing, silk reeling, silk weaving etc. Following table shows total investment and profit respectively this industry.

Expenditure of labour in Mulberry cultivation (1 acre of land):-

Item	Akalipur Block (Birbhum)			Nakashipara Block (Nadia)		
	Quantity (MDS)	Rate	Total	Quantity (MDS)	Rate	Total
Digging	17	350	5950.00	16	350	5600.00
Irrigation	3	350	1050.00	2	350	700.00
Application of FYM	8	350	2800.00	8	350	2800.00
Cleaning of mulberry plots	9	350	3150.00	9	350	3150.00
Leaf Harvest	11	350	3850.00	10	350	3500.00
Prunning	16	350	5600.00	15	350	5250.00
Total Cost			Rs.22400.00	Total Cost	21000.00	

Table 4: In case of mulberry cultivation for one acre of land, the expenditure is Rs. 22400.00 and 21000.00 in Akalipur and Nakashipara blocks respectively. Costs of expenditure includes (i) Digging- Rs. 5950.00 and 5600.00 in these blocks, (ii) irrigation- Rs. 1050.00 and 700, (iii) FYM- Rs. 2800.00 in these blocks, (iv) Cleaning of mulberry plots- Rs. 3150.00 in these blocks, (v) Leaf harvest- Rs. 3850.00 and 3500.00 in these blocks, (vi) Punning-Rs. 5600.00 and 5250.00 in these blocks respectively.

Cost of items in mulberry cultivation (1 acre of land):-

Items	Total	
	Akalipur Block (Birbhum)	Nakashipara Block (Nadia)
Farm yard manure (8 mt / ha / yr) @ 600 / ton	6400.00	6400.00
Chemical fertilizer @ 336:180:112	2750.00	2700.00
Irrigation (1.5 acre inch / ha / yr)	14500.00	16000.00
Total Cost	23650.00	Rs. 25100.00

Table 5: Cost of items for mulberry cultivation in these blocks are- (i) Farm Yard Manure is Rs. 6400.00 in Akalipur & Nakashipara blocks, (ii) Chemical fertilizer is Rs. 2750.00 & 2700.00 and (iii) Irrigation is Rs. 14500.00 & 16000.00.

So, the total investments are Rs. 23650.00 & 25100.00 in these blocks respectively.

Cost in silkworm rearing:-

Item	Akaliapur Block (Birbhum)			Nakashipara Block (Nadia)		
	Quantity	Rate	Total	Quantity	Rate	Total
Egg	1500 DFLs (F ₁ Hybrids)	300/ 100 DFLs	4500.00	1500 DFLs(F ₁ Hybrid)	320/ 100 DFLs	4800.00
Newspaper	30 kg	11/ kg	330.00	30 kg	10/ kg	300.00
Lime	6 kg	7/ kg	42.00	6 kg	7/ kg	42.00
Labex	60 kg	30/kg	1800.00	60 kg	30/kg	1800.00
Labour	30 MDS	350	10500.00	30 MDS	350	10500.00
Total Cost			Rs.17172.00	Total Cost		17442.00

Table 6: The cost of silk worm rearing in these districts is Rs. 17172.00 and 17442.00. Cost includes (i) Eggs- Rs. 4500.00 and 4800.00 in these blocks, (ii) Newspaper- Rs. 330.00 and 300.00 (iii) Lime- Rs. 42.00 in these blocks. (iv) Labex- Rs. 1800.00 in these blocks and (v) Labour is Rs.10500.00 in these blocks respectively.

TOTAL COST:

Items	Total	
	Akaliapur Block (Birbhum)	Nakashipara Block (Nadia)
Labour in mulberry cultivation	22400.00	21000.00
Cost of item in mulberry cultivation	23650.00	25100.00
Cost in silkworm rearing	17172.00	17442.00
Total Cost	63222.00	Rs. 63542.00

Table 7: Indicates total input in Sericulture industry. This table is sum of table no. 4, 5 and 6. The total expenditure of these blocks is Rs. 63222.00 and 63542.00 respectively.

PRODUCTION:

Items	Akalipur Block (Birbhum)			Nakashipara Block (Nadia)		
	Quantity	Rate	Total	Quantity	Rate	Total
Total cocoon @ 180 kg/bigha/100dfls/year (In a year 5 crops are there)	540 kg	Rs. 250/kg	135000.00	540 kg	Rs. 250/kg	135000.00
Bye-product @ 3% of cocoon product			5445.00			5445.00
Mulberry cuttings	2 mt	1200.00	2400.00	2 mt	1500.00	3000.00
4. Left over rearing wastes	–	–	1000.00	–	–	1000.00
Gross income	–	–	143845.00	–	–	144445.00
Total Cost	–	–	53822.00	–	–	59042.00
Net income (Gross – Total cost)			90023.00			85403.00

The gross income from this industry is Rs. 143845.00 and 144445.00 in Akalipur and Nakashipara blocks and net income are Rs. 90023.00 and 85403.00 respectively.

Conclusion:

Taken together and keeping in view the data analysis; it is cleared that the margin of profit is higher in Sericulture industry than others; which are Rs. 90023.00 and 85403.00 in Akalipur and Nakashipara block

respectively When we compared Sericulture with paddy where the earnings are Rs.9700.00 and 10915.00 in Akalipur And Nakashipara in one crop in a year. Paddy is cultivated twice in a year so return should be

roughly rupees 20000.00 to 21000.00 respectively where Sericulture produce five crops in a year and makes a profit of around Rs. 85000.00 to 90000.00 approx. In case of mustard; it is practiced once in a year on onset of winter and produces a profit of Rs. 9850.00 and 8850.00 in Akalipur and Nakashipara blocks respectively. Wheat is practiced once in a year in winter and makes a profit of Rs. 4400.00 and 4800.00 in Akalipur and Nakashipara blocks respectively. If we compare the total income from multiple farming system such as paddy, mustard and wheat in a year from one acre plantation so it will be (20000+8500+4400 =32900 in one block) which is still less than the Sericulture industry. So in conclusion the income generation through agriculture crop and sericulture at farmers' level suggests that sericulture is capable of more income generation than other traditional crops.

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