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An Economic Analysis of Production and Return of Niger Crop Grown in Jashpur District of Chhattisgarh State

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ABSTRACT

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The present study is based on An economic analysis of production and return of niger crop grown in Jashpur district of Chhattisgarh state, with the following objective. To work out the cost and returns of niger crop grow in Jashpur district of Chhattisgarh. The average size of holding for niger growers were 0.60 ha. On an average the cost of cultivation of niger was 13485.69 respectively, among different cost items contribution of total labour cost was 34.72 per cent in case of niger. Gross return for in case of niger it was Rs. 16798.41. The input-output ratio for niger 1:1.25. On an average marketable surplus in niger was worked out to be 96.05 percent.

Introduction

Agriculture plays a vital role in India's economy, more than 54 per cent population of the country engaged in agriculture (Anonymous, 2018), During 2016-17, rice, niger and pigeon-pea production was 110.15 million tonnes, 0.83 lakh tonnes and 4.78 million tonnes, and it has increased by 5.50%, 7.80% and 86.71%, respectively (Anonymous, 2017b). Paddy (*Oryza sativa*) is the major staple food crops to large population in the world directly consumed by people more than any other crops. In India, rice occupied 43.19 million hectare area,

production 110.15 million tonnes and yield 25.50 q/ha. In India (Anonymous, 2017b), West Bengal, Uttar Pradesh and Punjab are the three major rice producing states, which contributes more than 35 percent of the total production.

The production of pigeon-pea (*Cajanus cajan*) in India was 4.78 million tonnes and occupied area 54.01 million ha with average productivity 8.85 q/ha in 2016-17 (Anonymous, 2017b).

Niger (*Guizotia abyssinica*) cultivated for its seeds, which yield a valuable oil used

for food and as an illuminant, it can also be used as a manure and green manure for increasing soil organic carbon. In Chhattisgarh state, majority of population depends on agriculture. More than 80 percent population of the state is dependent on agriculture and its allied activities (Anonymous 2017a). The state is also known as “Rice Bowl of India”.

Materials and Methods

Sampling Framework

The detailed sampling framework that has been adopted for accomplishing the objectives of study is given below:

Selection of district

Chhattisgarh state is consisting of 27 districts. Out of these districts, Jashpur was selected randomly.

Selection of block

Jashpur district having eight blocks *viz.*, Bagicha, Duldula, Jashpur, Kansabel, Kunkuri, Manora, Farsabahar and Pathalgaon, among the blocks, Pathalgaon and Bagicha were selected purposively as it is the major contributor towards both area and production of major three selected crops (paddy, niger and pigeon-pea), also it has the highest area as compared to other crops.

Selection of village

From the sampled blocks of Jashpur district, 2 villages were selected from Pathalgaon block which were Jamjhor and Mayurnacha and 3 villages have selected from Bagicha block which namely Mahuadih, Ghughari and Pasiya, the selection of villages was made on the basis of maximum area coverage and production of the major selected crops.

For estimation of cost and returns of major crops, the cost concepts have used that given by the Commission of Agriculture Cost and Prices (CACP) which is given as follows-

Cost of cultivation

Cost A1: Consist of following 16 items of costs:

1. Value of hired human labour (permanent & casual)
2. Value of owned bullock labour
3. Value of hired bullock labour
4. Value of hired machinery
5. Value of owned machinery
6. Value of fertilizers
7. Value of manure (produced on farm and purchased)
8. Value of seed (both farm-produced and purchased)
9. Value of insecticides and fungicides.
10. Irrigation charges (both of the owned & owned and hired tube wells, pumping sets, etc.)
11. Canal-water charges
12. Land revenue, cesses and other taxes
13. Depreciation on farm implements (both bullock drawn & worked with human labour)
14. Depreciation on farm building, farm machinery.
15. Interest on the working capital.
16. Miscellaneous expenses (wages of artisans, and repairs to small farm implements).

Cost A2 = Cost A1 + Rent paid for Leased in Land.

Cost B1 = Cost A1 + Interest on value of Owned fixed Capital assets (excluding land)

Cost B2 = Cost B1 + rental value of owned land and rent paid for leased in land.

Cost C1 = Cost B1 + Imputed value of family labour.

Cost C2 = Cost B2 + Imputed value of family labour.

Cost C3 = Cost C2 +10% of managerial charges at Cost C2.

Income over cost A1 = Gross income – Cost A1

Income over cost A2 = Gross income – CostA2

Income over cost B2 = Gross income – Cost B1

Income over cost B2 = Gross income – Cost B2

Income over cost C1 = Gross income – CostC1

Income over cost C2 = Gross income – Cost C

Income over cost C3 = Gross income – Cost C

Variable cost

This includes all the cash expenses made during the period of crop growth stages namely, labour wages, bullock pair, wages, seed, plant protection chemicals , manures and fertilizers, interest on working capital etc. Which is calculated in Rs./ha.

Fixed Cost

This includes, Depreciation, land revenue and Interest on fixed capital and it is calculated in Rs./ha

Estimation of income

These include detailed analysis of cost and returns of the crop, such as gross income, net income, and input-output ratio.

(a) Gross income

It is the sum of all earnings before any deducing of taxes.

(b) Net income

It is the difference between total receipts and total expenses. It includes the farm manager's expenses and interest on capital invested in the business. It was calculated as:

Net income = Gross income – Total expenses

(c) Input-output ratio

It can be expressed as the ratio of output to input. The ratio was calculated as:-

Input-output ratio = O / I

Where, I = Total input

O = Total output

Results and Discussion

Cost of cultivation of niger

The cost of inputs used for niger cultivation under sample farms was estimated in Rs. per hectare and presented in table 1. Table reveals that overall cost of input used for niger was found to be Rs. per ha. 8799.90 (65.25 per cent), which varies from Rs8165.37 (63.95 per cent), 8572.95 (64.05 per cent), 8878.45(65.42 per cent) and 10692.41 (70.07 per cent) per ha at marginal, small, medium and large farms respectively.

The most costly input for cultivation of niger was human labour which was found to be Rs 4682.23 per ha (34.72). The overall share of human labour cost was noticed to be Rs4682.23 per ha. and 4452.47, 4663.36, 4725.88 and 5177.43 Rs. per ha. at marginal, small, medium and large farms respectively.

Bullock Labour was the next input in niger cultivation which accounted 14.53 per cent cost followed by machine charge 5.33 per cent. It was observed that the niger cultivators had not applied the recommended dose of fertilizers there by resulting in reduced yield

of niger. In view of this, it is imperative to educate and create awareness about the proper application of inputs in order to increase production and productivity of niger in the study area.

Table.1 Input wise cost of cultivation of niger

S.N.	Particulars	Marginal	Small	Medium	Large	Over All (Rs./ha)
A.	Variable cost					
1.	Human labour					
	Family labour	3424.49 (26.82)	3367.94 (25.16)	2317.24 (17.08)	2246.23 (14.72)	2930.62 (21.73)
	Hired labour	1027.98 (8.05)	1295.42 (9.68)	2408.64 (17.75)	2931.20 (19.21)	1751.61 (12.99)
	Total human labour	4452.47 (34.87)	4663.36 (34.84)	4725.88 (34.82)	5177.43 (33.93)	4682.23 (34.72)
2.	bullock labour					
	Owned	1936.31 (15.16)	1596.24 (11.93)	61.30 (0.45)	724.11 (4.75)	1123.77 (8.33)
	Hired	528.79 (4.14)	1041.57 (7.78)	1266.38 (9.33)	0.00 (0.00)	836.47 (6.20)
	Total bullock labour	2465.1 (19.30)	2637.81 (19.71)	1327.68 (9.78)	724.11 (4.75)	1960.24 (14.53)
3.	machine charge			1421.35 (10.47)	2398.59 (15.72)	718.92 (5.33)
	4. seed cost	624.37 (4.89)	648.92 (4.85)	712.55 (5.25)	850.83 (5.58)	685.22 (5.08)
	5. Manure & Fertilizer cost	309.38 (2.42)	293.13 (2.19)	349.52 (2.58)	1130.20 (7.41)	414.83 (3.08)
	6. Interest on working capital	314.05 (2.46)	329.73 (2.46)	341.48 (2.52)	411.25 (2.70)	338.46 (2.51)
	Sub total	8165.37 (63.95)	8572.95 (64.05)	8878.45 (65.42)	10692.41 (70.07)	8799.90 (65.25)
B.	Fixed cost					
1.	Land revenue	12.00 (0.09)	12.00 (0.09)	12.00 (0.09)	12.00 (0.08)	12.00 (0.09)
2.	Depreciation on implements	333.33 (2.61)	522.73 (3.91)	413.79 (3.05)	300.00 (1.97)	407.80 (3.02)
3.	Rental value of owned land	3840.00 (30.07)	3840.00 (28.69)	3840.00 (28.30)	3840.00 (25.16)	3840.00 (28.47)
4.	Interest on fixed capital	418.53 (3.28)	437.47 (3.27)	426.58 (3.14)	415.20 (2.72)	425.98 (3.16)
	Sub total	4603.86 (36.05)	4812.20 (35.95)	4692.37 (34.58)	4567.20 (29.93)	4685.78 (34.75)
	Total (A+B)	12769.23 (100.00)	13385.15 (100.00)	13570.82 (100.00)	15259.61 (100.00)	13485.69 (100.00)

Table.2 Break-up of cost, cost concept wise cost in niger at the sample farm

Sn	Costs/Category	Marginal	Small	Medium	Large	Overall (Rs/ha)
Break up cost						
1.	Cost A1(All actual expenses)	5086.21	3101.93	5659.33	8034.08	4328.84
2.	Cost A2=Cost A1+ Rent paid for leased in land	5086.21	3101.93	5659.33	8034.08	4328.84
3.	Cost B = A1 + Rental value of owned land + interest on fixed capital	9344.74	7379.41	9925.91	12289.28	8594.82
4.	Cost B1=Cost A1+ Interest on value of owned fixed capital	5504.74	3539.41	6085.91	8449.28	4754.82
5.	Cost B2=Cost B1+Rental value of owned land & Rent paid for leased in Land	8926.21	6941.93	9499.33	11874.08	8168.84
6.	Cost C= cost B +family labour	12769.23	10747.34	12243.15	14535.51	11525.44
7.	Cost C1=Cost B1 + imputed value of family labour	8929.23	6907.34	8403.15	10695.51	7685.44
8.	Cost C2= Cost B2 + imputed value of family labor	12350.70	10309.87	11816.57	14120.31	11099.46
9.	Cost C3= Cost C2 + 10% of Cost C2 on account of managerial function performed by farmer	13585.77	11340.86	12998.23	15532.34	12209.41

Table.3 Yield, cost and return of niger of the sample farm

S/No.	Particular	Marginal	Small	Medium	Large	Overall (Rs./ha.)
1. 1.	Yield of main product(q)	3.64	3.76	3.7	3.98	3.73298
2. 3.	Price main product (Rs./q)	4500.00	4500.00	4500.00	4500.00	4500.00
3. 4.	Cost of cultivation	12769.23	13385.15	13570.82	15259.61	13485.69
4. 5.	cost of production/qt	3508.03	3559.88	3667.79	3834.07	3610.33
5. 6.	Gross return	16380.00	16920.00	16650.00	17910.00	16798.41
6. 7	net return	3610.77	3534.85	3079.18	2650.39	3312.725
Input output ratio		1.28	1.26	1.23	1.17	1.247426

Table.4 Income of niger over different cost at sampled farms (Rs./ha.)

S.n	Income over different cost	Marginal	Small	Medium	Large	Overall
1	Income over Cost A1	11293.79	13818.07	10990.67	9875.92	13581.16
2	Income over Cost A2	11293.79	13818.07	10990.67	9875.92	13581.16
3	Income over Cost B	7035.26	9540.59	6724.09	5620.72	9315.18
4	Income over Cost B1	10875.26	13380.59	10564.09	9460.72	13155.18
5	Income over Cost B2	7453.79	9978.07	7150.67	6035.92	9741.16
6	Income over Cost C	3610.77	6172.66	4406.85	3374.49	6384.56
7	Income over Cost C1	7450.77	10012.66	8246.85	7214.49	10224.56
8	Income over Cost C2	4029.30	6610.13	4833.43	3789.69	6810.54
9	Income over Cost C3	2794.23	5579.14	3651.77	2377.66	5700.59

Cost of cultivation of niger on the basis of cost concept at sampled households

The cost of cultivation has also be computed on the basis of cost concept used by the Commission of Agriculture Cost and Price (CACP) presented in Table 2. It reveals that estimated cost A_1 was maximum at large farm and found to be Rs 8034.08 per ha followed by medium (Rs 5659.33 per ha), marginal (5086.21) and small (Rs 3101.93 per ha) respectively. Overall cost A_1 , was estimated to be Rs 4328.84 per ha. As already being noted that cost A_1 actual expenses or variable cost in niger cultivation. Cost A_2 include the rent paid for leased in land which was found to be same as Cost A_1 because the sample farmer haven't taken any land in leased. Cost C_3 was noted noticed to be Rs. 150563.88 which include 10 per cent of Cost C_2 as accounted of managerial function perform by farmers and same was noted to be increase of 48.60 over cost A_1 .

Yield, cost and return of niger at the sampled farms

The above table 3 represents the Yield, cost and return of niger. The average yield from the sample farms was maximum in large 3.98 q/ha followed by small 3.76 q/ha, medium 3.70 q/ha, and marginal farms 3.64 q/ha. The average price was 4500 Rs. for all land holdings. The maximum cost of cultivation occurred in large farms Rs. 15259.61, followed by medium farms Rs. 13570.82, small farms Rs. 13385.15 and marginal farms Rs. 12769.23 respectively, which resulted due to farm size and amounts of input expenditure.

As far as cost of production per quintal is concerned, it was minimum in marginal farms Rs. 3508.03, followed by small farms Rs. 3559.88, medium Rs. 3667.79 and maximum in large farms Rs. 3834.07 per quintal. This

resulted because of large farm size could more expend in input applications, and use of outside labors rather than family labors, which ultimately increased cost of production.

Although, gross return was highest in large farms Rs. 17910.00 followed by small Rs. 16920.00, medium Rs. 16650.00 and marginal farms with Rs. 16380.00, respectively. Still, net returns was maximum in marginal farms Rs. 3610.77 followed by small farms Rs. 3534.85, medium farms Rs. 3079.18 and minimum in large farms Rs. 2650.39

The input output ratio is maximum for small farms, 1:2.91, followed by medium farms, 1:2.86 and minimum in large farms with ratio of 1:2.82. Increased return from input in small farms is maximum due to increased productivity aroused due to minimum cost incurred. Also, in small farms, family labors are more active and do farm operations more efficiently, whereas in medium and large farms contribution of family labors decreases with increasing farm size and more labors are to be employed from outside and paid.

Income over different cost at sampled farms

Income over different cost was also calculated for the sample farms (Table 4). Income over cost A_1 was maximum in small farms (Rs. 13818.07) followed by marginal farms (Rs. 11293.79), medium (Rs. 10990.67) and minimum in large farms (Rs. 9875.92). Income over cost A_2 was also same as income over cost A_1 following similar trend. Income over Cost B_1 was Rs.10875.26, Rs. 13380.59, Rs.10564.09 and Rs. 9460.72 for marginal, small, medium and large farms respectively.

Income over Cost B_2 was Rs.7453.79, Rs. 9978.07, Rs.7150.67 and Rs. 6035.92 for marginal, small, medium and large farms

respectively. Income over Cost C1 was maximum in small farms followed by medium and marginal and minimum in large farms with Rs.10012.66, Rs.8246.85, 7450.77 and Rs. 7214.49 respectively. Income over Cost C2 was maximum in small farms Rs.6610.13, followed by medium and marginal farms Rs.4833.43 and 4029.30 and minimum in large farms Rs.3789.69. Income over Cost C3 also follows similar trend with Rs.5579.14, Rs. 3651.77, Rs. 2794.23 and Rs. 2377.66 in small, medium marginal and large farms respectively. The overall income over Cost A1, A2, B1, B2, C1, C2 and C3 was Rs. 13581.16, Rs. 13581.16, Rs. 13155.18, Rs. 9741.16, Rs. 10224.56, Rs. 6810.54, Rs. 6810.54 and Rs.5700.59 respectively.

In conclusion

Total area under niger cultivation of Chhattisgarh state during 2017-18 were observed as, 63245 ha and and production was 25743 metric tones.

The overall input-output ratio of rice, niger and pigeon-was found 1.86, 1.17 and 1.75.

Most costly human input for cultivation of niger was human labour at cost Rs.4682.23 per ha (34.72 percent).

The average yield of niger from the sample farms was maximum in large 3.98 q/ha.

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