

Research Paper

Study of Cropping Pattern and Profitability Analysis of Major Crops of North Eastern Ghats Agro-Climatic Zone of Odisha

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ABSTRACT

With bountiful of natural resources like fertile soil, organic rich climate and rich heritage, North Eastern Ghats agro-climatic zone of Odisha is one of the most fascinating areas of the state. The North Eastern Ghats region of Odisha spread over Kandhamal, Gajapati, Rayagada, part of Ganjam and small patches of Koraput which endowed with potentially rich natural resources at the same time are subjected to inherent problems. Keeping in mind all the constraints in the existing crop plan the study focused to examine the cropping pattern in both rainfed and irrigated situation, irrigation pattern and fertilizer consumption pattern in the zone and also to determine the cost of cultivation and profitability of major crops of the zone. As cost of cultivation and return information is very much crucial for the farmer to know whether that crop is remunerative for the farmer or not. The study was confined to five major crops of the district, namely, paddy, *ragi*, maize, blackgram and greengram. The selected crops that were taken together accounted for more than 60% of the gross cropped area of the zone. The study is based on both primary and secondary sources and has made use of the cost of cultivation data from OUAT. Using probability proportional to size method of sampling a total of 120 farmers were selected for the study.

HIGHLIGHTS

- Paddy is the major crop of the zone both in *kharif* and *rabi*. Among the pulses Green gram and Blackgram are the major crops.
- The zone is mainly rainfed so the cropping pattern is accordingly planned.
- The ACZ has rich potential, and endowed with a suitable agroclimate.

Keywords: Cropping pattern, Agriculture, Cost, Profitability, Agro climatic zone

Agriculture, the primary sector of the economy has continued to serve as the lifeline. About 54.6 per cent of the total workforce in the country and 83.3 per cent in Odisha are still engaged in agricultural and allied sector activities, which accounts for approximately 17.8 per cent of the country's and 21.27 per cent of the state's Gross Value Added (GVA) for the year 2020-21. Odisha has a geographical area of 1,55,707 sq. Kms and is divided into 10 Agro-Climatic Zones on the basis of soil structure, humidity, elevation, topography, vegetation, rainfall and other Agro- Climatic factors. The total cultivated land of the State is 61.80 lakh ha out of which 29.14 lakh ha (47%) is High land,

17.55 lakh ha (28%) Medium land and 15.11 lakh ha (25%) low land and about 65% of cultivated land in *Kharif* season is irrigated in the state. Majority of the farmers in Odisha are small and marginal and have limited access to resources. The climate of the State is tropical, characterized by high temperature, high humidity, medium to high rainfall, short & mild winter. The normal rainfall is 1451.2 mm. Most of the rainfall received in the state is concentrated over

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a period of 3 months (July, August & September) of the monsoon season. So far as crop coverage is concerned Rice is the major crop in *Kharif* season, so are pulses & oilseeds in Rabi season. The net area sown and gross cropped area during the year 2018-19 were 53.62 lakh ha and 83.38 lakh ha respectively. The cropping intensity in 2018-19 was 156% (Odisha Agricultural Statistics 2018-19).

With bountiful of natural resources like fertile soil, organic rich climate and rich heritage, North Eastern Ghats agro-climatic zone of Odisha is one of the most fascinating areas of the state. This zone is characterized by hot & moist, sub-humid climate. The average rainfall is 1597 mm and the temperature ranges between a maximum of 40 degree to a minimum 10 degree centigrade even 0 degrees in Daringbadi region (the Kashmir of Odisha) situated in Kandhamal district. The North Eastern Ghats region of Odisha spread over Kandhamal, Gajapati, Rayagada, part of Ganjam and small patches of Koraput which endowed with potentially rich natural resources at the same time are subjected to inherent problems like undulating topography, fragile steep slopes, shifting cultivation, large scale deforestation, intense rainfall, heavy runoff and severe soil erosion leading to continuous land degradation. These areas basically depend on rain water for cultivation and more than 70 % area are rainfed mostly in Kandhamal, Rayagada and Gajapati and some how irrigation is there in the 11 blocks of Ganjam which are coming under the selected zone. So through assured irrigation, the present level of crop yield and acreage can be multiplied. The optimal use of water for agriculture in rainfed area appears to be a vital and unavoidable task.

Agriculture is the life blood of the economy of the study zone. As it plays an important role in the economy, so cost of cultivation and return information is very much crucial for the farmer to know whether that crop is remunerative for the farmer or not. It also helps for price policy formulation and is not only essential for the survival of the farmers but also essential as more profit or returns from the crop act as an incentive for the farmers to grow the crops. The cost of cultivation should be less so as to get more net income, which is a parameter for doubling the farmers income of Odisha. If the flow of income from crop cultivation

is not regular and sufficient, farmers may not be able to repay their debts.

Given the low return from the crop cultivation, the interest of the farming community towards farming gradually decreasing and indebtedness is a major problem arising in front of them due to low profit, therefore Government came up with various price policy for them and in future should bring changes which ultimately minimize the cost of cultivation and maximize profit to the farmer.

Keeping in mind all these issues the study has focused upon the following objectives. The very first one is—

- (i) To examine the cropping pattern, irrigation pattern and fertilizer consumption pattern in the zone.
- (ii) To determine the cost of cultivation and profitability of major crops of the zone.

Database and Methodology

For the study both primary and secondary data were used. Primary data on various parameters like size of landholdings, costs and returns of major crops grown by the farmers, constraints faced by the farmers of the study zone etc were collected from the sample farmers using well-structured interview schedule. The data collected were purely based on the memory of the respondents.

Secondary data

Secondary data were collected from various sources like district website, Directorate of economics and statistics, Govt. of Odisha, Odisha agricultural statistics, district statistical handbook, Government department and mainly from the cost of cultivation scheme of Odisha undertaken in the department of Agricultural Economics, OUAT, Bhubaneswar. The area, production, yield of major crops grown by the farmers in the zone, rainfall and the source wise irrigation potential created of the selected agro climatic zone were collected for the year 2018-19.

The directorate of economics and statistics Government of India has established Cost of cultivation scheme in different state as also in the department of agricultural Economics, OUAT, Bhubaneswar Odisha. From the director of CCS it was confirmed that the field data were collected every year from 45 clusters (*tahasil/block*) and

from each cluster 10 farmers were chosen using probability proportional to size method of sampling.

Methodology

For the study a total of 120 farmers were taken from four districts coming under the North Eastern Ghats Agro climatic zone. And from the four districts, blocks or *tahasils* were selected as per the cost of cultivation scheme undertaken in OUAT, Odisha. Then from each cluster 20 farmers were selected, 10 farmers coming under the scheme and another 10 farmer from the same area using probability proportional to size as adopted by the CCS, OUAT. In this way 20 farmers from six clusters were selected making the sample size to 120.

Cost concept

The cost of cultivation of major crops was estimated by using different cost concepts such as farm management cost concept, cost in terms of variable cost and fixed cost. Different farm management cost concepts have been described as follows:

Cost A1 = Actual paid out cost incurred by farmer that includes both cash and kind expenditure involving

- (i) Human labour
 - (a) Hired labour
 - (b) Hired bullock
- (ii) Planting material viz., seed
- (iii) Value of manure (owned and purchased)
- (iv) Value of insecticides and pesticides and chemical fertilizers
- (v) Transportation cost
- (vi) Depreciation on implements and farm buildings
- (vii) Irrigation charges
- (viii) Land revenue, assets and other taxes
- (ix) Interest on working capital
- (x) Miscellaneous expenses

Cost A2 = Cost A1 + Rent paid for leased-in land.

Cost B1 = Cost A2 + Interest on owned capital assets excluding land.

Cost B2 = Cost B1 + Rental value of owned land and of leased land.

Cost C1 = Cost B1 + Imputed value of family labour

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

Cost C3 = 10 per cent over and above Cost C2 on account of managerial function

Cost of production = (Cost of cultivation/ha)/ (Quantity of main product (q)/ha)

Income Measures

- (a) Gross income (₹/ha) (GI) = ($Q_m \times P_m$)
where, Q_m = Quantity of main product (q/ha)
 P_m = Price of main product (₹/q)
- (b) Returns over variable cost (RVC) = Gross income – Cost A1
- (c) Farm business income (FBI) = Gross income – Cost A2
- (d) Family labour income (FLI) = Gross income – Cost B2
- (e) Net income (NI) = Gross income – Cost C2
- (f) Returns to management (RTM) = Gross income – Cost C3
- (g) Returns per rupee (RPR) = (Gross income/ha) / (Cost C2/ha)

RESULTS AND DISCUSSION

There are two agro-ecological situations found in the zone one is rain fed and another one is irrigated. Cropping pattern, the yearly sequence and spatial arrangement of crops and fallows on a given area which is influenced by various factors like soil, climate, rainfall input availability, extent of irrigation, production technology, price expectation and market opportunity. Production and productivity of crops like paddy, pulses and oilseed is low in this zone as water holding capacity of the soil is very low and drought like situation appears. So, the cropping pattern should be accordingly planned for enhancing yield and livelihood of the small and marginal tribal farmers of this zone. The cropping pattern of the zone for rainfed as well as irrigated area was briefly given in table.

The fertilizer consumption is very less in the study area so for increasing the production and productivity of crops balanced utilization of fertilizer should be encouraged. And that was

Table 1: Cropping Pattern of North Eastern Ghat ACZ for Rainfed Situation

Sl. No.	Cropping system	Month											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		Rabi			Zaid			Kharif			Rabi		
1	Rice + Fallow	Fallow					Upland Rice				Fallow		
2	Rice + Redgram + Fallow	Fallow					Rice + Redgram				Redgram		
3	Rice + Fallow	Fallow				Lowland Rice							
4	Rice + Greengram + Fallow	Greengram	Fallow				Lowland Rice					Greengram	
5	Rice + Blackgram + Fallow	Blackgram	Fallow				Lowland Rice					Blackgram	
6	Ragi + Fallow	Fallow				Ragi				Fallow			
7	Rice+Lathyrus Paira	Paira	Fallow				Lowland Rice					Lathyrus	
8	Rice + Horsegram + Fallow	Gram	Fallow				Lowlandrice				Horse		
9	Rice + Fieldpea + Fallow	Paira	Fallow				Lowlandrice					Fieldpea	
10	Small Millets + Fallow	Fallow				Small Millets				Fallow			
11	Bajra + Fallow	Fallow				Bajra				Fallow			
12	Sweetpotato + Fallow	Fallow					Sweetpotato					Fallow	
13	Redgram + Fallow	Fallow					Redgram					Fallow	
14	Yam + Fallow	Yam	Fallow		Yam								
15	Maize + Fallow	Fallow				Maize				Fallow			
16	Cotton + Fallow	Fallow				Cotton							
17	Turmeric + Fallow	Turmeric			Fallow	Turmeric							
18	Ginger + Fallow	Ginger			Fallow	Ginger							

Table 2: Cropping Pattern of North Eastern Ghat ACZ for Irrigated Situation

Sl. No.	Cropping System	Month											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	Rice + Fallow + Rice		Rice					Rice					
2	Rice + Maize + Fallow		Maize	Fallow				Rice				Maize	
3	Rice + Potato + Fallow		Potato	Fallow				Rice				Potato	
4	Rice + Taro + Fallow 02		Taro					Rice					
5	Rice + Groundnut + Fallow		Nut	Fallow				Rice				Ground	
6	Rice + Onion + Fallow		Onion		Fallow			Rice				Onion	
7	Rice + Chilli + Fallow		Chilli		Fallow			Rice				Chilli	
8	Rice + Ragi + Fallow		Ragi		Fallow			Rice				Ragi	
9	Rice + Sunflower		Flower	Fallow				Rice				Sun	
10	Rice + Mustard + Fallow		Mustard	Fallow				Rice				Mustard	
11	Rice + Greengram + Sesamum + Fallow	Gram	Sesamum			Fallow	Rice					Green	
12	Rice + Greengram + Fallow + Ragi	Greengram		Fallow	Ragi		Rice						
13	Rice + Sweetpotato + Fallow	Potato	Fallow				Rice					Sweet	
14	Rice + Vegetables + Fallow	Tables				Fallow	Rice					Vege	
15	Greengram + Ragi + Fallow	Fallow				Greengram		Ragi					
16	Sugarcane	Sugarcane											
17	Rice + Sesamum + Fallow	Samum		Fallow			Rice						Se

Table 3: Major key indicators of NEG ACZ (2018-19)

Sl. No.	District	Cropped Area (In 000Ha)			Rainfall	Net Irigated Area (000Ha)	Gross Irrigated Area (000Ha)
		Kharif	Rabi	Total			
1	Ganjam	386.81	197.56	584.37	1373.1 Mm	277.34	331.40
2	Gajapati	81.62	37.71	119.33	1685.6 Mm	31.52	43.19
3	Kandhamal	118.43	41.66	160.09	1826.4 Mm	28.44	33.56
4	Rayagada	162.49	41.12	203.61	1514.5 Mm	50.02	66.84

Table 4: Fertilizer Consumption Pattern of NEG Aczone

Sl. No.	District	Fertilizer Consumption (Kg/Ha) 2018-19		
		Kharif	Rabi	Total
1	Ganjam (Total District)	75.04	42.53	64.05
2	Kandhamal	19.81	37.61	24.44
3	Rayagada	75.68	26.14	65.68
4	Gajapati	46.47	40.57	44.61
	Odisha			70.59

Table 5: Per hectare costs of different inputs used in Paddy production (₹)

Sl No	Particulars	Cost	Percent Share
Variable Cost (₹/Ha)			
1	Imputed Family Labour	9000	17.69618308
2	Hired Human Labour	12000.00	23.59491077
3	Animal Labour	500.00	0.983121282
4	Machine Labour	13745	27.02600405
5	Seed	1000.00	1.966242565
6	Fertilizer	3500.00	6.881848976
7	Mannure	2400.00	4.718982155
8	Plant Protection Chemicals	1400	2.75273959
9	Misscelaneous	0.00	0
10	Irrigation Charge	0.00	0
11	Interest on Working Capital	5443.1	10.7024549
12	Total Variable Cost (Tvc)	48988.1	96.32248738
Fixed Cost (₹/Ha)			
13	Depriciation	1005	1.976073777
14	Land Revenue	20	0.039324851
15	Interest on Fixed Capital	845.325	1.662113996
16	Total Fixed Cost (Tfc)	1870.325	3.677512625
17	Total Cost (Tfc + Tvc)	50858.425	100

Table 6: Per hectare costs and income measures from Paddy production on various costs concept (₹)

Sl No	Cost Concepts		
	Particulars	Cost	Percent Share
1	Cost A1 (Total Paid Out Cost)	41013.10	57.44194002
2	Cost A2 (Cost A1 + Rent Paid for Leased-In Land)	41013.10	57.44194002
3	Cost B1 (Cost A2 + Interest on Owned Capital Assets Excluding Land)	41858.43	58.62588144
4	Cost B2 (Cost B1 + Rental Value of Owned Land and of Leased Land)	55908.43	78.30396618
5	Cost C1 (Cost B1 + Imputed Value of Family Labour)	50858.43	71.23106028
6	Cost C2 (Cost B2 + Imputed Value of Family Labour)	64908.43	90.90914502
7	Cost C3 (Cost C2 + 10% of Cost C2)	71399.23	100
8	Cost of Cultivation	64908.43	
9	Cost of Production	1442.409556	

carried out under Bringing Green Revolution to Eastern India Programme of Government of India.

Cost of cultivation of paddy

Paddy is the major *kharif* crop of the zone. Table 5 shows that the total cost of cultivation of paddy was

₹ 64908.43 among which 68.3% is towards labour charges and 16.50% is towards input cost.

Average yield of paddy per hectare was found to be 45 qtl which gives ₹ 72750 as main product value and ₹ 6300 as by product value. Other income

measures are also calculated and present in table Table 7.

Table 7

Sl. No.	Yield And Income Measures	
1	Yield (Qtl/ha)	45.00
2	Main Product(Qtl)	45.00
3	Main Product (Value)	72750.00
4	By Product (Value)	6300.00
5	Gross Income	79050.00
6	Return over variable cost (GI-Total variable cost)	30061.90
7	Farm business income (GI- COST A2)	38036.90
8	Family labour income (GI-COST B2)	23141.58
9	Net Income (GI-COST C2)	14141.58
10	B : C Ratio	1.217869637

Cost of Cultivation of Ragi

Ragi is one of the important millets grown in the zone and it is one of the major food grain in the diet of the large section of population of the zone. Previously there is no incentive for the farmer to grow the crop but now a days after the implementation of Odisha millet mission farmers are encouraged to grow the crop in more acreage with modern cultivation practices.

The total cost of cultivation of *ragi* per hectare was found to be ₹ 23632.23 and net income was ₹ 3367.77, which in turn makes the B:C to 0.87.

Table 8: Cost of Cultivation of Ragi in NEG ACZ (2018-19)

Sl. No.	Particulars	Cost	Percent share to the Total Cost
Variable Cost (₹/Ha)			
1	Imputed Family Labour	13750	62.12659095
2	Hired Human Labour	0.00	0
3	Animal Labour	0.00	0
4	Machine Labour	3150	14.2326372
5	Seed	390.00	1.762136034
6	Fertilizer	818.00	3.695967374
7	Mannure	0.00	0
8	Plant Protection Chemicals	0	0
9	Misscelaneous	0.00	0
10	Irrigation Charge	0.00	0
11	Interest on Working Capital	2263.5	10.22716644
12	Total Variable Cost (Tvc)	20371.5	92.044498

Fixed Cost (₹/Ha)			
13	Depriciation	1129	5.101157904
14	Land Revenue	15	0.067774463
15	Interest on Fixed Capital	616.73	2.786569632
16	Total Fixed Cost (Tfc)	1760.73	7.955501999
17	Total Cost (Tfc + Tvc)	22132.23	100

Table 9: Per hectare costs and income measures from Ragi production on various costs concept (₹)

Sl. No.	Cost Concepts	Cost	Percent Share To C3
1	Cost A1 (Total Paid Out Cost)	7765.50	29.87255837
2	Cost A2 (Cost A1 + Rent Paid For Leased-In Land)	7765.50	29.87255837
3	Cost B1 (Cost A2 + Interest on Owned Capital Assets Excluding Land)	8382.23	32.24501384
4	Cost B2 (Cost B1 + Rental Value of Owned Land and of Leased Land)	9882.23	38.01525884
5	Cost C1 (Cost B1 + Imputed Value of Family Labour)	22132.23	85.13892634
6	Cost C2 (Cost B2 + Imputed Value of Family Labour)	23632.23	90.90917134
7	Cost C3 (Cost C2 + 10% of Cost C2)	25995.43	100
8	Cost of Cultivation	23632.23	
9	Cost of Production	2625.803333	

Sl. No.	Yield and Income Measures	
1	Yield (Qtl/ha)	9.00
2	Main Product (Qtl)	9.00
3	Main Product (Value)	27000.00
4	By Product (Value)	0.00
5	Gross Income	27000.00
6	Return over variable cost (GI-Total variable cost)	6628.50
7	Farm business income (GI- Cost A2)	19234.50
8	Family labour income (GI-Cost B2)	17117.77
9	Net Income (GI-Cost C2)	3367.77
10	B : C Ratio	0.875267778

Cost of cultivation of maize

Maize is one of the important cereals grown in the zone. Rice-Maize-Vegetable is the main cropping system in some parts of the zone. Mainly sweetcorn variety of maize was grown in the zone. The cost and return structure of maize per hectare was calculated and shown in the following table. The table shows that the cost of cultivation of maize

was found to be ₹ 36334.65 and net income was ₹ 11965.35 per hectare.

Table 10: Cost of Cultivation of Maize in NEG ACZ (2018-19)

Sl. No.	Particulars	Cost	Percent Share
Variable Cost (₹/ha)			
1	Imputed Family labour	6452.96	22.27259156
2	Hired Human Labour	1700.00	5.867602722
3	Animal Labour	3421.73	11.81020721
4	Machine Labour	3050.00	10.52716959
5	Seed	3000.00	10.35459304
6	Fertilizer	4800.00	16.56734886
7	Mannure	0.00	0
8	Plant Protection Chemicals	1000	3.451531013
9	Misscelaneous	63.00	0.217446454
10	Irrigation Charge	0.00	0
11	Interest on Working Capital	2935.96	10.13355699
12	Total variable cost (TVC)	26423.65	91.20204745
Fixed Cost (₹/ha)			
13	Depriciation	1168	4.031388223
14	Land revenue	10	0.03451531
15	Interest on fixed capital	1371	4.732049019
16	Total fixed cost (TFC)	2549	8.797952552
17	Total cost (TFC+TVC)	28972.65	100

Table 11: Per hectare costs and income measures from Maize production on various costs concept (₹)

Sl. No.	Cost Concepts	Cost	Percent Share
1	Cost A1 (Total paid out cost)	21148.69	52.91399005
2	Cost A2 (Cost A1 + Rent paid for leased-in land)	21148.69	52.91399005
3	Cost B1 (Cost A2 + Interest on owned capital assets excluding land)	22519.69	56.34422995
4	Cost B2 (Cost B1 + Rental value of owned land and of leased land)	29881.69	74.7639427
5	Cost C1 (Cost B1 + Imputed value of family labour)	28972.65	72.48952601
6	Cost C2 (Cost B2 + Imputed value of family labour)	36334.65	90.90923875
7	Cost C3 (Cost C2 + 10% of Cost C2)	39968.05	100
8	Cost of cultivation	39756.38	
9	Cost of production	946.5804762	

Sl. No.	Yield and Income Measures	
1	Yield (Qtl/ha)	42.00
2	Main Product (Qtl)	42.00
3	Main Product (Value)	48300.00
4	By Product (Value)	0.00
5	Gross Income	48300.00
6	Return over variable cost (GI-Total variable cost)	21876.35
7	Farm business income (GI- Cost A2)	27151.31
8	Family labour income (GI-Cost B2)	18418.31
9	Net Income (GI-Cost C2)	11965.35
10	B : C Ratio	1.329309626

Cost of cultivation of pulses

Blackgram and greengram are the important pulses grown in the zone. The cost and return structure of the pulses are shown in table below.

Table 12: Cost of Cultivation of Pulses in NEG ACZ (2018-19)

		Crops			
Sl. No.	Particulars	Blackgram		Greengram	
		Cost	Percent Share	Cost	Percent Share
Variable Cost (₹/Ha)					
1	Imputed Family Labour	7500	33.69703668	6250	28.50432126
2	Hired Human Labour	4750.00	21.34145657	4750.00	21.66328415
3	Animal Labour	0.00	0	0.00	0
4	Machine Labour	2700.00	12.13093321	2700.00	12.31386678
5	Seed	2700.00	12.13093321	2000.00	9.121382802
6	Fertilizer	0.00	0	600.00	2.73641484
7	Mannure	0.00	0	0.00	0
8	Plant Protection chemicals	0	0	0	0
9	Misscelaneous	0.00	0	0.00	0
10	Irrigation Charge	0.00	0	0.00	0
11	Interest on Working capital	2206.25	9.912544957	2037.5	9.292408729
12	Total Variable Cost (Tvc)	19856.25	89.21290462	18337.5	83.63167856
Fixed Cost (₹/Ha)					
13	Depriciation	1548	6.955068371	2004	9.139625567
14	Land Revenue	7.9	0.035494212	15	0.068410371
15	Interest on Fixed Capital	845	3.7965328	1570	7.160285499
16	Total Fixed Cost (Tfc)	2400.9	10.78709538	3589	16.36832144
17	Total Cost (Tfc+Tvc)	22257.15	100	21926.5	100

Table 13: Per hectare costs and income measures from Maize production on various costs concept (₹)

Sl. No.	Cost Concepts	Blckgram		Greengram	
		Cost	% SHARE	Cost	% Share
1	Cost A1 (Total paid out cost)	13912.15	51.8822592	14106.50	51.4786918
2	Cost A2 (Cost A1 + Rent paid for leased-in land)	13912.15	51.8822592	14106.50	51.4786918
3	Cost B1 (Cost A2 + Interest on owned capital assets excluding land)	14757.15	55.0334982	15676.50	57.20807515
4	Cost B2 (Cost B1 + Rental value of owned land and of leased land)	16877.15	62.9395652	18661.50	68.10120208
5	Cost C1 (Cost B1 + Imputed value of family labour)	22257.15	83.0030747	21926.50	80.01612986
6	Cost C2 (Cost B2 + Imputed value of family labour)	24377.15	90.9091417	24911.50	90.90925679
7	Cost C3 (Cost C2 + 10% of Cost C2)	26814.85	100	27402.60	100
8	Cost of cultivation	24377.15		24911.50	
9	Cost of production	3250.28666		3832.5384	

Sl. No.	Particulars	Yield and Income Measures	
		Blackgram	Greengram
1	Yield (Qtl/ha)	6.75	6.00
2	Main Product (Qtl)	6.75	6.00
3	Main Product (Value)	54000.00	42000.00
4	By Product (Value)	1800.00	1500.00
5	Gross Income	55800.00	43500.00
6	Return over variable cost (GI-Total variable cost)	35943.75	25162.50
7	Farm business income (GI- Cost A2)	41887.85	29393.50
8	Family labour income (GI-Cost B2)	38922.85	24838.50
9	Net Income (GI-Cost C2)	31422.85	18588.50
10	B : C Ratio	2.289028865	1.746181482

CONCLUSION

The study was confined to five major crops of the district, namely, paddy, *ragi*, maize, black gram and green gram.. The selected crops that were taken together accounted for more than 60% of the gross cropped area of the zone. The study is based on both primary and secondary sources and has made use of the cost of cultivation data from OUAT. The cropping pattern of the zone shows that majority of the farmers grown paddy in *kharif* both in rain fed and irrigated ecology. In rain fed areas rice + pulses + fallow was practised and in irrigated area Rice + vegetable + fallow, rice + pulses + fallow and rice + maize + vegetable were practised. The study shows that whatever crops grown in the zone the profit for the farmer is less as cost of cultivation is more, so for doubling the farmers income the input cost should be lessed so as to get more net income and that can be possible by utilization of modern cultivation practices which include use of high yielding variety seed, use of mechanisation in farming as it reduces the labour cost which accounts more to the total cost of cultivation.

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