Imperial Journal of Interdisciplinary Research (IJIR)
Vol-2, Issue-5, 2016
ISSN: 2454-1362, http://www.onlinejournal.in

Comparative Economics of Major Cereals in Western Odisha

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Abstract: *Rice along with wheat and maize supply almost 60% of the dietary energy and protein derived from plants. Rice alone accounts for 40% of the protein in Asian diet. In India, rice provides 25% of our protein requirement besides being the principal source of vitamins (thiamine & riboflavin) and minerals (Ca & Fe). In India, maize is the third most important food crop after rice & wheat. It is cultivated in 8.12 mha. (2007-08) under a wide range of agro-ecological situations. It contributes nearly 8% in the national food basket and more than Rs. 100 billion to the agricultural GDP at market price apart from providing employment to over 100 million man-days at the farm and downstream agricultural and industrial sectors. Value-addition in maize has a great potential. There are several value-added products of maize particularly QPM & baby corn that not only increase the farm income but also provides employment to rural youth and farm women. The study is based on primary data which is collected the sample growers by cost accounting method with help of specially designed schedules under Odisha state. The multi-stage stratified random sampling technique was adopted in the study. Thus the sample size was 80 farm holdings. It is seen from the table that chemical fertilizers use was less than the recommended doses expect potash in all crops. The use of potash is not recommended by the universities till the use of potash was observed on the farmer's field so this is the double loss on farmers side. The other inputs were under utilized by the farmers in the study area. The inputs used for all crops were below the recommendation. In the economic point of view farmers should allocate their more land resources in the cultivation of maize in upland than high yielding paddy and then general paddy crop in study area. The benefit cost ratio in all major cereals was observed more than one unity which indicates the cultivation of cereals is economical viable under study area.*

1. Introduction

Rice, one of three most important food crops in world, forms the staple diet of 2.8 billion people. It is grown in all he continents except Antarctica occupying 150 mha. Producing 573 million tonnes paddy with an average productivity of 3.83 tonnes per hectare. Its cultivation is of immense importance to food security of Asia, where more than 90% of the global rice is produced and consumed. India is largest rice growing country while China is largest producer of rice. Rice provides 32-59% of the dietary energy & 24-44% of dietary protein in 39 countries. In India, It accounts for more than 40% of food grain productions, providing direct employment to 70% people in rural areas. Being the staple food for more than 65% of the people, our nation food security hinges on the growth and stability of its production.Rice along with wheat and maize supply almost 60% of the dietary energy and protein derived from plants. Rice alone accounts for 40% of the protein in Asian diet. In India, rice provides 25% of our protein requirement besides being the principal source of vitamins (thiamine & riboflavin) and minerals (Ca & Fe).Maize is the most versatile crop with wider adaptability in varied agro-ecologies. It has highest genetic yield potential among food grain crops. Globally, it is cultivated on nearly 150 mha. In about 160 countries having wider diversity of soil, climate, biodiversity and management practices that contributes nearly 37% in global grain production.In India, maize is the third most important food crop after rice & wheat. It is cultivated in 8.12 mha. (2007-08) under a wide range of agro-ecological situations. It contributes nearly 8% in the national food basket and more than Rs. 100 billion to the agricultural GDP at market price apart from providing employment to over 100 million man-days at the farm and downstream agricultural and industrial sectors.Value-addition in maize has a great potential. There are several value-added products of maize particularly QPM & baby corn that not only increase the farm income but also provides

employment to rural youth and farm women.In view of the above perspectives, a study on "Comparative Economics of major Cereals in Western Odisha" The Evidence from Village Level Study was undertaken with the following objectives.

Objectives

i. To study the resource base of the sample farmers in the study area.
ii. To estimate the Cost Benefit ratio of cereals crop in study area. &
iii. To analyze the comparative study on important cereals and to suggest the police measures in study area.

2.Methodology: The study is based on primary data which is collected the sample growers by cost accounting method with help of specially designed schedules under Odisha state. The multi-stage stratified random sampling technique was adopted in the study. In the first stage two blocks namely Dharmagarh and Kalampur were selected randomly, in the second stage, 8 villages were randomly selected at the rate of 4 villages per block. This constituted 5 per cent of the total number of villages of two selected blocks. In the final stage, list of paddy and maize farmers was prepared separately for both types of sample villages and 10 farm households from each of the 8 sample villages were selected randomly. Thus the sample size was 80 farm holdings. These borrower cultivators were further classified into four categories according to their size of operational holdings. This names of the sample block and villages were furnished in Table-A

Name of the Sample Villages Blockwise

Darmagarh Block		Kalampur Block	
1	Nandagaon	1	Kalampur
2	Tarapur	2	Kadalichuan
	Malpada	3	Bargaon
4	Badabasuli	4	Rajpur

Based on operational size of the holdings, the sample farmers were categorized in to marginal (< 1.00 ha.), small (1 to 2 ha.), medium (2 to 4 ha.) and large farmer (4 ha. and above). In all, the study covered 20 marginal, 29 small, 21 medium and 10 large farmers in both the regions.

The primary data for year 2014-15 were considered for the study. The gaps in the use of levels of various inputs and outputs have been worked out. The use levels of various inputs and outputs obtained in the cultivation were estimated by simple tabular method of analysis with the help of means, averages and percentages.

3. Results and Discussions:

An analysis of basic characteristics of the sample farms is considered to be of significance as it provides relevant background information against which the analysis is to be attempted. The detailed structures of the sample farms according to farm size groups have been discussed.

Size of Holding

The distribution of holding according to different size groups is given in Table 1

The average size of holding was estimated to 3.22 ha. for Dharmagarh (Region –I) and 3.13 ha. in Kalampur Block (Region-II) of the sample district. The operational size of holding of marginal, small, medium and large farmers are found to be 0.94, 1.72, 3.01 and 7.21 ha. as against 0.91, 1.63,2.95 and 7.02 ha. Respectively.

Type of Ownership of Land

Information relating to the land ownership are given in Table 2.It may be noted from the table that more than three-fourth of their total operational holdings accounted for owned land while the remaining were by way of leased in land on a share cropping basis. This clearly indicates that there is negligible extent of tenancy among the farmers in the area under study. On an average, the percentage of owned and leased in land worked out to 79.23 and 20.77 per cent in Dharmagarh as compared to 92.93 per cent and 7.07 per cent in Kalampur Block. And between size groups, the proportion of leased in land increased with decrease in size of holding. This was mainly due to the fact that the marginal and small farmers were interested to make their units viable by making labour investments in their farms.

Extent of irrigation

Irrigation plays an important role in agricultural production. The nature of cropping pattern followed by the farms in a particular area largely

depends upon the availability of irrigation facilities. The following table shows the extent of irrigation in different farm size groups.

In case of Region-I, the average irrigated area for all farm size groups pooled together was 2.29 hectares and its proportion to total operated area was 73.03 per cent. And between size groups this proportion varied between 69.44 to 76.74 per cent. In case of Region-II, the average irrigated area for all farm size groups pooled together was 2.51 ha. and its proportion to total operated area was 80.25 per cent. And between size groups this proportion varied between 78.53 per cent to 83.05 per cent. The small and marginal farmers in the regions-I and marginal and medium farmers in the region-II seem to enjoy better irrigation facilities as compared to others farm size groups in the area under study.

Per hectare resources use: The quantities of various inputs used directly affect the cost of cultivation and therefore, utilization of inputs such as human labour ,bullock labour, seeds , manures ,fertilizers etc .have studied in per hectare physically and monetary terms, In order to get an idea as to whether there is any difference in inputs used in cultivation of major cereals. The information regarding per hectare resources use is presented in Table-4.

Per hectare resource use gap in major cereals: The agricultural university and institutions recommended the input use for higher production of the crops. This differs from the actual use of inputs by the farmers . The per hectare resource use gap in different type of kharif cereals is presented in Table 5

It is seen from the table that chemical fertilizers use was less than the recommended doses except potash in all crops. The use of potash is not recommended by the universities till the use of potash was observed on the farmers field so this is the double loss on farmers side. The other inputs were underutilized by the farmers in the study area. Hence, there is no single farmer found to use the recommended doses of inputs. Such imbalance nutrient use lead to loss of nutrient, improper growth and reduced the yield level as compared to the potential. Thus it is use uneconomic to use imbalance nutrients.

Per hectare costs and returns: From the Table-6 the per hectare gross income received was Rs.33619.20 Rs.62944.00, and Rs. 81534.40 for paddy, high yielding paddy and maize respectively.

Human labour: It can be seen from table that in paddy crop, the use human labour was 80.38 days per hectare , comprising 85.9 days and 50.3 days in case of high yielding paddy and cotton respectively.

Bullock labour: The per hectare use of bullock labour was highest in high yielding paddy, followed by paddy and maize respectively.

Machine power: The per hectare utilization of machine power was observed more (i.e 9.03 hrs) in case of high yielding paddy crop.

Manure: The use of manure was 21.45 quintals per in case of high yielding paddy .The use of manure was not observed to be sufficient in all crops. The use of manure was found less in maize crop.

Fertilizers: In the paddy, the per hectare use of chemical fertilizers i.e. Nitrogen, Phosphorus and Potash was 61.93Kg, 27.69 Kg and 51.00 Kg per hectare respectively. The per hectare use of N, P &K in case high yielding paddy was 67.17 Kg, 22.72 Kg and 55.75 Kg respectively and also in case of maize was 142.86 Kg, 54.59 Kg and 125.42 Kg respectively. The per hectare use of nitrogen was found more in maize crop i. e.142.86 kg.

The per hectare profit at cost 'C' was the highest (Rs. 38846.45) in case maize followed by high yielding paddy (Rs.33840.86) and paddy (Rs24013.71).

The benefit cost ratio at cost 'C' was highest in case of maize (1.91) followed by high yielding paddy (1.86) and paddy (1.40).The benefit cost ratios in all major cereals were observed more than one unity which indicates the cultivation of cereals is economical viable under study area.

4. Conclusion: The inputs used for all crops were below the recommendation. In the economic point of view farmers should allocate their more land resources in the cultivation of maize in upland than high yielding paddy and then general paddy crop in study area. The benefit cost ratios in all major cereals were observed more than one unity which indicates the cultivation of cereals is economical viable under study area.

5. Acknowledgements
This work was supported by district statistical officers Kalahandi, Odisha for giving the data

6.References

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Table1. Distribution of holding in different size groups of sample farms of blocks

Size groups	**Dharmagarh (Region-I)**		**Kalampur (Region-II)**	
	Total No. of sample farms	Average size of operational holding (ha.).	Total No. of sample farms	Average size of operational holding (ha.).
I (below 1.00 ha)	9	0.94	11	0.91
II (1.01 to 2.00 ha)	14	1.72	15	1.63
III (2.01 to 4 .00 ha.)	11	3.01	10	2.95
IV (4.00 and above)	6	7.21	4	7.02
Pooled	**40**	**3.22**	**40**	**3.13**

Table 2. Distribution of own and leased in land in different size groups of sample farms (in hectares)

Size groups	**Dharmagarh (Region-I)**			Kalampur **(Region-II)**		
	Avg.size operational holding	**Own land**	**Leased in land**	**Avg. size of operational holding**	**Own land**	**Leased in land**
I	0.94 (100)	0.82 (87.23)	0.12 12.77)	0.91 (100)	0.85 (93.41)	0.06 (6.59)
II	1.72 (100)	1.36 (79.07)	0.36 20.93)	1.63 (100)	1.45 (88.96)	0.18 (11.04)
III	3.01(100)	1.82 (60.47)	1.19 39.53)	2.95 (100)	2.72 (92.20)	0.23 (7.80)
IV	7.2 (100)	6.5 (90.15)	0.71 (9.85)	7.02 (100)	6.82 (97.15)	0.20 (2.85)
Pooled	**3.22(100)**	**2.62(79.23)**	**0.60(20.77)**	**3.13 (100)**	**2.96(92.93)**	**0.17(7.07)**

(Figures in parenthesis are percentages)

Table 3.Distribution of area under irrigation in different size groups of sample farms

	Dharmagarh (Region-I)			Kalampur **(Region-II)**		
Size groups	**Average size of operation holding (ha)**	**Area under irrigation (in ha)**	**Per cent**	**Average size of operation holding (ha)**	**Area under irrigation (in ha)**	**Per cent**
I	0.94	0.72	76.6	0.91	0.73	80.22
II	1.72	1.32	76.74	1.63	1.28	78.53
III	3.01	2.09	69.44	2.95	2.45	83.05
IV	7.21	5.01	69.49	7.02	5.56	79.2
Pooled	**3.22**	**2.29**	**73.07**	**3.13**	**2.51**	**80.25**

Table 4.Per hectare resources use levels of major cereals

Sl. No.	Particulars	Paddy	High yielding Paddy	Maize hybrid
1	Total Human labour(in days)	80.38	85.90	50.3
2	Bullock power (in pair days)	5.78	6.35	4.95
3	Machine power in hrs	8.38	9.05	6.25
4	Seed (in Kg)	71.35	62.15	5.3
5	Manures (Qtls)	18.05	21.45	11.5
6	Fertilizers (in Kg)			
	N	61.93	67.17	142.86
	P	27.69	22.72	54.59
	K	51.00	55.79	125.42

Table 5. Per hectare resources use gaps for major cereals

Sl. No.	Resources use	Recommended	Actual	Gap	%Gap
PADDY					
1	Seed(Kg)	75.00	71.35	3.65	4.87
2	Manures (Qtls)	25.00	18.05	6.95	27.80
3	Nitrogen (Kg)	60.00	61.93	-1.93	-3.22
4	Phosphorus(kg)	40.00	27.69	12.31	30.78
5	Potash (Kg)	40.00	51.00	-11.00	-27.50
6	Output(Qtl.)	25.00	24.72	0.28	1.12
High yielding Paddy					
1	Seed(Kg)	70.00	62.15	7.85	11.21
2	Manures (Qtls)	25.00	21.45	3.55	14.20
3	Nitrogen (Kg)	80.00	67.17	12.83	16.04
4	Phosphorus(kg)	40.00	22.72	17.28	43.20
5	Potash (Kg)	40.00	55.79	-15.79	-39.48
6	Output(Qtl.)	62.00	44.96	17.04	27.48
Maize hybrid					
1	Seed(Kg)	5.00	5.30	-0.30	-6.00
2	Manures (Qtls)	25.00	11.50	13.50	54.00
3	Nitrogen (Kg)	120.00	142.86	-22.86	-19.05
4	Phosphorus(kg)	60.00	54.59	5.41	9.02
5	Potash (Kg)	60.00	125.42	-65.42	-109.03
6	Output(Qtl.)	70.00	62.24	7.76	11.09

Table 6.Per hectare costs, returns, gross income and b:c- ratio for major cereals

Sl. No.	Particulars	Units	Paddy	High yielding Paddy	Maize hybrid
1	Total cost				
	a)Cost- A	Rs	26112.37	36891.89	25868.90
	b)Cost-B	Rs.	31824.45	45745.94	33296.60
	c)Cost-C	Rs.	40800.58	59027.02	42687.95
2	Profit at				
	a)Cost- A	Rs.	15351.23	21193.27	55665.50
	b)Cost-B	Rs.	18677.33	26226.67	48237.80
	c)Cost-C	Rs.	24013.71	33840.86	38846.45
3	Production	Qtls.	24.72	44.96	62.24
4	Gross income	Rs.	33619.20	62944.00	81534.40
5	B:C-ratio				
	a)Cost- A		2.19	2.97	3.15
	b)Cost-B		1.80	2.40	2.45
	c)Cost-C		1.40	1.86	1.91