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A Study on Economics Analysis of Diversification Farming System in Satpura Plateau Region of Madhya Pradesh, India

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ABSTRACT

The research study entitled “A study on Economics Analysis of Diversification Farming System in Satpura Plateau Region of Madhya Pradesh” has been undertaken to study the location-specific exiting farming system along with their profitability and extent of diversification in the Satpura Plateau Region of Madhya Pradesh. Satpura plateau region of Madhya Pradesh was considered for study purpose. Satpura Plateau Region covers two districts i.e. Chhindwara and Betul. Chhindwara district having 11 blocks and Betul district having 10 blocks. One block from each district (i.e. Chhindwara and Multai) was selected purposively on the basis of more coverage of Agricultural Crops, Horticulture and dairy enterprises. After selection of block, lists of villages were prepared and then five villages were selected from each selected block. The list of farmer those who raised the Agricultural Crops, Horticulture and dairy enterprises were prepared and further categories into three groups on the basis of size of land holdings i.e. small (up to 2.0 ha) medium (2.1 to 4.0 ha) and large (above 4.0 ha) from each size group. Total 42 farmers were considered for detail investigation to fulfill. For the collection of primary data survey method was adopted to conduct the inquiry by personal visit with the help of interview schedule. The estimation of cost and return of different crops, scientific cost concepts were used. The result shows that on an average selling market price of milk (per liter) was observed to be Rs. 25 for all the size groups in dairy enterprise system. On an average of Rs. 126.54 income per day per animal was received from milk, F.Y.M. and dung under dairy enterprise system. More than 95 per cent income received from milk in all the size groups. The maximum gross income was obtained from Cabbage followed by Maize, Wheat, Paddy, Soybean, Marigold and Gram. It was found to be Rs. 82575, 77869, 96785, 69916, 66035, 42560 and 163500 for Paddy, Maize, Soybean, Wheat, Gram, Marigold and Cabbage respectively. The variation in gross income in different crops was observed in all the size groups due to price and level of production of different crops in the study area. Under crop group, the average net, farm business, and family labour income per hectare were observed to be Rs. 43405, 63879 and 49494 respectively. The gross income was found to be Rs. 79425, 77187, 95745, 70750, 65586, 41880 and 160000 for Paddy, Maize, Soybean, Wheat, Gram, Marigold and Cabbage respectively. The average net farm income per hectare was observed to be Rs. 46795, 47882 and 46017 for small, medium and large size group respectively. Dairy enterprise was also found profitable enterprise in the farming system. On an average net profit per annum of dairy were observed to be Rs. 42931, 44490 and 39780 under small, medium and large size group respectively. It could be concluded that farmers of different size groups i.e. small, medium and large adopted farming system which included three components i.e. crop, horticulture and dairy enterprise and this farming system was shows profitable business in the study area. It is revealed that on an average net profit was observed to be under different size groups of farming system, the highest net profit was received from horticulture then other components. It was found Rs. 41816, Rs. 51980 and Rs. 42400 for crop, horticulture and dairy per annum respectively. Over all it could be concluded that the highest net income was received from diversification farming system. Among the diversification farming system i.e. crop + horticulture + dairy enterprise was found most profitable in the study area. There is ample scope for increasing the farm income if farmers adopted diversification farming system in the study area. In this way more income and employment may be generated and improved the economic condition of farming community.

Keywords

Diversification,
Estimation,
Profitability,
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Introduction

Agriculture plays an important role in the economy of Madhya Pradesh as 80 per cent of the total population depends on agriculture. Only 49 per cent of the total geographical area is available for agriculture out of which 43.3 per cent is rain-fed and the holdings are small and scattered. Around 65 per cent of the total land holdings belong to small and marginal farmers occupying only 26 per cent of the cultivated land. Despite all these barring factors, climate of the state, especially in the Satpura Plateau Region is congenial for the cultivation of many vegetables and floricultural crops. Diversification of Agriculture in favour of more competitive and high value enterprises is considered as an important strategy to augment farm income, generate employment, alleviate poverty and conserve precious soil and water resources. High value crops have enormous demand potential in India is reflected by the rapid increase in the consumption of high value food commodities. Indian agriculture is gradually diversifying towards high value crops. So a sound and empirical understanding about the nature of crop diversification in Satpura Plateau Region of Madhya Pradesh and the constraints in accelerating its spread is needed such study would provide a strong support to evolving of appropriate policies for the development of required institutional arrangements and creation of adequate infrastructure for promoting crop diversification in the Satpura Plateau Region. Agricultural diversification is one of the several pathways of agricultural development. The demand for high-value food products such as fruits, vegetables, milk, meat and fish has been increasing rapidly in the domestic, as well as in the global markets. Further, with on-going process of market liberalization and globalization the domestic as well as global markets are moving towards integration. The state of Madhya Pradesh has a congenial agro-

climatic environment favouring cultivation of a variety of seasonal and off-season vegetables, fruits, flowers, spices, and aromatic and medicinal plants. Diversification of agriculture is also adopted as a strategy to minimize risk to lower crop failure where the immediate goal is not to make profit but to stabilize income for survival. Diversification is an age old practice of risk minimization and attainment of stable income from the farm. Farm diversification includes diversification of crops and farm based enterprises to broaden the income base of the farmers, resulting in the increased level of employment, production and income. Dairying being a self-income enterprise is an important alternative to diversify the arable farming for getting more, stable and continuous farm income and higher employment opportunities on smaller farms. However an omnipresent problem facing the farmer these days lies in the decision making about the profitable levels of diversification of crop farming with dairying so as to maximize his farm profits by increasing the productivity of milch animals and crops per unit of land and time with in the frame work scarce resources. The progress in production or steady growth in output is necessary to meet the challenges posed by the present economic, political and technological environment, On the other hand, farmers need to be assured of regular income for living at least above the poverty line. In this context, adoption of farming system approach is one of the important solutions to meet this peculiar situation because in the farming system approach, different enterprises can be undertaken meaningfully and based on the available resources, location-specific system can be developed which will result into sustainable agricultural development. In view of this, the research study has been undertaken to studied the location-specific exiting farming system along with their profitability and extent of diversification in the Satpura Plateau Region of Madhya Pradesh.

Materials and Methods

The Madhya Pradesh state was divided in to following 11 agro climatic zones viz. Chhattisgarh Plains, Northern Hill Region of Chhattisgarh, Kymore Plateau Satpura Hills, Central Narmada Valley Region, Vindhya Plateau Region, Gird Region, Bundelkhand Region, Satpura Plateau Region, Malwa Plateau, Nimar Plains and Jhabua Hill. In which Satpura plateau region of Madhya Pradesh was consider for study purpose as this region is very potential for productivity of different Agricultural Crops and Horticulture and dairy enterprise. Satpura Plateau Region covers two districts i.e. Chhindwara and Betul. Chhindwara district having 11 blocks viz. Chhindwara, Mohakhed, Chourai, Parasia, Junnardeo, Tamia, Amarwara, Harrai, Sausar, Bichua and Pandhurna. Betul district having 10 blocks viz. Betul, Shahapur, Ghoradongri, Chicholi, Bhimpur, Bhainsdehi, Athner, Amla, Multai, and Prabhat Pattan. One block from each district (i.e. Chhindwara and Multai) was selected purposively on the basis of more coverage of Agricultural Crops, Horticulture and dairy enterprises. After selection of block, a list of villages was prepared and then five villages were selected from each selected block. In Chhindwara block five villages namely Sonapur, Gouraiya, Partala, Rohnkala and Chandangaon, and from Multai block five villages namely Dunai, Jaam, Musakhapa, Dunawa and Samriya Pandri were selected on the basis of same criteria as adopted for selection of block.

The list of farmer those who raised the Agricultural Crops, Horticulture and dairy enterprises were prepared and further categories into three groups on the basis of size of land holdings i.e. small (up to 2.0 ha) medium (2.1 to 4.0 ha) and large (above 4.0 ha). For selection of 42 farmers i.e. small (17), medium (16) and large (09). Proportionate random sampling techniques were used.

For the collection of primary data survey method was adopted to conduct the inquiry by personal visit with the help of interview schedule. For estimation of cost and return of different crops, scientific cost concepts were used. For estimation of income, three measures viz., Net farm income, Farm business income and Family labour income were used.

Results and Discussion

Milk production under dairy enterprise

On an average milk production per animal per day was found 4.93 liter under dairy enterprise system. Average milk production per animal per day was increases as size group increased but the difference among the size groups was marginal. Average selling market price of milk (per liter) was observed to be Rs. 25 for all the size groups in dairy enterprise system. The average market price of milk was found Rs. 25 per liter and it was low then the price of milk in the urban area it may be due to selling the milk at the village level. Details about milk production and its price are given in Table 1.

Income from dairy enterprise system

In dairy enterprise, milk was the main source of income, but in additions to milk, income also received by the farmers from F.Y.M. and dung in the study area. On an average of Rs. 126.54 income per day per animal was received from milk, F.Y.M. and dung under dairy enterprise system. More than 95 per cent income received from milk in all the size groups. Details about income from dairy enterprise are given in Table 2.

Net profits from dairy enterprise system

On an average Rs. 77.2 net profit per day per animal was received from dairy enterprise

system. The average cost of production per liter of milk was estimated to be Rs. 10.0. As far as Benefit cost ratio was concerned, on an average it was 1:2.56 which indicates that dairy enterprise is profitable business. Average annual net profit per dairy farm was estimated Rs. 42401 under dairy enterprise system. Net profits from dairy enterprise system are given in Table 3.

Estimation of cost of cultivation

The details about estimated cost of cultivation of selected crop on the basis of cost concept under different size group have been provided in Table 4. In small size group the analysis shows that the total cost of cultivation (cost C₃) per hectare. Under small size groups came to Rs. 34333 and Rs. 50754 in crop group and horticulture group respectively. The cost A₂ represents paid out cost in terms of cash and kind involved in crop production.

Cost A₁ and A₂ of sample farmers are the same due to absence of the practice of leasing and therefore cost A₁ was not mentioned in the table. The percentage of cost A₂ to cost C₃ was estimated to be 44.1, 36.4, 38.6, 41.5, 40.8, 45.6 and 39.5 for Paddy, Maze, Soybean, Wheat, Gram, Marigold and Cabbage respectively. It could be concluded that total cost of cultivation per hectare (cost C₃) was found maximum in Cabbage (Rs. 76850) and minimum (Rs. 30792) in Maize crop. Over all on an average the total cost of cultivation (cost C₃) was found to be (Rs. 42543) per hectare.

Under medium size group of selected farming system the total cost (cost C₃) of cultivation per hectare of Cabbage was higher (Rs. 76315) than remaining crops. The percentage of cost A₂ to cost C₃ was vary under different crops. It was 48.7, 46.7, 51.4, 56.7, 51.2, 50.2 and 51.1 per cent for Paddy, Maize, Soybean, Wheat, Gram, Marigold and Cabbage respectively. It could be concluded that on an average total cost of cultivation per hectare was estimated to be Rs. 38337 and Rs. 51576 for crop and horticulture group. Under the horticulture group, total cost was 27 per cent higher than the crop group which indicates more fund is required for raising horticulture crop.

Large size group of selected farming system the total cost of cultivation (cost C₃) per hectare of horticulture crop group was 25 per cent higher than the crop group. The percentage of cost A₂ to Cost C₃ was vary under different crops. It was observed that 28 per cent more cost is required in horticulture group than the crop group. On an average total cost of cultivation per hectare (cost C₃) was Rs. 37789 and Rs. 50816 for crop and horticulture group. Overall average cost of cultivation per hectare was estimated to be Rs. 44302. Thus it could be concluded that pattern of investment on different crops was near about same in all the categories of size groups. The total cost of cultivation (cost C₃) per hectare of all the selected crops increased with the size of land holding.

Table.1 Milk production under dairy enterprise

Particulars	Small	Medium	Large	Average
Total milk production (liter)	52433	43435	20203	38690
Average milk production per animal per day (liter)	4.94	5.05	4.80	4.93
Average market Price (Rs. per liter)	25	25	25	25

Table.2 Income from dairy enterprise system

Unit: Rs. per day per animal

Sources	Small	Medium	Large	Average
Milk	123.50	126.25	120.00	123.25
F.Y.M.	2.47	2.89	2.12	2.49
Dung	0.92	0.78	0.69	0.79
Total	126.89	129.92	122.81	126.54

Table.3 Net profit from dairy enterprise system

Unit: Rs. per day per animal

Particulars	Small	Medium	Large	Average
Gross income	126.8	129.9	122.8	126.5
Gross expenses	48.6	48.8	50.3	49.3
Net profit	78.2	81.0	72.4	77.2
Average net profit per annum	42931	44490	39780	42401
Cost of production per liter of milk	9.8	9.7	10.5	10.0
Benefit cost ratio	1:2.60	1:2.65	1:2.43	1:2.56
Average no. of milch animal	3	3	3	3

Table.4 Productivity and gross income of selected crops under farming system

Unit Rs./ha

Small size group					
Crops	Productivity Qt./ha.	Value	By Product Qt./ ha.	Value	Gross Income
Paddy	42.36	76248	63.54	3177	79425
Maize	46.78	70170	140.34	7017	77187
Soybean	29.46	94272	29.46	1473	95745
Wheat	45.28	67920	56.60	2830	70750
Gram	25.72	64300	25.72	1286	65586
Marigold	27.92	41880	-	-	41880
Cabbage	320.0	160000	-	-	160000
Medium size group					
Paddy	45.70	82260	68.55	3427	85687
Maize	47.11	70665	141.33	7066	77731
Soybean	28.64	91648	28.64	1432	93080
Wheat	42.54	63810	53.17	2658	66468
Gram	27.69	69225	27.69	1384	70609
Marigold	30.62	45930	-	-	45930
Cabbage	336.0	168000	-	-	168000
Large size group					
Paddy	44.06	79308	66.09	3304	82612
Maize	47.69	71535	143.07	7153	78688
Soybean	31.24	99968	31.24	1562	101530
Wheat	46.42	69630	58.02	2901	72531
Gram	24.28	60700	24.28	1214	61914
Marigold	26.58	39870	-	-	39870
Cabbage	325.0	162500	-	-	162500
Over all average					
Paddy	44.04	79272	66.06	3303	82575
Maize	47.19	70790	141.58	7079	77869
Soybean	29.78	95296	29.78	1489	96785
Wheat	44.74	67120	55.93	2796	69916
Gram	25.89	64741	25.89	1294	66035
Marigold	28.37	42560	-	-	42560
Cabbage	327.0	163500	-	-	163500

Table.5 Cost of cultivation of selected crops (cost concept basis) under farming system

Unit : Rs./ha

Particulars	Crops						Horticulture			Over all average
	Paddy	Maize	Soybean	Wheat	Gram	Average	Marigold	Cabbage	Average	
Small size group										
Cost A ₂	15937 (44.1)	11217 (36.4)	15224 (38.6)	13544 (41.5)	13371 (40.8)	13859 (40.3)	11262 (45.6)	30369 (39.5)	20815 (41.0)	17337 (40.7)
Cost B ₁	17365	12646	16653	14972	14799	15287	12690	31797	22243	18765
Cost B ₂	30602	25510	32610	26764	25730	28243	19670	58464	39067	33655
Cost C ₁	19615	15128	19878	17812	18844	18255	15435	43197	29316	23786
Cost C ₂	32852	27992	35835	29604	29775	31212	22415	69864	46140	38676
Cost C ₃	36138	30792	39419	32565	32753	34333	24657	76850	50754	42543
Medium size group										
Cost A ₂	18702 (48.7)	15803 (46.7)	22452 (51.4)	22953 (56.7)	18152 (51.2)	19612 (51.1)	13482 (50.2)	39061 (51.1)	26272 (50.9)	22942 (51.0)
Cost B ₁	20067	17167	23817	24317	19517	20977	14847	40425	27636	24307
Cost B ₂	34348	30122	39330	35395	31285	34096	22502	68425	45464	39780
Cost C ₁	20592	17788	24127	25706	20451	21733	16743	41377	29060	25396
Cost C ₂	34873	30743	39641	36784	32219	34852	24398	69377	46888	40870
Cost C ₃	38360	33817	43605	40462	35441	38337	26838	76315	51576	44957
Large size group										
Cost A ₂	19153 (50.1)	16162 (47.3)	22913 (50.5)	20586 (54.2)	17948 (53.8)	19352 (51.2)	12826 (52.6)	41013 (53.0)	26920 (52.9)	23136 (52.2)
Cost B ₁	20312	17320	24072	21744	19107	20511	13985	42172	28079	24295
Cost B ₂	34081	30435	40993	33833	29426	33754	20630	69255	44943	39348
Cost C ₁	20960	17910	24291	22419	19974	21111	15518	43147	29332	25222
Cost C ₂	34729	31025	41212	34508	30293	34353	22163	70230	46197	40275
Cost C ₃	38202	34127	45334	37959	33322	37789	24379	77253	50816	44302

Figures in bracket shows the percentage to cost C₃

Table.6 Profitability of selected crops under farming system

Unit : Rs./ha

Particulars	Crops						Horticulture			Over all average
	Paddy	Maize	Soybean	Wheat	Gram	Average	Marigold	Cabbage	Average	
Small size group										
Gross income	79425	77187	95745	70750	65586	77738	41880	160000	100940	89339
Net farm income	43286	46395	56325	38185	32832	43405	17222	83149	50186	46795
Farm business income	63487	65969	80520	57205	52214	63879	30618	129631	80124	72002
Family labour income	48822	51676	63134	43985	39855	49494	22209	101536	61872	55683
Benefit cost ratio	2.19	2.50	2.42	2.17	2.00	2.25	1.69	2.08	1.88	2.06
Cost of production per quintal	778	508	1288	656	1223	890	883	240	561	726
Medium size group										
Gross income	85687	77731	93080	66468	70609	78715	45930	168000	106965	92840
Net farm income	47326	43913	49474	26005	35168	40377	19091	91684	55388	47883
Farm business income	66985	61928	70627	43515	52456	59102	32447	128939	80693	69897
Family labour income	51339	47608	53749	31072	39324	44618	23427	99574	61501	53059
Benefit cost ratio	2.23	2.29	2.13	1.64	1.99	2.05	1.71	2.20	1.95	2.00
Cost of production per quintal	764	567	1472	888	1229	984	876	227	551	768
Large size group										
Gross income	82612	78688	101530	72531	61914	79455	39870	162500	101185	90320
Net farm income	44409	44560	56196	34571	28591	41666	15490	85246	50368	46017
Farm business income	63458	62526	78616	51944	43965	60102	27043	121486	74264	67183
Family labour income	48531	48253	60536	38697	32487	45701	19239	93244	56241	50971
Benefit cost ratio	2.16	2.30	2.23	1.91	1.85	2.09	1.63	2.10	1.86	1.97
Cost of production per quintal	792	565	1401	755	1322	967	917	237	577	772

Table.7 Average profitability of selected crops under farming system

Unit: Rs.

Particulars	Small farmer				Medium farmer				Large farmer			
	Crops	Horticulture	Dairy	Overall	Crops	Horticulture	Dairy	Overall	Crops	Horticulture	Dairy	Overall
Gross expenses	34333	50754	26730	37272	38337	51576	26835	38916	37789	50816	27642	38749
Gross income	77738	100940	69662	82780	78715	106965	71326	85668	79455	101185	67422	82687
Net farm income	43405	50186	-	46795	40377	55388	-	47882	41666	50368	-	46017
Average net profit per annum	-	-	42931	42931	-	-	44490	44490	-	-	39780	39780
Farm business income	63879	80124	-	72002	59102	80693	-	69897	60102	74264	-	67183
Family labour income	49494	61872	-	55683	44618	61501	-	53059	45701	56241	-	50971
Benefit cost ratio	2.25	1.88	2.60	2.24	2.05	1.95	2.65	2.21	2.09	1.86	2.43	2.12
Cost of production per quintal	890	561	-	725	984	551	-	767	967	577	-	772
Cost of production per liter	-	-	9.8	9.8	-	-	9.7	9.7	-	-	10.5	10.5

Crop, Horticulture = Rs. per ha, Dairy = Rs. per annum

Table.8 Average net profit from diversification farming system

Unit: Rs.

Particulars	Small	Medium	Large	Overall
Crop	43405	40377	41666	41816
Horticulture	50186	55388	50368	51980
Dairy	42931	44490	39780	42400
Total	136522	140255	131814	136196

Crop, Horticulture = Rs. per ha, Dairy = Rs. per annum

Gross income from farming system

To estimate the gross income, quantity of main product, by product and its value are required. Details about productivity and gross income of selected crops under farming system are shown in Table 5. Over all the highest productivity was found in Maize on crop groups and Cabbage in horticulture crop groups. The level of productivity of Paddy and Wheat was observed near about at par. The maximum gross income was obtained from Cabbage followed by Maize, Wheat, Paddy, Soybean, Marigold and Gram. It was found to be Rs. 82575, 77869, 96785, 69916, 66035, 42560 and 163500 for Paddy, Maize, Soybean, Wheat, Gram, Marigold and Cabbage respectively. The variation in gross income in different crops was observed in all the size groups due to price and level of production of different crops in the study area.

Profit from farming system

Profit is expressed in this analysis in three forms i.e. net, farm business and family labour income. The details about estimation of income of different size group under farming system have been given in Table 6. Under crop group, the average net, farm business, and family labour income per hectare were observed to be Rs. 43405, 63879 and 49494 respectively. The gross income was found to be Rs. 79425, 77187, 95745, 70750, 65586, 41880 and 160000 for Paddy, Maize, Soybean, Wheat, Gram, Marigold and

Cabbage respectively. Under crop group, the net income was found highest in Soybean crop followed by Paddy, Maize, Wheat and Gram. While in horticulture crop, the net income was more in Cabbage than Marigold and it was 79 per cent higher than Marigold. The net farm income was observed to be Rs. 43286, 46395, 56325, 38185, 32832, 17222 and 83149 for Paddy, Maize, Soybean, Wheat, Gram, Marigold and Cabbage respectively.

The result of B.C. ratio shows that raising all the selected crops are profitable but the variation among the crops was observed. As far as cost of production per quintal was concerned, its shows that more fund are required in Soybean (Rs.1288) than the other crops under small size group. The pattern of net, farm business, family labour income, cost of production per quintal and B.C. ratio was near about same but the variation in amount was observed among the size groups. Over all it could be concluded that the highest net farm income was observed in Soybean in all the size group and also found that the net farm income increases as size group increased.

Average profitability under farming system

The average profitability of different size groups under farming system is given in Table 7. It revealed from the table that net farm income was found more in horticulture group then crop group and dairy enterprise. The farm business income and family labour

income was also observed more in horticulture crop than crop group. Regarding cost of production per quintal, it was more in crop group than the horticulture crop it may be due to more productivity in horticulture crop. The average net farm income per hectare was observed to be Rs. 46795, 47882 and 46017 for small, medium and large size group respectively. Dairy enterprise was also found profitable enterprise in the farming system. On an average net profit per annum of dairy were observed to be Rs. 42931, 44490 and 39780 under small, medium and large size group respectively. Over all it could be concluded that farmers of different size groups i.e. small, medium and large adopted farming system which included three components i.e. crop, horticulture and dairy enterprise and this farming system was shows profitable business in the study area.

Average Net profit from diversification farming system

The detail about estimation of expenses and income of selected farming system was work out and discussed in the previous section. The average net profit under selected farming system are given in Table 8. It is revealed from the table that on an average net profit was observed to be under different size groups of farming system, the highest net profit was received from horticulture then other components. It was found Rs. 41816, Rs. 51980 and Rs. 42400 for crop, horticulture and dairy per annum respectively. Over all it could be concluded that the highest net income was received from diversification farming system.

In Satpura Plateau Region, it was observed that the farming systems followed by the farmers are of varied nature. Among the diversification farming system i.e. crop + horticulture + dairy enterprise was found most profitable in the study area. The farming

system a long term basis can be sustainable when the reasonable balance between crop, horticulture and livestock enterprise would be maintained. Although majority of farmers keep milch animal for household consumption (milk) purpose but if number of milch animal increased then farmers can sell milk to enhance their family income. In view of this it is necessary to motivate the farmers to adopt livestock based farming system suitable to Satpura Plateau Region for proper utilization of resources. There is ample scope for increasing the farm income if farmers adopted diversification farming system in the study area.

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