



An Economic Analysis of Rice Based Cropping Systems in Ratnagiri District of Maharashtra

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ABSTRACT

The study was conducted at Department of Agricultural Economics, Dr. B.S. Konkarni Vidyapeeth, Dapoli Dist. Ratnagiri with objectives to estimate cost, return and profitability of rice based cropping systems in Ratnagiri district of Maharashtra. In this study, primary data were collected from 120 farmers by personal interview method with the help of pre-tested schedule. Simple tabular analysis was applied for the comparison of yields and inputs used by the farmers. Economics of individual crop and crop combination was worked out. The standard cost concepts used in farm management studies. Results showed that in study area six farming systems followed by farmers. From the finding of present study, total cost higher found in FS-I (Rs.109617) and least total cost in FS-IV (Rs. 68436). The per farm gross returns were maximum in FS-III (Rs. 148377) followed by FS-II (Rs.128837), FS-I (Rs. 126304), FS-VI (Rs. 115794), FS-IV (Rs. 87787) and FS-V (Rs.76876), which indicated higher returns in farming systems in which irrigated plantations were undertaken. Among all the farming systems FS-III, FS-II and FS-VI were found highly profitable than other farming systems. The FS-II (Paddy+Pulses+Irrigated plantation) and FS- III (Paddy + Irrigated plantations) plays a major role in profitability of the farming systems. Which underline its importance and need to concentrate on these enterprises for making farming systems more profitable. Therefore, the proper balance between livestock enterprises and crop enterprises need to be encouraged to bring remaining farming systems more profitable.

Keywords: Rice, farming systems, cost and profitability.

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INTRODUCTION

Agriculture has been the major source of livelihood in the Indian economy. Notwithstanding on major diversification in the structure of the economy over the last few years, the dependence on agriculture continues unabated. The pulls and pressures in the agricultural sector continue to exert their influence on the overall cause of economic activity, although the relative dependence of the economy on the agricultural sector has registered a marked decline. The income from cropping alone is hardly sufficient to sustain the farmer's family in case of small and marginal farmers, who constitute 80.3 per cent of agricultural population with only 36 per cent of area operated. With decline in farm size due to explosion of population, it would be increasingly difficult to produce enough food for the family by the end of 21st century.

Farming systems represent integration of farm enterprises viz. cropping systems, animal husbandry, fisheries, forestry, etc. for optimal utilization of resources bringing prosperity to the farmer. Farming system is a system which consists an appropriate combination of farm enterprises like crop, livestock, fisheries, poultry, etc. and means available with farmer to raise them for productivity. The farming systems is a whole farm approach, where in farm is studied in holistically. The farm situation changes with very little spatial change, Therefore, the location of specific farming system should be identified, studied and the profitable farming system which are perfectly suited to a particular location need be suggested. Because crop or any other enterprise can not sustain the farmer in long run. In view of this, study was carried out in Ratnagiri district of Maharashtra state with objectives to study cost, return and profitability of farming system.

MATERIAL AND METHODS

Ratnagiri district of the Konkan region was selected purposively for the study as it has more diversified farming practices. For the selection of farmers, three stages of random sampling technique was followed with tahasil as primary unit, village as second unit and cultivator as ultimate unit. Dapolitahasil of Ratnagiri district from Konkan region was selected purposively for the present study. The list of villages in selected tehsil and list of cultivators along with their land holding was obtained from revenue records and ten villages and twelve cultivators from the concerned villages of Dapolitahasil were selected randomly. Thus final sample consisted of 120 cultivators from ten villages.

Data collected by survey method through personal interviews with the help of comprehensive schedule specially designed for this purpose.

The data were processed for arriving at desired conclusions. The data were arranged in suitable tables and cross tables. Simple statistical tools like arithmetic averages, frequency distribution, percentages and ratios were used. Simple tabular analysis was applied for the comparison of yields, inputs used and labour used by the cultivators, to know the suitable farming systems for the district.

Economics of individual crop and crop combination /crop rotation was worked out. The standard cost concepts used in farm management studies are as follows.

Cost A :

Value of hired human labour + Value of hired bullock labour + Value of owned bullock labour + Hired machinery charged + Value of seed + Value of insecticides and pesticides + Value of manure + Value of fertilizer + Depreciation on implements, machinery and farm buildings.+ Irrigation charges + Land revenue and other ceases + Interest on working capital + Miscellaneous expenses.

Cost B :

Cost A + Imputed rental value of land + Imputed interest on fixed capital.

Cost C :

Cost B + Imputed value of family labour.

RESULTS AND DISCUSSION

Cropping pattern

The area under different crop in different seasons i.e. cropping pattern is another important factor influencing the level of total annual expenses in the farm as well as returns from the farm business. The level of running expenses are influenced by change of crops due to varying quantities of input use. The important crops grown in the study area were Paddy, Finger millet (*Naghi*), Coconut, Arecanut, Cashewnut, and Mango. The pulse crops included Wal, Indian bean (*Pawata*), Lentil, Cowpea etc. The total cropped area was 0.78 hectares in *kharif* season and 0.28 hectares in *rabi* season. The total area under perennial crops was 0.71 hectares. Gross cropped area was 1.78 hectares and net sown area was 1.49 hectares with cropping intensity of 119.60 percent.

Existing farming systems

It was observed from that, in the study area six major farming systems were followed by the farmers, viz, 1) Paddy + Pulses + Dairy (FS-I), 2) Paddy + Pulses + Irrigated plantation (FS-II), 3) Paddy + Irrigated plantations (FS-III), 4) Paddy + Other cereal + Irrigated plantations (FS-IV), 5) Paddy + Dairy (FS-V) 6) Paddy + Rainfed plantations (FS-VI).

The paddy enterprise was observed to be followed in all farming systems. The pulses were grown under FS-I, and FS-II with dairy and irrigated plantations respectively, while other cereals were grown under FS-IV with irrigated plantations. The irrigated plantations and rainfed plantations were grown under FS-III and FS-VI respectively, while dairy was undertaken in FS-V.

The irrigated plantation and pulses were main enterprises followed in addition to paddy in the study area due to suitable agro-climatic situation for these crop.

Profitability of enterprises

The per hectare profitability in case of crop enterprises and per unit profitability for non crop farm enterprises were worked out and same is presented in Table 2.

a) Paddy: It was observed from Table 1 that paddy crop was grown under all the farming systems in the study area. The per hectare gross returns were maximum in FS-III (Rs.45500) followed by in FS- VI (42950). The per hectare gross returns were minimum in FS-IV (33320). However, per hectare cost was also less in FS-IV (Rs.40962) indicating that less use of inputs. The per hectare total cost in FS-III, FS-V, FS-VI was more. The input-output ratios were ranging from Rs.0.81 in FS-IV to Rs. 0.98 in FS-II indicating need to increase adoption of high yielding varieties and also proper utilization of resources.

b) Wal : It was observed from the Table 1 that, wal was grown under FS-I and FS-II. The total cost per hectare in FS-I and FS-II were Rs.36906 and Rs.35237. respectively. The per hectare gross

returns in FS-I and FS-II amounted to Rs. 56000 and Rs. 50400, respectively. In spite of less cost incurred in FS-II, the net return was higher than FS-I. This was due to higher productivity of wal in FS-II, which resulted in higher gross returns. The input output ratio in FS-I and FS-II were Rs. 1.51 and Rs. 1.43, respectively.

c) Hyacinth bean (Indian bean) : The per hectare cost and return structure of Hyacinth bean (Indian bean) depicted in Table 1 showed that, total cost was higher in FS-II than in FS-I due to use of human labour. The gross return in FS-I was greater than in FS-I. The Input-Output ratio were Rs.1.49 and Rs.1.82 in FS-I and FS-II, respectively.

d) Lentil : In case of lentil, the per hectare gross returns worked out to Rs. 29167 in FS-I and Rs. 27273 in FS-II. The total cost of cultivation was Rs. 20066 in FS-I and Rs. 17844 in FS-II. The net income in FS-II was greater than in FS-I. The input-output ratio were ranging from Rs.1.45 in FS-I to Rs. 1.52 in FS-II.

e) Cowpea : It was observed from Table 1 that, cowpea grown under FS-I and FS-II. The total cost per hectare in FS-I and FS-II were Rs. 38813 and Rs.34021. respectively. The per hectare gross returns in FS-I and FS-II amounted to Rs. 71940 and Rs. 56000, respectively. Total cost was higher in FS-I than in FS-II, due to use of bullock and human labour. The gross return in FS-I was greater than in FS-II. The input-output ratios were Rs. 1.85 and Rs. 1.64 in FS-I and FS-II, respectively.

f) Dairy : It was observed from the table that, per animal gross returns were maximum (Rs.44280) in FS-I followed by FS-V (Rs.36698). The per animal total cost of maintenance was minimum (Rs.31661) in FS-V, while it was maximum (Rs.37639) in FS-I. The return per rupee invested at total cost were ranging from Rs. 1.15 in FS-V to Rs.1.18 in FS-I.

g) Coconut : It was revealed that, the coconut was grown under FS-II, FS-III, and FS-IV. The total cost in coconut worked out to Rs.57636, Rs.41167, and Rs.49717. in FS-II, FS-III, and FS-IV respectively. The per hectare total cost of maintenance was minimum (Rs.41167) in FS-III, while it was maximum (Rs.57636) in FS-II. The per hectare gross returns were maximum in FS-II (Rs.111103) followed by in FS-IV (96678). The per hectare gross return were minimum in FS-III (70450). The per hectare net returns was ranging from Rs.29283 to Rs. 53467. The input-output ratio was ranging from Rs.1.71 in FS-III to Rs.1.94 in FS-IV indicating suitability of crop to agro-climatic situation and its high profitability.

h) Arecanut : As indicated in results (Table 1) the per hectare total cost and gross returns for crop grown under FS-III were Rs. 32488 and Rs.47408 respectively. Which lead to net returns per hectare at Rs.14920. The returns per rupee invested was Rs. 1.46, which indicated high profitability of crop.

i) Coconut + Arecanut : In case of coconut + arecanut, it was observed that coconut + arecanut were grown under FS-II, FS-III, and FS-IV. The total cost was minimum in FS-III (Rs.72712) than FS-II and FS-IV. It was also observed that there was very less difference in cost in FS-II and FS-IV. However, despite higher cost in FS-II. The gross return was maximum in FS-II followed by FS-IV. The per hectare net returns was ranging from Rs.63743 (FS-IV) to Rs. 78933 (FS-III). The input-output ratio were Rs. 1.88, Rs.2.08 and Rs.1.77 in FS-II, FS-III and FS-IV, respectively.

j) Finger millet : In finger millet, which was cultivated by the farmers in FS-IV, The per hectare cost and returns structure of finger millet depicted in Table 2 showed that, the per hectare total cost of cultivation was Rs.25480 and gross returns worked out to Rs.23800. The input output ratio was Rs.0.93, indicating low productive efficiency of the crop. Swami (2004) in his study in Ratnagiri district also found that the input output ratio in finger millet was 0.77. The results indicated the need for proper farm management practices in finger millet crop as the crop is being grown in less fertile and eroded lands.

k) Mango : As indicated in results (Table 1) mango was grown only under FS-VI. The per hectare total cost was Rs.41770. The per hectare gross return worked out to Rs.71176, resulting into per hectare net returns at total cost Rs.29406. The input output ratio were found to be higher side (Rs.1.7) which indicated the suitability and economic importance of this crop in the study area.

l) Cashewnut : Cashewnut was observed to be grown only under FS-VI, (Table 1) as an important enterprise in rainfed condition along with mango. The per hectare total cost was Rs. 45428. The per hectare gross returns amounted to Rs. 99840 and per hectare net returns over total cost were Rs. 54412 and input output ratio was Rs.2.19. Similar observation were also recorded by Swami (2004) while studying farming systems in Ratnagiri district of Maharashtra. It could be concluded that cashew was comparatively high income earning crop and required less care and inputs and thus it could be included in the farming system under rainfed conditions.

The per farm cost and returns structure in each major farming system followed by farmers in the study area were estimated independently and they are presented in Table 2.

Table 1 : Profitability of crops grown and other enterprises followed in major farming systems (Rs./ ha.).

Farming Systems	Particulars	Total variable cost (TVC)	Total fixed cost (TFC)	Total cost (TC)	Gross returns	Net income over TVC	Net income over (TC)	Input - output ratio
FS-I	Paddy	33178	9240	42418	40180	7002	-2238	0.94
	Wal	25028	11878	36906	56000	30372	19094	1.51
	Hyacinth bean	17716	9280	26997	40421	22705	13424	1.49
	Lintil	12660	7405	20066	29167	16507	9101	1.45
	Cowpea	24279	14534	38813	71940	47561	33126.72	1.18
	Dairy	34217	3422	37639	44280	10063	6640	1.18
FS-II	Paddy	33956	9637	43593	42560	8504	-1033	0.98
	Wal	24293	10944	35237	50400	26107	15163	1.43
	Hyacinth bean	17044	11077	28121	51200	34156	23079	1.82
	Lintil	10754	7090	17844	27273	16519	9429	1.52
	Cowpea	22143	11877	34021	56000	33357	21979	1.64
	Coconut	35732	21904	57636	111103	75371	53467	1.92
	Arecanut	54582	29848	84431	158771	104189	74340	1.88
FS-III	Paddy	36204	10127	46331	45500	9296	-831	0.97
	Coconut	26038	15128	41167	70450	44412	29283	1.71
	Arecanut	21200	11288	32488	47408	26208	14920	1.46
	Coconut + Arecanut	44051	28661	72712	151645	107594	78933	2.08
FS-IV	Paddy	32856	8097	40962	33320	455	-7642	0.81
	Finger millet	18969	6511	25480	23800	4331	-1680	0.93
	Coconut	30212	19500	49712	96678	66466	46966	1.94
	Coconut + Arecanut	54577	27729	82306	146049	91472	63743	1.77
FS-V	Paddy	34482	9404	43886	41160	6578	-2726	0.93
	Dairy	28239	3422	31661	36698	8459	5037	1.15
FS-VI	Paddy	35057	9703	44760	42950	7393	-1810	0.95
	Mango	26521	15249	41770	71176	44555	29406	1.7
	Cashewnut	25401	20027	45428	99840	74439	54412	2.19

Table 2 Cost and return structure of farming systems(Rs./ farm).

Farming Systems	Total variable cost (TVC)	Total fixed cost (TFC)	Total cost (TC)	Gross returns	Net income	Input -output ratio
FS-I	92086	17531	109617	126304	16587	1.15
FS-II	54966	26303	81002	128837	47835	1.59
FS-III	63821	30582	94403	148377	53374	1.57
FS-IV	49587	18849	68436	87787	19351	1.28
FS-V	61348	11509	72857	76876	4019	1.06
FS-VI	46082	24074	70156	115794	45638	1.65

In study area six major farming systems were observed viz., 1) Paddy + Pulses + Dairy (FS-I), 2) Paddy + Pulses + Irrigated plantation (FS-II), 3) Paddy + Irrigated plantations (FS-III), 4) Paddy + Other cereal + Irrigated plantations (FS-IV), 5) Paddy + Dairy (FS-V), 6) Paddy + Rainfed plantations (FS-VI).

The enterprises followed in FS-I were paddy, wal, Hyacinth bean, lentil, cowpea, and dairy. The per farm total cost and gross returns were Rs.109617 and Rs.126304, respectively. The net returns at total cost was Rs.16587. The input-output ratio was Rs.1.15.

It was observed from Table 2 that, the components of FS-II were paddy, wal, Hyacinth bean, lentil, cowpea, coconut and coconut + arecanut. The per farm total cost was Rs.81002. The per farm gross returns was amounted to Rs.128837. The net returns over total cost was Rs. 47835 and input-output ratio was Rs. 1.59.

In case of FS-III enterprises such as paddy, coconut, arecanut and coconut + arecanut were grown. The per farm total cost was worked out to Rs.94403. The per farm gross returns and net returns were Rs.148377 and Rs.53374, respectively.

The farmers following FS-IV were engaged in cultivation paddy, other cereal, coconut and coconut + arecanut crops. The per farm total cost was Rs.68436. The per farm gross return was worked out to Rs.87787. The net returns over total cost was amounted to Rs.19351. The input-output ratio was Rs.1.28. Regarding FS-V, it was observed that, the enterprises followed under this system were paddy and dairy. The per farm total cost was worked out to Rs.72857. The per farm gross return was amounted to Rs.76876 and net returns over total cost was Rs.4019. The input-output ratio was Rs.1.06.

The enterprises followed in FS-VI were paddy, mango, and cashewnut. The per farm total cost and gross returns worked out to Rs.70156 and Rs.115794, respectively which resulted into net returns of Rs.45638.

It was observed that, total cost was maximum in FS-I (Rs.109617) while it was minimum in FS-IV (Rs.68436). The per farm gross returns were maximum in FS-III (Rs. 148377) followed by FS-II (Rs.128837), FS-I (Rs. 126304), FS-VI (Rs. 115794), FS-IV (Rs. 87787) and FS-V (Rs.76876), which indicated higher returns in farming systems in which irrigated plantations were undertaken. The per farm net returns were maximum in FS- III (Rs. 53374) followed by FS-II (Rs. 47835), FS-VI (Rs. 45638), FS-IV (Rs. 19351), FS-I (Rs.16587), and FS-V (Rs. 4019).

The returns per rupee invested at total cost, were maximum in FS-VI (Rs. 1.65) followed by FS-II (Rs.1.59). In remaining farming systems it was ranging from Rs.1.06 to Rs. 1.57. It could be concluded that, the area under rainfed plantations, irrigated plantations, need to be increased to improve the per farm net returns in case of different farming systems in this study area by bringing cultivable waste land, particularly with high slope or undulating land which is 14.08 per cent in sample households and 16.93 per cent in Ratnagiri district.

Among all, the existing farming systems namely 1) Paddy + Irrigated plantation (FS-III), 2) Paddy + Pulses + Irrigated plantation (FS-II), 3) Paddy + Rainfed plantations (FS-VI) were found to be highly profitable farming systems than remaining farming systems.

CONCLUSION

The irrigated plantations play a very dominant role in profitability of the farming systems. Which underline its importance and need to concentrate on these enterprises for making farming systems more profitable. Thus the proper balance between livestock enterprises and crop enterprises need to be encouraged to bring remaining farming systems more profitable.

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