



Research Article

PROFITABILITY OF MAJOR FARMING SYSTEMS IN NORTH COASTAL ZONE OF ANDHRA PRADESH

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Abstract: The presented study was conducted in north coastal Andhra Pradesh based on the primary data collected from 400 farmers and secondary data on farming situations existing in the zone. The zone totally had 20 farming situations across the three districts viz., Srikakulam, Vizianagaram and Visakhapatnam. The crop and allied activities like dairy, poultry and sheep & goat rearing were considered for the study. The BCR was high in FS-III (1.27), FS-IV (1.38) and FS-VI (1.31) of Srikakulam, Vizianagaram and Visakhapatnam districts respectively. The results further confirmed that the farming systems with allied activities along with crops were more profitable than cropping alone. The farming systems with sheep & goat rearing yielded more returns than any other farming systems. Response Priority Index (RPI) was used to rank the production constraints of farming systems. Scarcity of labour and high production cost were the major constraints identified through response priority index (RPI).

Keywords: Farming system, Cost-return structure, BCR, Constraints, RPI

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Introduction

Agriculture is still the backbone for Indian economy even in the era of industrialization. Agriculture not only plays a vital role in Indian economic development but also provides food and livelihood to half of the population. Due to the advanced technologies in crop production and crop protection, there was huge jump in production of crops noticed. However, the productivity of crops was not so impressive. This stagnation in yield levels and rising input prices, reduce the profitability of agri-business. This forces the present farming community to think in the lines of productivity approach than area approach in increasing profitability of farm business. In these circumstances, it seems Farming System Approach (FSA) is a viable option [1]. Farming system is a complex inter-related set of elements containing crops, livestock and allied activities, which interact among themselves. Different components of farming system are originally linked in a way that there would be material flows from one component to another component. The output of one component serves as input for another component [2]. By this way, farming system provides an opportunity for efficient utilization of inputs which are generating within the system. The studies so far conducted in farming systems were few in Andhra Pradesh and the farming system approach for tackling the agricultural problems gradually gained importance in the current scenario. The study was conducted with the following objectives:

- To identify the existing farming systems in the zone
- To calculate the cost return structure of the major farming systems in zone
- To prioritize the constraints associated with farming systems

Methodology

North coastal zone of Andhra Pradesh state was purposively selected for the

study as this zone has considerable coastal corridor, high altitude zone, variable climatic conditions and location-specific existing farming systems. This zone comprises of three districts viz., Srikakulam, Vizianagaram and Visakhapatnam. DAATT centres of each district divided the district into several farming situations based on irrigation facilities and soil types. A total of 20 farming situations were present in the entire zone i.e., 6 in Srikakulam, 6 in Vizianagaram and 8 in Visakhapatnam. The total mandals under each situation were listed out and the mandal with highest cultivable land was selected, thus 20 mandals from three districts were selected for the study. From each mandal, 2 villages were selected based on highest cultivable land and from each village 10 farmers were selected randomly to make a sample of 400 farmers for study. The primary data collected from selected farmers through pre tested schedules and secondary data collected from Coordinators of DAATTCs and Assistant Statistical Officers of selected mandals [3-11].

Analytical tools used

To identify existing farming systems and their profitability in the zone, the general tabular analysis, costs-returns structure of farming systems, cost concepts etc. were used.

RPI (Response Priority Index): In the quantification of constraints expressed by the respondents, there was a problem whether to give more emphasis for number of responses to a particular priority or to the highest number of responses to a constraint in first priority. But, both lead to different conclusions. To resolve this Responses-Priority Index (RPI) as a product of Proportion of Responses (PR) and Priority Estimate (PE) was adopted.

Table-1 Farming systems practiced by the sample respondents in the study area

Farming systems	Components	Srikakulam (N=120)		Vizianagaram (N=120)		Visakhapatnam (N=160)	
		No.	% to total	No.	% to total	No.	% to total
I	C	28	23.33	26	21.67	45	28.13
II	C+D	37	30.83	39	32.50	41	25.63
III	C+P	15	12.50	14	11.67	18	11.25
IV	C+S&G	11	9.17	13	10.83	6	3.75
V	C+D+P	21	17.50	19	15.83	26	16.25
VI	C+D+S&G	2	1.67	3	2.5	15	9.38
VII	C+P+S&G	2	1.67	2	1.67	3	1.88
VIII	C+D+P+S&G	3	2.5	2	1.67	2	1.25
IX	C+Mu	1	0.83	-	-	1	0.67
X	C+F	-	-	2	1.67	2	1.25
	Total	120	100	120	100	160	100

Note: C= Crops, D= Dairy, P= Poultry, S&G= Sheep & Goat, Mu= Mushroom unit, F=Floriculture

Table-2 Cost return structure of major farming systems practiced in Srikakulam district (Rs./farm)

Particulars	FS-I	FS-II	FS-III	FS-IV	FS-V
Total variable costs (TVC)	176301(73.21%)	238524(74.13)	367690(83.59)	208097(80.93)	462860(81.95)
Total fixed costs (TFC)	64587(26.79)	83303(25.87)	72232(16.41)	49082(19.07)	102069(18.05)
Total costs (TC)	240830(100)	321768(100)	439862(100)	257125(100)	564822(100)
Returns					
Returns from crops	262004(100)	317573(80.51)	279834(50.23)	187912(59.75)	358062(52.08)
Dairy		76895(19.49)			88482(12.87)
Poultry			277252(49.77)		240989(35.05)
Sheep & goat				126579(40.25)	
Gross returns	262004(100)	394468(100)	557085(100)	314491(100)	687533(100)
Net returns	21174	72856	117042	57365	122710
Returns over TC	1.09	1.24	1.27	1.22	1.22

Note: Figures in parentheses indicate percentage to total

Table-3 Cost return structure of major farming systems practiced in Vizianagaram district (Rs./farm)

Particulars	FS-I	FS-II	FS-III	FS-IV	FS-V
Total variable costs (TVC)	159196(72.49)	219681(75.52)	344020(81.95)	199998(79.40)	461050(82.96)
Total fixed costs (TFC)	60465(27.51)	71700(24.48)	75824(18.06)	51886(20.60)	94753(17.04)
Total costs (TC)	219622(100)	290876(100)	419771(100)	251881(100)	555768(100)
Returns					
Returns from crops	248249(100)	257342(77.74)	273934(53.93)	188183(54.09)	305613(44.42)
Dairy		73702(22.26)			74386(10.81)
Poultry			234045(46.07)		308003(44.77)
Sheep & goat				159698(45.90)	
Gross returns	248249(100)	331044(100)	507979(100)	347881(100)	688002(100)
Net returns	28627	39716	63828	89877	132233
Returns over TC	1.13	1.14	1.21	1.38	1.24

Note: Figures in parentheses indicate percentage to total

Table-4 Cost return structure of major farming systems practiced in Visakhapatnam district (Rs./farm)

Particulars	FS-I	FS-II	FS-III	FS-V	FS-VI
Total variable costs (TVC)	195859(73.89)	255634(75.69)	563037(85.25)	404865(82.30)	231191(80.95)
Total fixed costs (TFC)	69230(26.11)	82162(24.31)	97435(14.75)	87095(17.70)	54758(19.05)
Total costs (TC)	265062(100)	337749(100)	660423(100)	491932(100)	285591(100)
Returns					
Returns from crops	297398(100)	301753(81.66)	359160(45.78)	293999(50.63)	191152(51.16)
Dairy		67789(18.34)		73900(12.73)	57373(15.36)
Poultry			425330(54.22)	212722(36.64)	
Sheep & goat					125084(33.48)
Gross returns	297398(100)	369542(100)	784490(100)	580621(100)	373609(100)
Net returns	32337	31794	124062	86609	88018
Returns over TC	1.12	1.09	1.19	1.18	1.31

Note: Figures in parentheses indicates percentage to total

The PR for the i th constraint will give the ratio of number responses for a particular constraint to the total responses as given below:

$$(RPI)_i = \frac{\sum_{j=1}^k F_{ij} \cdot X_{[(k+1)]-j}}{\sum_{i=1}^I \sum_{j=1}^k F_{ij}}$$

Where, $(RPI)_i$ = Response Priority Index for i th constraint.

$\sum_{j=1}^k F_{ij}$ = Total number of responses for the i th constraint.

F_{ij} = Number of responses for the j th priority of i th constraint ($i=1,2,3,\dots,I$;
 $j=1,2,3,\dots,k$).

k = Number of priorities.

$X_{[(k+1)]-j}$ = Scores for j th priority.

$\sum_{i=1}^I \sum_{j=1}^k F_{ij}$ = Total number of responses to all constraints.

Here, Larger the RPI, higher the importance for the particular constraint.

Results and Discussion

Identification of existing and major farming systems

The various components of farming systems identified in the north coastal zone of Andhra Pradesh included crops, dairy, poultry, sheep & goat rearing, mushroom unit and floriculture activities [Table-1].

Table-5 Comparative economics of the major farming systems in the study area

SN	Farming systems	Total variable costs(TVC)	Total fixed costs(TFC)	Total costs(TC)	Gross returns(GR)	Net returns over TC	Net returns over TVC	BCR
Srikakulam district								
1	FS-I	176301	64587	240830	262004	21172	85703	1.09
2	FS-II	238524	83303	321768	394468	72856	155944	1.23
3	FS-III	367690	72232	439862	557085	117042	189395	1.27
4	FS-IV	208097	49082	257125	314491	57365	106394	1.22
5	FS-V	462860	102069	564822	687533	122710	224673	1.22
Vizianagaram district								
1	FS-I	159196	60465	219622	248249	28627	89053	1.13
2	FS-II	219681	71700	290876	331044	39716	111363	1.14
3	FS-III	344020	75824	419771	507979	88210	163959	1.21
4	FS-IV	199998	51886	251824	347881	89877	147883	1.38
5	FS-V	461050	94753	555768	688002	132233	226952	1.24
Visakhapatnam district								
1	FS-I	195859	69230	265062	297398	32337	101539	1.12
2	FS-II	207203	69375	337749	369542	31794	162339	1.09
3	FS-III	563037	97435	660423	784490	124062	221453	1.19
4	FS-V	406011	87896	493879	580621	86742	174610	1.18
5	FS-VI	231191	54758	285591	373609	88018	142418	1.31

Table-6 RPI for prioritization of production problems pertained to farming systems of Study area

S	Production Constraints	Srikakulam		Vizianagaram		Visakhapatnam	
		RPI	Rank	RPI	Rank	RPI	Rank
1	Non availability of quality seed	0.779	3	0.400	7	0.499	6
2	Lack of irrigation facilities	0.406	7	0.786	3	0.703	4
3	Insufficient funds	0.313	8	0.307	8	0.313	8
4	Lack of adequate knowledge	0.614	5	0.698	4	0.613	5
5	High cost of production	0.898	2	0.900	2	0.898	2
6	Scarcity of labour	0.988	1	0.978	1	0.986	1
7	Non availability of credit	0.113	10	0.126	10	0.114	10
8	Untimely availability of inputs	0.187	9	0.187	9	0.186	9
9	Inefficient utilization of inputs	0.703	4	0.618	5	0.405	7
10	Non availability of machinery	0.498	6	0.500	6	0.783	3

As many as 10 farming systems were noticed in Visakhapatnam and 9 farming systems found in Srikakulam and Vizianagaram districts. Dairy was the one of the most common activity noticed in the majority of farming systems identified in the study area. Pagire, *et al.*, [3] also concluded same results in his study on farming systems. A sample of 10 or more respondents practicing any of the above farming systems were considered as major farming systems for further analysis. It was observed from the [Table-1], a total of five farming systems were considered for cost-return structure analysis in Srikakulam, Vizianagaram and Visakhapatnam districts. In Srikakulam and Vizianagaram districts, FS-I, FS-II, FS-III, FS-IV and FS-V were considered whereas in Visakhapatnam, FS-I, FS-II, FS-III, FS-V and FS-VI were finalized for further study.

Cost and return structure of major farming systems in the study area Srikakulam

The results presented in [Table-2] confirmed that FS-III (1.27) was most profitable farming system with net returns of Rs. 117042 among the identified farming systems in the Srikakulam district. Similar results were observed in [4]. The BCRs of FS-I, FS-II, FS-IV and FS-V were 1.09, 1.24, 1.22 and 1.22 respectively. The crop component contribution in total returns was less in FS-III (50.23%) followed by FS-V (52.08%) and FS-IV (59.75%). The income from dairy was less when compared with other allied activities like poultry and sheep & goat. The farming systems with allied activities like dairy, poultry and sheep & goat were more profitable. The less profitability in FS-I was due to lower yields and higher cost of production.

Vizianagaram

From the results presented in [Table-3], FS-IV (1.38) was most profitable farming system with net returns of Rs. 89877 among the identified farming systems in the Vizianagaram district. The dairy component income in FS-II and FS-V was Rs. 73702 and Rs. 74386 respectively. The share of crop component income was lowest in FS-V (44.42%) followed by FS-III (53.93%) and FS-IV (54.09%) inferring that when the allied activities like dairy, poultry and sheep & goat were included in

a farming system, the returns from crops sector was decreases due to diversion of concentration on these allied sectors. The BCRs of FS-I, FS-II, FS-III and FS-V were 1.13, 1.14, 1.23 and 1.24 respectively.

Visakhapatnam

The total costs and returns from FS-VI were Rs. 285591 and Rs. 373609, which recorded the highest with BCR of 1.31 [Table-4]. Even though the net returns were more in FS-III, the increased costs decreased the return per rupee investment. Dairy was most common component in FS-II, FS-V and FS-VI of Visakhapatnam. The income share of poultry was highest in FS-III (54.22) followed by FS-V (36.64). The BCRs of FS-I, FS-II, FS-III and FS-V were 1.12, 1.09, 1.19 and 1.18 respectively. Unlike Srikakulam and Vizianagaram, the return per rupee investment was lowest in FS-II of Visakhapatnam.

Comparative economics of major farming systems of study area

The cost and returns of farming systems in a region cannot be compared with each other due to specific demographic features of respective farming situations. However, a critical look at the components of farming systems in [Table-5] suggested that FS-III (1.27), FS-IV (1.38) and FS-VI (1.31) of Srikakulam, Vizianagaram and Visakhapatnam districts respectively were the most profitable farming systems. A comparison of similar farming systems across districts concluded that FS-I and FS-V were more profitable in Visakhapatnam with net return of Rs. 32337 and Rs. 86742 respectively. Whereas, FS-II and FS-III of Srikakulam district were more profitable than similar farming systems of Vizianagaram and Visakhapatnam with net returns of Rs. 72856 and Rs. 117042. In a nut shell, FS-IV of Vizianagaram was the most profitable (Rs.89877) among all the major farming systems of study area with BCR of 1.38. Similar results were reported [5].

Production constraints

The major problem identified in production was the scarcity of labour in all three districts of study area [Table-6].

The main reason for this was finding off-farm works which were more profitable. As a result of scarcity of labour, the wage rates were gradually increasing, which in turn increases the cost of production. Same constraint reported as major one in farming systems research conducted [6]. Hence, high cost of production was second major problem in the study area with RPI of 0.898, 0.900 and 0.898 in Srikakulam, Vizianagaram and Visakhapatnam districts. Lack of irrigation facilities was the third (0.786) problem in Vizianagaram and fourth (0.703) problem in Visakhapatnam districts as the crops grown under these two districts were mostly rainfed in nature. Lack of technical knowledge was the fifth problem observed in Srikakulam (0.614) and Visakhapatnam (0.613) districts. Insufficient funds, untimely availability of inputs and lack of credit facilities were other problems with least significance.

Summary and Conclusion

The study has revealed the existing farming system in the north coastal Andhra Pradesh according to the farming situations in the zone. The farming systems when combined with allied activities like poultry and sheep & goat were more profitable in all three districts. The sheep and goat component were most profitable due to less maintenance cost as they completely raised by grazing of public lands. Due to the social stigma attached to the sheep & goat rearing, only small farmers had taken up this activity. The region-specific farming systems have to be promoted for profitability and for enhancing total income of farmers.

Application of research: Implementation of profitable farming systems and problems associated with them

Research Category: Agricultural Economics, Farming systems

Abbreviations: Rs. = Rupees, RPI = Response Priority Index, BCR = Benefit Cost Ratio, FS= Farming systems

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Study area / Sample Collection: North Coastal Zone of Andhra Pradesh

Cultivar / Variety / Breed name: Nil

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