Available online at www.ijpab.com

DOI: http://dx.doi.org/10.18782/2320-7051.7217

ISSN: 2320 – 7051

Int. J. Pure App. Biosci. **6 (6):** 833-837 (2018)

Research Article

International Journal of Pure & Applied Bioscience

OPEN ACCESS

Analysis of Productivity And Profitability of Existing Cropping System and Integrated Farming System in Varied Agro Climatic Zones of Karnataka Under Rain Fed Condition

Nagaraju and Ningaraju G. K.*

Department of Agronomy, College of Agriculture, UAS, GKVK, Bengaluru-65

*Corresponding Author E-mail: rajuagron@gmail.com

Received: 2.10.2018 | Revised: 14.11.2018 | Accepted: 21.11.2018

ABSTRACT

Karnataka scenario 80 per cent of small and marginal farmers operational land holding is less than 2 ha and they growing monocrop or commercial crop having less profitable due to many constraints. From field survey in Agro Climatic Zones of Karnataka revealed that, among the different cropping system integrated farming system has recorded higher average gross returns (Rs. 2,19,343), net returns (Rs.1,35,850) and benefit cost ratio (2.76) over the conventional mono cropping in all the zones of Karnataka. Higher Profitability and productivity with lesser cost of cultivation of integrated farming system is mainly due to the year round employment generation, reduced dependency on external inputs and components of integrated farming system act as insurance under unexpected crop losses by climate vagaries.

Key words: *Rain fed condition, Productivity, Profitability and Integrated farming system.*

INTRODUCTION

Karnataka is a state of diverse cultures and faiths. The social and economic scenario in the state is marked by a lot of regional disparities. The state has 10 Agro Climatic Zones including plains, plateau and hills in its 30 districts and 176 Taluks. Agriculture is the backbone of the people in Karnataka and is characterized by wide crop diversification. The state has 66 per cent of rural population and 56 per cent of the workers have been classified under the cultivators and agricultural laborers

In Karnataka, majority of the farmers holds less than 2 ha of land. These farmers generally practice conventional farming, where they need to produce continuous reliable and balanced supply of food as well as cash for basic needs and recurrent farm expenditure. So these need to develop suitable integrated farming system for farmers to avoid the crop loss and to generate employment and income generation throughout year.

The production system adopted during green revolution was explorative and the natural resources like soil and water were subjected to immense pressure beyond carrying capacity[7].

Cite this article: Nagaraju and Ningaraju, G.K., Analysis of Productivity and Profitability of Existing Cropping System and Integrated Farming System in Varied Agro Climatic Zones of Karnataka Under Rain Fed Condition, *Int. J. Pure App. Biosci.* **6(6):** 833-837 (2018). doi: http://dx.doi.org/10.18782/2320-7051.7217

This leads to degradation of not only the crop system but also to the life supporting environment as whole. As a result sustainability of agricultural production system and the farming system has faced crisis[4]. The objectives of farming system in general are converging on to the development of suitable location specific farm technology to raise and sustain the total farm productivity in terms of food, feed, fodder and fuel and to meet the felt needs of the farmers within the sphere of their agro-socio-political favorites and constraints[2]. The sustenance of increased productivity must emphasize on the development of strategies aimed at maintaining improved yields without depleting natural resources or destabilizing the environment.

Today, concerns regarding environmental safety and sustainability of land productivity are increasing among scientists, administrators and environmentalists. It is doubted whether the strategy adopted during the green revolution era could be continued any longer under the challenging conditions of this new century. Already, a section of people in the world is questioning the propriety of conventional agriculture and a few of them are advocating alternative practices that are perceived to lay foundation for sustained production. On these lines, systems like alternative agriculture, natural farming, organic farming *etc*. were proposed at various conventions. However, the scientists harping on the success of green revolution continue to doubt whether such a system can really be functional, productive and meet the growing demands for agricultural products in this e-age. These emphasize the need to develop new strategy of living with the nature and nurturing it for sustainable production.

The Integrated Farming Systems (IFS) therefore assumes greater importance for sound management of farm resources to enhance the farm productivity and reduce the environmental degradation, improve the quality of life of resource poor farmers and maintain sustainability. In order to sustain a positive growth rate in agriculture, a holistic approach is the need of the hour. Farming system is a mix of farm enterprises in which farm families allocate resources for efficient utilization of the existing enterprises for enhancing productivity and profitability of the farm. These farm enterprises are crop, livestock, aquaculture, agro-forestry, agri-horticulture and sericulture.

Integrated farming system approach is not only a reliable way of obtaining fairly high productivity with considerable scope for resource recycling, but also concept of ecological soundness leading to sustainable agriculture. With increasing energy crisis due to shrinking of non-renewable fossil-fuel based sources, the fertilizer nutrient costs have increased steeply and with gradual withdrawal of fertilizer subsidy. It is expected to have further hike in the cost of fertilizers. This will leave the farmers with no option but to fully explore the potential alternate sources of plant nutrients at least for the partial substitution of the fertilizer nutrients for individual crops and in the cropping systems. Keeping these views conducted a survey work in all the Agro climatic Zones of Karnataka to know the productivity and profitability of existing mono cropping system and integrated farming system to develop a suitable IFS model for resource poor small and marginal farmers under rain fed situation of Karnataka.

MATERIAL AND METHODS

Survey conducted under ICAR-Emeritus scientist scheme project entitled "Studies on System Productivity, Sustainability and Livelihood Security of Integrated Farming System under Rainfed and Irrigated System", to know the existing cropping system and integrated farming system productivity and profitability in different zones of Karnataka with the objective of development of efficient integrated farming system model for resource poor farmers of different Agro Climatic Zones of Karnataka.

Components in Integrated Farming System (Rainfed)

- One hectare is developed on watershed concept by putting soil and moisture

conservation structure including surface water harvesting

- Graded bunds , water ways with drop structure and farm pond

➢ Area is divided into blocks

➢ Introduction of suitable crops and cropping systems cereals, pulses, oilseeds, flower crops and vegetables in sequence or as intercrops which is suitable for particular Zone.

➢ Agroforestry –

- Dry land Horticulture fruit crops Mango, Sapota, Guava, Jackfruit, Tamarind, Gooseberry etc
- Bund and Boundary planting trees – Melia, Glyricedia, Sesbania, Silver oak, Casurina, Neem, Pongamia and Mulberry

➢ Livestock – Mulching cow, Sheep, Goat, Rabbit, Pig, and Poultry birds etc.

➢ Recycling of farm waste - Compost and Vermicompost, Bio digester and Biogas

➢ Multiple use of water for high value crops - Flowers, Composite Fish Culture

➢ Kitchen garden – Greens and Vegetables

Technologies in integrated farming system:

- Soil and moisture conservation, water harvesting
- Improved crops and cropping system
- Livestock and fish production
- Agroforestry
- Biogas and bio digester
- Azolla production
- Compost and vermi compost
- Honeybee production

Profitability: It is defined as the net income of the farmer from agriculture and allied enterprises expressed in rupees. This variable was measured by using the procedure developed by Shivaprasad[8] where the net income of the farmer from agriculture and allied enterprises was taken into consideration to measure the profitability.

Net returns= Gross returns - Cost of cultivation

Benefit: cost ratio (B: C)

The benefit: cost ratio was calculated as follows.

$$\text{B:C ratio} = \frac{\text{Gross returns (Rs. ha}^{-1}\text{)}}{\text{Cost of cultivation (Rs. ha}^{-1}\text{)}}$$

RESULTS AND DISCUSSION

The present study is definite to yield data on the socio-economic characteristics of small and marginal farmers of Karnataka. This will enable to understand the existing farming system really played a role in their sustainable livelihood. The present investigation also ascertained the existing integrated farming systems in the study area. This will be helpful in understanding of the supplementary and complementary relationship among different enterprises for effective development, dissemination and adoption of suitable integrated farming system technologies to the existing farming system. A critical analysis of rural livelihood security would provide an insight into the strengths and weaknesses of the small and marginal farmers in their endeavor. The present investigation assessed the perception of farmers towards the reduction in vulnerability in conventional farming. The productivity and profitability under dry land conditions was comparatively low as compared to irrigated condition. Results of the survey indicated that, productivity of the mono cropping system was as low as compared to integrated farming system. Integrated farming system (IFS) recorded higher productivity and profitability than farmers practice method. The farmers practice method recorded gross returns of Rs. 62981, net returns of Rs. 22447 with 1.49 B: C ratio (Table 2). Integrated farming system method recorded higher gross returns (Rs. 2, 19,343), net returns (Rs. 1,35,850) and benefit cost ratio (2.76). Because this method comprises the components like cropping, vermicomposting, goat rearing and cattle (bullocks, cow and calves) rearing. Among components studied in rainfed IFS method, field crops + diary + vermicomposting unit was more profitable than growing of single crop. Similar results were reported by Jayanthi *et al.*[5], Channabasavanna *et al.*[3], Kamble Anand Shankar *et al.*[6].

Table 1: Existing cropping system and type of soil in different Zones of Karnataka

Sl. No.	Name of the zone	Soil type	Existing cropping system
01	North Eastern Transition Zone (7 taluks)	Shallow to medium black clay soils in major areas. Red lateritic soils in remaining areas.	Jowar, Blackgram, Greengram, Redgram, Bajra, Sunflower, Sesamum, Niger, Paddy, Sugarcane
02	North Eastern Dry Zone (11 taluks)	Deep to very deep black clay soils in major areas. Shallow to medium black soils in minor pockets.	Redgram, Sunflower, Ground nut, Bajra, Green gram, Blackgram, Sesamum, Jowar, Cotton, Sugarcane, Paddy
03	Northern Dry Zone (35 taluks)	Black clay medium and deep in major areas, sand loams in remaining areas.	Bajra, paddy, Ground nut, Sunflower, Jowar, Sesamum, Green gram, Horse gram, Cowpea, Cotton, Redgram, Castor, Niger, Maize and Millets
04	Central Dry Zone (17 taluks)	Red Sandy loams in major areas, shallow to deep black soil in remaining areas.	Ground nut, Ragi, Maize, Jowar, Sunflower, Red gram, Field bean, Paddy, Sesamum, Horse gram and Cotton
05	Eastern Dry Zone (24 taluks)	Red loamy soils in major areas, clay lateritic soils in remaining areas.	Ragi, Paddy, Field bean, Maize, Groundnut, Castor, Niger, Horse gram, Red gram, Cowpea and Bengal gram
06	Southern Dry Zone (18 taluks)	Red sandy loams in major areas and in remaining areas, pockets of black soils.	Paddy, Ragi, Jowar, Maize, Red gram, Horsegram, Cowpea, Fieldbean, Ground nut, Sesamum, Castor, Niger, Cotton, Tobacco and Sugar cane
07	Southern Transition Zone (14 taluks)	Red sandy loams in major areas and in remaining areas, red loamy soils.	Ragi, Paddy, Maize, Jowar, Redgram, Horsegram, Cowpea, Fieldbeen, Castor, Niger, Sunflower, Sesamum, Groundnut, Cotton, Tobacco and Sugarcane.
08	Northern Transition Zone (14 taluks)	Shallow to medium black clay soils and red sandy loamy soils in equal proportion.	Ground nut, Jowar, Maize, Paddy, Cotton, Sugarcane, Tobacco, Bajra, Redgram, Sunflower, Soybean, Green gram, Horsegram, Field been, Cowpea, Millets.
09	Hilly Zone (22 talukas)	Red clay loamy soils in major areas.	Paddy, Maize, Sugarcane, Black gram and Green gram
10	Coastal Zone (13talukas)	Red lateritic and coastal alluvial.	Paddy, Maize and Sugarcane

Anonymous (2016)

Table 2: Productivity and profitability of existing cropping system and suggested integrated farming system in different zones of Karnataka

Name of the zone	Existing mono cropping					Integrated Farming System		
	Crop	Average yield (kg ha^{-1})	Gross Returns (Rs.)	Net returns (Rs.)	B:c ratio	Gross Returns (Rs.)	Net returns (Rs.)	B:c ratio
North Eastern Transition Zone (7 taluks)	Jowar	2053.4	40247	10641	1.36	208435	150710	3.61
	Redgram	2590.6	104376	58188	2.26			
North Eastern Dry Zone (11 taluks)	Jowar	1538.33	39996	13918	1.53	232090	159533	3.18
	Bajra	1467.57	27883	4404	1.19			
Northern Dry Zone (35 taluks)	Bajra	1431.0	27360	3881	1.17	250250	160650	2.79
	Maize	3167.2	58592	8773	1.18			
Central Dry Zone (17 taluks)	Finger millet	1918.0	59458	29154	1.96	225888	143196	2.50
	Fieldbean	1465.7	48367	15998	1.49			
Eastern Dry Zone (24 taluks)	Maize	2920.0	49640	10660	1.27	249475	182875	3.74
	Finger millet	2242.8	64975	26670	1.70			
Southern Dry Zone (18 taluks)	Sugarcane	108.7 t ha^{-1}	252510	140615	2.25	226500	135000	2.48
	Finger millet	1591.3	49331	19027	1.62			
Southern Transition Zone (14 taluks)	Maize	3613.25	66845	26745	1.67	195000	117000	2.5
	Finger millet	1809.5	56094	25790	1.85			
Northern Transition Zone (14 taluks)	Jowar	1428.0	37128	11050	1.42	197452	103852	2.10
	Maize	2780.3	51436	12476	1.32			
Hilly Zone (22 taluks)	Paddy	3839.0	61424	8330	1.16	198585	93930	2.11
	maize	3356.7	62098	13279	1.27			
Coastal Zone (13 taluks)	Paddy	3545.0	56720	6575	1.13	209763	111763	2.62
	Maize	2440.3	45146	2777	1.07			
Average			**62981.30**	**22447.55**	**1.49**	**219343.8**	**135850.9**	**2.76**

CONCLUSION

Integrated farming system as an option to improve livelihood security among small and marginal farmers in rain fed condition of Karnataka. It has been highlighted that if properly managed, it can be a powerful tool for poverty reduction and socio-economic empowerment of the farmers. In backward regions, risk resilient approaches like integrated farming system approach play a greater role for enhancing the farm productivity and income, and further the livelihoods of small and marginal farmers.

REFERENCES

1. Anonymous, Directorate of statistics, Government of Karnataka (2016).
2. Channabasavanna, A. S., Investigations on the Rice based farming system in Tunga Badhra Project of Karnataka. *Ph.D. Thesis*, Dept, Agron, Uni, Agric, Sci., Dharwad (2000).
3. Channabasavanna, A. S., Biradar, D. P., Prabhudev, K. N. and Hegde, M., Development of profitable integrated farming system model for small and medium farmers of Tungabhadra project area of Karnataka, *Karnataka J. Agric. Sci.*, **22(1):** 25-27 (2009).
4. Dent, J. B., *System Theory Applied to Agriculture and Food Chain*. Elsevier, Amsterdam (1990).
5. Jayanthi, C., Baluswamy, M., Chinnusamy, C. and Mythily, S., Integrated nutrient supply system of linked components in lowland integrated farming system, *Indian J. Argon.*, **48:** 241-246 (2003).
6. Kamble, A. N. and Shankar, Yogeesh, L. N., Prashant, S. M., Sheik Peer, P. and Desai, B. K., Integrated Farming System: Profitable Farming to Small Farmers, *Int. J. Curr. Microbiol. App. Sci*, **6(10):** 2819-2824 (2017).
7. Mahapatra, I. C., Roy, J. K., Sinhababu, D. P. and Behera, U. K., Rice-based farming system for livelihood improvement of Indian farming (In:) *Extended Summaries of National Symposium on Research Priorities and Strategies in Rice Production System for Second Green Revolution*, 20-22 November 2007, Association of Rice Research Workers, CRRI, Cuttuck, India pp. 16-18 (2007).
8. Shivaprasad, M. V., An analysis of farming system with reference to cropping pattern, profitability and behavioral characteristics of farmers of the southern dry zone of Karnataka state. *M. Sc. (Agri.) Thesis*, Univ. Agric. Sci., Bangalore (1982).