

Original Research Article

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Economic Performance of Different IFS Components under Different Conditions of North Eastern Transition Zone of Karnataka

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ABSTRACT

Traditional farming system used by farmers in India are based on centuries of experience characterized by mixed farming involving crop production with one or more enterprises like dairy, poultry, sericulture, piggery, sheep, goat, fisheries and bee-keeping. The main aims were to achieve stability of production, provide subsistence for the family and guard against weather aberrations and other environmental stresses. In recent years, farming system gave scientific touch to the existing practices and found ways and means to make it sustainable in changing global scenario. To explore the components in farming system the study was undertaken in North Eastern Transition Zone of Karnataka, to know the different economic performance of different components followed by IFS farmers. The list of farmers practicing IFS has been prepared and categorized into dryland and irrigated conditions based on discussion with field facilitators, Agriculture officers and Horticulture officers. There are around 180 farmers practicing integrated farming system were selected randomly, of which 90 farmers comes under dryland and 90 farmers under irrigated condition. The findings under dryland condition shows that, yield of jowar was 12.25 q/ha and returns per rupee of investment was 1.28, whereas yield of soyabean was 12 q/ha and returns per rupee of investment was 1.15 followed by redgram (11.25 q/ha and 1.74) and greengram (11 q/ha and 1.63). The findings under irrigation condition show that, the yield of flower crops was 82.50 q/ha and returns per rupee of investment was 2.52 followed by papaya (1655 q/ha and 2.23), banana (1450 q/ha and 2.25) and mango (542.5 q/ha and 2.13) respectively.

Keywords

Economic, Performance, Dryland, Irrigated, IFS, Yield, Returns/ rupee of investment

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Introduction

The most significant achievement in India after independence is the self reliance in food

grain production. The use of high yielding varieties, irrigation facilities, higher application of fertilizers and pesticides contributed to sufficient food grain production

in the mid 60's and 70's of the last century. Later on development in the other enterprises like dairy, poultry, piggery, fishery, goat farming, sericulture *etc.*, took place in an isolated manner. However the productivity of high yielding varieties and hybrids became stagnant during last decade and with limited scope for increasing the cultivable land and the country's food security is likely to be threatened in the future. The human population of India has increased to 1210.2 million at a growth rate of 1.76 per cent in 2011 over 2001 (1028.7 million) and is estimated to increase further to 1530 million by 2030 (Census of India, 2011). There are projections that demand for food grains would increase from 234 million tonnes in 2009-10 to 345 million tonnes in 2030 (Government of India, 2009). Hence, in the next two decades the production of food grains needs to be increased @ 5.5 million tons annually. Simultaneously, the demand for high-value commodities *viz.*, fruits, vegetables, livestock products, fish, poultry *etc.*, are increasing faster than food grains and is expected to increase by 100 per cent by 2030. To tackle this situation diversification of crop is very necessary to utilize unexplored and little explored resources to raise the income. The goal of diversification in agriculture is to stabilize the farm income particularly on small farms and to withstand the challenges of trade liberalization. Therefore, crop diversification from less remunerative to more remunerative crops, need based, demand driven, location specific and national goal seeking is a continuous and dynamic concept, which involves spatial, temporal, value addition and resource complementary approaches. This diversified food basket will provide food security and improve the quality of life by adding to nutritional status of people. Therefore in the present paper an attempt has been made to assess the performance of crop components in dryland and irrigated condition under IFS.

Materials and Methods

To address the above mentioned issues, the paper uses findings of the study carried out in North Eastern Transition Zone of Karnataka during 2019-20. The Zone consists of two districts *viz.* Bidar and Kalaburagi. Taluks selected for the study were Bidar, Humanabad, Bhalki, Basavakalyan from Bidar district, Chincholi and Aland from Kalaburagi district. For the present study, multistage random sampling procedure was adopted for selection of sample farmers. In first stage, four taluks from Bidar district and two taluks from Kalaburagi districts were selected. In the second stage, a list of hoblis where more number of integrated farming system farmers has been prepared in consultation with officials of Department of Agriculture and Department of Horticulture working in the respective districts and also personal visits to KVKs, RSKs and some of the IFS farmers, the list of farmers actually practicing IFS and hoblis have been selected from each selected taluks. Further 3 hoblis were selected based on maximum number of IFS practicing farmers under each selected taluks, thus making a total of 18 hoblis. Nine hoblis explicitly Mannalli, Bagdal, Janwada from Bidar taluk, Bhalki, Halbarga, Khatak Chincholi from Bhalki taluk and Nirna, Hallikhed B, Humnabad from Humanabad taluk were selected under irrigated condition. Similarly, Hulasur, Mudabi, Basavakalyan from Basavakalyan taluk, Aland, Kajoni, Nimbarga from Aland taluk and Chincholi, Kodli and Sulepet from Chincholi taluk were selected under dryland condition.

From each hobli ten farmers were selected randomly thus making of 90 sample size of IFS practicing farmers under irrigated condition. Similar procedure was followed for selection of dryland IFS practicing farmers, hence making a total sample size of 180 farmers for the study.

The data was collected on major component under IFS through personal interview method with the help of interview schedule in an informal atmosphere either in home or field. The data collected was represents the yield and returns/ rupee of investment.

Results and Discussion

The yield and return/ rupee of investment of major IFS components under dryland and irrigated condition was presented in Table 1 and 2 respectively. The major crops under dryland condition was redgram, black gram, soya bean, green gram and Bengal gram under pulse crops and jowar belongs to cereal crop. Further in irrigated condition redgram, black gram, soya bean, Sugar cane, green gram and Bengal gram under pulse crops and jowar belongs to cereal crop. Whereas mango, papaya, banana and flower crops belongs to horticulture crops.

The data presented in Table 1 revealed the yield and returns per rupee of investment, the yield of jowar was 12.25 q/ha and returns per rupee of investment was 1.28, whereas yield of soyabean was 12 q/ha and returns per rupee of investment was 1.15 followed by redgram (11.25 q/ha and 1.74) greengram (11 q/ha and 1.63), blackgram (10.75 q/ha and 1.39), and bengalgram (10.50 q/ha and 1.28). In dryland condition the availability of irrigation water is very less or almost negligible and farmers' depend up on rain water directly for crop cultivation. Rain water was not available during the survey period because there was a saviour drought and availability of rain water was also low. The highest returns per rupee of investment was noticed in jowar because the extent of inputs used in the jowar was low as compared to other crops, and it required less water compared to other crops, farmers grow *rabi* jowar as it is staple food crop and source of fodder component.

A glance at Table 2 revealed that data on yield and returns per rupee of investment of crop component. The yield of sugarcane was 90.55 ton/ha and returns per rupee of investment was 2.40 followed by soyabean (18.75 q/ha and 1.70), redgram (17.53 q/ha and 2.51), jowar (16.75 q/ha and 1.65), bengalgram (16.25 q/ha and 2.09) blackgram (15.50 q/ha and 1.87), greengram (14.00 q/ha and 1.90). Further it also revealed the data on horticulture component, the yield of flower crops was 82.50 q/ha and returns per rupee of investment was 2.52 followed by papaya (1655 q/ha and 2.23), banana (1450 q/ha and 2.25) and mango (542.5 q/ha and 2.13) respectively. Under irrigated condition the return/ rupee of investment was more in flower crops because of adequate favourable condition and requirement of labour is also less for growing flower crops. The greatest advantage is that, flowers needs much less land and water for production when compared to other agricultural crops and it also ensures the prices around the year. The net profit against the actual investment is much higher form flowers when compared the conventional crops and flower crops are always high in demand. The returns per rupee of investment was more under irrigated condition because even though there was a saviour drought but availability of water for irrigation was more compare to dry land farmers for irrigation purpose because maximum farmers under irrigated condition were had borewell, open well, farm pond *etc.* which helped them to provide irrigation during critical situation.

The data in Table 3 revealed that results of dryland farmers, 67.78 per cent of farmers possessed 2 to 3 bullocks followed by four and above bullocks (3.33 %). Whereas nearly six (5.55 %) per cent of farmers possessed one buffalo while a very less (4.44 %) per cent of farmers possessed one cow. It is interesting to know that, majority (61.11 %)

of farmers possessed more than 3 numbers of goat/sheep while slightly more than one fourth (26.66 %) of farmers possessed two to three goat/ sheep. In case of poultry one third (33.33 %) of farmers possessed more than 3 poultry birds a meagre (6.66 %) per cent of farmers had less than 2 to 3 poultry birds.

In case of irrigated condition, two fifth (44.44 %) of farmers possessed 2 to 3 bullocks followed by more than three (12.22 %). Further, more than two fifth (46.67 %) of farmers possessed 2 to 3 buffalos followed by more than three (15.56 %) and only 10.00 per cent of farmers possessed one buffalo. It is also be noticed from the Table slight more than one fourth (25.56 %) of farmers possessed 2 to 3 cow, while nearly seventeen (16.67 %) per cent of farmers possessed more than three cow and around sixteen (15.56 %) per cent of farmers possessed one cow. It is interesting to know that, nearly one fourth (23.33 %) of farmers' possessed more than 3 goat/sheep followed by two to three (16.67 %) and a very negligible (3.33 %) per cent of

farmers possessed one 3.33 goat/sheep. In case of poultry nearly one third (31.11 %) of farmers possessed more than 3 poultry birds followed by 2 to 3 poultry bird (11.11 %).

The number of livestock maintained by farmers was depending up on the quantity of fodder produced and availability of labour force in the farming system. The possession of dairy, poultry and sheep and goat was for additional income and by-product of livestock. It is general practice of the farmers to use farm by-products as a feed to livestock and they fetches the additional income, whereas waste material of livestock used for FYM or vermicompost preparation and cow urine and dung utilized in preparation of jeevamrutha and panchagavya. In present condition livestock has become livelihood enterprise in the rural areas. Bullocks' utilisation are mainly for ploughing, levelling, furrowing, seeding and weeding and carrying compost to the fields meant for raising crops.

Table.1 Economic performance of crop component followed by IFS farmers under dryland condition

(n=90)

Sl. No.	Crops	Yield (q /ha)	Price (Rs/q)	Cost of Cultivation (Rs.)	Gross Return (Rs.)	Net Return (Rs.)	Returns/ rupee of investment
I	Pulse crops						
1.	Redgram	11.25	6000	38750	67500	28750	1.74
2.	Blackgram	10.75	4650	36088	49988	13900	1.39
3.	Soyabean	12	3710	38625	44520	5895	1.15
4.	Greengram	11	5200	35066	57200	22137.5	1.63
5.	Bengalgram	10.5	4920	37050	51660	14610	1.39
II	Cereal crop						
1.	Jowar	12.25	3000	28750	36750	8000	1.28
III	Horticulture crops						
1	Vegetables			11000	18000	7000	1.64

Table.2 Economic performance of different components (crop + horti) followed by IFS farmers under irrigated condition

(n=90)

Sl. No.	Crops	Yield (q /ha)	Price (Rs/q)	Cost of cultivation (Rs.)	Gross Return (Rs.)	Net Return (Rs.)	Returns/ rupee of investment
I	Pulse crops						
1	Redgram	17.53	6000	41875	105150	63275	2.51
2	Blackgram	15.50	4650	38537.5	72075	33537.5	1.87
3	Soyabean	18.75	3710	40875	69562.5	28687.5	1.70
4	Greengram	14.00	5200	38300	72800	34500	1.90
5	Sugarcane (in ton)	90.55	1859	70185	168332	98147	2.40
6	Bengalgram	16.25	4920	38300	79950	41650	2.09
II	Cereal crop						
1	Jowar	16.75	3000	30500	50250	19750	1.65
III	Horticulture crops						
1	Mango	542.5	857	218582.5	464922.5	246340	2.13
2	Papaya	1655	418	309915	691790	381875	2.23
3	Banana	1450	425	274220	616250	342030	2.25
4	Flower crop	82.5	2932	95982.5	241890	145907.5	2.52

Table.3 Distribution of IFS farmers according to their livestock possession under dryland and irrigated conditions

(n=180)

Conditions	Category	livestock possession (1)		livestock possession (2 to 3)		livestock possession (4 and above)	
		f	%	f	%	f	%
Dryland condition	Bullock	--	--	61	67.78	3	3.33
	Buffalo	5	5.55	--	--	--	--
	Cow	4	4.44	--	--	--	--
	Sheep/Goat	--	--	24	26.66	55	61.11
	Poultry	--	--	6	6.66	30	33.33
Irrigated condition	Bullock	--	--	40	44.44	11	12.22
	Buffalo	9	10.00	42	46.67	14	15.56
	Cow	14	15.56	23	25.56	15	16.67
	Sheep/Goat	3	3.33	15	16.67	21	23.33
	Poultry	--	--	10	11.11	28	31.11

Note: f=Frequency, %=Per cent

Table.4 Cost and returns of livestock and component under integrated farming system

Livestock inventory	Cost of annual maintenance (Rs.)	Gross Income per annum (Rs.)	Net Income per annum (Rs.)	Returns/ rupee of investment
Local buffalo/cow	27740	60000	32260	2.16
Cross breed cow	46350	124400	78050	2.68
Buffalo breed	47200	117900	70700	2.50
Sheep/goat/unit	224250	493200	268950	2.20
Poultry / unit	4850	8000	3150	1.65

Note: Poultry -50 birds/ unit, Sheep/goat –10/ unit, Dairy = 1 cow/buffalo

Table.5 Economics of dairy farming followed by IFS farmers

Sl. No.	Inputs	Local buffalo/cow Cost (Rs)	Cross breed cow Cost (Rs)	Buffalo breed Cost (Rs)
I	Feed/miscellaneous cost			
1	Rice bran	3460	8450	8800
2	Feed mix	4350	5850	6200
3	Dry fodder	3250	7550	7800
4	Green fodder	6530	12750	12950
5	Medicines	650	1250	950
6	Labour	9500	10500	10500
II.	Total cost production	27740	46350	47200
III.	Average milk/day(lit)	6	13	12
IV.	Average milk/annum(lit)	1800	3900	3600
V.	Rs./lit	32	31	32
VI.	Milk Rs./annum	57600	120900	115200
VII.	Returns from by-products	2400	3500	2700
VIII.	Total return	60000	124400	117900
IX.	net return	32260	78050	70700
	Returns/ rupee of investment	2.16	2.68	2.50

Note: Poultry -50 birds/ unit, Sheep/goat – up to 10/ unit, Vermicompost pit - 2 pits/unit, Dairy = more than 1 cow/buffalo

Table.6 Economics of sheep/goat farming followed by IFS farmers per unit

Sl. No.		Sheep/ goat
I	Particulars	Cost of production(Rs)
1	Mineral mixtures	73000
2	Medicines	6000
3	Green fodder	91250
4	Labour	50000
5	Miscellaneous	4000
II	Total cost of production	224250
1	Gestation period (days)	144
2	Dry period (days)	32
3	Lambing	176
4	average body weight (Kg)	32
5	Milk Rs/lit	75
III	Net Returns	268950
1	Average limbs	40
2	Milk yield / year for 9 eve/doe	97200
3	Sale cost of 10 goat/sheep	120000
4	Sale cost of limbs	240000
5	Cost of manure	36000
IV	Total return	493200
V	Returns/ rupee of investment	2.20

Note - Per unit content 10 goats/sheep

Table.7 Economics of poultry farming followed by IFS farmers

Sl. No.		Poultry
I	Particulars	Cost of production(Rs)
1	Chick price (Rs 22/chick)	1100
2	Cost of feed	3250
3	Vaccination	500
4	Total cost of production	4850
II	Net Return	3150
1	Bird weight (2Kg/bird)	100
2	Rs/Kg	80
III	Total return (Rs)	8000
IV	Returns/ rupee of investment	1.65

Note - Poultry -50 birds/ unit,

The data from Table 4 depicted the results on cost and returns/ rupee of investment, the cost of production for crossbreed cow was ₹ 46350 and returns/ rupee of investment was 2.68

followed by vermicompost ₹ 23762 and 2.53, buffalo breed ₹ 47200 and 2.50, sheep/goat ₹ 224250 and 2.20, local buffalo or cow ₹ 27740 and 2.16 and poultry ₹ 4850 and 1.65

respectively. Though the cost of production was highest in buffalo breed but the return/ rupee of investment was high in cross breed cow because it yields highest milk per day as compared to other livestock and they are very susceptible to temperature and other management practices and also they have better reproductive capacity.

The results from Table 5 depicted that, an average milk yield / annum of local buffalo, cross breed and buffalo breed was 1800, 3900, 3600 litres respectively, and the feed cost of buffalo breed was higher it was mainly due to higher cost on concentrate and buffalo breeds are very much response to concentrates.

A glance from the Table 6 revealed that, cost of production for 1 unit of sheep/goat was ₹ 224250 because of cost on concentrates which is cheaper as compared to other livestock. Their cost on medicine was also low because they have better disease resistance when compared to other animals. Sheep/goat are very friendly and cheaper to maintain because green fodder given to goats about 2 to 3 kg per day would be sufficient. and they can adopt various agro-climatic conditions when they are integrated into agriculture along with other livestock where there manure can be utilised and they can feed on weeds also and their milk has good demand in market as it can use for various medicinal purpose.

It is observed from Table 7 that cost of production for one unit of poultry was ₹ 4850 and return was ₹ 3150 because of cost of feed and vaccination. Returns/ rupee of investment was 1.65 because poultry broilers intake of feed is comparatively low while it produces maximum possible amount of food for us and the main advantage was it has a continuous source of income. The returns/ rupee of investment was low in poultry but it gives rapid return on investment and it requires less investment.

It can be concluded that, additional enterprises with crop *viz.* dairy, poultry, sheep, goat rearing *etc.* have great potentialities in the agricultural economy. These enterprises not only supplement the income of the farmers but also help in increasing the family labour employment. It is the only way to get more income from the agriculture and allied enterprises as compared to mono-cropping. In IFS the farm wastes are better recycled used as input for other component for productive purposes. The integration of crops and livestock is a boon for low-income small-scale farmers and it uses diverse resources such as fodder legumes, crop residues and livestock manure in a system of nutrient recycling.

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