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IFS Approaches for Sustainable Livelihood of Small and Marginal Farmers in Odisha

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ABSTRACT

Agriculture is the main source of rural employment but being deprived of irrigation facilities a majority of small and marginal farmers are heavily under-employed for 6 to 8 months in a year in rain fed farming system. Even under well established irrigated condition the growth of agriculture sector itself has been almost stagnant for the last 8 to 10 years. Sustainable agriculture seeks to achieve three main goals, economic efficiency, environmental quality and social responsibilities. It is estimated that about 7 million hectares of land in this country is affected by varying degree of soil salinity and sodicity that inhibit the agriculture production in the affected areas. The farmers generally unaware of the magnitude of the problems continue to grow crops without soil reclamation measures, and harvest very poor yields. The rain fed farming comprises about 91% area coarse cereals, 91% of pulses and 80% of oilseeds and 65% of cotton besides supporting major animal production systems. The production and productivity is yet not up to the mark which necessitates an integrated intensive farming system that includes almost all the components of crop and allied agri-enterprises available or can be improved in the rain fed agriculture. This farming system approach which comprises not only crops, but also horticulture, livestock, fisheries and agro forestry is in practice by and large which needs improvement through the technology intervention in addition to the policy support. The farmers through their experience have established these farming systems to meet their food, fiber and fuel requirements in a manner that they are least dependant on the external sources. The study encompasses the effort to maximize the output from the land based enterprises comprising all possible combinations of the enterprises to have an appropriate cost effective farming system to make farming profession much more stable, sustainable and profitable benefiting the farming communities in general and resource poor farmers in particular. The issues of such intensive integrated farming system address rain fed agriculture/ farming with integrated watershed approach, cropping system approach, multistoried farming system, livestock cum cropping system, integrated agro forestry system, organic farming system, alternate farming system, integrated fish farming, shifting cultivation system, integrated crop management etc. to combat the effects of climate change issues and challenges in rain fed agriculture with reference to small and marginal farmers to generate sustainable livelihood.

Rain fed agriculture in India is practiced since time immemorial. It occupies > than 60% cultivated area, contributes to>40% of food grains, supports more than 40% population and two third of livestock are in this region. Rain fed agriculture is dominated by small and marginal holders. The per capita availability of food is also at risk. Rain is the only source of water for rain fed farming. Rain fed farming comprises of about 90% area of coarse cereals (sorghum, maize, finger and pearl millet), 91% of pulses (chick pea, pigeon pea and other pulses), 60% of oilseeds (ground nut, rape seed, mustard, soybean and others) and 65% of cotton. About 50% area under rice and 10% under wheat are rain fed. National Commission on Agriculture predicted that even when full irrigation potential is tapped by 2013 AD, over 50% of the arable land will continue to remain rain fed. In Odisha the rain fed farming is followed in not less than 60% of the cultivated area is under rain fed farming. The agrarian state like Odisha with 85% people dependant on agriculture, experiences several challenges including

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Table 1: Dimensions of intensified integrated faring system(1.0 to 1.40 ha. Area)

Existing farming systems	Expenditure (in lakhs Rs)	Gross Return (in lakh Rs)	Man days (no.) F	M	B:C	IIFS (intensified integrated faring system)	Expenditure (in lakh Rs)	Gross Return (in lakh Rs.)	Man days F	M	B:C	Additional man days created (No.)
Integrated watershed approach												
Paddy+ pulses	0.30	0.95	269	195	3.16	Paddy+pulses+vegetables +sunflower +poultry+apiary	0.45	1.95	298	274	4.33	108
Livestocks based farming system												
Paddy+ diary+goatery +poultry+ NTFPs	0.42	0.96	245	168	2.28	Paddy+diary+Goatery+ Improved Poultry+Apiary+ mushroom+NTFPs Value addition	0.65	3.05	298	237	4.69	122
Integrated Agro forestry System												
Vegetables +NYFPs +Apiary	0.55	1.95	267	190	2.05	Vegetables+NTFPs valueaddition+Apiary +Poultry+Turmeric+ Zinger	0.78	3.60	339	335	4.64	217
Cropping System												
Paddy+maize + cowpea+ ragi+ NTFP	0.50	1.10	280	225	2.2	Paddy+Maize+Cowpea+ragi +vegetables+Apiary+Improved poultry+NTFPs value addition +vegetable nursery	0.98	4.87	362	342	4.96	199
Integrated Crop Management												
Vegetable based farming system	1.21	2.96	255	226	2.44	Kharif off-season Vegetables+ seasonal Vegetables summer off-season	1.4	6.78	335	320	4.84	194
(seasonal Vegetables)						Vegetables+apiary+poultry+ turmeric+zinger+fishclture+ floriculture						
Multistory farming system												
Mango+maize+ Turmeric + Pineapple+ NTFPS	0.90	2.20	275	236	2.44	Mango+maize banana+ Turmeric+Pineapple+blackgram +tuber crops+beans+apiary+ poultry NTFP value addition	1.30	6.32	361	357	4.86	207
Organic farming												
Paddy+ blackgram	0.65	1.38	241	218		Paddy+blackgram+Kharif cauliflower+apiary+poultry+ mushroom+ vegetable nursery+tubercrops	0.86	3.21	305	275	4.54	141

flood, cyclone, draught etc. The average size of holding has reduced from 0.39 ha in 1950 to 0.12 ha in 2000, which is expected to reduce further to 0.05 ha by vision 2020. There is a need to develop suitable integrated farming system since single crop production is subject to high degree of risk and uncertainty due to seasonal and irregular income and employment. The small and marginal farmers comprising 82 per cent of the farming community own 52 per cent of the farm land. The per capita income is limited to Rs.33,226 as compared to national average of Rs.54,835 during 2010-11, which is expected to cause nutritional insecurity.

METHODOLOGY

The present study was conducted to identify the (i) dimensions of Intensification of Integrated Farming System in dry land and rain fed agriculture and (ii) to identiy the Intensification of Integrated Farming System in different districts of Odisha. The study was carried out in Gajapati district of Odisha selected purposefully as a sample to identify the dimensions of Intensification of Integrated Farming System in dry land and rain fed agriculture on the basis of the impact of technological interventions of KVK Gajapati since 2005-06to 2010-11 in rain fed farming system of the district. Four out of seven blocks namely R.Udayagiri, Mohana, Rayagada and Guma having predominant rain fed farming system were selected where KVK has made technological interventions for development of integrated intensive farming systems. The objective of the investigation was to assessed the profitability of integrated intensive farming systems over the existing farming system approaches. The data were collected and analyzed from twelve locations.

The district Gajapati is having predominant rain fed agriculture with irrigation less than 30 per cent and belongs to North Eastern Ghat Agro climate Zone of Odisha. More than 50 per cent of the geographical area is under forest coverage limiting the crop agriculture. Majority of the farm families are small and marginal holders depending upon diversified farming for livelihood .Integrated farming systems are followed by and large but with improper land and crop management . the cost benefit ratio is not up to mark besides supporting tae subsistence livelihood. In this context KVK of the district had planned intensified Integrated farming Systems through efficient management of land, water human and natural resources. Intensification of Integrated farming system modules identified for different parts of Odisha.(Identified by Krshi Vgyan Kendras)

RESULTS AND DISCUSSION

Table 2. Pond based farming system at Rampada, Bhapur, Nayagarh

Components	Area (ha)	Expenditure (Rs.)	Gross return (Rs.)	NMR (Rs.)	B-C ratio
Pisciculture	0.80	35300	135255	99955	3.83
Horticulture	0.14	7800	34135	26335	4.38
Poultry	540 No.	49600	68160	18560	1.37
Grand Total	**0.94**	**92700**	**237550**	**144850**	**2.56**

Table 3. Rice based farming system at Mayurbhanj

Components	Area	Gross income	Expenditure	Net Profit	B:C ratio
Paddy + Wheat	14.0 Ac.	236000	96000	14000	4.67
Black Gram + Green gram	12.0 Ac.	84000	40000	44000	2.1
Fruit	532	139000	41000	98000	11.13
Dairy	0.5 nos.	36500	15000	21500	2.43
Poultry + Duckery	1800 per batch	374000	174000	200000	4.34
Fishery	3.0 Ac.	120000	45000	75000	2.67
	Total	**989500**	**411000**	**578500**	**2.73**

Table 4. Crop based farming system at Cuttack

Components	Area (ha)	Expenditure (Rs.)	return (Rs.)	NMR (Rs.)	B-C ratio
Crop Component	1.20	64326	118286	53960	1.84
Horticulture	1.20	38000	110650	72650	2.91
Animal Component	0	14800	26544	11744	1.79
Grand Total	2.40	117126	255480	138354	2.18
Conventional Cropping system	**2.40**	**23200**	**35960**	**12760**	**1.55**

Table 5. Crop based farming system at Kanakpur, Kalahandi

Components	Area (ha)	Expenditure (Rs.)	Gross return (Rs.)	NMR (Rs.)	B-C ratio
Crop Component	5.00	228000	682900	454900	3.00
Animal Component	0	16200	38800	22680	2.40
Poultry	0	2000	11600	9600	5.80
Pisciculture	0.2	8000	20000	12000	2.5
Grand Total	5.2	254200	753380	499180	2.96
Conventional Cropping system	1.4	13100	19200	6120	1.47

Table 6. Crop based farming system at Cuttack

Components	Area (ha)	Expenditure (Rs.)	Gross return (Rs.)	NMR (Rs.)	B:C ratio	Employment generated (man days)
Crop Component	2.5	20000	80000	60000	4.0	130
Paddy (SRI)+ Sunflower	1.0	8000	45000	37000	5.62	45
Vegetables (Kharif & rabi)	1.5	50000	240000	190000	4.8	150
Dairy (Desi cows)	3.0 cows	3000	6000	3000	2.0	20
Grand Total	**5.0**	**81000**	**371000**	**290000**	**4.58**	**345**

Table 7. Conventional Cropping System

Components	Area (ha)	Expenditure (Rs.)	Return (Rs.)	NMR (Rs.)	B:C ratio	Employment generated man days
Crop Component (Paddy)	2.5	15000	50000	35000	3.33	120
Blackgram	1.0	6000	15000	9000	2.5	15
Vegetables (Kharif & rabi)	1.5	50000	150000	100000	3.0	150
Dairy (Desi cows)	3.0 cows	3000	5000	2000	1.66	20
Grand Total	**5.0**	**74000**	**220000**	**146000**	**2.97**	**305**

The study reveals that Intensified Integrated Farming Systems are invariably profitable as compared of the existing Integrated Farming Systems through efficient management of land, water, human and natural resources available. The technological interventions were made suitable to the micro farming situations with low external inputs and market driven production in this rain fed agriculture. The faming system has provided gainful employment of the family human resources creating additional man days to both male and female farmers. The technological interventions therefore need to be replicated through participatory and PPP mode. However the organized marketing is the fore most requirements as evidenced from the geographical situations. The Intensified Integrated Farming Systems approaches therefore may be given priority for production of ff season vegetables, floriculture, and value added products through post harvest and processing technology. Hence, a well thought plan for rain fed agriculture with blending of suitable scientific and indigenous technologies can be useful to address the issue of livelihood security in sustainable way.

CONCLUSION

The study encompasses the effort to maximize the output from the land based enterprises comprising all possible combinations of the enterprises to have an appropriate cost effective farming system to make farming profession much more stable, sustainable and profitable benefiting the farming communities in general and resource poor farmers in particular. The issues of such intensive integrated farming system address rain fed agriculture/ farming with integrated watershed approach, cropping system approach, multistoried farming system, livestock cum cropping system, integrated agro forestry system, organic farming system, alternate farming system, integrated fish farming, shifting cultivation system, integrated crop management etc. to combat the effects of climate change issues and challenges in rain fed agriculture with reference to small and marginal farmers to generate sustainable livelihood.

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