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Effective Agricultural Management Practices for Farmers through Field Farmers' School Programmes - A case Study in Chikkaballapura district, Karnataka (India)

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Abstract – **Over the last few decades' Indian agriculture, farmers followed many indigenous technologies in the integrated management of crop production. These integrated farming systems were not only economically, socially and environmentally feasible but also sustainable. Moreover, indigenous technologies existing knowledge are declining fast due to the modernization of agriculture and lack of interest of young people to learn the traditional knowledge from the old agriculture practitioner. So the documentation and conservation of the knowledge is essential. In order to retain these technologies among farming communities, the government of Karnataka conducted Farmers' Field Schools (FFS) through the Community Based Tank Management Consultancy Project from the University of Agricultural Sciences, Bangalore in four taluks of Chikkaballapura District, Karnataka in selected tank commands renovated by Jala Samvardhane Yojana Sangha (JSYS, a World Bank sponsored project).The study was conducted with the objective of identifying and analyzing the cost and returns of FFS demonstrated crops and studying the impact of FFS on the socio-economic condition of farmers and its sustainability of practice. The different random sampling technique was used to select 60 farmers from four selected tank commands and due care was taken so that the majority were interviewed. Primary data were collected through the questionnaires consisting of both personal and closed interview method types are used, well designed annexure schedules tables designed for the study purpose. Partial budgeting techniques and tables were making used for the computation of means and percentages to present the data regarding the costs and returns and to study the impact of FFS on the income of sample farmers in the study area. In first stage, four taluks i.e. Chintamani, Shidlagatta, Bagepalli and Gudibande of Chikkaballapure Districts were selected for FFS and selected tank commands were chosen. FFS showed how rational use of inputs and recommended cultivation practices in the same farmers' fields could enhance farmers' incomes. To educate farmers regarding modern production technologies, efforts were made through FFS by adopting IPM and INM techniques. These technologies not only enhanced resource productivity but also conserved natural resources. Based on this lesson, extension agencies should make necessary arrangements to provide technical guidance for agricultural enterprise as a whole to increase productivity in the tank commands. Thus FFS has emerged as a new channel for communicating information to the agriculture community.**

Keywords – **Azospirillumin, Community Based Tank Management, Farmers' Field School, Integrated Nutrient Management, Integrated Pest Management, Jala Samvardhana Yojana Sangha.**

INTRODUCTION

Expressions of interest must be received at the offices of Jala Samvardhane Yojana Sangha by 30 April 2002. Opportunity Background the Karnataka Community Based Tank Management Project in India aims to prove the viability of community-based tank development and management through developing, testing, and implementing pilot projects. It will cover 2,000-3,000 of 37,000 or so tanks in the state during the first stage of implementation. Tanks are small, artificially created bodies of water and are used across the state for minor irrigation. Over the last few decades traditional ways of tank management have been eroded and communities have become increasingly dependent on the State to repair and maintain their tanks. Consultants will be used to provide technical assistance and in producing studies to strengthen the policy, planning, and legal environment, to provide training and capacity building and for project administration. The project is funded by a Specific Investment Loan from the World Bank Opportunity Structure. The Jala Samvardhane Yojana Sangha (JSYS), which will manage the Karnataka Community Based Tank Management Project in India, now issues a request for expressions of interest in undertaking a monitoring and learning consultancy. The project will cover 2,000 in nine of the administrative divisions of the state. This pilot scheme will be used, if successful, to demonstrate the viability of the tank management and scaled up to state-wide implementation. It focuses on taluk (the name of a state sub-division) level management, and will be implemented in response to community demand. In 2002 the Minor Irrigation Department of the Karnataka State Government implemented a demand-driven tank rehabilitation project. This project is formally known as the Jala Samvardhane Yojana Sangha Karnataka Community-Based Tank Management Project, and receives assistance from the World Bank.

The objective of the JSYS project is to implement community-based approaches aimed at improving the management of traditional irrigation tanks. The development objective of the Karnataka Community-Based Tank Management Project to improve rural

livelihoods and reduce poverty by developing and strengthening community-based approaches to improving and managing selected tank systems. Tank irrigation is an age old established practice in most of the semi- arid tropical parts of India. The tank irrigation system is a holistic approach to tank management. It has actively incorporated relevant agricultural, environmental and income level issues raised by local community members into its tank rehabilitation approach. 'Tank' refers to an embankment constructed across run-off water to impounding water. Earthen bunds and embankments constructed across the slope of a valley to harvest and store water in the rainy season and used for irrigation and other purposes. Tanks are a historical innovation to deal with monsoon irregularities and reduce the risk of uncertainties in and particularly in south (peninsular) India.

This study was conducted to study on the impact of Farmers Field Schools (FFS) which were introduced in the study area by the Community Based Tank Management Consultancy Project Bangalore, to learn about its use and impact on the farming community to achieve, overall agricultural development of the tank command farmers of Chikkaballapura District. FFS consist of groups of farmers who get together to study a particular topic. FFS provide opportunities for learning by doing. It teaches basic agricultural and management skills that make farmers experts in their own farms. FFS is a forum where farmers and trainers debate observations, experiences and present new information from outside the community. FFS approach is a non-formal, learner-centered educational process and an innovative, participation- oriented program to build the technical knowledge of tank command farmers and empower them to find solutions to their own problems in farming and to increase farmers' self-confidence and decision-making abilities through group discussions and meetings with a final focus on achieving profitability for farming in tank command areas (CBTMCP Report, 2003-2004, 2005-2006). FFS plots were compared to check plots in terms of cost and returns to assess the impact of FFS on farmers' yields and net returns. The details are presented in Table 1.Chikkaballapura District comprises five Taluks, Chintamani, Shidlagatta, Bagepalli, Gudibande and Gowribidanur and falling under the south-eastern transitional dry zone of Karnataka. Because of similar agro-climatic conditions almost all types of field crops are grown successfully in these districts. The climatic conditions are suitable for growing all types of field crops and, if irrigation is available, sugarcane, paddy and horticultural crops.

II. Methodology

Primary data were collected through the questionnaires. Both personal and closed interview method types are used, well-designed annexure schedule tables are designed for the study purpose. Partial budgeting techniques and tables were used for the computation of means and percentages to present the data regarding the costs and returns and to study the impact of FFS on the income of sample farmers in the study area. In first stage, four taluks i.e. Chintamani, Shidlagatta, Bagepalli and Gudibande of Chikkaballapure District were selected for FFS and selected tank commands were then chosen.

III. Results and Discussion

To assess the impact of FFS on economic conditions of the sample farmers, the cost and returns were computed for the demonstrated plot in FFS and the results compared with control plots for production of selected crops following farmers' practices with similar situations. The costs incurred and returns realized in production of selected crops under FFS in Chikkaballapura are presented in Tables 2, 3 and 4. Calculation of costs and returns structures of demonstrated crops of FFS plots and control plots in tank commands of Chikkaballapura District are presented in Table 5.

A. Chintamani taluk

The results of FFS conducted for paddy crops in K. Raguttahalli command area of Chintamani taluk are presented in Table 2. The technological interventions in the FFS plot resulted in a substantial increase in yield of 8896 kgs per ha while it was only 4942 kgs per ha in the control plots. The results revealed that high crop yields recovered in FFS system compared to control methods. Net returns obtained in FFS plots (Rs.57,848) were higher compared to control plots (Rs.15,296). The study also revealed that the farmers were convinced about FFS plots cultivation and accepted the new method of cropping system compared to control plots. The expenditure for both the paddy system was similar, however, there was huge difference in the gross and net income. The highest gross income of rupees 101,931 was gained in FFS plots compared to Rs.58,687 in control plots. Net returns obtained in FFS plots (Rs.57,848) were higher compared to control plots (Rs.15,296) (Table 2). This resulted in net additional returns of Rs.42,552 per hectare showing compatibility of high yielding variety KRH-2 to the region over other varieties like tella Hamsa commonly grown by the farmers in the study area. The FFS treatment followed the absence of puddling and stagnation of water for the paddy crop. The irrigation was required once in eight days and saved 50% of the water and electricity. The direct seeding method was followed in FFS where transplantation was not required, which saved 80% of the seed quantity. The plant to plant distance was maintained about 1 feet × 1 feet, which enhanced the numbers and length of the roots, height of the paddy crop and provided good soil aeration. The FFS has proved low input cost and high income. However, the disadvantage in control method was the requirement of high seed quantity, continuous irrigation, and transplantation and also required high labour costs. The application of farmyard manure, neem oil, NSKE and tank silt improved the productivity paddy crop in FFS plots compared to high input of farmyard manure, DAP, Urea, Ammonium Sulphate and tank silt in control plots. Seeds were treated with Azospirillumin in FFS plots and Trichogramma japonicum was used as biological control for stem borer and leaf

folder, which enhance the productivity of paddy crop compared to control plots.

B. Shidlagatta Taluk

The results of FFS conducted for paddy crops in Bashettihalli command area of Shidlagatta taluk are presented in Table 3. The technological interventions in the FFS plot resulted in a substantial increase in yield of 88,950 kgs per ha while it was only 49,420 kgs per ha in the control plots. The results revealed that high crop yields recovered in FFS system compared to control methods. Net returns obtained in FFS plots (Rs.57,737) were higher compared to control plots (Rs.14,889). The study also revealed that the farmers were convinced about FFS plots cultivation and accepted the new method of cropping system compared to control plots. The expenditure for both the paddy system was similar, however, there was huge difference in the gross and net income. The highest gross income of Rs.101,920 was gained in FFS plots compared to Rs.58,680 in control plots. Net returns obtained in FFS plots (Rs.57,737) were higher compared to control plots (Rs.14,889) (Table 3). This resulted in net additional returns of Rs. 42,848 per hectare showing compatibility of high yielding variety KRH-2 to the region over other varieties like tella Hamsa commonly grown by the farmers in the study area. The FFS treatment followed the absence of puddling and stagnation of water for the paddy crop. The irrigation was required once in eight days and saved 50% of the water and electricity. The direct seeding method was followed in FFS where transplantation was not required, which saved 80% of the seed quantity. The plant to plant distance was maintained about 1 feet × 1 feet, which enhanced the numbers and length of the roots, height of the paddy crop and provided good soil aeration. The FFS has proved low input cost and high income. However, the disadvantage in control method was the requirement of high seed quantity, continuous irrigation, and transplantation and also required high labour costs. The application of farmyard manure, neem oil, NSKE and tank silt improved the productivity paddy crop in FFS plots compared to high input of farmyard manure, DAP, Urea, ammonium sulphate and tank silt in control plots. Seeds were treated with Azospirillumin in FFS plots and Trichogramma japonicum was used as biological control for stem borer and leaf folder, which enhance the productivity of paddy crop compared to control plots.

C. Bagepalli Taluk

The results of FFS conducted for maize crops in Kondareddypalli command area of Bagepalli taluk are presented in Table 4.The results revealed that high crop yields recovered in FFS system compared to control methods. Net returns obtained in FFS plots (Rs.32,816) were higher compared to control plots (Rs.20,212). The study also revealed that the farmers were convinced about FFS plots cultivation and accepted the new method of cropping system compared to control plots. The expenditure for both the maize system was similar, however, there was huge difference in the gross and net income (Table 4). The highest gross income of Rs.50,000 was gained in FFS plots compared to Rs.40,270 in control plots. Net returns obtained in FFS plots (Rs.32,816) were higher compared to control plots (Rs.20,212) (Table 4). This resulted in net additional returns of Rs. 12,604 per hectare showing compatibility of high yielding variety NS-61 to the region over other varieties like CSH-5 commonly grown by the farmers in the study area. Net return increased was mainly due to fertilizer application as per recommendation along with top dressing of nitrogen four weeks after sowing (Table 4).

D. Gudibande Taluk

The results of FFS conducted for cauliflower crop in Halegudibande tank command in Gudibande taluk are presented in Table 5. The technological interventions in the FFS plot resulted in increase in yield of 190 ton per ha while it was only 180 ton per ha in the control plots. The results revealed that high crop yields recovered in FFS system compared to control methods. Net returns obtained in FFS plots (Rs.131,115) were higher compared to control plots (Rs.130,181). The study also revealed that the farmers were convinced about FFS plots cultivation and accepted the new method of cropping system compared to control plots. The highest gross income of rupees 1.52 was gained in FFS plot compared to Rs.142,000 in control plots. Net returns obtained in FFS plot (Rs.152,000) were higher compared to control plots (Rs.144,000) (Table 5). This resulted in net additional returns of Rs.937 per hectare showing compatibility of high yielding variety NS-61 used for both FFS and control plot. Net return increased was mainly due to use of organic manures 25 t/ha bio-fertilizers (PSB) 5kgs/ha, transplanting 25 days old seedlings on adopting 45x30 cm spacing, applied of fertilizers at NPK 350 kgs/ha. IPM components like fixing pheromone traps of 25 number/ha, spraying of NSKE 4% solutions 4 times at an interval of at 3, 5, 7 and 9th week after transplanting.

IV. TABLES

Table 1. Taluk wise details of Farmers' Field School conducted in the study area.

S.No.	Taluk	Village	Crop
1	Chintamani	K. Raguttahalli	Paddy
2	Shidlagatta	Basettihalli	paddy
3	Bagepalli	Kondareddipalli	Maize
4	Gudibande	Halegudibande	Cauliflower

Table 2: Cost and returns structure in Paddy production under FFS and control plots in K. Raguttahalli tank command of Chintamani taluk per hectare.

Particulars	Control method		FFS method	
	Quantity	Rupees	Quantity	Rupees
No. of Labors	203	16210	217	17396
Bullocks plough	25	7413	25	7413
Threshing machine/tractor	20	9884	20	9884
Other expenditures	-	9884	-	9390
Total expenditures	-	43391	-	44083
Grain yield (kg)	4942	49421	8896	88958
Straw yield (kg)	6178	9266	8649	12973
Gross income	-	58687	-	101931
Net income	-	15296	-	57848
Increase in cost in FFS plots over control plots	42552			

Table 3: Cost and returns structure in Paddy production under FFS and control plots in Bashettihalli tank command of Shidlagatta taluk per hectare.

Particulars	Control method		FFS method	
	Quantity	Rupees	Quantity	Rupees
No. of Labors	205	16410	218	17196
Bullocks plough	26	7513	26	7513
Threshing machine/tractor	21	9984	22	10084
Other expenditures	-	9884	-	9390
Total expenditures	-	43791	-	44183
Grain yield (kg)	4940	49420	8890	88950
Straw yield (kg)	6170	9260	8640	12970
Gross income	-	58680	-	101920
Net income	-	14889	-	57737
Increase in cost in FFS plots over control plots	42848			

Table 4: Cost and returns structure in Maize production under FFS and control plots in Kondareddipalli tank command of Bagepalli taluk per hectare.

S.No.	Particulars	Unit	Control plot			FFS plot
			Quantity	Rs	Quantity	Rs
1	Human labour	M.D	104	4493.00	110	4751.00
2	Machine labour		0	430.00	0	375.00
3	Bullock labour	B.P	18	1854.00	22	2254.00
4	Seed	Kg	0.60	1480.00	0.60	1482.00
5	FYM	t	5	5000.00	5	5000.00
	Total	**-**	**-**	**13257.00**	**-**	**13862.00**
6	Fertilizer		-	-	-	-
	a. Nitrogen	Kg	100	500.00	150	750.00
	b. Phosphate	Kg	25	242.00	100	460.00
	c. Potash	Kg	50	230.00	100	970.00
	d. Vermicompost	q	0	0	3.00	750.00
	e. PSB	Kg	0	0	2.50	20.00
	Total		**-**	**972.00**	**-**	**2950.00**
7	PPC	lt/kg	8	4579.00	4.9	122.00
8	NSKE	lt.	0	0	10.00	100.00
9	Miscellaneous charges	Rs.	-	1250.00	-	1150.00
	Total	**Rs.**	**-**	**5829.00**	**-**	**1372.00**
	Total cost	**Rs.**	**-**	**20058.00**	**-**	**17184.00**
	Main product	**Q**	**-**	**40270.00**	**-**	**50000.00**
	Gross returns	**Rs.**	**-**	**40270.00**	**-**	**50000.00**
	Net returns	**Rs.**	**-**	**20212.00**	**-**	**32816.00**
	Increase in cost in FFS plots over control plots	**Rs.**	**12604.00**			

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Table 5: Cost and returns structure in cauliflower production under FFS and control plots in tank command of Gudibande taluk per hectare.

Particulars	Control method		FFS method	
	Quantity	Rupees	Quantity	Rupees
No. of Labors	104	4493.00	100	4751.00
Bullocks plough	18	1854.00	22	2254.00
FYM (tones)	5	1500.00	12	3600.00
Fertilizer (kg)	175	972.00	350	2180.00
Organic manures (tones)	0	0	25	3000.00
Biofertilizer/PSB (kg)	0	0	4	100.00
Tank silt (tones)	5	2000.00	0	0
Other expenditures	-	3000.00	-	5000.00
Total expenditures	-	13819.00	-	20885.00
Main product (tones)	180	144000.00	190	152000.00
Gross income	-	144000.00	-	152000.00
Net income	-	130181.00	-	131115.00
Increase in cost in FFS plots over control plots	934.00			

Table 6: Costs and returns in FFS and control plots in tank commands of Chikkaballapura District.

S. No.	Particulars	Chikkaballapura District							
		Chintamani		Shidlagatta		Bagepalli		Gudibande	
		FFS plot	Control plot	FFS plot	Control plot	FFS plot	Control plot	FFS plot	Control plot
1.	Total cost	44083	43391	44183	43791	17184	20058	20885	13819
2.	Gross returns	101931	58687	101920	58680	50000	40270	152000	144000
3.	Net returns	57848	15296	57737	14889	32816	20212	131115	130181
4.	Increase in cost in FFS plot over control plot	42552		42848		12604		934	
5.	Net additional returns	42552		42848		12604		934	

V. Conclusion

More than 70 percent of the farmers experienced yield enhance due to FFS in four taluks of Chikkaballapura District. It is cleared that adoption of recommended package of practice, Integrated Pest and Disease Management practice and Integrated Nutrient Management in FFS fields. Reduced cost of cultivation was also experienced in FFS fields due to reduced cost of lab our incurred on weeding due to use of weedicides and reduced use of plant protection chemicals which were replaced by NSKE biopesticides. Based on the findings of the above study adoption of recommended package of practice along with INM and IPM can improve increase the productivity Thus, the FFS approach can become sustainable approach to reach the farming community.

Acknowledgment

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References

[1] Karnataka Community Based Tank Management Project Jalasamvardhane Yojana Sangha (JSYS), Website: www.jsysindia.org.

[2] CBTMCP Report, 2003. Annual Report of Karnataka Community Based Tank Management Consultancy Project. Published by University of Agricultural Sciences, Dharwad.

[3] Saikumar C. Bharamappanavara , Mundinamani S.M., Nithya V.G., and Naik B.K. 2010. Sustainable approach of on-farm demonstrations (OFD) and its socioeconomic impact on farmers in the tank commands of north eastern Karnataka (http://kastoria.teikoz.gr/icoae2/wordpress/wp-content/uploads/articles/2011/10/011.pdf).

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