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Crop Diversification in Tungabhadra Project Area of Karnataka

S. C. Meena
Subject Matter Specialist
(Soil Science), KVK, Jhalawar,
(Rajasthan) India

Vishakha Bansal
Subject Matter Specialist
(Home Science), KVK, Jhalawar,
(Rajasthan) India

Rajeev Bairathi
Programme Coordinator,
KVK, Jhalawar,
(Rajasthan) India

Abstract **– A field experiment was undertaken on "Cropping System Diversification Studies" at Agricultural Research Station, Siruguppa under University of Agricultural Sciences, Dharwad (Karnataka). The soil type was deep black with pH 8.2. The available NPK contents in soil were 205, 32 and 485 kg/ha, respectively. Yield data pooled during *rabi/summer* indicated that significantly higher yield (28000 kg/ha) was recorded in ridge gourd followed by tomato (26598 kg/ha) and radish (11064 kg/ha). Highest rice equivalent yield (26518 kg/ha) was recorded in rice-ridgegourd cropping system, which was followed by rice-tomato (1671 kg/ha), rice-clusterbean (11810 kg/ha) and rice-radish (10313 kg/ha), when compared to existing rice-rice (6953 kg/ha) system. Gross return, net return and B:C ratio were also higher in rice-ridgegourd cropping system (Rs. 201217, Rs. 166485 and 5.79, respectively), when compared to the other systems and rice-rice cropping system alone.**

Keywords **- Cropping System, Diversification, Vegetables, Fertility and Productivity etc.**

I. Introduction

In Tungabhadra project area of Karnataka, rice-rice cropping system is the predominant system. This system has been discouraged now a days by farming community due to requirement of more water and have adverse effects on soil fertility and productivity. The soil salinity and alkanity were increasing in trend day by day. Therefore, keeping in view of scarcity of water and soil health, this system can be changed with an objective that alternate cropping system is more profitable and sustainable.

II. Material and Methods

A field experiment was undertaken at Agricultural Research Station, Siruguppa under UAS, Dharwad (Karnataka). The soil type was deep black with pH 8.2. The available NPK contents in soil were 205, 32 and 485 kg/ha, respectively. In the present study, rice-rice cropping system was diversified with different vegetable crops like Coriander (*Coriandrum sativum L.*), Ridgegourd, Ladies finger (*Abelmascus esculentus*), Clusterbean (*Cyamopsis tetragonoloba*), Vegetable cowpea (*Viga unguiculata L.*), Tomato (*Lycopersican esculentum*), Onion (*Allium cepa*) and Radish (*Betavulgaris spp.*).

The experiment was laid out in randomized block design with ten treatments in three replications. In *Kharif* season, rice was taken as a common crop in all treatments. The plot size being 8m X 4m keeping 20 X 10cm. distance. Fertilizers was given as per recommendations *i.e.* 150-75-75 NPK Kg/ha. After the harvest of rice crop in *rabi/summer* along with rice and sesamum, different vegetables like coriander, ridgegourd, bhendi, clusterbean, vegetable cowpea, tomato and radish were taken up. Fertilizer was given as per recommendations. Once hand weeding and two inter cultivation operations were taken up. Plant protection measures were applied two time in bhendi, tomato, coriander and vegetable cowpea. Rice equivalent yield, gross return, total cost of cultivation, net returns and B : C ratio was worked out.

III. Results and Discussion

Yield data for 2004-05 *Kharif* indicated that rice did not showed significant differences for yield among different treatments but, it showed larger variations in vegetable treatments as discussed in Table-1. Pooled data revealed that both grain and straw yield of rice during *Kharif* did not showed any significant difference among the various treatments (Table-2). However, rice, sesamum and other different vegetable crops were grown during *rabi/summer* season. Pooled yield data during *rabi/summer* 2002-03 to 2004-05 indicated that significantly highest yield (28000 kg/ha) was recorded in ridgegourd followed by tomato (26598 kg/ha) and radish (11064 kg/ha). Highest rice equivalent yield (26518 kg/ha) was recorded in rice-ridgegourd cropping system followed by rice-tomato cropping system (16751 kg/ha) rice-clusterbean cropping system (11810 kg/ha) and rice-radish cropping system (10313 kg/ha) when compared to existing rice-rice (6953 kg/ha) cropping system. Gross return, net return and B:C ratio were also higher in rice-ridgegourd cropping system (Rs.201217, Rs.1,66,485 and 5.79, respectively), when compared to other systems and rice-rice cropping system alone. This might be due to the higher market return from vegetable crops. These results were also authenticated by Annonymus 2004 by research findings at various locations viz. at Pantnagar (Uttarnchal), Sabour (Bihar), Varanasi (UP), Mosodha (UP), Chiplima (Orissa), Jabalpur (MP), Kalyan (WB), Thanjaur (TN), Karmana (Kerala), Karjat (Maharashtra) and Navasari (Gujarat).

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Table 1: Yield of rice (Kharif) and vegetable (rabi & Summer) as influenced by cropping systems diversification studies

SL. No.	Treatments	Rice grain Yield(kg/ha)				Vegetable yield(kg/ha)			
		2002-03	03-04	04-05	Pooled	2002-03	03-04	04-05	Pooled
1	Rice-Rice	3849	3405	3070	3441	3168	4459	2908	3512
2	Rice-Sesamum	3304	4142	2729	3392	833	704	768	768
3	Rice-Coriander	3828	3972	2912	3571	221	487	55	254
4	Rice-Ridge gourd	3748	4161	2887	3599	36797	29967	17235	28000
5	Rice-Bhendi	3806	4069	2948	3608	3994	8144	6214	6117
6	Rice-Clusterbean	3691	3856	2808	3452	5823	16933	7877	10211
7	Rice-Vegetable Cowpea	3741	3899	2973	3871	2113	2746	534	1798
8	Rice-Tomato	3626	3835	2700	3434	31914	40115	7765	26598
9	Rice-Onion	3662	3811	2766	3413	4842	4537	9009	6129
10	Rice-Radish	3958	4209	3168	3778	11854	8179	13158	11064
SEM+-					185				960
CD@5%					NS				2688
CV(%)					10.5				18.6

Table 2 : Yield and monitory returns as influenced by cropping systems diversification (Pooled)

Treat. No	Treatments		Yield (kg/ha.)		REY	GR (Rs/ha)	TCC (Rs/ha)	NR (Rs/ha)	B:C ratio.
	Kharif	Rabi	Kharif	Rabi					
1	Rice	Rice	3441	3512	6953	52535	45000	7535	1.16
2	Rice	Sesamum	3392	768	5952	41194	32693	8410	1.26
3	Rice	Coriander	3571	254	4417	33170	32107	1507	1.05
4	Rice	Ridge gourd	3599	28000	26518	201217	34752	166465	5.79
5	Rice	Bhendi	3608	6117	9725	64555	36466	28294	1.78
6	Rice	Cluster bean	3452	10211	11810	89095	37632	51463	2.37
7	Rice	Vegetable cowpea	3871	1798	5097	36298	35254	1758	1.05
8	Rice	Tomato	3434	26598	16751	111630	36600	74978	3.05
9	Rice	Onion	3413	6129	6197	50390	49196	13061	1.35
10	Rice	Radish	3778	11064	10313	76626	35067	41559	2.16
Sem +/-			185	960					
CD @ 5%			NS	2688					
CV (%)			10.5	18.6					

REY – rice equivalent yield, GR- Gross returns, TCC- Total cost of cultivation, NR- Net returns Market rates (Rs/kg): Rice- 7.33, Ridgegourd- 6.00, Clusterbean- 6.00, Bhendi- 6.00, Cowpea- 5.00, Tomato- 3.67, Radish- 4.33 and Onion- 3.33