

STUDIES ON SUSTAINABLE CROP-CUM-FISH FARMING SYSTEMS FOR SMALL FARMERS UNDER RAINFED SITUATIONS

U. Kalita, J. Suhrawardy, J.R.Das and M.N. Roy
Regional Agricultural Research Station, AAU, Gossaigaon - 783 360, Assam, India

ABSTRACT

Field experiments were conducted under medium lowland and upland situation of Kokrajhar district of lower Brahmaputra Valley agro-climatic condition of Assam during 198-99 and 1999-2000 to study the sustainable crop-cum-fish farming systems for small farmers. The sequence Jute-Sali rice -wheat recorded the highest rice equivalent yield (REY), 89.99q/ha and 85.47 q/ha during 1998-99 and 1999-2000 respectively followed by Ahu rice-Sali rice - Fodder oats under medium low land situations. But under upland situation cultivation of pointed gourd recorded the highest REY.

INTRODUCTION

In a populous country like India, where the per capita availability of land and water resources is going down, the need of the hour is a vertical growth in food grains production without endangering the ecological assets. Since the population is likely to stabilize at a maximum of 164 million by 2050, the country will have to plan for increasing the food grain production from the current level of 200 million tones to 450-500 million tones by 2050 AD or so (Sivanppan, 2002). Therefore, to meet the projected demand Indian agriculture has to upgrade the potentially to produce 9 million tones of food grains every years. An Integrated Intensive Farming System (IIFS), for example, with id components such as irrigated rice along with fish, other crops in mixed or rotational practiced, vegetables, fruit trees, poultry, livestock and apiary in appropriate combination in different types of land holding, is a viable option that can provide both food security sand to the rural option that can provide both food security and livelihood security to the rural workforce on an economically sustainable basis. Integration of various enterprises, namely cropping, animal husbandry, fishery, forestry etc. have great potentialities in the agricultural economic, which not only supplemented the income of the farmer but also helps in increasing the family labour employment. The present study was therefore, undertaken to study the sustainable crop cum-fish farming systems for small farmers that enable to improve food production, raise farmer's income and generate employment opportunities in rural areas.

MATERIALS AND METHODS

Field experiments were conducted during 1998-99 and 1999-2000 at Regional Agricultural Research Station, AAU, Gossaigaon, Kokrajhar, Assam to study the sustainable crop-cum-fish farming systems for small farmers under rainfed situations. The components integrated in the farming systems are : (a) field crops and cropping system, (b) vegetable crop like pointed gourd and (c) fish culture. While programming for cropping system, due consideration was given to crops under cultivation in the locality, the crop rotation followed, and the water requirement for fish culture. An area of 0.8665 ha was allotted for cropping and remaining 0.1333 ha for fish rearing, the total area being 0.9998 ha under different land situation (Table 1). The production technologies for different crop and fish rearing are given in (Table 2). The fertilizer nutrient N,P and K were applied in the form of urea, single supperphosphate and muriate of

potash respectively. The soils of the experimental sites were light textured (loam to sandy loam), acidic in reaction (pH 4.8 and 5.0), high total N, low available P and medium available K.

RESULTS AND DISCUSSION

The results of the experiment have been presented in Table 3. The highest REY 89.99 q/ha were recorded during 1998-99 and 1999-2000 respectively with the cropping system Jute-Sali rice-wheat followed by Ahu rice-Sali rice-Fodder oats and the lowest REY 25.34 q/ha and 27.67 q/ha were recorded with the sequence Ahu rice-Sesamum during 1998-99 and 1999-2000 respectively. While cultivation of pointed gourd ranks third in respect of REY under upland situations. Ramasamy et.al. (1996) reported from Tamil Nadu that under irrigated low land, rice-poultry-cum-mushroom system is best and can be adopted to earn higher net return and increase the productivity per unit area time and also the opportunity to the small and marginal farmers for the effective utilization of family labour round the year. Integrated farming system was also observed by Ganesan et.al. (1991).

Thus under medium low land situation Jute-Sali-wheat sequence may be more suitable. While under upland situations cultivation of vegetables like pointed gourd performed better among all other practices followed for the small farmers in Kokrakhar district of the lower Brahmaputra valley agro-climatic conditions of Assam.

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Table 1. Land situation and allocation under different enterprises.

Land situation	Enterprises	Area(ha)	Crops/Cropping system/fish culture
Medium lowland	Crop	0.1333	Ahu rice-Sali rice - Fodde oats
	Crop	0.2666	Jute-Sali rice-wheat
Upland	Crop	0.2666	Ahu rice-Sesamum
	Crop	0.1333	Mesta-Tori
	Crop	0.0667	Pointed gourd
	Fishery	0.1333	Fish culture
	Total area	0.9998	

Table 2. Package of practices followed for different enterprises and selling price

Crop	Variety	Seed rate (kg/ha)	Row to Row spacing (cm)	Fertilizer dose			Selling price (Rs./q)	
				N	P2O5	K2O	1998-99	1999-00
Ahu rice	Bang lami	75	20	20	10	10	450.00	450.00
Sali rice	Phulpakheri	45	20 x 15	20	10	10	675.00	675.00
Oats	Kent	100	25 x 30	40	20	20	25.00	25.00
Jute	JRO - 524	6	25 x 15	30	25	25	700.00	700.00
Wheat	HRD - 77	100	20	80	46	42	600.00	600.00
Sesamum	Madhabi	4	30	30	20	20	400.00	1450.00
Mesta	Local	15	30 x 15	40	20	20	550.00	550.00
Toria	M-27	10	Broadcasting	40	35	15	1250.00	1300.00
Pointed Gourd	Local	M : F 1 : 10	45	55	55	35	800.00	800.00
Fish rearing	Rahu Chinaputhi Katla	Mix. pop.	-	Lime=300 kg/ha/year N+P2O5+K2O=350kg/ ha/year Ricebean: oil cake=1:1			4000.00	4000.00

Table 3 Crop yield, fish production and Ahu rice equivalent yield(REY) of crop-cum-fish farming system

Crop/cropping system/ Fish culture	Crop yield/Fish production (q/ha) 1998-99			Crop yield/Fish production (q/ha) 1999-2000			REY (q/ha)		Mean REY
	Summer	Kharif	Rabi	Summer	Kharif	Rabi	1998-99	1999-00	
Ahu rice-Sali rice- Fodder oats	12.25	39.25 (58.08)	135.50 (7.53)	10.35	33.45 (50.18)	125.00 (6.94)	77.86	67.47	72.67
Jute-Sali rice-wheat	10.55 (16.41)	37.50 (56.25)	13.00 (17.33)	9.25 (14.39)	34.50 (51.75)	14.50 (19.33)	89.99	85.47	87.73
Ahu rice- Sesamum	11.50	4.45 (13.84)	-	10.75	5.25 (16.92)	-	25.34	27.67	26.51
Mesta-Toria	9.25 (11.31)	-	6.55 (18.19)	8.75 (10.69)	-	7.15 (20.66)	29.50	31.35	30.43
Pointed gourd	31.25 (55.56)	3.50 (6.22)	-	25.00 (44.44)	2.85 (5.07)	-	61.78	49.51	55.65
Fish culture		3.23 (28.71)			3.45 (30.67)		28.71	30.67	29.69