

Studies on Multiple Cropping Systems in Wetlands

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The results of three years experiment on multiple cropping in wetland revealed that Rice - Rice - Rice cropping system would give maximum net income and greater return per rupee invested under wetland conditions with assured water supply throughout the year. Rice - Rice - Pulse cropping system can be adopted in places where water availability is limited in summer and the farmer has only limited resources to invest.

The traditional system of 'growing two rice crops in a year under wetland conditions can be suitably modified to a three crop system adopting the latest production technology and thus, can enhance agricultural production resulting in efficient water management.

Sadanandan and Mahapatra (1973) reported that continuous cropping of rice gave the lowest yield compared with other cropping systems. Sree Ranga-samy *et al.* (unpubl.) observed that rice-groundnut - rice gave the maximum yield and net return under rice farming systems of Pondicherry. Information on the suitable multiple cropping system under wetland conditions of Coimbatore tract, which will result in increased income and water use efficiency is lacking. Hence the present investigation was undertaken.

MATERIALS AND METHODS

An experiment was conducted at Tamilnadu Agricultural University, Coimbatore to find out the most profitable cropping system for wetlands. The cropping systems studied in the experiment are given in Table I. In all

TABLE I. Details of cropping system adopted

System	Crop	Variety	Season	Field duration in days
I	Rice	Kannagi	June-October	92
	Rice	IR 20	Sep.-February	133
	Rice	Bhavani	Jan.-June	119
				344
II	Rice	Kannagi	July-October	93
	Rice	IR 20	Oct.-March	130
	Cotton	MCU 7	March-July	132
				355
III	Rice	Kanchi	May-Sep.	93
	Rice	IR 20	Sep.-February	130
	Green-gram	CO.2	Feb.-May	85
				308
IV	Rice	Kannagi	May-Sep.	94
	Rice	IR 20	Sep.-February	130
	Black-gram	CO.2	Feb.-May	82
				306

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the four cropping systems, separate nurseries were raised for rice. In cropping system III and IV greengram and blackgram were sown without any preparatory cultivation (i.e.) a soaking irrigation was given immediately after the harvest of rice and the pulse crops were sown by dibbling on the next day.

The experiment was laid out for three years (1973-76) in a compact block of 1000 m² with the plot size of 25 x 40 m for each system. The soil was of clay type with pH. 7.8 and E.C. 0.4 m.mhos/cm. The fertility level was medium with regard to avail-

able N and P and high with regard to available K. The management practices for the cropping systems were followed as per the package of practices recommended by Tamil Nadu Agricultural University. The results obtained are discussed below.

RESULTS AND DISCUSSION

Grain Yield : All rice cropping system (Rice - Rice - Rice) gave the highest grain yield of 13929 kg/ha (Table II). Inclusion of greengram and blackgram in place of rice (Cropping systems III and IV) gave 8,690 and 8,350 kg grain/ha respectively. These

TABLE II. Production Potential and Economics of Cropping Systems

Cropping System	Total field duration in days	Grain yield (kg/ha)	Total income (Rs/ha)	Cost of cultivation (Rs/ha)	Net profit (Rs/ha)	Income per rupee invested (Rs.)	Per day production (kg/ha)	Response/kg of nutrients in kg			Total quantity of water used cm/year
								N	P	K	
Rice-Rice-Rice (R-R-R)	344	13929	15700	8038	7662	1.95	40.6	31.8	65.5	65.5	350
Rice-Rice-Cotton (R-R-C)	355	7030 (grain) + 940 (Kapas)	10460	8078	2382	1.30	19.8 (grain) + 2.7 (Kapas)	22.5 15.6	46.8 47.0	46.8 + 47.0	280
Rice-Rice-Green-gram (R-R-Gg)	308	8690	10173	6649	3524	1.53	28.4	27.8	58.0	58.0	230
Rice-Rice-Black-gram (R-R-Bg)	306	8350	9446	6148	3198	1.52	27.3	26.7	55.6	55.6	230

observations are in confirmity with the results of All India Coordinated Agromomic Research Projects (1976) wherein Rice - Rice - Rice cropping system gave the maximum grain yield and net return.

Cropping systems I (Rice - Rice - Rice) and II (Rice - Rice - Cotton) were in the field for 344 and 355 days respectively and occupied the land for a major period leaving a small gap. In other cropping systems (III and IV) the

land was fallow for about sixty days and hence not effectively utilised.

Economics of different cropping systems : Cropping system I gave the maximum net return of Rs. 7,662/ha with the highest per day production of 40.6 kg/ha and Rs. 1.95 as income per rupee invested (Table II). The next highest net return and per day production of Rs. 3,524 and 28.4 kg respectively were obtained from Rice - Rice - Greengram cropping system. Per day production and income per rupee invested were almost same in both Rice-Rice-Greengram and Rice - Rice - Blackgram cropping systems and provide better alternative to Rice - Rice - Rice system, especially when water is limiting in summer. Rice-Rice-Cotton yielded the least with low net income and per day production because of the poor performance of cotton in wetland in summer and higher expenditure involved in raising the crop. This is seen from the fact that the cost of cultivation of this

cropping system was the highest among the four cropping systems studied. In the case of Rice - Rice - Greengram and Rice - Rice - Blackgram systems the net income though low, was obtained with the lowest expenditure and a water requirement of 230 cm only. In the first cropping system the highest net income of Rs. 7,662/ha was obtained with the highest investment and a water requirement of 350 cm. The response per kg of nutrient applied in Rice-Rice-Rice cropping system is higher than in the other systems studied

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