EFFECT OF PLANTING TECHNIQUES AND IRRIGATION PRACTICES ON THE YIELD AND ECONOMICS OF RICE

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ABSTRACT: ***The field experiment was conducted to "Find out suitable planting technique and irrigation practices in rice ecosystem at Annamalai University Experimental Farm, Annamalai Nager, during Navari season of 2016. Nine treatments combinations were studied in RBD with tree replication. The treatments comprised of direct dry seeded rice, direct wet seeded rice and manual transplanted rice, with flooding throughout the crop growth, saturation up to panicle initiation, and alternate wetting and drying. All treatments significantly influenced by the crop growth, yield components and yield of rice. The highest net return and BCR were obtained with manual transplanting with flooding throughout the crop growth and the same treatment registered the highest net income of Rs. 55,871 and return rupee^{-1} invested of 2.6. The least net income of Rs. 7,838 and least return rupee^{-1} invested of 1.2 were obtained with direct dry seeded rice with alternate wetting and drying.***

key word: Rice, irrigation, yield, economics.

Introduction

Rice is the most important food crop, accounting for about 29 per cent of the total calorie intake of the people in the developing countries. Rice is cultivated in 114 countries of the world over an area of 153.9 (m.ha). According to Department of Agriculture and Co-operative (DAC) the world rice production is 478(m.t) in 2014-2015. In India, rice is the staple food for millions of people and plays a vital role in the economy.

Rice is being grown in an area of 1.93 m.ha with an annual production of 6.61 m.t in Tamil Nadu. The average rice productivity in India and Tamil Nadu were 2.12 and 3.07 t. ha^{-1} as against 6.1 and 3.7 t ha. for china and the world, respectively (Anonymous, 2011). The reason for low rice yield in India and particularly in Tamil Nadu are many and diverse in nature. The methods of growing rice, heavy infestation of weeds, inefficient utilization of applied nitrogen, ill effects of cloudy weather on the photosynthetic activity of rice plant in monsoon season and adverse soil condition such as salinity and alkalinity are some of the factors that seriously impede the overall production of rice in our country.

DDSR is a faster and easier sowing methodology, reduce the labour, earlier crop maturity by 7-10 days and higher tolerance of water deficit Balasubramanian and Hill (2002). A major impediment in the successful cultivation of direct- seeded rice (DSR) in tropical countries is heavy infestation of weed which often range from 50-91 per cent Paradkar *et al.,* (1997), However weeds are the main biological constraints to the production of DSR Rao *et al.,* (2007), which may causes 60-80 per cent reduction in grain yield of rice.

Materials and Method

Details of study area

The field experiment was conducted to find out suitable planning technique and irrigation practice in rice ecosystem at Annamalai University Experimental Farm, Annmalai Nager, during *Navari* season of 2016. The study area has mean annual rainfall of about 1248 mm, majority of which was received during North East Monsoon. The climate of the region is characterized by tropical climate with a hot dry summer (March-June), and extended wet period from September TO February. Rice based cropping system is followed in the present study area. The soil was clayey soil with pH of 7.4.

Methodology

In the study the performance of planting technique and irrigation practices on yield and economics in rice crop. Nine treatment combinations were studied in RBD with three replication. The rice variety chosen for the experiment was ADT 43 (105 days) during *Navarai* 2015-2016 with a spacing of 15×10cm. A fertilizer schedule of 120: 40: 40 NPK kg/ha was adopted as the common practices for the experiment. Statistical analysis was carried out as per the procedure suggested by Panse and Sukhatma (1978).

Flooding the plots throughout the crop growth were irrigated to maintain a uniform standing water column of 5 cm throughout the crop duration, saturation upto panicle initiation plots were maintained 5 cm water column upto panicle initiation stage, alternate wetting and drying plots were irrigated to maintained 5 cm alternately. Irrigation was with held and water from the field was drained 10 days before harvesting.

Result and Discussion

Effect on yield and economics

Among the various treatments, the treatment T_7- Manual transplanting with flooding throughout the crop growth recorded the highest grain yield of 5590 kg ha^{-1}. The next best treatment was T_8-Manual transplanting with saturation upto panicle initiation (5371 kg ha^{-1}) and it was on par with the treatment T_4-Direct wet seeded rice with flooding throughout the crop growth (5226 kg ha^{-1}). The lowest grain yield was recorded in T_3- Direct dry seeded rice with alternate wetting and drying with only of 3970 kg ha^{-1}.

Among the various treatments the treatment T_7-Manual transplanting with flooding throughout the crop growth

Table. 1 Yield (Kg ha^{-1}) as influenced by different rice planting technique and irrigation methods

Treatments	Grain yield	Straw yield
T-1 Direct dry seeded rice with flooding throughout the crop growth.	4398	7141
T-2 Direct dry seeded rice with saturation upto panicle initiation.	4257	6920
T-3 Direct dry seeded rice with alternate wetting and drying.	3970	6550
T-4 Direct wet seeded rice with flooding throughout crop growth.	5226	8139
T-5 Direct wet seeded rice with saturation upto panicle initiation.	4835	7694
T-6 Direct wet seeded rice with alternate wetting and drying.	4694	7455
T-7 Manual transplanting with flooding throughout the crop growth.	5590	8762
T-8 Manual transplanting with saturation upto panicle initiation.	5371	8356
T-9 Manual transplanting with saturation upto panicle initiation.	5089	7992
S.Ed	92.5	132.5
CD(P=0.05)	185	265

Table.2 Economics (Rs ha^{-1}) as influenced by planting technique and irrigation methods

Treatments	Gross income (Rs.ha^{-1})	cost of cultivation (Rs.ha^{-1})	Net income (Rs.ha^{-1})	Return rupee^{-1} Invested (Rs.)
T-1 Direct dry seeded rice with flooding throughout the crop growth.	54962	35740	19222	1.5
T-2 Direct dry seeded rice with saturation upto panicle initiation.	48022	35090	12932	1.4
T-3 Direct dry seeded rice with alternate wetting and drying.	42488	34650	7838	1.2
T-4 Direct wet seeded rice with flooding throughout crop growth.	81499	37440	44059	2.2
T-5 Direct wet seeded rice with saturation upto panicle initiation.	66928	35320	31608	1.9
T-6 Direct wet seeded rice with alternate wetting and drying.	59957	35490	24467	1.7
T-7 Manual transplanting with flooding throughout the crop growth.	91405	35534	55871	2.6
T-8 Manual transplanting with saturation upto panicle initiation.	89054	35426	53628	2.5
T-9 Manual transplanting with saturation upto panicle initiation.	74106	36250	37856	2.0

Among the treatments, manual transplanting with flooding throughout the crop growth (T_7) recorded higher gross income, net income and return rupee^{-1}. This might be due to improved crop performance through efficient irrigation and cheaper weed control responsible for higher returns with lesser cost of cultivation. This observation is in collaboration with the findings of De Datta 1988.

The least gross income, net income and return rupee^{-1} invested was recorded in the direct seeded rice with alternate wetting and drying and it might be due to the increasing magnitude of competition by unrestricted weed growth affecting the performance of the rice crop.

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