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The economic feasibility of various treatment combinations of rice (*Oryza sativa* L.)

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Abstract
A field experiment was conducted on the topic entitled "The economic feasibility of various treatment combinations of rice (*Oryza sativa* L.)" during two consecutive *kharif* seasons of 2017 and 2018 at Agronomy Research Farm, Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Ayodhya (U.P.) Experiment was comprised with sixteen treatment combinations *viz.* four planting geometry and four nitrogen levels in split plot design. Four planting geometry i.e. 15x10 cm**,** 15x15 cm, 20x10 cm and 20x15 cm were kept in main plots and four nitrogen levels i.e. 0 kg N/ha, 60 kg/N ha, 120 kg N/ha and 180 kg/N ha were kept in sub plots. The experiment was replicated three times. Results reveal that application of 120 kg N/ha applied in 20cm×10cm planting geometry recorded highest gross nutrient Rs. 102140/ha; net return Rs. 68415/ha and highest net return per rupees invested 2.02.

Keywords: Geometry, return, gross, economic

Introduction
Rice (*Oryza sativa* L.) is the foremost staple food for more than 60% of the world's population providing major source of the food energy. It is grown in 114 countries across the world on an area about 160 million hectares with annual production of 494.3 million tonnes, and total supply of 711.5 million tonnes (Anonymous, 2015-16) [1]. Globally, total rice consumption was recorded 491.5 million metric tonnes in 2014-15 (Anonymous, 2015-16) [1]. More than 90% of the world's rice is produced and consumed in Asia. It is the important crop in the country's food security accounting about 44% of the total food grain production and holds about 20% share in national agricultural GDP and provides 43% calorie requirement for more than 70% of Indians. In India rice covers highest area by a single crop and it is also maximum area among all rice growing countries. It is an important crop in India which occupied 43.9 million hectares with the annual production of 103.6 million tonnes (Ministry of Agriculture, Directorate of Economics and Statistics, 2015). It is estimated that by the year 2025, the world's farmers should produce about 60% more rice than at present to meet the food demands of the expected world population at that time and by 2035, 114 million tones additional milled rice need to produce.

Rice farming in the state is most vulnerable and risk prone due to complex ecological situations marked by frequent flood or drought or both. It is clear that yield is stagnating around ≤ 2.0 t q/ha since 2001-2002 except in the year 2002-2003, 2004-2005 and 2009- 2010 due to erratic rainfall distribution causes excess water stagnation/ drought or both in different years. Rice is grown in all the districts of Uttar Pradesh with low to high acreage. It is part of the nearly every meal and it is grown on a majority of the rural farms. Uttar Pradesh is the leading producer of rice and rank 3rd in the country. Annual rice production is around 12 metric ton in state. It is cultivated mainly in Kharif season (wet season) in around 5.90 million hectares followed by Zaid (summer season) 35000-40000 hectare only. As regards the Boro rice, it is grown in only deeply flooded areas around 3000 ha or so mainly in the eastern districts of the Uttar Pradesh. The average productivity of the state is around 2 t/ha (Ministry of Agriculture, Directorate of Economics and Statistics, 2015). There are three rice growing seasons in the state. These are wet season (*Kharif*), winter season (Boro) and *Summer* season (Zaid). The growing period of rice in difference seasons are *Kharif* – June – July to October-November; Boro – October- November to April – May and *Zaid* – February to May- June. *Kharif* is the main rice growing season in the state and more than 98% rice (around 5.9 mha) is cultivated during kharif season covering early, medium and long duration varieties.

A Limited rice area around 35000-40000 ha in Zaid and hardly 3000 – 3500 ha area in boro season is being cultivated. During kharif season rice is cultivated in all the regions of the state while Boro rice is restricted to deeply flooded area of the eastern U.P. covering different districts *viz*. Gorakhpur, Basti, Deoria, Ballia, Ghazipur, Mirzapur and Varanasi. As regards the cultivation of Zaid rice in the state it is grown only in tarai regions covering Pilibhit, Bareilly, Rampur, Bahraich, Sarawasti, Balrampur, Siddharth Nagar, Kushinagar, Maharajganj and Deoria districts of the state with season wise varieties.

Most of the rice varieties developed by different institutions and universities are cultivated in kharif season. Mega varieties cultivated during kharif season are NDR -359, Narendra 97, Sarjoo-52, Kalanamak, Pusa basmati-1, BPT-5204, Swarna, Narendra -118 and Shushk Samrat.

Materials and Methods

The field experiment was conducted during Kharif 2017 and Kharif 2018 at Agronomy Research Farm of Narendra Deva University of Agriculture and Technology, Narendra Nagar (Kumarganj), Ayodhya (U.P.).

The experimental site is located at Kumarganj which is situated 40 km away from Ayodhya city on Ayodhya Raibarely road. Geographically the experimental site is situated at $26^0.47'$ North latitude and $81^0.12'$ East longitude with is an altitude of 113 m. from mean sea level in the Indo Gangatic Plain Zone of Eastern Uttar Pradesh. The climate in this region is sub humid. The soil is sandy loam with a pH of 8.1.

Summary and Concussion

Cost of cultivation (Rs/ha): Cost of cultivation was recorded highest (Rs. 35435/ha) under S_1N_3 under planting geometry of 15×10cm spacing applied with 180 kg N/ha followed by (Rs.35045/ha) S_3N_3 i.e., plant spacing of 20×10cm spacing under same N level due to higher plants/m^2 and N level. The lowest cost of cultivation Rs. 30,665/ha was recorded in S_4N_0 (i.e. 20x15 cm spacing grown without the use of nitrogen) mainly due to lowest plant population grown without the use of N.

Gross return (Rs/ha)

Application of 120 kg nitrogen/ha given in 20×10cm spacing recorded highest gross return Rs.102140/ha followed by Rs. 101845/ha in 15×15cm spacing applied with 180 kg N/ha due to higher yield. The lowest gross return Rs. 57,900/ha was recorded under 15x10 cm spacing grown without the use of nitrogen application (S_1N_0) Gupta *et al*, 2014 also reported similar results.

Net return (Rs/ha)

Application of 120 kg nitrogen/ha applied in 20×10cm spacing recorded highest net return Rs.68415/ha followed by Rs. 66950/ha in 15×15cm spacing applied with 180 kg N/ha due to higher gross return relative to cost of cultivation. Like gross return; the lowest net return Rs. 26,425/ha was recorded in S_1N_0. Murthy *et al*, 2015 and Shukla *et al*, 2015 also reported similar results.

Net return/rupee invested

Application of 120 kg nitrogen/ha applied in 20×10cm spacing recorded highest net return per rupee invested 2.02 followed by 1.91 in 15×15cm spacing fertilized with 180 kg N/ha due to higher Net return in comparison to cost of cultivation. The lowest net return per rupee invested 0.83 was recorded in 15x10 cm spacing grown without the use of nitrogen (S_1N_0).

Table 1: Economics of various treatment combinations

Treat. Comb.	Cost of Cultivation (Rs/ ha)	Gross Return (Rs/ ha)	Net Return (Rs/ha)	Net return/ rupee invested
S_1 N_0	31475	57900	26425	0.83
S_1N_1	32795	79285	46490	1.41
S_1N_2	34115	906250	56535	1.65
S_1N_3	35435	94020	58585	1.65
S_2N_0	30935	65625	34690	1.12
S_2N_1	32255	85680	53425	1.65
S_2N_2	33575	95740	62165	1.85
S_2N_3	34895	101845	66950	1.91
S_3N_0	31085	67545	36460	1.17
S_3N_1	32405	94070	61665	1.90
S_3N_2	33725	102140	68415	2.02
S_3N_3	35045	60563	25518	0.72
S_4N_0	30665	64880	34215	1.11
S_4N_1	31985	81285	49300	1.54
S_4N_2	33905	92840	58935	1.73
S_4N_3	34625	98740	64115	1.85

Conclusion

Application of 120 kg N/ha applied in 20cm×10cm planting geometry recorded highest gross return Rs. 102140/ha, net return Rs. 68415/ha and highest net return/rupees invested 2.02.

References

1. Anonymous. Directorate of economics and statistics, department of agriculture and corporation, Ministry of agriculture Government of India. 2015-2016;19:27-41.
2. Rajesh V, Thanunathan K. Effect of seedling age, number and spacing on yield and nutrient uptake of traditional Kambanchamba rice. Madras Agriculture Journal. 2003;90(1-3):47-49.
3. Ramamoorthy K, Krishnamurthi VV, Balasubramanian A. Effect oftime of nitrogen application on growth, yield and economics of irrigated rice. Madras Agricultural Journal. 1997;84(11-12):647-649.

4. Rautaray SK. Effect of spacing and fertilizer dose on grain yield of rice (*Oryza sativa* L.) in rice-rice cropping sequence *Oryza*. 2007;44(3):285-287.
5. Shah MH, Khushu MK, Khandey BA, Bali AS. Effect of spacing and seedling per hill on transplanted rice under late sown conditions. Indian Journal of Agronomy. 1991;36(2):274-275.
6. Sharma KP, Tomar RKS. Performance of rice varieties under different rates of nitrogen and phosphorus. Crop Research. 1997;13:69-72.
7. Shukla UN, Srivastava VK, Singh S, Sen A, Kumar V. Growth, yield and economic potential of rice (*Oryza sativa*) as influenced by different age of seedlings, cultivars and weed management under system of rice intensification. Indian Journal of Agricultural Sciences. 1984;84(5):628-36,
8. Shukla VK, Tiwari RK, Malviya DK, Singh SK, Ram US. Performance of rice varieties in relation to nitrogen levels under irrigated condition. African J Agricultural Research. 2015;10(12):1517-1520.
9. Singh CB, Aujla TS, Sandhu BS, Khera KL. Effect of transplanting date and irrigation regime on growth, yield and water use efficiency in rice in northern India. Indian Journal of Agricultural Sciences. 1996;66(3):137-141.
10. Singh G, Kumar R, Upadhyay VB, Kewat KT. Effect of spacing and seedling age in yield of hybrid rice *Oryza*. 2003;40:46-47.
11. Singh M, Sharma SN. Effect of wheat residue management practices and nitrogen rates on productivity of and uptake of rice (*Oryza sativa* L.) – wheat (*Triticum aestivum*) cropping system. Indian Journal of Agricultural Sciences. 2000;70:835-839.
12. Srinivasan K. Effect of plant spacing on ratoon rice performance IRRN. 1990;15(4):21.
13. Trivedi KK, Kwatra KL. Effect of dates of transplanting and hill spacing on growth and yield of rice. JNKVV Research Journal. 1983;3:227-229.
14. Verma AK, Pandey N, Tripathi S. Effect of transplanting spacing and number of seedlings on productive tillers, spikelet sterility, grain yield and harvest index of hybrid rice. IRRN. 2002;27(1):51.
15. Wagh RG, Thorat ST. Effect of split application of nitrogen and plant densities on yield and yield attributes of rice. Oryza. 1987;24(1):169-171.
16. Zaidi SFA, Tripathi HP. Effect of nitrogen levels on yield, N uptake and nitrogen use efficiency of hybrid rice *Oryza*. 2007;44(2):181-183.