Assessment of Selected Rice Varieties under Direct Seeded Condition in NICRA Villages of Chatra District

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ABSTRACT

An on farm trial (OFT) was conducted during the year 2013 and 2014 to identify a suitable variety in upland situation through direct seeding in bio-physical and socio-economic condition of Chatra district. Experiment was conducted in Mardanpur village of Chatra block of Chatra district of Jharkhand where NICRA Project is under operation. The trial was designed in randomized block design consisting of 20 replications with five technological options i.e. TO_1 : Farmers variety (Motkagora) with farmer practice $N_{30}P_{20}K_0$, TO_2 : Vandana with improved practice $N_{40}P_{20}K_{20}$, TO_3 : Anjali with improved practice $N_{40}P_{20}K_{20}$, TO_4 : Virendra with improved practice $N_{40}P_{20}K_{20}$ and TO_5 : CR-40 with improved practice $N_{40}P_{20}K_{20}$. Farmer's preference was also measured through a 5 points rating scale. Results indicated that TO_3 i.e. improved variety Anjali with $N_{40}P_{20}K_{20}$ under direct seeded condition in rain-fed Tar-III was found most suitable followed by TO_4- Virendra with improved practice $N_{40}P_{20}K_{20}$ and TO_2 Vandana with improved practice $N_{40}P_{20}K_{20}$.

Introduction

Agriculture in India has of course, got transformed form hand to month subsistence farming to high productivity venture to attain self sufficiency with the production of over 140 Mt of food grains in 2011, compared to 35 Mt in 1950. This marvelous achievement over a period of four decades since 1970 was possible due to introduction of high yield cum high quality varieties in almost all crops with development and adoption of scientifically improved packages of cultivation practices (Kumar swamy 2012).

The productivity and production of rice crop has been stagnant over the years. Also the per capita land availability is decreasing since 1951. The per capita availability of land decreased from 0.37 ha in 1951 to 0.19 ha in 2001. By 2051 this is going to be as low as 0.08 ha (Reddy & Shenoy, 2013). Simultaneous demand of rice is also growing every year and it is estimated that by 2025 A.D. the requirement would be 140 million ton in order to sustain present food self sufficiency and meet future food requirement. India has to increase its rice productivity by 3 % per annum (Tuong & Bouman, 2001; Devi & Ponnari, 2009). In Jharkhand about 18.55 lakh ha area falls under rice cultivation where Chatra district contributes 33,000 ha area under rice. Out of 33000 ha area under rice 12000 ha area falls under upland(Tanr-III) micro farming situation where productivity is very poor i.e. 8.9 q/ha. For increasing the productivity of rice under upland situation in rainfed condition direct seeded technology is becoming very popular among the farmers. The Central Government as well as the State Government has also given much emphasis to popularize this technology among the farmers. Direct seeded rice does not depend on single factor but it is a combination of principles encapsulated that the practitioners need a great care to steer it comprehensively. It is apparent that direct seeded rice technology addresses many issues such as water scarcity,

labour requirement, cost of production and utilization of uncultivable land.

Keeping this factor under consideration KVK, Chatra conducted an on farm trial (OFT) to evaluate the performance of selected rice varieties under improved practice i.e. recommended dose of fertilizers.

Materials and Methods

The field experiment was conducted during 2012-13 and 2013-14 in farmer's fields of Mardanpur village of Ara Panchyat under Chatra block of Chatra district where NICRA Project is under operation. The soils of the village were sandy loam to sandy clay loam, analyzing low in available N, low to medium in available P (8-9 kg/ha) and medium to high in available K (175-182 kg/ha) with pH ranging from 5.3 to 6.4 The on farm trial was designed with five treatments TO_1 : Farmers variety (Motkagora) with farmer practice $N_{30}P_{20}K_0$, TO_2 : Vandana with improved practice $N_{40}P_{20}K_{20}$, TO_3 : Anjali with improved practice $N_{40}P_{20}K_{20}$, TO_4 : Virendra with improved practice $N_{40}P_{20}K_{20}$ and TO_5 : CR-40 with improved practice $N_{40}P_{20}K_{20}$. The trial was conducted in 20 replications/ locations in randomized block design with $1000m^2$ plot size i.e. each treatment covering $2000m^2$ area. Data were collected through observation and using PRA tools. The intervened technologies were assessed on the basis of yield attributing characters income and farmers preferences. The farmers reaction towards the intervened technologies were measured with the help of scoring system developed on a 5 point rating scale for eight selected attributes of technology i.e. for home consumption, for higher income, for religious purpose, for social purpose, for making beer, for mat making, for fuel purpose, for compost making with their scores given in parentheses as most suitable, (5) suitable, (4) moderately suitable, (3) least suitable (2) and unsuitable (1).The overall choice scores were calculated and subsequently ranking was done.

Table 1 . Yield attributing character of selected rice varieties under direct seeded Condition (2012-13 and 2013-14)(N=20)

Technology	Height of plant	Number of tillers/plant	Number effective tillers/plant	Number grain/panicle	Test weight
TO$_1$: Farmers variety (Motkagora) with farmer practice N$_{30}$P$_{20}$K$_0$	1.1	6	4	40	17
TO$_2$: Vandana with improved practice N$_{40}$P$_{20}$K$_{20}$	1.3	11	8	73	22
TO$_3$: Anjali with improved practice N$_{40}$P$_{20}$K$_{20}$	1.4	1.8	8.6	74	23.12
TO$_4$: Virendra with improved practice N$_{40}$P$_{20}$K$_{20}$	1.25	7	76	21.5	
TO$_5$: CR-40 with improved practice N$_{40}$P$_{20}$K$_{20}$	1.05	8	6.8	79	23.12

Results and Discussion
Yield attributing characters

The yield attributing characters pertaining to selected varieties are given in table-1.

Table -1 shows that   plant height was highest in technology option TO$_3$, (1.40m)   variety Anjali with N$_{40}$P$_{20}$K$_{20}$, followed by TO$_2$ (1.30m) variety Vandana with N$_{40}$P$_{20}$K$_{20}$, technology option TO$_4$ (1.25m) Virendra with N$_{40}$P$_{20}$K$_{20}$ and   technology option TO$_1$ (1.10m) Farmers variety (Motkagora) with N$_{30}$P$_{20}$K$_0$. Lowest height was observed in technology option TO$_5$ i.e. CR-40 (1.05m) with N$_{40}$P$_{20}$K$_{20}$.   Number of tillers was also found highest in technology option-II (Var.- Vandana)   i.e. 11 tillers/hill, followed technology option-III (Var.- Anjali) 10.8 tillers/hill, technology option IV(Var.- Virendra)   9 tillers/hill, technology option V (Var.- CR-40)   8 tillers/hill the lowest was observed in technology option I i.e. farmers variety 6 tillers/hill.

Effective tillers/hill was also found highest in technology option –II (Var.- Vandana)   8.6 followed by technology option-III (Var.- Anjali) 8.0, technology option-IV (Var.- Virendra) 7.6, technology option-V(Var.- CR-40)   6.8. The number of grain/panicle was found highest in technology option-V (79) in variety CR-40 followed by technology option-IV (76) variety Virendra, technology option-III (74) variety Anjali , technology option-II (73) in variety Vandana . The test weight was found highest in technology option-III & V (23.12) followed by technology option-II (22), technology option-IV (21.5).

Yield and Economics

The highest yield was observed in TO$_3$: Anjali with N$_{40}$P$_{20}$K$_{20}$ (28.5q/ha) followed by TO$_4$: Virendra with N$_{40}$P$_{20}$K$_{20}$ (26.80q/ha), TO$_2$: Vandana with   N$_{40}$P$_{20}$K$_{20}$ (26.00q/ha), TO$_5$: CR-40 with N$_{40}$P$_{20}$K$_{20}$. The gross income and net income were also found highest in TO$_3$, i.e. (41239.5 & 27419) followed by TO$_4$ (38135.5 & 24315.5), TO$_2$ (37076 and 23256) . B:C ratio was also calculated and found highest in TO$_3$ (2.98) followed by TO$_4$ and TO$_2$ respectively.

Preference Ranking of selected rice varieties

Data of preference ranking for knowing the choice of farmers related to demonstrated technology are   given in Fig.-1.

Fig 1. Preference ranking of demonstrated rice varieties.

Preference criteria	TO$_1$: Farmers variety (Motkagora) with farmer practice N$_{30}$P$_{20}$K$_0$	TO$_2$: Vandana with improved practice N$_{40}$P$_{20}$K$_{20}$	TO$_3$: Anjali with improved practice N$_{40}$P$_{20}$K$_{20}$	TO$_4$: Virendra with improved practice N$_{40}$P$_{20}$K$_{20}$	TO$_5$: CR-40 with improved practice N$_{40}$P$_{20}$K$_{20}$
Home consumption	000	0000	00	00000	000
Higher income	000	0000	00	00000	000
Religious purpose	0	0	00000	0	0
Social purpose	000	0000	000	00000	000
Making beer	00	00	00000	00	00
Mat making	-	00	000	-	-
Fuel purpose	0000	0	0	000	00000
Compost making	0	0000	00000	000	00
PREFERENCE	V	III	I	II	IV

Fig 1 shows that TO$_3$ i.e. Anjali variety with N$_{40}$P$_{20}$K$_{20}$ under direct seeded condition in upland (Tanr III) emerged as the first choice of farmers considering all the preference criteria i.e. home consumption,   higher income, religious purpose, social purpose, mat making, fuel purpose and compost making. followed by TO$_4$, TO$_2$ & TO$_5$ respectively.

Conclusion

Technology option **3 (Var. Anjali)** was highly accepted by majority of the farmers which has now diffused among rice growers of Chatra district.

Table 2. Average yield and economics of rice varieties underdirect seeded rice (2012-13 and 2013-14).

(N=20)

Technology option	Grain yield (q/ha)	Straw yield (q/ha)	Gross Income (Rs/ha)	Net Income (Rs/ha)	B:C Ratio
TO$_1$: Farmers variety (Motkagora) with farmer practice N$_{30}$P$_{20}$K$_0$	13.80	32.56	18680	8985	1.92
TO$_2$: Vandana with improved practice N$_{40}$P$_{20}$K$_{20}$	26.00	73.84	37076	23256	2.68
TO$_3$: Anjali with improved practice N$_{40}$P$_{20}$K$_{20}$	28.5	84.93	41239.	27419	2.98
TO$_4$: Virendra with improved practice N$_{40}$P$_{20}$K$_{20}$	26.80	75.57	38135	24315.5	2.75
TO$_5$: CR-40 with improved practice N$_{40}$P$_{20}$K$_{20}$	24.00	59.28	32892	19092	2.38

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