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## Comparison of yield and income between the beneficiaries and non-beneficiaries of BGREI (Bringing green revolution in Eastern India) programme

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### Abstract

Bringing Green Revolution to Eastern India (BGREI) program was implemented in Sonapur district in the year 2011. The presented study was conducted to compare the yield and income between BGREI and Non-BGREI beneficiaries. Forty beneficiaries of BGREI and forty Non-BGREI beneficiaries were randomly selected as respondents. Data were collected with the help of interview schedule by the researcher and for analysis of data t-test was adopted. It was found that there was a significant difference of yield and income per unit land between BGREI beneficiaries and Non-Beneficiaries. The yield and income of BGREI beneficiaries have increased considerably than that of Non-BGREI beneficiaries, because under BGREI program a number of interventions were adopted by the Government to increase the yield and income of farmers.

**Keywords:** BGREI, beneficiaries, yield, income

### Introduction

Bringing Green Revolution to Eastern India (BGREI) program is the outcome of the recommendations of the Task Force constituted by Government of India in pursuance of the decisions taken in the meeting of the Committee of Secretaries held on 29th November, 2009 to make short and 1 medium term recommendations for efficient management of water, power and other inputs as well as subsidy to maximize agricultural production on a sustainable basis. The Task Force was inter-alia ascribed to assess the existing scenario of water resources development, utilization and management of food-grains production in the country, with a particular reference to North-Western and Eastern India, taking into consideration the problems being faced due to over-exploitation of water resources in the states like Punjab, Haryana and Western Uttar Pradesh as well as to generate recommendations for developing infrastructure relating to water, power, marketing, storage and rural connectivity in Eastern and North-Eastern regions of the country to support sustainable agricultural production. Accordingly, "Bringing Green Revolution to Eastern India (BGREI)" program was initiated in 2010-11 to address the constraints limiting the productivity of "rice based cropping systems" in Eastern India comprising of seven (7) States namely, Assam, Bihar, Chhattisgarh, Jharkhand, Odisha, Eastern Uttar Pradesh and West Bengal. The goal of the BGREI program is to harness the water potential for enhancing rice production in Eastern India which was hitherto under utilized. During 2010-11, the major focus of the States was on promotion of improved crop production technologies of major crops, water harvesting measures and their utilization for overall agriculture development. The food grain production has increased from 51 million tons (MT) in 1950-51 to 250MT during 2011-12 highest ever since independence (Arjun, 2013) [2]. In the subsequent years 2011-12 and 2012-13, the program provided a more focused approach on medium and long term strategies for asset building activities of water conservation and utilization along with short-term strategies pertaining to transfer of technology of major cereals.

### Background of BGREI

- The programme of "Bringing Green Revolution to Eastern India (BGREI)" was launched in 2010-11 under RKVY (Rashtriya Krishi Vikas Yojana) to address the constraints limiting the productivity of "rice based cropping systems" in eastern India comprising seven (7) States namely; Assam, Bihar, Chhattisgarh, Jharkhand, Odisha, Eastern Uttar Pradesh (Purvanchal) and West Bengal. The East was selected for the project essentially to harness the region's "abundant water resources", necessary to enhance the production

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of food grains. Prof. M.S. Swaminathan also said that water management is the main problem in eastern India, not water availability (Anonymous, 2012)<sup>[1]</sup>.

- The programme, part of the Rashtriya Krishi Vikas Yojana (RKVY), gained momentum in 2011-12 with an outlay of Rs 400 crores with a focus on rice and wheat and strategic interventions relating to crop production, water harvesting, asset building and site-specific activities needed for improving the agronomy (Mukherjee, 2012)<sup>[7]</sup>.

### Objectives of BGREI

1. To increase production & productivity of rice and wheat by adopting latest crop production technologies.
2. To promote cultivation in rice fallow area to increase cropping intensity and income of the Farmers.
3. To create water harvesting structures and efficient utilization of water potential.
4. To promote post harvest technology and marketing support.

### Interventions of BGREI

The major interventions are as follows:-

- Block / cluster demonstration of improved production technology
- Asset building activities for farm improvement
- Site specific activities for farm renovation
- Seed production & distribution
- Need based Inputs
- Marketing support & post-harvest management and
- Ecology specific rice based cropping

### Strategies adopted for achieving the goals of BGREI programme

- To promote improved production technology of rice on massive scale including popularizing of newly released HY cultivars and Hybrids.
- To bring rice fallow areas under cultivation through cropping system based approach.
- To popularize adoption of stress tolerant rice varieties.
- To create irrigation structures like farm ponds, lift irrigation point etc. to improve irrigation potential.
- To promote use of farm machineries and implements suitable for small land holding.
- To create infrastructure such as godown, procurement centre, marketing infrastructure etc.

### Objectives of the Study

1. To compare the yield per unit land between BGREI Beneficiaries and Non Beneficiaries.
2. To compare the income per unit land between BGREI Beneficiaries and Non-Beneficiaries.

### Methodology

Odisha state is divided in to 30 districts. Out of 30 districts, Sonepur district is purposively selected for the study, because The BGREI programme was introduced in Sonepur (Subarnapur) district in the year 2011. Sonepur district consists of six blocks namely, Binika, Birmaharajpur, Dunguripali, Sonepur, Tarava, Ullunda, out of which two blocks namely Ullunda and Birmaharajpur were selected purposively for the study.

For selection of respondents random sampling method was followed. In this type of sampling, the respondents have been selected using techniques of random sampling.

For the present investigation, total 80 respondents have been selected. Twenty beneficiaries each from village namely Bagbahali and Litipali under Ullunda block (BGREI block) were selected and 14,13 and 13 Non-Beneficiaries from Uphula, Ranapali, Jatesingha villages respectively (total=40) under Birmaharajpur block (Non-BGREI block) were selected randomly. Thus the total number of respondents for the present study is 80.

The BGREI programme has been implemented in Odisha in the year 2010-11 to increase the yield of rice per unit land and income of the beneficiary farmers. In the present study it was intended to assess the impact of BGREI programme. Data were collected by the researcher by personal interview method with the help of interview schedule in the month of October and November 2018. The impact of BGREI programme on yield and income was assessed through comparison of average yield and income of the beneficiaries with the non- beneficiaries' and t-test was applied to find out any significant difference of yield and income. For this purpose the following null hypothesis have been formulated:-

H01: There is no significant difference of mean yield per unit land between BGREI and Non- BGREI farmers.

H02: There is no significant difference of mean income per unit land between BGREI and Non-BGREI farmers.

Level of significance: 5%

### Results and Discussion

The present study was conducted to assess the impact of BGREI programme in the study area. For this purpose yield of rice under BGREI programme was compared with that of Non-Beneficiary farmers. Data were collected from the selected farmers (both BGREI and Non-BGREI farmers) relating to yield per acre and income per acre. In order to find out any significant differences in yield and income between the two categories of farmers t-test was computed and presented below. The null hypothesis has also been tested.

### Differences in yield of rice per unit land between BGREI and Non-BGREI Farmers

Sum of yield of BGREI farmers (40 farmers) = 724 quintals /acre

Sum of yield of non-BGREI farmers (40 farmers) = 457 quintals/acre

Mean yield of BGREI farmers =18.10 quintals/acre

Mean yield of non-BGREI farmers=11.42 quintals/acre

### t-test:-

$$s_1^2 = \frac{1}{n_1 - 1} \left[ \sum x_1^2 - \frac{(\sum x_1)^2}{n_1} \right]$$

$$= \frac{1}{40-1} \left[ 5413 - \frac{208849}{40} \right]$$

$$= \frac{1}{39} [5413 - 5221.225]$$

$$= \frac{1}{39} \times 191.775$$

$$= 0.025 \times 191.775$$

$$= 4.794$$

$$s_2^2 = \frac{1}{n_2 - 1} \left[ \sum x_2^2 - \frac{(\sum x_2)^2}{n_2} \right]$$

$$= \frac{1}{40-1} \left[ 13612 - \frac{524176}{40} \right]$$

$$= \frac{1}{39} [13612 - 13104.40]$$

$$= \frac{1}{39} \times 507.6$$

$$= 0.025 \times 507.6$$

$$= 12.69$$

$$S = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

$$S = \sqrt{\frac{(40 - 1)4.794 + (40 - 1)12.69}{40 + 40 - 2}}$$

$$= \sqrt{\frac{39 \times 4.794 + 39 \times 12.69}{78}}$$

$$= \sqrt{\frac{186.966 + 494.91}{78}}$$

$$= \sqrt{\frac{681.876}{78}}$$

$$= \sqrt{8.742}$$

$$= 2.956$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \text{ at } n_1 + n_2 - 2 \text{ df}$$

$$= \frac{18.1 - 11.425}{2.956 \sqrt{\frac{1}{40} + \frac{1}{40}}}$$

$$= \frac{6.675}{2.956 \sqrt{\frac{2}{40}}}$$

$$= \frac{6.675}{2.956 \sqrt{\frac{1}{20}}}$$

$$= \frac{6.675}{2.956 \sqrt{0.05}}$$

$$= \frac{6.675}{2.956 \times 0.223}$$

$$= \frac{6.675}{0.659}$$

$$= 10.128$$

$$Df = n_1 + n_2 - 2 = 40 + 40 - 2 = 78$$

Table value of t at 78 df at 5% level of significance (two-tailed test) is 1.994.

Since the calculated value of t is much higher than the table value at 78 df at 5% level of significance, the null hypothesis

viz; "There is no significant difference of mean yield per unit land between BGREI and non-BGREI farmers." is rejected.

This means under BGREI programme the yield of paddy per acre has increased considerably. Similar findings were mentioned by Chouhan *et al.* (2015)<sup>[4]</sup>, Sharma *et al.* (2015)<sup>[10]</sup>, and Manjunatha and Parmod (2015)<sup>[6]</sup>.

#### Difference in income per unit land between BGREI and Non-BGREI farmers

It was also intended to find out the difference in income per unit land between BGREI and Non-BGREI farmers. For this purpose t-test was calculated. This is presented below

Sum of income of BGREI farmers (40 farmers) = Rs. 583500/- per acre

Mean income of BGREI farmers (40 farmers) = Rs. 14587.50/- per acre

Sum of income of Non-BGREI farmers = Rs. 311500/- per acre

Mean income of Non-BGREI farmers = Rs. 7787.50/- per acre

#### t-test:

$$s_1^2 = \frac{1}{n_1 - 1} \left[ \sum x_1^2 - \frac{(\sum x_1)^2}{n_1} \right]$$

$$= \frac{1}{40 - 1} \left[ 2701250000 - \frac{97032250000}{40} \right]$$

$$= \frac{1}{39} [2701250000 - 2425806250]$$

$$= 0.025 \times 275443750$$

$$= 6886093.75$$

$$s_2^2 = \frac{1}{40 - 1} \left[ 9310750000 - \frac{340472250000}{40} \right]$$

$$= \frac{1}{39} [9310750000 - 8511806250]$$

$$= 0.025 \times 798943750$$

$$= 19973593.75$$

$$S = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

$$S = \sqrt{\frac{(40 - 1)6886093.75 + (40 - 1)19973593.75}{40 + 40 - 2}}$$

$$= \sqrt{\frac{39 \times 6886093.75 + 39 \times 19973593.75}{78}}$$

$$= \sqrt{\frac{268557656.25 + 778970156.25}{78}}$$

$$= \sqrt{\frac{1047527812.5}{78}}$$

$$= \sqrt{13429843.75}$$

$$= 3664.67$$

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \text{ at } n_1 + n_2 - 2 \text{ df}$$

$$= \frac{14587.50 - 7787.50}{3664.67 \sqrt{\frac{1}{40} + \frac{1}{40}}}$$

$$= \frac{6800}{3664.67 \sqrt{\frac{2}{40}}}$$

$$= \frac{6800}{3664.67 \sqrt{\frac{1}{20}}}$$

$$= \frac{6800}{3664.67 \sqrt{0.05}}$$

$$= \frac{6800}{3664.67 \times 0.223}$$

$$= \frac{6800}{817.22}$$

$$= 8.32$$

$$Df = n_1 + n_2 - 2 = 40 + 40 - 2 = 78$$

Table value of t at 78 df at 5% level of significance (two-tailed test) is 1.994.

Since the calculated value of t is much higher than the table value at 78 df at 5 level of significance, the null hypothesis viz; "There is no significant difference of mean income per unit land between BGREI and non-BGREI farmers" is rejected.

This means under BGREI programme the income of paddy per acre has increased considerably. So, BGREI programme is a farmer friendly programme and it should continue to sustain and improve the livelihood of farmers. The findings were supported by Sengar *et al.* (2008)<sup>[9]</sup> and Kumar *et al.* (2007)<sup>[5]</sup>.

Bahera (2017) in his study also found that the productivity of rice crop of the beneficiaries of BGREI has increased considerably. Sahoo (2018)<sup>[8]</sup> in his study found that the national Food Security Mission has increased the socio economic conditions of the tribal farmers in Kandhamal district of Odisha.

## Conclusion

The productivity and income of rice crop of beneficiary farmers in the selected block under BGREI was higher than Non-Beneficiaries of BGREI programme. BGREI comprised of three broad categories of interventions: (i) block demonstrations; (ii) asset building activities such as construction of check dam, minor irrigation tank and other water resources development works; and (iii) site specific activities for facilitating petty works such as construction/renovation of irrigation channels/electricity for agricultural purposes in a cluster approach for convenience and cost effectiveness. Under BGREI program farmers adopted new seed varieties, farm machines & implements, nutrients, pesticides. Marketing support including post harvest management was included as an intervention. For this reasons the yield and income per unit land of BGREI beneficiaries

have increased considerably than that of Non-BGREI beneficiaries.

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