

Study No-178

END TERM EVALUATION STUDY IN RESPECT OF THE IMPLEMENTATION OF BRINGING GREEN REVOLUTION TO EASTERN INDIA (BGREI) PROGRAM (CONSOLIDATED REPORT)

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AGRO-ECONOMIC RESEARCH CENTRE
VISVA-BHARATI, SANTINIKETAN, 2013

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Preface

India continues to be largely an agrarian economy where a large section of its rural population is still dependent on agriculture for their livelihood. Over the decades since independence, there have been efforts to improve the condition of the farmers through increasing production and productivity in the agricultural sector based on technological innovations.

The program of Bringing Green Revolution in Eastern India (BGREI) was initiated in the year 2010-11 with a view to address regional imbalances in growth, imparting stability to agricultural output and bringing the benefits of agricultural research technology to the resource poor farmers across all the regions of the country to ensure economic equity.

The present study entitled **“End-term Evaluation Study/Appraisal in respect of the Implementation of the Bringing Green Revolution in Eastern India (BGREI)”** was assigned by the Directorate of Economics and Statistics, Ministry of Agriculture, Government of India. The study was carried out in seven eastern states namely, Assam, Chhattisgarh, Eastern Uttar Pradesh, Bihar, Jharkhand, Odisha and West Bengal by the AER Centres situated in the states during 2012. AER Centre, Visva-Bharati, Santiniketan was entrusted with the responsibility of coordinating the study and preparing the present consolidated report.

The study was taken up by the then Director, AER Centre, Visva-Bharati who shouldered the responsibility of drafting the consolidated report. However, in March 2013 we were advised by the Ministry of Agriculture to revise, rewrite and improve upon the quality of the draft report. At this instance we had to take up the consolidation work afresh. But a common study design and analytical method had already been prepared (review meeting held at AERC, Visva-Bharati on 28th July, 2012) and followed by all the participating centres. In view of the situation, we had to re-edit the consolidated report afresh. Presentation of the present draft report was held on July 11, 2013 at AER Centre, Visva-Bharati in the valuable presence of Dr. S. Bhavani, Principal Advisor, Dr. B. S. Bhandari, Advisor and Dr. J. Sandhu, Agricultural Commissioner, Ministry of Agriculture, Government of India, representatives from State agricultural Directorate, University experts and representatives from the participating centres (barring Allahabad centre). On the basis of the detailed comments from the experts the present report is being prepared.

On behalf of the centre, I take this opportunity to thank Mr. Satya Vir Singh, Consultant (Agronomy), BGREI Cell and Mr. Ashok Kumar Khanna, Program Manager, BGREI Cell, Ministry of Agriculture, Government of India for their valuable advice in course of the consolidation work. My sincere thanks to Dr. S. Bhavani, and Dr. J. Sandhu, Ministry of Agriculture, Government of India for their invaluable comments during presentation of the draft report. I express my deep sense of gratitude to Dr. B. S. Bhandari, Advisor, Ministry of Agriculture, Government of India for his continuous advice and guidance in course of the

consolidation work. I thank the officials of State agricultural Directorate, our panel of experts for their valuable suggestions during the deliberation. I am also thankful to the research personnel of all the participating centres for their kind cooperation in conducting the study in respective states.

Preparation of the consolidated report was done by Debanshu Majumder, Debajit Roy and Ranjan Kumar Biswas. My sincere thanks to all of them. This research team worked very hard in this whole process of consolidation. I am also thankful to D. Mondal, D. Das, N. Maji, Munshi A. Khaleque and A. Patra for providing the secretarial assistance.

Santiniketan
31/10/2013

(Saumya Chakrabarti)
Hony. Director

Executive Summary

1.1 Background of the Program:

The spread of HYV technology resulting in the “Green Revolution in India” since mid sixties had been successful in enhancing the crop productivity and achieving self-sufficiency in food-grains production in the country.

However, the most widely debated issue about this “Green Revolution” was the growing income disparities between different regions and between different categories of farmers.

Therefore, it becomes particularly important to address regional imbalances in growth, imparting stability to agricultural output and bringing the benefits of agricultural research technology to the resource poor farmers across all the regions of the country to ensure economic equity.

A new technology based on hybrid variety of rice and wheat (the two staple crops in eastern region) seeds were thought of to make a dent in the existing level of productivity.

Furthermore, it is worth noting in this regard that the Green Revolution technology that was propagated in the mid 60’s depended heavily on assured and controlled irrigation that was catered mostly by the tube wells. With the passage of time indiscriminate and over use of tube well irrigation has resulted in an acute depletion of sub-soil water table in the country. Hence, there had been a need for an alternative technology that could address the environmental issues in the process of pushing up the productivity frontier.

The program of **Bringing Green Revolution to Eastern India (BGREI)** is intended to address the underlying constraints for enhancing productivity of rice and wheat in seven states of eastern India (Assam, Bihar, Chhattisgarh, Jharkhand, Eastern Uttar Pradesh, Orissa and West Bengal) so that agricultural productivity is reasonably enhanced in these areas.

1.2 The program

The program takes care of needed technology in terms of assured provision for incentivized supply of recommended agricultural inputs to the farmers adopting cluster approach in order to ensure equity amongst farmers across selected locations in the BGREI States. The process of input **inducement under BGREI program differs from other crop development programs** in respect of the provision of cash doles for “Deep ploughing in rain-fed areas/land preparation & line sowing/transplanting for all ecologies” and making **provision of improved seed supply**. Besides this, the programme intended to **enhance supply of agriculture credit** and **procurement of agriculture commodities by the public sector agencies at the minimum support prices**.

The programme of **Bringing Green Revolution in Eastern India** was launched in the year 2010-11 to enhance the agriculture production in the states of Assam, Bihar, Chhattisgarh,

Jharkhand, Orissa, Eastern U.P and West Bengal. It was conceived as a lateral to Rashtriya Krishi Vikas Yojna (RKVY).

The program included a bouquet of activities including three broad categories of interventions namely, organizing **Block demonstrations of rice and wheat** in different rice and wheat ecologies; **asset building** for water management such as construction of shallow tube wells/dug wells/bore wells, and distribution of pump sets, drum seeders, zero till seed drills and **site specific activities** such as construction/renovation of field/irrigation channels/electric power supply for agricultural purposes and institution building for inputs supply. The program envisaged adopting both medium and long term strategies for asset building activities relating to water conservation and utilization in combination with short term strategies pertaining to transfer of technology through block demonstration.

The program was implemented in a cluster approach. The size of cluster for the interventions was determined as 1000ha. Selection of villages/blocks was made based on ecology. From the ecologies beneficiary farmers were selected for each cluster. In each Block Demonstration one Progressive Farmer for every 100 ha of area was selected for providing handholding support to the beneficiary farmers.

In order to ensure effective implementation of the program, district-wise scientific resources drawn from ICAR-SAU system were roped besides 3-tier monitoring system put in place at National, State and District levels. Institutional support for technical backstopping has been arranged through Central Rice Research Institute (CRRI) besides provision of honorarium to Progressive farmers and field staff of State Department of Agriculture concerned as a stop gap arrangement for extension support at ground level.

1.3 Rationale for the Study: There was overwhelming response to the BGREI program at all the levels in the BGREI States and crop production prospects were reported to have made a breakthrough. Enthused with these reports, Department of Agriculture & Cooperation decided for conducting an “End Term Evaluation of BGREI program”.

The study would focus on evaluation of Block Demonstrations of rice & wheat to the extent possible besides understanding the planning & implementation strategies adopted by the BGREI States.

1.4. Objectives of the study: The specific objectives of the study are:-

- ▶ To identify gaps, if any, between recommended, promoted and implemented strategies;
- ▶ To explore effectiveness of technical backstopping;
- ▶ To examine the effectiveness of the provision of progressive farmers and SDA staff entrusted with BGREI program;
- ▶ To observe crop response to promoted technology; and

► To evaluate the impact of various interventions of Block demonstrations that tends to drive growth of rice and wheat yield.

1.5. Data Base: The sample units of demonstrations, for each of the BGREI states have been selected from 5 rice ecologies namely; rain-fed uplands, rain-fed shallow low land, rain-fed medium deep water, rain-fed deep water and irrigated. At the first stage of sampling, for each state, one district is selected from each of the ecologies considering the concentration of demonstrations in the district. In the second stage, one representative block from one Block Demonstration under each of the different ecologies is selected following the same procedure. In the third stage, a total number of 10 beneficiaries and 5 non-beneficiaries are selected at random from each selected block. In sum, a total number of 450 beneficiaries and 225 non-beneficiaries spread over 34 selected districts across all the seven BGREI States are covered in the study.

For secondary data on different aspects of BGREI program – financial allocation and utilization, we had to depend on various government sources including State Directorate of Agriculture in each BGREI states. Data on area, production and yield for rice and wheat at the state level (both NFSM and BGREI districts) were made available to us by the BGREI Cell, New Delhi.

1.6 Identification of Beneficiaries: A homogeneity test of the respondent farmers (both beneficiaries and non-beneficiaries) in respect of land holding size and level of education was carried out separately to probe into the characteristics of the respondents in respect of their position in economic and social ladder. The results reveal that the respondents were more or less homogenous with little variations across ecologies and household characteristics. However, homogeneity test for the beneficiaries was not conducted in respect of Bihar, Jharkhand and Eastern Uttar Pradesh.

It is to be noted that the result of the test for homogeneity signifies that the two sections of respondent namely; beneficiaries and non-beneficiaries are alike in terms of their land holding sizes and educational attainments. Hence, it is possible to get an impression of the impact of an intervention like BGREI comparing the two groups.

1.7 Result and Discussions

1.7.1 Adoption of BGREI Program

The focus of BGREI program was on technology transfer with assured technical backstopping, water asset building and site specific needs. Accordingly, the entire program was sub-divided in the following three projects backed with the provision of their monitoring.

The allocation of funds among these three major interventions was: nearly **63 per cent** of the total funds for **block demonstrations**, **17 per cent** for **asset building activities** and **19**

per cent for site specific activities. About **1 per cent** of the funds were earmarked for **monitoring activities** at national level.

It appears from the data on fund allocation in the BGREI states that allocation of funds among these interventions within the state **did not maintain a strict compliance** with the prescribed norm. However, the proportions of allocation among the three interventions on the whole for all BGREI states had been rather successful in maintaining a **near proximity** to the prescribed norm.

1.7.2 Concentration ratio of Block Demonstration:

The statistic provides us with an estimate of outreach of the crop production technology. For all states taken together the concentration ratio for rice was 0.023 and for wheat it turned out to be 0.032 with variability across the states. One of the reasons behind this variability may be due to ecologically differentiated allocation of Block demonstrations.

1.7.3 Progressive Farmers under BGREI: The selected Progressive Farmers were entrusted with responsibility motivating the participating farmers in adoption of technology. The Progressive Farmers had the additional responsibility of acting as a liaison between the extension workers, scientists and the beneficiary farmers to assist in the technical backstopping and disseminating the technology at the grass-root. They were also entrusted to keep a detailed record of the agricultural operations with the help of "Information Card".

1.7.4 Adoption of input package for rice during 2011-12:

This study revealed that the beneficiaries have not used entire recommended input package. In many cases, beneficiary farmers have not undertaken seed treatment; weed control through weedicides, application of micro-nutrients and plant protection measures. The farmers did not receive the inputs package specified in the BGREI guidelines uniformly across all the BGREI States. Deep ploughing and line sowing has not been adopted in several cases. This gets reflected from the primary survey across all ecologies.

1.7.5 Adequacy of input package during 2011-12:

There was mixed response of beneficiaries of Block demonstrations of rice and wheat regarding adequacy of Input packs for Block demonstrations.

1.7.6 Beneficiary farmers' perception towards BGREI program during 2011-12:

The farmers' opinion was solicited with regard to the overall rating of the BGREI program. There was mixed response of beneficiaries of Block demonstrations of rice and wheat in this regard. The overall 74 per cent beneficiaries rated the program as "Good" and 26 per cent rates it as "Average".

1.7.7 Medium and long term physical achievements in the BGREI States:

It is observed that in Assam, Chhattisgarh and Eastern Uttar Pradesh installation of shallow tube wells and pump sets had been widespread. In Bihar the achievement was substantially low in this regard. In Jharkhand, however, no target was set as to physical water asset building activities and no work has been done in this respect.

1.8 Technical Backstopping:

1.8.1 Performance Index in respect of Technical Backstopping during 2011-12:

So far as implementation of BGREI is concerned there had been Progressive Farmers, state extension workers, KVKs and SAUs, who had been entrusted to provide technical backstopping to the farmers. Performance index are percentages computed on the basis of responses from farmers as regards to their access to technical knowhow from sources mentioned above. Results indicate that 47 per cent beneficiaries accessed technical knowhow from the local extension worker of State Department of Agriculture followed by 36 per cent from Progressive farmers, 11 per cent from *Krishi Vigyan Kendras* and 6 per cent from State Agricultural University.

1.8.2 Adequacy of Technical Backstopping (farmers' perception) during 2011-12:

The general opinion among the beneficiary farmers was that the provision of technical backstopping had been adequate. On the whole 73 per cent beneficiaries reported adequacy in technical backstopping.

It might be mentioned that the scientists of SAUs & ICAR (ICAR-SAU system) were identified for providing technical support to the BGREI beneficiaries during 2011-12 with the help of KVKs and extension workers from state department of agriculture. A sizeable majority of the respondents (68%) reported that extension workers of state department of agriculture provided the best technical support followed by Progressive Farmers (19%).

1.9 Monitoring:

A three tier monitoring structure has been put in place at National, State and District Levels. CRRI is the nodal agency for monitoring the program.

1.9.1 Monitoring status of the program by CRRI, Cuttack:

It appears from the official statistics that were made available, CRRI scientists have carried out the awareness meetings regarding implementation of BGREI program in general and provided necessary technical backstopping.

1.9.2 Monitoring by Central Steering Committee (CSC): The staff of BGREI Cell has visited the 61 BGREI districts out of 114 districts during *Kharif* -2011 and 14 districts during *Rabi*:

2011-12 out of 54 districts. All the States stood by the program and accomplished task of program formulation & implementation on time.

1.9.3 Monitoring by SLMTs:

Assam: There were 12 SLMT meetings in 2010-11 and 6 meetings in 2011-12.

Bihar: In Bihar the fifteen SLMT meeting was held.

Chhattisgarh: Only two meetings of SLMTs were conducted

Eastern Uttar Pradesh: only 5 meetings were organized at state level to monitor the BGREI program in Eastern Uttar Pradesh.

Jharkhand: One meeting for the year 2011-12 was held.

Odisha: Three SLMT meetings were held 2011-12.

West Bengal: No information regarding SLMT meeting was available from State Agricultural Directorate despite repeated requests.

1.9.4 Details about DLMTs:

No detailed account of composition of the DLMT. Neither the numbers of meetings, discussions and resolutions taken in such meeting was available from the reports of the participating centres barring the report prepared by AER Centre, Visakhapatnam.

1.10 Impact of BGREI program

1.10.1 BGREI program and changes in Cropping Intensity: The results of CI across rice ecologies indicate differentiated pattern between BGREI beneficiaries and non-beneficiaries. On the whole it can be said that there has been marginal changes over two years in cropping intensity for both beneficiary and non-beneficiary farmers with variations across states. The change in CI in the states (as derived from sample survey results) cannot be attributed to the program of BGREI. There may have been some other factors influencing the cropping intensity in the states in the years of reference. Over and above, the BGREI program as conceived had focused on increasing the yield of crops of which we shall be discussing presently.

1.10.2 BGREI program and rise in grain yield:

It is revealed from the mean yield achieved by the beneficiaries and non-beneficiaries that there exists a difference in grain yield between them. In most of the states the average yield of crops among beneficiaries was substantially higher than their counterparts (i.e. non-beneficiaries).

1.10.3 Yield Gap analysis amongst BGREI beneficiaries and non- beneficiaries:

The ecology specific yield gap analysis in rice and wheat crops in BGREI States except eastern Uttar Pradesh reveals that wide gap exists across ecologies and districts within a state and between states too. This exercise, however, was not carried out by AER Centre, Allahabad. Normally yield gap is the difference between yield obtained at the farm level and the potential yield of a particular variety on the experiment station. Differences in yield gap between beneficiary and non-beneficiary farmers would suggest the impact of changes brought about in terms of yield enhancement. However, the yield gap analysis has been made differently for different states with differential benchmark. On the whole substantial yield gap is observed between beneficiaries and non-beneficiaries, the former registering higher yield.

Hence, it can be said that the beneficiary farmers in general in all the BGREI States had an edge over the non-beneficiaries in enhancing the yield of crop.

1.11 Conclusions

- The study revealed that there are certain gaps in varying extents between recommended, promoted and implemented strategies across different States due to lack of uniformity in input package/mode of implementation/documentation across the States.
- In case of technical backstopping, the scientists of SAUs, KVKs & ICAR (ICAR-SAU system) were identified for providing technical support to the BGREI beneficiaries during 2011-12.. Through a regular contact technology dissemination had been quite successful in the BGREI states.
- After a detailed analysis of yield rates across beneficiary and non-beneficiary farmers across different states, the study reveals a positive crop response to promoted technology under BGREI program. Though it seems too early to conclude strongly as to the definite impact of the program nonetheless there are signs towards a positive change.
- In course of the study, the impact of various interventions of Block demonstrations to drive growth in rice and wheat is reflected in changes in yield rates. The BGREI program, as conceived, addressed towards increasing the yield rather than the cropping intensity. Hence, the impact of intervention under block demonstration programs under BGREI is more prominent in increasing the yield rates for the beneficiary farms as compared to non-beneficiaries.

1.12 Recommendations and Policy Suggestions

- Efforts should be made to reduce the gaps between recommended, promoted and implemented strategies.

- In course of dissemination of technology, provision of Progressive Farmers and regular monitoring from State agriculture departments can play vital role. As such, such links between the beneficiaries and State machineries should be encouraged.
- Interventions through crop demonstrations has helped decline the gap between ecology specific potential and actual yields across beneficiary farms. Hence, such demonstration programs should be encouraged.
- Eastern India covered under the BGREI program has exhibited a glimpse of a high potential for yield enhancement of rice, wheat and *Rabi* pulses through a favourable positive crop response. There is a huge scope to exploit this potential through scientific and technological intervention like BGREI, and hence the program should continue with greater effort and coordination.
- An all round effort should be made to ensure the timeliness of input delivery system prescribed under the recommended technology.
