

FARMERS' PERCEPTION TOWARDS THE APPLICATION OF BIOZOTE IN SELECTED DEMONSTRATED RICE FIELDS AT HAFIZABAD AND SHEIKHUPURA DISTRICTS

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ABSTRACT:- Bio-fertilizers, besides their role in soil health improvement are also considered environment friendly and a cheap substitute for fertilizer. Biozote application in rice crop was demonstrated at farmers' fields in Hafizabad and Sheikhupura districts under the project "Improving Soil Fertility and Soil Health in Pakistan". The present paper aimed to assess the performance of biozote on rice and is based on perceptions of farmers involved in on-farm demonstration trials. Four different treatments on each selected plot were carried out for demonstration purpose by a team of technical partners from NARC during *kharif* 2014. The results are based on farmers' perception recorded through a structured questionnaire and face to face interviews at their fields. Majority of the host farmers found that plots with biozote had better germination and also found it a good technology for improving rice yield. Non-availability of biozote at local level, less farmers' awareness and low education level of farmers were identified as major issues in adoption of this technology in the study areas.

Key Words: Biozote; Rice; Yield; Farmers' Perception; Adoption Constraints; Pakistan.

INTRODUCTION

Rice belongs to the genus *Oryza* and the tribe Oryzeae of the family Gramineae (Poaceae). The genus *Oryza* has 25 recognised species, of which 23 are wild and two species namely, *O. sativa* and *O. glaberrima* are cultivated (Morishima, 1984; Vaughan, 1994; Brar and Khush, 2003). Rice is an imperative cereal in the world and serves as food for about 50% of the world's population (Ladha et al., 1997). Pakistan needs a gigantic change in agriculture for momentous contribution in the improvement of livelihoods of its people as well as

macroeconomic welfare and prosperity. In Pakistan, agriculture and food security anxiety remain high on the policy agenda at national level and the performance of agriculture has been encouraging with growth of 2.1% during 2013-14 (GoP, 2014).

The primarily outstanding and contributing role of bio-fertilizers is an extensive reduction in environmental pollution and upgrading in agro ecological consistency. Due to low price, bio-fertilizers are affordable to farmers. It plays an important role in accumulation of existing nutrients like nitrogen and phosphorus to the crop plants (Purohit and Dodiya,

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2014). Bio-fertilizers contribute a positive role in improving soil fertility by fixing atmospheric nitrogen, both in association with and without plant roots. They also solubilize insoluble soil phosphates and produces plant growth substances in the soil (Venkatashwarlu, 2008). Bio-fertilizers manufactured are sold commercially by different research organizations in Pakistan. Bio-fertilizer manufactured by Pakistan Agricultural Research Council (PARC) Islamabad comprises living bacteria, TAL-169 in the carrier material. Application of phosphorus to legume crops improves grain yield extensively (Hussain, 1981). Grain yield of chickpea was considerably better with *Rhizobium* and phosphorus (Raut and Kohire, 1991). *Rhizobium* inoculum normally increased plant growth, yield with components and nitrogen fixation in chickpea (Fatima et al., 2008). Bio-fertilizers are microbial preparations containing living cells of different microorganisms. These living cells have the potential to make active plant nutrients in soil from unworkable to workable shape through biological process. Bio-fertilizers are used in live formulation of beneficial microorganism. By application to seed, root or soil, they activate the availability of nutrients through biological activity and assist to build up the lost micro flora and improve the soil health (Ismail et al., 2013). Bio-fertilizer can be used alone or in combination and for easy appliance, they are packed in suitable carrier such as lignite or peat. Carrier also has imperative function in sustaining sufficient shelf life (Singh et al., 1999). Bio-fertilizers have an immense potential as supplementary,

renewable and environmental friendly sources of plant nutrients. They are also an important component of Integrated Nutrient Management (INM) and Integrated Plant Nutrition System (IPNS) (Raghuvanshi, 2012). Naturally grown bio-fertilizers are good for better yield as well as they are risk free to humans and lead to better sustainable economic development for the farmers and their country (Mishra and Dash, 2014). In various countries, bio-fertilizers are gradually becoming more popular for many crops. They are containing products of active or latent strains of soil microorganisms, either bacteria alone or in combination with algae or fungi that enhance the plant availability and uptake of mineral nutrients (Vessey, 2003).

Land Resources Research Institute, NARC, Islamabad provides scientific bases for enhancing and sustaining soil productivity and protecting the environment. After laboratory testing and studying field performance, Land Resources Research Institute, NARC, Islamabad had developed biozote and introduced throughout in the country for legumes and cereals. The results showed 20-40% increase in yield. The key objective of the study was to acquire host farmers' perceptions, views and recommendations regarding biozote application in their rice fields and to identify the problems and constraints in adoption of the biozote technology.

MATERIALS AND METHOD

The paper is based on the study conducted for getting feedback of the biozote application on rice through

demonstrations under Soil Fertility and Soil Health Project in district Hafizabad and Sheikhpura in Punjab, Pakistan. The seven demonstrations, for biozote application on rice at four farmers fields in Hafizabad and three in Sheikhpura, were conducted by the team of soil scientists from Land Resources Research Institute (LRRI), NARC during *kharif* (summer) 2014. The demonstrations were carried out through four treatments; two treatments as per farmer practices with one bag DAP per acre with biozote and 2nd without biozote with same DAP level. The other two treatments were demonstrated by application of biozote with 20 kg DAP and last treatment with 30 kg DAP but without applying biozote. The application ratio of biozote was one packet (0.50 kg) per acre and the area of each demonstration site ranges from one acre to four acres and equally divided into four treatments. Out of seven, six demonstrations sites were sown through nursery transplantation. At one site, direct seeded method was applied with addition of equal quantity of SOP (56 kg) per acre in all treatments. All the demonstrations were conducted under irrigated conditions. An interview schedule was designed and mainly targeted to record the farmers' perceptions about the effect of biozote on plant growth and yield. Data was collected from selected seven host farmers by personnel interview method during December, 2014 after the harvest of rice crop. The differences by treatments could not be captured as farmers were unable to give responses by treatments. Hence host farmers views and accordingly results are

based on farmers' responses for treatments as with and without biozote application. The results were analyzed using Microsoft Excel and a simple descriptive analysis was used to acquire results.

RESULTS AND DISCUSSION

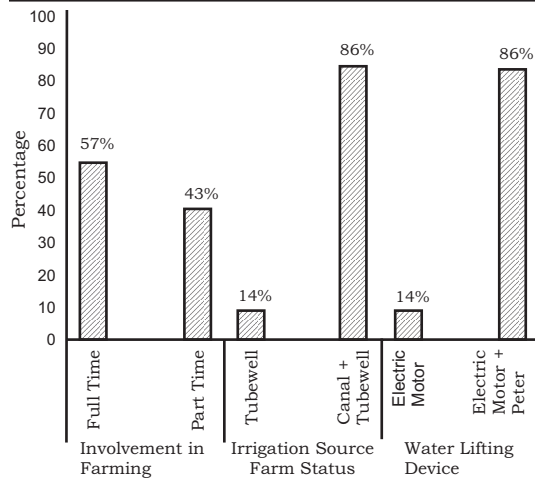
Socio-economic Status of the Host Farmers

Socio-economic status of the host farmers has shown, mean of age were 49 years with 8 years of average formal education and average total cultivated land of 140 acres (Table 1). The findings indicated that 43% of the host farmers were mainly middle aged (41-50 years) that are in their economically active stage and can undergo the stress. Similarly a significant number (57%) of the host farmers had middle level education which enables the individual farmers to know how to seek for and apply information on improved farm practices. While majority 86% of the host farmers had land holding 1-100 acres and 14% had 101-200 acres respectively in the study area.

Table 1. Socio-economic characteristics of the host farmers

Statement	Description	% age distribution (f)	Mean
Age group (years)	a. 30-40	14 (1)	49
	b. 41-50	43 (3)	
	c. 50-60	43 (3)	
Literacy status (years)	a. Primary	29 (2)	08
	b. Middle	57 (4)	
	c. Graduation	14 (1)	
Total cultivated land (acres)	a. 1-100	86 (6)	140
	b. 101-200	14 (1)	

Source: Survey data, 2014



Source: Survey data, 2014

Figure 1. Involvement in farming, irrigation sources and water lifting devices

Involvement in Farming, Irrigation Sources and Water Lifting Devices of Host Farmers

The data showed that 57% of the host farmers had full time involvement while 43% had part time involvement in farming activities in the study area (Figure 1). Similarly, 14% of host farmers were using only tube wells while 86% were using both the tube wells and canals for irrigation purposes. Similarly, 14% of host farmers were using electric motors while 86% were using both electric motor and peter as water lifting device in the study area.

General Impact of Biozote Technology on Rice Crop

Majority of host farmers were hopeful about biozote and considered it a positive intervention for the fellow farmers. The data showed, that 29% of the host farmers observed it good, 57% found it normal while 14% considered it as low in performance

Table 2. Impact of biozote technology on rice crop

Statements	Description	% age distribution (f)
General observations of host farmers regarding biozote	a. Good	29 (2)
	b. Average	57 (4)
	c. Low	14 (1)
Effect of biozote on rice germination	a. No change	43 (3)
	b. 5-10 %	43 (3)
	c. 11-15 %	14 (1)
Effect of biozote on crop stand and vigor	a. Good	14 (1)
	b. Average	43 (3)
	c. Low	43 (3)
Effect of biozote on rice yield (per acre)	a. No change	29 (2)
	b. 1-3 mounds	57 (4)
	c. 4-6 mounds	14 (1)

Source: Survey data, 2014

(Table 2). There were mix responses of the host farmers regarding the effect of biozote on rice germination; as 43% answered that they don't recognize any change, 43% observed (5-10%) improvement while 14% observed (11-15%) change in germination of rice crop. Similarly the observations regarding crop stand and vigor was also encouraging and the host farmers were convinced that biozote performed well in crop stand and vigor as 14% evaluated it good, 43% evaluated it average and 43% observed it low. Different responses were collected from the host farmers regarding biozote effects on yield; as 29% of the host farmers assessed no change, 57% observed (1-3) maunds change while 14% evaluated (3-6) maunds change per acre due to the use biozote technology.

Other Aspects About Biozote Technology

The application of biozote has reduced the usage of chemical fertilizers and improved yield. The results depicted that 14% of host

Table 3. Other aspects about biozote technology

Statement	Description	% age distribution (f)
Major benefit which farmer perceive from biozote	a. Yield	14(1)
	b. Fertilizer Saving	29(2)
	c. Both	57(4)
Farmer used biozote with his own expenses	a. Yes	14(1)
	b. No	86(6)
Major problems in adoption of biozote in the study area	a. Availability	29(2)
	b. Awareness	42(3)
	c. Both	29(2)

Source: Survey data, 2014

farmers considered yield as key benefit, 29% deliberated fertilizer saving while 57% found both the yield and fertilizer savings as a major benefit which farmer perceived (Table 3). It was noted that only one farmer utilized biozote technology on their own expense in the study area. The major problems in adoption of biozote technology were its un-availability in local markets and less farmers' awareness in the study area. About 42% mentioned un-awareness of the farmers, 29% stated its un-availability and 29% considered both the above reasons.

CONCLUSION AND RECOMMENDATIONS

This study was undertaken in 2014 to document the feedback of the host farmers' regarding biozote technology at district Hafizabad and Sheikhpura of Punjab Province. The host farmers observations about the effect of biozote on yield and germination of rice were recorded. The data collected from the host farmers showed that biozote has positive effect on crop vigor and germination.

Similarly, the host farmers were convinced that biozote had also an encouraging impact on crop yield and considered it as a good intervention for farmers. Beside the positive effect of the tested biozote on yields, it was also noticed that biozote also minimizes the inorganic fertilizer usage. Although the host farmers agreed about the performance of biozote in rice crop but the adoption of biozote technology by fellow farmers was still not satisfactory in the study area. It was noted that the major problems in adoption of biozote technology were its un-availability in local markets as well as the lack of awareness and knowledge in fellow farmers. Furthermore, the farmers of the study area rely totally on middleman for their finances which greatly affect their decisions and choices. Therefore, it is concluded that the dissemination efforts under the project would be helpful by creating more awareness in farmers and gathering information regarding use of biozote through organizing more Farmer Field Days (FFDs) and conduction of further demonstration plots in the study area. The site selection for demo plots were good but arrangement of permanent display boards of specific technology at demonstration sites will be further helpful in knowledge enhancement in the study area.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

S.No	Author Name	Contribution to the paper
1.	Mr. Muhammad Nisar Khan	Conceived the idea, Wrote abstract, Methodology, Conclusion, Data entry in SPSS and analysis, Results and Discussion
2.	Mr. Hassnain Shah	Wrote abstract, Methodology, Technical input at every step, Overall management of the article
3.	Mr. Saqib Shakeel Abbasi	Methodology, Results and Discussion
4.	Dr. Abid Hussain	Conclusion, Technical input at every step

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