Indian Journal of Fundamental and Applied Life Sciences ISSN: 2231– 6345 (Online)
An Open Access, Online International Journal Available at www.cibtech.org/sp.ed/jls/2015/04/jls.htm
2015 Vol. 5 (S4), pp. 1021-1026/Rakipour and Noorivandi
Research Article

ATTITUDE OF WHEAT FARMERS TOWARD APPLICATION OF PHOSPHATE BIOFERTILIZER BARVAR-2

Mahboobeh Rakipour and *Azade N. Noorivandi
[1]*Department of Agricultural Extension, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran*
[2]*Department of Agricultural Management, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran*
**Author for Correspondence*

ABSTRACT
The purpose of this research was analyzing attitude of wheat farmers toward application of phosphate biofertilizer Barvar-2 in Shoushtar township of Khouzestan Province, Iran. The population of this study included wheat farmers. The statistical population was N=4800 people. The sample size based on Krejcie & Morgan table was n=355. Questionnaire reliability was estimated by calculating Cronbach's alpha and it was appropriate for this study. Data were analyzed using the Statistical Package for the Social Sciences (SPSS). To reach the research objectives, appropriate statistical procedures for description were used. Data analysis was carried out through data description and data inferential analysis. The results of research showed the correlation between participation in extension practices, income, technical knowledge, communication channel, social participation, level of education, crop yield and attitude toward application of phosphate biofertilizer Barvar-2 was significant. The result of regression analysis by stepwise method indicated participation in extension practices, income, technical knowledge, communication channel, social participation, level of education, crop yield may well explain for 64.4% changes ($R^2 = 0.712$) in attitude of farmers.

Keywords: *Attitude, Phosphate Biofertilizer Barvar-2, Wheat Farmer*

INTRODUCTION
Agriculture is an important part of every society. Sustainable economies are, in part, based upon sustainable food systems which depend in part upon agriculture. Agriculture affects the environment, human health, and even social order. Thus, any attempt to achieve sustainability must set as priority the attainment of a more sustainable agriculture (Baide, 2005 quoted from Horrigan *et al.,* 2002)**.** Cary *et al.,* (2001) point out that there is a range of constraints that discourage adoption of natural resources' management programs. They also explain that these constraints can have four different backgrounds: "perspective of individual landholders, the characteristics of desirable management practices, the socio-economic structure of adopters' communities and the broader institutional settings". The application of fertilizers is one of the primary methods for improving the availability of soil nutrients to plants. Fertilizing can change rates of plant growth, maturity time, size of plant parts, phytochemical content of plants (Raissi *et al.,* 2012) and seed capabilities. High-input practices such as heavy use of chemical fertilizers have created a variety of economic, environmental, ecological and social problems. Furthermore, the increasing costs of chemical inputs have left farmers helpless, resulting to decreasing seed quality of certain crops and resulting in the fall of commodity prices and consequently reducing farm income (Raissi *et al.,* 2012 quoted from Khadem *et al.,* 2010). Raissi *et al.,* (2012) revealed that different fertilizer systems had different affects on yield and yield components. Organic manure had the highest effect on the studied traits. Seeds are depended upon environmental conditions and agronomic practices. Based on averaged results, it can be concluded that biological fertilizing systems have the ability to produce more reliable seeds with more storability potential compared to conventional systems.
Bio-fertilizers are not only eco-friendly and cost effective but also increase phosphorus uptake, promotes growth and yield of plants by supplying nutrients in available form, provides resistance against pests and diseases and strengthens soil structure (Sharma, 2002). Yousefi *et al.,* (2010) studied the impact of phosphate fertilizer of Barvar-2 on the yield of maize and concluded that the -maize yield was increased by 50 kg ha. Zaredost *et al.,* (2014) revealed the application of biological phosphate fertilizers containing

© Copyright 2014 | Centre for Info Bio Technology (CIBTech)

PSB and mycorrhiza fungi not only decreases the uptake of chemical phosphate fertilizer, but also increases plant growth. Zaredost *et al.*, (2014) quoted from Khalaj (2009) investigated the effect of bio-fertilizer, Barvar-2 on phosphorus uptake in Polianthes tuberosa flower and concluded that the best results were obtained by applying bio- and chemical fertilizer in 50:50 ratios. Ghanbari and Janjan (2013) revealed that using of Barvar-2 phosphate biofertilizers leading to 1) Reduction of environmental pollution, 2) Climate fitness, 3) reduced consumption of phosphate chemical fertilizer, 4) Significant yield increase, 5) Inexpensive shipping, 6) Low diseases, 7) Compatibility with other chemical, 8) High Pi solubilizing competency, 9) Colony formation rhizosphere, 10) Genetic stability, 11) Long shelf time, 12) Simple application methods.

MATERIALS AND METHODS

The purpose of this research was analyzing attitude of wheat farmers toward application of phosphate biofertilizer Barvar-2 in Shoushtar township of Khouzestan Province, Iran. The population of this study included wheat farmers. The statistical population was N=4800 people. The sample size based on Krejcie & **Morgan** table was n=355. Questionnaire reliability was estimated by calculating Cronbach's alpha and it was appropriate for this study.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). To reach the research objectives, appropriate statistical procedures for description were used. Data analysis was carried out through data description and data inferential analysis. A five-point Likert-type scale was used as the instrument to gather data in order to measure attitude of wheat farmers.

RESULTS AND DISCUSSION

Results

Demographic Profile

Table 1 shows the demographic profile and the descriptive statistics for some characteristics of the wheat farmers. The results of the demographic information of the participant indicated that the age of 34.65% of farmers was between 30-40 years.

The minimum age of participant was 20 years and the maximum age was 65 years. Based on educational levels, a greater proportion (86.2%) of them had educational level to read and write. Based on the income, 59.15% of them had 150-250 million rial in year.

Table 1: Demographic profile of wheat farmers

Variables	Frequency	Percentage	Cumulative Percentage
Age			
20-30	48	13.52	13.52
30-40	123	34.65	48.17
40-50	116	32.68	80.85
50-60	53	14.93	95.77
60-70	15	4.23	100
Educational level			
Read and write	306	86.2	86.2
Elementary	23	6.48	92.68
Guidance school	8	2.25	94.93
High school	7	1.97	96.90
Diploma and upper	11	3.1	100
Income (Million Rials)			
0-150	76	21.41	21.41
150-250	210	59.15	80.56
250-350	34	9.58	90.14
350 and upper	35	9.86	100

© Copyright 2014 | Centre for Info Bio Technology (CIBTech)

Attitude of Wheat Farmers toward Application of Phosphate Biofertilizer Barvar-2

In this study, for analyzing attitude of wheat farmers toward application of phosphate biofertilizer Barvar-2, the Likert scale was used. The ratings on the Likert scale were from one to five (1. Strongly Disagree, 2. Disagree, 3. No opinion, 4. Agree, 5. Strongly agree).

The final computed score represented the overall level of attitude. The Table 2 revealed the answer of farmers to each item of attitude toward toward application of phosphate biofertilizer Barvar-2. For example, 163 person to the first questions answered strongly agree and 123 person agreed. Table 3 identified the level of overall attitude toward application of phosphate biofertilizer Barvar-2 after computing 10 items of attitude.

Table 2: Frequency of wheat farmers to each item of attitude toward application of phosphate biofertilizer Barvar-2

Items	1	2	3	4	5	Mean	sd	cv
Target farmers should take advantage of the resources.	0	0	69	123	163	4.26	1.662	0.390
The use of bio-fertilizers to produce a healthy product.	0	35	89	129	102	3.84	2.072	0.540
The use of bio-fertilizers play an effective role in strengthening the soil.	0	19	88	136	112	3.96	1.916	0.484
Less use of chemical fertilizers has an important role in the protection of sources.	0	0	55	146	154	4.28	1.555	0.363
The use of biofertilizers human health consequences.	0	24	79	118	134	4.02	2.029	0.505
The use of bio-fertilizers to reduce production costs.	12	25	106	104	108	3.76	2.316	0.615
Cause diseases such as cancer, excessive use of chemicals.	0	5	76	132	142	4.16	1.748	0.420
Biological fertilizer increases profitability	28	44	101	78	104	3.52	2.714	0.770
Soil and water is a natural heritage and should be transferred to the next generation.	0	0	0	137	218	4.61	1.059	0.230
The use of bio-fertilizers environmental health consequences.	12	41	112	84	106	3.65	2.440	0.668

1. Strongly Disagree, 2. Disagree, 3. No opinion, 4. Agree, 5. Strongly agree

Table 3: Level of overall attitude toward toward application of phosphate biofertilizer Barvar-2

Attitude	Frequency	Percent	Cumulative percent
Very low	0	0	0
Low	0	0	0
Moderate	109	30.7	4.9
High	119	33.52	64.22
Very high	127	35.78	100
Total	355	100	

© Copyright 2014 | Centre for Info Bio Technology (CIBTech)

Research Article

Correlation Study

Spearman correlation coefficients to test hypotheses was used, the results of this test are as follows (Table 4):

The results of table 4 showed the correlation (r=0.468) between participation in extension practices and attitude toward application of phosphate biofertilizer Barvar-2 at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that farmers with high participation in extension practices had high attitude.

The results of table 4 showed the correlation (r=0.409) between income and attitude toward application of phosphate biofertilizer Barvar-2 at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that farmers with high income had high attitude.

The results of table 4 showed the correlation (r=0.612) between technical knowledge and attitude toward application of phosphate biofertilizer Barvar-2 at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that farmers with high technical knowledge had high attitude.

The results of table 4 showed the correlation (r=0.716) between communication channel and attitude toward application of phosphate biofertilizer Barvar-2 at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that farmers with high using of communication channel had high attitude.

The results of table 4 showed the correlation (r=0.692) between social participation and attitude toward application of phosphate biofertilizer Barvar-2 at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that farmers with high social participation had high attitude.

The results of table 4 showed the correlation (r=0.517) between level of education attitude toward application of phosphate biofertilizer Barvar-2 at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that farmers with high level of education had high attitude.

The results of table 4 showed the correlation (r=0.613) between crop yield and attitude toward application of phosphate biofertilizer Barvar-2 at the level of 0.01 was significant. Therefore, the null hypothesis is rejected. It means that with 99% of confidence, we can conclude that farmers with high crop yield had high attitude.

Table 4: Relationship between attitude toward application of phosphate biofertilizer Barvar-2 and independent variables

Independent variable	Dependent variable	r	p
Participation in extension practices	attitude toward application of phosphate biofertilizer Barvar-2	0.468	0.000
Income		0.409	0.000
Technical knowledge		0.612	0.000
Communication channel		0.712	0.000
Social participation		0.692	0.000
Level of education		0.517	0.000
Crop yield		0.613	0.000

Regression Analysis

Table 5 shows the result for regression analysis by stepwise method. Liner regression was used to predict changes in attitude by different variables. Participation in extension practices, income, technical knowledge, communication channel, social participation, level of education, crop yield may well explain for 64.4% changes ($R^2 = 0.712$) in attitude of farmers.

$Y=11.325+0.612x_1+0.723x_2+0.871x_3+0.590x_4+0.618x_5+0.613x_6+0.816x_7$

© Copyright 2014 | Centre for Info Bio Technology (CIBTech)

Table 5: Multivariate regression analysis

Independent variable	B	Beta	T	Sig
Participation in extension practices	0.612	0.456	3.298	0.000
Income	0.723	0.479	2.592	0.000
Technical knowledge	0.871	0.349	2.726	0.000
Communication channel	0.590	0.580	2.465	0.000
Social participation	0.618	0.712	2.956	0.000
Level of education	0.613	0.709	2.976	0.000
Crop yield	0.816	0.801	3.665	0.000
Constant	11.232	----	4.567	0.000

R^2=0.712 F=7.358, Sig= 0.000

Conclusion

The results of research showed the correlation between participation in extension practices, income, technical knowledge, communication channel, social participation, level of education, crop yield and attitude toward application of phosphate biofertilizer Barvar-2 was significant. Therefore, we can conclude that farmers with high participation in extension practices, income, technical knowledge, communication channel, social participation, level of education, crop yield had high attitude toward application of phosphate biofertilizer Barvar-2. The result of regression analysis by stepwise method indicated participation in extension practices, income, technical knowledge, communication channel, social participation, level of education, crop yield may well explain for 64.4% changes (R^2 = 0.712) in attitude of farmers.

Therefore, to development of the attitude of farmers toward application of phosphate biofertilizer Barvar-2, considering variables of participation in extension practices, income, technical knowledge, communication channel, social participation, level of education, crop yield are essential. This should be considered by managers and planners.

ACKNOWLEDGMENTS

This paper is part of MSc thesis of Mahboobeh Rakipour graduate student of agricultural extension department, Shoushtar branch, Islamic Azad University. Thus, appreciate of professors and lectures of agricultural management department.

REFERENCES

Baide JMR (2015). Barriers to Adoption of Sustainable Agriculture Practices in The South: Change Agents Perspectives. A Thesis Submitted to the Graduate Faculty of Auburn University in Partial Fulfillment of the Requirements for the Degree of Master of Science Auburn, Alabama**.**

Cary John W, Trevor Webb and Neil F Barr (2001). The Adoption of Sustainable Practices: Some New Insights, Land & Water Australia, Canberra. Available: http://www.lwa.gov.au/downloads/final_reports/BRR19.pdf [Accessed on September 8, 2009].

Ghanbari M and Janjan A (2013). The application of Barvar 2- biological phosphate fertilizer in wheat cultivation a step to organic agriculture (green) and reduction of environmental pollution. *Life Science Journal* **10**(1) 487-490.

Horrigan Leo, Robert S Lawrence and Polly Walker (2002). How Sustainable Agriculture Can Address the Environmental and Human Health Harms of Industrial Agriculture. *Environmental Health Perspectives* **110**(5) 445-456.

Khadem SA, Galavi M, Ramrodi M, Mousavi SR, Rousta MJ and Rezvani Moghadam P (2010). Effect of animal manure and superabsorbent polymer on corn leaf relative water content, cell membrane stability and leaf chlorophyll content under dry condition. *Australian Journal of Crop Science* **4** 642-647.

© Copyright 2014 | Centre for Info Bio Technology (CIBTech)

Khalaj MA, Hasanzadeh S and Yosefbeigi A (2009). Investigation replacement of phosphorus bio-fertilizer to common chemical phosphorus in Polianthes tuserose. Final report to national Omamental plants research station, National Omamental Plant Research Station, Mahallat, Iran, 26.

Raissi A, Galavi M, Ramroudi M, Mousavi R and Rasoulizadeh M (2012). Effects of phosphate bio-fertilizer, organic manure and chemical fertilizers on yield, yield components and seed capabilities of isabgol (Plantago ovate)**.** *International Journal of Agriculture and Crop Sciences* **4**(24) 1821-1826**.**

Sharma AK (2002). *Biofertilizers for Sustainable Agriculture* (Agro bioscience India Publication) 407.

Yousefi K, Galavi M, Ramrodi M and Mousavi SR (2011). Effect of biophosphate and chemical phosphorus fertilizer accompanied with micronutrient foliar application on growth, yield and yield components of maize (Single Cross 704). *Australian Journal of Crop Science* **5** 175-180.

Zaredost F, Hashemabadi D, Barari Ziyabari M, Mohammadi Torkashvand A, Kaviani B, Jadid Solimandarabi and Zarchini (2014). The effect of phosphate bio-fertilizer (Barvar-2) on the growth of marigold**.** *Journal of Environmental Biology* **35** 439-443**.**

© Copyright 2014 | Centre for Info Bio Technology (CIBTech)