

Impact of extension service to rice farmers

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Abstract: The purpose of this study has been to investigate the effectiveness of the education received by the rice growers of the city of Babol from the extension service in raising rice yield. The population studied contained 179 farmers who had taken part in educational programs organized by the extension service regarding the operations of planting, maintaining, and harvesting rice. This research was of the applied, retroactive, and semi – empirical type; and it was carried out in a descriptive – correlative way employing the field study method and using questionnaires. The SPSS software was used to analyze the gathered data. Results obtained from the correlation coefficient among variants suggest that there is a positive and significant relationship between the independent variables (level of education, income, the acreage of paddy field owned, participation in educational classes organized by the extension service, the use of the method of delivering talks, the use of practical training, organizing work labs, making use of educational media, and the compatibility of the main points presented to the farmers with the dependent variable of the effectiveness of the educational courses, but that the independent variables of age, the number of contacts with extension agents, the number of visits to the model fields, the screening of video films, the use of group discussions, and the extent of experience and knowledge of extension agents do not have a significant relationship with the effectiveness of the educational courses. Results obtained from the Kruskal-Wallis and the Mann-Whitney tests on the effects of individual dependent variables suggest that the main occupation, the use of bank facilities, and the use of support facilities offered after the educational courses influence their effectiveness, but that the type of the place the education is offered and whether the instructor is native or non-native do not affect the effectiveness of the educational courses. Results obtained from the step-by-step regression concerning the combined effect of the independent variables on the dependent variables indicate that the variables of the acreage of paddy field owned by the farmer, participation in educational classes organized by the extension service, and the use of work labs have positive effects on the effectiveness of the educational courses.

$$Y = 1.27 + 0.209 \times 5 + 0.153 \times 7 + 0.307 \times 27$$

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Key words: Effectiveness, educational programs organized by the extension service, rice farmers, the extension service and the education of farmers.

1. Introduction

Population growth and limitations of production resources throughout the world confront sustainable and secure food supplies with new challenges every day. The most important base for providing this sustainable food security is the agriculture sector which, in its broad sense, has the ability of preserving human life. The ever increasing growth of world population, at a progressive rate at that, has caused the agriculture sector to become more important and to make the necessary changes in itself commensurate with the changing conditions of the times. These changes in agriculture, which are considered as the development of the agriculture sector, took place for a time with increases in land area under cultivation. However this solution alone cannot solve the problem. Therefore, we have to search for other options such as: farming practices and the possibility of utilizing the

available resources in the best way, making suitable improvements in soil, water, and seeds, and managing the production and post - production operations in an appropriate and optimal way. To do all this, we need the force of human resources in the shape of exploiters of the agriculture sector who stand in the forefront and who have to reflect the results of the activities of the other sectors in the form of production. Such a force needs to be powerful and knowledgeable to take part in this process. To achieve this power and knowledge, the first thing needed is a format of educational and empowering programs. Therefore, agricultural development has a strong and persistent relationship with education (Aeenee, 2000).

Progress, development, and resolution of problems in third world countries can only be achieved through permanently prioritizing the agriculture sector (Zamanipour, 2005); and

agricultural development must start with empowering the human resources with the help of knowledge-oriented development (Kinnla, 2006). Educational programs of the agricultural sector in the format of educational programs organized by the extension service are part of the fundamental programs, funded in the national budget, which are executed for the purpose of improving and developing the rural and urban communities.

Therefore, establishing the position and status of education and extension is possible through the appearance of their effects in realizing the important social and economic goals. The role of education in the development of countries is now known to everybody; and hence, managers, policy makers, and planners have realized the high efficiency of education in all its different aspects, and consider education as an effective factor in exploiting the experience and the abilities of the human force for productive work and for increasing productivity (Bafouer, 2002).

Education is a process in which the learner and the teacher try to understand phenomena and to increase their knowledge through mutual activities carried out in a cordial environment (Mirkamali, 2001). Education is also a process that develops the abilities and the behavior of man and prepares him to better perform his work. Therefore, the purpose of education is to develop the knowledge and productivity of people. Such an education must be effective and manifest the related goals. Therefore, the education organized by the extension service and designed with the purpose of increasing the abilities and skills of rural operators in order to improve their life qualitatively and quantitatively must have the necessary effectiveness and move in that direction (Iravani, 1992).

Effectiveness has been defined as success in realizing goals or in executing the missions delegated (Mirsepasi, 1998), as the degree of achieving short-term and long-term goals in relation to the expectations of stakeholders and evaluators, or as organizational life. Therefore, the educational programs section is expected to see if the education offered can achieve the designed goals and whether this education is capable of bringing about the intended changes. Serious discussions are taking place, especially in developed countries, about the necessity of having extension services; therefore, education offered through extension services must prove its effectiveness in order to survive. To this end, factors influencing the effectiveness of educational programs organized by the extension service are considered in this article; and with this purpose in mind, a case study was conducted in the city of Babol in which rice farmers expressed their views on this question.

Rice is one of the most important crops domesticated by man and about 16% of the arable land in the world is under rice cultivation. Rice is a crop of temperate and dry areas and is planted up to the height of 4750 meters above sea level (Khodabende, 1996). In Iran, rice is the most important crop plant and is the main source of providing the protein and calorie needs of the Iranian people. In the city of Babol, nearly 10000 hectares of the total area under cultivation is dedicated to the production of rice, which is the main spring crop of the city (Anonymous, 2005). The educational programs organized by the extension service for rice farmers which, with the launching of the "Pivotal Rice Project" in 2000 and by utilizing motivational and encouraging tools (awarding prizes, etc.) and through supportive measures (guaranteed purchase of the rice produced, provision of inputs, machinery etc.), had entered a new phase (Anonymous, 2000), were improved and reorganized in 2004 with the Project of Increasing Rice Yield.

In this project, the new educational programs are focused on through the supervision of agriculture engineers (Anonymous, 2004).

In this study, our purpose is to investigate the efficiency and effectiveness of extension programs on rice carried out during 2005 -2006 from the perspective of rice farmers of Babol. Some of the main specific goals of the present study are as follows:

- Studying the individual characteristics of the farmers
- Identifying the role of the education offered by the extension service in improving the educational courses held for rice farmers
- Studying the degree of suitability of the main points for the dates and hours designated for the educational programs
- Studying the suitability of the main points of the topics taught in educational courses for the needs of rice farmers
- The extent to which the rice farmers employ the extension methods taught in the programs.

In the rest of the article, some of the studies and previous research conducted in this area are presented. Khademi (2002) in a study titled *The Effectiveness of Education Offered by the Extension Service for Pomegranate Growers of the City of Garmsar in Increasing Fruit Yield during the Years 2000–2001*, concluded that personal variables such as level of education of the farmer, whether agriculture is the main occupation, number of contacts with the extension agent, methods of practical teaching, suitability of the programs, and work experience of instructors influenced the effectiveness of the extension programs.

Abdolmaleki (2006) in his research with the title *The Effectiveness of Extension Programs in the City*

of Toyserkan showed that these courses were effective with respect to increasing the knowledge and awareness of rangeland owners, and that there was a significant relationship between the extent of knowledge and awareness of the two groups.

Javadinia et al., (2000) in his research, showed that awareness plays an important role in the effectiveness of programs carried out. In Keshavarz (2002) research with the title of The Effectiveness of Formal Technical and Professional Training Courses Offered by the Ministry of Construction Jihad showed that the variables of gender, type of high school diploma held, applied material taught by instructors, and the attraction of the taught material for the farmers had a significant relationship with effectiveness and that the people taught had a positive attitude towards the technical and professional courses. Furthermore, in Aeenae's research titled Evaluation of the Effectiveness of Educating Producers in Gorgan in Increasing the Yield of Wheat in the years 1998–1999, it was shown that monthly income, acreage under wheat cultivation owned by the farmer, number of visits to the field, extent of using methods of practical teaching, extent of suitability of the topics taught for satisfying the educational needs of the farmers, and different locations of holding the educational courses had a significant relationship with the effectiveness of the educational courses.

2. Materials and Methods The Region Studied

This research is of the applied type and the method used is descriptive, practical- communicative, and in it, the effectiveness of the education courses offered by the extension service for the rice farmers and the increase in yield are considered as dependent variables. As the research was carried out after the programs and the educational courses had come to an end i.e., the research is about the years 2006-2007. It is of the retroactive type. This study was conducted in the field survey method in which questionnaires were used. 179 rice farmers of Babol were chosen by random sampling; and they responded to the questions asked in the questionnaires. After gathering the information, the data was extracted and analyzed. In order to take samples from the existing statistical community, the simple random sampling method was used, while making sure that everything is taken into account.

The dependent variable in this research is the effectiveness of the educational courses offered by the extension service for rice farmers, and the independent variables include the personal variables (age, level of education), the economic variables (income, acreage of paddy field owned by the farmer, use of bank facilities), variables related to the extension service

(participation in educational – extension classes, number of contacts with extension agents, visits to the model fields, extent of using the video films, talks delivered for the farmers, practical teaching, group discussions, work labs, quality of the location of offering the courses, suitability of the main points taught for time designated for teaching them, use of native instructors, and extent of knowledge and experience of the extension agents. In order to assess admissibility, copies of the questionnaire were distributed among professors, experts and M. Sc. and Ph.D. students in the field of extension and agricultural education. After making the necessary changes in the questionnaire, we became confident the questions asked precisely evaluate those characteristics we had in mind in this research. To assess the validity of the questionnaire, 20 copies of it were distributed among rice farmers in two villages in the city of Amol and then the software SPSS and the Kronbach-alpha test were used to assess the answered questionnaires. The validity obtained for the questionnaire was 85%, which was adequate for our study (Mansoorfar, 1995, Kalantari, 2004).

In this research, two methods were used: the descriptive method (such as the frequency, the percentage, and the mean), and the practical-communicative (regression) method.

3. Discussion and Results

In this study, the highest frequency relates to people 36-40 years old, and this while more than 63% of the population in the statistical community is older than 36. The results are presented in Table 1.

Table 1. Frequency Distribution of the Age of the Farmers

Age	Frequency	Percentage	Cumulative percentage
25 and younger	14	7.8	7.8
26 – 30	17	9.5	17.3
31 – 35	31	17.3	34.6
36 – 40	41	22.9	57.5
41 -45	37	20.7	78.2
46 -50	18	10.1	88.3
Older than 50	21	11.7	100
Total	179	100	

Mean: 39 Youngest 24 and oldest 64 Standard deviation: 8.93

Based on the results of the research, it was found that most farmers had paddy fields of 5 hectares or less. The second largest group, who had 6 – 10 hectares of paddy fields, formed more than 78% of the community. These two groups made up more than 78% of the community, the reasons being the enforcement of the law of Agrarian Reforms' and the

existence of public domains. The distribution of rice paddies is due to other Islamic laws such as joint ownership (Table number 2).

Table 2. Frequency Distribution of Farmers According to the Acreage of Rice Paddies

Acreage of paddy fields	Frequency	Percentage	Cumulative percentage
5 hectares or less	93	52	3.1
6 – 10 hectares	47	26.3	28.3
11 – 15 hectares	20	11.2	57.5
16 -20 hectares	12	6.7	89.2
More than 20 hectares	7	3.9	100
Total	179	100	

Mean: 7.18 Smallest 0.5 and largest 26 hectares
Standard deviation: 5.5

The levels of education of the statistical community are also balanced and close to each other: 23.7% are illiterate and 17.3% have high school diplomas or higher degrees. As a whole, more than 80% of the community has adequate education. The level of education was as expected, because Babol ranks high in the level of literacy in Iran.

Table 3. Frequency of Distribution of Rice Farmers on the Basis of Participation in Educational Courses on Planting Rice Offered by the Extension Service

Attendance at educational classes offered by the extension service	Frequency	Percentage	Cumulative percentage
Very low	26	14.8	14.8
Low	56	31.8	46.6
Average	50	28.4	75
High	24	13.6	88.6
Very high	20	11.4	100
No answer	3		
Total	179	100	

Mode: 2 Standard deviation: 1.20 Variance: 1.44

Table 3 shows that the educational courses offered by the extension service on planting rice were not very attractive for the farmers: low attendance for around 49% and high attendance for about 24% of the farmers, the reasons being that classes on the maintenance of the rice crop were not held or that the farmers, due to their long experience in this aspect of rice production, felt they did not need this education. Table number 4 also, which is about classes held on the maintenance period of the crop, shows that the attendance rate is low for around 50% of the farmers and high for about 24%.

Table 4. Frequency Distribution of the Farmers Regarding Attendance at Educational Classes Held by the Extension Service on the Maintenance Period of the Rice Crop

Attendance at Educational Extension Classes	Frequency	Percentage	Cumulative percentage
Very low	26	14.5	14.8
Low	64	35.8	51.1
Average	44	24.6	76.1
High	21	11.7	88.1
Very high	21	11.7	100
No answer	3	1.7	
Total	179	100	

Mode: 2 Standard deviation: 1.21 Variance: 1.46

Table 5 is also about the frequency distribution of attendance at classes on the maintenance of the rice crop, and we see that more than 55% of the farmers showed a low rate of attendance at these classes and 20 farmers frequently attended them.

Table 5. Frequency Distribution of Respondents Regarding Attendance at Educational Courses Held by the Extension Service on the Harvesting of the Rice Crop

Attendance at Educational Classes Offered by the Extension Service	Frequency	Percentage	Cumulative percentage
Very low	44	24.9	24.9
Low	57	32.2	57.1
Average	41	32.2	80.2
High	22	12.4	92.7
Very high	3	7.3	100
No answer	2		
Total	179	100	

Mode: 2 Standard deviation: 1.21 Variance: 1.44

Table number 6 shows the effectiveness of the educational courses held by the extension service for the farmers. More than 38% of the community considered this effectiveness to be from high to very high, more than 75% thought it was more than average, and about 20% stated that the effectiveness of these educational courses was low.

Table 6. The Views of the Respondents on the Effectiveness of the Education Offered by the Extension Service on Rice production

Attendance at educational classes held by the extension service	Frequency	Percentage	Cumulative percentage
Very low	8	4.5	4.5
Low	34	19.2	23.7
Average	66	37.3	61
High	40	22.6	83.6
Very high	29	16.4	100
No answer	2	1.1	
Total	179	100	

Mode: 3 Standard deviation: 1.08 Variance: 1.18

In Table number 7, the role of knowledge and experience of extension agents and extension experts in planting rice is shown. Around 54% of the respondents considered this role to be small, 29.1% thought it was average, and only 16.7% believed this role was big or very big.

Table 7. Frequency Distribution of the Views of the Farmers Concerning the Role of Experience and Knowledge of Extension Agents and Instructors in Planting the Rice Crop

The Role of Experience and Knowledge of Extension Agents	Frequency	Percentage	Cumulative percentage
Very small	30	16.8	16.8
Small	67	37.4	54.2
Average	52	29.1	83.2
Big	19	10.6	93.9
Very big	11	6.1	100
Total	179	100	

Mode: 2 Standard deviation: 1.08 Variance: 1.17

Moreover, our investigations show that knowledge and experience of the extension agents had a small role also in the maintenance period: 50% of the respondents considered this role to be small, only 19.5% thought it was extensive, and the rest believed it to be average.

This role was even smaller concerning the harvesting operation: more than 60% of the community thought it was small, only 14% considered it to be extensive, and the rest believed it was average.

Table 8 shows the effect of participating in the educational courses on increasing the yield. Around 59.3% of the respondents thought participation in the educational courses offered by the extension service had little or very little effect on increasing rice yield, 22.7% thought it had an average effect, and 17.4% believed its effect to be extensive or very extensive. Of course, the reason for this is probably the long history of planting rice, or perhaps it is because the farmers do not pay attention to the new needs and technologies for increasing rice yield.

Table 8. Frequency Distribution of the Respondents Regarding the Effect of Participating in Educational Courses on Increasing Rice Yield

Increase in Yield	Frequency	Percentage	Cumulative percentage
Very little	42	24.4	24.4
Little	60	34.9	59.3
Average	39	22.7	82
Large	18	10.5	92.4
Very large	13	7.6	100
Total	179	100	

The effect of the extension programs on increasing income is also similar to that seen in Table 8.

Table 9. Frequency Distribution of the Respondents Regarding the Influence of Native Instructors on the Effectiveness of the Educational Courses Held by the Extension Service

The influence of native instructors	Frequency	Percentage	Cumulative percentage
Very little	14	7.8	7.8
Little	26	14.5	23.3
Average	71	39.7	62
Great	50	27.9	89.9
Very great	18	10.1	100
Total	179	100	

Mode: 2 Standard deviation: 1.05 Variance: 1.11

Table 9 shows that 38.7% of the respondents think the fact that the instructors were native had a great influence on the effectiveness of the education, about 40% thought this influence was average, and only around 22% believed that native instructors had a limited influence on the effectiveness of the education.

Table 10. Prioritization of the Methods of Education Used by the Extension Service Regarding the Planting, the Maintenance, and the Harvesting of Rice from the Viewpoint of Rice Farmers.

Method of offering the education	Mean	Standard deviation
Talks delivered by the extension service instructors	2.85	1.19
Work lab	2.65	1.08
Educational video films	2.55	1.13
Visits to model fields	2.53	1.11
Scientific training	2.44	1.16
Group discussion	2.41	1.06
Question and answer sessions	2.36	1.08
Use of computers	2.15	0.79

In this table, the cumulative frequency of the views of the respondents regarding the influence of prioritization of methods used in educational courses held by the extension service in the city on the effectiveness of the courses in relation to the planting, the maintenance, and the harvesting of the rice crop was investigated. In this regard, most farmers gave the top priority to the method of delivering extension speeches which, of course, was the most frequently used and the easiest method. Methods having lower priorities were work labs, educational video films, visits to model farms, practical education, group discussions, question and answer sessions, and the use of computers, respectively. Of course, the method in which computers are used was given the lowest priority because it is not a widely used method. It must be added that many suitable methods, such as teaching

the way of doing things, group discussions, and radio and television programs are less often used due to their limited application or because of limitations imposed on their use. In Table 11, the results obtained from testing the correlation between factors that influence the effectiveness of education offered by the extension service and the increase in yield are presented. On this basis, the level of education has a significant relationship with the acreage under cultivation, participation in educational classes held by the extension service, benefitting from talks delivered by instructors of the extension service, applying the practical education received, attending the work labs, using educational opportunities and educational media, and the suitability of the main points taught for the times designated for teaching them. This relationship was not observed regarding age, income, number of contacts with the extension agent, use of educational films, and group discussions.

Table 11. Results Obtained from Tests of Correlation between extension Activities and Yield Increase.

Items	r	P
Level of education	0.391	** 0.00
Acreage under cultivation	0.698	*0.04
Participation in educational classes held by the extension service	0.598	**0.00
Benefitting from talks delivered by instructors of the extension service	0.207	*0.05
Applying things learned in practical education	0.510	** 0.000
Attending work labs	0.520	** 0.000
Using educational opportunities and media	0.242	**0.002
Suitability of the main points taught for the times designated for teaching them	0.277	** 0.000

** Spearman's correlation coefficient (P less than or equal to 0.001)

* P less than or equal to 0.05

Moreover, based on Kruskal – Wallis and Mann – Whitney tests, the main occupation of the farmers influenced the effectiveness of the educational courses offered, and there was a significant difference between those who used bank facilities and those who did not.

In the continuation of the study, linear regression was used in order to investigate the influence of those factors affecting the effectiveness of the educational courses held by the extension service which influenced yield increase. Regression tests are used to investigate the role of independent variables in determining the extent of the changes of the dependent variable.

Table 12. Results Obtained from Regressing Factors Influential on the Effectiveness of the Educational Courses Held by the Extension Service in Improving the Performance of Such Factors.

Independent variables	B	SEB	Beta	T	Sig
Acreage under cultivation	0.209	0.027	0.591	7.73	0.000
Participation in educational classes	0.153	0.048	0.227	3.19	0.002
Work labs	0.301	0.109	0.172	2.75	0.000
Intercept	1.27	0.295			

F = 4.785 sig = 0.000

R = 0.822 R = 0.582

On the basis of results obtained from multivariate regression, the regression equation between the independent and the dependent variables is as follows:

$$Y = 1.27 + 0.209 \times 5 + 0.153 \times 7 + 0.307 \times 27$$

Based on results obtained from the variable of acreage under cultivation, participation in educational classes, and attendance at work labs, 0.58% of the changes determine crop yield.

4. Suggestions

In this section, taking into account the results obtained from reviewing the literature available and from descriptive and inferential analyses, the following suggestions can be put forward:

1. The most important point in holding educational and extension classes, especially in an informal way, is to have experts assess the needs of the farmers so that farmers will have a lot of motivation and will be greatly inclined to take part in such classes. Therefore, before presenting any educational programs, the actual needs must be identified and paid attention to.

2. Taking into account the results obtained, we recommend that the use of practical education, work labs, talks delivered by instructors of the extension service, group discussions and field trips be included in future programs in order for programs to be more effective.

3. Creating variety in messages, especially at the elementary level, sent by the extension service in the form of publications distributed throughout the city, must be carefully adhered to and carried out.

4. Taking the obtained results into account, we recommend that the time and the place of holding the educational courses, and their content, be more adapted to the needs of those receiving the education and that more attention be paid to the time these classes are held at.

5. Establishing model fields and demonstrating the way things should be done require advanced

technical know – how, and this should be taken into account in order to improve the educational programs.

6. Improving the scientific knowledge of individual extension agents active at the level of villages can have great influence on the effectiveness of the educational courses.

7. A holistic viewpoint causes the cohesion of all conditions effective in successful production in the fields; therefore, this view should replace partial viewpoints for the extension programs to succeed.

8. Encouraging farmers to have their soil and water scientifically analyzed can make it possible to make the correct decisions during the planting period; therefore, we suggest that both the farmers and the officials pay attention to this point.

9. Experts and extension agents have an important role in the transfer of findings and in making educational programs effective, but this becomes possible only when suitable conditions are provided for making the programs “up to date” and “carried out at the right time”.

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