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Full Length Research Paper

Use of high yield rice by Guilan farmers seeking to achieve a sustainable rice production development in Iran

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This research was done in the Guilan Province. Our statistical populations were the guilanian rice cultivators that cultivated rice in the farming year of 2007 to 2008. The purpose of this article is to compare and study the production average (function) and income of two groups of farmers which culture the productive figures and native ones. Finally, we identified and classified the factors which are effective in the acceptance of improved figures. For this purpose, we gathered the required information by asking essential questions based on the field study method. We then, analyzed the statistics by the Spss software besides the library study, observation and interviews. The results of this study showed that the cost of rice cultivation for productive figures is high but the income gotten from it may be effective for accepting its cultivation by farmers. Other factors such as the farmer's education, age, communication with the agricultural promoter and participation in the promotional and educational classes and so on can be effective for accepting and using these figures by Guilan farmers.

Key words: Acceptance, high yield, production.

INTRODUCTION

At the present, something very vital in the rural area is sustainable rural development. Sustainable development is a development that is able to provide the present requirement for humans without adventuring into the existence of environmental resources of future generations. The main purpose of sustainable development is the recovery and promotion of living conditions for all, keeping and operation of better ecosystems, and provision of more security and prosperity for future generations (Ellis and Biggs, 2001). Development and growth in economic and social contexts, which on the one hand is assessed by economists and on the other by socialists and other researchers of some sciences such as geography, have been given much attention and have become the basis of planning. A nagging problem in the study of economic development and social change has been that of distinguishing between the concepts of development and growth (Ghadir and Habibi, 2004). Development word has different definition and interpretation in view of development economists and researchers which includes the increase of production efficiency, promotion of life quality and quantity level, removal of poverty and privation, promotion of the health and therapy service level, removal of unemployment problems and inflation and providing socio-economic requirements. In fact, development influences our living. The ideal meaning of development is to improve all living quality (Khakpour, 2006). On the other hand, we can consider development as an economic, social, and political process which results from living standard and the need to improve the living standard of an increasing population. Development process has so much importance that it must be observed parallel to population growth. The most important subject in the definition of development is its relationship with humans, one that considers development in terms of population, participation, and

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endogeneity. We can, in fact, say that development is for humans and about humans and its final end is to help humans to reach a stage of satisfaction in life (Eanali and Taherkhani, 2005).

A development which is regarded as important has been noted by managers to be as follows:

1. Development should be a change that promotes the life condition of the majority of people.
2. The people who benefit from development should be more than those who do not benefit from it.
3. Development should make confident people to provide minimum requirements them.
4. Development should be based on the needs of people.
5. Development should promote self-competence.
6. Development should grant long-term and sustained recovery.
7. Development should not destroy natural environment.

Rural development is impossible unless it be the cause of agricultural development. One of the causes of agricultural development is increasing of ideal agricultural production. In regard to individual, cultural, societal, environmental, and economic factors, farmers are limited, such that these factors influence attitude and the decision to accept or not accept renewed methods (Hsieh, 1998). Accepting renewed designs in a developing country such as ours is done with great hesitation. This hesitation in accepting renewed methods results in the difference between development of industrial countries and developing countries (Fassl, 1994).

Rice is an important food crop for a large proportion of the world's population. It is a staple food in the diet of the population of Asia, Latin America, and Africa. Rice provides 35 to 60% of the dietary calories consumed by nearly more than 3 billion people (Fageria et al., 2003). Globally, it is also the second most cultivated cereal after wheat. Unlike wheat, 95% of the world's rice is grown in less developed nations, primarily in Asia, Africa, and Latin America. China and India are the largest rice producing and consuming countries in the world.

By the year 2025, it is estimated that it will be necessary to produce about 60% more rice than what is currently produced to meet the food needs of a growing world population. In addition, the land available for crop production is decreasing steadily due to urban growth and land degradation. Hence, increases in rice production will have to come from the same or an even less amount of land. This means appropriate rice production practices should be adopted to improve rice yield per unit area (Fageria, 2007).

Iran, together with India, Pakistan, Korea, China, Taiwan and Thailand are some of the main rice producing countries in Asia. Per capita average usage of rice in the world ranges from 80 to 90 kg; while this amount in Iran is 25 to 45 kg. The aforementioned product in Iran is the second source of food supply after wheat. Because of the increase in population, rapid growth in per capita usage, lack of the lands that can be cultivated for rice, the location of Iran in a semi-desert area, and lack of mechanization of farming operations, the amount of imported rice has increased considerably in recent years in comparison with the past (Simeon et al., 2006).

The greatest amount of rice cultivation in Iran (in the three Northern provinces of Guilan, Mazandaran, and Golestan) is carried out at 71% of the cultivable areas of the whole country. Diversity in local and improved rice varieties in these provinces are countless and all of them are classified in six groups of long grain good quality, long grain high yielding, average grain good quality, average grain high yielding, short grain good quality and short grain high yielding products. Guilan is one of the provinces that have attracted much attention regarding the agricultural products, especially, rice (Peykani et al., 2008).

Guilan province has allocated more than 35 to 42% of paddy production and under cultivation area of Iran, respectively. In this province more than 181 exploiters on productive and talented areas with more than 230000 ha are busy with rice farming (Peykani et al., 2008). Indeed, rice cultivation is considered the most important agricultural activity in this province and the economy of the province is also based on agriculture, with rice cultivation being on top. Most of the under cultivated areas of local varieties in Guilan includes Hashemi and Alikazemi. Most of the under cultivated areas of breed varieties in Guilan includes Khazar hybrid.

Lands that have the capacity for tillage in Iran are limited. Hence their optimum exploitation is the main purpose of the country. Modern technology has used for providing its seeds. This is not only able to increase yield in the surface unit but also able to respond to food requirements increasingly.

The acceptance and use of high product varieties are not only able to decrease differences and recover economical conditions of agriculture but are also able to provide necessary sources for achieving self-independence and even exporting these crops. Achieving these purposes is not impossible; it is, in fact, very easily, requiring an awareness of characteristics, structures, impediments, and hard shapes.

Therefore, this research studies the yield characteristics of high yield rice, their acceptance, and cost of producing them in Guilan province in order to promote the development and attainment of self-independence and proportional welfare in rice farming in Guilan.

MATERIALS AND METHODS

Statistical sample of this research were rice farmers in Guilan that they has occupied to tillage this crop in 1386 to 1387. In this research, rice farmers were divided into two groups: the first category includes farmers who cultivate high yield varieties, while the second category includes those that cultivate local varieties. By using systematic and branch sampling, the rural population which

Table 1. Comparing two groups of farmers who tillage native and high yield varieties in according to rice paddy amount productivity (yield).

Variable	High yield variety			Native variety		
Production	**Frequency**	**Percent**	**Cumulative percent**	**Frequency**	**Percent**	**Cumulative percent**
1-2	-	-	-	3	1.9	1.9
2.1-3	-	-	-	64	39.5	41.4
3.1-4	1	0.7	0.7	92	56.7	98.1
4.1-5	9	0.7	7.2	3	1.9	100
5.1-6	48	34.8	42	-	-	-
6.1-7	66	47.9	89.9	-	-	-
7.1-8	14	10.1	100	-	-	-
Total	138	100	-	162	100	-
Mean		3.2543 ton/ha			3.2543 ton/ha	

Table 2. Comparing two groups of farmers who tillage native and high yield varieties in according to income amount (to decade cost) of selling rice paddy.

Variable	High yield variety			Native variety		
Income (thousand $)	**Frequency**	**Percent**	**Cumulative percent**	**Frequency**	**Percent**	**Cumulative percent**
Lower of 10	1	0.7	0.7	23	14.6	14.6
10-20	8	5.8	6.5	41	39.9	25.3
20-30	13	9.4	15.9	32	59.5	34.2
30-40	16	11.6	27.5	24	74.1	14.6
40-50	18	13.1	40.6	15	82.9	8.8
50-60	37	26.8	67.4	10	89.2	6.3
60-70	27	19.5	86.9	9	93.7	5.7
Higher of 70	18	13.1	100	8	100	5.1
Total	138	100	-	162	100	-
Mean		31895 $			50470 $	

should complete questionnaire was got. Sampling volume was accounted for by Cohcran formulation. Questionnaire streamline of the research was signified by using experts and scientists idea in agricultural Department in Guilan province. For signification of questionnaire credit, a pre-test was done in one of the rural areas with 30 persons. While carrying out the study, library observation and estimated Alpha pass 90 coefficients were used. However, different software were used for data processing. In this research by using descriptive statistical method (abundance, percentage, average, standard diversion and standard average error), two groups of farmers (according to rice paddy product amount and income amount to decade cost) were compared. Also they (in the age, literacy surface, participation in extension-education classes and execution and renewal of equipment design) were compared. In the final part of the research, these three assumptions were tested:

1. Individual characters (age, literacy, sex, married condition, individual number under supporter owner kind, lasting agricultural workers) influence the acceptance of high yield varieties.
2. Participation in education-extension classes influences the acceptance of high yield varieties.
3. Execution of equipment and renewal of equipment designs influence the acceptance of high yield varieties.

RESULTS AND DISCUSSION

Results of Table 1 showed that the high yield of farmers who tillage native items, are 4.1 to 5 ton/ha and minimum yield them are 1 to 2 ton/ha. Average of paddy product is 32543 ton/ha in this group. Also, the high yield farmers who tillage high yield varieties are 7.1 to 8 ton/ha and minimum of yield them are 4.1 to 5 ton/ha. Average product in this group are 6.3022 ton/ha. It is observed that the average product in the second group is almost twice equal of the first group (Table 1).

In Table 2, it was observed that income (to decade cost) of majority people, who till native varieties is 10000 to 30000 $. Also, it was observed that income (to decade cost) of majority of people, who till high yield varieties is 50000 to 60000 $. When the income of the two groups were compared, it was determined that the average of agricultural income used for the tillage of high yield varieties is 50470 $ and it is more than that of the native varieties (31895 $) (Table 2).

Affective factors in accepting high yield varieties

In Table 3, it was observed that among the 168 farmers who till native varieties, three of them (1.8%) were 80 to 86 years of age (that is, they have the maximum age)

Table 3. Comparing two groups of farmers who tillage native and high yield varieties in regard to age.

Variable	High yield variety			Native variety		
Age	**Frequency**	**Percent**	**Cumulative percent**	**Frequency**	**Percent**	**Cumulative percent**
20-29	10	7.1	7.1	6	3.6	3.6
30-39	12	8.5	15.6	13	7.9	11.6
40-49	41	29.5	45.1	35	21.7	33.2
50-59	44	31.8	76.9	32	19.7	52.9
60-69	28	20.2	97.1	43	26.5	79.4
70-79	3	2.1	100	30	18.6	98.2
80-89	-	-	-	3	1.8	100
Total	138	100	-	168	100	-
Mean	56.35			49.57		

Table 4. Comparing two groups of farmers who tillage native and high yield varieties in according to literacy.

Variable	High yield variety			Native variety		
Literacy surface	**Frequency**	**Percent**	**Cumulative percent**	**Frequency**	**Percent**	**Cumulative percent**
Illiterate	28	20.3	20.3	76	46.9	46.9
Literacy	5	3.6	23.9	10	6.2	53.1
movement	13	18	37	13	8	61.1
Elementary	34	24.6	61.6	25	15.4	76.5
Guidance	30	21.7	83.3	20	12.3	88.9
High School	18	13	96.4	15	9.3	98.1
Diploma	5	3.6	100	-	-	-
High Diploma	-	-	-	3	1.9	100
Total	138	100	-	162	100	-

Table 5. Comparing two groups of farmers who tillage native and high yield varieties in regard to participation in education-extension classes.

Variable	High yield variety		Native variety	
Participation in classes	**Frequency**	**Percent**	**Frequency**	**Percent**
Yes	80	58	35	21.6
No	57	42	127	78.4
Total	138	100	162	100

and six of them (3.6%) were 20 to 29 years of age (that is, they have the least age). Also, their average age estimated was almost 56.35 years. Between 138 farmers who tillage high yield varieties, three persons (2.1%) were 70 to 79 years of age (that is, they have the maximum age) and ten persons (7.1%) were 20 to 29 years of age (that is, they have the least age); also, their average age was estimated to be between 49 to 57 years. Comparing their ages showed that the age of farmers who till high yield varieties is lower than that of the others.

In Table 4, it was observed that 118 persons (79.7%), that is, majority of the people who till high yield varieties, were literates and 28 of them (20.3%) were illiterates, while 76 farmers (46.9%) who till native varieties (almost half them) were illiterates. So, literacy is a main factor for accepting and tilling of high yield varieties.

Results of Table 5 showed that between 162 farmers who tillage native varieties, 35 persons (21.6%) gave positive answers to questions of participation in classes and 127 persons (78.4%) gave negative answers. Between 138 persons who tillage high yield varieties, 80 persons (58%) gave positive answers to question of participation in classes and 58 persons (42%) gave negative answers, such that the participation of these classes was a main factor for accepting high yield varieties.

Most of the problems faced by rice farmers in Guilan are: favorite operation of existing sources, impossible tillage of manipulating items in the vicinity's lands,

Table 6. Comparing two groups of farmers who tillage native and high yield varieties in regard to execute of renew and equipment design in rice lands.

Variable	High yield variety		Native variety	
Renew and equipment design	**Frequency**	**Percent**	**Frequency**	**Percent**
Yes	129	93.5	92	56.8
No	9	6.5	70	43.2
Total	138	100	162	100

Table 7. The relation between individual characters and tillage high yield varieties.

The relation between individual characters and tillage high yield varieties					
Pressure of correlation	**Kind of coefficient**	**Chi-square test**	**Depended variable**	**Independed variable**	**Row**
0.316	V Cramer	0	Age	Tillage high yield varieties	1
0.339	V Cramer	0	Literacy	Tillage high yield varieties	2
-	-	0.239	Sex	Tillage high yield varieties	3
-	-	0.909	Married condition	Tillage high yield varieties	4
0.367	V Cramer	0	Lasting farmer workers	Tillage high yield varieties	5
-	-	0.34	Number of person under supporting	Tillage high yield varieties	6
-	-	0.336	Owner kind	Tillage high yield varieties	7

Table 8. The relation between participation in the education-extension classes and on application of high yield varieties.

Phi-coefficient	Chi-square test	Depended variable	Independed variable
0.322	0.001	Tillage high yield varieties	Participation in classes

requiring manual and hard labour in the total stages because of lack of access to road, spreading diseases such as arthritis due to durable contact of water, and impossible tillage in operation due to swampy water in summer and autumn seasons. In order to solve these problems and recover the existing condition, emergency action needs to be taken with regards to the renewal and unification of farms by agricultural affairs experts.

Results of Table 6 showed that among the 162 farmers who till native items, 92 persons (56.8%) executed this design and 70 persons (43.2%) did not, while among the 138 farmers who till high yield varieties, 129 persons (93.5%) executed equipment and renewed designs in their lands and 9 persons (6.5%) did not. Comparing these statistics, we found that majority of the people, who till high yield varieties, executed equipment and renewed equipment designs in their lands.

Test hypostasis results

1. Individual characters (age, literacy, married condition, number of person under supporting, lasting farmer workers, owner kind) are influence on application of high yield varieties. The result of Chi-Square test shows that age, literacy, lasting farmer workers in amount of 99% was significant between individual characters and tillage high yield varieties (Table 7).
2. The participation in the education-extension classes has influence on the application of high yield varieties. The result of Chi-Square test shows a significant relation in amount of 99% between participation in the education-extension classes and on application of high yield varieties (Table 8).
3. The renewal of equipment design has influence on application of high yield varieties. The result of Chi-square test shows a significant relation in amount of 99% between renewal of equipment design and application of high yield varieties (Table 9).

Conclusion

The result of this research showed that although the production cost of high yield varieties is high, yield in the surface unit of this item is higher than the native varieties. In regards to unit cost for rice, it is said that income (to decade cost) is higher for farmers who tillage this varieties. This finally provided income and welfare for farmers. In addition, application of these varieties could

Table 9. The relation between execution of equipment renewal of equipment design of high yield varieties.

Phi-coefficient	Chi-square test	Depended variable	Independed variable
0.425	0.001	Tillage high yield varieties	Renew and equipment design

be a relevant step for access to self independence and it is impeded for currency export.

In another part of this research, it was defined that factors, such as age, literacy, tillage cost, relation to agricultural promoters and participation in education-extension classes are important in accepting the application of these varieties by Guilanian farmers.

Conclusively, it was observed that the following variables (especially, execution of equipment and renewal of equipment design, lasting agricultural work, farmer literacy surfaces, participation in education-extension classes, and farmer age) have the most coherence with high yield varieties respectively and are important for extension and development.

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