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Annals of Biological Research, 2011, 2 (6) : 97-101  
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# The Advantages and Constraints in Application of Transgenic Crops in Iran

Seyed Jamal Farajallah Hosseini<sup>1</sup>; Sahar Dehyouri; Arash Eslami

Mamaghan Branch, Islamic Azad University, Mamaghan, Iran

## ABSTRACT

*Agricultural experts in the field of biotechnology in Iran were surveyed in order to explore their perception about advantages and constraints in application of transgenic crops in Iran. The total population for this study was 40 researchers in the field of biotechnology in Ministry of Agriculture of Iran. Data were collected through interview schedules. Based on the results of study, there were negative relationship between perception of respondents about application of transgeneic crops and economic, managerial, social, policy making and environmental constraints as independent variables.*

**Keywords:** Biotechnology, Agriculture, Transgenic crops, Advantages, Constraints.

## INTRODUCTION

World population is increasing rapidly. It is predicted that in 2030, when world population reaches more than 8 million, people need food three times the world will cope with the current agricultural land. To avoid disaster, the communities must continuously cope with the issue of poverty, food insecurity, loss of the environment (water and soil) and loss of genetic resources [1].

The role of agriculture in economic and social development of countries, are more than just producing food. In many countries, agriculture sector is the main engine of economic development and it could be a major source of job creation and poverty reduction [2].

Agricultural development has been facing major challenges which among them could be agricultural lands, water resources, global climate changes and environmental issues.

Based on the report by ISAAA, people needs twice as much as foods to fulfill their needs. In this regard, the main strategic direction in the food and agricultural sector is the application of genetic technology to overcome the problem of food security [3].

Development and application of new technology should follow three objectives: increased food production, environmental sustainability and economic development [2].

Biotechnology in agriculture has opened up exciting scientific fronts. The new techniques of biotechnology are rapid, highly specific and efficient use of resources. Effective implementation of modern biotechnology has helped in plant breeding program. Modern biotechnology allows farmers to select specific genes and traits that make their favorite plant. Secondly, it allows farmers to have the freedom of movement of genes from unrelated species.

Sanjari Banstani has pointed the main advantages of biotechnology in agriculture sector [4]:

Creating Plants resistance to pests;

Creating plants resistance to herbicides;

Creating plants resistance to fungal;

Creating plants resistance to cold and hot weather;

Creating plants with medical use;

Creating plants with changes in metabolism in order to grow faster with lasting longer; and

Growing fish and other aquaculture products.

However, production and application of biotechnology products have faced several impediments. There is a debate among proponents and opponents of genetically modified crops. The supporters have been arguing that application of this technology would increase production with good quality of products. On the other hand, opponents emphasized on the issue of manipulating tissues and reduction oriented approach in agriculture sector [5].

The development of biotechnology in general and agricultural biotechnology in particular has faced following impediments:

Ozor and Mugabe pointed out to the lack of clear priorities, policies and strategies in investing the research and development in biotechnology [6, 7].

Lack of appropriate policies at macro level in developing biotechnology, multiplicity of decision centers and lack of national policy in developing biotechnology are some of the constraints in development of biotechnology [8].

Many of the innovative research and development efforts result in a small number of scientists which personally design and develop the programs in the field of agricultural biotechnology [6, 7].

Pheu and Ragasa, and Escaler referred to inadequate legal capacities in the developing countries which slow down the progress in biotechnology [9,10].

The absence of codified rules on production, import, export and biotechnology-related products and a weak legal capacity are important factors in the approval of any product that is undergoing extensive testing. Private biotechnology companies believe that the existing laws are weak and a legal system, strong, transparent and cost-effective to control the distribution and use of GM products is required [9].

Another obstacle is the low-and short-term investments in biotechnology research and development. It is important to identify funding mechanisms for research in biotechnology [6, 7, 10].

## MATERIALS AND METHODS

The total population for this study was 40 researchers in the field of biotechnology in Ministry of Agriculture of Iran. Data were collected through interview schedules.

A questionnaire consisted of open-ended and fixed choice questions was developed to collect the data. A series of in-depth interviews were conducted with some senior experts in the field of agricultural biotechnology to examine the validity of questionnaire.

Content and face validity were established by a panel of experts consisting of faculty members at Islamic Azad University and experts in the Ministry of Agriculture. A For measurement of correlation between the independent variables and the dependent variable correlation coefficients have been utilized and include Pearson test of independence.

## RESULTS

The results of descriptive statistics show that the all respondents were male with average age of 42 years old and more than 77 percent had bachelor degree. The average working experience was 14 years old.

In order to finding the perception of respondents about advantages of trans genetic crops, they were asked to express their views. Table 1 displays the respondents' means about the seven statements. As can be seen the highest mean number refers to the producing high yielding varieties (mean=3.60) and lowest mean number refers to protecting environment (mean=3.25).

**Table 1: Means of Respondents' Views about the advantages of trans genetic crops (1=very little; 5=very much)**

Statement	Mean and Standard Deviation	
	Mean	SD
Producing high yielding varieties	3.60	0.810
Resistance toward pests and diseases	3.58	0.958
Increasing production	3.60	1.810
Decreasing the cost of production	3.53	1.086
Increasing food quality	3.23	1.143
Food security	3.33	1.185
Protecting environment	3.25	1.276

Table 2 shows the means of respondents' views about the impediments in application of transgenetic crops in Iran.. As can be seen the highest mean number refers to social and cultural obstacles (mean=3.95) and lowest mean number refers to economic obstacles (mean=3.16).

**Table 2: Means of Respondents' Views about the obstacles in application of transgenetic crops (1=very little; 5=very much)**

Statement	Mean and Standard Deviation	
	Mean	SD
Social and cultural	3.95	1.061
Environmental	3.89	1.060
Policy making	3.39	1.285
Managerial	3.30	1.159
Educational	3.20	1.181
Economic	3.16	1.366

Spearman coefficient was employed for measurement of relationships between independent variables and dependent variable. Table 3 displays the results which show that there were negative relationship between perception of respondents about application of transgenetic crops and economic, managerial, social, policy making and environmental constraints as independent variables.

**Table 3: Correlation measures between independent variables and application of transgenetic crops**

Independent variables	Dependent variable	r	p
Economic	Application of transgenetic crops	-0.381*	0.018
Managerial	Application of transgenetic crops	-0.314*	0.049
Policy making	Application of transgenetic crops	-0.407*	0.011
Social and cultural	Application of transgenetic crops	-0.420**	0.007
Environmental	Application of transgenetic crops	-0.359*	0.027
Educational	Application of transgenetic crops	-0.094	0.562

\*\*p<0.01, \*p<0.05

## DISCUSSION AND CONCLUSION

The perception of experts about constraints in application of transgenetic crops in Iran was surveyed in this article. The findings show that social/cultural and policy making constraints had negative relationship with application of transgenetic crops. The result is in accordance with findings of Qaim and Meghani [11, 12].

In regard to policy making issue, it is important to involve farmers in developing policies and strategies related to biotechnology in agriculture. Poor people should be included directly in the debate and decision making about technological change, the risk of that change and the consequences of no change or alternative kinds of change [13].

The perception of respondents in this study was independent of educational constraints. This result is inconsistent with Koch, Ekman and Brink observations that informing farmers and increasing their knowledge about the biotechnology can have positive impacts on the adoption of biotechnology [14, 15, 16].

It is important to point out that the negative attitudes of stakeholders would have impact on the application of transgenetic crops. The reason could be the majority of farmers are not familiar with advantages of biotechnology in general and transgenetic crops in particular.

In a study about the perception of Illinois farmers, results show that those farmers who utilized or planned to utilize GM crop technology had more optimistic perceptions of biotechnology and GM crops than did those who chose not to use the technology [17].

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