

## Capacity Building in Agricultural Biotechnology in Turkey

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### ABSTRACT

Turkey, situated at the junction of two continents, benefits both from its rich Asian legacy and its proximity to neighboring European countries. Although the level of socio-economic development places the country clearly in the group of developing countries, Turkey has been a candidate country for admission to the European Union (EU) since 1999. As a result, the conditions for capacity building in agricultural biotechnology include elements from both the industrialized and developing countries. Because of its favorable climate and time-tested farming traditions dating back to ancient Mesopotamia, the country possesses one of the richest floras in the world. This review attempts to illuminate the role and importance of local actors in introducing modern biotechnology to the Turkish agricultural system. Agricultural biotechnology, specifically plant biotechnology, has a high priority in the Turkish government's program. Public-funded research and education in this field is given due priority, but research by the private sector is relatively poorly funded. The ongoing field trials with genetically modified seeds are conducted mostly by multinational companies whose aim it is to commercialize the genetically modified organisms (GMOs) as soon as legislation concerning biotechnology is implemented. The attitude of the big farm owners to genetically modified crops is positive because they expect economic advantages from these crops. On the other hand, public awareness about genetically modified food is quite low, and neither the consumer organizations nor the media represent a particular power in this area. Thus, the power centers in agricultural biotechnology are the government and the multinational

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biotech companies. The local industry, the consumers, and the media have relatively less input. Moreover, communication between groups is fairly poor, and this contributes to a growing gap between the strong and the weak actors. Turkey has already decided to implement the EU regulation in contained use and the deliberate release of GMOs, which has been shaped in the European sociopolitical environment where the consumers and their organizations represent a powerful force, and where the power constellation between the actors is quite different. Nevertheless, it can be argued, that this route might still be the right choice for Turkey during the phase of introducing this high-tech method of production to its agriculture.

*Key Words:* Agricultural biotechnology; Developing countries; EU candidate country; Turkey; GMO.

## INTRODUCTION

When investigating biotechnology policies and the introduction of genetically modified organisms (GMOs) to agricultural production in a specific country, there is a range of issues that must be considered, which are quite different in the high-income and the low-income parts of the world. Most of the controversial issues in the industrialized countries are concerned with the environment and health, whereas in developing countries questions of the social and economic impact of GMOs predominate. Although the GM technology promises to contribute to many beneficial changes in the latter group of countries, the question of whether this new technology might solve the problem of hunger in the poorer world still remains debatable. The Green Revolution in the 1960s did not demonstrate that “higher yields, more food” can necessarily solve the problem of hunger. The problem of hunger seems to persist even in countries that are producers and exporters of agricultural products.

However, some developing countries (e.g., India, China, and Malaysia) are establishing large biotech research centers to achieve technological competitiveness. These latecomers in the race for industrialization may enjoy a comparative advantage in that there is a pool of available technologies that they can import, without incurring the costs of the pioneers. Turkey, being in the process of capacity building in biotechnology, might possess this advantage of the latecomers.

## GENETIC RICHNESS OF TURKEY

Turkey’s geographic position at the junction between Europe and Asia and its beneficial climate endow the country with one of the richest natural resources in the world. Some even believe that Turkey could easily turn into the region’s Kuwait, profiting from its “green gold” as much as that wealthy Arab country profits from its oil.

Two important gene centers described by Vavilov,<sup>a</sup> the Near East and the Mediterranean (Fowler and Mooney, 1990) are located in this country. Besides, Turkey is also

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<sup>a</sup>Nikolai Vavilov (1887–1943) was a Russian plant geographer who collected more than 250,000 seeds from the major agricultural centers in the world. Vavilov mapped out the distribution of diversity for the crops he studied and defined eight centers of origin—all of which are located in the Third World countries.



a diversity center for many wild and cultivated plants. Past migrations between the two continents, through Turkey, by different tribes with their different lifestyles not only brought many relatives of crop plants that are cultivated today but also fostered the distribution and the evolution of many related crop species.

Studies conducted to date show that there are 163 families (8745 species) of vascular plants in Turkey and 2763 species are endemic (Kaya et al., 1998). Turkey includes gene centers of some forest trees (cedar, juniper, sweet gum, etc.), and wild relatives of cultivated plants (wheat, barley, lentil, chickpea, apple, pear, walnut, pistachio, chestnut, etc.), all crops of worldwide importance.

The richness of Turkish flora has enabled the use of all these plants for very different purposes: as food, as pharmaceuticals, as a source of raw material for industry, and wood among others. The most economically important plants can be grouped as field crops (cereals, legumes, industrial plants, and forage plants); horticultural plants (vegetables, fruits, and ornamentals); medicinal and aromatic plants; and forest trees (Kaya et al., 1998). The wild and transitional forms of many cultivated plants also serve as valuable genetic sources.

### TURKEY AS A DEVELOPING COUNTRY

According to the "Human Development Report 2001" (HDR, 2001) published for the United Nations Development Programme, Turkey ranked 19th on the list of 90 developing countries (measured by Human Poverty Index).<sup>b</sup> The total population of Turkey in 1999 was 65.7 million, an increase of 25.7 million since 1975. The annual growth rate was 2.1%. Thirty percent of the population is under 15 years of age. Another striking figure is the change in the ratio of urban to rural population. In 1975, only 41% of people lived in the cities, whereas by 1999 the urban population had increased to 74% (HDR, 2001).

Forty-nine percent of females are in the labor force; of these, 65% are working in agriculture. By comparison, in Norway, the female labor force and the share of women working in agriculture are 59% and 2%, respectively. The estimated annual earnings for women in Turkey is 3,900 USD, and for men 8,700 USD (HDR, 2001).

The agricultural sector plays a significant role in the Turkish economy. The number of people active in agriculture (full-time and part-time) is about 9.7 million (about 41% of the total labor force). The share of agriculture in Turkish *GDP* is 14.3%. The arable crop sector accounts for more than three-quarters of agricultural production in Turkey. The most important agricultural crops in Turkey are cereals (mostly wheat with a yield of 21 million tons in 1998), followed by various types of fruit and vegetables (MARA, 2002). However, agricultural growth is restrained by high interest rates and inflation, important structural deficiencies such as fragmented and small holdings, a lack of grass root farmer organizations, inadequate marketing facilities, and inefficient open-market pricing. As a consequence, Turkish agricultural productivity has been consistently falling over the past 10 years. At present, Turkey is no longer self-sufficient in food production. Hazelnuts, dried fruits, such as raisins and apricots, citrus fruits, tobacco, and cotton are the largest

<sup>b</sup>Human Poverty Index measures deprivations in three basic dimensions of human development: a long and healthy life, knowledge, and a decent standard of living.



export products. Cereals (mainly wheat and, to a lesser extent, maize and rice) are the major imports.<sup>c</sup>

### TURKEY BETWEEN TWO WORLDS

Even though the level of industrialization and human development places the country in the group of developing countries, there are similarities with European countries that suggest Turkey is quite different from many of the developing countries. First, its EU candidate country status has been achieved through implementation and adaptation of EU standards in different policy fields. Preparation for membership—even if the time frame is not yet established—has already resulted in some important structural changes. Thus, the Turkish Ministry of Agriculture is working on the implementation of EU biotechnology regulations to the Turkish legislation. This decision was taken, after much debate, because the ethical approach of the EU was preferred and because there was the need for harmonization with EU regulations as EU markets present a future market for Turkish food products.

However, there are two interesting aspects worth noting. First, the EU policy on biotechnology was established in a sociopolitical environment where consumer concerns and public opinion were dominant factors (McHughen, 2000). The consumer organizations were politically powerful, and biotechnology regulations that reflected public concerns were developed. In contrast, the consumer organizations in Turkey are relatively new and do not have the tradition and power to act as a counterweight to the governmental offices. This means that Turkey is implementing a policy, which is strongly influenced not by the Turkish people but by European consumers' concerns. The second point is that even though in most EU countries the responsibility for policy making in biotechnology is spread over a multitude of Ministries, in Turkey the Ministry of Agriculture is the only one with a significant leading role. In Turkey, this might be considered an advantage. If decision making was spread over a greater number of actors, the policy process would be much slower and more complex, which would result in unnecessary delays in building the national capacity.

As pointed out in the Thematic National Report of Turkey, the status of implementation of the Convention of Biological Diversity (CBD), "benefit sharing" is one of the main concerns of the country. Being a country with rich genetic resources, the deficiency of rules on benefit sharing seems an urgent problem. So far, there are no regulations on how Turkey should—as in most other developing countries with genetic resources—benefit on its own biological diversity. Countries—most of them from the developed world—with strong intellectual property protection are in a position to take advantage of the latter countries' gene resources without being forced to share the economic benefit with the country of origin. In this respect, Turkey's problem is very similar to those of Latin American countries.

The fact that Turkey does not share all the same concerns with EU countries but shares several similar problems with the developing countries puts the country to a position "somewhere in between" the developed 1st world and the developing 3rd world.

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<sup>c</sup>Regular report from the Commission on Turkey's progress toward accession to the EU. Source: [www.tarim.gov.tr](http://www.tarim.gov.tr)



## ACTORS IN TURKISH AGRICULTURAL BIOTECHNOLOGY

### Government and Industry

A major player in the implementation of biotechnology regulations in Turkey is the Ministry of Agriculture. The Turkish Biotechnology Law is being harmonized with the EU legislation, and the Turkish Patent Law is harmonized with the European Patent Conventions. Turkey will soon modify its regulations to conform to the CBD and Trade-related intellectual property rights (TRIPs) standards. Another major actor is the group of multinational corporations, the seed producers from the United States and Europe, who dominate the international scene. For the moment, these multinational companies are playing a rather passive role but a closer look at their global strategies and future plans predicts that soon they will become the "powerful actor." The commercialization of GMOs has not started in Turkey because the biotechnology law is still to be ratified by the Turkish Parliament. While waiting for the law to be enacted, the multinational companies are investing in future field trials with GMOs and are arranging information meetings with local stakeholders.

At present, it seems that the closest partner of the multinational companies is also the one who is responsible for controlling their activities, namely, the Ministry of Agriculture. The expertise and knowledge of people from these companies is often being used by the Ministry. They are often invited to join the governmental committees and to give speeches at national conferences on GMO issues. Even though the presence of the biotech industry in the decision-making process is both natural and necessary in every country, it may be argued that their position in Turkey is giving them a more influential position, above the usually observed standard. Therefore, the almost exclusive network of the Ministry, the multinational biotech industry, and perhaps the potential purchasers of GM seeds represent a power center. The relevant international networking and the financial resources rest primarily in their hands.

### The Scientists

The scientists we interviewed stated that they are mostly satisfied with the research conditions at their universities but were rather critical of the country's policy making in biotechnology. They complain that they, as "independent scientists," are not included in the process of policy making and that the governmental advisory committees are rather poorly organized. They are concerned that the presence and leadership of scientists from other countries might be dominant in setting Turkish policies. They are also aware that they do not have a common platform for communication and exchange of information and that their role in providing public information is not fully coordinated.

There are three main views represented among the scientists. One group fully supports the introduction of GMOs without being critical of the potential risks, saying that the introduction of GMOs would surely result in an increase in agricultural production and solve a number of problems for the farmers. Another group of scientists believes in the need for being more cautious and want to postpone the introduction of GMOs until sufficient scientific evidence confirms the safety of these products. The third group of scientists suggest that the public be kept informed of the issues and that they take an active part in the decision-making process.



The different opinions of the Turkish scientists may reflect a deficiency in mutual discussions among themselves. They seem to know more about the opinions of and appear to be more influenced by their colleagues from foreign universities—where most of them have obtained their PhD degrees—than their own fellow researchers in Turkey.

### **The Local Biotech Industry, the Consumer, and the Media**

The research activities in the local biotech industry are relatively low compared to multinational companies. Some local companies continue to do research in classic biotechnology (e.g., production of yeasts for food industries) but newer techniques, such as genetic modification of crops, are not included in their future strategies. Although the government's efforts to strengthen biotech research capacity in higher education institutions seems to satisfy academia, the university–industry link seems to be missing. The low number of national patent applications indicate that in this area, innovation—and thereby applied research—is relatively poor. In the present scenario, the applied research projects in agricultural biotechnology—the field trials with GMOs—are mostly being conducted by international companies.

Public knowledge and public awareness of possible risks in agricultural biotechnology is low. There is almost a complete lack of consumer awareness in this field. Apparent causes for this lack of interest include few financial resources to create awareness, the lack of interest due to other seemingly more important socioeconomic issues, and the lack of public trust in civil service organizations. As a result, the many Turkish consumer organizations, to their own detriment, do not contribute to the ongoing dialogue.

The Turkish media, particularly the daily newspapers, have not been focusing on environmental problems for the last few years. In fact, it seems that the nuclear accident at Chernobyl was the last environmental issue that was thoroughly discussed by the public. Genetic modification in agriculture is rarely an issue in the Turkish press. The two main reasons for this according to the press (Dobos, 2002), were that there are many other important public issues and there is almost no genuine consumer interest in GMOs. The role of television is also limited, with most of the national channels being considered as merely entertainment channels. Furthermore, few, if any, local scientists and researchers choose television as a communication media. They consider the TV channels not the “appropriate” forum for scientists; in other words, it is beneath a good scientist's dignity to appear in an entertainment media.

### **THE MISSING NETWORK**

As indicated, in Turkey the national power actors—the policy makers, the industry, and the big farm owners—form a cluster at one end of the axis, and the “weak” actors—the consumers, the local industry, the media and, in part, the scientists—are at the other end. The power of the strong group derives from its links to the international actors (politically and economically) and to each other through their common understanding of the importance of GMOs. Their viewpoint reflects the thinking of policy makers and industry people who accept the value systems of industrialized countries. The goal of this powerful group is to establish national legislation in harmony with international conventions, to implement the EU regulations for GMOs and to introduce GM crops to the Turkish market.



The weaker actors (i.e., the local industry, the media and the consumer organizations) apparently do not seek a stronger role in the ongoing dialogue because they are far more concerned with the more pressing and immediate concerns of everyday life. The non-urgent invisible effects of a new technology seem remote. Furthermore, the local industry, which is growing very slowly, cannot compete with the multinational companies because the entry investments in biotechnology research are so high that they cannot raise the necessary funding. Therefore, it seems very likely that the Turkish GMO market may be left to foreign companies.

Thus, when analyzed, there seem to be the following gaps in the network, listed in perceived order of relevant importance:

- Disconnection between the politicians and the consumers.
- Disconnection between the politicians and scientists.
- Disconnection between scientists and the public.
- Disconnection between media and scientists.

### CONCLUDING REMARKS

The findings of this review, where the theory of actor-network (Latour, 1987) was used as a tool of examination, indicate that in the process of introducing GMOs to Turkish agriculture, the actions by the major actors—ministerial officers, scientists, the multinational biotech industry, the consumers and the media—do not represent a consensus but a polarization along a power axis. The strong actors are the governmental institutions, the multinational companies, and the big farm owners. The weak players are the consumers, the local biotech industry, the media, and in part, the scientists. The strong actors are connected to each other through international contacts, information channels, and economic resources. The weak actors do not constitute a web; they are characterized by low awareness, limited financial resources, and few points of contact with each other. Rather, the scientists appear like a heterogeneous group of individuals, with high scientific ambitions and good conditions for doing research but with deficient communication both among themselves and among other actors.

Despite the apparent missing connections between the actors within the weak group as well as those between the strong and the weak group, the process of development of agricultural biotechnology seems to proceed at quite a fast pace. Furthermore, the system of the disconnected actors seems to be in some balance, implying that if some changes were to occur (e.g., the consumers would increase their power or the media would put the effects of biotechnology on their agenda), the power constellation and the present balance might become reorganized.

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