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**THE PERCEPTIONS ON GMOs and GM FOOD  
WITH SOME SELECTED SOCIAL INDICATORS  
IN an “IRRELEVANT STATE”, TURKEY**

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Advances in genetic engineering and related disciplines termed as ‘modern biotechnology’ have major impacts on agriculture and food industry as well as on various areas. This study aims to define the level of awareness on genetically modified organisms (GMOs)<sup>1</sup> and genetic modification (GM) in agriculture and husbandry and perceptions on consumption of genetically modified (GM) food as contained by meat, bread, and vegetables on the bases of social indicators of gender, age, education, rural and urban residence, income, political view, and religious beliefs. Perceptions are considered supportive or contrary judgments. The article also aims to evaluate the perceptions within the theory of “irrelevant state”<sup>2</sup>; in other words, lack of real relevance about her people’s interests for a better understanding of the impact of new technology as a global and interrelated phenomenon by inter-relating micro-level analysis with macro-level of analysis. The study is based on a field work conducted in 2004. The elaborations and evaluations are mostly made via quantitative analysis with a sample of 800 respondents.

## **1. Introduction**

The applications of developments in genetic engineering and related disciplines referred to as modern biotechnology is a relatively new area, entering a process of changes in societies both at national and international level. Modern biotechnology is used in sectors of health, medicine, industry in addition to food industry , including agriculture and husbandry. It is more commonly applied in areas of agriculture and husbandry.

The benefits and risks of GM food has led to intensive controversies among scholars (Batallion 2000; Hung 2008).. On the other hand, GM crops as well as other biotechnological products are produced at increasing rates every year both in developed and developing countries. World-wide area cultivated with genetically modified crops was 1.7 million hectares in 1996, and it reached to 577 million hectares in 2006 (James 2006). It means it grew with an unaccepted 60-

fold increase rate (James, 2006, 3). In some developing countries, such as Argentina, China, India and South Africa, the growth rate of agricultural biotechnology in particular has doubled. While the rate of GM food production is 19% for developing countries, it is 9% in developed countries (Mucci et al. 2004).

In the last decade, there has been an increased interest in food risks produced by the techno-economical changes of agriculture and industry, which are usually included in the concepts of “food safety” (Wandell 1994; Yeung and Morris 2001), “food ethics” (Early, 2002; Bahargeva, 2006). The debates have been accelerated by globalization and commoditization of key biotechnological products especially GM foods after the second half of 1990s. This study explores the perceptions and actions of people with macro-level perspective with a perspective of inter-relating micro-level results of the study, by focusing on the role of politics and state on the problem of food safety in general and specifically for GMOs.

## **2. Theories and Evaluations on Modern Biotechnology and GM Food**

There are different levels of theories and discussions on modern biotechnology and its implications at various areas of application:

First, debates on the power of modern biotechnology question whether it ‘shapes’ or ‘reshapes’ the world or not. Some scholars consider biotechnology a “revolution” or “epoch making”, which will bring radical changes in each aspect of the life and society. Our time is termed as “biotechnology revolution” or “biotechnology era”. One of the pioneers of this perspective is Gerardo Otero. This perspective assumes that by developing this technology, many social problems, poverty, stagnation and inequality will be overcome. On the other hand, there are some scholars who see biotechnology as a new technology that makes changes in the society but not revolutionary ones. Buttel (1989) defines biotechnology as a “subsidiary technology” because it is mainly applied to declining sectors of the national and global economy. According to the author, biotechnology as a substantial technology, whose pace and dynamics are determined largely by others, involve more fundamental social factors and technical forms. However, the author later changed his position based on the concept of the “third technological revolution” (Otero 1991). Scholars’ positions in evaluation of biotechnology are shifting from a less effective to a radical one as developments and applications are continuing.

Second level of the debates is related to technology itself by listing its positive or negative effects.. Discussions formed around the evaluation of the impacts of technology, specifically whether it is a positive or a negative process. In these arguments, there are two antagonist perspectives or poles regarding application of modern biotechnology. The first one considers biotechnology and its result positive. This perspective may be called ‘technologism’, which sees modern biotechnology as a means of providing development by benefiting from any sector of the economy as well as any person of the society. The other perspective considers biotechnology, in fact all technologies, negative and believe it to be a threat. Thus, it is against any development in this area. This perspective may then be called anti-technologism” (radical environmentalism and communitarianism). For example Beck argues that the power from techno-economic progress is being overshadowed by the production of risks, revealed as irreversible threat to the life of planet, animals and human beings. The author further maintains that we are on the verge of moving into a society where the discourse about risks is becoming a central theme (Wandel 1994).

The third level of debates focus on its effects, especially at an international level, as well as its technical risks. This perspective evaluates the development of biotechnology as a new way of exploitation of lower classes at national level and especially exploitation of developing societies by the developed ones. The supporters evaluate exploitation process as the use of genetic resources by developed countries and as transfer of new technology to developing countries. The third level of theorizing focuses on technology and its implications in a broader perspective of socio-economical-political level, i.e. “political-economic perspective”, and sees the risks as not the only result of technological advance Buctuanon 2001: Fowler at. al.2001; Dunn at. al.irows.ucr.edu; 10.10.2006; Löfgren 2005, www.druid.dk; Erbaş 2008).

These different perspectives have different assumptions about the future development in GMOs and their results. However, it is certain that there will be some radical changes in many aspects of the life at national and global level. Like many other products, food has been mobilized as a commodity in global production and trade systems and governed through global institutions (Phillips 2006). “Genetically modified crops necessitate not only new development policy, but new ways of theorizing development itself in the light of globalized system of food production” (Herrick 2008, 50). Thus, to understand the issue better, we need to focus on the socio-political role of food and the interaction between local and global systems (Pietrykowski 2008, 5).

The developments in producing GM food and commoditization of products create both supporters and opponents of the process. The supporters of the process list the possible benefits, while opponents of the process list possible risks of GM foods. Supporters and opponents of the process have different interests. Moreover, the role of the state is important in biotechnological development i.e. formation of biosafety and food systems. “The starting point is that state interventions, including supportive regulatory arrangements and the shaping of public attitudes, constitute core assets in the evaluation of bio-industrial complexes” (Benner and Löfgren 2007). It is also important to consider the risk level of the public to be subjected. In Turkey, public in general is considered the other or ‘outsider’ in the process of constitution of food safety systems as for many other developments. The supporter of GMO crops are the government, businessmen, and ranchers, who expect economic advantage, and a small group of academicians, who benefit from this process.

### **3. Development of Biotechnology and Biosafety Regulations in Turkey**

Countries have different application policies toward biotechnological development and products. Consumers of different countries also have different perceptions and behaviors toward biotechnological development and products. In EU countries, European labeling laws, introduced in 1997, obligate labeling the food about the process by which it was created, but in the US, it is not required. One survey, conducted in 1995, found that 49% of Swedes, 70% of Germans and 78% of Austrians would not buy a bioengineered food product. In contrast, an average Japanese, US, and Canadian consumer would buy such products (Mitsch, and Mitchell, 1999). “Whilst the European position is evidently more rigid, in the USA, their behaviors are much more positive for the consideration of science and technology” (Evangelisti et. al. 2001:322).

“In the United Kingdom, the debate on the ethicality of biotechnological products is very heated and controversial. Whereas in Germany, the behavior of the public opinion is, by and large, in favor, and in fact the change of majority in the government with the entry of environmentalists, has not altered the decisions of the funds in favor of this sector’s development. On the whole, the country shows a culture which is open to innovation and the bettering of the quality of life (Evangelisti et. al. 2001:322). Japan, in the last ten years, has notably increased its biotechnological products and related technology to the extent that their government has promoted a basic strategy to favor the bio-industry by way of adequate funding (Evangelisti et. al. 2001:314).

Development of biotechnology is relatively new in Turkey, and as other technologies, it is controlled by the state both in the sense of policy and applications. The State leads the drive to achieve economical advance. On the one hand, she leads a path by following the European experience on the way of trying to be a member of EU and by following the US experience; on the other hand, this can be assumed as main paradox of Turkish biotechnology policy, especially agriculture and food biotechnology. Nevertheless, she just focuses on achieving biotechnological developments without considering the dynamics of the society and public interest. For this reason, the term of “irrelevant state” was used meaning that the state does not care about public or citizen interest; instead is a “dependent state” or “embedded state”. The basic obstacle to development in biotechnology is the existence of comprehensive policy of biotechnology and also the limited budget that is devoted to technology (Erbaş, 2006).

In Turkey, biotechnology is considered a way of economic development and is prioritized in the Development Plan. There are three basic official documents in which the importance of biotechnology is addressed: The first one is “Turkish Science Policy: 1983-2003”, which was prepared by the State Ministry of the Republic of Turkey in 1983. The second document is “Turkish Science and Technology Policy: 1993-2003”, which was prepared by TUBITAK in 1993 for the meeting of the Higher Council for Science and Technology (BTYK). The third one is the project of “Vision 2023: Strategies of Science and Technology” ,referred to as Vision 2023, was prepared for the sixth meeting. This project was undertaken in 2001 at the sixth meeting of BTYK and executed in 2003. It was evaluated as an effort to prepare a comprehensive policy of science and technology in Turkey. It aimed to develop a long-term shared vision of science and technology. In the same meeting, decision was taken to prepare a National Biotechnology Research Program in agriculture for 2001-2010. In 2005, at the 11<sup>th</sup> meeting of BTYK, as the result of Vision 2023 Project, biotechnology was evaluated as primary technological area (Tubitak 1985; 993).

In Turkey, not only the regulation related to GM food but also food safety regulation in general is new. It was only in 1998, when the need for HACCP (Hazard Analysis and Critical Control Point) was determined by a regulation. In 2000, the regulation of food control was passed as an obligation, and in 2004, the “Food Law” was enacted. The basic problem in Turkey is not the existence of law, but it is the application of the Law for food control because the existence of a

large informal sector and unregistered food products and sale units termed as “businesses under the stairs” (merdivenaltı işleri).

As an agricultural country, Turkey is a major importer of corn, soybeans, vegetable oils and cotton. The export of US and Argentina of these products to Turkey reached \$225 million in 2004. Thus, all the policies related to agricultural biotechnology is coordinated by the Ministry of Agriculture and Rural Affairs (MARA). Since MARA has been given authority over biotechnology, there is little or no participation from the ministry of Health or Environment except previously established interagency biosafety committees. Within MARA, the General Directorate of Research and Development (TAGEM) has had primary responsibility for participation in the Biosafety Protocol meetings and workshops and for drafting of biosafety regulations.

Turkey received a fund of USD 250,000 for a United Nations Environment Forum (UNEF) Project. The goal of the project was to assist Turkey to fulfill the responsibilities under Cartagena Biosafety Protocol and assist Turkey to define the needs and develop a legal base for all agricultural biotechnology. Turkey has been in the process of drafting biosafety legislation for the past six years. Starting in 2003, National Biosafety Law Draft was opened to the public and private opinion in 2005 and it has not been completed yet.

#### **4. Methodology**

This study consists of two levels of analysis; the first aims to define the level of awareness on GMOs in general and perceptions on GM (genetically modification) in agriculture and husbandry as well as on GM food consumption; the second level aims to Secondly relate the micro-level results to macro-level of economical, social and political developments.

Data were collected from both rural and urban areas of Ankara (the capital city) and Isparta, an important city in western Turkey, where irrigation farming is practiced. For the present study, only limited part of a field study will be used by reanalyzing the data of research was conducted in 2004 as a project.<sup>3</sup> The original sample consisted of 200 professionals, 400 urban consumers, and 400 villagers by excluding professionals that can enables to compare villagers those people can be thought as producers who use GM products for market as a producer, and as consumers who just consume not producing GM products. Urban consumers were the people who purchase GM products and foods. Data gathered by face-to face personal interview held at the participants' homes by a group of students mainly from the dept of sociology and other disciplines

of social sciences. In addition, in depth interviews were conducted and focus groups were formed by the researcher.

**Table 1 Sample of the Survey**

SUB-CATEGORIES	NUMBER OF PERTICIPANTS		
	ANKARA	ISPARTA	Total
Urban Residents	200	200	400
Rural Residents	200	200	400
Total	400	400	800

Two different kinds of questionnaires that mainly consisted of close- ended questions and scales and some open-ended questions were used for data collection. The questionnaire prepared for the villagers consisted of 98 questions, and the questionnaires used for urban consumer consisted of 80 questions.

After the participants were asked about their awareness on biotechnology or GMOs and organic agriculture, they were informed about GMOs and its benefits and risks. Then, they were asked to answer the questions related to their perceptions of the issue. Perceptions of genetic modification in agriculture and husbandry and behaviors of the participants for GM food consumption was determined by the following questions:

1. "To have higher yielding seeds they must be manipulated".
2. "Using genetically modified seeds without official control may cause serious hazards".
3. "There is no problem in using more effective new technological product of those the exact results unknown instead of existing chemicals for agricultural harmful".
4. "To create a more fertile species of cattle, it is acceptable to manipulate cattle's genetic material".
5. "Genetically modified foods may cause serious hazards for human health".
6. "I would eat bread produced from genetically modified wheat".
7. "I would eat genetically modified tomatoes".
8. "I would eat genetically modified animals' meat".
9. "It bothers me eating foods or drinking beverages which contain genetically modified organisms".

## **5. Results and Discussion**

### **5.1. Selected Demographic and Selected Social Indicators**

Demographic variables and explanatory social indicators that are thought to be important in perception and consuming behaviors are shown in Table 2. Most of the respondents (43.9 %) have primary school level of education. Here, the existence of illiterate people with a 2.5% is important. Most of the respondents (80.8%) were male and the proportion of female was only 19.3%. Most of the participants (67.4%) were aged between 26 and 55 years. The percentage of youngest people is 14.4 and the oldest people are 18.3.

Of the respondents, 35.9% had less than 500 TL monthly income, which is nearly \$ 350; 36.6% of the participants had a monthly income of 501-1000 TL, and 27.6% of the participants had an income over 1001 TL a month. More than half of the participants (60.9%) were the rightist or conformist, followed by social democrats with a 26.4%, and 12.8 % of the participants considered their political views as leftists or radicals. The level of devotion to religion was not very high. Most of the participants (77.0%) considered themselves moderately religious. Only 13.5% considered themselves highly religious.

**Table 2 Distributions of Democratic Characteristics and Selected Social Indicators**

<b>Residence</b>			<b>Income</b>		
	N	%		N	%
1 Rural	400	50.0	1 Up to 500 TL	251	35.9
2 Urban	400	50.0	2 Between 501 and 1000 TL	256	36.6
Total	800	100.0	3 1001 and over	193	27.6
<b>Education</b>			Total	700	100.0
1 Illiterate and Primary school	351	43.9			
2 Secondary school	118	14.8			
3 High School	210	26.3			
4 University degree or higher	121	15.1			
Total	800	100.0	<b>Political View</b>		
<b>Gender</b>			1 Right	439	60.9
1 Female	154	19.3	2 Social Democrat	190	26.4
2 Male	646	80.8	3 Other (leftists and radicals)	92	12.8
Total	800	100.0	Total	721	100.0
<b>Age</b>					
1 18-25 years	115	14.4	<b>Level of religiosity</b>		
2 26-40 years	260	32.5	1 Lowest	75	9.5
3 41-55 years	279	34.9	2 Moderate	608	77.0
4 55 and older	146	18.3	3 Highest	107	13.5
Total	800	100.0	Total	790	100.0

## 5.2. Awareness of GMOs and Organic Agriculture

Based on assumptions that the awareness of people on GMO's in Turkey is low, and to determine the level of their awareness, the participants were asked about their awareness on GMOs as: whether they had heard about biotechnology or GMOs; whether they had knowledge of biotechnology and what exactly GMOs were. To confirm their answers to these questions, they were also asked whether they had any knowledge of organic agriculture and their level of organic food consumption. Accordingly, 66.7% had never heard of biotechnology or GMOs. Knowledge of biotechnology, on what exactly it meant, was limited among the respondents who had heard about it (19.5%) This corresponds to only 6.4% of the participants. Knowledge of respondents about



organic agriculture is 31.6 that are interestingly lowest than the knowledge of biotechnology (33.3).

**Table 3 Awareness and Knowledge of GMOs and Organic Agriculture**

Awareness and knowledge	No		Yes		Total	
	N	%	N	%	N	%
1 Having Heard Biotechnology or GMOs	531	66.71	265	33.29	796	100.0
2 Having Knowledge of GMOs	210	80.46	51	19.54	261	100.0
3 Having Knowledge of Organical Agriculture	545	68.38	252	31.62	797	100.0
4 Consumption of Organic Foods	70	27.67	183	72.33	253	100.0

The percentage of participants who had heard of GMOs, knowing it is low and also knowledge of organical agriculture and consuming the organic food are low in general.

Cross tabulation results of awareness on GMOs and organic agriculture with relation to explanatory indicators are shown in Table 4:

- More urban residents had heard about GMOs than villagers; more educated people had heard about GMOs than participants with less education. Higher rates of younger participants, participants with high income level, and less religious participants had heard about GMOs than the others. (First line of the Table).
- Higher rates of participants with higher education, higher income, less religious devotion had knowledge on GMOs Although the difference was not statistically significant, a higher rate of democrats had knowledge of GMOs than the others (Second line of the Table).
- rural residents had more knowledge on organic agriculture than urban residents; males , than females; , more educated participants, than less educated ones; participants aged 41-55 years, than the others; and high income participants, than the others (Third line of the Table).
- A higher rate of urban residents persisted in consuming organic food than urban residents; a higherrate of social democrats, leftist and radicals, than rightists; and a higher rate of less religious participants than the others (Fourth line of the Table).

Rural residents had a higher rate of knowledge on organic agriculture than urban residents. This issue was observed among the villagers where many villagers cultivate organic food for themselves and inorganic food for the markets. The rates of rural and urban residents with knowledge on organic agriculture were 33.9% and 29.3 % respectively. This may be due to villagers' interest in especially discussions of agricultural developments in Turkey. There was a cleavage between those who consider organic agricultural production to be better than non-

organic products for the development of Turkish economy and export rate. Gender was not important in being knowledgeable about GMOs and consuming organic food. It was only important in being knowledgeable about organic agriculture, with a distribution of 19.1% female and 34.6% male participants.

**Table 4 Relationship of Awareness and Knowledge of GMOs and Organic Agriculture with Selected Social Indicators\***

	Residence	Educ.	Gender	Age	Income	Pol.View	Religiosity
	P	P	P	P	P	P	P
Having Heard of Biotechnology or GMOs	0.044	0.000	0.153	0.000	0.000	0.007	0.059
Having Knowledge of GMOs	0.230	0.005	0.437	0.278	0.000	0.062	0.014
Having Knowledge of Organic Agriculture	0.094	0.000	0.000	0.000	0.122	0.005	0.646
Consuming Organic Foods	0.000	0.138	0.220	0.685	0.803	0.051	0.087

\* Values are indicating the significance of cross tabulations of mentioned variables.

### 5.3. Perceptions and Actions of GM Food and Their Relationship with Selected Social Indicators

As it can be seen on Table 5, the percentage of people with positive perception of GM is not low if the answers of ‘agree’ and ‘undecided’ are evaluated together. Especially, genetic manipulation of seeds and cattle are evaluated more positively than of the other items.

**Table 5 Perceptions on GMOs and GM Food**

	Agree		Undecided		Disagree		Total	
	N	%	N	%	N	%	N	%
To have higher yielding seeds, they must be manipulated	483	60.5	61	7.6	255	31.9	799	100.0
Serious hazards of using genetically modified seeds	39	82.6	71	8.89	689	4.9	799	100.0
Using new technological product for agricultural harmful	161	20.2	154	19.3	484	60.6	799	100.0
Manipulation of genetic material of cattle	314	39.3	72	9.0	413	51.7	799	100.0
GM foods may cause serious hazards for human health	52	80.6	103	12.9	642	6.	797	100.0
Eating bread produced from genetically modified wheat	237	29.7	89	11.1	473	59.2	799	100.0
Eating genetically modified tomatoes	233	29.2	82	10.3	483	60.5	798	100.0
Eating meat from genetically modified animals	176	22.1	95	11.9	525	66.0	796	100.0
Bothering foods containing GMOs	118	73.6	93	11.6	589	14.8	800	100.0

Table 6 shows how the selected demographic and social indicators influence perceptions of application of biotechnology in agriculture and husbandry and how the people behave in consuming the goods by using cross tabulations.

- The place of residence is significant for all the items. Rural residents are more in favor of GM than the urban ones (First column of Table 6).
- Gender has a significant effect for 8 items except “serious hazards of using genetically modified seeds”. Males are more in favor of GM than females (Second column of Table 6).
- Education is important for 5 items in perception and behaviors related to GM and GM food. Less educated people are more in favor of GM than the others (Third column of Table 6).
- Age is significant for 5 items. Older participants are more in favor of GM than the younger participants (Fourth column of Table 6).
- Political view is important for 4 items. Rightists are more in favor of GM than the others (Fifth column of Table 6).
- Religiousness is significant for 2 items. Highly religious participants are more in favor of Gm than the others (Sixth column of Table 6).
- Income is significant for only 1 item. The participants with high income level are more in favor of using “more effective new technological product of those the exact results unknown instead of existing chemicalsfor agricultural harmful but” (Seventh column of Table 6).

**Table 6 Relations of Perceptions on GMOs and GM Food with Selected Social Indicators\***

	Residence	Gender	Education	Age	Pol.View	Religiosity	Income
	P	P	P	P	P	P	P
To have higher yielding seeds they must be manipulated	0.000	0.000	0.000	0.000	0.000	0.001	0.151
Serious hazards of using genetically modified seeds	0.000	0.569	0.039	0.259	0.004	0.035	0.921
New technological product for agricultural harmful	0.008	0.000	0.085	0.039	0.367	0.747	0.003
Manipulation of the genetic material of cattle	0.000	0.000	0.003	0.005	0.018	0.368	0.071
GM foods may cause serious hazards for human health	0.000	0.032	0.182	0.014	0.138	0.635	0.995
Eating bread produced from genetically modified wheat	0.000	0.000	0.004	0.033	0.478	0.191	0.175
Eating genetically modified tomatoes	0.000	0.000	0.032	0.202	0.533	0.191	0.474
Eating meat from genetically modified animals	0.000	0.000	0.088	0.161	0.325	0.454	0.189
Bothering foods which contain GMOs	0.001	0.006	0.097	0.318	0.025	0.402	0.198

\* Values are indicating the significance of cross tabulations of mentioned variables.

Perceptions and behaviors about GMOs and GM food are used as a scale for mean analysis. The scale consisted of 9 items and scores of 9-27, where low score indicates negative perceptions and high score indicates positive perceptions. Mean analysis showed that there were significant differences in the place of residence, gender, education, and age differences ( $p < 0.001$ ); political view was significant at  $p < 0.005$ ; religiosity level is significant at  $p < 0.05$ , and income is statistically not significant on perceptions and action on GMOs and GM food.

**Table 7 Mean Analysis on GMOs and GM Food by Selected Social Indicators**

		GM-food							GM-food				
		Mean	N	Variance	F	Sig.			Mean	N	Variance	F	Sig.
<b>Residence</b>	Rural	15.843	400	24.409			<b>Pol. View</b>	Right	15.018	435	23.728		
	Urban	13.316	393	18.451				Soc. Dem	14.218	188	22.171		
	<b>Total</b>	14.590	793	23.028	58.997	0.000		Other	13.337	92	20.797		
<b>Gender</b>	Female	12.715	151	15.138			<b>Total</b>		14.592	715	23.231	5.454	0.004
	Male	15.031	642	23.887									
	<b>Total</b>	14.590	793	23.028	29.498	0.000							
<b>Education</b>	Primary	15.246	349	24.106			<b>Religiosity</b>	Lowest	13.253	75	19.678		
	Secondary	15.359	117	26.853				Moderate	14.707	601	23.251		
	High Sch.	13.462	208	18.588				Highest	14.794	107	23.731		
	Univer. +	13.882	119	19.850				<b>Total</b>	14.580	783	23.106	3.191	0.042
	<b>Total</b>	14.590	793	23.028	8.086	0.000							
<b>Age</b>	18-25	14.026	114	18.645			<b>Income</b>	- 500	14.924	249	23.780		
	26-40	13.927	260	20.825				501 -1000	14.008	253	21.048		
	41-55	14.710	276	24.767				1001 +	14.225	191	22.133		
	55 and +	16.014	143	24.521				<b>Total</b>	14.397	693	22.428	2.531	0.080
	<b>Total</b>	14.590	793	23.028	6.570	0.000							

## 6. Conclusion

Micro-level results of the study show that there are differences between selected social indicators: the rate of participants who have heard GMOs, having knowledge of GMOs and organic agriculture, and who are persistent in consuming organic food. The perceptions of GMOs and on consuming GM food are also low, but if we think this level after giving information of GMOs, its benefits and risks it is expected lower than this level. And at purchasing behaviors because of cheapness this proportion may be higher than at the perceptual level. Another important result of the field study is that the villagers are more supportive than urban residences. They are producer besides being consumers and will produce GM crops and yield animals that affect all food system of the society even world food system in some extent. They were explained their supportive opinions as a result of maintenance strategy of coping with economical difficulties coming from agricultural policies in Turkey. On the other hand at the macro-level of analysis we

see the lack of academics interesting on social aspects of modern biotechnology and its applications. People are not interested yet in biotechnology and GMOs even there is propaganda against GMOs called “No to GMOs Platform” in Turkey supported by some association. And the issue is not take place in media.

Generally, the new model of the food safety and governance that is common in EU countries depends on the concept of citizenship emphasizing individual agency and choices, and citizens are obligated to actively “self-govern” as rational risk assessors. The role of the state is to shape this self governance, rather than to manage risks on behalf of the population (Draper & Green 2002, 623). It mainly depends on the presence of an organized strong civil society, with consumer organizations able to articulate and contribute food governance. Turkey has already implemented the EU regulation of GMOs and GM food, which has been shaped in a different social formation. Food governance in Turkey is not developed or introduced as an answer to social change, like many other developed countries. In other words, governance in Turkey has not developed in accordance with national and local demand, and public participation and even no reticence among civil society. It is decided from above without public participation and without considering public and country interests which makes her “irrelevant state”.

On the one hand the state and responsible authorities are not clear to define the policy of biotechnology and biosafety related to biotechnological production. On the other hand it she can not or nor infrastructure of analyzing the imported goods for determine GM food. Turkey imports corn, soybeans, and vegetable oils and cotton their product from US and Argentine that generally evaluated as GM foods has received little attention. More ever the foods that are not accepted by imported countries are consumed in national market. There is no regulation for protect the people from the possible risks of the GM foods. Thus people in Turkey are consuming imported GM food without knowing. In Turkey, social and long-term economic priorities seem to be forgotten even by the directly responsible institutions. They work as much as they can get funds. Both the public institutions and NGOs began to be semi-governmental authorities to seek fund and thus, social priorities began to disappear on behalf of these new intentions. Hence, the local people still seem as open sources for a laboratory of biotechnological products (Erbaş 2006) especially GM food despite living in an agricultural country. Under such conditions, Turkey has to be more dependent on big transnational companies and get more risks from maluse of GMOs.

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<sup>1</sup> GMO's (genetically modified organism) is generally used as an organism in which the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination. Food produced by using this technology named as GM food (genetically modified food) in this study.

<sup>2</sup> I am very appreciating to Mehmet Erbaş for the notion of "irrelevant state".

<sup>3</sup> The Project founded by Ankara University, Biotechnology Institute. Paper based on new analysis of data of the project supported by Ankara University, Institute of Biotechnology.

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