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## Genetically Modified Organisms and Turkish Legislation

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## **Genetically Modified Organisms and Turkish Legislation**

*Abstract: The main purpose of my article is to discuss what GMOs are, the controversies about this specific issue and the related regulations that are put forward by the authorities. GMOs are genetically altered organisms which have been widely produced and bred in certain parts of the world. According to some experts, this special practice of agriculture emerged in order to put an end to famine and prevent food scarcity. As growing GMOs seems to be more convenient than the traditional farming, it is more eligible to produce food in large scale which will be a fine solution for food scarcity. However, there are some oppositions to the GMOs. It is strongly believed that the real causes of famine is not related to production, it is a problem of distribution of food. Moreover, patenting the seeds leads to an unstoppable control and dominance over food by the private enterprises. Therefore, the opponents state that the aims of these companies are solely financial gain and monopolisation in food production. Patenting the seeds is another arguable issue. It poses a great threat for the organic farmers since GMO seeds can contaminate the others through natural ways. This is not the only danger that organic farmers face with; they can also be sued by the GMO producers for this unintended exposure to GMO seeds. Not only the diminishing of the variety of species but also the possible adverse effects of GMOs on human health create a debate between the two groups. These are not the only topics that are open to discussion. In addition to these, labelling the products creates a huge problem among the poorly educated consumers as they have not been clearly regulated in some countries. Hence, this subject having such a close connection to human health cannot be ignored by the law. In fact, a number of countries have enacted legislation in order to regulate this sensitive field. Turkey, having been dependent on the import of the agricultural goods for a period of time, has to join these countries with a recent legislation. All these contemporary issues for Turkey will be highlighted in my article.*

*Key Words: IVR, Word Congress, Legal Sociology, Genetically Modified Organism, Genetic Engineering, Turkish Legislation of GMO.*

### **I. Introduction**

Fish in strawberries, bacterias killing pests in corn, tomatoes with long lasting shelf life, 3G cellular phones, the Internet... Vertiginous technological improvements and legislations that are trying to keep pace with all...

Already known, the relationship between law and social phenomena is the main subject of social philosophy and the direct reflection of technological developments is in the interest of law, hence, leading to new fields of regulation. These regulations are mostly related to the

resolving of the unforeseen problems caused by technology. For example, the thefts and fraud emerging right after we were introduced to the Internet have brought a series of urgent protection and prevention programmes. Generally, a social change leads a way to a new regulation and this regulation meets the needs of the society until a newer fundamental change is required. Because of this reason, there is no need to put regulations so often. However, if the subject matter is technological developments, it may not be possible to keep the pace with these as they have brought immense changes to our lives with an unbelievable speed. Because of this reason, a jurist facing a new field of regulation should be informant about technology to a certain level in order to go beyond law and understand the main change, which would prevent the obsolescence of a recent regulation, and identify the right owners and the definition of crime. That is why, today, it is highly required for the jurists who are far-sighted and can work interdisciplinarily more than ever. I must confess that I had to learn the terminology related to genetics and agriculture, and I have grasped that without truly understanding what these organisms are, reaching a final decision is impossible to put a legal regulation.

Actually if GMOs have stayed as a scientific subject of research, it can be possible to cover the issue technically without a need for a comprehensive legal regulation. Nevertheless, GMOs coming as a source of food makes this issue a multi-dimensional one and this technological invention has started to influence societies directly.

- a) Apart from everything, GMOs are an outcome of a scientific research and a matter of copyright in terms of the inventor.
- b) GMOs are trading items, bought and sold. As a consequence, it has an economic dimension.
- c) As GMOs are commercial goods, they affect pharmaceuticals, farmers, retailers and consumers, and open a road for some areas that should be legally regulated.
- d) Along with the fact that GMO producers can produce these organisms freely, human beings' right to know what they are consuming and the prevention of using them as guinea pigs occur as another legal problem. Moreover, this is a problem of ethical, religious and social philosophy.
- e) The countries researching and producing GMOs are developed countries. By this way, it has been stated that these countries can control the underdeveloped ones and this results in a political dispute covering the terms like sovereignty and independence.

As a result we can say that the problem is multi-dimensional. While doctors, genetic engineers, physicists, farmers and organisations, health organisations and biologists are now taking part in the arguments, there is a strong need to put a regulation to what extent they are going to be served for human or animal consumption. Each country's regulations and approach is different from one another.

## **II. History:**

For the first time in 1900, the results of the experiment done by Dutch botanist Hugo De Vries and his colleague Carl Correns and Australian Erich Tschermarck related to the hybridation of the peas were announced independently from the genetic laws. That is why the year 1900 is accepted as a milestone in the field of genetics.<sup>1</sup> Since that time, genetics has improved and GMOs have been used in pharmaceuticals, agriculture, and waste disposal industry.<sup>2</sup>

## **III. What is a GMO?**

A genome provides and controls the structure, function and reproduction of every living organism. A genome is a general name given to the all genes that are found in the chromosomes of an organism. Genes are responsible for the production of the proteins, and a production scheme is needed for the production of the proteins by the organism. These schemes are coded by the genes in the chromosomes. In the works that have been done in the past 20 years, the gene map of a human being has been totally clarified<sup>3</sup>, for example there are 23 pairs of chromosomes in the human genome, one of each pair from each parent.<sup>4</sup> However, it has been figured out which gene produces what protein and this makes up only the 1.2% of the genome. It has not been identified what the rest is yet. The studies in the field of genetics alongside with trying to understand what a gene is have been applying various techniques to change the genetic material and enable species transfer, and these have formed the basis of biotechnology<sup>5</sup>. By placing a gene into another organism, the gene has been modified. As a result, GMO is an abbreviation of genetically modified organism, also known as genetically engineered organism or transgenic organism. It carries genetic material that has been made in the laboratory and transferred into it by genetic engineering<sup>6</sup>. Nevertheless, it has

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<sup>1</sup> Yıldırım, Mustafa Fadıl; Gen Teknik Uygulamalardan Doğan Hukuki Sorumluluk, Engin Yayınevi, Ankara, 2008, p. 1.

<sup>2</sup> Yıldırım, p.3. Demirkol, Kenan; GDO: Çağdaş Esaret, Kaynak Yayınları, İstanbul, 2010, p. 27.

<sup>3</sup> Demirkol, p. 45-47.

<sup>4</sup> Ho, Mae Wan; "FAQs On Genetic Engineering, [www.biosafety-info.net/pubart.php?pid=38](http://www.biosafety-info.net/pubart.php?pid=38) (15.7.2011).

<sup>5</sup> Çelik, Venhar/ Turgut-Balık, Dilek; "Genetiği Değiştirilmiş Organizmalar (GDO)", Erciyes Üniversitesi Fen Bilimleri Enstitüsü Dergisi 23 (1-2),2007, p. 13-23.

<sup>6</sup> Ho, Mae Wan; "FAQs On Genetic Engineering, [www.biosafety-info.net/pubart.php?pid=38](http://www.biosafety-info.net/pubart.php?pid=38) (15.7.2011).

not still been identified where an alien gene (i.e bacteria) is going to place on a genome of a living organism (i.e.plant). It is not possible to determine this, and thus, brings the arguments of disorder and risk. Starting from this, an unbelievable argument has taken off.

#### **IV. Why have GMOs been produced?**

For the last 150 years, whilst some significant inventions, out of scientific interest, have ushered a new era, scientists have been researching in order to handle some problems and ease the lives of human beings. Besides this scientific interest in producing the GMOs, as stated by the ones who work on this specific subject matter, the most significant problem that the world has been facing is the lack of providing cheap and qualified food for the people, especially after the war, despite the increase in population. It is estimated that the world population will be approximately 11 billion and the number of the poor will increase<sup>7</sup>. In addition to the rise in population, the salination of soil, erosion, flood, climatic pressures, pest outbreaks<sup>8</sup>, soil degradation, urbanisation and new highways are making the problem worse. Furthermore, a lot of countries are suffering from water shortage<sup>9</sup>. In order to solve this problem in agricultural production an increase has been provided with the policies that are known as ‘green revolution.’ However, the chemicals that were previously used in order to maintain this increase polluted the environment in an irreversible way and led to damage in the balance of nature<sup>10</sup>. Moreover, it is not possible to acquire high yields as before. The effects of ‘green revolution’ can be easily observed in countries like Mexico, India, Turkey, Korea, China and Brazil<sup>11</sup>. Protecting the environment and decreasing the use of the pesticides and herbicides has now become a centre of interest by the ones who are interested in genetics.

Supporters of GMOs believe that they are ultimately beneficial for the mankind and think that they can solve significant agricultural, health and ecological problems potentially<sup>12</sup>. According to them, biotechnology offers a way forward that can be a potent source of growth, distributional gains and nutritional improvement in developing countries which gear

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<sup>7</sup> Aktaş, Erkan; “Globalisation, Poverty and Genetically Modified Agricultural Product”, <http://mpa.ub.uni-muenchen.de/8657> (9.6.2011).

<sup>8</sup> Yusuf, Shadid, “Globalisation and the Challenge for Developing Countries”, Journal of African Economies, Vol: 12, AERC Supplement 1,2003, p. 61.

<sup>9</sup> Beauval, Valentin; “Nourrir le Monde”, [http://www.resogm.org/IMG/pdf/I\\_Nourrir\\_le\\_Monde\\_diagnostic\\_global.pdf](http://www.resogm.org/IMG/pdf/I_Nourrir_le_Monde_diagnostic_global.pdf) (15.7.2011).

<sup>10</sup> Aytoğu, Rasim Kaan; Organik Tarım Analizi ve AB Fırsatı, İstanbul Ticaret Odası Yayınları, No 2006-12, İstanbul, 2006, p. 9.

<sup>11</sup> Beauval, Valentin/Dufumier, Marc; “Les Plantes Génétiquement Modifiées Peuvent-Elles Nourrir le Tiers Monde?”, Revue Tiers Monde, No: 188, Octobre- Décembre, 2006, p. 742.

<sup>12</sup> Çelik/ Turgut-Balık, p.16.

themselves to harness this technology<sup>13</sup>. The potential benefits of biotechnology are too significant, and the risks are sufficiently controllable to make it worthwhile to break the current logjam and move towards a consensus on developing and regulating genetically modified crops. GM crops furnish new products and profits for economic growth, increase crop yields, reduce pesticide use, multiply farming options, and improve the diet and health of the world's impoverished people<sup>14</sup>.

By gene transfer technology “less water-more food”<sup>15</sup>, “better seed for a brighter future”<sup>16</sup>, “better seeds, healthier foods”<sup>17</sup> have been aimed. By this way, lucrative GMOs, needing less water, resistant to pesticides, growing faster, planted in barren lands and with increased nutritional values and a long lasting shelf life, have been produced. The advances in genetic and transgenic technology have made it possible to engineer crops to cope with a wide range of environments. Plants are being bred to achieve better yields and to withstand water stress, salinity and high temperatures and to resist some of the common diseases and pests.<sup>18</sup>

Apart from this, GMOs are being used in health sector. Drugs, hormones and vaccines have been developed, and studies related with growing artificial tissues and organs have been done in order to lengthen and improve the life expectancy. For instance, the artificial insuline hormone that is used by the diabetics or hepatitis vaccine is an outcome of these studies<sup>19</sup>. Moreover, the applications of biotechnology include the production of new enzymes and additives, improving new products in paper and waste treatment industries, and manufacturing biogas<sup>20</sup>.

Another goal of agricultural biotechnology is along with hunger, providing raw material for the millions of people who cannot clothe themselves. The agricultural studies to produce economical clothing have majored on cotton. As India has the 21% of world cotton planting, genetically modified cotton was first applied in this country. Today, the 81% India cotton planting is made up of genetically modified cotton<sup>21</sup>.

Since GMOs are basically targeting to find solutions for hunger and clothing, the products that are focused on are canola, soy, cotton, rice and corn. Except for corn, the other

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<sup>13</sup> Yusuf, p. 61.

<sup>14</sup> Yusuf, p. 62.

<sup>15</sup> [www.monsanto.com](http://www.monsanto.com) (12.7.2011)

<sup>16</sup> [www.monsanto.com](http://www.monsanto.com) (12.7.2011)

<sup>17</sup> [www.monsanto.com](http://www.monsanto.com) (12.7.2011)

<sup>18</sup> Yusuf, p. 60.

<sup>19</sup> Oğuzlar, Özlem; Genetiği Değiştirilmiş Organizmalara İlişkin Uluslararası ve Avrupa Birliği'ndeki Düzenlemeler, Galatasaray Üniversitesi Yayınları, İstanbul, 2009, p. 1.

<sup>20</sup> Demirkol, p. 27.

<sup>21</sup> Demirkol, p. 78.

products are being used as animal food or by-products of human food. The products that are sold today are either resistant to herbs or pests, or both<sup>22</sup>. The manufacturing of these products are mainly in the USA, Argentina, Canada and Brazil. The production takes place in China, Spain, Romania, Uruguay, Mexico, Colombia, Bulgaria and Germany to a less extent<sup>23</sup>.

## **V. Are GMOs a solution?**

### *1. Hunger:*

It would be wiser to talk about the fair distribution of food rather than explaining hunger. One of the forerunners GMO producers, Argentina, has been exporting a substantial amount of wheat and meat; however, the quarter of its population lacks qualified nourishing. Furthermore, another paradox is that the two third of farming industry has been struggling with hunger and this occurs in underdeveloped or developing countries<sup>24</sup>. Before hunger, the opponents of GMOs concentrate on the problem of obesity in developed countries. For example, 70% of the children in the States are suffering from obesity and metabolic disorders like diabetes, cholesterol and high blood pressure. While a large proportion of GMO studies are being carried out in the States and American style of food consumption have become popular, these kinds of diseases can be seen anywhere in the world<sup>25</sup>. As a matter of fact, the initial purpose of the GMO production is not to find a solution for hunger but to make profit through eliminating prominent traditional producers of food<sup>26</sup>.

We can say that there is a problem of distribution than a problem of hunger. The unfair division fields, civil wars and other disputes, race, religious or gender discrimination and inequality, lack of infrastructure due to transport and stockage, farmers' loans, inadequate technological innovation, the policy of pricing are the problems that should be solved before identifying 'hunger'<sup>27</sup>.

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<sup>22</sup> Saam, Mirko/ Bordogna Petriccione, Barbara/ November, Andreas; "Les Impacts des Plantes Transgéniques dans les Pays en Voie de Développement et les Pays en Transition", *Revue Européenne des Sciences Sociales* (En ligne), XLII-130, mis en ligne le 16 Novembre 2009. <http://resp.revuep.org/493> (22.2.2011).

<sup>23</sup> Çetiner, p. 18.

<sup>24</sup> Beauval/Dufumier, p. 741.

<sup>25</sup> Shiva, Vandana; *Yeryüzü Demokrasisi*, Çev.: Ali K. Saysel-Elçin Gen-Onur Günay, bgst Yayınları, İstanbul, 2010, p. 57.

<sup>26</sup> Dufumier, Marc; "Biotechnologies et Développement Agricole Dans le Tiers Monde", *Revue Tiers Monde*, No 188, Octobre-Décembre, 2006, p. 698.

<sup>27</sup> Saam/Borgogna Petriccione/November, p. 21.



## *2. Immigration:*

When big companies are explaining the benefits of the genetic engineering, they have a tendency to compare it with large-scale industries, not to the ecological and smaller ones, a large majority of the farmers own a land not larger than one hectare to meet their basic needs and to market their tiny amount of products<sup>28</sup>. When searching for the roots of the ones living in slums and suffering from hunger and malnutrition, it can be seen that most of them are farmers. These people cannot handle with the large scale competitive markets that do not need hand craft, and since they do not know anything other than farming they cannot find a place in urban life. These need 'food aid', in which 'the concept of food aid' is a medium for using the regulation of the market when there is a large amount of demand.<sup>29</sup> It is a well-known fact that when there is an overproduction of transgenic corn, the problem of hunger is exaggerated, even the archive news is shown to the public trying to convince that the excessive amounts would be sent to Africa as aid. African nations are dubious about the safety of the corns, and even though the president of Zambia claimed that they would refuse to get the 'toxic food' to their country despite severe conditions, Zimbabwe, Malawi, Lesotho and Mozambique accepted them in respect to some precautions to be taken; but during the transport no precautions were taken against contamination<sup>30</sup>.

## *3. Increasing Productivity:*

GMO experiments have been applied in drained, irrigated and lucrative lands where a high dose of pesticides and chemicals were applied. However, GMO planted fields do not have the same features. It has been promised that productivity rate would increase from 40% to 80%. As an example that can be given to a reverse situation is that Turkey, by using conventional seeds, have got 2.5% more yield than India<sup>31</sup>. Hundreds of Indian farmers who were disappointed and living in poverty committed suicide by drinking pesticides and GMO seeds led to an important sociological problem<sup>32</sup>. Certainly, the low chance of getting higher yields from the GMO seeds is not peculiar to cotton<sup>33</sup>.

In addition to this, farmers have to practice by using these chemicals so that they can get higher yields. By coincidence, the firms selling GMO hybrid seeds can be in the same

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<sup>28</sup> Shiva, *Çalınmış Hasat*, p. 117.

<sup>29</sup> Beauval/Dufumier, p. 741.

<sup>30</sup> Saam/Borgogna Petriccione/November, p. 12.

<sup>31</sup> Demirkol, p. 79.

<sup>32</sup> Malone, A.; "The GM Genocide: Thousands of Indian Farmers are Committing Suicide After Using Genetically Modified Crops", <http://www.dailymail.co.uk/news/worldnews/article-1082559/The-GM-genocide-Indian-farmers-committing-suicide-using-genetically-modified-crops.html> (4.3.2011).

<sup>33</sup> Dufumier, p. 697. Shiva, *Yeryüzü Demokrasi*, p. 171.

position with the companies selling chemicals. This situation makes these farmers dependent on these firms<sup>34</sup>.

#### *4. Ecological Balance:*

GMO products have been regarded as a solution by the companies investing in this R&D and biogenetic scientists, as a result of criticisms against green revolution. However, as GMOs are resistant to pests there occurred a greater demand for using more pesticides<sup>35</sup>. This has led to environmental pollution. An ongoing use of herbicides can give way to an exaggerated pollution in waters. Besides, herbicide resistance can contaminate other weeds or insects and there may be a possibility that they are not eliminated. Under normal circumstances this may not be probable, but since the genetic formation of the plants have changed, this can occur anytime anywhere<sup>36</sup>. Thus, the supporters of the GMOs point out that GMOs are not the only factor to pollute the environment and add that intensive agricultural practices are harmful for the environment in anyway<sup>37</sup>.

#### *5. The Criticism of Neo-Darwinism:*

No matter how it is, living things adapt themselves to the environmental factors in a life cycle. The alteration of genetics in the hands of the human beings disrupts the evolution. This also brings this approach: "...the organism tended to be seen as no more than a collection of genes, its development, the unfolding of a 'gene programme' encoded in the genome". It has also been stated that seeing the living as a mass of genes brings along ethical and religious problems. Plus, according to some, mankind is being sacrificed because of the GMOs produced just for financial gain<sup>38</sup>.

#### *6. Addiction and Poverty:*

The transnational companies, which have invested great sums of money in the creation of GMOs, have made a genetic alteration in order to prevent reproduction of the seeds and got the patent of the emasculated seeds<sup>39</sup>. By this way a seed which is a free source has become

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<sup>34</sup> Beauval/Dufumier, p. 743.

<sup>35</sup> Shiva, Vandana; *Çalınmış Hasat*, Çev.: Ali K. Saysel, bgst Yayınları, İstanbul, 2006, p. 18.

<sup>36</sup> Dufumier, p. 696.

<sup>37</sup> Insall, Lynn; "Avrupa Birliği'nde Genetiği Değiştirilmiş Gıdalar", *Modern Biyoteknoloji Genetiği Değiştirilmiş Organizmalar ve Gıda Güvenliği Konferans Notları*, Gıda Dernekleri Federasyonu, Comart Uluslararası Organizasyon ve Tanıtım Hizmetleri, Ankara, 2005, p. 93.

<sup>38</sup> Ho, Mae Wan; "Evolution", <http://www.ratical.org/co-globalize/MaeWanHo/encyclo.html> (18.5.2011).

<sup>39</sup> Beauval/Dufumier, p. 744-745.

merchandise<sup>40</sup>. This is a new and weird situation for the farmers because in conventional farming they can reproduce and use the same seeds for the following year and share them. The GMO seeds are far more expensive than the others – a GMO company charges an extra 2.3 dollars as ‘technology cost’-<sup>41</sup>, and the farmers who are convinced that they would get higher yields cannot receive what they expect. By this way, if a farmer getting the seeds once does not purchase more seeds for another three years, has to send a sample from his yield to the company<sup>42</sup>. According to the contract, companies can visit the fields without permission.

In addition, seed regulations force the farmers to use only the registered seed. For instance, Josef Albrecht from Bavaria has been applying organic agriculture and producing his own ecologic wheat. Other ten farmers used these seeds. In 1996, Bavaria government imposed a fine to him for trading unregistered seed trade. In Scotland, the seed trade, which had been legal up to 90s, is now an illegal practice. The potato seed producers had to sign a deal that force them to breed certain types of potatoes<sup>43</sup>. The commutation of seeds is illegal in the USA<sup>44</sup>.

The companies that possess the patent of the seeds do not want any other practices out of their control. Naturally, this situation gives a way to change in the habits and routines of the farmers who are used to conventional methods of production. In some situations, the technological seeds can be obtained through hybriding. Hence, farmers have to deal with lawsuits as they have not received a patent before. (i.e. Indian farmers have to go to court for basmati rice)<sup>45</sup>.

### *7. Contamination and the Freedom of Production:*

The transmission of transgenic features from a GMO to other plants is an unwanted but a factual scenario<sup>46</sup>. As stated above, GMO seeds are sold by an extra cost and a natural contamination would cause a financial loss. On the other hand, the conventional and organic farmers can trade their crops under certain conditions. This contamination has an adverse affect on the quality of their crops, and they receive unjust treatment as companies open lawsuits asking for a great deal of money. An example best illustrating this is Percy Schmeiser. A Biotech company prosecuted Percy Schmeiser although he did not purchase

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<sup>40</sup> Shiva, *Yeryüzü Demokrasisi*, p. 171.

<sup>41</sup> Shiva, *Çalınmış Hasat*, p. 112.

<sup>42</sup> Demirkol, p. 68.

<sup>43</sup> Shiva, *Çalınmış Hasat*, p. 111.

<sup>44</sup> Shiva, *Çalınmış Hasat*, p. 112.

<sup>45</sup> Shiva, *Çalınmış Hasat*, p. 104-105.

<sup>46</sup> Housset, Karine; “Acceptabilité sociale des OGM: Le Rôle des Médias”, *Journal International de Bioéthique*, Vol.: 13, 2002/2, p. 81.

seed from the firm. The reason for this was that his field had been contaminated by the canola plant that this company had produced. It is highly surprising that instead of compensating the bio-pollution, the firm demanded restitution for patent infringement (400.000 US dollars). The Federal Court found Schmeiser guilty, but the Supreme Court disaffirmed the verdict as he did not profit from the presence of the seeds in his field<sup>47</sup>.

#### 8. Food Safety:

The people who study GMOs agree to the idea that these products do not have any adverse effects on human health. In fact, there has been an ongoing dispute on the safety of these products. Transgenic crops are not risk free, however. GM genetic material is not like an ordinary genetic material. Natural genetic material in non-GM food is broken down by special enzymes to provide energy and building-blocks for growth and repair.<sup>48</sup> That is why GM crops cannot be controlled. GM constructs are designed to jump into genomes. Unfortunately, they can also jump out again, to invade other genomes. GM lines are well-known to be unstable, partly because the integrated GM construct can be lost, and the viral promoter makes it worse. In addition to this, Mae Wan Ho -a geneticist- also states: “Some experiments have shown that GM genes can transfer from plants to soil fungi and bacteria. Two German geneticists monitored fields where GM sugar beet was planted. They found that the GM construct has persisted in the soil for at least two years after plants were removed, and some bacteria in the soil may have taken up different part of the construct”<sup>49</sup>. Another study revealed that “the DNA retaining capability of plasmid DNA fluctuated in different soils. The results were encouraging in that extracellular DNA such as puc 18 plasmid could persist in the natural soil for more than a month and it retains the transformable molecular nature. Hence, soils having such a plasmid DNA are the potential source for the horizontal gene transfer among bacteria”<sup>50</sup>. The negative outcome of this is the transport of resistant plasmids causing a bacterial resistance to antibiotics<sup>51</sup>.

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<sup>47</sup> Schmeiser, P.; “Facing Down Goliath One Farmer’s Battle with a GM Giant”, <http://www.percyschmeiser.com/AcresUSAstory.pdf> (3.3.2011). Shiva, Çalınmış Hasat, p. 113. Demirkol, p. 74.

<sup>48</sup> Ho, Mae Wan; “How Corporations Rule and Ruin the World”, <http://ratical.org/co-globalize/MaeWanHo/corporation.html> (15.7.2011).

<sup>49</sup> Ho, Mae Wan; “How Corporations Rule and Ruin the World”, <http://ratical.org/co-globalize/MaeWanHo/corporation.html> (15.7.2011).

<sup>50</sup> Kandhavelu, Meenakshisundaram/Vennison, P. John; “Persistence of Plasmid in different soils”, <http://www.Academicjournalp.org/AJB,AfricanJournalofBiotechnology>, Vol. 7 (15), pp. 2543-2546, 2008 (21.4.2011).

<sup>51</sup> Davison, John; “Genetic Exchange between Bacteria in the Environment”, *Plasmid*, Vol:42, issue 2, September 1999, pp. 73-91.

They have the potential to harm natural ecosystems, leading to the protection for resistant pests, and cause allergic reactions or other health problems when incorporated in foods.<sup>52</sup> Because of this, some scientists are telling that GM crops are unsafe, unsound and unsustainable and if they are not good for us here, and they cannot be good for the developing world<sup>53</sup>.

The contamination of non GM seeds by the GM seeds is another issue of food safety and this is a subject matter that attracts a great deal of attention. For example, in China, “in case of accidental spread of GMOs, the institutions or persons shall close down the site immediately, run a thorough investigation, adopt effective measures to prevent continuous spread of the GMOs, and report to the responsible administration; for an area in which unfavorable effect has happened, people in the area shall be quarantined and put under medical monitoring; within the spreading area, tracing and monitoring measures shall be taken until no more risks exist”<sup>54</sup>. Hormone disorders, cell division malfunctions, disabilities, miscarriages and cell death are other negative consequences of GMOs<sup>55</sup>.

#### *9. Monocultured Agriculture:*

On the condition that GMOs are preferred- because of the easiness of their production- conventional methods and production techniques can be abandoned. This is threatening for biodiversity<sup>56</sup>. This represents patented seeds, cartels and a change from biodiversity to monoculture. To exemplify, as a consequence of the imposed cotton monoculture in India, the production of leguminous seeds in Warangal region, millet and oil seeds have become extinct<sup>57</sup>. Besides, agricultural practices of GMOs require more usage of herbicides and pesticides, thus the rich biodiversity of soil has been affected negatively<sup>58</sup>. Biodiversity is a source of prosperity and a cultural value creating the circumstances of sustainability<sup>59</sup>.

#### *10. Religious Reactions:*

Naturally, there is a sect of people thinking that dealing with the genes is an intervention to divinity. Especially, these less educated people being unaware of the content of the food they

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<sup>52</sup>Yusuf, p. 62.

<sup>53</sup> Ho, Mae Wan; “How Corporations Rule and Ruin the World”, <http://ratical.org/globalize/MaeWanHo/corporation.html> (15.7.2011)

<sup>54</sup>Liu, Yinliang; “Regulations of GMOs in China”, *Journal International de Bioéthique*, Vol: 19, No: 4, 2008, s. 151.

<sup>55</sup> Kenan Demirkol, p. 237-244.

<sup>56</sup> Dufumier, p. 696.

<sup>57</sup> Shiva, *Yeryüzü Demokrasisi*, p. 171.

<sup>58</sup> Shiva, *Çalınmış Hasat*, p. 77.

<sup>59</sup> Shiva, *Yeryüzü Demokrasisi*, p. 22.

consume show more reaction to these products. Inserting swine genes to the tomatoes-protecting the crops from the cold- has received reaction from the Muslim. Apart from this, in general sense, any creative activity that aims to change the world is regarded as a rebellion against God's will<sup>60</sup>.

### *11. Turkey and the Legislation about GMOs:*

GMOs, supported by the governments in America, are highly suspected by Europe. The environmental pollution that these products can cause and the adverse effects on human health have been opened to discussion both in academic grounds and media<sup>61</sup>. That is why the production and sales of GMO had been banned until 2004 in Europe. Although the European Council lifted the ban after this year<sup>62</sup>, it is still not possible to say that there is mass production in Europe. A mainstream policy is trying to be followed by considering the principle of precautionary. Avoiding obstacles to technological innovations and finding a legal regulation to answer the ethical criteria is regarded as a solution<sup>63</sup>. In order to provide this, transparent process, identification and independent controls are needed<sup>64</sup>.

In our country, after the Second World War, the usage of pesticides, mechanisation, chemical fertilizing and irrigation have been effective on the production of the food people need. Therefore, Turkey has got the reputation of self-adequacy in terms of agricultural practices. However, it is claimed that when the rate of productivity is compared to arable lands, this so-called efficiency is not healthy. The aim of boosting the agricultural production has led to the destruction of meadows and forests, the irrigation of steep fields, dehydrated wetlands and damaged ecological balance because of artificial water sources. Besides, biodiversity has been adversely affected. Thus, as in the global world, ecological balance has been destroyed to increase the agricultural productivity, and the solution has been found in the GMOs<sup>65</sup>. Actually, a country that regulated birth control in its Constitution has an ageing population, and government is strongly in favour of increasing the population. Hence, the claim that GMOs is a probable solution for the shortage of food is far from reality.

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<sup>60</sup> Yazıcı, Olcay; Bütün Arılardan Özür Dileriz”, Çerçeve, MÜSİAD Yayınları, No: 13/36, 2005, p. 60.

<sup>61</sup> Housset, p. 86.

<sup>62</sup> Dubreuil, Bertrand Hériard/ Dissart Jean-Christophe; “L’Entrée des OGM en Europe”, Diagnostic, Proje 293, 2006, p. 28.

<sup>63</sup> Housset, p. 87.

<sup>64</sup> Housset, p. 89.

<sup>65</sup> Çetiner, Selim; “Tarımsal Biyoteknoloji ve Gıda Güvencesi: Sorunlar ve Öneriler”, Modern Biyoteknoloji Genetiği Değiştirilmiş Organizmalar ve Gıda Güvenliği Konferans Notları, Gıda Dernekleri Federasyonu, Comart Uluslararası Organizasyon ve Tanıtım Hizmetleri, Ankara, 2005, p. 13-14.

The researches on gene technology have been carried out in our country for the last 30 years. It can be observed that the scientists educated abroad are taking place in government sponsored projects and researches in universities. All the GMO studies are on a research level, and none of them has reached to the consumer yet<sup>66</sup>.

In Turkey, a regulation is needed, particularly after Rio Declaration in 1992. The first study in this field was published by the Minister of Agriculture as “Instructions on Field Experiments of Transgenic Cultured Plants”. By this way field studies have emerged, but these studies were conducted by the Ministry, not by the independent institutions, which have brought some questions<sup>67</sup>.

Turkey, signing Cartagena Protocol, approved in barely four years and put the law into force in terms of domestic legislation. On 26th October 2009, before the Biosafety Act, which should be in accordance with this protocol, a regulation was published under the headline of ‘Regulation on Import, Process, Export, Control and Inspection of GMOs as Food and Animal Feed’. Although the authorities claim that they reinforced this regulation to prevent the entrance of these products to the country, the import of these products was legalized, which is obvious from its title. A lawsuit was filed to The Council of State based upon the claim that this field should be regulated by a law not a regulation. The Council agreed to stay the motion. Later, it was abolished by the Regulation of GMOs (13.08.2010).

Before this law came into force, despite the ban of raising GMOs, (seeds were not included i.2/a) soya and corn were imported. As meat is expensive in Turkey, it is alleged that soya meat is added to meat balls- one of the favourite dishes of people living in Turkey- glyose syrup (produced from corn) to baklava- another favourite- and other desserts or even other food as it extends the shelf life. As they stay only as a rumour, the firms are reluctant to label their products, and a common sense has not been formed yet. Besides, it has been mentioned that a committee would be formed (i. 6); however, the independence of this committee is suspicious as it will be dependent on the Ministry. Furthermore, there are serious problems in the infrastructure of the laboratories identifying the risks in our country. And this means that even if a legal basis is established the existence of risks would last.

Looking at the policies developed in recent years, instead of making long term plans, it is possible to say that it has become widespread to import GMOs for the aim of supporting the maintenance of development using technology, and these are all conducted in spite of clear scientific risks, and it is possible to say that for a long time there would be a legal gap.

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<sup>66</sup> Bayraç, Abdullah Tahir/ Kalemtaş, Gülsüm/ Baloğlu, Mehmet Cengiz/Kavas, Musa; Genetiği Değiştirilmiş Organizmalar, Ed: Sertaç Önde, ODTU Yayıncılık, Ankara, 2011, p. 67-68.

<sup>67</sup> Demirkol, p. 262-263.

Government, six years later, realising the fact that there is going to be a problem in ordering the issue with a regulation, prepared a Biosafety Act and put into force along with disputes and worries on 18 March 2010. It was stated that during the preparations, NGOs were not invited but the executives of a prominent seed company attended the preliminary talks<sup>68</sup>.

With the Act, controlled experimental activities are allowed and the import and export of GMOs are legalized. The disapproved launching of GMOs to the markets, the production of animals and plants with GMOs, the usage of GMOs against the committee decisions, and including them in any baby and early child products are banned. (i.5)

In order to establish transparency, informing public about the GMOs, involving them in decision-making process and labelling are other items of the Act. (i. 8/1-e) (i. 8/1-i) Moreover, an application of an action plan in case of a probable risk is also included in the Act. (i. 8/3) A biosafety board was formed to evaluate the applications related to GMO production. (i 9) In this board, there are 9 members assigned by the Ministry, and just one of them is an academician, and another is from the professional organisations (i. 9). In this case, opposite to the claims, it is said that this board would not be independent from the government and the pressure of the companies, thus, is being criticised severely. In addition, the ethical committee assigned by this board is another subject of disapproval (i.11).

A short while after the publication of this Act, a regulation related to the GMOs and products was prepared by the General Directorate of Food Control on 13 August 2010. This was put into practice on 26 September 2010. It was published in accordance with the Act. It includes the applications for the GMOs, assessment, decision, import, processing, labelling, tracing, releasing, auditing and controlling. The main aim is to avoid the risks that can arise from the GMOs produced by biotechnology in the frame of scientific and technologic developments. In the wake of protecting the well-being of humans, animals and plants and biodiversity, it regulates applications, assessment, decision, import, processing, labelling, tracing, releasing, auditing and controlling. It also defines the principles about the activities that include the R&D of the GMOs limiting the contact with the outer circles in a controlled definite area. It can be seen that the banned issues are highlighted in the regulation, the risks are mentioned and necessary precautions are to be taken. Although the production of the GMOs is banned, the import of the GMOs is also allowed in the regulation. This includes both animal feed and human consumption. The imported GMOs are required to be under a process of control and the Ministry have to identify the kind of imported GMO. (i.14) It is

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<sup>68</sup> <http://www.tumgazeteler.com/?a=5182720&cache=1> (22.7.2011)



very important for a consumer to be aware of a product being a GMO or not due to providing the transparency. In this regulation, a threshold value is defined, and if there is a genetic alteration above this value, this appears on the labels. (i.18) Plus, non GMO products can be labelled. (i.18). In order to provide a transparency, all the applications, documents, decisions are announced to the public through Biotechnology Information Exchange mechanism. But, for the domestic R&D practices there is no requirement for an application to the Ministry. The regulation of sharing information related to the R&D practices is regulated; however, if not, a punishment scheme does not take place in the regulation.

In the regulation, a risk evaluation regarding the environment, socio-economic evaluation and an 'ethical assessment' –if needed by the board- are conducted for each application. 'Ethical assessment' is identified as an evaluation setting out the possible effects of releasing and consuming GMOs on the consumers and farmers' ethical values.

Nowadays, nine varieties of corn, six varieties of cotton, three varieties of soya, three varieties of canola, one breed of potato and yeast and a variety of bacterium are allowed to be imported. In the decisions that the GMO Scientific Committee, formed by the Ministry, has taken, there are some vague statements like "In the light of the current information", or "... it is expected not to result in risk for human and animal health". According to the experts, the reason for these unclear statements is avoiding the legal complaints of the consumers because of the harms that can be caused by the GMOs<sup>69</sup>.

## **VI. Conclusion**

To summarise the current situation in Turkey it can be said that while boasting as a self-adequate country in agriculture, Turkey has become dependent on other countries as a result of wrong agricultural policies. For example, by the import of GMOs - Turkey as the third biggest sugar beet producer- the production of sugar beet is under pressure because of the law and quotas reinforced by the government. It is planned that the sugar deficit should be covered by the suspicious imported corn. Some arguments are taking place because of the increase in the quota of the sugar produced from corn used in many products like bread, soda or chocolate. This is a normal outcome as in some European countries (France, the Netherlands and England) it was banned and in the States the production quota was dropped from 10% to 2%. The quota was increased 50% by the cabinet (31 January 2011) and is now 15%. The limit is 2% in the States. This has no accordance with any EU legislation, and creates enormous difficulties for the sugar beet producers. A different option rather than a

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<sup>69</sup> <http://www.euractiv.com.tr/cevre/article/gdo-lu-25-urune-turkiyeden-ithalat-izni-011369> (22.7.2011).

product manufactured in domestic lands leads to socio-economic disputes, in addition to this; there are many studies on the adverse effects of sugar produced from corn.<sup>70</sup> It is even more confusing to let the import of genetically modified sugar beet since 2010.

Although Turkey can be regarded as a conservative country considering the innovations, when the subject is technology, the situation in this case is just the opposite. However, the socioeconomic structure of the society is approaching technology without questioning the harms while exploiting it with an indifferent attitude. Therefore, it is very important to enlighten the society clearly about the advantages and probable disadvantages of technology.

We cannot say that there is a widespread argument in our country about the GMOs. It is possible to say that these arguments are just limited to some media coverage of a handful TV shows and newspaper articles. Yet, ordinary citizens should be informed as it is a subject matter concerning the well-being of the infant to the adult, and the farmer to the tradesmen. Nevertheless, new regulations were put into force without mentioning these concerns, and using GMOs are allowed especially in the animal feed, yet, not directly for human consumption. This is not the preference of the general population. In recent years, the current government let some anti-environmental projects such as nuclear or hydroelectric power plants claiming that it would lead to the development country. These kinds of preferences include a political outlook. The ecological balance should be taken into consideration, and as we all know technological advancements cannot re-form it in case it is lost. I strongly believe that we have to be very careful as GMOs bring along many proved risks, and precautions should be taken to a further step from labelling.

Certainly, it is not wise to reject technology altogether from the point we have reached. However, as we do not take into account that, this order has not been created by the mankind, and not knowing the ways of compensation, we should respect the existing order; if you build your house near the river bed, you will lose it one day.

The Enlightenment Age's consumption and prosperity greed resulted in the disappearance of the civilizations in America. I hope this techno- century should not bring the end of the world.

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<sup>70</sup> Özdemir, Şemsinur; - 19 Mayıs 2009, Salı, İSTANBUL, Zaman, <http://www.resmi-gazete.org/haber/5093973/hazir-gidalardaki-fruktoz-asiri-kilo-aldiriyor.html> (11.6.2011).

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