*Role of the environmental ethics in creating the bio-policies: genetically modified organisms**

Papel de la ética ambiental en crear bio-políticas: organismos modificados genéticamente

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Abstract

When taking decisions on environment, being satisfied only with the science and technology without considering the ethical and philosophical problems will create more problems than it solves. The fundamental assumption in this study is that the environment policies should be determined by incorporating the views of as different stakeholders as possible and in political circles within an ethical framework. For example, by using biotechnology, it is possible to cultivate, reproduce and genetically modify the organs, tissue and cells of vegetables. Despite strongly opposed by environment organizations, anti-globalization groups, some academicians and politicians due to their negative effects on natural world, Genetically Modified Organisms are promoted by some agricultural producers and manufacturing companies as well as by some political groups. The importance of referring to the environmental ethics approaches in making the bio policies is understood when we consider that although claims focus on the idea that the reproduction of the genetically modified species will reduce famine in the world, heal diseases and ensure continuity in agriculture, the available data indicate that the main purpose is to control the sectors like seed, food and medical products.

Key words: environmental, ethics, policies, biotechnology, genetically modified organisms.

Resumen

Al tomar decisiones sobre el ambiente, contentarse sólo con la ciencia y la tecnología sin considerar los problemas éticos y filosóficos creará más problemas de los que resuelve. El supuesto fundamental de este estudio es que las políticas ambientales deberían determinarse incorporando, en lo posible, las visiones de las diferentes partes interesadas y en círculos políticos dentro de un marco ético. Por ejemplo, a través de la biotecnología es posible cultivar, reproducir y modificar genéticamente los órganos, tejidos y células de los vegetales. A pesar de la fuerte oposición por parte de las organizaciones ambientales, de los grupos antiglobalización, de algunos académicos y políticos debido a sus efectos negativos en el mundo natural, los Organismos Modificados Genéticamente son promovidos por algunos productores y compañías agrícolas, así como por algunos grupos políticos. La importancia de referirse a los enfoques de la ética ambiental en el diseño de bio-políticas se entiende cuando se considera que, a pesar de las afirmaciones que se centran en la idea de que la reproducción de especies modificadas genéticamente reducirá el hambre en el mundo, curará enfermedades y asegurará la continuidad de la agricultura, los datos disponibles indican que el propósito principal es controlar sectores tales como el de las semillas, los alimentos y los productos médicos.

Palabras clave: ambiental, ética, políticas, biotecnología, organismos modificados genéticamente.

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Introduction

At the beginning of the 21st century, we can easily say that the people face unprecedented environment problems and even the greatest mass destruction danger. While natural resources decrease day by day together with the increasing population, the wastes of the productions to meet the increasing consumption make our world uninhabitable. In this case, we need to face the truth that human beings, encountering a dangerous future, have to take and implement important decisions urgently. However, considering that many of today's problems are the result of the good faith decisions of the former generations, first we need to find an answer to the question of how the best decisions should be made.

When taking decisions on environment, being satisfied only with the science and technology without considering the ethical and philosophical problems will create more problems than it solves. The reason is that the environment is a huge and integrated phenomenon that cannot be managed only with the tools provided by science and technology. It is the boundless quality of environment what lies behind the search of answers to some questions originating from abstract sciences like epistemology and metaphysics to break down the benefit of environment and the danger created in the environment.

Today, the highly controversial subject of the "Genetically Modified Organisms" should be evaluated within the framework of the environmental ethics approach that systematically examines the moral relations between the people and their natural environment as the scientific answers given for the solution are conflicting and contain high risk factor.

The reasons for modifying the genetics of the agricultural products are hidden under an ethical cover by linking it to the fight against poverty. Is the fact so innocent? Or may the World Trade Organization be partial in its decisions because 45 % of the corn production, 85 % of the soya bean production and 76 % of the cotton production on the US soil are genetically modified products? Is it appropriate to claim that these data are scientific despite the fact that at least a quarter century is needed to verify the correctness of the data obtained from the laboratory studies? Or is there a reasonable explanation for impeding the exports of the countries deciding, based on import freedom, not to import genetically modified products due to unfair competition?

The fundamental assumption in this study is that the environment policies should be determined by incorporating the views of as different stakeholders as possible and in political circles within an ethical framework, not at the science laboratories, at the management boards of companies or within the bureaucratic structures of the governments.

1. Genetically modified organisms and fight against poverty

One of the most important points based by the views defending GMO is that it is necessary to increase the species and production quantities by modifying the genetics of the vegetables and animals to meet the ever increasing the food requirement in the world. On the other hand, many ecologists state that the famine problem in the third world countries is caused by the unplanned use and the unfair distribution of the production capacity, not by the lack of production potential and they add that the existing agriculture capacity is sufficient for meeting the requirements of the world population. According to the 1990 report of the United Nations Food and Agriculture Organization (FAO), the increase

in the cereal production is 50 times higher than the population growth. However, depending on this data, it is not possible to claim that there is no famine problem in the world. Therefore it is necessary to determine the origin of the problem first.

When we look at the countries suffering from famine, we notice that all of them are former colonies of the western countries. The agricultural economies of these countries are managed for the benefit of other countries. Many countries, even after winning their independence, had to implement export based agricultural policies as they struggle with the economic problems like external debts. That is they had to produce food to bring foreign currency instead of producing food to feed the people. In many countries suffering from famine, agriculture is made to grow products for the developed countries like coffee, cotton, banana and cacao, not to feed the local people.

On the other hand, it is necessary to accept that the wrong consumption models should be changed before claiming that the single way to meet the ever increasing food requirement in the world is to modify the genetics of the organisms. According to the data of the American Agriculture Department, Americans waste every year more than 25 percent of the produced food. According to the same research, the amount of the waste food in 1995 in the USA is about 43 million tonnes. When we assume that a person consumes 1,5 kg food a day in average, 4 million people could be fed if only 5 percent of the waste food could be recycled. It is understood that it is not possible to fight against poverty by just providing production increase after the projects started in 1960s by the Rockefeller Foundation in countries like India and Mexico under the name of "Green Revolution", the purpose of the projects being claimed as to substantially solve the famine problem and to provide sufficient nutrition by the improved seeds. In this context, when we look at the data of the World Development Report published by the World Bank in 1993, we see that, contrary to the expectation, poverty climbs up following the use of modern techniques in agriculture. In the concerned report, it is stated that in 1976 the average income per capita in the countries with low income was 2,4 percent of the high income countries and this rate was 2,3 percent in 1982 and 1,9 in 1988. Another result of this study demonstrates that the national income per capita growth in the countries of low and medium income group from 1980 to 1990 was 52 per cent of the developed countries. Therefore, we can state that the reason of the famine in the world is the unfair distribution of food and unplanned agriculture policies, not the lack of sufficient food. In the fight against poverty, you may think that there is no damage in providing fair distribution between the different geographies of the world, between the different income groups of the same country and between different generations. As the cost of the serious increases in the agricultural production achieved by modifying the genetics of the organisms, we can list the increasing environmental pollution, global warming, extinction species and many other environment problems. We will elaborate on this interaction in the following section, however, I would like to end this section of the study by reminding of the phrase: "**No costless gain is possible in nature**".

2. Effects of the genetically modified organisms on natural world

Today biotechnology has a wide application area including medicine. For example, by using biotechnology, it is possible to cultivate, reproduce and genetically modify the organs, tissue and cells of vegetables in purified artificial environment. Therefore, it is possible to claim that biotech-

nology brings solutions to problems that cannot be solved by conventional methods known and helps the realization of quality production in both quantitative and qualitative sense. Although many countries, including ours, became signatory states, except a few countries, to the Convention on Biological Diversity which took effect in 1998 in order to ensure protection of all elements of biological diversity, sustainable use and fair and just share of the rights to arise from their use, it is believed that biotechnology today has a broader area of use than defined. The reason is that during the course of time, the concerned technology started to be mainly used by the "life science" companies. On the other hand, these companies claim that their works will reduce famine in the world, heal diseases, effect human health positively and ensure continuity in agriculture. However, when we look at the works done in reality, we see that the main purpose is to control and create monopoly in the sectors of seed, food, medical products and fibre products.

Today over four dozens genetically modified products are under cultivation over an agricultural area of 70 million acres US. Almost all of the food and fibre will be genetically modified in US in the next 5-10 years. These include soybeans, corn, potatoes, canola oil, cotton seed oil, papaya, tomatoes and dairy products. In addition, 500,000 dairy cows are being injected regularly with Bovine Growth Hormone (rBGH) produced only by one company in the world. Most supermarket processed food items include genetically modified ingredients and tests verify this fact. In addition several dozen more genetically modified crops are being developed and will soon be released into the marketplace. The results of the genetical engineering applied to food and fibre are uncertain and dangerous for the future of the animals, human beings, environment and organic agriculture. As stated by Dr Michael Antoniu, English molecular scientist, gene- splicing has resulted in the unexpected production of toxic substances. Toxic substances are seen especially in the genetically engineered bacteria, yeast, plants and animals. In 1989 a genetically engineered type of L-tryptophan, a popular supplement, caused the death of 37 Americans and permanently disabled or afflicted more than 5,000 others with a potentially fatal and painful blood disorder (eosinophilia myalgia syndrome ("EMS"). Showa Denko, Japan's third largest chemical company, had for the first time in 1988-89 used genetically engineered bacteria in an over-the-counter supplement. It is believed that the bacteria somehow became contaminated during the DNA transfer process and this caused the people to become ill. That's why Showa Denko has paid out USD 2 billion in damages to people who caught EMS. In 1999, a detailed study carried out by Rowett Institute scientist Dr. Arpad Pusztai published in the English press revealed the damages of the genetically modified potatoes. Laboratory tests determined genetically engineered potatoes, spliced with DNA from the snowdrop flower (grown in Europe and blooms before the snow melts) and a commonly used viral promoter, the Cauliflower Mosaic Virus (CaMv), are poisonous to mammals. These potatoes that are significantly different in chemical composition from regular potatoes, damaged the vital organs and immune systems of rats. Most dangerous of all is that a severe viral infection took place in the , damage to the rats' stomach linings that was definitely caused by the CaMv viral promoter, a promoter used in all genetically engineered products.

Genetically Modified Organisms also posses the risk of causing cancer as well as its toxic effect. In 1994, the FDA approved the sale of Bovine Growth Hormone (rBGH) by a company and injection of this hormone into dairy cows despite all oppositions by the though scientists. The people consuming foods produced from the milk of these cows have high risks of developing breast, prostate and colon cancer. In 1998, scientists

appointed by the Canadian government found the prostate cancer and thyroid cysts possibilities in the experiments on rats. As a result, in the beginning of 1999, the government of Canada banned the use of this hormone in dairy cows.

When gene engineers splice a foreign gene into a plant or microbe, they link it to another gene and this is called an antibiotic resistance marker gene (ARM). This determines if the first gene given remained successfully in the host organism. However, some researchers warn that these ARM genes might unexpectedly recombine with disease-causing bacteria or microbes and state that diseases that cannot be cured with traditional antibiotics might emerge. For example new strains of salmonella, e-coli and campylobacter are some of these diseases. Therefore European Union authorities are currently considering a ban on all genetically modified foods containing antibiotic resistant marker genes. The fact that the Genetically Modified Organisms are resistant against pesticides as well as antibiotics causes the concerned organisms to indirectly damage agriculture. The studies showed that the American farmers growing genetically modified products used more pesticides than the traditional farmers. Another characteristic of these antibiotic resistant plants is that they do not get damaged by the pesticides. Therefore the farmers are able to use plenty amount of pesticides and the plants are not damaged from that. Besides some leading companies in biotechnology do also manufacture and sell toxic pesticides. Therefore it is said that these companies are genetically engineering plants to be resistant to herbicides that they manufacture. Moreover, some researchers from Cornell University found that pollen from genetically engineered corn was poisonous to Monarch butterflies and claimed that this type of products would also damage the beneficial insects and beneficial soil microorganisms as well as butterflies. The truth behind these claims is consolidated by the fact that similar claims were suggested by the researchers conducting experiments at Michigan State University several years ago. In addition to all of these, the severity of the problem is clear when one considers the fact that the genetically modified pollens are transferred from the areas where the genetically modified products are in cultivation to areas where both organic and regular agriculture are done by wind, rain, birds, bees and pollen-carrying insects and that the DNA of the crops there are damaged too.

3. Multinational companies and country policies

Despite strongly opposed by environment organizations, anti-globalization groups, some academicians and politicians due to their negative effects on natural world, Genetically Modified Organisms are promoted by some agricultural producers and manufacturing companies as well as by some political groups. Genetically Modified Organisms deserve to be called as Frankenstein food as they have unwanted effects on the ecologic balance, increase foreign dependency and leave the agriculture sectors of the countries to monopoly companies According to the figures given by Pimentel, an ecologist, of the total energy spent for the field, 32 % goes to nitrogenous manure, 28% to agricultural equipment fuel, 15 % to the construction and maintenance of these machines, 11% to the electrical energy used for various works and 4% for drying the product. Subsequent inputs are transportation and distribution, potassium fertilizer and seed with 2% share each. Pesticides, insecticides, irrigation and labour cover less than 2% of the total inputs. As seen here, the industrialized agriculture contains very small amount of human labour among total inputs and therefore it should be called as agriculture industry rather than farming.

The following table (No.1) from the study of Prof. Dr. Mehmet Öztürk, a lecturer at the Molecular

Biology and Genetics Department of the Bilkent University, show that the production amounts of GMOs incredibly increased after 2000s. This high amount of production is an evidence of the increase in demand and consumption. Apart from that, the severity of the situation is clearer when we consider the fact that seed market of the genetically modified agriculture and feed products is under the monopoly of 8-10 companies in the world. Therefore GMOs are actually a technique of dominance. Patent right is the most important tool providing this right. The basic profit model of the companies conducting these works is based on collection of payments for patent rights, therefore, GMOs can be easily patented as technique and product by highlighting the technique in particular. However, patent is a method applied to protect the inventions that have innovative properties and industrial applicability. That is, in genetical modifications, only the technique creating the change can be patented. Granting patents to genes existing in the nature is not a technical practice and therefore it can only be called as biological piracy.

PRODUCT	1996	2001	2002
Soya	0.5	33.3	36.5
Corn	0.3	9.8	12.4
Cotton	0.8	6.8	6.8
Canola	0.1	2.7	3.0
Potatoes	0.1	0.1	0.1
Marrow	0.0	0.1	0.1
Papaya	0.0	0.1	0.1
TOTAL	1.7	52.6	58.7

Table No. 1. Transgenic plant agriculture in the world (mHA)

3.1 USA

For more than the last ten years, agriculture of genetically modified products has been conducted in the USA in an area of millions of hectares. It is known that in 2004, 45% of the planted corns, 85% of the soybeans and 76% of the cotton have been genetically modified. USA has become a better market for the genetically modified products as the American people are not sufficiently aware of the subject and they don't establish cultural links with their food. Europe views the subject from the framework of ethics and safety, while USA strongly condemns Europe for starting unfair competition and even submits complaints to the World Trade Organization.

When the case is examined within the framework of the available data, it is observed that USA is not baseless in its reactions against the situation. Member countries of the European Union are the 4th biggest market where USA based agricultural products are marketed. According to he data of the United States Department of Agriculture (USDA), the export from USA to EU in 2005 was 7 trillion dollars and this equals to 12% of the total agricultural products import from USA. Majority of the import products consists of soybeans, tobacco, animal feed and corn gluten. USA is also an importer of many products like cheese, oil, wine and beer. 13 trillion USD is paid for the export of these products from EU. Before 1997, 4% of the corn grown in USA was exported to bring an income of 300 million dollars, while this figure dramatically decreased after 1997. As of 2004, the share of EU in USA's corn export fell below 0,1 percent. For example Spain purchased in 1998-1998 one tenth of the amount it purchased in the previous year, while Portugal had no imports. A similar case is seen with the export of the soybeans. Soybeans export, totalling to 9,8 million ton in 1995, decreased to 3,6 million ton in 2004. This fall in the export amounts of USA was good for Brazil which exports the same products for cheaper and increased its export percentages. For example agricultural export reached to 8,9 million ton in 2002 from 3 million ton in 1995.

Although it was promising that GMA was banned in Mendocino County within the California, possibly the most environmentally sensitive state of the United States, and then some restrictions were brought for the GMO plants in Trinity and Marin in the same state, it was evident by the refusal of the law proposals on the ban in Butte, Lake, San Luis Obispo, Humboldt and Sonoma that the case in the USA couldn't be easily changed.

3.2 European Union

With its council directive no 90/220/EEC (see Annex 2) in 1990 European Union determined for the first time the conditions for conducting R&D works regarding GMOs in a restricted environment, making some field experiments and starting cultivation. After that EU underlined the importance given to the subject with more than twenty commission resolutions taken between 1993 and 2010. Although with the council resolution no 258 in 1997, it was requested to label the 14 products allowed to be genetically modified and the side products containing them, the use of GMOs as feed and/or food was restricted by the commission's resolution no 1829/2003 (see Annex 3) due to the public reaction.

As known, the fact that the commission resolutions are binding on the member countries which have great sensitivity on GMOs. This is caused by the fact that the Europeans have more chance to reach correct information and that they have a habit of establishing cultural links with their food. In many European kitchens, priority is given to local and traditional types. The fact that the traditional structures like bakery, butcher and grocery still exist in European countries beside the supermarkets explains the reason for them to act more septic against the genetically modified products than the Americans. For example, the use of Monsanto corn (MON810), the only permitted genetically modified product in France, was banned by the French government in 9 February 2008. The data of the survey conducted throughout EU to find out the views of the European public on GMOS show that most of the people living in the European countries find genetically modified products risky and unusable. The countries opposing with 65 percent to GMOs are Italy, Ireland and Greece, while the same rate goes down to 30% in England, Austria, Holland and Finland. Today for the European Commission, with the influence of the public will, containing any genetically modified substance is the evidence that the concerned product is risky for the human health and/or the environment. Therefore, the commission resolution no 1829 dated 2003 requires in addition to food labelling that each substance used in production should be examined to find out whether it contains any genetically modified item and cultivation, import and processing periods should be controlled even the final product is not a genetically modified products. Besides, it is also stated that it will be appropriate that the EU risk evaluation should be made by a single agency. In this context, the risk evaluation and production and/or consumption approval in the European Union are done by European Food Safety Authority (EFSA).

3.3 Turkey

Turkey has a special position in terms of genetic diversity of plants. It is stated that Turkey, with a surface area of 78 million ha, has 10.754 taxons (Vural, 2003). This figure is only a little less than the amount throughout Europe. Two of the gen centres known as the origin of the living species, Mediterranean and Near East Gene Centres, intersect in our country (Vavilov, 1994). In addition, the fact that our country is the centre of three different vegetation geographical regions (Iran, Mediterranean and Europe – Siberia) and Anadolu is located on the migration and hosted many civilizations during the course of its historical development helped in the increase of diversity. Herbaceous plants like peas, wheat, rye, flax,

lentil, chickpea, beet, onion types, clover, trefoil and woody plants like pistachio, pear, vine, apple, plum and pomegranate originate from Turkey. Our country is also rich in terms of the farmer types of the cultivated plants as well as of the number of plant types. Besides, around 35% of the 10.754 taxons are endemic in our country which has intense endemism. The most endemic areas are Western, Central and Eastern Toros Mountains, Amanos mountain, the region along the south east of the Van Lake, areas near the border of Georgia in the North-eastern Anatolia, Gümüşhane and Erzincan vicinity in the Eastern Passage region, Çankırı and Kastamonu vicinity in the Northern passage region, Salt Lake and surroundings in the Central Anatolia, Uludaş and Kaz Mountains.

Despite all favourable conditions of our country, it is worth being concerned that we now import many agricultural products and couldn't reach the desired level in export. Although there is public reaction on the genetically modified import products, when we compare to the EU legislation we can say that the developments in Turkey regarding the production, export, import of these products are doubtful and therefore open to manipulation. There is no answer yet to the questions in the minds of the citizens because of the discussions taking place for around 1 year on the regulation related to the genetically modified products which took effect in 26 October 2009. Some stakeholder groups including the Turkey Food Industry Employers stated that products containing genetically modified organisms had been imported in Turkey for years and the new regulation could change this situation. Some anti-government environmentalist groups and opposition parties emphasize that with the new regulation the Transgenic Plant Agriculture in our country will increase and the import of these product will be easier. However, it can be said that the claims of the first group contain more truth when we consider that this draft law was prepared for harmonization with the EU legislation and Senator Chuck Grassley, member of the Finance Committee of the US Senate, reacted immensely to the regulation. It is obvious that there is confusion about the system now. Therefore, in order to be able to resolve the matter fully, it will be essential to unite 4 Research Laboratories and increase their capacity, to establish the bio security information network, to increase standardization criteria for risk assessments and most importantly to submit pure information to the public in time.

3.4 Other countries

3.4.1 Australia

Starting from the beginning of 2003, some states of Australia other than Queensland used to ban the cultivation of transgenic plants. However, in the late 2007, New South Wales and Victoria states abolished the bans unlike South Australia which continued the ban on the cultivation of transgenic plants. West Australia abolished the ban in December 2008. Tasmania extended it until November 2014.

3.4.2 Canadá

In 2005, a committee in Prince Edward Islands (PEI) drafted a bill to ban the transgenic products in the state. However, the bill was denied. The use of transgenic products in PEI has been rapidly increasing since January 2008. Canada is one of the countries, where transgenic canola is produced most.

3.4.3 New Zealand

Products containing genetically modified organisms are not grown in New Zealand. Also it is against the law to use medicines containing genetically modified living organisms.

3.4.4 Zambia

Zambia government started a project to increase awareness on the benefits of bio ecological works including transgenic plants and to change the negative attitudes of the public.

4. GMO and environmental ethics

At the beginning of the 21st century, we can easily say that the people face unprecedented environment problems and even the greatest mass destruction danger. While natural resources decrease day by day together with the increasing population, the wastes of the productions to meet the increasing consumption make our world uninhabitable. In this case, we need to face the truth that human beings, encountering a dangerous future, have to take and implement important decisions urgently. However, considering that many of today's problems are the result of the good faith decisions of the former generations, first we need to find an answer to the question of how the best decisions should be made.

When taking decisions on environment, being satisfied only with the science and technology without considering the ethical and philosophical problems will create more problems than it solves. The reason is that the environment is a huge and integrated phenomenon that cannot be managed only with the tools provided by science and technology. It is the boundless quality of environment what lies behind the search of answers to some questions originating from abstract sciences like epistemology and metaphysics to break down the benefit of environment and the danger created in the environment.

As stated in the writings of Rachel Carson, when we consider the environment problems only as technical problems waiting for solutions from some specialism areas, the risk ratio to be faced will increase. The reason is, as stated above, the coverage area of the environment problem is so large that it cannot be covered by any branch of science. As Carson points out, the contamination caused by insecticides concerns agriculture, various branches of biology, chemistry, medicine, economy, political science and law. Therefore, finding an urgent technical solution to the environment problems leads only to the narrow, limited and temporary elimination of the problem. We will see different comments when the scientific objectivity is discussed. However, even when science is considered at the simplest way, we face ethical values. Science requires reduction of the number of assumptions by scientists, quitting partialness, questioning the correctness of the results they reach and limiting these results with the findings in hand. In this sense, scientific method has a real ethics securing an unbiased, correct and rational result. It is possible to talk about the reliability of the environment problems as long as the science practice is in agreement with this ethics. On the other hand, it would be wrong to think that the environment problems can be solved within the framework of an abstract ethics theory. It will be appropriate to verify this result by a philosophical slogan: Science without ethics is blind, ethics without science is futile. Ethics, in the simplest definition, is a custom science. The word ethics in Greek is derived from the word ethos ("custom"). Ethics as a branch of axiology is one of the four main branches of philosophy. It tries to understand the nature of the concept of morals to distinguish between the right and wrong. In the traditional understanding of ethics, human is in the centre. It deals with the relations among the individuals and relations between the individual and the society. Human beings are not responsible for respecting environment. However, during the course of time, the ethical foundations of human behaviour are reflected in different scientific branches. For instance ethical

philosophy is referred to in anthropology, while associating a culture with the other and distributing scarce resources in economy, defining power in the political science, legalizing principles and rules in law, determining unethical behaviour in criminology, treating unethical behaviour in psychology and protecting the natural resources in ecology.

Environmental Ethics assumes that the moral rules manage and has to manage the behaviour of people against the natural world. Therefore, the Environmental Ethics theorem has to explain the responsibilities of the people towards who and what, and to indicate the justified reasons of these responsibilities. The expansion of ethics to cover environment is a result of its process spent in ecological evolution. Therefore, Environmental Ethics can be defined as a philosophical approach emerged with the adaptation of the science of ethics to ecological crisis. Environmental Ethics discusses whether nature has a meaning and definition other than defined by the human beings. Within the framework of the works done in this context, 3 approaches were prominent in the western world: Stewardship, Utilitarianism and Respect of Life.

In the Stewardship approach, which is a Christian tradition, it is argued that the nature is created by God for human beings who have a stewardship role and responsibility to ensure the continuity of nature. However in the 16th and 17th century, with science being more prominent, the mystical side of the nature-human relations was rejected and nature started to be defined as the servant of nature. For example, Francis Bacon argued that nature should only be in service of human beings needs and expectations of human beings should be above all. This thesis of Bacon can be given as a strong example to anthropo-centric approach. This is a dualist approach suggesting that nature has a value as it meets the needs of human beings only, which is against the eco-centric approach. Therefore, it doesn't conform to the Sustainable Development approach which we will discuss later.

Utilitarianism approach evaluates the activities according to their results. For Utilitarianism, activities are not valuable if they don't achieve the intended results even if they were conducted in good faith. Ideal results should be reflected for human beings as satisfaction, happiness and improvement. Jeremy Bentham, considered as the father of the Utilitarianism approach, summarizes the subject as the maximum happiness to maximum people. This approach, just like the stewardship approach, conflicts with the principles of the sustainable development understanding as it brings focus on the absolute happiness of only the maximum people currently available and ignores the minority and/or future generations.

The third approach focuses on the respect of life principle and only on the needs and expectations of the currently living people and ignores the non-living natural objects in a sense, therefore none of these three approaches emerging in the beginning of the 1940s made much echo. However, we cannot deny their importance of these discussions for creating a basis to other researches which will develop environmental ethics. For instance, when the extensively discussed issue of "Genetically Modified Organisms" is evaluated within the framework of ethical approaches, it can be said that the current applications do not match with none of the environmental ethics approaches as the concerned modifications on the genes of the vegetative and animal organisms started to pose great risks for both humans and the modified species.

5. Conclusion

Governments are integrated structures assuming management. Undoubtedly, as a result of the re-

placement of management by governance, inclusion of the concerned stakeholders to the policy making process has started to gain importance. On the other hand, the healthy continuation of governments can only be possible with the public support they receive. Therefore, governments have to take the expectations and priorities of the people into consideration and reflect it to the decision making processes. However, for the people to be able to take initiative, it is essential that the correct information is produced and shared with people. Therefore, technical works should be carried out by independent bodies in the process of making the bio policies. The concerned works can be listed as follows:

- Activating resource management
- Establishing a contamination control agency
- Creating regulatory policies
- Conducting environmental impact assessment
- Creating specialist advisory committees
- Using rational policy analysis techniques

Activating resource management: resource management is a method that was applied by Gifford Pinchot in USA in the beginnings of 1900s as a reaction to the waste of natural resources and that targeted sustainable use of renewable resources. In the beginning, this method was used by the Forest Office of the Department of Agriculture and then given autonomy to reduce the effect of the governments and used in different services where specialism was important (Land Use, Natural Life and Fishery, Ocean and Atmosphere Management). GMOs should be given special attention while making resource management because of the toxic effects caused by the genetical modification of animal and/or vegetative organisms and direct and indirect effects on soil, water and atmosphere by the pesticides and fertilizers that are produced in harmony with the herbicide and fertilizer resistance structures of the genetically modified species.

Establishing a contamination control agency: central and/or local administrations try to bring the contamination levels below the international danger thresholds by establishing various units aiming to fight with contamination. The first of concerned agencies was established in England in 1864 to determine the contamination caused by Alkali. After 1970s, many developed countries established agencies under different names but for the same goals to start contamination control.

Creating Regulatory Policies: Today biotechnology has a very broad area of practice including medicine. Therefore, it is not possible to reject the concerned technology as a whole. However, it is necessary to control the seed, food, medical products and fibre sectors in the world by using biotechnology, to establish mechanisms to prevent monopoly and accordingly to bring forward legal sanctions.

Conducting environmental impact assessment: it is the determination of the possible damages to be given by all kinds of investments that suggest the use of biotechnological techniques that provide the cultivation, reproduction and genetical modification of vegetable and animal organ, tissue and cells in pure artificial feeding environments, the measures to be taken to eliminate these damages and production efficiency. Besides, within the scope of the Environmental Impact Assessment, all scientific data on the investment to be made are evaluated and its possible social added value is calculated. Actually a separate committee has to be established to perform the concerned task and this committee should determine the effect of each investment on the balance between the economic growth and the ecological sustainability.

Using rational policy analysis techniques: it will be appropriate to use some financial analysis models before starting ethical evaluations as well as the scientifically integrated work. We

see that first works on this matter were done in 1950s and that the price-benefit analysis were adapted to water resources management. Today different models are developed and it is known that risk analysis, decision analysis and estimation methods are frequently used as well as the price-benefit analysis. The following process is followed if the price-benefit analysis is used for policy selection:

- Options as alternatives to what shouldn't be done and indicating what should be done are listed

- Damages and benefits of each option are determined and listed. It is not necessary that these benefit and damages have a market value.

- A shadow budget is prepared by determining the financial equivalence of each damage and benefit. As the preparation of this shadow budget requires huge amount of technical knowledge and experience, heavy work is required by specialists from different disciplines because some subjects under assessment have a financial value with market equivalence and some don't. For example, when making an analysis on the construction of a dam, the cost of the construction and the kilowatt/hours value of the energy generation given as the final benefit can be easily determined. However, it is very difficult to estimate the financial equivalences of the problems to arise from the prevention of the free flow of a river and the psychological and sociological factors that the individuals living in the places to be destroyed may face.

- The future values of the benefits and damages that will take place in the future are determined and reflected to present time with certain reduction.

- For each option, total damage is deducted from total benefit to reveal the net profit of the option.

- The option with highest profitability is accepted as the policy to be applied.

The importance of referring to the environmental ethics approaches in making the bio policies is understood once more, when we consider that although claims focus on the idea that the reproduction of the genetically modified species will reduce famine in the world, heal diseases more easily and ensure continuity in agriculture, the available data indicate that the main purpose is to control the sectors like seed, food, medical products and fibre.

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