Genetic engineering: scientific wonder or environmental scourge? essay

Business, Industries

After the World War I, the decrease in population happened in most of the countries all over the world.

This happening caused somehow, a good effect because of the decreased in population but it also caused a big negative effect due to lack of manpower. Due to this result, the baby boom happened. It is the years of producing a lot of babies, thus, increase in population has not been stopped and because of that, the food crisis provoked. The question that until now has been hanging up is that can the global hunger be solved. A lot of statistics and studies are saying that in less than three decades, the family of man will sit down hungry to the world’s banquet table.

Hunger will arise. Even the nourishment of the people will still be a problem because for every second, more babies are born to strain the global food resources. Because of this big problem, the world of agriculture was alarmed and as response, researches on agriculture are improved and widened. Biotechnology is a systematic process where it focuses on the researches of private and non-private or even the government’s agencies to help solve the problems that are related to improvement of quality and quantity of crops and livestock. Generally, biotechnology is the science that deals with the modification of natural and biological processes of living organisms but not necessarily the genes (Heinberg, 1999). This means, that the natural methods for quality improvement are part of biotechnology.

In some manner, genetic engineering can be seen as potential profit-making life industry due to the profit that will gain by the multinational companies and also it can be seen as the solution for the global hunger. Looking at its

negative side, genetic engineering is also a threat to the whole humanity and the biodiversity. With this issue, the social and economic concerns are also affected. The first question that should people bear in mind is, “ Can genetic engineering feed the world?” Some people believe in the idea that through genetic engineering the food crisis can be solved.

This belief is specifically made by researchers and some scientists. These people are the proponents of genetic engineering who promote the technology as the solution to the global hunger arising from increasing population, decreasing land for cultivation and dwindling harvests (Mae-Wan Ho, 1998). The positive records or the benefits that can be obtained from using GMO are already established.

According to C. Ford Runge from U. S. Biotech, he found that in 2002, half of the $40 billion in the value of harvested maize, soybeans cotton and canola was from engineered crops. Through genetic engineering, there is an improvement in agronomic, environmental and product quality traits of the crops. In the agronomic traits, the yield of varieties, increased stalk strength and cold and drought tolerances are improved and developed while in the environmental traits, the development of low phytate corn and soybeans that when digested by livestock, produce lower levels of phosphorus in waste, which in turn means less harmful run-off going into the country’s water supply. Also, the product quality traits are enhanced.

It includes the nutritional improvement such as better digestibility of wheat, more beta-carotene in potatoes and reduced transfat acids in crop oils

(McConnell, 2003). In the Philippines, among the noted researches in genetic engineering are the control of ripening in papaya and Carabao mango and development of papaya resistant to ringspot virus. The research on the control of ripening in papaya and mango is reported to have brought significant ease to the one of the country’s principal problems in tropical fruits exportation. Current statistics show that the technology in delaying the ripening of genetically improved papaya and mango radically reduced the postharvest losses by 70%. With this technology, Philippine papaya and mango could now reach their farthest destinations in good marketable quality and appearance.

Researches also confirmed that the fruits with longer shelf life could be transported by sea freight without any need for extensive cooling systems, which means reducing the local exporters’ marketing expenses. On the other hand, the development of ringspot virus tolerant papaya really helped the local farmers because rinspot virus is regarded as the most dreaded disease infecting papaya and crops belonging to the cucurbit family (Fresco, 2003). The other benefits of GMO are the following: 1.) Bt Crops, or” insecticides crops” that kill pests. Bt crops have been genetically modified to act like real insecticide plants and to kill the pests that eat them. They are supposed to lead to the disappearance of specific pests in the fields, and therefore to lead to better yield, and consequently to decrease in pesticide use. This works through producing a poison lethal for some insects. When insects attack and eat the plant, they also eat the poison that will kill them within 2 to 4 days.

2.) Roundup-ready crops or crops tolerant to specific herbicides. Roundup-ready crops are modified to be tolerant to specific herbicides. The foreign genes of the roundup-ready crops come from the petunia flower or from the Agrobacterium sp., which naturally overproduces the element tolerant to the herbicide action. 3.) Crops richer in nutritional properties. Feed for livestock and human food are genetically modified to improve their nutritional qualities.

Such improved feed reduces the need, thus, the cost, for feed supplement. In the case of iron, some incorporated genes increase the plant’s ability to take up iron from the soil, while other accumulates iron in the seeds. In the Philippines, the golden rice is developed to add more iodine (Burkhardt, 1997). Csiro laboratory in UK is currently performing research on transgenic sulphur Lucerne for sheep (Ye, 2000).

4.) Crops resistant against viral, bacterial and fungal infections. Tomato plants have been genetically modified to be resistant to the attack of the Tobacco Mosaic virus which destroys their leaves and the transgenic rice IR72 is under research and has been genetically engineered with agene known to be resistant to bacterial blight which is the cause of one of the most destructive diseases of rice. 5.

) Crops surviving under specific or extreme conditions. Cultivated with less soil, less water, without insecticide or chemical herbicide are the focuses in developing the Super-Rice. The transgenic plant will produce more grains, and will theoretically increase the yield by 60% compared to the yield of

existing varieties. One of the latest good records of genetic engineering is the on-going research regarding the edible vaccine. It is developed by the scientists to cure the Norwalk Virus that is very deadly especially on the children’s condition.

It caused dehydration in the case of the children. Because injectable vaccines are costly to deliver and needles can transmit diseases, an edible vaccine might offer a better approach in fighting Norwalk Virus that is mostly occurring in developing countries. It works through the added capsid protein that forms the shell around diarrhea-causing Norwalk virus in the spuds of the potatoes. When the potato is eaten, the product could stimulate the body’s immune system to create a flood of antibodies then it would prevent the latching of Norwalk virus in the cells lining the intestines, which causes diseases. In the testing of the results of the edible vaccine, the researchers also detected some antibodies in the feces of the people who received the edible vaccines. This people are the consumers of genetically altered potatoes and who received the vaccines.

That indicates that the immune agents are plentiful that some are being excreted (Tacket & Arntzen, 2000). Considering the disadvantages of GMO, the effects are the following: 1.) Development of resistance. Only a few years after the first release of Bt crops in the environment, there is already a major problem of pests becoming resistant to the plant.

In 1996, USA, Monsanto’s Bt cotton presented excessive damages from Bt resistant pests. Scientists are already recommending 20 to 40% of non

transgenic crops to be simultaneously planted with transgenic crops to slow down the evolution of resistance. 2.) Animals other than pests can be affected. Several experiments have shown that beneficial insects and small mammals could be poisoned and severely affected themselves after eating pests infected by Bt poison, thus, the Bt poison could affect beneficial animals in the wild by entering into the food chain. 3.

) Genetic pollution of the environment. It has already been demonstrated. This can result from cross-pollination, unplanned breeding and horizontal gene transfer. Indeed, crops have the potential to multiply and recombine out of control in nature. Several researches have led to the conclusion that genetically modified seeds traveled as far as a mile and bred with wild relatives.

In Denmark & Scotland, GM rapeseed oil may transfer their foreign gene by cross pollination to wild relatives. In France, experiments have demonstrated transfer of foreign genes from rape to radish. In some countries, it also takes place in mustard, canola and sugar beet (Cummins, 2000). Also, such incontrollable multiplication will result into the development of weeds that are difficult to control and will ultimately decrease yield (Rifkin, 1998).

Results obtained by several studies show that the new weeds have more “ weed:” properties than the original ones. This explains the term “ super weeds”. 4.) Unexpected reactions between foreign gene and the human body. Some unexpected interactions can occur between the foreign genes and the genes of the host organism and these interactions can create toxins

or new allergens, or modify the concentration of existing ones (McKibben, 2003).

According to UN Food and Agriculture Organization (1992), the potential risks of GMO are inadequate controls, transfer of allergens, unpredictability in consuming the natural resources, undesired gene movement and environmental hazards. Some great scientists like George Wald, who is a Nobel Prize winning biologist and Harvard Professor gave his view regarding genetic engineering. He gave his early warning saying that Recombinat DNA technology like the concept of genetic engineering has placed a major problem in the history of science and humanity. He said that through this technology, the redesigning of a new organism that is already a product of evolution some million years ago can be done.

This means that people cannot always depend on the inventions and discoveries of science. People should leave the condition as it is but if it needs improvement, it must be in a natural way (Shiva, 1997). REFERENCESTacket, C. O. & Arntzen, C.

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