

The road to future Food and Medicine

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In Japan, as in the rest of world, people have questioned about the food they eat and how the medicine they take works. One of the current topics is genetically modified (GM) food. Most scientists and doctors are in favor of GM food because so many studies have been done using large amount of money and manpower with regard to their safety and advantages, including nutrients. Yet, some activists and concerned groups strongly oppose, not only the marketing of GM foods but also performance of field experiments. These kinds of actions hamper Japanese scientific research and effective evaluation of GM foods which is already behind those of Europe and the U.S. So far, the opposition is based on distrust of government policies and action in which serious decision about what is good and what should be done are often not made and thus postponed of successful multinational corporations and of anything that flies in the face of organic dogma, which has very little to do with organic farming in reality. As it will be mentioned later, strict organic farming is impossible for average farmers in Japan today.

Farming and food production in the U.S. and the other parts of world: Since the production and sale of GM food plant is prohibited, we would like to look at the data in the U.S., particularly agriculture in the state of California. Fears that multinational corporations take land and sales of agriculture away from family based farmers is not based on facts. Ninety-nine percent of all U.S.

farms are family owned and operated. The 2002 consensus of agriculture says that less than 1 percent of America's farm and ranches are owned by non-family corporations, and about 94 percent of U.S. agricultural products sold are produced on farms owned by individuals, family partnerships and family corporations. Only 6 percent of U.S. agricultural product sales involve GM food 20 years after GM vegetables first appeared.

California is still number one agricultural producer and exporter in the U.S., contributing over \$30 billion (¥360 oku) to the American economy, from more than 350 different crops that supply food, fiber, flowers and nutrients to the world. California agriculture supports over 1.1 million jobs, about 8 percent of all the jobs in the U.S. Farming is becoming a more technology-oriented profession in Japan and is often considered a side business. This viewpoint inclines people against serious thought of future development and toward a conservative and selfish attitude.

Food safety: Humankind has made tremendous improvements in plants, inconceivable to people a century ago, through selective breeding and hybridization using controlled pollination of plants. Current technology is an extension of traditional plant breeding practices with one important aspect, the transfer of beneficial traits in a precise and controlled manner which is labor and time saving. Crops developed through biotechnology are subject to testing and

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monitoring in the laboratory, health organizations and governmental offices. In the case of the U.S., three levels of checks must be cleared before new plants can serve as food. Namely, the Department of Agriculture (USDA) checks the safety of growing. The Food and Drug Administration (FDA) checks the safety for eating, and the Environmental Protection Agency (EPA) regulating crop protection and environmental effects. Similar procedures are taken in Japan but the government decision is slow and possibly very conservative.

Some people may say that absolute safety is impossible, and the Japanese government is hesitant to say that there is absolutely no risk in this world, because the amount of money, labor and workmanship put in is not sufficient to engender great confidence. The level of pre-market evaluation done on every biotechnology crop is far greater than any other type of food crop or their products. Furthermore, government has the authority to recall products from shelves and terminate plants sales, if these are not suitable, or some science-based information identifies a public or environmental hazard.

Is organic farming really better? Organic and conventional farming can coexist and biotechnology can make our food safer, more nutritious, and less allergic. Through genetic recombination technology, one can make plants more nutritious, and more resistant to insects and microorganisms, thus against diseases and drought. This can reduce the use of pesticides and equipment to protect crops from a harsh environment. Organic and biotech choices are tools for farmers, giving them a wide range of available technology to produce a safe, healthy, abundant and affordable food supply. Consumers can also choose healthier and more nutritious food at an affordable price.

There is no evidence that organically produced

food is any safer than food produced by any other method of farming, nor is there a clear nutritional bonus to eating organic food, even though some people may feel so. Misguided media hype has produced propaganda saying that organic food is the best and only food to eat. However, there is no evidence that GM foods currently on the market in the U.S. and some other countries pose any human health concern or that they are any less safe than those foods produced through traditional breeding. To date, no evidence of ill health effects attributed to genetic engineering have been documented and/or proven. These ideas are mentioned in the U.S. National Academy of Sciences publication entitled *Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects*, 2004. The safety and usefulness of GM foods is endorsed by medical doctors, dietitians, food technologists and scientists in the U.S.

The world has benefited from a reduction in pesticide use: GM foods contain much less pesticide and reduce the contamination of the environment. According to the U.S. Department of Agriculture survey of Biotechnology-Derived Crops planted in 2003, conducted by the National Center for Food and Agriculture Policy, biotech varieties of cotton and corn increase food and fiber production by more than 3 million kilos, income by \$33 million and reduce pesticide use by 400,000 kilograms annually. In China, pesticide poisonings to cotton workers have dropped by 75 percent. According to a 2001 European Union report, there are no new risks to human health or the environment compared with conventional plant breeding based on about 400 research groups. The EU spent 65 million US dollars for this intensive study.

The ideology used by many organic supporters is not backed by science; many of them are not familiar with science and technology and are against the industrialization of agriculture.

Actually, an all-organic world is neither sustainable nor efficient in the use of the land, especially in Japan where less than 40 percent of food required is produced. Organic farming is less efficient and certified organic produce is more expensive than traditionally produced ones. But, upper and middle class Japanese women care less about price. Farmers know that the incorporation of many and various technologies into their agricultural practices achieves sustainable farming of land and for products, which means more profit.

World responsibility: Over 800 million people or 13% of the world's population are poor and malnourished. Twenty thousand children die every day from malnutrition and another twenty thousand adults die from famine. Saving people from such conditions can not be attained without permitting the use of technologies now available or without research to further improve and utilize new technologies, including biotechnology and recombinant DNA (Prof. N. Borlaug, Nobel Laureate). The answer to the problem of the poor, according to a number of organizations that oppose GM crops, is more organic agriculture. We need more sustainable regenerative agriculture practices, but "organic" farming is the type of agriculture already practiced by the poor, primary because they do not have the means to buy fertilizers, pesticides, and irrigation equipment. (Dr. M. Chrispeels, Director of San Diego center for Molecular Agriculture). Africa, where most food crop production is "organic", is unlikely to see much improvement in its' already dismal food situation. Exhaustion of the soil caused by a lack of fertilizers is depressing yields and pushing agriculture onto more erodible soils. Most African agriculture requires considerably more investment in agricultural research and new types of research, certainly including GM crops. This world does not have enough land mass to support an all-organic food and fiber production

society. In order to preserve wilderness and the biodiversity it offers, higher crop productivity which is not feasible with organic crops, is necessary. It is wise and more effective towards world peace, if the Japanese government supports the GM research and transfers information and technology to those poornations.

Science, Medicine and Biotechnology:

More than 250 million people worldwide have been helped by more than 100 biotechnology drug products and vaccines and, of those biotech medicines on the market, 75 percent were approved in the last seven years. Human insulin to treat diabetes became the first commercial application of biotechnology, followed by others, as a result of research like recombination technology. Thus, world authorities such as the American Medical Association, the Ammerican Dietic Association, the Institute of Food Technologists, the World Health Organization, and the Food and Agricultural Organization of the United Nations support biotechnology. They recognize food biotechnology as a safe, environmentally clean, and useful tool to help feed the world.

Campaigns of fear against GM food based largely on fantasy and a lack of respect for science and technology and try to persuade from an ideological, philosophical point of view. Economic grounds are often influenced by a limited number of activists who have not brought forth scientific evidence to support their claims of negative health consequences or environmental impact. In October last year, the California State University Program for Education and Research in Biotechnology released a statement on behalf of the California State university System stating that science is the driving force behind innovation and technology advancement and has been a key factor of California's agricultural success and that there is no credible scientific evidence to question the health and environmental safety

of approved, commercial biotech crops. In this, one finds leadership from universities for society in an agriculture state, like Niigata prefecture, where universities follow regional needs often for available money. It has become more difficult to convince local governments that science and technology, based on curiosity and forward action make a significant contribution to society. Locally directed science and medicine often make mistakes because of insufficient studies and critical evaluation. What we need in Niigata prefecture, where the emphasis is on agriculture, sightseeing and education is decision making based on scientific and economical evidence and an active information transfer to public.

Cross-contamination: If growers demonstrate that they have appropriate safeguards in place to attempt to avoid contamination, these growers' certification can not be revoked. If the certifier denies a grower's organic status, the grower can appeal the decision, and the California Department of Food and Agriculture will grant it back, so long as the grower maintains high normal organic-growing practices. Several California farmers successfully farm conventional, organic and biotech crops. They do so by creating buffers between crop varieties and implementing practices such as crop rotation and monitoring. So far they have never faced any difficulties. However, these practices may not be so easy because activists focus on the variety which currently sells best and do not look for future development being extremely nervous about hybridization and recombination technology. Because the government is concerned about aggressive movement of activists, they have not prepared the necessary procedure once cross-contamination occurs.

Fear of the unknown, seen in anti-GM agriculture, will stop all scientific advances, including life-saving technological breakthroughs such as penicillin and vast number of anti-biotics, the pasteurization of milk and many vaccines

including polio and AIDS. Fortunately, the world is increasingly accepting the cultivation of plants from modern biotechnology. More than seven million farmers in eighteen countries planted a total of 167.2 million acres in 2003, up fifteen percent from 2002. The four major countries are Argentina, Canada, China and the United States.

Conclusion: Farmers should retain as much choice as possible in determining what they plant, and consumers should have an equal amount of freedom in choosing what they eat. National and local governments should support related research and should transmit all information to the public. Food and medicine are of invaluable support to developing countries, together with education from Japan.

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