

HOW DO THE RUSSIAN CITIZENS OF DMITROV HILLS CONCEPTUALIZE GENETICALLY MODIFIED FOODS?

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Abstract

The purpose of agricultural biotechnology is to address challenges producers face in the production of food. Through genetic modification, crops have been developed that are resistant to drought, heat, insects, and diseases. Despite varying opinions toward GM foods in and among different countries, the production of GM crops continues to increase. Russia's official stance on agricultural biotechnology has been inconsistent. Russian President Vladimir Putin has named biotechnology as a scientific innovation that will benefit Russian agriculture. However, the Russian Ministry of Agriculture is encouraging the development of an "organic" agricultural market. The decisions of the Russian government will influence the rural Russian population the most by the economic and environmental issues associated with producing genetically modified foods. Opinion polls and surveys have been given to Russians concerning the acceptance of this technology, but little has been done to determine why Russians perceive this technology as acceptable or unacceptable. That is, how do Russians conceptualize genetically modified foods? To answer this question, interviews were conducted in the Russian village, Dmitrov Hills. The qualitative data were analyzed through frame analysis. Three salient frames were found within the data giving evidence to how rural Russians conceptualize genetically modified foods. These frames include: Not ecologically pure; It doesn't concern me; and Trust in science. The researchers also found that most participants did not understand the concept of a genetically modified food, even when given an example.

Introduction/Theoretical Base

According to the United States Department of Agriculture (2005), agricultural biotechnology includes "traditional breeding techniques that alter living organisms, or parts of organisms, to make or modify products; improve plants or animals; or develop microorganisms

for specific agricultural uses.” Genetic engineering or genetic modification (GM) is also a component of modern biotechnology.

From 2004 to 2005, the amount of biotech crops planted worldwide increased 11% to 90 million hectares or 222 million acres. Soybeans, corn, cotton, and canola are the most commonly planted biotech crops. The United States, Argentina, Brazil, and Canada lead the world in biotech crop production (James, 2005). The increased efficiencies of GM crops give countries opportunities to export the surplus not used domestically. Yet, European import restrictions on GM foods present an obstacle in the global use of this technology (Falk, Chassy, Harlander, Hoban, McGloughlin, & Aklaghi, 2002). Many countries currently producing GM foods are continuing to increase use of biotechnology even though the world population has varying opinions and attitudes among and within different countries (Hoban, 2004).

The purpose of agricultural biotechnology is to address challenges producers face in the production of food. Through genetic modification, crops have been developed that are resistant to drought, heat, insects, and diseases. These crops can also have increased nutritional content, increased yield, and reduced post-harvest losses. These aspects make the adoption of GM crops in developing countries very attractive. Despite these positive factors, many countries are opposed to the adoption of GM foods for fear of adverse effects to human health and the environment. Other countries simply lack the market capacity and infrastructure necessary to produce GM foods (Pew Initiative on Food and Biotechnology, 2004).

Russian Agriculture and Biotechnology

Russia, the largest country in the world, is a player in regional and global agricultural markets. Russia’s agricultural industry includes 133 million hectares of farmable land and 14% of the Russian labor force work in agriculture to feed 147 million inhabitants (Economic Research Service, 2004). The leading crops grown in Russia include wheat, sugarbeets, potatoes, corn, barley, rye, oats, sunflowers, and cotton (USDA, 1994).

Farms in Russia can currently be categorized as corporate, subsidiary plot, and private. Corporate farms are the original state and collective farms from the Soviet era and continue to operate much as they did since reforms began in 1992. These farms occupy approximately 90 percent of Russia’s arable cropland, supplying 90 percent of the nation’s grain and sugarbeet production and almost half of the livestock production (Osborne & Trueblood, 2002). After the fall of socialism, subsidiary plots and private farms emerged. Subsidiary plots refer to small divisions of land originally owned by collective farms, but now are owned by local families for the purpose of growing and raising their own food. These plots account for 5 percent of arable cropland, but account for more than 50 percent of the total agricultural output (Osborne & Trueblood, 2002). Collective farm workers who wished to become independent farmers were given tracts which formed current private farms. These are equivalent to family farms in the United States and occupy 4 percent of the total arable cropland (Osborne & Trueblood, 2002). According to Dr. Pavel Sorokin, Professor at Moscow State Agro-Engineering University, production and efficiencies in both private farms and subsidiary farms are increasing (P. Sorokin, personal conversation, February 28, 2005).

Since the devaluation of the ruble in 1998, investments in Russian agricultural production has slowly grown; production increased by 5 percent in 2000 and 6.8 percent in 2001. This increased production has impacted the Russian agricultural market by creating more competition; in turn, producers are forced to improve efficiency through finding new technologies. This includes the option of growing GM foods (Borodina, 2002).

Russia's official stance on agricultural biotechnology has been inconsistent. Russian President Vladimir Putin and the Russian Minister of Agriculture have both named biotechnology as a scientific innovation that will benefit Russian agriculture. However, very limited federal funding is available for agricultural research and application of GM products. Russia is also lagging behind other industrialized countries in the adoption of commercialized GM crops for production. Although two GM crops have been approved for production in Russia (AGBIOS, 2006), current government environmental regulations prevent the commercial production of either (USDA FAS, 2005). All food and feed imports containing GM ingredients must be registered and certified (USDA FAS, 2005). Russia also has mandatory labeling regulations for GM foods (Huffman, Rousu, Shogren, & Tegene, 2004).

As Russia grows its agricultural sector and becomes a larger player in agricultural trade through membership in the World Trade Organization, Russian legislators will need to make key decisions in the production and consumption of GM foods (Zadorozhniy, 2002). The decisions of the Russian government will influence the rural Russian population the most by the economic and environmental issues (Skryabin & Yablokov, 2004, April) associated with producing GM foods. All the same, citizens' perceptions and attitudes of GM foods will continue to guide policy of Russia's new democracy.

The worldwide market for GM foods was estimated at \$45 billion, of which the Russian market share was 0.5% or \$500 million (Borodina, 2002). Russia has registered nine crop plant varieties and registered 59 different GM food products; all of which must be labeled if 5% or more of the ingredients contain GM ingredients (Kuzmichenko, 2002). In addition to economic benefits, the use of GM crops may help the little protected Russian environment by reducing the use of pesticides (Demin, 2000).

Several barriers to the growth of agricultural biotechnology exist. The Russian Ministry of Agriculture is encouraging the development of an "organic" agricultural market. Another barrier is the expense required to build an agricultural infrastructure as well as modernize farming practices through more efficient machinery and agricultural chemicals. Also, Russians fear the unknown possible adverse affects of biotechnology to their own health and the environment (USDA FAS, 2005).

Transfer of Agricultural Knowledge

Russia's agricultural knowledge transfer system includes agricultural education, extension, training, technology transfer, and agricultural research; however, this is very limited to scale compared to that of the United States. In the past, narrowly-focused Russian specialists provided information services to agricultural producers on state and collective farms. This system worked well with a small number of clients, but neglected the needs of more than 280,000 private farmers and 50,000 structured farm enterprises. This system also ignored the needs of 40 million household subsidiary plot holders, whose number will continue to increase (Mudahar, Jolly, & Srivastava, 1998). The agricultural knowledge system is comprised of agricultural vocational training schools, scientific research institutes, agricultural higher education institutions, and technical agricultural colleges; these are poorly linked to the knowledge transfer systems (Mudahar, Jolly, & Srivastava, 1998).

In 1991, the USDA's Cooperative State Research, Education, and Extension Service (CSREES) developed a seven-year project to help Russian agriculture shift from the former state-operated collective farms to private farms. The program, Russian-American Farm Privatization Project (RAFPP), developed a U.S. style farm in Russia where American farm

families lived and served as mentors to Russian farmers. In 1996, the RAFPP worked with Russian and American universities to develop an agricultural knowledge transfer system which mimicked the U.S. Extension Service. The extension system was implemented in two Russian regions (Cooperative State Research, Education, and Extension Service, 2005).

Attitude toward GM food

Few comparable opinion polls have been conducted, but the available data indicate consumer attitudes differ greatly with opinions changing over time (Hoban, 2004). In the United States and Canada, consumers are typically accepting of biotechnology use to develop new plants, but are less accepting of biotechnology use in animals. North American consumers seem generally optimistic about the future uses of biotechnology. In contrast, Europeans are more negative in their views of biotechnology. These consumers have voiced desire to have GM food products separated, identified, and labeled. In developing countries, consumers are challenging government control of biotechnology and want more visible accountability in the regulatory process (Cantley, Hoban, & Sasson, 1999).

The Russian consumer is aware of agricultural biotechnology, but in a largely negative light due to biased journalism and public relation efforts of anti-biotechnology non-governmental organizations. This negative point of view, as well as labeling regulations, has encouraged retailers and producers to avoid food products that may contain GM ingredients. (USDA FAS, 2005). Many Moscow residents, the largest consumer market in Russia, are supporting the “organic” food trend. The Moscow City Government also voices an anti-biotechnology policy and has even established a council to monitor the use of GM ingredients in food products (USDA FAS, 2005). Many believe Russian consumers need to be educated with unbiased discourse concerning the issues of biotechnology in order for them to make logical decisions concerning the acceptance of GM foods (Falk, et al., 2002).

EnviroNics International (2000) conducted an international study of consumer attitudes toward biotechnology in 35 countries. In Russia, when given the statement, “The benefits of using biotechnology to create genetically modified food crops that do not require chemical pesticides are greater than the risk,” 40% of Russian respondents agreed, 23% disagreed, and 37% were not sure.

Greenpeace (2005) polled 1567 Russian citizens of various demographics and found that 31% are not aware of GM food products and 65% of the respondents found these products unacceptable. However, why do Russians find GM foods unacceptable? Furthermore, how do citizens of rural Russia conceptualize GM products?

Purpose

The aforementioned studies simply quantify opinions of Russian citizens, but have not answered why Russians have these opinions. The literature gives evidence that Russian citizens have few experiences with GM products; do Russians understand the benefits and drawbacks of this technology? Why do Russians find GM foods unacceptable? How much does their culture play a part in this decision? The purpose of this study was to further explore the specific question: How do the Russian citizens of Dmitrov Hills conceptualize GM foods?

Methods and Data Sources

To conduct this study, the lead researcher traveled to the village of Dmitrov Hills, Russia to conduct personal semi-structured interviews. The interview questions were developed from

previous studies concerning international perceptions of biotechnology (Irani, Rudd, Friedel, & Gallo-Meagher, in review) and were translated into Russian and e-mailed to city officials of Dmitrov Hills two weeks prior to data collection. All participants viewed the questions prior to data collection and were supplied the interview questions in Russian text during data collection. Interviews were conducted inside the participants' homes with the use of a translator native to the village. Interviews were audio-taped and later transcribed and translated into English by the researchers. Data were analyzed according to frame analysis techniques (Fisher, 1997). Frames were identified through the use of Glaser's constant comparative technique (1978) which allowed researchers to code patterns and relationships within the data for the purpose of distinguishing frames. Researchers analyzed the data in English and then compared results to Russian transcriptions to improve dependability and trustworthiness. Furthermore, the lead researcher kept a reflective journal of thoughts and conceptual relationships throughout the data collection process.

Data Sources

The village of Dmitrov Hills was chosen as residents were still largely employed by the former collective farm and knowledgeable of agriculture. The lead researcher utilized village leaders to describe the population of Dmitrov Hills with regards to education level, methods of receiving news and information, as well as association with agriculture. A village leader also helped identify 20 participants who were representative of the demographics of the village, as well as people willing and available to participate in an interview.

All participants were native to the village. From this group of participants, 12 were female and eight were male with ages ranging from 19 to 79 years. Occupations of the participants can be summarized in the following: six teachers, of which one was retired; six associated with work on the former collective farm, of which two were retired; three working in business, of which one was retired; three college students; one independent farmer; and one district mayor.

Frame Analysis

The researchers chose a qualitative design for this study, because the data sought were considered sensitive with a high degree of complexity to the participants. The interview process allowed for focus on issues revolving around biotechnology while permitting unexpected phenomena to be expressed for greater understanding. Frame analysis originates from media researchers, but its use as a data analysis technique has been cited by sociologists, linguists, and policy analysts (Fisher, 1997). Reese (2003) proposes that, "Frames are *organizing principles* that are *socially shared* and *persistent* over time, that work *symbolically* to meaningfully *structure* the social world" (p. 11). Most frames revolve around a conflict in which major phenomena are interpreted by people of a shared culture through the use of language and images (Hertog & McLeod, 2003). A simple representation of a frame often provides a person a context in which to view the phenomena, interpret meaning, and form an opinion.

Results and Conclusions

Leaders of Dmitrov Hills provided the researchers with general information concerning the village. Dmitrov Hills (population 1,395), is located 300 kilometers east of Moscow. Most families, regardless of employment, maintained gardens for growing fruits and vegetables. Many have chickens, while approximately half of the families have one cow or one to three pigs.

Describing the education of Dmitrov Hills' citizens, village leaders estimated that 10% have an equivalent of a four year college degree and approximately 60% have had some form of technical education related to their employment. Two technical universities are located within 50 kilometers from Dmitrov Hills. Most people living in the village acquire news and information through television, newspaper, and word of mouth.

In this study, data analysis of participants' responses identified three salient frames of GM foods. Specifically, master frames included: 1) Not ecologically pure; 2) It doesn't concern me; and 3) Trust in science. These are further elaborated below.

Not Ecologically Pure

Russians, in general, are very conscious about their health and the health of loved ones. In fact, to formally say "hello" in Russian, one says "Здравствуйте" (pronounced zdravstvuyte), which literally translates to "Good health to you" in English. Furthermore, Russians commonly relate good health to eating, drinking, and cleanliness. When Russians were asked "What food improvements would you like to see?" the most common response was that they would like to see more natural food. For example, one participant said she wished foods would "... *be more natural, ecologically pure, safe for a healthy person*" (participant code #12).

The term "natural" was commonly used to refer to foods grown without the use of pesticides, fertilizers, chemicals, or supplements used to enhance produce or meat. Another participant elaborated, "*I would prefer... more natural, those closer to natural products. So, I would prefer if there were less chemicals. Also, I would appreciate if the control over those supplements in Russia improved*" (19). This participant used the term "natural" in reference to any additives used during the processing of food. Many other participants discussed how natural food was better compared to the use of additives in food bought at the store. One participant complained, "*...like sausage with soy is not our liking...*" (20).

Another participant said "*...they produce foods with these "E" signs [on labels]... English "E" means artificial coloring, artificial, not natural*" (16), referring to imported processed food. Although this was the only participant that mentioned an "E" on the label represents an unnatural food, it is important to note that he now has a negative view of all imported food with an "E".

Only a few participants seemed content with the quality and availability of food; one participant stated, "*Well, everything is fine now. You can buy quality foods now*" (18). With these few participants, there seemed to be an insinuation that the quality of food is dependent on the price you pay. That is, everyone lives up to one's means.

In the second question, participants were asked of their opinion concerning GM foods or biotechnology. It was quickly realized that participants did not understand the technology associated with the term. After a couple interviews, the lead researcher began using the example of a GM potato resistant to the Colorado Beetle; a case relevant to Russian agriculturists. It was found that even with the use of this example, most participants still could not differentiate GM technology from chemicals, pesticides, fertilizers, additives, supplements, or vitamins. Simplified, the researchers believe that even with the example of biotechnology, most participants did not understand the concept.

Participants who did understand the concept of GM foods still were unaware of the benefits of this technology, or chose to ignore those benefits. A participant explained, "*To tell the truth, I am not an expert in the area. Well, I heard about this issue, but personally, I'd rather not. Nature is nature. It is better to grow naturally*" (18). With further questioning, a couple

participants could give examples of a GM product before the Colorado Beetle example was given. However, it was evident that these same few participants were unable to convey characteristics of GM products in terms of benefits, disadvantages, concerns, or how the products were made.

The lead researchers asked participant nine, an agronomist, “What would you do if you had an opportunity to improve the quality of the potato, or productivity, by using genetically-modified seed, for example?” She responded, “*I would probably defend my point of view, I can repeat it. We should grow potato from seeds that we buy [locally] or grow ourselves*” (9). As an agronomist, this participant had knowledge of the Colorado Beetle resistant potatoes and other beneficial characteristics of GM foods prior to the interview, but decidedly framed the technology as creating ecologically impure foods.

Regardless if participants understood the concept of GM foods, they still framed GM foods as unnatural and; therefore, not healthy to eat. For example, one participant said, “*Well, as for resistance it is clear, it is for the plant, but what about the human body. I, for example, not sure about it. What influences will it have on the human body and development*” (13). Many discussed the unknown effects to the human body, but unknown effects to the environment were never considered by the participants. Another affirmed: “*There shouldn't be anything like this at all, everything should be produced naturally. Everything should be produced naturally... Why would you do that? It [Food] used to be tastier... Apples are tasteless now... It is better when you grow your food rather than buy*” (8). Because the unknown effects to the environment were not mentioned, one could assume that the participants were either unaware of these effects because of lack of knowledge, the participants do not value the environment, or the unknown effects to the human body were too great to consider anything else.

Throughout the data, the term “organic farming” was never used; however, the data did give evidence that Russian participants frame any food grown or processed through methods not occurring in nature as not ecologically pure. That is, GM foods were framed as not ecologically pure.

It Doesn't Concern Me

As noted above, citizens of Dmitrov Hills had their own gardens and raised their own chicken, beef, or pork. Even though produce, meat, milk, and eggs were bought from stores, a considerable amount of food was raised at home. Because of this, many participants viewed GM food as not pertaining to them. One participant declared, “*First, we probably don't have many of them [GM foods] here, maybe somewhere in big cities... We grow foods ourselves, in gardens, we don't have genetic stuff*” (16). Participant 12 stated, “*We don't come across it in our life, for example.*” When the researcher asked this participant if urban citizens should be more informed, she responded, “*Yes, maybe because they have more choices in stores... We grow our own foods anyway*” (12).

Addressing the European Union's rejection of the United States' GM products, a participant exclaimed, “*I don't care; I am neither for nor against it. This is Europe's problem, this is the problem of America, and these are their problems*” (4). When participants were asked to discuss the issue of the European Union rejecting United States GM products, it was evident that most were not aware of the situation and asked questions to clarify.

Many participants were ready to admit that they know little about GM foods. “*We are probably just not used to them. We haven't heard much about them*” (2). Another participant asserted, “*We practically don't have any experience of producing it and very little experience of*

consuming. That is why I cannot say a lot about it" (20). Furthermore, participants were hesitant to take a position for or against biotechnology because of their little knowledge. Participant one said, *"I don't know, of course, maybe everyone has his own truth, maybe there are some pluses, maybe they are necessary, those modified products"* (1).

A few participants admitted they were scared of this technology that they did not understand. Other participants continued to ask questions to learn more about GM foods and biotechnology. These questions typically pertained to America's use of GM foods and it was noted that these participants were more accepting of the technology.

Comments made by participant four seemed to summarize this frame by stating, *"It is an issue for them, I see. For us, it is a very distant thing. It is not a problem for us; we don't have this issue"* (4). However, the researchers believe the largest contributor to this frame is the lack of understanding of GM products. This frame will continue to change through time as these participants learn more about the benefits and drawbacks of this technology. As the Russian government and agricultural industry make decisions concerning GM foods, this issue will become more relevant and meaningful to these participants affecting the way these products are framed.

Trust in Science

Russians have been long advocates of science. For example, Russia launched the first man to orbit the earth and now is among the three countries that have sent men into space. This is still true today, despite the economic and political troubles Russia has endured during the last 20 years. This belief in science carried through to the final frame when participants were asked to take a position on GM foods. Specifically, the question was, "Do you believe that Russian farmers should grow genetically modified foods for Russians to consume?" From the participants, six were against growing GM foods on Russian soil. This group tended to be older and female. One participant deliberated, *"Actually, I don't know, it seems to me they shouldn't. Maybe the yield will be higher, but it is useless, and you eat something that you don't know what it is"* (5).

However, 14 participants were in favor of using the new technology. Most of this group accepted raising GM products on Russian farmland if declared safe by Russian scientists. Participant 15 assessed, *"...because this thing hasn't [been] fully researched yet, I think that before approving it, it should be studied"* (15). Another participant discussed, *"Well, as a dilettante, if it is proven that it is quite safe and edible, why not? Let them grow"* (14). These participants were aware that they knew little about GM products, but if science gave evidence that GM products were safe, they were willing to accept the technology.

Russian or independent scientists were preferred by the participants, as another explains, *"And why not, I think our scientists' research didn't fall much behind of American [scientists]"* (17). Others preferred independent scientists to Russian or American scientists. Regardless of the scientists' affiliation, the data suggest that these Russian participants will trust the evidence from science.

Other participants were simply open to the thought of raising GM products. *"I think we certainly should begin,"* declared participant 19. A few participants supported their decision citing a free market. For example, *"Well, if there is demand, why not grow them? What is the point?"* (3). Another participant agreed, *"We probably should try everything... Maybe it would be more profitable"* (2). Only these two participants saw the economic advantage of growing GM products with favorable results.

It is noted that participants who rejected the idea of growing GM products tended to draw clear distinctions between nature and science and that science should not interfere with natural food. Participants who accepted the notion of Russian farmers growing GM products believed science could answer their questions concerning how this technology supports human sustainability. This majority sought more evidence concerning GM foods and believed science could give them evidence to form opinions. That is, how these participants framed this issue could be resolved by trusting science.

These frames provide evidence to how the participants conceptualize GM foods. To summarize: 1) Russian participants prefer natural (organic) foods; 2) Russian participants have little experience with GM technology, so they cannot reason how it affects them; and 3) Russian participants trust science to provide support or opposition of GM foods. It is important to note that many Russian participants did not understand the concept of GM foods and could not differentiate between this technology and chemicals, fertilizers, pesticides, additives and supplements. As Russians gain more understanding of GM products these frames will be modified; but, how so?

It may be possible that as these Russian participants gain more understanding of GM foods and realize it does affect them. This may create a conflict as participants decide if natural foods are still better, or if science given enough evidence to support the production of GM foods. It seems possible that these two frames may collide, as they have done in other countries.

Implications

This study is limited as the translation of Russian to English may have altered interpretation and meaning from the data. Furthermore, one cannot generalize from qualitative data, but these findings may be transferable to other similar environments within rural Russian villages.

This study developed a starting point in the understanding of how people in rural Russia conceptualize GM foods and generated many questions. How will these frames change as the Russian participants gain more knowledge? Do urban citizens of Russia frame GM foods in the same manner? How will these frames impact the environmental and economical issues of Russia? Will these frames be expressed to the Russian government to the point that it affects policy decision?

This study also gives evidence of a need to disseminate knowledge concerning the benefits and drawbacks of GM foods so these villagers can make informed decisions regarding this technology. The realization of an uninformed group of people and how these people conceptualize GM foods will better help nonprofit and government organizations in educating and extending information regarding the issues concerning GM products.

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