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Public Understanding and Perception of and Attitude Towards Agricultural Biotechnology in the Philippines

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ACRONYMS

AFIC	Asian Food Information Center
BIC	Biotechnology Information Center
Bt	*Bacillus thuringiensis*
IRRI	International Rice Research Institute
FDA	Food and Drug Administration
GM	Genetically Modified
CIMMYT	International Maize and Wheat Improvement Center
ICS	Integrated Communication Strategy
ISAAA	International Service for the Acquisition of Agri-biotech Applications
LGU	Local Government Unit
NGO	Non-Government Organization
R&D	Research and Development
UIUC	University of Illinois at Urbana-Champaign

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Abstract

This study was conducted to determine the stakeholders' socio-demographic characteristics, worldviews and values, information sources as well as their level of understanding and perception of, and attitude towards agricultural biotechnology. The study further determined the relationships between socio-cultural factors and the stakeholders' understanding and perception of, and attitude towards biotechnology.

A survey using either an interview schedule or a questionnaire was carried out among 423 sample respondents representing eight stakeholder groups in the Philippines. These were businessmen and traders, consumers, extension workers, farmer leaders and community leaders, journalists, policy makers, religious leaders, and scientists. Respondents came from Metro Manila, Cagayan Valley, and Laguna, all in Luzon; Cebu City and the province of Iloilo represented Visayas; while Davao City and Bukidnon represented Mindanao. Data were analyzed using descriptive analysis and statistical tests of Chi Square and Spearman Rank Correlation.

Findings indicate that the Philippine stakeholders were mostly male, married, between 31 to 50 years old, and were holders of baccalaureate degrees. Many were rural dwellers and were mostly Roman Catholics .

In terms of worldviews and values, the religious leaders exhibited a more conservative stand. They agreed that "the use of biotechnology in food production is against my moral values", while majority of the other stakeholders thought otherwise. Together with policy makers, the religious leaders also strongly supported the statement that "until we know that genetically altered foods are totally safe, those products should be banned." On the other hand, the journalists and scientists were more open and optimistic about biotechnology with many disagreeing that "genetic manipulation takes mankind into realms that belong to God and God alone." Stakeholders generally disagreed with the statements that "we have no business meddling with nature, and that regulation of modern biotechnology should be left mainly to the industry." However, they held similar views in terms of willingness to pay for labeling of genetically modified foods and the belief that genetic engineering could lead to nutritious and cheaper foods.

Filipino stakeholders had generally low exposure to sources of information on agricultural biotechnology. If ever they did access sources of information, they used multiple sources, combining both mass media and interpersonal sources. Policy makers had the highest mass media usage, and highest use of printed materials. Among interpersonal sources, consumers and extension workers were the most popular. Insignificant sources of information were the religious leaders, NGOs, websites, print materials, food regulators, seminars and public forums, and agricultural biotechnology companies.

University-based scientists were the most trusted source of information by the different stakeholders in this study. This total trust was highest among the farmer leaders and community

leaders, policy makers, religious leaders, and the consumers.

All the stakeholder groups rated their understanding of science as adequate and claimed knowing only "some" in terms of the uses of biotechnology in food production.

Food characteristics were deemed very important in biotechnology by the stakeholders. Religious leaders appear to be highly concerned with food characteristics compared to other stakeholders. There was a general tendency also to perceive the benefits of agricultural biotechnology in food production as either moderately or very beneficial by most of the stakeholders.

On the whole, all stakeholder groups had favorable perceptions about agricultural biotechnology.

Stakeholders perceived the international research institutions like International Rice Research Institute (IRRI) and International Maize and Wheat Improvement Center (CIMMYT) as very concerned about public health and safety on agricultural biotechnology. Those perceived as concerned (but not very concerned) were the university-based scientists, and government research institutions.

On the whole, science has been perceived by stakeholders as an important part of agricultural development. Those who were very interested in the issue of biotechnology in food production were the policy makers, scientists , and the journalists.

Stakeholders had a generally favorable attitude towards agricultural biotechnology. They felt that genetically altered foods should be labeled. Food safety and environmental impacts were two important issues that policy makers and scientists would consider when making decisions about agricultural biotechnology.

Socio-demographic characteristics were found to relate significantly with the stakeholders' understanding and perception of, and attitude towards biotechnology. Respondents who are older and with higher education tend to display a higher level of understanding, a more positive perception, and a more favorable attitude towards agricultural biotechnology.

Specifically, stakeholders agreed that the government is ensuring the safety of the food people eat.

Views and values were also found to be more significantly related with perception and attitude than with understanding of biotechnology. Those who hold the view that the use of biotechnology in food production is against their moral values tend to have a negative perception that only large agricultural companies benefit from biotechnology.

Stakeholders generally had a low level of exposure to information sources on biotechnology. Information sources tend to relate positively with level of understanding and attitude towards agricultural biotechnology, regardless of whether these are mass media or interpersonal sources. They, however, create varying perceptions (both positive and negative) regarding agricultural technology. The only source which consistently leads to positive behavior towards agricultural biotechnology is the group of experts, professionals or scientists.

Part 1 Introduction

Rationale

Why do Filipinos seem to be divided when it comes to issues about biotechnology? How come that even among the scientists themselves, there is no agreement as to the safety or risks surrounding biotechnology? This mixed reception of biotechnology particularly in agricultural production in the country has become a challenge to communication in dealing with uncertainties brought about by science. Fundamental in addressing the issue is the need to know the public understanding and awareness of the relevance and importance of biotechnology.

A five-country Asian study was conducted in 2002 by the International Service for the Acquisition of Agri-biotech Applications (ISAAA) and the University of Illinois at Urbana-Champaign (UIUC). The countries covered were Indonesia, Malaysia, Philippines, Thailand, and Vietnam. It was designed to determine the public understanding, perception, and attitude towards agricultural biotechnology. Representing the public as stakeholders in the 2002 study were eight sectors, namely: policy makers, journalists, scientists, farmer leaders and community leaders, extension workers, consumers, businessmen and traders, and religious leaders.

Results of the first study were useful because they provided answers to the following questions:

1. What do stakeholders generally know or understand about agricultural biotechnology?
2. What are their views and opinions about the impact and role of biotechnology in their lives?
3. Where do they obtain information and what kind of information or message contents do they get?
4. Who do they trust to tell the truth about biotechnology?

At the time the study was conducted in 2002, agricultural biotechnology was more of a theoretical issue in the Philippines since results of field experiments especially about Bt corn have not been concluded yet. After more than two years and several plantings of Bt corn in selected areas, as well as the government's endorsement of the application and use of agricultural biotechnology in the Philippines, it is of interest to know the current trends concerning the public understanding and perception of and attitude towards biotechnology among the Filipinos.

Objectives

The study specifically aimed to:

1. describe the socio-cultural characteristics of the various stakeholders in agricultural biotechnology;
2. identify their information sources;
3. find out their understanding and perception of and attitude towards agricultural biotechnology; and
4. determine the relationship between socio-cultural factors and stakeholders' understanding and perception of and attitude towards agricultural biotechnology

Conceptual Framework

In keeping with the objectives, the study determined the relationship between the socio-cultural factors, including communication factors, and the stakeholders' understanding, perception, and attitude towards agricultural biotechnology. Using appropriate statistical tests (Chi-square test and Spearman's Rank Correlation) variables with significant relationships were determined.

The conceptual framework of this study is summed up in Figure 1 below.

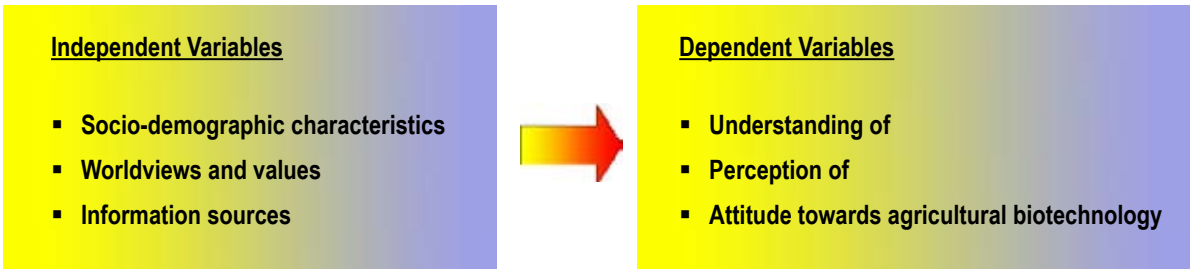

Figure 1. Conceptual framework of the study

The variables and operational definitions of the various stakeholder used in the 2002 study were also used for this study. Other socio-cultural factors such as religion (under socio-demographic) and worldviews and values were added this time to broaden the socio-cultural dimension of the study.

Definitions of Stakeholders

1. Businessmen and traders – individuals who are directly involved in the food and agricultural industry

2. Consumers – market goers (the market may be a supermarket or a wet market)

3. Extension workers – personnel working in universities, colleges, agriculture ministries, or state research institutes whose responsibilities include information dissemination, technology transfer, assisting farmers, and providing feedback to universities and research

institutes on the needs of farmers and their communities

4. Farmer leaders and community leaders – include officers of farmer associations and cooperatives and non-elected members of community councils at the municipality and barangay levels whose opinions and ideas tend to influence the overall dynamics of community debates or discussion on crop biotechnology and/or agricultural production

5. Journalists – media writers and broadcasters on national and local television, radio, and print whose primary beat is agriculture or science and technology. They may also include prominent columnists and commentators in major national dailies, radio and television programs who may have covered biotechnology and/or science and technology topics

6. Policy makers – individuals whose decisions and opinions would have significant influence or impact on national policies, laws, and regulations relating to the overall direction of the country's agricultural development programs including production, research, and trade. Policy makers may include senators, congressmen, parliamentarians, elected national representatives; members of legislative agricultural committees; officials in agriculture departments or ministries at the national or regional level such as directors and heads of units; and local government officials such as mayors, vice-mayors, and councilors

7. Religious leaders – people who are recognized leaders of major religious groups in the country. They may include Roman Catholic priests and nuns; Protestant and Baptist pastors and elders; preachers from Born Again groups; preachers and leaders from Iglesia ni Cristo; and Muslim imams.

8. Scientists – individuals who are not part of the country's crop biotechnology research consortium and who conduct research or develop technologies related to agricultural production and are based at universities and R&D institutions

Part 2 Review of Literature

In recent years, public opinion research on agricultural biotechnology has been intensively conducted in different parts of the world to measure its social acceptability. It started when R&D agencies realized that the benefits of agricultural biotechnology will be best achieved if the consumers, food manufacturers, and policy makers consider it safe and beneficial.

A bulk of studies on this field was undertaken in the United States and Europe. Comparable public opinion studies were likewise done in the developing countries particularly in the Southeast Asian Region. Global trends were also presented to assess the social acceptability of agricultural biotechnology in Indonesia compared with other parts of the world.

Global Trends

Studies on trends regarding public awareness and understanding of agricultural biotechnology in the US showed that only one-third of consumers in the US have heard or read about biotechnology. The trend, however, changed in 1997 when 'Dolly, the sheep', was widely publicized by the media. Survey results in the US and in Japan showed that increasing level of awareness leads to increasing consumer acceptance of agricultural biotechnology products (Hoban, 1998).

Analysis of survey results further showed that social acceptability of agricultural biotechnology was influenced by a number of interlinked factors: 1) benefits that can be derived from agricultural biotechnology should be clear and demonstrable, 2) risks should be socially acceptable, and 3) biotechnology applications should be viewed as morally acceptable to society. Researchers recommended that public understanding of the benefits and risks of agricultural biotechnology be improved through communication and education programs. The ethics of "feeding the world while protecting the environment" may also influence consumers' attitudes. It will further be important to ensure that government regulations are in place to minimize any risks (Hoban, 1998).

The Mellmann Group and Public Opinion Strategies conducted a study in August 2003 that probed on topics rarely explored in widely-available opinion polls about agricultural biotechnology. This included how Americans feel about the way GM products are regulated in the US and the application of genetic engineering technology to animals. Key findings indicated that Americans oppose a ban on GM foods, but are strongly supportive of a regulatory process

that directly involves the Food and Drug Administration (FDA). It was also determined that Americans are far more comfortable with genetic modifications in plants than in animals and are particularly supportive of genetic modifications that improve health and nutrition.

The study by Pew Initiative on Food and Biotechnology in 2003 revealed that Americans' knowledge of GM foods remains low and their opinions about its safety is just as divided as it was two years ago. The survey also showed that social acceptability of GM products increases when the public knows that it was reviewed and approved by FDA. Another important finding was that public support for GM products decreases as uses of the technology shift from plants to animals (Pew, 2003).

The Participatory Assessment of Social and Economic Impacts of Biotechnology, a collaborative research project of Initiative for Future Agriculture and Food Systems and the US Department of Agriculture conducted a public opinion research on the social acceptance of biotechnology in the US. The study employed computer-assisted telephone interviews with more than 1,200 respondents across the US. About 80 percent of the respondents were willing to embrace agricultural biotechnology for its social benefits. On the other hand, the study showed a polarized result when the relationship of personal benefit and willingness to accept agricultural biotechnology was examined (Nevitt et al., 2004).

The Environics International completed the most extensive international study of consumer attitude towards agricultural biotechnology. The study covered 35,000 respondents from 35 countries (Environics in Hoban, 2004). Respondents were asked whether the benefits of agricultural biotechnology are greater than the risks. Results showed that consumers in the United States (US) and Asia have a more positive attitude towards biotechnology than Europeans and Australians. The US led the industrialized countries in supporting biotechnology. Overall, people in the developing countries tend to be quite supportive of genetically modified (GM) crops (Hoban, 2004).

Over two-thirds of the respondents in the following countries perceived that the benefits of genetically modified foods outweigh the risks: US, Colombia, Cuba, Dominican Republic, China, India, Indonesia, and Thailand (Hoban 2004).

Fewer than 40 percent of consumers in four European countries (France, Greece, Italy, and Spain) and in Japan considered the benefits of GM crops greater than the risks. Respondents in most European countries, Japan, and South Korea were much more negative in outlook towards agricultural biotechnology than in other parts of the world (Hoban, 2004).

Another study by Environics International entitled "Food Issues Monitor" probed into consumers' attitude towards GM food. Consumers in 10 countries were asked whether they would buy food with GM ingredients if the resulting products were higher in nutritional value. Respondents were given the option of continuing to buy the product or to stop buying it if they learned it was genetically modified. Among the stakeholders included in the study, consumers in China and India exhibited the highest support for GM food items. Majority of consumers from the US, Brazil, and Canada gave similar support for GM food products. On the other hand, majority of European and Australian consumers would tend to reject GM foods even if they were more nutritious (Hoban, 2004).
Over the years, trends in awareness on agricultural biotechnology vary across countries. Studies found that awareness tends to be high in Germany, Austria, Denmark, and Japan. It was also

quite high in Canada, The Netherlands, and in three other Scandinavian countries. Nine other European countries reported relatively lower levels of awareness of biotechnology. During the last few years, awareness appears to have risen in Europe. This fluctuating trend can be partially attributed to media coverage and to activists who overemphasized potential risks of agricultural biotechnology. Moreover, a number of fundamental cultural differences exist among the European countries and in North America that impede the diffusion and acceptance of information and knowledge on agricultural biotechnology (Hoban, 2004).

Trends in Asia

The Asian Food Information Centre (AFIC) conducted man-on-the-street interviews with 600 consumers in China, Indonesia, and the Philippines (AFIC, 2003). The research aimed to determine the awareness of and attitude of consumers in the three countries towards agricultural biotechnology, and food safety and quality in general; and to identify consumers' demand for agricultural biotechnology, nutrition, and food safety information.

Results showed that majority of the consumers were aware that GM foods are present in their everyday diet and they were not worried about it. Those who reported that they had eaten GM foods also indicated that they took no action to avoid them. Moreover, they also expressed their willingness to try samples of GM foods.

Respondents were also asked about their concerns on food safety and quality. More than 90 percent reported a strong concern on nutritional value, microbial contamination, and pesticide residues; but not on GM foods which turned out to be their least concern.

The AFIC (2003) study, moreover, revealed that Asians have a positive attitude towards the benefits of biotechnology-derived foods. They perceived agricultural biotechnology as a means to improve the nutritional value of food and reduce the food cost. About 60 percent of respondents reported that they expected either themselves or their families to benefit from food biotechnology during the next five years (Hoban, 2004).

Knowledge of agricultural biotechnology was also assessed. It revealed that the knowledge of consumers in China, Indonesia, and the Philippines on science and technology and technical terms associated with agricultural biotechnology was quite low. However, consumers have exhibited awareness of which crops have been developed through biotechnology (AFIC, 2003).

When asked about where they get information on agricultural biotechnology, respondents identified mass media as their primary source of information. They also indicated that they preferred mass media over public sector bodies. However, they perceived that the latter, such as government agencies and scientists, are "reliable and credible protectors of human health and safety." Consumers also indicated no demand for labeling GM foods (AFIC, 2003).

ISAAA, in collaboration with UIUC, conducted a key stakeholders' perception survey in five Southeast Asian countries: Indonesia, Malaysia, Philippines, Thailand, and Vietnam. The study focused on the key stakeholders' knowledge and understanding of agricultural biotechnology, their views and opinions about the impact and role of biotechnology, sources and kinds of

information, and their perceived trustworthy sources of truth about biotechnology.

The study found that Southeast Asians have high interest in biotechnology and strongly appreciated the role of science in the development of agriculture. In addition, they perceived that agricultural biotechnology is not a risk to public health and food safety. They also believed that agricultural biotechnology will bring forth improvements to agriculture that, in turn, can benefit small farmers.

Respondents were also asked about their willingness to pay the cost for labeling GM foods. Businessmen, consumers, and farmer leaders indicated their demand for such labels, but not all of them were willing to pay for the extra cost involved. Majority of the stakeholders in Thailand, Vietnam, Indonesia, and Malaysia expressed disagreement with posing extra cost to consumers for food labeling. However, the respondents in the Philippines remained divided on this issue (UIUC-ISAAA, 2003).

When asked about their perceived trustworthy sources of truth about GM food, majority of the stakeholders answered university scientists and research institutes as the most trustworthy. They perceived this sector as highly concerned about public health and safety issues including biotechnology. This is because university scientists and research institutes are very capable of assessing and managing the risks associated with agricultural biotechnology (UIUC-ISAAA, 2003).

Trends in the Philippines

Three similar research studies on public knowledge and understanding, attitude, and perception toward agricultural biotechnology in the Philippines have been conducted. One study on knowledge, attitude, and perception of key stakeholders about genetically modified rice was conducted by PhilRice and the International Rice Research Institute in 2003 (Mataia et. al. 2003). Survey questionnaires were distributed to measure public knowledge, attitude, and perception about biotechnology research in the Philippines. Survey respondents included university presidents and professors, policymakers in government institutions responsible for agriculture, environment, health, trade, and science and technology as well as representatives from research institutions, multinational companies, NGOs, farmer organizations, religious groups, the media, legislators, college students, public officials, and agriculturists.

Results showed that almost 80 percent of the respondents were aware of rice biotechnology. Those who were in favor of biotechnology turned out to be those who were very aware of the benefits of rice biotechnology, while respondents in the group who opposed biotechnology were most frequently aware of the risks of the technology. Although the majority had heard of rice biotechnology, this did not necessarily mean a high level of correct knowledge and understanding of rice biotechnology.

Sources of information on rice biotechnology included media, research and government institutions, professors and co-workers. Reading materials such as books, magazines, newspapers and other publications were cited as well as TV/radio and public discussions. Students said they often obtained information in the classroom. Nearly all of the respondents (96%) expressed their willingness to learn more about rice biotechnology through a variety of information sources.

With regard to attitude towards rice biotechnology, a majority of respondents (76%) expressed conditional support for rice biotechnology research while only 15 percent supported GM rice research unequivocally. The primary concern of the respondents who expressed conditional support was the impact of genetically modified rice on human health. The study also revealed that there was no relationship between respondents' educational attainment and support for rice biotechnology research, nor was there a relationship between support for biotech rice and knowledge of rice biotechnology.

The second study, the UIUC-ISAAA Project in 2003, was an extensive survey with journalists, scientists, farmer leaders and community leaders, extension workers, consumers, businessmen and traders as well as religious leaders. The survey focused on the following variables: 1) interest in and concern about agricultural biotechnology; 2) perceived risks and benefit of biotechnology; 3) perception of institutional concern and institutional accountability; 4) opinions, understanding, and knowledge about science and biotechnology; 5) sources and characteristics of information on biotechnology; and 6) attitude towards biotechnology.

Results showed that a majority of Philippine stakeholders - particularly policy makers, journalists, businessmen, farmer leaders, and extension workers - were highly interested in agricultural biotechnology. About 70 percent of policy makers, businessmen, and extension workers believed that biotechnology is good for Philippine agriculture. On the other hand, consumers, religious leaders, and scientists showed relatively less interest and concern about biotechnology (ISAAA 2003).

The third research, the AFIC study done in 2002, revealed that Filipinos were not strongly concerned about biotechnology, although 93 percent of the respondents expressed their concern for food safety. Among those safety concerns were a) if the food is clean/hygienic (22%), b) fresh (19%) and c) sanitary (19%).

Comparative Data

Based on the AFIC study (2003) with consumers in China, Indonesia, and the Philippines, some comparisons can be made about country trends. Nutritional value turned out to be the most important concern among all the respondents in the three countries. In the Philippines, almost 90 percent of the respondents said that, indeed, nutritional value was their main concern about food (AFIC 2003**).**

Animal diseases were the second most important concern in the Philippines (78%) and in China (70%). The least important concern about food was biotechnology or genetically modified foods. Only 19% of all respondents in the three countries gave the highest score of 10 for this attribute (AFIC 2003).

With regard to perceived benefits and risks, the Philippine stakeholders did not really consider biotechnology as posing a high risk to public health and food safety. In fact, majority of the respondents viewed agricultural biotechnology as having moderate to high benefits, particularly among journalists, policy makers, extension workers, and businessmen. Religious leaders, however, seemed evenly divided on this issue (ISAAA 2003).

The AFIC study in 2003 supports the findings of ISAAA study in 2002. Sixty percent of the Filipino respondents perceived that biotechnology has benefits. However, this figure is quite low compared to Indonesia (83%) but a little higher compared to China's (55%). When asked about their perceived benefits of agricultural biotechnology, a small 23 percent of the Filipino respondents indicated that biotechnology can improve human health and nutrition (AFIC 2003).

In contrast to the prevailing notion that the disadvantages of biotechnology outweighed its benefits, the study showed that no single disadvantage of food biotechnology stood out prominently. Those mentioned by a few were: a) may cause side effects (12%), b) technology too expensive for farmers (10%), and c) more chemicals harmful to the body (11%).

When understanding and knowledge about agricultural biotechnology were gauged, the Philippine stakeholders gave themselves moderate ratings. Based on a pop-quiz of 12 statements, most of the stakeholders, except for religious leaders have obtained moderate scores. This seems logical since most of the Philippine stakeholders have a college degree and have access to scientific information through various media (ISAAA 2003).

Respondents' awareness of terminologies used in biotechnology was low among all the stakeholders in the Philippines, Indonesia, and China. For those few who reported awareness of these terms, the most common definitions given to biotechnology were:
a) changing the genetic code content of a product, b) production of a better product, and c) addition of other components to a product (AFIC, 2003).

Respondents also rated themselves very low in awareness of the terms "genetically modified foods" and "biotechnology-derived foods" (AFIC 2003). Some who reported a level of awareness of these terms were asked to define them. Their answers were as follows:

- Transfer of altered genes into a certain product to make it bigger and sweeter
- Food derived from genes
- Quality products using modern technology
- Artificially processed food
- Food with improved quality
- Food with additives or processing aids

The study also looked into awareness of the scope of food biotechnology. When Filipino respondents were asked to give an example of biotechnology-derived foods, rice was the most mentioned (AFIC, 2003).

In terms of attitude towards agricultural biotechnology, no less than 60 percent of the stakeholders expressed at least an above-moderate stance on biotechnology. However, no data suggest strongly positive attitude toward biotechnology (ISAAA, 2003).

A hypothetical question was used in the AFIC study to gauge Filipino attitude towards agricultural biotechnology. When asked if they would try genetically modified corn snacks, 30 percent of all respondents said that they "would definitely try it" while another 58 percent said that they "would probably try it".

Respondents were specifically asked if they had any reservations about consuming biotechnology-derived foods. About 64 percent had no reservations while the remaining 36 percent indicated some. These included harmful effects to the body, less nutritional value, possible side effects, presence of too much chemicals, insufficient studies/trials about such foods, and religious reservations.

When asked where they get information on agricultural biotechnology, the journalists, businessmen, policy makers, and scientists pointed to both mass media and interpersonal sources more often than any other stakeholders. On the other hand, religious leaders hardly gathered information on biotechnology. The Philippine stakeholders cited university scientists as very trustworthy sources, followed by science magazines and websites. University scientists were regarded as being sympathetic to public health and safety issues and possessing the expertise to conduct risk assessment and risk management. Hence, the study concluded that university scientists can be very effective agents for educating the public about agricultural biotechnology (ISAAA, 2003).

In the AFIC study, mass media turned out to be the main sources of information in the Philippines (TV, 43%; newspapers, 38%; magazine, 34%). Thirty-seven percent indicated that they preferred radio as their source of information (AFIC, 2003).

Part 3 Methodology

Research Design

The survey method was used in the study. This was deemed appropriate as the objective was to obtain a picture of the pattern of behavior of a cross-section of the stakeholder population in the Philippines.

Locale of the Study

The Philippines was divided into three major island groups: Luzon, Visayas, and Mindanao. From each island group, a key city and an adjacent province were chosen for better representation and more efficient data gathering. The criteria for choosing the key city and adjacent province were as follows:

- There is an existing institution linked to the Biotechnology Information Center (BIC) or the Regional Applied Communication Office (RACO) through which data gathering may be coordinated.
- People are familiar with or have basic knowledge of biotechnology.

Based on the above criteria, the identified project sites included were Metro Manila, Cagayan Valley, and Laguna in Luzon; Cebu City and Iloilo Province in Visayas; and Davao City and Bukidnon in Mindanao.

Sampling of Respondents

The sample size for the different stakeholders was determined by a statistician. Sample respondents were chosen from the following sectors:

1. Businessmen and traders
2. Consumers
3. Extension workers
4. Farmer leaders and community leaders
5. Journalists
6. Policy makers
7. Religious leaders
8. Scientists

Multi-stage stratified sampling was done for the island groups to the province or city down to

the various groups of stakeholders. According to the statistical procedure followed, the samples should be at least 400 (please refer to the statistical formula and computation in the box). This number was increased to 420 upon the advice of the statistician to minimize the likelihood of having a sample size of less than 30 per stakeholder group in case of drop-outs or unavailable respondents during actual data gathering. The number of respondents per stakeholder group was pro-rated according to the assumed trend about its population relative to the population of the other stakeholders. The desired total number of 420 samples was increased to 423 according to defined stratifications.

Formula and Computation for Minimum Sample Size

$$n = \frac{(Z2)(\quad)(1-\quad)}{e2}$$

where : n = sample size
Z = 1.96 (for a 5% standard error) or if acceptable level of error is .05
= variance (set at 0.5 for this study)

Computations:

$$n = \frac{(1.96)^2 (1/2) (1-1/2)}{(0.5)^2}$$

$$n = \frac{4 (1/2) (1/2)}{.0025} = 1/.0025 = 400$$

The choice of where the respondents would be drawn (city or province) depended on where most of the targeted stakeholders were found. For example, scientists and journalists were drawn mostly from the city while farmer leaders and extension workers were drawn from the province.

Data Gathering Methods and Instruments

Structured interview schedule were used to gather data. In cases when this was not possible (e.g. policy makers not available for interview), self-administered questionnaires were used instead.

The interview schedule covered substantially those areas included in the ISAAA-UIUC 2002 study. As stated earlier, the worldviews and the values of the respondents were looked into in this research.

Data Analysis

Data were analyzed using descriptive techniques. Frequency counts, percentages, ranges, and weighted means were used to describe the socio-cultural characteristics; worldviews and values; information and information sources; understanding and perception of and attitude of stakeholders towards agricultural biotechnology. Relationships between the socio-cultural factors and level of understanding, perception of, and attitude of stakeholders toward agricultural biotechnology were analyzed using Chi-square test and Spearman Rank Correlation test.

Part 4 Results and Discussion

Socio-demographic characteristics

Of the 423 respondents selected for this study, more than half (53%) were male. There were more males in sectors generally perceived to be dominated by males such as policy makers (88.6%), religious leaders (74.3%), and farmer leaders and community leaders (70.4%) (Appendix Table 1).

Majority of the respondents in all the eight stakeholder groups were married. Though there was no majority trend in terms of age, 35.8 percent of the total respondents were aged 41 to 50. The largest percentages of respondents who were 41 to 50 years old were in the groups of extension workers, farmer leaders/community leaders, policy makers, religious leaders, and scientists. The youngest among the stakeholders were the businessmen and traders (Appendix Tables 2 and 3).

Four out of ten respondents (40.1%) had a BA or BS degree, and about the same number had either a graduate or a post-graduate degree (Appendix Table 4). By the very nature of their group, the scientists (80%), the journalists (54.3%), and the policy makers (51.4%) had either graduate or post-graduate education. While the farmer participants represented all the educational levels from the elementary education, it is interesting to note that a greater percentage of them had either some college education (19.7%), a BS or BA degree (19.7%) or a graduate or post-graduate degree (21.1%).

Based on area of residence (Appendix Table 5), 45 percent lived in rural areas, 34.8 percent lived in urban areas, and 20.2 percent lived in suburban areas. Farmer/community leaders (77.5%), extension workers, policy makers (45.7%), and religious leaders (45.5%) resided mostly in rural areas. On the other hand, more than half (57.1%) of the journalists were urban-dwellers.

Based on distribution according to religion, majority (72.1%) of the respondents were Roman Catholics (Appendix Table 6).

Worldviews and Values

In assessing their world views and values, participants were asked to rate eight statements using a four-point rating scale of strongly agree (4), agree (3), disagree (2), strongly disagree (1). Appendix Table 7 summarizes the results for this variable.

The use of biotechnology in food production is against my moral values.

Majority of the stakeholder groups (58.6%) did not consider the use of biotechnology in food production as against their moral values. The extension workers registered the biggest disagreement to the statement at 67.7 percent. Using the weighted mean, Appendix Table 7 shows that the group of religious leaders was between the disagree-agree response having a weighted mean of 2.5.

If my community would hold an information session on biotechnology in food production, I would attend.

All the stakeholder groups supported this item (63.7%) and the mean ratings of 3.2 to 3.4 further attest to this. Farmer leaders and community leaders together with the scientists indicated strong tendency to attend such information sessions, both having the highest mean rating of 4.

Foods that have been genetically altered should be labeled.

Stakeholders, in general, took the view that GM foods should be labeled. As indicated by the percentages, 47.5 per cent "strongly agreed" and another 45.6 percent "agreed". Mean ratings were mostly between these two responses.

Genetic manipulation takes mankind into realms that belongs to God and God alone.

No majority trend was observed for this statement. The stakeholders were distributed to those who agreed (24.6%) and disagreed (38.2%). Based on the weighted mean of 3.1, it is the religious leaders who thought that genetic manipulation belongs only to God. The businessmen and the scientists registered the lowest weighed mean at 2.3 each indicating that they disagree with the statement.

Until we know that genetically altered foods are totally safe, those products should be banned.

Respondents were more inclined to support this statement, with 27.3% giving strong agreement and 37.9% , strong agreement. As expected more from the religious group (50%) strongly agreed and 31.4% of scientists disagreed. The weighted means revealed that the religious leaders (3.4) and the consumers (3.0) had the highest agreement with the statement. The journalists were the skeptics since their 2.7 weighted mean was between agree and disagree.

We have no business meddling with nature.

Overall, the stakeholders were open to manipulation of nature as reflected by the fact that about 50 percent generally disagreed (49.2%) with the statement that "we have no business meddling with nature." The weighted mean (2.8) of the religious leaders suggests an ambivalence between agree and disagree. The consumers and the policy makers, on the other hand, had a weighted mean of 2.1 each indicating disagreement with the statement.

I am willing to pay for the extra cost for labeling genetically modified foods.

Though not a majority, many respondents (41.7%) agreed with the statement that respondents were "willing to pay the extra cost for labeling genetically modified foods." The weighted means for the different groups ranged from 2.3 to 2.7 suggesting that the responses tend to be between disagreement and agreement. This suggests some degree of ambivalence among them. Extension workers (51.6%) and journalists (51.5%) agreed while majority of policy makers (67.6%) disagreed.

The regulation of modern biotechnology should be left mainly to the industry.

There is a preponderance of disagreement with the statement that "regulation of modern biotechnology should be left mainly to the industry." Those who registered the highest in disagreement were the scientists (74.3%), businessmen and traders (42.0%), and farmer leaders and community leaders (50.0%). If the weighted means would be considered, then the consumers (1.9) would also be part of the group which disagreed.

In general, all stakeholders tend to hold worldviews favorable to agricultural biotechnology. Even religious leaders did not view biotechnology in food production as against their moral values. But they still held certain degree of precaution as majority felt that GM foods should be banned until it is known that they are totally safe, and that regulation should not be left mainly to the industry. The public, as exemplified by the stakeholders in this study, was willing to pay the extra cost for labeling GM foods.

Information Sources on Biotechnology

Results also showed that the Philippine stakeholders had low exposure to information sources on agricultural biotechnology (Appendix Table 8). They had not contacted any information source on agricultural biotechnology during the last two months before they were interviewed.

For a few who had two or three times accessed or received information, these came mostly from multiple sources: mass media (TV, newspaper and radio), interpersonal sources, and printed materials.

Active information users were the policy makers who usually obtained their information on agricultural biotechnology from mass media (54.3%) (TV, newspapers, and radio) and newsletters, pamphlets, or brochures (60.0%). The group having least contact with information sources on biotechnology in food production was that of the religious leaders. The trend also depicts that the local politicians, food regulators, and attendance in seminars were the least accessed sources of information on agricultural biotechnology (Appendix Table 8).

Extent of Trust in Information Sources

Respondents were asked whether they had total trust (4), some trust (3), no trust at all (2), and not sure (1) about several information sources on agricultural biotechnology.

University scientists were identified as the most trusted information source among the stakeholder groups, with 48.8 percent and 46 percent having total and some trust on them (Appendix Table 9). Across stakeholders, the other information sources were given only on a rating of "some

trust."

Based on weighted means (of consistently 3.0 and above), the trusted information sources that stood out in the study were the private sector and university-based scientists, science magazines and newsletters, and web sites. It is interesting to note that religious leaders were trusted both by the policy makers and their fellow religious leaders as trusted sources of information on agricultural biotechnology.

Usefulness of Information in Making Judgments About Food Production

Stakeholders evaluated the usefulness of information on biotechnology for food production. Possible responses were very useful (3), somewhat useful (2), and not useful (1). Appendix Table 10 shows the participants' responses.

Stakeholders rated the information on biotechnology for food production that they obtained as useful (46.2%) and very useful (50.0%). The percentages and weighted mean (2.5) indicate that policy makers, consumers, as well as farmer leaders and community leaders were the ones who find these very useful.

Perception on How Scientific are the Information on Biotechnology

Across all groups, the predominant perception was that the information they get on agricultural biotechnology is somewhat scientific. The highest proportion of about two-thirds was noted among the scientists themselves, suggesting the need to enhance the quality of information being disseminated about biotechnology (Appendix Table 11).

Weighted means at 2.4 by the policy makers suggest that these respondents perceived that the information they get about biotechnology is somewhat scientific. This is about the same perception as those of the consumers and extension workers with weighted means of 2.3 each.

Considering that these respondents are of the on-scientific group, it can thus be seen that there is a need to put in some effort in popularizing information on agricultural biotechnology in food production.

Understanding of Biotechnology

Understanding of Science

For this item, the majority (74.3%) rated themselves as having adequate understanding of science (Appendix Table 12). This trend was consistent for all the stakeholder groups. The journalists (88.2%) topped the group followed by the businessmen and traders (78.0%), the consumers (78.0%) and the extension workers (77.4%). It should be noted that the journalists interviewed in this study were science writers. The weighted means of 1.9 to 2.2 for the different groups further

support the trend (Appendix Table 12).

Knowledge on the Uses of Biotechnology in Food Production

Respondents were asked to indicate their knowledge of the uses of biotechnology in food production using a rating scale of know a great deal (3), know some (2), and know nothing at all (1).

Majority (85.4%) of the respondents across all groups rated themselves as having some knowledge (Appendix Table 13). The weighted means for the different groups show the same trend. This is despite the result that majority of the respondents have high educational attainment. Very few, even from the scientists group, claimed to know a great deal about agricultural biotechnology. This suggests that indeed, there is still a big knowledge gap on uses of biotechnology in food production among the public that has yet to be addressed.

Understanding of the Uses of Biotechnology in Food Production

To assess the respondents' understanding of the uses of biotechnology in food production, they were asked to answer whether the 13 statements given were true or false. Respondents gave correct answers to 11 out of the 13 statements, suggesting that they have good understanding of the subject matter (Appendix Table 14).

Statements correctly assessed as true were as follows:

- In reality, all crops have been "genetically modified" from their original state through domestication, selection, and controlled breeding over long periods.
- Yeast for brewing consists of living organisms.
- With every new emerging technology, there will always be potential risks.
- In genetic engineering, genes of interest are transferred from one organism to another.
- Golden rice (genetically modified rice) contains beta carotene.
- Products from genetically modified crops are now being sold in the Philippines.
- GM crops are now being commercially grown in the Philippines.
- Plant viruses infect vegetables and fruits.

Statements correctly assessed as false were as follows:

- Ordinary tomatoes do not contain genes, while GM tomatoes do.
- Science can guarantee zero risk.
- By eating GM corn, a person's genes could also be modified.

The lone statement incorrectly assessed as false was :

- Plant viruses are transferred to humans when they eat vegetables and fruits infected with

plant viruses.

A considerable number, ranging from one-third to two-fifths, were ignorant about golden rice as a GM food. Religious leaders (47.1%) and consumers (42.45) formed the bulk of this group. Likewise, several had the misconception that human genes are not identical to those of a monkey. About one-third did not even know about it.

All the above suggest that while the Filipino public may have good understanding of agricultural biotechnology, there are still some basic knowledge that they should be made aware of as these could influence their outlook concerning biotechnology.

Factual Knowledge on Biotechnology: Use of Biotechnology Crops

Stakeholders were presented theoretical scenarios of possible biotechnology crops. They were asked what they would do if a number of these crops are developed. They were also given the following choices: to grow or plant the crop, use it as food, as animal feed, or as industrial by-products (Appendix Table 15).

Filipinos were most interested to use biotechnology crops such as tomato, papaya, eggplant, corn, rice and papaya for planting and for food. They considered rice and corn as versatile, as these can be used for crop growing, food, animal feed, and industrial by-products. Aside from food, papaya was also seen as having potential for producing other industrial by-products. Ridiculous though was the idea given by a few to consider cotton for food and animal feed.

These findings suggest that factual knowledge of the stakeholders on use of biotechnology crops is quite good. Some minor misconceptions may just have to be corrected to promote a better appreciation of agricultural biotechnology.

Factual Knowledge on Biotechnology: Importance of Food Characteristics

Stakeholders were asked to rank from very important (4) to very unimportant (1) certain food characteristics that they would consider. Appendix Table 16 shows their assessment.

In general, all food characteristics cited in the study were deemed very important by the stakeholders. These were: non-allergenic, non-poisonous, price, appearance, nutritional quality, taste, and pesticide residue content. The weighted means for all items and for different stakeholder groups were above 3.0 indicating a rating of very important.

Based on percentages, an overwhelming majority emphasized non-allergenic, non-poisonous, nutritional quality, and pesticide residue content as important considerations for use of biotechnology in food production. One hundred percent of religious leaders cited food being non-poisonous, and 100 percent of policy makers focused on pesticide residue content as important.

Perception of Agricultural Biotechnology

Appendix Tables 17 and 18 reflect the perception of the respondents on the risks/hazards and benefits associated with the use of agricultural biotechnology in food production. Respondents

rated from very hazardous (3), somewhat hazardous (2), and not at all hazardous (1).

Perceived Risks

Almost half (49.3%) of the respondents said that the use of agricultural biotechnology in food production was somewhat 'hazardous', while three out of ten respondents (30.7%) said that the use of agricultural biotechnology in food production was not at all hazardous (Appendix Table 17).

Weighted means show that the religious leaders participating in the study were most concerned as their perception had a mean of 2.0. Scientists among the respondents had a weighted mean of 1.5 suggesting that their perceptions were in between "not at all hazardous to somewhat hazardous." This could be reflective of their education and training.

Perceived Benefits

Majority of the respondents perceived agricultural biotechnology as beneficial in food production. Almost half (48.2%) said that agricultural biotechnology in food production was moderately beneficial, while roughly four out of ten respondents (40.7%) said that agricultural biotechnology in food production was very beneficial (Appendix Table 18).

Weighted means ranged from 2.3 from the religious leaders to 2.6 each group from the journalists and the policy makers. Once again, the religious leaders among the respondents were conservative in their perception of biotechnology in food production.

Perception of Agricultural Biotechnology

Respondents were asked to rate ten perception statements based on their degree of agreement or disagreement with them, using a rating scale of 1 (lowest) to 4 (highest) (Appendix Table 19). Positive responses were given by majority of the stakeholders to the following statements:

1. Government agencies are doing their best to ensure that the food we eat is safe.
2. Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.
3. The risks of genetic engineering have been greatly exaggerated.
4. Biotechnology is good for Philippine agriculture.
5. Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.
6. Regulations on biotechnology should include inputs from the non-government sector.

Consistently high weighted mean ratings of 2.9 (agree) and above were observed for statements 4, 5, and 6. All these reflect that the Filipino stakeholders has a generally positive attitude towards what the government is doing to ensure the safety of the public when using biotechnology for food production. This also shows the trust that they have on the government and on the biotechnology experts when it comes to agricultural biotechnology.

The above trend is further supported by the respondents' (47.4%) perception that the statement

"biotechnology in food production only benefits large agricultural companies" is not true. The majority came from the scientists (62.9%), journalists (55.9%), and extension workers (53.2%). This is the political aspect of biotechnology where transparency could help establish public trust.

There was, however, mixed responses concerning the statement that "vital information about the health effects of GM foods is being held back." There were 39.4 percent who agreed, 31.3% who disagreed, and 21.5 percent who said they did not know. Those who believed the statement came mostly from the consumers (45.9%) and journalists (45.7%). Those who believed otherwise came from the policy makers (54.3%). This perception has to be addressed especially that it affects the two groups of consumers who can make or break the acceptance of agricultural technology among the public. Consumers as the end users can accept or reject agricultural biotechnology; while journalists can disseminate good or bad things about biotechnology and influence the other stakeholders' perception and opinion with what they know and think.

While nearly half (47.7%) agreed to the statement that "genetic engineering of food products could create unexpected new allergens or contaminate products in anticipated ways, resulting in threats to public health," 20 percent disagreed , and 18.1 percent did not know. This reveals that there are still some knowledge gaps about the consequences of genetic engineering which the public should be educated on.

Based on the weighted means of 3.0 to 3.2 for most stakeholder groups, it is evident that the respondents agreed that regulations on biotechnology should include inputs from the non-government sector.

The religious leaders in this study exhibited some degree of caution about biotechnology as shown by their 3.1 weighted mean regarding the statement that genetic engineering of food products could "create unexpected new allergens or contaminate products which may be threats to public health."

Perception of Institutional Concern About Health and Safety

Appendix Table 20 reflects how the respondents perceived the involvement of 10 individuals, groups, and organizations in public health and safety in agricultural biotechnology.

Perceived as highly concerned by majority of the respondents were the international research institutions like IRRI and CIMMYT (60.1%), university-based scientists (58.4%), and government research institutions (54.6%). The weighted means of 3.1 and above for all stakeholder groups further indicate this concern. The policy makers gave the highest weighted mean of 3.6 to international research institutes.

The consumers/general public, consumer groups, local farm leaders, agricultural biotechnology companies, and mass media/journalists were rated as somewhat concerned. The religious leaders/groups were perceived by many (45.2%), though not a majority, as very concerned and by others (37.4%) as only somewhat concerned. On a per stakeholder group, the lowest weighted mean rating of 2.7 among all stakeholders was given by the farmer leaders and community leaders to the consumers/general public and by the religious leaders to the

agricultural biotechnology companies. This suggests that they perceived the latter groups as having lesser concern about public health and safety with regard to agricultural biotechnology among all stakeholder groups.

Perception that Science Should be a Part of Agricultural Development

As to the respondents' perception about the extent that science should play in agricultural development, their responses were categorized into very much a part (3), somewhat a part (2), and should not be part at all (1).

On the whole, science has been perceived as an important part of agricultural development by all the stakeholders (74.9%). Scientists registered the highest response (85.7%) followed by journalists (79.4%) and consumers (79.0%) with weighted means of 2.8 each (Appendix Table 21) .

Attitude Towards Agricultural Biotechnology

Interest in Uses of Agricultural Biotechnology

Stakeholders were almost equally divided into very interested (45.7%) and somewhat interested (48.8%) when it comes to uses of agricultural biotechnology. Weighted means also indicate a range of 2.3 to 2.7 , suggesting a rating in-between very interested and somewhat interested (Appendix Table 22).

Exhibiting high interest were the policy makers (71.4%), scientists (51.4%), and journalists (50%) – stakeholder groups who are in the forefront of decision making processes and advocacy initiatives in agricultural biotechnology. Groups that registered weighted means closer to very interested were the extension workers (2.5), journalists (2.5), and scientists (2.5). Businessmen and traders, consumers, and religious leaders had the lowest weighted means of 2.3 each suggesting some interest.

Concern on Uses of Agricultural Biotechnology in Food Production

Appendix Table 23 shows that half (50%) of all the stakeholders were very concerned about the uses of agricultural biotechnology in food production. As expected, the policy makers (80%) were very concerned, followed by the journalists (55.9%), scientists (54.3%), and the consumers (50.5%).

This high concern may be explained as follows:

Based on the nature of their work, policy makers were very concerned because they are the ones who will allow, control, and regulate applications of biotechnology. Determining potential threats to public health and safety would be their primary responsibility. Scientists, on the other hand, were very concerned because of their role as technology developers and key persons in

managing health risks before biotechnology-derived products can get to the policy makers and to the public. Similarly, journalists were very concerned because of their role in keeping the public informed about issues that would affect public health and safety. And lastly, consumers were concerned because they will be eventually the end users of agricultural biotechnology.

Attitude Towards Biotechnology

The respondents' attitude was measured by seven statements to which they were asked to indicate whether they strongly agreed (4), agreed (3), disagreed (2), strongly disagreed (1), or don't know. There were seeming contradictions as seen from the results in Appendix Table 24.

Stakeholder groups, in general, had highly favorable attitude towards biotechnology as indicated by their strong agreement with the following statements:

- If my community would hold an information session on biotechnology in food production, I would attend.
- Foods that have been genetically altered should be labeled.
- The public should be consulted in formulating food regulation and laws.

This was corroborated by the stakeholders disagreement (41.2%) when it comes to contributing time or money to an organization that promotes a ban on GM foods. Majority who disagreed came from scientists (54.3%) and policy makers (51.4%).

No majority trend came out for other statements and the stakeholders were somehow dispersed on issues pertaining to the following:

- I am willing to pay the extra cost for labeling GM foods.
- The public should be directly consulted in approving R&D in agricultural biotechnology.

The weighted means (2.3 to 2.7) for all stakeholder groups for the first statement above approximate in-between agreement and disagreement, and the stakeholders were distributed to those who agreed (37.8%) and to those who disagreed (29.0%).

For the second statement, majority agreed (with 39.2% agreeing and 27.6 strongly agreeing) but a considerable number (23.8%) disagreed. The lowest weighted mean of 2.2 on the issue was exhibited by the extension workers, majority (77.4%) who were against directly consulting the public in approving R&D in agricultural biotechnology. Perhaps the extension workers felt that it was tantamount to bypassing their role when this happens.

Applications to be Considered in Judging Biotechnology Products

The issue was asked only to the policy makers and scientists in relation to their work of making judgment about agricultural biotechnology products**.** They were asked to rate six statements using a 4-point scale ranging from all the time (4), almost always (3), seldom (2), and never (1).

The general trend, based on percentages and weighted means, shows apparent interest among these two groups to focus on specific applications as basis for judging biotechnology products almost always, and not all the time (Appendix Table 25).

Both would almost always consider all the following six items when making judgments on biotechnology:

- Use of modern biotechnology in the production of foods to make them more nutritious, taste better, and keep longer (58.6%)
- Taking genes from plant species and transferring them into crop parts to make them more resistant to pests and diseases (37.1%)
- Introducing human genes into bacteria to produce medicines and vaccines, for example to produce insulin for diabetes (32.9%)
- Modifying genes of laboratory animals such as a mouse to study human diseases like cancer (38.6%)
- Introducing fish genes into strawberries to resist extreme freezing temperature (34.3%)
- Using genetic testing to detect and treat diseases we might have inherited from our parents (37.7%)

Based on weighted means for all items, however, the policy makers tend to consider all these applications more than the scientists. This implies that in the Philippines, the policy makers are more concerned on the applications when judging biotechnology products than the scientists.

Issues to Focus on When Making Decisions on Biotechnology

The policy makers and the scientists were the only stakeholders who were asked to assess how often they focus on eight given items using the same rating scale as above. Overall trend shows that stakeholders tend to consider certain issues neither all the time nor seldom, but almost always (Appendix Table 26).

Issues which both stakeholders almost always focused on were as follows:

- GM foods are as safe as conventional ones and have undergone testing by regulatory bodies (52.9%).
- There is no evidence GM crops harm the environment or have potential harm to the environment any more than conventional agricultural farming methods (50.0%).
- Farmers want GM crops because they make crop production cheaper, increase yield, and increase income (61.4%).
- Groups that oppose modern biotechnology have no factual evidence for their claims of negative health consequences or environmental impact. (42,9%).
- Plant breeders and farmers want access to modern biotechnology to improve their crops. Everyone knows that this will not solve world hunger (48.6%).

All these imply that policy makers and scientists were very concerned with issues on food safety and environmental impacts of biotechnology. Though the weighted means for the policy makers

and scientists were close to each other in all instances, those of the former were always higher than the latter. This could further mean that policy makers are more concerned with the issues discussed than the scientists (Appendix Table 26).

There were also other issues which both scientists and policy makers seldom considered when making decisions about biotechnology. Among these were:

- Pollen from genetically modified crops will contaminate native plant species and further reduce biodiversity (38.6%).
- Pest-resistant GM crops would also harm non-target organisms like butterflies (40%).

This means that scientists and policy makers are not as concerned with the impacts of biotechnology on other organisms as they are concerned with its impacts on food safety.

Issues/Concerns on Biotechnology Heard or Know about

Based on multiple responses, issues about biotechnology heard or known about can be ranked as follows: moral/ethical, cultural, religious, and political. Findings imply that the biggest challenge for biotechnology were moral/ethical issues than technical soundness and utility.

Based on frequency count, the issues can be ranked as follows: moral/ethical, cultural, religious, and political in that order (Appendix Table 27). Moral/ethical issues (230 responses) on agricultural biotechnology turned out to be the primary concern of all the stakeholder groups. The consumer group among the respondents were the most concerned as evidenced by the 57 responses.

Relationships Between Socio-Demographic Characteristics and Level of Understanding, Perception, and Attitude Towards Agricultural Biotechnology

Using the Chi-Square test, relationships between selected categorical variables were tested at a level of significance of .05.

While no relationship was found between age and level of understanding, significant relationships were found between age and perception of as well as attitude towards agricultural biotechnology.

Age and Perception of Agricultural Biotechnology

A significant relationship was found between the age of the stakeholders and their perception that government agencies are doing their best to ensure that the food people eat are safe. The result suggests that the higher the age of the stakeholders, the higher the likelihood that they would agree that the government is ensuring the safety of the food people eat (Table 1).

Another significant finding was on the perception that genetic engineering could result in threats

to public health. Older stakeholders were likely to perceive the possibility of threats to public health due to genetic engineering (Table 1).

Older respondents usually have more exposure and experience from which they build up their perception and attitude. Having gained more information also, they now have a better basis for perceiving things as they are.

Age and Attitude Towards Agricultural Biotechnology

A highly significant relationship was found between age and concern about the use of agricultural biotechnology in food production. This means that older stakeholders are more concerned about the use of agricultural biotechnology in food production than the younger ones. Table 1 also shows a significant relationship between age and interest in the use of agricultural biotechnology in food production.

It is worth pointing out that while the older stakeholders were the ones concerned about the use of biotechnology in food production, they were also the ones who showed interest in agricultural biotechnology. This suggests a safety-conscious but interested group of stakeholders.

Table 1. Age and perception of and attitude towards agricultural biotechnology

Independent Variable	Dependent Variable	Value of r_s	Significance
Age			
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	0.184	S
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	0.126	S
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY		
	Interest in using agricultural biotechnology in food production	0.113	S
	Concern in using agricultural biotechnology in food production	0.131	HS

Education and Level of Understanding of Agricultural Biotechnology

Education has a highly significant relationship with the stakeholders' understanding of science. This means that the higher the education, the better the understanding of science (Table 2). A significant relationship was also found between education and the stakeholders' perception that government agencies are doing their best to ensure that people eat safe food. Results suggest that those with higher education are likely to perceive that government is making sure that people have safe food to eat.

This could be explained by the fact that education provides one with more knowledge and facts about science, which in turn broaden one's perspective and basis for decision No significant relationship was found between education and attitude towards agricultural biotechnology.

Table 2. Education and understanding and perception of agricultural biotechnology

Independent Variable	Dependent Variable	Value of r_s	Significance
Education	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.171	VHS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	0.161	S

Views and Values on Society and Perception of Agricultural Biotechnology

A high significant relationship was found between the world view that the use of biotechnology in food production is against one's moral values and the perception that biotechnology in food production only benefits large agricultural companies (Table 3). The religious leaders registered the highest weighted mean at 2.9 for this worldview. This is expected because some religious leaders in the Philippines have been outspoken about their negative views on biotechnology.

A negative relationship was found between moral values and the statement that vital information about the health effects of genetically modified foods is being held back.
This suggests that the higher the weighted mean about biotechnology-derived food being against one's moral values, the lower the agreement with the statement that vital information about the health effects of GMOs is being held back. Interestingly in both variables, the religious leaders had the highest mean rating.

A significant relationship was also observed with this worldview and the perception that biotechnology is good for Philippine agriculture. The negative sign indicates that those who agree with the worldview tended to disagree with the perception that biotechnology is good for Philippine agriculture.

The third perception that had a significant relationship with biotechnology being against moral values was the perception that genetic engineering could produce allergens that may be a threat to public health. Once again, those who were more in agreement with the worldview; tended to disagree with the perception that genetic engineering is a threat to public health.

The worldview that biotechnology is against the stakeholders' moral values had a significant relationship with the stakeholders' interest in using agricultural biotechnology for food production. Ironically, this means that those who perceive biotechnology in food production as against their moral values are the ones interested in agricultural biotechnology in food production.

Table 3. World view (a) and perception of and attitude towards agricultural biotechnology.

Independent Variable (Worldviews and Values)	Dependent Variable	Value of r_s	Significance
(a) The use of biotechnology in food production is against my moral values.			
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Biotechnology in food production only benefits large agricultural companies.	0.202	VHS
	Vital information about the health effects of genetically modified foods is being held back.	-0.182	S
	Biotechnology is good for Philippine agriculture.	-0.182	S
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	-0.157	S
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY		
	Interest in using agricultural biotechnology in food production	0.129	S

Attendance in an Information Session on Biotechnology

A significant relationship was found between attendance in an information session on biotechnology and the perception that governments agencies are doing their best to ensure that the food people eat are safe (Table 4). This suggests the value of information sessions in creating favorable perception about the government's effort in ensuring that the food people eat are safe.

A significant relationship was also found between attendance in an information session and the perception that government agencies have the scientific facts and technical information to make good decisions about agricultural biotechnology.

Finally, a significant relationship was also obtained that those who are willing to attend an information session agree that the expert statements on biotechnology production are based on scientific analyses, and are therefore, objective.

All the above suggest that information session can be maximized to create favorable attitude among the public about biotechnology.

Attitude Towards Agricultural Biotechnology

A highly significant relationship was obtained between plan to attend an information session in the community and interest in the use of agricultural biotechnology in food production (Table 4). The latter logically serves as motivator for the first.

A significant relationship was also obtained between the statements that those who have less concern about the use of biotechnology in food production were those who also plan to attend an information session in their community about biotechnology. Again, this irony may need to be explored in other future studies.

Relationship Between Information Sources and Understanding and Perception of, and Attitude Towards Agricultural Biotechnology

Read or watched biotechnology in the mass media

A highly significant relationship was found between reading or watching about biotechnology in the mass media and the perception that biotechnology only benefits the agricultural companies (Table 5). This suggests that audiences perceived the mass media as reporting that biotechnology benefits only the agricultural companies.

Meanwhile, a negative significant relationship was observed between reading or watching about

Table 4. World view (b) and perception of and attitude towards agricultural biotechnology

Independent Variable (Worldviews and Values)	Dependent Variable	Value of r_s	Significance
If my community would hold an information session on biotechnology in food production, I would attend.			
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	0.119	S
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	0.139	S
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	0.138	S
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY		
	Interest in using agricultural biotechnology in food production	-0.319	VHS
	Concern in using agricultural biotechnology in food production	-0.146	HS

biotechnology in the mass media and the perception that biotechnology is good for Philippine agriculture. This means that the more people know about biotechnology from the mass media, the more they see it as disadvantageous for the country's agriculture. Mass media content may need to be checked so as not to create this negative impression.

A significant negative relationship was also found between reading or watching about biotechnology in the mass media and the perception that genetic engineering could create unexpected new allergens which may be a threat to public health. This suggests that those who read or watch about biotechnology in the mass media get more educated about biotechnology in the process; thereby, negating their belief that genetic engineering may produce new allergens that may cause threats to public health.

Stakeholders who read or watched about biotechnology in the mass media were found to have a significant relationship in their interest in using agricultural biotechnology in food production. In other words, those who were exposed to biotechnology were also interested in using agricultural biotechnology in food production.

Table 5. Relationship between mass media as information sources and perception of and attitude towards biotechnology

Independent Variable (Information Sources)	Dependent Variable	Value of r_s	Significance
Read or watched about biotechnology in the mass media (TV, newspapers, radio)			
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.142	S
	Biotechnology in food production only benefits large agricultural companies.	0.161	VS
	The risks of genetic engineering have been greatly exaggerated.	-0.136	S
	Biotechnology is good for Philippine agriculture.	-0.129	S
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health	-0.123	S
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY		
	Interest in using agricultural biotechnology in food production	0.116	S

Talked to or heard from family/friends/neighbors/officemates about biotechnology

A very significant relationship was found between talking or hearing interpersonally about biotechnology and the knowledge about the uses of biotechnology in food production (Table 6). It suggests that interpersonal sources such as family, friends, neighbors, or officemates are good sources of biotechnology and its uses.

Meanwhile, a negative highly significant relationship was found between having interpersonal communication with family/friends/neighbors/officemates and the perception that government regulatory agencies have the scientific facts they need to make good decisions about biotechnology in food production. This suggests that the more the interpersonal communication about biotechnology, the less is the perception that government does not have the scientific facts to make good decisions about biotechnology in food.

Another highly significant result was obtained between interpersonal communication on biotechnology and the perception that the risks of genetic engineering have been greatly exaggerated. The result suggests that as interpersonal communication increases, the more that genetic engineering is perceived as less risky.

The stakeholders' interpersonal communication and their perception that experts' statements on biotechnology were objective had a negative significant relationship. Results suggest that as interpersonal communication increases, the lower the tendency to agree that experts' statements are objective.

In addition, a negative significant relationship was also found between interpersonal communication and the perception that regulations on biotechnology should include statements from the non-government sector. The statement reveals that stakeholders who have more interpersonal communication do not agree that regulations on biotechnology should include statements from the non-government sector.

Table 6. Relationship between informal interpersonal sources of information and understanding and perception of and attitude towards biotechnology in food

Independent Variable (Information Sources)	Dependent Variable	Value of r_s	Significance
Talked to or heard from family/friends/ neighbors/officemates about biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of knowledge about the uses of biotechnology in food production	0.189	VS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.161	VS
	The risks of genetic engineering have been greatly exaggerated.	-0.162	VS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.124	S
	Regulations on biotechnology should include inputs from the non-government sector.	-0.131	S
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY		
	Concern in using agricultural biotechnology in food production	0.186	S

Talked to religious figures

Religious figures were found to be non-significantly related to the level of understanding and perception of and attitude towards biotechnology of the stakeholders. Religious figures appear to have no influence at all on one's behavior towards biotechnology.

Talked to professionals or experts

Stakeholders who talked to professionals, experts, or scientists were found to have a higher mean rating in their level of understanding about the uses of biotechnology in food production (Table 7). Very high significant relationship was found between the stakeholders talking to professionals, experts, or scientists and the level of understanding of biotechnology of the stakeholders. Those who talked to professionals, experts, or scientists were also found to have a very significant relationship with their understanding of science. Both could be very well explained by the fact that the quality of the source of information determines the outcomes in terms of knowledge gained on biotechnology.

As expected, talking to experts was found to have a highly significant relationship with the perception that government regulatory agencies have the scientific facts to make good decisions about biotechnology in food. As experts, personnel of government regulatory agencies are expected to have more than adequate knowledge about biotechnology and its applications.

The stakeholders with high exposure or contact with experts also had a very high significant relationship with the stakeholders' perception that the risks of genetic engineering have been greatly exaggerated. It is understood that those who have more contact with the professionals, experts, or scientists were in a better position to disagree with statements about the risks of genetic engineering.

Stakeholders who talked or heard from professionals or experts on biotechnology agreed with the statement that vital information about the health effects of biotechnology are being held back. A significant relationship was observed between the two variables.

A significant relationship was found between talking to or hearing from professionals and the perception that biotechnology is good for Philippine agriculture. This is understandable since the stakeholders perceived that they were talking to the experts.

Meanwhile, very significant relationship was found between talking to or hearing from the professionals and the perception that current regulations in the Philippines are sufficient to protect people from risks linked to modern biotechnology.

A very significant relationship was also found between talking to or hearing from professionals and the perception that regulations on biotechnology should get inputs from the non-government sector.

On the whole, it is apparent that professionals or experts are good sources of information. Contact with them tends to lead to more favorable attitude towards biotechnology.

Table 7. Relationship between formal interpersonal sources of information and understanding and perception of, and attitude towards biotechnology in food production

Independent Variable (Information Sources)	Dependent Variable	Value of r_s	Significance
Talked to or heard from experts/ professionals or scientists about biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.181	VS
	Rate of knowledge about the uses of biotechnology in food production	0.215	VHS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	0.222	VHS
	Vital information about the health effects of genetically modified foods is being held back.	0.128	S
	The risks of genetic engineering have been greatly exaggerated.	0.218	VHS
	Biotechnology is good for Philippine agriculture.	0.122	S
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	0.161	VS
	Regulations on biotechnology should include inputs from the non-government sector.	0.175	VS
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY		
	Interest in using agricultural biotechnology in food production	0.202	VHS
	Concern in using agricultural biotechnology in food production	0.212	VHS

Talked to or heard from NGOs

A very highly significant relationship was found among stakeholders who talked to or heard about biotechnology from non-government organizations and the perception that vital information about the health effects of genetically modified foods is being held back. This finding needs to be properly addressed, since it appears that those who talk to or hear more from the NGOs are likely to believe that vital information about the health effects of biotechnology in foods are being held back.

Those who talked to or heard from the NGOs about biotechnology also indicated that regulations on biotechnology should include inputs from the non-government sector.

A significant relationship was also found between talking to or hearing from the NGOs and the

perception that government regulatory agencies have the scientific facts to make good decisions about biotechnology in food.

A negatively very significant relationship was found between talking to or hearing from NGOs and the attitude of stakeholders that science is a part of agricultural development in the Philippines. This indicates that those who talk to or hear more from the NGOs say that science is a part of agricultural development in the country (Table 8).

Table 8. Relationship between NGOs as information sources and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	Dependent Variable	Value of r_s	Significance
Talked to or heard from a Non-Government Organization (NGO) about biotechnology			
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	0.132	S
	Vital information about the health effects of genetically modified foods is being held back.	0.228	VHS
	Regulations on biotechnology should include inputs from the non-government sector.	0.137	S
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Science is a part of agricultural development in the Philippines	-0.16	VS

Talked to or heard from a local politician/local leader

Results showed that those who talked to or heard more from the local politician/local leader had a negative perception about government agencies and what they are doing to ensure that the food people eat are safe (Table 9).

Those who listened more to local politicians/local leaders are likely to have a negative perception that government regulatory agencies have the scientific facts that they need to make good decisions about biotechnology.

In addition, those who talked to or heard about biotechnology from local politicians/local leaders had a positive attitude that science is a part of agricultural development in the Philippines.

Table 9. Relationship between local politicians or leaders as information sources and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	Dependent Variable	Value of r_s	Significance
Talked to or heard from a local politician/local leader about biotechnology			
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.128	S
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.201	VHS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Science is a part of agricultural development in the Philippines	0.132	S

Accessed a website on biotechnology

Those who accessed the website perceived that vital information about the health effects of genetically modified foods are being held back. Meanwhile, respondents who also accessed the website on biotechnology had a positive attitude towards using biotechnology in food production. Furthermore, a very significant relationship was also observed between access to websites on biotechnology and interest in using biotechnology for food production (Table 10).

Reading books on biotechnology

A negative significant relationship was found between reading books about biotechnology and the knowledge of the stakeholders about the uses of biotechnology in food production (Table 11).

Those who read books negatively perceived that biotechnology in food production only benefits large companies. This suggests that those who had read more books did not perceive that biotechnology only benefits the large companies.

A negative significant relationship was also observed between reading books and the perception that government agencies are doing their best to ensure that the food people eat are safe.

Significant relationships were found between reading books and the attitude of stakeholders toward agricultural biotechnology. It was found that reading books is significantly related to the

Table 10. Relationship between websites as information sources and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	Dependent Variable	Value of r_s	Significance
Accessed a web site on biotechnology			
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Vital information about the health effects of genetically modified foods is being held back.	0.128	S
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Interest in using agricultural biotechnology in food production	0.157	VS
	Concern in using agricultural biotechnology in food production	0.214	VHS

Table 11. Relationship between books as information sources and understanding and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	Dependent Variable	Value of r_s	Significance
Read books on biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of knowledge about the uses of biotechnology in food production	-0.12	S
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.133	S
	Biotechnology in food production only benefits large agricultural companies.	-0.171	VS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Interest in using agricultural biotechnology in food production	0.143	S
	Concern in using agricultural biotechnology in food production	0.144	S

concern in using agricultural biotechnology in food production. Furthermore, reading books is also significantly related to the stakeholders' interest in using agricultural biotechnology in food production.

Read newsletters, pamphlets, or brochures on biotechnology

Reading newsletters and other print materials on biotechnology had a very high significant relationship with the knowledge of the stakeholders regarding the uses of biotechnology in food production. As one read more newsletters and other print materials, knowledge about the uses of biotechnology in food technology also increased (Table 12).

The rate of understanding of science was also found to be significantly related to the understanding of science. The more print materials read about biotechnology, the higher the understanding of science.

Two negative very highly significant relationships were also observed from the stakeholders. As expected, those who read print materials on biotechnology perceived that not all expert statements on biotechnology are based on scientific analyses. In addition, those who read print materials on biotechnology did not perceive that the risks of genetic engineering have been greatly exaggerated. This suggests that the stakeholders think that the reports on genetic engineering are just right.

A significant relationship was found between readership of print extension materials on biotechnology and the perception that government agencies are doing their best to ensure that the food people eat are safe.

Stakeholders who read extension print materials also showed a significant relationship in their attitude towards using agricultural biotechnology in food production.

Talked to or heard from food regulators on biotechnology

A negative significant relationship was found between talking to or hearing from food regulators and the stakeholders' perception that current regulations in the Philippines are sufficient to protect people from risks linked to modern biotechnology. Those who talked to or heard about biotechnology from food regulators were likely to perceive that current regulations are not enough to protect people from risks in biotechnology (Table 13).

Those who talked to or heard about biotechnology from food regulators were also found to agree that government agencies are doing their best to ensure that the food eaten by people are safe.

Meanwhile, a negative significant relationship was found between talking to or hearing from food regulators and the perception that the risks about genetic engineering are greatly exaggerated. This shows that stakeholders in contact with food regulators do not perceive that the risks of genetic engineering have been exaggerated.

Another significant negative relationship was shown in the relationship between exposure to food regulators and the perception that vital information about the health effects of genetically modified foods is being held back. Results show that stakeholders do not believe that vital information on health effects is being held back.

Table 12. Relationship between popular publications as information sources and understanding and perception of and attitude towards biotechnology in food

Independent Variable (Information Sources)	Dependent Variable	Value of r_s	Significance
Read newsletters/ pamphlets/brochures on biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.153	S
	Rate of knowledge about the uses of biotechnology in food production	0.254	VHS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	0.122	S
	The risks of genetic engineering have been greatly exaggerated.	-0.222	VHS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.248	VHS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Concern in using agricultural biotechnology in food production	0.144	S

Finally, a very significant relationship was found between talking to or hearing about biotechnology from food regulators and concern in using agricultural biotechnology in food production (Table 13).

Attended seminars and public forums on biotechnology

A positive significant relationship was found between attendance in seminars and public forums on biotechnology and the stakeholders' knowledge about the uses of biotechnology in food production (Table 14).

Meanwhile, a negative very significant relationship was found between attendance in seminars and the stakeholders' perception on the risks of genetic engineering has been greatly exaggerated. This result suggests that stakeholders who attended seminars did not agree that risks about genetic engineering were greatly exaggerated.

There was also a negative significant result between attendance in seminars and the perception

Table 13. Relationship between food regulators as information sources and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	Dependent Variable	Value of r_s	Significance
Talked to or heard from food regulators on biotechnology			
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	0.136	S
	Vital information about the health effects of genetically modified foods is being held back.	-0.119	S
	The risks of genetic engineering have been greatly exaggerated.	-0.146	S
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.191	VS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Concern in using agricultural biotechnology in food production	0.179	VS

that biotechnology in food production only benefits large agricultural companies. This shows that as attendance in seminar increases, perception that biotechnology benefits only large companies decreases.

In addition, a negative significant relationship was found between attendance in seminars and perception that current regulations in the Philippines are sufficient to protect people from risks linked to modern biotechnology. This finding needs further study because it suggests that as attendance increases, perception about current regulations being sufficient to take care of people decreases.

A negative significant relationship was found between attendance in seminars and the attitude that science is a part of agricultural development in the Philippines. This result suggests that those who attended seminars on biotechnology tended to disagree with the idea that science is part of agricultural development in the Philippines.

Finally, those who attended seminars and public forums on biotechnology were interested in agricultural biotechnology for food production (Table 14).

Table 14. Relationship between seminars and forums as information sources and understanding and perception of and attitude towards biotechnology in food

Independent Variable (Information Sources)	Dependent Variable	Value of r_s	Significance
Attended seminars, public forums on biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of knowledge about the uses of biotechnology in food production	0.153	S
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Biotechnology in food production only benefits large agricultural companies.	-0.12	S
	The risks of genetic engineering have been greatly exaggerated.	-0.183	VS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.124	S
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	-0.134	S
	Interest in using agricultural biotechnology in food production	0.142	S

Talked to or heard from agricultural biotechnology companies

Agricultural biotechnology companies as sources of information related more negatively with a number of perception statements (Table 15). They could lead to the perceptions that:

- Government agencies have no scientific facts to make good decisions about biotechnology in food.
- Biotechnology is not good for the Philippine government.
- Current regulations in the Philippines are not sufficient to protect people from any risks linked to modern biotechnology.

Similarly , they could lead to a declining interest in using biotechnology in food production as indicated by its negative relationship with attitude (Table 15).

However, they could also lead to developing the positive perceptions that:

- The risks of genetic engineering have not been exaggerated.
- Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.

All the above imply that while agricultural biotechnology companies believe that information on food engineering are scientific, the government lack these information to make good decisions and to protect the public from its risks. Hence, as information sources, they could lead to more unfavorable than favorable support to the use of agricultural biotechnology in the country.

Table 15. Relationship between agricultural biotechnology companies as information sources and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	Dependent Variable	Value of r_s	Significance
Talked to or heard from agricultural biotechnology companies			
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.223	VHS
	The risks of genetic engineering have been greatly exaggerated.	-0.16	VS
	Biotechnology is good for Philippine agriculture.	-0.122	S
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	0.0168	VS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.183	VS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Interest in using agricultural biotechnology in food production	-0.116	S

Part 5 Summary and Conclusions

Summary

A cross-sectional study was done to find out the understanding and perception of and attitude towards agricultural biotechnology of eight groups of stakeholders in the Philippines. Data were gathered using either questionnaire or interview schedule depending on where they were warranted based on the respondents' preference and schedule. Frequency counts, percentages, and weighted mean ratings were used to analyze the data. Further, a number of hypotheses about the relationships of socio-demographic characteristics, worldviews and values, and sources of information with level of understanding, perception, and attitude towards agricultural biotechnology were tested using Chi-square test and the Spearman Rank Correlation test.

Socio-Demographic Characteristics

There was not much difference in the distribution of male and female respondents in the study. Most of the Philippine consumers who participated were female. Scientists and journalists were mostly male. The respondents had graduate or post-graduate degrees. Majority lived in rural areas.

About a third of the respondents were aged 41 to 50 years old, the largest percentages of whom were in the groups of extension workers, farmer leaders and community leaders, policy makers, religious leaders, and scientists. The youngest among the stakeholders were the businessmen and traders. Majority of the respondents in the study were Roman Catholics.

In terms of worldviews and values, the religious leaders strongly held on to the view that the "use of biotechnology in food production is against my moral values." Religious leaders also strongly supported the statement that "until we know that genetically altered foods are safe, those products should be banned."

Journalists and scientists were more open and optimistic about biotechnology with many disagreeing that "genetic manipulation takes mankind into the realms that belong to God and God alone."

Stakeholders generally disagreed with the statement that people "have no business meddling with nature and that regulations of modern biotechnology should be left industry. "mainly to the industry."

Nearly three-fifths of the respondents disagreed with the statement that "biotechnology in

food production is against my moral values," implying that regardless of stakeholder group, biotechnology was not related to moral values.

More than half of the respondents believed that genetic engineering could lead to nutritious and cheaper foods. This was highly evident in the responses of extension workers and policy makers.

Fifty-seven percent of the study participants strongly agreed with the statement "consumers have a right to choose what they eat, hence to know what they are eating." The highest number among those who agreed came from the religious leaders.

In general, the Philippine stakeholders have more positive worldviews and values– values which are consistent with and critical to achieving a high level of social acceptability of agricultural biotechnology. Despite a very positive outlook, the Philippine stakeholders were more cautious on matters of food safety and sufficient regulations on biotechnology-derived products.

More than half of the respondents believed that genetic engineering could lead to nutritious and cheaper foods. This was highly evident in the responses of extension workers, policy makers, and consumers.

Fifty-seven percent of the study participants strongly agreed with the statement "consumers have a right to choose what they eat, hence to know what they are eating." The highest number among those who agreed came from the religious leaders.

Information Sources on Biotechnology

The main sources of information on biotechnology were the mass media (radio, television and newspaper) and interpersonal sources (friends, relatives, neighbors, experts and professionals), although exposure during the last two months prior to the study was considerably low. Despite the access to the various mass media and interpersonal sources, the reason for low exposure can be attributed to lack of widely and frequently circulated information on biotechnology, inasmuch as the respondents have shown high interest in seeking information on biotechnology.

Data pointed to the fact that the University scientists were still the most trusted and sought-after information source.

Even if majority of the respondents indicated some trust in websites, most of the respondents did not use the internet as an information source. This is interesting to note since advancements in technology would usually lead one to think that many stakeholders would take advantage of websites as an information source, especially since most of them were highly literate.

Science-related sources such as NGOs, books and agricultural biotechnology companies were insignificant information sources on biotechnology as evidenced by the high number of respondents who did not use these information sources during the last two months.

In this study, religious leaders were among the stakeholders who actively sought biotechnology information. This is a welcome development since these leaders would be able to guide their followers on the pros and cons of biotechnology. However, religious leaders gave a low rating on

the usefulness of biotechnology.

Stakeholders (except scientists and religious leaders) found the information they received so far to be very useful but only somewhat scientific.

Level of Understanding

On the whole, the level of understanding of science differed among respondents. Scientists and policy makers had similar understanding about agricultural biotechnology. Farmers, journalists and religious leaders have the same level of understanding. The extension worker had a similar understanding of science with the rest of the stakeholders.

Knowledge About Biotechnology

Scientists differed in level of knowledge on biotechnology from the other stakeholders. This is expected inasmuch as it is their job to investigate and provide scientific explanations to the consuming public. Scientists, therefore, must be able to ensure that GMOs are safe and that they are not a threat to public health and safety as far as food production is concerned.

Perception of Agricultural Biotechnology

Generally, the respondents had a positive perception of agricultural biotechnology. However, there existed a significant difference among stakeholders whether government agencies are doing their best to ensure that food eaten is safe. Businessmen and consumers had similar perception and so did farmers, extension workers, and scientists. Religious leaders perceived it otherwise because all stakeholders believed that only large agricultural companies benefit from biotechnology. This is a focal issue that needs to be addressed especially if this is a fallacy.

Respondents in the current study deemed the use of agricultural biotechnology in food production as somewhat hazardous and only moderately beneficial. It implies then that ample explanation and education of the public is necessary.

Attitude Towards Agricultural Biotechnology

Policy makers and journalists were very interested and concerned, together with scientists, in agricultural biotechnology as implementation, information dissemination, and knowledge generation of agricultural biotechnology largely depend on them. This implies that agricultural biotechnology is still an issue that needs to be solved, clarified, and worked on more rigorously.

However, since almost half of the respondents were somewhat interested, it can be deduced that all stakeholders were anxious about the uses of biotechnology in food production. It can be assumed then that once policies on biotechnology are formulated based on sound and well-researched knowledge, and coupled with information dissemination, implementation and adoption of agricultural biotechnology will be hastened. It further connotes that these three stakeholder groups (policymakers, journalists, and scientists) should collaborate to promote the use of agricultural biotechnology in food production.

Respondents felt that they should be consulted in formulating food regulations and laws and in approving R&D on biotechnology. Labeling of GMO products is generally favored by most of the stakeholders.

In terms of frames to be used in deciding whether biotechnology can be applied, respondents noted that improvements have to be done as far as making food more nutritious, better-tasting, and with longer shelf life even if it means using modern approaches or taking necessary plant genes and transferring those to crop plants.

However, scientists should focus on issues concerning safety, crop resistance to pests, and impact on the environment before they decide on applying biotechnology. Moreover, scientists have to take into account the moral/ethical issues surrounding biotechnology more than its technical soundness and utility.

Conclusions

1. All the stakeholders, in general, have favorable perception and attitude towards agricultural biotechnology. In a few instances, the religious leaders become skeptical and exhibit some degree of ambivalence. This is particularly true for the worldviews that biotechnology in food production is against their moral values and that they have no business meddling with nature.

2. Philippine stakeholders have low exposure to information sources on agricultural biotechnology. But when they do access information, they use both mass media and interpersonal communication sources.

3. Among the stakeholders, active information seekers are the policy makers and the least are the religious leaders.

4. University scientists are the most trusted information sources among the stakeholders.

5. Whatever information they acquired about agricultural biotechnology, respondents consider them moderately useful and scientific.

6. All stakeholders, including scientists, consider themselves as having moderate understanding of science and of agricultural biotechnology.

7. There is the prevailing tendency for all stakeholders to perceive agricultural biotechnology as hazardous, but despite that they still view it as beneficial. The religious leaders are the most conservative when it comes to risks and befits of agricultural biotechnology.

8. Generally, there is a favorable perception of the government as being responsible in making sure that proper safeguards are put in place when dealing with agricultural biotechnology.

9. Stakeholder groups which have consistently demonstrated interest and concern about agricultural biotechnology are the policy makers, scientists, and journalists. The first two stakeholder groups making decisions on agricultural biotechnology is based on issues concerning food safety and environmental impacts.

10. In terms of relationships, stakeholders who are older and with higher education tend to perceive agricultural biotechnology favorably.

11. Information sources tend to relate positively with level of understanding and attitude towards agricultural biotechnology, regardless of whether these are mass media or interpersonal sources. They, however, create varying perceptions (both positive and negative) regarding agricultural technology. The only source which consistently leads to positive behavior towards agricultural biotechnology is the group of experts, professionals or scientists.

Part 6 Recommendations

Based on the results of the study it is recommended that the following more immediate communication activities and other related matters be undertaken:

1. A content analysis of the various mass media to determine the type of messages (positive or negative) that are communicated about agricultural biotechnology. This would further determine why certain sources tend to create positive or negative perception and attitude towards biotechnology.

2. A consumer study on acceptable pricing scheme of GM foods can be undertaken since 61.2 percent of the respondents indicated that price of goods was very important.

3. Probe the respondents' perceptions of the moral, ethical, religious, and cultural issues that affect agricultural biotechnology in food production. This is important since many of the respondents use these issues for viewing agricultural biotechnology negatively.

4. Communication strategies to promote the use of agricultural biotechnology should stress on cheaper, nutritious food as one of its benefits. Many respondents put a high importance on the following characteristics of genetically modified foods: non-allergenic, non-poisonous, price, food appearance, nutritional quality, taste, and avoidance of pesticides. Emphasis should also be made on the fact that genetically modified food are safe to eat.

5. Communication about agricultural biotechnology should address three negative perceptions. Respondents believed that 1) vital information on agricultural biotechnology is being withheld, 2) current regulations on the use of agricultural biotechnology in the Philippines are insufficient, and 3) Genetic engineering may produce foods that have allergens and contaminants that pose a threat to public health.

6. Newsletters, pamphlets, and brochures should be continuously used to disseminate information on biotechnology. Respondents have the most trust on this sources. Publications like these can be printed in the dialects to reach more audiences.

7. Communication materials should focus more on providing correct and more accurate information about agricultural biotechnology. Many avenues for information dissemination for biotechnology have so far been provided but they seem to be providing inaccurate knowledge. Also, awareness can now be coupled with trial or adoption of agricultural biotechnology.

8. University-based scientists should be given communication trainings and updated information materials because they are frequently sought for information. University-based scientists were also assessed tustworthy source of information.

9. Radio, broadsheets and television should be fully tapped in the dissemination of information on biotechnology. These have been ranked as top three sources that respondents trusted. Mass media as also been also perceived to have a high involvement in agricultural biotechnology.

10. Encourage and train members of the different stakeholder groups to use web sites. This could possible lead to more interest in and a more concern about the use of agricultural biotechnology among other members in the various sectors.

The following recommendations can be made regarding policy

1. It is important to label genetically modified food, but according to the results, consumers should not have to shoulder the extra cost of labeling. Further information about this issue may be obtained from the recommended probing of the stakeholders' responses.

2. Results also show that respondents perceive the need for a government regulatory board to monitor advances in biotechnology. This is to assure the public that the impacts of biotechnology on human health and the environment are being carefully taken care of.

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Appendix Table 1. Distribution of respondents by gender

Stakeholder	Male		Female		TOTAL	
	n	%	n	%	n	%
Businessmen and traders	21	42.0	29	58.0	50	100
Consumers	39	39.0	61	61.0	100	100
Extension workers	19	30.6	43	69.4	62	100
Farmer leaders and community leaders	50	70.4	21	29.6	71	100
Journalists	20	57.1	15	42.9	35	100
Policy makers	31	88.6	4	11.4	35	100
Religious leaders	26	74.3	9	25.7	35	100
Scientists	18	51.4	17	48.6	35	100
TOTAL	**224**	**53.0**	**199**	**47.0**	**423**	**100**

Appendix Table 2. Distribution of respondents by civil status

Stakeholder	Single		Married		Others		TOTAL	
	n	%	n	%	n	%	n	%
Businessmen and traders	15	30.6	33	67.3	1	2.0	49*	100
Consumers	44	44.0	53	53.0	3	3.0	100	100
Extension workers	16	25.8	44	71.0	2	3.2	62	100
Farmer leaders and community leaders	6	9.0	59	88.1	2	3.0	67*	100
Journalists	10	28.6	22	62.9	3	8.6	35	100
Policy makers	4	11.8	28	82.4	2	5.9	34*	100
Religious leaders	6	17.1	27	77.1	2	5.7	35	100
Scientists	3	8.6	31	88.6	1	2.9	35	100
TOTAL	**104**	**24.9**	**297**	**71.2**	**16**	**3.8**	**417**	**100**

*Some respondents gave no answer.

Appendix Table 3. Distribution of respondents by age

Stakeholder	20 and below		21-30		31-40		41-50		51-60		61 and above		TOTAL	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Businessmen and traders	0	0	20	42.6	5	10.6	15	31.9	5	10.6	2	4.2	47*	100
Consumers	2	2.1	33	34.7	18	18.9	28	29.5	12	12.6	2	2.1	95*	100
Extension workers	0	0	6	10.0	15	25.0	25	41.7	12	20.0	2	3.3	60*	100
Farmer leaders and community leaders	0	0	4	6.0	18	26.9	19	28.4	13	19.4	13	19.4	67*	100
Journalists	0	0	7	23.3	8	26.7	5	16.7	8	26.7	2	6.7	30*	100
Policy makers	1	3.1	0	0	4	12.5	19	59.4	8	25.0	0	0	32*	100
Religious Leaders	0	0	2	5.9	7	20.6	17	50.0	6	17.6	2	5.9	34*	100
Scientists	0	0	1	2.9	7	20.0	15	42.9	12	34.3	0	0	35	100
TOTAL	3	0.8	73	18.2	82	20.5	143	35.8	76	19.0	23	5.8	400	100

*Some respondents gave no answer.

Appendix Table 4. Distribution of respondents by educational attainment

Stakeholder	Some Elementary		Elementary Grad		Some High School		High Scool Grad		Some College		BS/BA		Grad/ PostGrad		Others		TOTAL	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Businessmen and traders	0	0	0	0	0	0	0	0	7	14.0	27	54.0	15	30.0	1	2.0	50	100
Consumers	0	0	1	1.0	0	0	3	3.0	5	5.0	47	47.0	41	41.0	3	3.0	100	100
Extension workers	0	0	0	0	0	0	0	0	2	3.2	34	54.8	25	40.3	1	1.6	62	100
Farmer leaders and community leaders	6	8.4	5	7.0	6	8.4	11	15.5	14	19.7	14	19.7	15	21.1	0	0	71	100
Journalists	0	0	0	0	0	0	1	2.9	3	8.6	11	31.4	19	54.3	1	2.9	35	100
Policy makers	2	5.7	0	0	0	0	0	0	1	2.9	14	40.0	18	51.4	0	0	35	100
Religious leaders	0	0	0	0	1	2.9	1	2.9	2	5.9	16	47.1	12	35.3	2	5.9	34*	100
Scientists	0	0	0	0	0	0	0	0	0	0	6	17.1	28	80.0	1	2.9	35	100
TOTAL	8	1.9	6	1.4	7	1.7	16	3.8	34	8.1	169	40.0	173	41.0	9	2.1	422	100

*One respondent gave no answer

Appendix Table 5. Distribution of respondents by area of residence

Stakeholder	Rural		Suburban		Urban		TOTAL	
	n	%	n	%	n	%	n	%
Businessmen and traders	17	34.0	15	30.0	18	36.0	50	1000
Consumers	33	33.0	20	20.0	47	47.0	100	100
Extension workers	31	50.8	13	21.3	17	27.9	61*	100
Farmer leaders and community leaders	55	77.5	7	9.9	9	12.7	71	100
Journalists	9	25.7	6	17.1	20	57.1	35	100
Policy makers	16	45.7	7	20.0	12	34.3	35	100
Religious leaders	15	45.5	5	15.2	13	39.4	33*	100
Scientists	13	37.1	12	34.3	10	28.6	35	100
TOTAL	**189**		**85**		**146**		**420**	**100**

*Some respondents gave no answer.

Appendix Table 6. Distribution of respondents by religion

Stakeholder	Roman Catholic		Protestant		Islam		Others		TOTAL	
	n	%	n	%	n	%	n	%	n	%
Businessmen and traders	41	83.7	5	10.2	0	0	3	6.1	49*	100
Consumers	70	70.7	13	13.1	0	0	16	16.2	99*	100
Extension workers	43	69.4	9	14.5	3	4.8	7	11.3	62	100
Farmer leaders and community leaders	55	77.5	9	12.7	2	2.8	5	7.0	71	100
Journalists	28	80.0	2	5.7	0	0	5	14.3	35	100
Policy makers	28	80.0	5	14.3	1	2.9	1	2.9	35	100
Religious leaders	9	26.5	9	26.5	1	2.9	15	44.1	34*	100
Scientists	29	82.9	4	11.4	0	0	2	5.7	35	100
TOTAL	**303**	**72.1**	**56**	**13.3**	**7**	**1.7**	**54**	**12.9**	**420**	**100**

*Some respondents gave no answer.

Appendix Table 7. Stakeholders' views on society and values

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
a. The use of biotechnology in food production is against my moral values.													
Businessmen and traders	1	2.0	9	18.0	28	56.0	9	18.0	3	6.0	50	100	2.0
Consumers	2	2.0	12	12.1	62	62.6	18	18.2	5	5.1	99*	100	2.0
Extension workers	5	8.1	4	6.5	42	67.7	7	11.3	4	6.5	62	100	2.1
Farmer leaders and community leaders	5	7.2	19	27.5	31	44.9	8	11.6	6	8.7	69*	100	2.3
Journalists	3	8.8	5	14.7	21	61.8	4	11.8	1	2.9	34*	100	2.2
Policy Makers	0	0	4	11.4	22	62.9	9	25.7	0	0	35	100	1.9
Religious Leaders	7	21.2	4	12.1	17	51.5	2	6.1	3	9.1	33*	100	2.5
Scientists	2	5.7	6	12.1	21	60.0	5	14.3	1	2.9	35	100	2.1
Total	25	6.0	63	15.1	244	58.5	62	14.9	23	5.5	417	100	
b. If my community would hold an information session on biotechnology in food production, I would attend.													
Businessmen and traders	12	24.0	37	74.0	0	0	0	0	1	2.0	50	100	3.2
Consumers	29	29.0	63	63.0	1	1.0	2	2.0	5	5.0	100	100	3.3
Extension workers	17	27.4	45	72.6	0	0	0	0	0	0	62	100	3.3
Farmer leaders and community leaders	34	49.3	33	47.8	1	1.4	1	1.4	0	0	69*	100	3.4
Journalists	11	32.	21	61.8	1	2.9	0	0	1	2.9	34*	100	3.3
Policy Makers	10	28.6	25	71.4	0	0	0	0	0	0	35	100	3.3
Religious Leaders	10	29.4	21	61.8	0	0	1	2.9	2	5.9	34*	100	3.3
Scientists	12	34.3	22	62.9	0	0	0	0	1	2.9	35	100	3.4
Total	135	32.2	267	63.7	3	0.7	4	1.0	10	2.4	419	100	
c. Foods that have been genetically altered should be labeled.													
Businessmen and traders	22	44.0	24	48.0	2	4.0	0	0	2	4.0	50	100	3.4
Consumers	54	54.5	42	42.4	1	1.0	0	0	2	2.0	99*	100	2.5
Extension workers	24	38.7	36	58.1	2	6.5	0	0	0	0	62	100	3.4
Farmer leaders and community leaders	31	44.3	35	50.0	2	2.9	2	2.9	0	0	70*	100	3.4

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
Journalists	19	55.9	13	38.2	2	5.9	0	0	0	0	34*	100	3.5
Policy Makers	11	31.4	17	48.6	6	17.1	1	2.9	0	0	35	100	3.1
Religious Leaders	21	61.8	9	26.5	1	2.9	1	2.9	2	5.9	34*	100	3.6

Appendix Table 7. (continued) Stakeholders' views on society and values

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
c. Foods that have been genetically altered should be labeled.													
Scientists	17	48.6	15	42.9	3	8.6	0	0	0	0	35	100	3.4
Total	199	47.5	191	45.6	19	4.5	4	1.0	6	1.4	419	100	
d. Genetic manipulation takes mankind into realms that belong to God and God alone.													
Businessmen and traders	4	8.2	11	22.4	19	38.8	6	12.2	9	18.4	49*	100	2.3
Consumers	18	18.6	19	19.6	32	33.0	13	13.4	15	15.5	97*	100	2.5
Extension workers	11	17.7	22	35.5	24	38.7	5	8.1	0	0	62	100	2.6
Farmer leaders and community leaders	14	20.3	16	23.2	28	40.6	7	10.1	4	5.8	69*	100	2.6
Journalists	5	15.2	5	15.2	17	51.5	2	6.1	4	12.1	33*	100	2.4
Policy Makers	4	11.4	12	34.3	14	40.0	5	14.3	0	0	35	100	2.4
Religious Leaders	12	35.3	10	29.4	7	20.6	1	2.9	4	11.8	34*	100	3.1
Scientists	4	11.4	7	20.0	17	48.6	4	11.4	3	8.6	35	100	2.3
Total	72	17.4	102	24.6	158	38.2	43	10.4	39	9.4	414	100	
e. Until we know that genetically altered foods are totally safe, those products should be banned.													
Businessmen and traders	10	20.0	19	38.0	15	30.0	3	6.0	3	6.0	50	100	2.8
Consumers	34	34.3	33	33.3	19	19.2	9	9.1	4	4.0	99*	100	3.0

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
Extension workers	13	21.0	29	46.8	17	27.4	3	4.8	0	0	62	100	2.8
Farmer leaders and community leaders	17	25.0	24	35.3	19	27.9	4	5.9	4	5.9	68*	100	2.8
Journalists	10	29.4	11	32.4	10	29.4	1	2.9	2	5.9	34*	100	2.9
Policy Makers	5	14.3	18	51.4	8	22.9	4	11.4	0	0	35	100	2.7
Religious Leaders	17	50.0	8	23.5	3	8.8	1	2.9	5	14.7	34*	100	3.4
Scientists	8	22.9	16	45.7	11	31.4	0	0	0	0	35	100	2.9
Total	114	27.3	158	37.9	102	24.5	25	6.0	18	4.3	417	100	

Appendix Table 7. (continued) Stakeholders' views on society and values

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
f. We have no business meddling with nature.													
Businessmen and traders	2	4.0	10	20.0	25	50.0	8	16.0	5	10.0	50	100	2.1
Consumers	8	8.2	17	17.3	47	48.0	16	16.3	10	10.2	98*	100	2.2
Extension workers	3	4.9	15	24.6	37	60.7	6	9.8	0	0	61*	100	2.2
Farmer leaders and community leaders	7	10.0	16	22.9	21	30.0	11	15.7	15	21.4	70*	100	2.3
Journalists	3	9.1	5	15.2	19	57.6	6	18.2	0	0	33*	100	2.2
Policy Makers	1	2.9	8	2.9	20	57.1	6	17.1	0	0	35	100	2.1
Religious Leaders	9	27.3	6	18.2	13	39.4	1	3.0	4	12.1	33*	100	2.8
Scientists	1	2.9	5	14.3	22	62.9	6	17.1	1	2.9	35	100	2.0
Total	34	8.2	82	19.8	204	49.2	60	14.4	35	8.4	415	100	
g. I am wiling to pay the extra cost for labeling genetically modified foods.													
Businessmen and traders	3	6.0	22	44.0	18	36.0	5	10.0	2	4.0	50	100	2.5
Consumers	16	16.3	35	35.7	26	26.5	10	10.2	11	11.2	98*	100	2.7
Extension workers	5	8.1	32	51.6	21	33.9	4	6.5	0	0	62	100	2.6

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
Farmer leaders and community leaders	3	4.3	26	37.1	25	35.7	13	18.6	3	4.3	70*	100	2.3
Journalists	4	12.1	17	51.5	8	24.2	2	6.1	2	6.1	33*	100	2.7
Policy Makers	5	14.3	16	45.7	13	67.6	1	2.9	0	0	35	100	2.7
Religious Leaders	4	11.8	14	41.2	8	23.5	6	17.6	2	5.9	34*	100	2.5
Scientists	2	5.7	12	34.3	16	45.7	1	2.9	4	11.4	35	100	2.5
Total	42	10.0	174	41.7	135	32.4	42	10.0	24	5.8	417	100	
h. The regulation of modern biotechnology should be left mainly to industry.													
Businessmen and traders	2	4.0	11	22.0	26	52.0	9	18.0	2	4.0	50	100	2.1
Consumers	6	6.0	12	12.0	41	41.0	32	32.0	9	9.0	100	100	1.9
Extension workers	5	8.1	17	27.4	26	41.9	14	22.6	0	0	62	100	2.2
Farmer leaders and community leaders	2	2.9	17	24.3	35	50.0	8	11.4	8	11.4	70*	100	2.2
Journalists	2	5.9	7	20.6	12	35.3	12	35.3	1	2.9	34*	100	2.0
Policy Makers	2	5.9	5	14.7	23	37.1	4	11.8	0	0	34*	100	2.1
Religious Leaders	2	5.9	9	26.5	11	32.4	10	29.4	2	5.9	34*	100	2.1
Scientists	1	2.9	2	5.7	26	74.3	6	17.1	0	0	35	100	1.9
Total	22	5.2	80	19.1	200	47.7	95	22.7	22	5.2	419	100	

*Some respondents gave no answer.

Appendix Table 8. Sources of biotechnology information most frequently contacted within the past two months

Information Source	Number of times in the last 2 months								TOTAL	
	0		1		2		3 or more			
	n	%	n	%	n	%	n	%	n	%
a. Read or watched about biotechnology in the mass media (TV, newspapers, radio)										
Businessmen and traders	18	36.0	19	38.0	5	10.0	8	16.0	50	100
Consumers	35	35.7	31	31.6	18	18.4	14	14.3	98*	100
Extension workers	20	32.3	21	33.9	9	14.5	12	19.4	62	100
Farmer leaders and community leaders	28	39.7	19	27.9	10	14.7	11	16.2	68*	100
Journalists	9	25.7	10	28.6	9	25.7	7	20.0	35	100
Policy makers	6	17.1	19	54.3	3	8.6	7	20.0	35	100

Information Source	Number of times in the last 2 months								TOTAL	
	0		1		2		3 or more			
	n	%	n	%	n	%	n	%	n	%
Religious leaders	9	26.5	11	32.4	10	29.4	4	11.8	34*	100
Scientists	9	25.7	13	37.1	8	22.9	5	14.3	35	100
Total	134	32.1	143	34.3	72	17.3	68	16.3	417	100
b. Talked to or heard from family/friends/ neighbors/officemates about biotechnology										
Businessmen and traders	24	48.0	15	30.0	4	8.0	7	14.0	50	100
Consumers	33	33.0	41	41.0	17	17.0	9	9.0	100	100
Extension workers	16	26.2	25	41.0	13	21.3	7	11.5	61*	100
Farmer leaders and community leaders	30	45.5	20	30.3	6	9.1	10	15.2	66*	100
Journalists	17	48.6	5	14.3	7	20.0	6	17.1	35	100
Policy makers	8	22.9	13	17.1	8	22.9	6	17.1	35	100
Religious leaders	14	41.2	9	26.5	8	23.5	3	8.8	34*	100
Scientists	8	22.9	13	37.1	5	14.3	9	25.7	35	100
Total	150	36.1	141	33.8	68	16.3	57	13.7	416	100
c. Talked to or heard from a religious figure (e.g., nun, priest, monk, imam, cleric) about biotechnology										
Businessmen and traders	35	70.0	6	12.0	5	10.0	4	8.0	50	100
Consumers	71	71.7	20	20.2	7	7.1	1	1.0	99*	100
Extension workers	37	59.7	18	29.0	3	4.8	4	6.5	62	100
Farmer leaders and community leaders	48	75.0	9	14.1	4	6.3	3	4.8	64	100
Journalists	20	57.1	6	17.1	5	14.3	4	11.4	35	100
Policy makers	19	54.3	6	17.1	7	20.0	3	8.6	35	100
Religious leaders	19	55.9	7	20.6	5	14.7	3	8.8	34*	100
Scientists	23	65.7	6	17.1	6	17.1	0	0	35	100
Total	272	65.7	78	18.8	42	10.1	22	5.3	414	100

Appendix Table 8. (continued) Sources of biotechnology information most frequently contacted within the past two months

Information Source	Number of times in the last 2 months								TOTAL	
	0		1		2		3 or more			
	n	%	n	%	n	%	n	%	n	%
d. Talked to or heard from experts/ professionals or scientists about biotechnology										
Businessmen and traders	22	44.0	15	30.0	5	10.0	8	16.0	50	100
Consumers	42	42.0	33	33.0	13	13.0	12	12.0	100	100
Extension workers	14	22.6	23	37.1	11	17.7	14	22.6	62	100
Farmer leaders and community leaders	19	29.2	30	46.2	8	12.3	8	12.3	75*	100
Journalists	12	34.3	11	31.4	8	22.9	4	11.4	35	100
Policy makers	8	22.9	15	42.9	4	11.4	8	22.9	35	100
Religious leaders	12	35.3	15	44.1	5	14.7	2	5.9	34*	100
Scientists	8	22.9	11	31.4	7	20.0	9	25.7	35	100
Total	137	32.9	153	36.8	61	14.7	65	15.6	416	100
e. Talked to or heard from a Non-Government Organization (NGO) about biotechnology										
Businessmen and traders	29	58.0	11	22.0	5	10.0	5	10.0	50	100
Consumers	75	75.0	14	14.0	6	6.0	5	5.0	100	100
Extension workers	29	46.8	22	35.5	5	8.1	6	9.7	62	100
Farmer leaders and community leaders	33	51.6	15	23.4	10	15.6	6	9.4	64*	100
Journalists	21	61.8	4	11.8	8	23.5	1	2.9	34*	100
Policy makers	16	45.7	7	20.0	10	28.6	2	5.7	35	100
Religious leaders	15	44.1	14	41.2	4	11.8	1	2.9	34*	100
Scientists	20	57.1	12	34.3	1	2.9	2	5.7	35	100
Total	238	57.5	99	23.9	49	11.8	28	6.8	414	100
f. Talked to or heard from a local politician/ local leader about biotechnology										
Businessmen and traders	35	70.0	7	14.0	5	10.0	3	6.0	50	100
Consumers	82	82.0	15	15.0	3	3.0	0	0	100	100
Extension workers	44	71.0	11	17.7	4	6.5	3	4.8	62	100
Farmer leaders and community leaders	45	71.4	12	19.0	4	6.3	2	3.2	63*	100
Journalists	28	80.0	4	11.4	1	2.9	2	5.7	35	100
Policy makers	17	48.6	13	37.1	2	5.7	3	8.6	35	100
Religious leaders	27	79.4	5	14.7	1	2.9	1	2.9	34*	100
Scientists	23	65.7	10	28.6	2	5.7	0	0	35	100
Total	301	72.7	77	18.6	22	5.3	14	3.4	414	100

Appendix Table 8. (continued) Sources of biotechnology information most frequently contacted within the past two months

Information Source	Number of times in the last 2 months								TOTAL	
	0		1		2		3 or more			
	n	%	n	%	n	%	n	%	n	%
g. Accessed a web site on biotechnology										
Businessmen and traders	33	66.0	12	24.0	3	6.0	2	4.0	50	100
Consumers	62	62.6	18	18.2	11	11.1	8	8.1	99*	100
Extension workers	36	58.1	13	21.0	3	4.8	10	16.1	62	100
Farmer leaders and community leaders	54	83.1	5	7.7	5	7.7	1	1.5	65	100
Journalists	22	64.7	5	14.7	4	11.8	3	8.8	34*	100
Policy makers	21	60.0	8	22.9	4	11.4	2	5.7	35	100
Religious leaders	27	19.4	4	11.8	3	8.8	0	0	34*	100
Scientists	16	45.7	11	31.4	4	11.4	4	11.4	35	100
Total	271	65.4	76	18.4	37	8.9	30	7.2	414	100
h. Read books on biotechnology										
Businessmen and traders	26	55.3	10	21.3	5	10.6	6	12.8	47	100
Consumers	52	52.0	31	31.0	7	7.0	10	10.0	100	100
Extension workers	23	37.1	20	32.3	11	17.7	8	12.9	62	100
Farmer leaders and community leaders	39	60.9	16	25.0	6	9.4	3	4.7	64*	100
Journalists	15	44.1	9	26.5	6	17.6	4	11.8	34*	100
Policy makers	14	40.0	15	42.9	5	14.3	1	2.9	35	100
Religious leaders	22	66.7	8	24.2	1	3.0	2	6.1	33*	100
Scientists	19	54.3	9	25.7	5	14.3	2	5.7	35	100
Total	210	51.2	118	28.8	46	11.2	36	8.8	410	100
i. Read newsletters/ pamphlets/ brochures on biotechnology										
Businessmen and traders	18	36.0	21	42.0	5	10.0	6	12.0	50	100
Consumers	41	41.8	34	34.7	11	11.2	12	12.2	98*	100
Extension workers	13	21.0	24	38.7	11	17.7	14	22.6	62	100
Farmer leaders and community leaders	25	39.1	25	39.1	7	10.9	7	10.7	64*	100
Journalists	7	20.6	14	41.2	7	20.6	6	17.6	34*	100
Policy makers	5	14.3	21	60.0	5	14.3	4	11.4	35	100
Religious leaders	14	41.2	15	44.1	3	8.8	2	5.9	34*	100
Scientists	9	25.7	13	37.1	9	25.7	4	11.4	35	100

Information Source	Number of times in the last 2 months								TOTAL	
	0		1		2		3 or more			
	n	%	n	%	n	%	n	%	n	%
Total	132	32.0	167	40.5	58	14.1	55	13.4	412	100

Appendix Table 8. (continued) Sources of biotechnology information most frequently contacted within the past two months

Information Source	Number of times in the last 2 months								TOTAL	
	0		1		2		3 or more			
	n	%	n	%	n	%	n	%	n	%
j. Talked to or heard from food regulators on biotechnology										
Businessmen and traders	31	62.0	10	20.0	6	12.0	3	6.0	50	100
Consumers	70	70.0	20	20.0	6	6.0	4	4.0	100	100
Extension workers	36	58.1	16	25.8	6	9.7	4	6.5	62	100
Farmer leaders and community leaders	49	75.4	13	20.0	1	1.5	2	3.1	65*	100
Journalists	20	57.1	9	25.7	1	2.9	5	14.3	35	100
Policy makers	21	60.0	8	22.9	4	11.4	2	5.7	35	100
Religious leaders	24	70.6	9	26.5	0	0	1	2.9	34*	100
Scientists	25	71.4	9	25.7	0	0	1	2.9	35	100
Total	276	66.3	94	22.6	24	5.8	22	5.3	416	100
k. Attended seminars, public forums on biotechnology										
Businessmen and traders	42	84.0	5	10.0	1	2.0	2	4.0	50	100
Consumers	84	84.0	12	12.0	3	3.0	1	1.0	100	100
Extension workers	40	64.5	9	14.5	8	12.9	5	8.1	62	100
Farmer leaders and community leaders	41	63.1	15	23.1	6	9.2	3	4.6	65*	100
Journalists	26	74.3	5	14.3	1	2.9	3	8.6	35	100
Policy makers	19	54.3	9	25.7	5	14.3	2	5.7	35	100
Religious leaders	29	87.9	2	6.1	2	6.1	0	0	33*	100
Scientists	21	60.0	9	25.7	3	8.6	2	5.7	35	100
Total	302	72.8	66	15.9	29	7.0	18	4.3	415	100
l. Talked to or heard from agricultural biotechnology companies										
Businessmen and traders	26	52.0	13	26.0	4	8.0	7	14.0	50	100
Consumers	83	83.8	11	11.1	4	4.0	1	1.0	99*	100

Information Source	Number of times in the last 2 months								TOTAL	
	0		1		2		3 or more			
	n	%	n	%	n	%	n	%	n	%
Extension workers	32	52.5	19	31.1	3	4.9	7	11.5	61*	100
Farmer leaders and community leaders	40	61.5	17	26.2	4	6.2	4	6.2	65*	100
Journalists	21	60.0	9	25.7	1	2.9	4	11.4	35	100
Policy makers	13	37.1	17	48.6	1	2.9	4	11.4	35	100
Religious leaders	28	82.4	6	17.6	0	0	0	0	34*	100
Scientists	19	54.3	11	31.4	3	8.6	2	5.7	35	100
Total	**262**	**63.3**	**103**	**24.9**	**20**	**4.8**	**29**	**7.0**	**414**	**100**

*Some respondents gave no answer.

Appendix Table 9. Extent of trust in information sources on agricultural biotechnology

	Information Source	Total Trust		Some Trust		No Trust at All		Not Sure		TOTAL		Weighted Mean
		n	%	n	%	n	%	n	%	n	%	
a.	Consumer groups											
	Businessmen and traders	2	4.0	39	78.0	4	8.0	5	10.0	50	100	2.8
	Consumers	10	10.0	64	64.0	5	5.0	21	21.0	100	100	2.6
	Extension workers	5	8.2	37	60.7	9	14.8	10	16.4	61*	100	2.6
	Farmer leaders and community leaders	3	4.2	39	54.9	21	29.6	8	11.3	71	100	2.5
	Journalists	4	11.8	28	82.4	1	2.9	1	2.9	34*	100	3.0
	Policy makers	1	2.9	30	85.7	3	8.6	1	2.9	35	100	2.9
	Religious leaders	6	17.1	17	48.6	0	0	12	31.4	35	100	2.5
	Scientists	0	0	25	70.6	3	8.8	6	17.6	34*	100	2.6
	Total	31	7.4	279	66.4	46	11.0	64	15.2	420	100	
b.	Agricultural workers/services											
	Businessmen and traders	8	16.0	39	78.0	2	4.0	1	2.0	50	100	3.1
	Consumers	21	21.2	67	67.7	3	3.0	8	8.1	9*	100	3.0
	Extension workers	15	25.0	42	70.0	1	1.7	2	3.3	60*	100	3.2
	Farmer leaders and community leaders	33	46.5	35	49.3	1	1.4	2	2.8	71	100	3.4
	Journalists	5	14.3	25	68.6	3	8.6	2	5.7	35	100	2.9
	Policy makers	7	20.0	27	77.1	1	2.9	0	0	35	100	3.2
	Religious leaders	9	25.7	19	54.3	3	8.6	4	8.6	35	100	2.9

Information Source	Total Trust		Some Trust		No Trust at All		Not Sure		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	
Scientists	0	0	32	88.6	0	0	3	8.6	35	100	2.8
Total	98	23.3	286	68.1	14	3.3	22	5.2	420	100	
c. Farmers/Farmer groups											
Businessmen and traders	6	12.0	38	76.0	2	4.0	4	8.0	50	100	2.9
Consumers	16	16.2	70	70.7	6	6.1	7	7.1	99*	100	3.0
Extension workers	11	18.0	35	57.4	5	8.2	10	16.4	61*	100	2.8
Farmer leaders and community leaders	22	31.0	35	49.3	7	9.9	7	9.9	71	100	3.0
Journalists	3	8.6	28	77.1	2	5.7	2	5.7	35	100	2.9
Policy makers	4	11.4	28	80.0	2	5.7	1	2.9	35	100	3.0
Religious leaders	8	23.5	20	58.8	1	2.9	5	11.8	34*	100	2.9
Scientists	2	5.7	21	57.1	5	14.3	7	20.0	35	100	2.5
Total	72	17.1	275	65.5	30	7.1	43	10.2	420	100	

Appendix Table 9. (continued) Extent of trust in information sources on agricultural biotechnology

Information Source	Total Trust		Some Trust		No Trust at All		Not Sure		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	
d. Family/friends/neighbors											
Businessmen and traders	4	8.0	32	64.0	5	10.0	9	18.0	50	100	2.6
Consumers	15	15.3	66	67.3	5	5.1	12	12.2	98*	100	2.9
Extension workers	7	11.7	36	60.0	6	10.0	11	18.3	60*	100	2.7
Farmer leaders and community leaders	7	9.9	41	57.7	19	26.8	4	5.6	71	100	2.7
Journalists	0	0	26	71.4	6	17.1	3	8.6	35	100	2.7
Policy makers	2	5.9	27	79.4	4	11.4	1	2.9	34*	100	2.9
Religious leaders	2	5.9	20	58.8	4	11.8	8	20.6	34*	100	2.5
Scientists	2	5.7	21	57.1	6	17.1	6	17.1	35	100	2.5
Total	39	9.4	269	64.5	55	13.2	54	12.9	417	100	

Information Source	Total Trust		Some Trust		No Trust at All		Not Sure		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	
e. Newspapers											
1. National Dailies											
Businessmen and traders	4	8.2	39	79.6	2	4.1	4	8.2	49*	100	2.9
Consumers	10	10.2	78	79.6	3	3.1	7	7.1	98*	100	2.9
Extension workers	6	10.2	47	79.7	1	1.7	5	8.5	59*	100	2.9
Farmer leaders and community leaders	12	16.9	39	54.9	13	18.3	7	9.9	71	100	2.8
Journalists	5	14.3	29	82.9	0	0	1	2.9	35	100	3.1
Policy makers	5	14.3	27	77.1	2	5.7	1	2.9	35	100	3.0
Religious leaders	4	11.8	21	61.8	3	8.8	6	14.7	34*	100	2.7
Scientists	1	2.9	25	71.4	6	17.1	3	8.6	35	100	2.7
Total	47	11.3	305	73.3	30	7.2	34	8.2	416	100	
2. Tabloids											
Businessmen and traders	1	2.1	30	63.8	8	17.0	8	17.0	47*	100	2.5
Consumers	2	2.2	55	59.8	21	22.8	14	15.2	92*	100	2.5
Extension workers	5	8.8	35	61.4	10	17.5	7	12.3	57*	100	2.7
Farmer leaders and community leaders	7	10.0	24	34.3	30	42.9	9	12.9	70*	100	2.4
Journalists	2	6.1	22	36.6	5	15.2	4	12.1	33*	100	2.7
Policy makers	2	6.5	23	74.2	2	6.5	4	12.9	31*	100	2.7
Religious leaders	3	8.8	18	52.9	3	8.8	10	26.5	34*	100	2.4
Scientists	0	0	16	44.1	11	32.4	7	20.6	34*	100	2.3
Total	22	5.5	223	56.0	90	22.6	63	15.8	398	100	

Appendix Table 9. (continued) Extent of trust in information sources on agricultural biotechnology

Information Source	Total Trust		Some Trust		No Trust at All		Not Sure		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	
f. Private sector scientists											
Businessmen and traders	17	34.0	29	58.0	2	4.0	2	4.0	50	100	3.2
Consumers	23	23.0	70	70.0	1	1.0	6	6.0	100	100	3.1
Extension workers	17	27.9	37	60.7	3	4.9	4	6.6	61*	100	3.1
Farmer leaders and community leaders	35	49.3	28	39.4	1	1.4	7	9.9	71	100	3.3
Journalists	7	20.6	25	73.5	1	2.9	1	2.9	34*	100	3.1
Policy makers	10	28.6	24	68.6	0	0	1	2.9	35	100	3.2
Religious leaders	6	17.6	22	64.7	2	5.9	4	16.8	34*	100	2.9
Scientists	6	17.6	27	77.1	1	2.9	1	2.9	35	100	3.1
Total	121	28.8	262	62.4	11	2.6	26	6.2	420	100	
g. Radio broadcasts											
Businessmen and traders	1	2.0	38	76.0	5	10.0	6	12.0	50	100	2.7
Consumers	3	3.0	81	81.8	5	5.1	10	10.1	99*	100	2.8
Extension workers	9	14.8	45	73.8	2	3.3	5	8.2	61*	100	3.0
Farmer leaders and community leaders	13	18.8	36	52.2	16	23.2	4	5.8	69*	100	2.8
Journalists	3	8.6	25	71.4	4	11.4	3	8.6	35	100	2.8
Policy makers	3	8.6	24	70.6	1	2.9	6	17.6	34*	100	2.7
Religious leaders	5	14.7	21	61.8	1	2.9	7	20.6	34*	100	2.7
Scientists	1	2.9	28	79.4	2	5.9	3	8.8	34*	100	2.8
Total	38	9.1	298	71.6	36	8.6	44	10.6	416	100	
h. Agricultural biotechnology companies											
Businessmen and traders	12	24.5	30	61.2	1	2.0	6	12.2	49*	100	3.0
Consumers	17	17.0	67	67.0	9	9.0	7	7.0	100	100	2.9
Extension workers	8	13.1	41	67.2	6	9.8	6	9.8	61*	100	2.8
Farmer leaders and community leaders	17	24.3	34	48.6	11	15.7	8	11.4	70*	100	2.9
Journalists	5	14.7	22	64.7	4	11.8	3	8.8	34*	100	2.9
Policy makers	7	20.0	25	71.4	2	5.7	1	2.9	35	100	3.1
Religious leaders	4	11.8	19	55.9	5	14.7	6	14.7	34*	100	2.6
Scientists	1	2.9	31	88.6	2	5.7	1	2.9	35	100	2.9
Total	71	17.0	269	64.3	40	9.5	38	9.1	418	100	

Appendix Table 9. (continued) Extent of trust in information sources on agricultural biotechnology

Information Source	Total Trust		Some Trust		No Trust at All		Not Sure		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	N	%	
i. Dealers of agricultural inputs											
Businessmen and traders	4	8.2	35	71.4	5	10.2	5	10.2	49*	100	2.8
Consumers	5	5.1	67	67.7	15	15.2	12	12.1	99*	100	2.7
Extension workers	5	8.2	39	63.9	5	8.2	12	19.7	61	100	2.6
Farmer leaders and community leaders	9	12.7	45	63.4	13	18.3	4	5.6	71	100	2.8
Journalists	2	5.7	23	65.7	5	14.3	5	14.3	35	100	2.6
Policy makers	4	11.4	25	71.4	3	8.6	3	8.6	35	100	2.9
Religious leaders	4	11.4	19	54.3	4	11.4	8	20.0	35	100	2.5
Scientists	0	0	23	65.7	8	22.9	4	11.4	35	100	2.5
Total	33	7.8	276	65.7	58	13.8	53	12.6	420	100	
j. Religious leaders/groups											
Businessmen and traders	2	4.0	33	66.0	8	16.0	7	14.0	50	100	2.6
Consumers	17	17.2	59	59.6	12	12.1	11	11.1	99*	100	2.8
Extension workers	7	11.5	39	63.9	5	8.2	10	16.4	61*	100	2.7
Farmer leaders and community leaders	12	16.9	37	52.1	15	21.1	7	9.9	71	100	2.8
Journalists	6	17.1	20	57.1	52	14.3	4	11.4	35	100	2.3
Policy makers	4	11.4	26	74.3	2	5.7	3	8.6	35	100	2.9
Religious leaders	11	31.4	19	54.3	2	5.7	3	8.6	35	100	3.1
Scientists	3	8.6	21	57.1	7	20.0	4	11.4	35	100	2.7
Total	62	14.7	254	60.3	56	13.3	49	11.6	421	100	
k. Science magazines and newsletters											
Businessmen and traders	17	34.0	28	56.0	3	6.0	2	4.0	50	100	3.2
Consumers	38	38.0	58	58.0	1	1.0	3	3.0	100	100	3.3
Extension workers	14	23.0	42	68.9	3	4.9	2	3.3	61*	100	3.1
Farmer leaders and community leaders	22	31.0	35	49.3	9	12.7	5	7.0	71	100	3.0
Journalists	13	37.1	19	54.3	2	5.7	1	2.9	35	100	3.3
Policy makers	10	28.6	24	68.6	0	0	1	2.9	35	100	3.2
Religious leaders	10	28.6	21	60.0	0	0	4	11.4	35	100	3.1
Scientists	10	28.6	25	71.4	0	0	0	0	35	100	3.3
Total	134	31.7	252	59.7	18	4.3	18	4.3	422	100	

Appendix Table 9. (continued) Extent of trust in information sources on agricultural biotechnology

	Information Source	Total Trust		Some Trust		No Trust at All		Not Sure		TOTAL		Weighted Mean
		n	%	n	%	n	%	n	%	n	%	
l.	Television broadcasts											
	Businessmen and traders	5	10.0	40	80.0	2	4.0	3	6.0	50	100	2.9
	Consumers	10	10.0	76	76.0	4	4.0	10	10.0	100	100	2.9
	Extension workers	13	21.3	41	67.2	2	3.3	5	8.2	61*	100	3.0
	Farmer leaders and community leaders	16	22.5	39	54.9	10	14.1	6	8.5	71	100	2.9
	Journalists	6	17.1	23	65.7	2	5.7	4	11.4	35	100	2.9
	Policy makers	4	11.4	30	85.7	1	2.9	0	0	35	100	3.1
	Religious leaders	8	22.9	20	57.1	1	2.9	6	14.3	35	100	2.9
	Scientists	3	8.6	28	80.0	2	5.7	2	5.7	35	100	2.9
	Total	65	15.4	297	70.4	24	5.7	36	8.5	422	100	
m.	University-based scientists											
	Businessmen and traders	21	42.0	24	48.0	2	4.0	3	6.0	50	100	3.3
	Consumers	43	43.0	54	54.0	3	3.0	0	0	100	100	3.4
	Extension workers	28	45.9	29	47.5	3	4.9	1	1.6	61*	100	3.4
	Farmer leaders and community leaders	49	69.0	18	25.4	0	0	4	5.6	71	100	3.6
	Journalists	17	48.6	17	48.6	1	2.9	0	0	35	100	3.5
	Policy makers	19	54.3	16	45.7	0	0	0	0	35	100	3.5
	Religious leaders	11	31.4	19	54.3	3	8.6	2	5.7	35	100	3.1
	Scientists	18	51.4	17	48.6	0	0	0	0	35	100	3.5
	Total	206	48.8	194	46.0	12	2.8	10	2.4	422	100	
n.	Web sites on biotechnology											
	Businessmen and traders	15	30.0	28	56.0	0	0	7	14.0	50	100	3.0
	Consumers	28	28.3	58	58.6	5	5.1	8	8.1	99*	100	3.1
	Extension workers	21	34.4	35	57.4	3	4.9	2	3.3	61*	100	3.2
	Farmer leaders and community leaders	26	37.1	18	25.7	11	15.7	15	21.4	70*	100	2.8
	Journalists	12	34.3	20	57.1	2	5.7	1	2.9	35	100	3.2
	Policy makers	10	28.6	24	68.6	0	0	1	2.9	35	100	3.2
	Religious leaders	7	20.0	22	62.9	2	5.7	4	11.4	35	100	2.9
	Scientists	8	22.9	26	74.3	0	0	1	2.9	35	100	3.2
	Total	127	30.2	231	55.0	23	5.5	39	9.3	420	100	

*Some respondents gave no answer

Appendix Table 10. Usefulness of information in making judgments about agricultural biotechnology in food production

Stakeholder	Very Useful		Somewhat Useful		Not Useful		TOTAL		Weighted Mean
	n	%	n	%	n	%	N	%	
Businessmen and traders	18	36.0	28	56.0	4	8.0	50	100	2.3
Consumers	47	47.5	50	50.5	2	2.0	99*	100	2.5
Extension workers	27	44.3	31	50.8	3	4.9	61*	100	2.4
Farmer leaders and community leaders	38	53.5	28	39.4	5	7.0	71	100	2.5
Journalists	13	37.1	21	60.0	1	2.9	35	100	2.3
Policy makers	20	58.8	14	41.2	0	0	34*	100	2.6
Religious leaders	15	42.9	19	54.3	1	2.9	35	100	2.4
Scientists	16	45.7	19	54.3	0	0	35	100	2.5
TOTAL	194	46.2	210	50.0	16	3.8	420	100	

*Some respondents gave no answer.

Appendix Table 11. Stakeholders' perception on how scientific is the information they get on agricultural biotechnology

Stakeholder	Very Scientific		Somewhat Scientific		Not Scientific		TOTAL		Weighted Mean
	n	%	n	%	n	%	N	%	
Businessmen and traders	13	26.0	29	58.0	8	16.0	50	100	2.1
Consumers	36	36.0	59	59.0	5	5.0	100	100	2.3
Extension workers	20	32.8	37	60.7	4	6.6	61*	100	2.3
Farmer leaders and community leaders	14	20.0	39	55.7	17	24.3	70*	100	2.0
Journalists	7	20.0	24	68.6	4	11.4	35	100	2.1
Policy makers	15	44.1	18	52.9	1	2.9	34*	100	2.4
Religious leaders	8	23.5	19	55.9	7	20.6	34*	100	2.0
Scientists	9	25.7	25	71.4	1	2.9	35	100	2.2
TOTAL	125	29.8	250	59.7	44	10.5	419	100	

* Some respondents gave no answer.

Appendix Table 12. Understanding of science

Stakeholder	Very Good		Adequate		Poor		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	
Businessmen and traders	8	16.0	39	78.0	3	6.0	50	100	2.1
Consumers	21	21.0	78	78.0	1	1.0	100	100	2.2
Extension workers	9	14.5	48	77.4	5	8.1	62	100	2.1
Farmer leaders and community leaders	6	8.5	46	64.8	19	25.4	71	100	1.9
Journalists	1	2.9	30	88.2	3	8.8	34*	100	1.9
Policy makers	9	26.5	24	70.6	1	2.9	34*	100	2.2
Religious leaders	5	14.3	25	71.4	5	14.3	35	100	2.0
Scientists	10	29.4	22	64.7	2	5.9	34*	100	2.2
TOTAL	**69**	**16.4**	**312**	**74.3**	**39**	**9.3**	**420**	**100**	

*Some respondents gave no answer

Appendix Table 13. Knowledge on the uses of biotechnology in food production

Stakeholder	I know a great deal		I know some		I know nothing at all		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	
Businessmen and traders	2	4.1	42	85.7	5	10.2	49*	100	1.9
Consumers	7	7.1	89	89.9	3	3.0	99*	100	2.0
Extension workers	3	4.8	53	85.5	6	9.7	62	100	2.0
Farmer leaders and community leaders	4	5.8	57	82.6	8	11.6	69*	100	1.9
Journalists	2	5.9	31	91.2	1	2.9	34*	100	2.0
Policy makers	2	5.7	31	88.6	2	5.7	35	100	2.0
Religious leaders	1	2.9	29	82.9	5	14.3	35	100	1.9
Scientists	9	26.5	24	70.6	1	2.9	34*	100	2.2
TOTAL	**30**	**7.2**	**356**	**85.4**	**31**	**7.4**	**417**	**100**	

*Some responses are missing.

Appendix Table 14. Understanding of biotechnology in food production

Statement	True		False		Don't Know		TOTAL	
	n	%	n	%	n	%	n	%
a. In reality, all crops have been "genetically modified" from their original state through domestication, selection, and controlled breeding over long periods of time.								
Businessmen and traders	33	66.0	12	24.0	5	10.0	50	100
Consumers	68	68.0	28	28.0	4	4.0	100	100
Extension workers	40	64.5	18	29.0	4	6.5	62	100
Farmer leaders and community leaders	46	64.8	20	28.2	5	7.0	71	100
Journalists	19	54.3	14	40.0	2	5.7	35	100
Policy makers	27	77.1	7	20.0	1	2.9	35	100
Religious leaders	20	58.8	9	26.5	5	14.7	34*	100
Scientists	26	78.8	5	15.2	2	6.1	33*	100
Total	279	66.4	113	26.9	28	6.7	420	100
b. Yeast for brewing consists of living organisms.								
Businessmen and traders	41	82.0	6	12.0	3	6.0	50	100
Consumers	86	86.0	2	2.0	12	12.0	100	100
Extension workers	53	85.5	4	6.5	5	8.1	62	100
Farmer leaders and community leaders	56	80.0	1	1.4	13	18.6	70*	100
Journalists	30	85.7	2	5.7	3	8.6	35	100
Policy makers	30	85.7	2	5.7	3	8.6	35	100
Religious leaders	24	68.6	1	2.9	10	28.6	35	100
Scientists	30	90.9	1	3.0	2	6.1	33*	100
Total	350	83.3	19	4.5	51	12.1	420	100

Statement	True		False		Don't Know		TOTAL	
	n	%	n	%	n	%	n	%
c. Ordinary tomatoes do not contain genes, while genetically modified tomatoes do.								
Businessmen and traders	10	20.0	27	54.0	13	26.0	50	100
Consumers	10	10.0	75	75.0	15	15.0	100	100
Extension workers	7	11.3	50	80.6	5	8.1	62	100
Farmer leaders and community leaders	28	39.4	36	50.7	7	9.9	71	100
Journalists	12	34.3	19	54.3	4	11.4	35	100
Policy makers	9	25.7	23	65.7	3	8.6	35	100
Religious leaders	6	18.2	22	66.7	5	15.2	33*	100
Scientists	0	0	31	91.2	3	8.8	34*	100
Total	82	19.5	283	67.4	55	13.1	420	100

Appendix Table 14. (continued) Understanding of biotechnology in food production

Statement	True		False		Don't Know		TOTAL	
	n	%	n	%	n	%	n	%
d. With every new emerging technology, there will always be potential risks.								
Businessmen and traders	46	92.0	4	8.0	0	0	50	100
Consumers	97	97.0	3	3.0	0	0	100	100
Extension workers	58	93.5	3	4.8	1	1.6	62	100
Farmer leaders and community leaders	57	82.6	9	13.0	3	3.4	69*	100
Journalists	30	85.7	1	2.9	4	11.4	35	100
Policy makers	34	97.1	1	2.9	0	0	35	100
Religious leaders	30	85.7	2	5.7	3	8.6	35	100
Scientists	33	97.1	1	2.9	0	0	34*	100
Total	385	91.7	24	5.7	11	2.6	420	100
e. In genetic engineering, genes of interest are transferred from one organism to another.								
Businessmen and traders	42	85.7	2	4.1	5	10.2	49*	100
Consumers	85	85.0	4	4.0	11	11.0	100	100

Statement	True		False		Don't Know		TOTAL	
	n	%	n	%	n	%	n	%
Extension workers	51	82.3	8	12.9	3	4.8	62	100
Farmer leaders and community leaders	58	82.9	7	10.0	5	7.1	70*	100
Journalists	26	76.5	5	14.7	3	8.8	34*	100
Policy makers	33	94.3	0	0	2	5.7	35	100
Religious leaders	26	76.5	2	5.9	6	17.6	34*	100
Scientists	29	85.3	3	8.8	2	5.9	34*	100
Total	350	83.7	31	7.4	37	8.9	418	100
f. Golden Rice (genetically modified rice) contains beta-carotene.								
Businessmen and traders	28	56.0	6	12.0	16	32.0	50	100
Consumers	49	49.5	8	8.1	42	42.4	99*	100
Extension workers	38	62.3	3	4.9	20	32.8	61*	100
Farmer leaders and community leaders	45	63.4	7	9.9	19	26.8	71	100
Journalists	21	61.8	2	5.9	11	32.4	34*	100
Policy makers	24	68.6	3	8.6	8	22.9	35	100
Religious leaders	16	47.1	2	5.9	16	47.1	34*	100
Scientists	23	69.7	1	3.0	9	27.3	33*	100
Total	244	58.5	32	7.7	141	33.8	417	100

Appendix Table 14. (continued) Understanding of biotechnology in food production

Statement	True		False		Don't Know		TOTAL	
	n	%	n	%	n	%	n	%
g. More than half of human genes are identical to those of a monkey.								
Businessmen and traders	20	40.0	10	20.0	20	40.0	50	100
Consumers	49	49.5	21	21.2	29	29.3	99*	100
Extension workers	20	32.8	21	34.4	20	32.8	61*	100
Farmer leaders and community leaders	32	45.1	23	32.4	16	22.5	71	100
Journalists	17	50.0	7	20.6	10	29.4	34*	100
Policy makers	17	48.6	5	14.3	13	37.1	35	100
Religious leaders	7	20.6	11	32.4	16	47.1	34*	100
Scientists	17	51.5	7	21.2	9	27.3	33*	100
Total	179	42.9	105	25.2	133	31.9	417	100
h. Science can guarantee zero-risk.								
Businessmen and traders	3	6.0	46	92.0	1	2.0	50	100
Consumers	3	3.1	92	93.9	3	3.1	98*	100
Extension workers	3	4.8	58	93.5	1	1.6	62	100
Farmer leaders and community leaders	4	5.6	58	81.7	9	12.7	71	100
Journalists	2	5.7	29	82.9	4	11.4	35	100
Policy makers	1	2.9	31	88.6	3	8.6	35	100
Religious leaders	3	8.6	27	77.1	5	14.3	35	100
Scientists	1	2.9	33	97.1	0	0	34*	100
Total	20	4.8	374	89.0	26	6.2	420	100
i. By eating genetically-modified corn, a person's genes could also be modified.								
Businessmen and traders	5	10.0	38	76.0	7	14.0	50	100
Consumers	5	5.0	76	76.0	19	19.0	100	100
Extension workers	9	14.8	47	77.0	5	8.2	61*	100
Farmer leaders and community leaders	18	25.4	43	60.6	10	14.1	71	100
Journalists	3	8.6	25	71.4	7	20.0	35	100
Policy makers	1	2.9	28	80.0	6	17.1	35	100
Religious leaders	4	11.4	22	62.9	9	25.7	35	100
Scientists	1	2.9	30	88.2	3	8.8	34*	100
Total	46	10.9	309	73.4	66	15.7	421	100

Appendix Table 14. (continued) Understanding of biotechnology in food production

Statement	True		False		Don't Know		TOTAL	
	n	%	n	%	n	%	n	%
j. Products from genetically modified crops are now being sold in the Philippines.								
Businessmen and traders	46	92.0	4	8.0	0	0	50	100
Consumers	88	88.9	2	2.0	9	9.1	99*	100
Extension workers	58	93.5	2	3.2	2	3.2	62	100
Farmer leaders and community leaders	67	94.4	2	2.8	2	2.8	71	100
Journalists	32	91.4	0	0	3	8.6	35	100
Policy makers	31	88.6	1	2.9	3	8.6	35	100
Religious leaders	27	77.1	2	5.7	6	17.1	35	100
Scientists	32	94.1	1	2.9	1	2.9	34*	100
Total	381	90.5	14	3.3	26	6.2	421	100
k. Genetically modified crops are now being commercially grown in the Philippines.								
Businessmen and traders	46	92.0	1	2.0	3	6.0	50	100
Consumers	75	75.0	8	8.0	17	17.0	100	100
Extension workers	55	88.7	6	9.7	1	1.6	62	100
Farmer leaders and community leaders	60	84.5	9	12.7	2	2.8	71	100
Journalists	31	88.6	2	5.7	2	5.7	35	100
Policy makers	28	80.0	2	5.7	5	14.3	35	100
Religious leaders	26	74.3	4	11.4	5	14.3	35	100
Scientists	27	79.4	4	11.8	3	8.8	34*	100
Total	348	82.5	36	8.5	38	9.0	422	100

Statement	True		False		Don't Know		TOTAL	
	n	%	n	%	n	%	n	%
l. Plant viruses infect vegetables and fruits.								
Businessmen and traders	47	94.0	1	2.0	2	4.0	50	100
Consumers	93	93.0	3	3.0	4	4.0	100	100
Extension workers	57	93.4	4	6.6	0	0	61*	100
Farmer leaders and community leaders	63	88.7	6	8.5	2	2.8	71	100
Journalists	31	88.6	2	5.7	2	5.7	35	100
Policy makers	33	94.3	0	0	2	5.7	35	100
Religious leaders	28	80.0	3	8.6	4	11.4	35	100
Scientists	32	94.1	1	2.9	1	2.9	34*	100
Total	384	91.2	20	4.8	17	4.0	421	100

Appendix Table 14. (continued) Understanding of biotechnology in food production

Statement	True		False		Don't Know		TOTAL	
	n	%	n	%	N	%	n	%
m. Plant viruses are transferred to humans when they eat vegetables and fruits infected with plant viruses.								
Businessmen and traders	21	42.0	22	44.0	7	14.0	50	100
Consumers	37	37.0	48	48.0	15	15.0	100	100
Extension workers	12	19.7	42	68.9	7	11.5	61*	100
Farmer leaders and community leaders	32	45.1	32	45.1	7	9.9	71	100
Journalists	13	38.2	15	44.1	6	17.6	34*	100
Policy makers	9	25.7	19	54.3	7	20.0	35	100
Religious leaders	21	60.0	10	28.6	4	11.4	35	100
Scientists	4	11.8	26	76.5	4	11.8	34*	100
Total	149	35.5	214	51.0	57	13.6	420	100

*Some respondents gave no answer.

Appendix Table 15. Factual knowledge of biotechnology: the use of biotechnology crops *

	Biotechnology Crop	Grow/ Plant	Food	Animal Feed	Industrial By-products	None	Don't Know	TOTAL
		n	n	n	n	n	n	n
a.	Tomato resistant to tomato virus diseases							
	Businessmen and traders	40	34	1	19	1	2	
	Consumers	76	47	21	45	3	6	
	Extension workers	50	36	15	29	5	1	
	Farmer leaders and community leaders	64	48	17	33	2	0	
	Journalists	25	27	3	14	0	2	
	Policy makers	30	28	14	24	0	1	
	Religious leaders	19	20	12	15	4	1	
	Scientists	27	26	9	21	1	1	
	Total							
b.	Papaya resistant to papaya virus disease							
	Businessmen and traders	37	32	12	21	2	1	
	Consumers	75	68	20	50	1	3	
	Extension workers	47	43	18	28	5	1	
	Farmer leaders and community leaders	61	40	11	34	2	1	
	Journalists	26	25	6	16	2	0	
	Policy makers	29	27	8	20	0	1	
	Religious leaders	23	17	11	13	4	0	
	Scientists	28	27	9	20	1	1	
	Total							
c.	Eggplant resistant to borer insect infestation							
	Businessmen and traders	38	32	11	11	0	1	
	Consumers	73	66	19	31	3	4	
	Extension workers	48	43	12	16	6	1	
	Farmer leaders and community leaders	62	42	10	19	2	1	

*multiple responses

Appendix Table 15. (continued) Factual knowledge of biotechnology: the use of biotechnology crops*

Biotechnology Crop	Grow/ Plant	Food	Animal Feed	Industrial By-products	None	Don't Know	TOTAL
	n	n	n	n	n	n	n
c. Eggplant resistant to borer insect infestation							
Journalists	25	22	6	11	2	0	
Policy makers	29	28	8	14	1	1	
Religious leaders	23	18	11	6	4	0	
Scientists	26	25	10	15	1	1	
Total							
d. Corn tolerant to herbicide							
Businessmen and traders	29	25	20	19	1	2	
Consumers	64	53	46	47	4	9	
Extension workers	45	34	33	27	5	2	
Farmer leaders and community leaders	57	36	30	27	3	2	
Journalists	25	19	11	14	1	2	
Policy makers	28	25	25	23	0	1	
Religious leaders	21	15	16	10	5	0	
Scientists	26	15	22	21	0	1	
Total							
e. Corn resistant to borer insect infestation							
Businessmen and traders	32	27	20	18	2	2	
Consumers	71	55	46	46	2	6	
Extension workers	47	32	32	23	4	2	
Farmer leaders and community leaders	58	39	24	30	2	1	
Journalists	24	17	15	17	0	1	
Policy makers	29	26	23	29	0	1	
Religious leaders	19	17	16	12	4	0	
Scientists	27	24	21	23	0	1	
Total							

*multiple responses

Appendix Table 15. (continued) Factual knowledge of biotechnology: the use of biotechnology crops*

Biotechnology Crop	Grow/ Plant	Food	Animal Feed	Industrial By-products	None	Don't Know	TOTAL
	n	n	n	n	n	n	n
f. Rice resistant to blight disease							
Businessmen and traders	16	35	13	10	2	2	
Consumers	73	65	29	38	2	1	
Extension workers	47	37	18	19	5	3	
Farmer leaders and community leaders	62	45	20	20	1	0	
Journalists	22	23	6	14	1	1	
Policy makers	29	29	17	18	1	0	
Religious leaders	19	22	10	9	4	1	
Scientists	26	19	12	17	0	1	
Total							
g. Rice with more Vitamin A							
Businessmen and traders	30	39	14	13	1	2	
Consumers	66	81	23	34	0	4	
Extension workers	45	44	17	21	4	1	
Farmer leaders and community leaders	61	52	14	17	1	0	
Journalists	23	24	5	12	0	0	
Policy makers	30	28	16	20	1	0	
Religious leaders	22	25	10	7	3	1	
Scientists	24	32	9	17	0	1	
Total							
h. Papaya that takes longer to ripen							
Businessmen and traders	33	30	10	20	2	1	
Consumers	64	60	19	44	3	3	
Extension workers	44	37	18	26	5	1	
Farmer leaders and community leaders	59	47	17	28	1	1	
Journalists	26	21	4	14	0	0	

*multiple responses

Appendix Table 15. (continued) Factual knowledge of biotechnology: the use of biotechnology crops*

Biotechnology Crop	Grow/ Plant	Food	Animal Feed	Industrial By-products	None	Don't Know	TOTAL
	n	n	n	n	n	n	n
h. Papaya that takes longer to ripen							
Policy makers	25	25	10	13	1	2	
Religious leaders	19	21	11	13	5	1	
Scientists	22	24	11	22	0	1	
Total							
i. Cotton resistant to insect infestation							
Businessmen and traders	35	10	71	24	2	2	
Consumers	60	14	12	53	2	11	
Extension workers	44	12	7	32	6	1	
Farmer leaders and community leaders	45	6	5	35	13	3	
Journalists	21	10	4	21	1	0	
Policy makers	28	4	5	21	0	3	
Religious leaders	22	9	4	13	3	1	
Scientists	26	6	6	26	1	1	
Total							

*multiple responses

Appendix Table 16. Factual knowledge of biotechnology: the importance of food characteristics

Characteristic	Very Important		Moderately Important		Moderately Unimportant		Very Unimportant		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
a. Non-allergenic													
Businessmen and traders	44	88.0	5	10.0	0	0	1	2.0	0	0	50	100	3.8
Consumers	92	92.0	8	8.0	0	0	0	0	0	0	100	100	3.9
Extension workers	55	90.2	6	9.8	0	0	0	0	0	0	61*	100	3.9
Farmer leaders and community leaders													3.8
	58	81.7	10	14.1	3	4.2	0	0	0	0	71	100	
Journalists	27	79.4	6	17.6	0	0	1	2.9	0	0	34*	100	3.7
Policy makers	32	91.4	3	8.6	0	0	0	0	0	0	35	100	3.9
Religious leaders	33	94.3	2	5.7	0	0	0	0	0	0	35	100	3.9
Scientists	33	94.3	1	2.9	1	2.9	0	0	0	0	35	100	3.9
Total	374	88.8	41	9.7	4	1.0	2	0.5	0	0	421	100	
b. Non-poisonous													
Businessmen and traders	47	94.0	2	4.0	0	0	1	2.0	0	0	50	100	3.9
Consumers	97	99.0	1	1.0	0	0	0	0	0	0	98*	100	4.0
Extension workers	55	91.7	4	6.7	1	1.7	0	0	0	0	60*	100	3.9
Farmer leaders and community leaders													3.9
	67	95.7	2	2.9	1	1.4	0	0	0	0	70*	100	
Journalists	30	90.9	2	6.1	0	0	1	3.0	0	0	33*	100	3.8
Policy makers	34	97.1	1	2.9	0	0	0	0	0	0	35	100	4.0
Religious leaders	35	100	0	0	0	0	0	0	0	0	35	100	4.0
Scientists	33	94.3	1	2.9	1	2.9	0	0	0	0	35	100	3.9
Total	398	95.7	13	3.1	3	0.7	2	0.5	0	0	416	100	
c. Price													
Businessmen and traders	24	51.1	16	34.0	6	12.8	1	2.1	0	0	47*	100	3.3
Consumers	65	65.7	33	33.3	1	1.0	0	0	0	0	99*	100	3.6
Extension workers	40	65.6	19	31.1	1	1.6	0	0	1	1.6	61*	100	3.7
Farmer leaders and community leaders													3.6
	43	62.6	21	30.4	5	7.2	0	0	0	0	69*	100	
Journalists	17	50.0	13	38.2	3	8.8	1	2.9	0	0	34*	100	3.4
Policy makers	23	65.7	11	31.4	1	2.9	0	0	0	0	35	100	3.6
Religious leaders	24	68.6	8	22.9	2	5.7	1	2.9	0	0	35	100	3.6
Scientists	18	51.4	14	40.0	2	5.7	1	2.9	0	0	35	100	3.4
Total	254	61.2	135	32.5	21	5.1	4	1.0	1	0.2	415	100	

Appendix Table 16. (continued) Factual knowledge of biotechnology: the importance of food characteristics

Characteristic	Very Important		Moderately Important		Moderately Unimportant		Very Unimportant		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
d. Food appearance													
Businessmen and traders	35	71.4	12	24.5	0	0	2	4.1	0	0	49*	100	3.6
Consumers	63	64.3	32	32.7	3	3.1	0	0	0	0	98*	100	3.6
Extension workers	44	72.1	15	24.6	1	1.6	0	0	1	1.6	61*	100	3.7
Farmer leaders and community leaders	52	74.3	15	21.4	3	4.3	0	0	0	0	70*	100	3.6
Journalists	17	51.5	14	42.4	1	3.0	1	3.0	0	0	33*	100	3.4
Policy makers	20	60.6	12	36.4	1	3.0	0	0	0	0	33*	100	3.6
Religious leaders	24	68.6	9	25.7	0	0	2	5.7	0	0	35	100	3.6
Scientists	21	60.0	9	25.7	3	8.6	2	5.7	0	0	35	100	3.4
Total	276	66.7	118	28.5	12	2.9	7	1.7	1	0.2	414	100	
e. Nutritional quality													
Businessmen and traders	40	80.0	9	18.0	0	0	1	2.0	0	0	50	100	3.8
Consumers	84	84.0	16	16.0	0	0	0	0	0	0	100	100	3.8
Extension workers	54	87.1	6	9.7	1	1.6	0	0	1	1.6	62	100	3.9
Farmer leaders and community leaders	53	74.6	18	25.4	0	0	0	0	0	0	71	100	3.7
Journalists	31	91.2	3	8.8	0	0	0	0	0	0	34*	100	3.9
Policy makers	32	91.4	3	8.6	0	0	0	0	0	0	35	100	3.9
Religious leaders	32	94.1	2	5.9	0	0	0	0	0	0	34*	100	3.9
Scientists	31	88.6	3	8.6	0	0	1	2.9	0	0	35	100	3.8
Total	357	84.8	60	14.2	1	0.2	2	0.5	1	0.2	421	100	
f. Better taste													
Businessmen and traders	41	82.0	8	16.0	0	0	1	2.0	0	0	50	100	3.8
Consumers	77	77.0	21	21.0	2	2.0	0	0	0	0	100	100	3.8
Extension workers	43	70.5	17	27.9	0	0	0	0	1	1.6	61*	100	3.7
Farmer leaders and community leaders	51	71.8	18	25.4	2	2.8	0	0	0	0	71	100	3.7
Journalists	26	76.5	8	23.5	0	0	0	0	0	0	34*	100	3.8
Policy makers	20	57.1	15	42.9	0	0	0	0	0	0	35	100	3.6
Religious leaders	25	71.4	6	17.1	4	11.4	0	0	0	0	35	100	3.6
Scientists	29	82.9	4	11.4	1	2.9	1	2.9	0	0	35	100	3.7
Total	312	74.1	97	23.0	9	2.1	2	0.5	1	0.2	421	100	

Appendix Table 17. (continued) Factual knowledge of biotechnology: the importance of food characteristics

Characteristic	Very Important		Moderately Important		Moderately Unimportant		Very Unimportant		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
g. Pesticide residue content													
Businessmen and traders	38	76.0	7	14.0	2	4.0	3	6.0	0	0	50	100	3.6
Consumers	87	87.0	8	8.0	5	5.0	0	0	0	0	100	100	3.8
Extension workers	49	80.3	10	16.4	2	3.3	0	0	0	0	61*	100	3.8
Farmer leaders and community leaders	55	77.5	13	15.5	3	4.2	0	0	0	0	71	100	3.8
Journalists	29	85.3	4	11.8	1	2.9	0	0	0	0	34*	100	3.8
Policy makers	35	100	0	0	0	0	0	0	0	0	35	100	4.0
Religious leaders	27	77.1	4	11.4	1	2.9	3	8.6	0	0	35	100	3.6
Scientists	32	91.4	1	2.9	1	2.9	1	2.9	0	0	35	100	3.8
Total	352	83.6	47	11.2	15	3.6	7	1.7	0	0	421	100	

*Some respondents gave no answer.

Appendix Table 17. Rating of perceived risks/hazards associated with the uses of agricultural biotechnology in food production

Stakeholder	Very Hazardous		Somewhat Hazardous		Not at All Hazardous		No Opinion		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	
Businessmen and traders	3	6.0	28	56.0	11	22.0	8	16.0	50	100	1.8
Consumers	5	5.1	55	56.1	23	23.5	15	15.3	98*	100	1.8
Extension workers	3	4.8	29	46.8	21	33.9	9	14.5	62	100	1.6
Farmer leaders and community leaders	6	8.6	32	45.7	28	40.0	4	5.7	70*	100	1.7
Journalists	3	8.6	16	45.7	13	37.1	3	8.6	35	100	1.7
Policy makers	0	0	16	45.7	12	34.3	7	20.0	35	100	1.6
Religious leaders	7	20.0	15	42.9	7	20.0	6	17.1	35	100	2.0
Scientists	0	0	16	45.7	14	40.0	5	14.3	35	100	1.5
TOTAL	**27**	**6.4**	**207**	**49.3**	**129**	**30.7**	**57**	**13.6**	**420**	**100**	

*Some respondents gave no answer.

Appendix Table 18. Rating of perceived benefits of agricultural biotechnology in food production

Stakeholder	Very Beneficial		Moderately Beneficial		Not at All Beneficial		No Opinion		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	
Businessmen and traders	20	40.0	22	44.0	4	8.0	4	8.0	50	100	2.5
Consumers	44	44.0	47	47.0	4	4.0	5	5.0	100	100	2.5
Extension workers	21	33.9	32	51.6	4	6.5	5	8.1	62	100	2.4
Farmer leaders and community leaders	29	40.8	37	52.1	2	2.8	3	4.2	71	100	2.5
Journalists	16	45.7	15	42.9	1	2.9	3	8.6	35	100	2.6
Policy makers	17	48.6	14	40.0	2	5.7	2	5.7	35	100	2.5
Religious leaders	8	22.9	21	60.0	3	8.6	3	8.6	35	100	2.3
Scientists	17	48.6	16	45.7	0	0	2	5.7	35	100	2.6
TOTAL	**172**	**40.7**	**204**	**48.2**	**20**	**4.7**	**27**	**6.4**	**423**	**100**	

Appendix Table 19. Perception of agricultural biotechnology

	Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
		n	%	n	%	n	%	n	%	n	%	n	%	
a.	Government agencies are doing their best to ensure that the food we eat is safe.													
	Businessmen and traders	12	24.0	23	46.0	11	22.0	4	8.0	0	0	50	100	2.9
	Consumers	21	21.2	55	55.6	14	14.0	6	6.1	3	3.0	99*	100	2.9
	Extension workers	21	33.9	30	48.4	6	9.7	4	6.5	1	1.6	62	100	3.1
	Farmer leaders and community leaders	24	33.8	34	47.9	12	16.9	1	1.4	0	0	71	100	3.1
	Journalists	11	31.4	18	51.4	4	11.4	1	2.9	1	2.9	35	100	3.1
	Policy makers	19	54.3	12	34.3	3	8.6	0	0	1	2.9	35	100	3.4
	Religious leaders	5	14.3	16	45.7	8	22.9	3	8.6	3	8.6	35	100	2.7
	Scientists	8	22.9	22	62.9	4	11.4	0	0	1	2.9	35	100	3.1
	Total	121	28.7	210	49.8	62	14.7	19	4.5	10	2.4	422	100	
b.	Biotechnology in food production only benefits large agricultural companies.													
	Businessmen and traders	7	14.0	15	30.0	21	42.0	3	6.0	4	8.0	50	100	2.6
	Consumers	9	9.1	31	31.3	43	43.4	11	11.1	5	5.1	99*	100	2.4
	Extension workers	7	11.3	16	25.8	33	53.2	4	6.5	2	3.2	62	100	2.2
	Farmer leaders and community leaders	10	14.1	19	26.8	32	45.1	9	12.7	1	14.0	71	100	2.4
	Journalists	4	11.8	7	20.6	19	55.9	3	8.8	1	2.9	34*	100	2.4
	Policy makers	3	8.6	10	28.6	15	42.9	7	20.0	0	0	35	100	2.3
	Religious leaders	7	20.6	10	29.4	14	41.2	1	2.9	2	5.9	34*	100	2.7
	Scientists	2	5.7	7	20.0	22	62.9	3	8.6	1	2.9	35	100	2.2
	Total	49	11.7	115	27.4	199	47.4	41	9.8	16	3.8	420	100	
c.	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.													
	Businessmen and traders	9	18.0	31	62.0	7	14.0	2	4.0	1	2.0	50	100	3.0
	Consumers	11	11.1	48	48.5	18	18.2	6	6.1	16	16.2	99*	100	2.2
	Extension workers	15	24.2	26	41.9	15	24.2	2	3.2	4	6.5	62	100	2.5
	Farmer leaders and community leaders	14	19.7	47	66.2	5	7.0	1	1.4	4	5.6	71	100	3.1
	Journalists	7	20.0	22	62.9	3	8.6	0	0	3	8.6	35	100	3.0

Appendix Table 19. (continued) Perception of agricultural biotechnology

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	N	%	
c. Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.													
Policy makers	7	20.0	21	60.0	5	14.3	1	2.9	1	2.9	35	100	3.0
Religious leaders	6	17.6	16	47.1	9	26.5	0	0	3	8.8	34*	100	2.9
Scientists	7	20.0	21	60.0	5	14.3	1	2.9	1	2.9	35	100	3.0
Total	76	18.1	232	55.1	67	15.9	13	3.1	33	7.8	421	100	
d. Vital information about the health effects of genetically modified foods is being held back.													
Businessmen and traders	4	8.0	22	44.0	13	26.0	0	0	11	22.0	50	100	2.2
Consumers	6	6.1	45	45.9	17	17.3	5	5.1	25	25.5	98*	100	2.7
Extension workers	2	3.2	21	33.9	21	33.9	2	3.2	16	25.8	62	100	2.5
Farmer leaders and community leaders	3	4.3	29	41.4	25	35.7	3	4.3	10	14.3	70*	100	2.5
Journalists	0	0	16	45.7	13	37.1	0	0	6	17.1	35	100	2.5
Policy makers	2	5.7	7	20.0	19	54.3	0	0	7	20.2	35	100	2.4
Religious leaders	6	17.6	12	35.5	7	20.6	0	0	9	26.5	34*	100	3.0
Scientists	0	0	13	37.1	16	45.7	0	0	6	17.1	35	100	2.4
Total	23	5.5	165	39.4	131	31.3	10	2.4	90	21.5	419	100	
e. The risks of genetic engineering have been greatly exaggerated.													
Businessmen and traders	5	10.0	26	52.0	9	18.0	0	0	10	20.0	50	100	2.3
Consumers	13	13.3	51	52.0	17	17.3	0	0	17	17.3	98*	100	3.0
Extension workers	3	4.8	40	64.5	12	19.4	1	1.6	6	9.7	62	100	2.8
Farmer leaders and community leaders	5	7.2	31	44.9	17	24.6	3	4.3	13	18.8	69*	100	2.7
Journalists	4	11.4	17	48.6	9	25.7	0	0	5	14.3	35	100	2.6
Policy makers	5	14.3	26	74.3	2	5.7	1	2.9	1	2.9	35	100	
Religious leaders	2	5.7	11	31.4	12	34.3	0	0	10	28.6	35	100	
Scientists	5	14.7	20	58.8	7	20.6	1	2.9	1	2.9	34*	100	
Total	42	10.0	222	53.1	85	20.3	6	1.4	63	15.1	418	100	

Appendix Table 19. (continued) Perception of agricultural biotechnology

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
f. Biotechnology is good for Philippine agriculture.													
Businessmen and traders	11	22.0	27	54.0	4	8.0	1	2.0	7	14.0	50	100	3.1
Consumers	23	23.2	57	57.6	10	10.1	2	2.0	7	7.1	99*	100	3.1
Extension workers	12	19.7	41	67.2	6	9.8	1	1.6	1	1.6	61*	100	3.1
Farmer leaders and community leaders	23	32.4	37	52.1	4	5.6	4	5.6	3	4.2	71	100	3.2
Journalists	6	17.1	22	62.9	2	5.7	0	0	5	14.3	35	100	3.1
Policy makers	8	22.9	23	65.7	2	5.7	1	2.9	1	2.9	35	100	3.1
Religious leaders	8	25.0	15	46.9	5	15.6	3	9.4	1	3.1	32*	100	2.9
Scientists	6	18.2	22	66.7	4	12.1	0	0	1	3.0	33*	100	3.1
Total	97	23.3	244	58.7	37	8.9	12	2.9	26	6.2	416	100	
g. Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.													
Businessmen and traders	11	22.4	27	55.1	3	6.1	1	2.0	7	14.3	49*	100	3.1
Consumers	14	14.1	68	68.7	9	9.1	0	0	8	8.1	99*	100	3.1
Extension workers	12	19.4	42	67.7	3	4.8	1	1.6	4	6.5	62	100	3.1
Farmer leaders and community leaders	15	21.7	43	62.3	6	8.7	0	0	5	7.2	69*	100	3.1
Journalists	7	20.0	19	54.3	4	11.4	0	0	5	14.3	35	100	3.1
Policy makers	7	20.0	27	77.1	1	2.9	0	0	0	0	35	100	3.2
Religious leaders	5	14.7	19	55.9	7	20.6	1	2.9	2	5.9	34*	100	2.9
Scientists	6	17.1	26	74.3	1	2.9	0	0	2	5.7	35	100	3.2
Total	77	18.4	271	64.8	34	8.1	3	0.7	33	7.9	418	100	
h. Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.													
Businessmen and traders	4	8.0	18	36.0	12	24.0	9	18.0	7	14.0	50	100	2.4
Consumers	5	5.1	23	23.2	37	37.4	15	15.2	19	19.2	99*	100	2.2
Extension workers	7	11.3	15	24.2	24	38.7	4	6.5	12	19.4	62	100	2.5
Farmer leaders and community leaders	4	5.7	34	48.6	20	28.6	4	5.7	8	11.4	70*	100	2.6
Journalists	4	11.4	11	31.4	14	40.0	3	8.6	3	8.6	35	100	2.5
Policy makers	4	11.4	16	45.7	4	11.4	3	8.6	8	22.9	35	100	2.8
Religious leaders	2	5.9	10	29.4	13	38.2	3	8.6	6	17.6	34*	100	2.4

Appendix Table 19. (continued) Perception of agricultural biotechnology

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	N	%	
h. Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.													
Scientists	4	11.4	9	25.7	13	37.1	3	8.6	6	17.1	35	100	2.5
Total	34	8.1	136	32.4	137	32.6	44	10.5	69	16.4	420	100	
i. Regulations on biotechnology should include inputs from the non-government sector.													
Businessmen and traders	20	40.0	23	46.0	2	4.0	0	0	5	10.0	50	100	3.4
Consumers	45	45.5	49	49.5	1	1.0	0	0	4	4.0	99*	100	3.5
Extension workers	16	25.8	41	66.1	2	3.2	0	0	3	4.8	62	100	3.2
Farmer leaders and community leaders	13	18.3	42	59.2	12	16.9	0	0	4	5.6	71	100	3.0
Journalists	12	34.3	21	60.0	1	2.9	0	0	1	2.9	35	100	3.3
Policy makers	8	22.9	27	77.1	0	0	0	0	0	0	35	100	3.2
Religious leaders	14	40.0	16	45.7	1	2.9	0	0	4	11.4	35	100	3.4
Scientists	10	28.6	24	68.6	1	2.9	0	0	0	0	35	100	3.3
Total	138	32.7	243	57.6	20	4.7	0	0	21	5.0	422	100	
j. Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health													
Businessmen and traders	7	14.0	24	48.0	11	22.0	0	0	8	16.0	50	100	2.9
Consumers	14	14.1	48	48.5	9	9.1	7	7.1	21	21.2	99*	100	2.9
Extension workers	9	14.5	24	38.7	15	24.2	1	1.6	13	21.0	62	100	2.8
Farmer leaders and community leaders	7	10.1	36	52.2	16	23.2	1	1.4	9	13.0	69*	100	2.8
Journalists	1	2.9	24	68.6	5	14.3	0	0	5	14.3	35	100	2.9
Policy makers	2	5.7	18	51.4	11	31.4	0	0	4	11.4	35	100	2.7
Religious leaders	8	22.9	13	37.1	5	14.3	0	0	9	25.7	35	100	3.1
Scientists	2	5.9	13	38.2	12	35.3	0	0	7	20.6	34*	100	2.6
Total	50	11.9	200	47.7	84	20.0	9	2.1	76	18.1	419	100	

*Some respondents gave no answer.

Appendix Table 20. Perceived involvement of individuals, groups, and organizations in public health and safety with regard to agricultural biotechnology

	Individual/Group/ Organization	Very Concerned		Somewhat Concerned		Not at All Concerned		Not Sure		TOTAL		Weighted Mean
		n	%	n	%	n	%	n	%	n	%	
a.	Consumers/General Public											
	Businessmen and traders	14	28.0	19	38.0	15	30.0	2	4.0	50	100	2.9
	Consumers	32	32.3	47	47.5	14	14.1	6	6.1	99*	100	3.1
	Extension workers	14	22.6	29	46.8	16	25.8	3	4.8	62	100	2.9
	Farmer leaders and community leaders	12	16.9	34	47.9	16	22.5	9	12.7	71	100	2.7
	Journalists	6	17.6	16	47.1	11	32.4	1	2.9	34*	100	2.8
	Policy makers	12	34.3	14	40.0	8	22.9	1	2.9	35	100	3.1
	Religious leaders	6	17.1	19	54.3	6	17.1	4	11.4	35	100	2.8
	Scientists	12	34.3	17	48.6	6	17.1	0	0	35	100	3.2
	Total	108	25.6	195	46.3	92	21.9	26	6.2	421	100	
b.	Consumer groups											
	Businessmen and traders	15	30.0	23	46.0	10	20.0	2	4.0	50	100	3.0
	Consumers	45	45.5	41	41.4	8	8.1	5	5.1	99*	100	3.3
	Extension workers	18	29.0	32	51.6	9	14.5	3	4.8	62	100	3.0
	Farmer leaders and community leaders	14	19.7	37	52.1	15	21.2	5	7.0	71	100	2.8
	Journalists	7	20.6	23	67.6	4	11.8	0	0	34*	100	3.1
	Policy makers	18	51.4	12	64.3	3	8.6	2	5.7	35	100	3.3
	Religious leaders	12	34.3	13	37.1	4	11.4	6	17.1	35	100	2.9
	Scientists	14	40.0	18	51.4	3	8.6	0	0	35	100	3.3
	Total	143	34.0	199	47.3	56	13.3	23	5.5	421	100	
c.	Non-government organizations											
	Businessmen and traders	16	32.0	28	56.0	4	8.0	2	4.0	50	100	3.2
	Consumers	37	37.4	46	46.5	5	5.1	11	11.1	99*	100	3.1

Individual/Group/ Organization	Very Concerned		Somewhat Concerned		Not at All Concerned		Not Sure		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	
Extension workers	28	45.2	28	45.2	5	8.1	1	1.6	62	100	3.3
Farmer leaders and community leaders	18	25.4	37	52.1	12	16.9	4	5.6	71	100	3.0
Journalists	15	44.1	16	47.1	2	5.9	1	2.9	34*	100	3.3
Policy makers	22	62.9	10	28.6	2	5.7	1	2.9	35	100	3.5
Religious leaders	13	37.1	15	42.9	1	2.9	6	17.1	35	100	3.0
Scientists	20	58.8	11	32.4	2	5.9	1	2.9	34*	100	3.5
Total	169	40.2	191	45.5	33	7.9	27	6.4	420	100	

Appendix Table 20. (continued) Perceived involvement of individuals, groups, and organizations in public health and safety with regard to agricultural biotechnology

Individual/Group/ Organization	Very Concerned		Somewhat Concerned		Not at All Concerned		Not Sure		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	
d. Local farm leaders											
Businessmen and traders	16	32.0	20	40.0	12	24.0	2	4.0	50	100	3.0
Consumers	36	36.4	38	38.4	16	16.2	9	9.1	99*	100	3.0
Extension workers	12	19.4	30	48.4	17	27.4	3	4.8	62	100	2.8
Farmer leaders and community leaders	23	32.9	39	55.7	5	7.1	3	4.3	70*	100	3.2
Journalists	8	23.5	22	64.7	1	2.9	3	8.8	34*	100	3.0
Policy makers	16	45.7	15	42.9	2	5.7	2	5.7	35	100	3.3
Religious leaders	7	20.0	19	54.3	5	14.3	4	11.4	35	100	2.8
Scientists	8	22.9	21	60.0	3	8.6	3	8.6	35	100	3.0
Total	126	30.0	204	48.6	61	14.5	29	6.9	420	100	
e. Agricultural biotechnology companies											
Businessmen and traders	17	34.0	21	42.0	7	14.0	5	10.0	50	100	3.0
Consumers	44	44.4	31	31.3	9	9.1	15	15.1	99*	100	3.1
Extension workers	16	25.8	30	48.4	5	8.1	11	17.7	62	100	2.8
Farmer leaders and community leaders	21	15.5	32	45.1	11	15.5	7	9.9	71	100	2.9

Individual/Group/ Organization	Very Concerned		Somewhat Concerned		Not at All Concerned		Not Sure		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	
Journalists	7	20.6	18	52.9	3	8.8	6	17.6	34*	100	2.8
Policy makers	14	40.0	15	42.9	1	2.9	5	14.3	35	100	3.1
Religious leaders	9	25.7	13	37.1	6	17.1	7	20.0	35	100	2.7
Scientists	16	45.7	10	28.6	2	5.7	7	20.0	35	100	3.0
Total	144	34.2	170	40.4	44	10.4	63	15.0	421	100	
f. Mass media/Journalists											
Businessmen and traders	17	34.0	26	52.0	4	8.0	3	6.0	50	100	3.1
Consumers	32	32.3	51	51.5	6	6.1	10	10.1	99*	100	3.1
Extension workers	15	24.6	37	60.7	5	8.2	4	6.6	61*	100	3.0
Farmer leaders and community leaders	23	32.9	28	40.0	12	17.1	7	10.0	70*	100	3.0
Journalists	13	37.1	16	45.7	5	14.3	1	2.9	35	100	3.2
Policy makers	18	51.4	14	40.0	2	5.7	1	2.9	35	100	3.4

Appendix Table 20. (continued) Perceived involvement of individuals, groups, and organizations in public health and safety with regard to agricultural biotechnology

Individual/Group/ Organization	Very Concerned		Somewhat Concerned		Not at All Concerned		Not Sure		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	
f. Mass media/Journalists											
Religious leaders	12	34.3	14	40.0	4	11.4	5	14.3	35	100	2.9
Scientists	15	42.9	13	37.1	3	8.6	4	11.4	35	100	3.1
Total	145	34.5	199	47.4	41	9.8	35	8.3	420	100	
g. International Research Institutions (e.g., IRRI, CIMMYT, etc.)											
Businessmen and traders	31	62.0	15	30.0	3	6.0	1	2.0	50	100	3.5
Consumers	59	59.6	30	30.3	1	1.0	9	9.1	99*	100	3.4
Extension workers	41	66.1	15	24.2	2	3.2	4	6.5	62	100	3.5
Farmer leaders and community leaders	45	63.4	18	25.4	2	2.8	6	8.5	71	100	3.4
Journalists	14	41.2	15	44.1	3	8.8	2	5.9	34*	100	3.2
Policy makers	26	74.3	7	20.0	0	0	2	5.7	35	100	3.6
Religious leaders	15	42.3	13	37.1	3	8.6	4	11.4	35	100	3.1
Scientists	22	62.9	10	28.6	0	0	3	8.6	35	100	3.5
Total	253	60.1	123	29.2	14	3.3	31	7.4	421	100	
h. Religious leaders/groups											
Businessmen and traders	22	44.9	18	36.7	6	12.2	3	6.1	49*	100	32.
Consumers	36	36.4	41	41.4	15	15.2	7	7.1	99*	100	3.1
Extension workers	32	51.6	21	33.9	7	11.3	2	3.2	62	100	3.3
Farmer leaders and community leaders	28	39.4	29	40.8	6	8.5	8	11.3	71	100	3.1
Journalists	20	58.8	8	23.5	5	14.7	1	2.9	34*	100	3.4
Policy makers	19	54.3	14	40.0	1	2.9	1	2.9	35	100	3.5
Religious leaders	15	42.9	13	37.1	5	14.3	2	5.7	35	100	3.2
Scientists	18	51.4	13	37.1	3	8.6	1	2.9	35	100	3.4
Total	190	45.2	157	37.4	48	11.4	25	6.0	420	100	

Appendix Table 20. (continued) Perceived involvement of individuals, groups, and organizations in public health and safety with regard to agricultural biotechnology

Individual/Group/ Organization	Very Concerned		Somewhat Concerned		Not at All Concerned		Not Sure		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	
i. Government research institutions											
Businessmen and traders	26	52.0	19	38.0	4	8.0	1	2.0	50	100	3.4
Consumers	50	50.5	38	38.4	3	3.0	8	8.1	99*	100	3.3
Extension workers	32	51.6	25	40.3	2	3.2	3	4.8	62	100	3.4
Farmer leaders and community leaders	47	66.2	12	16.9	5	7.0	7	9.9	71	100	3.4
Journalists	14	41.2	17	50.0	1	2.9	2	5.9	34*	100	3.3
Policy makers	26	74.3	7	20.0	0	0	2	5.7	35	100	3.6
Religious leaders	15	42.9	14	40.0	1	2.9	5	14.3	35	100	3.1
Scientists	20	57.1	13	37.1	1	2.9	1	2.9	35	100	3.5
Total	230	54.6	145	34.4	17	4.0	29	6.9	421	100	
j. University-based scientists											
Businessmen and traders	27	54.0	19	38.0	3	6.0	1	2.0	50	100	3.4
Consumers	60	60.6	28	28.3	2	2.0	9	9.1	99*	100	3.4
Extension workers	35	56.5	21	33.9	3	4.8	3	4.8	62	100	3.4
Farmer leaders and community leaders	47	66.2	17	23.9	2	2.8	5	7.0	71	100	3.5
Journalists	15	44.1	16	47.1	2	5.9	1	2.9	34*	100	3.3
Policy makers	23	65.7	9	25.7	1	2.9	2	5.7	35	100	3.6
Religious leaders	19	54.3	12	34.3	2	5.9	2	5.7	35	100	3.4
Scientists	20	57.1	13	37.1	0	0	2	5.7	35	100	3.5
Total	246	58.4	135	32.1	15	3.6	25	5.9	421	100	

Appendix Table 21. Extent that science should be part of agricultural development in the Philippines

Stakeholder	Very Much a Part		Somewhat a Part		Should Not Be a Part at All		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	
Businessmen and traders	35	70.0	13	26.0	2	4.0	50	100	2.7
Consumers*	79	79.0	20	20.0	1	1.0	100	100	2.8
Extension workers	48	77.4	13	21.0	1	1.6	62	100	2.8
Farmer leaders and community leaders	48	67.6	21	29.6	2	2.8	71	100	2.6
Journalists	27	79.4	5	14.7	2	5.9	34*	100	2.7
Policy makers	27	77.1	8	22.9	0	0	35	100	2.8
Religious leaders	22	62.9	12	34.3	1	2.9	35	100	2.6
Scientists	30	85.7	4	11.4	1	2.9	35	100	2.8
TOTAL	**316**	**74.9**	**96**	**22.7**	**10**	**2.4**	**422**	**100**	

*One respondent gave no answer.

Appendix Table 22. Interest in the uses of agricultural biotechnology in food production

Stakeholder	Very Interested		Somewhat Interested		Not at All Interested		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	
Businessmen and traders	17	34.0	29	58.0	4	8.0	50	100	2.3
Consumers	39	39.0	53	53.0	8	8.0	100	100	2.3
Extension workers	32	51.6	27	43.5	3	4.8	62	100	2.5
Farmer leaders and community leaders	32	45.1	36	50.7	3	4.2	71	100	2.4
Journalists	17	50.0	16	47.1	1	2.9	34*	100	2.5
Policy makers	25	71.4	9	25.7	1	2.9	35	100	2.7
Religious leaders	13	37.1	19	54.3	3	8.6	35	100	2.3
Scientists	18	51.4	17	48.6	0	0	35	100	2.5
TOTAL	**193**	**45.7**	**206**	**48.8**	**23**	**5.4**	**422**	**100**	

*One respondent gave no answer

Appendix Table 23. Concern on the uses of agricultural biotechnology in food production.

Stakeholder	Very Concerned		Somewhat Concerned		Not at all Concerned		No answer		Total		Weighted mean
	n	%	n	%	n	%	n	%	n	%	
Businessmen and traders	21	42.0	26	52.0	3	6.0			50	100	2.4
Consumers	50	50.5	45	45.5	4	4.0			99*	100	2.5
Extension workers*	29	46.8	32	51.6	0	0				100	2.5
Farmer leaders and community leaders	31	44.3	36	51.4	3	4.3			70*	100	2.4
Journalists*	19	55.9	13	38.2	1	2.9	1			100	3.1
Policymakers	28	80.0	7	20.0	0	0			35	100	2.8
Religious leaders	13	37.1	17	48.6	5	14.3			35	100	2.2
Scientists	19	54.3	14	40.0	2	5.7			35	100	2.5
TOTAL	210			190	18		3		35	100	

* some respondents gave no answer

Appendix Table 24. Attitude towards agricultural biotechnology

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
a. If my community would hold an information session on biotechnology in food production, I would attend.													
Businessmen and traders	18	36.0	31	62.0	0	0	0	0	1	2.0	50	100	3.3
Consumers	39	39.4	51	51.5	1	1.0	0	0	8	8.1	99*	100	3.4
Extension workers	32	51.6	28	45.2	1	1.6	0	0	1	1.6	62	100	3.5
Farmer leaders and community leaders	43	60.6	28	39.4	0	0	0	0	0	0	71	100	3.6
Journalists	14	40.0	19	54.3	1	2.9	1	2.9	0	0	35	100	3.4
Policy makers	22	62.9	13	37.1	0	0	0	0	0	0	35	100	3.6
Religious leaders	13	37.1	19	54.6	0	0	0	0	3	8.6	35	100	3.4
Scientists	20	57.1	15	42.9	0	0	0	0	0	0	35	100	3.6
Total	201	47.6	204	48.3	3	0.7	1	0.2	13	3.1	422	100	
b. I would contribute my time or money to an organization that promotes a ban on genetically modified foods.													
Businessmen and traders	0	0	10	20.4	23	46.9	9	18.4	7	14.3	49*	100	2.0
Consumers	5	5.1	18	18.4	40	40.8	15	15.3	20	20.3	98*	100	2.2
Extension workers	8	12.9	11	17.7	25	40.3	11	17.7	7	11.3	62	100	2.3
Farmer leaders and community leaders	12	16.9	15	21.1	23	32.4	15	21.1	6	8.5	71	100	2.4
Journalists	2	5.7	9	25.7	15	42.9	6	17.1	3	8.6	35	100	2.0
Policy makers	3	8.6	3	8.6	18	51.4	9	25.7	2	5.7	35	100	2.0
Religious leaders	4	11.4	10	28.6	10	28.6	4	11.4	7	20.0	35	100	2.5
Scientists	1	2.9	2	5.7	19	54.3	9	25.7	4	11.4	35	100	1.8
Total	35	8.3	78	18.6	173	41.2	78	18.6	56	13.3	420	100	
c. Foods that have been genetically altered should be labeled.													
Businessmen and traders	22	44.0	22	44.0	3	6.0	1	2.0	2	4.0	50	100	3.4
Consumers	59	59.6	35	35.4	1	1.0	1	1.0	3	3.0	99*	100	3.6
Extension workers	33	53.2	26	41.9	2	3.2	1	1.6	1	1.6	62	100	3.5
Farmer leaders and community leaders	28	39.4	40	56.3	3	4.2	0	0	0	0	71	100	3.5

Appendix Table 24. (continued) Attitude toward agricultural biotechnology

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
c. Foods that have been genetically altered should be labeled.													
Journalists	19	54.3	13	37.1	1	2.9	2	5.7	0	0	35	100	3.5
Policy makers	18	51.4	11	31.4	5	14.3	1	2.9	0	0	35	100	3.3
Religious leaders	20	57.1	11	31.4	1	2.9	0	0	2	5.7	35	100	3.5
Scientists	14	40.0	17	48.6	3	8.6	0	0	1	2.9	35	100	3.3
Total	213	50.5	175	41.5	19	4.5	6	1.4	9	2.1	422	100	
d. The public should be consulted in formulating food regulations and laws.													
Businessmen and traders	20	40.0	20	40.0	6	12.0	1	2.0	3	6.0	50	100	3.2
Consumers	50	51.0	38	38.8	5	5.1	2	2.0	3	3.1	98*	100	3.4
Extension workers	38	61.3	18	29.0	3	4.8	1	1.6	2	3.2	62	100	3.5
Farmer leaders and community leaders	37	52.1	23	32.4	7	9.9	2	2.8	2	2.8	71	100	3.4
Journalists	17	48.6	16	45.7	2	5.7	0	0	0	0	35	100	3.4
Policy makers	25	71.4	10	28.6	0	0	0	0	0	0	35	100	3.7
Religious leaders	17	48.6	11	31.4	2	5.7	1	2.9	4	11.4	35	100	3.4
Scientists	17	48.6	13	37.1	5	14.3	0	0	0	0	35	100	3.3
Total	221	52.5	149	35.4	30	7.1	7	1.7	14	3.3	421	100	
e. I am wiling to pay the extra cost for labeling genetically modified foods.													
Businessmen and traders	5	10.0	18	36.0	15	30.0	8	16.0	4	8.0	50	100	2.4
Consumers	11	11.1	41	41.4	26	26.3	12	12.1	9	9.1	99*	100	2.6
Extension workers	10	16.4	22	36.1	19	31.1	6	9.8	4	6.6	61*	100	2.6
Farmer leaders and community leaders	5	7.0	29	40.8	19	26.8	15	21.2	3	4.2	71	100	2.3
Journalists	4	11.4	15	42.9	13	37.1	1	2.9	2	5.7	35	100	2.7
Policy makers	5	14.3	13	37.1	13	37.1	4	11.4	0	0	35	100	2.5
Religious leaders	9	25.7	10	28.6	7	20.0	5	14.3	4	11.4	35	100	2.7
Scientists	8	22.9	11	31.4	10	28.6	4	11.4	2	5.7	35	100	2.7
Total	57	13.5	159	37.8	122	29.0	55	13.1	28	6.7	421	100	

Appendix Table 24. (continued) Attitude toward agricultural biotechnology

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
f. The public should be directly consulted in approving R&D in agricultural biotechnology.													
Businessmen and traders	14	28.0	20	40.0	8	16.0	4	8.0	4	8.0	50	100	2.9
Consumers	29	29.3	46	46.5	14	14.1	3	3.0	7	7.1	99*	100	3.1
Extension workers	1	1.6	13	21.0	48	77.4	0	0	0	5.6	62	100	2.2
Farmer leaders and community leaders	27	38.0	24	33.8	10	14.1	6	8.5	4	0	71	100	3.1
Journalists	12	34.3	20	57.1	3	8.6	0	0	0	0	35	100	3.2
Policy makers	14	40.0	16	45.7	5	14.3	0	0	0	0	35	100	3.2
Religious leaders	13	38.2	12	35.3	1	2.9	1	2.9	7	20.6	34*	100	3.4
Scientists	6	17.1	14	40.0	11	31.4	3	8.6	1	2.9	35	100	2.7
Total	116	27.6	165	39.2	100	23.8	17	4.0	23	5.5	421	100	

*Some respondents gave no answer

Appendix Table 25. Applications stakeholders would consider when making judgments on biotechnology (*Research foci*)

Research Focus	All the Time		Almost Always		Seldom		Never		Don't Know		No Answer		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
a. Use of modern biotechnology in the production of foods to make them more nutritious, taste better, and keep longer															
Policy makers	13	37.1	19	54.3	3	8.6	0	0	0	0			35	100	3.3
Scientists	8	22.9	22	62.9	1	2.9	2	5.7	2	5.7			35	100	3.1
Total	21	30.0	41	58.6	4	5.7	2	2.9	2	2.9			70	100	
b. Taking genes from plant species and transferring them into crop plants to make them more resistant to pests and diseases															
Policy makers	13	37.1	12	34.3	7	20.0	1	2.9	2	5.7			35	100	3.1
Scientists	9	25.7	14	40.0	7	20.0	3	8.6	2	5.7			35	100	2.9
Total	22	31.4	26	37.1	14	20.0	4	5.7	4	5.7			70	100	

Appendix Table 25. (continued) Applications stakeholders would consider when making judgments on biotechnology (*Research foci*)

Research Focus	All the Time		Almost Always		Seldom		Never		Don't Know		No Answer		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	N	%	n	%	n	%	
c. Introducing human genes into bacteria to produce medicines and vaccines, for example to produce insulin for diabetes															
Policy makers	12	34.3	13	37.1	10	28.6	0	0	0	0			35	100	3.1
Scientists	4	11.4	10	28.6	11	31.4	4	11.4	6	17.1			35	100	2.5
Total	16	22.9	23	32.9	21	30.0	4	5.7	6	8.6			70	100	

Research Focus	All the Time		Almost Always		Seldom		Never		Don't Know		No Answer		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	N	%	n	%	n	%	
d. Modifying genes of laboratory animals such as a mouse to study human diseases like cancer															
Policy makers	12	34.3	13	37.1	9	25.7	0	0	1	2.9			35	100	3.1
Scientists	2	5.7	14	40.0	9	25.7	5	14.3	5	14.3			35	100	2.4
Total	14	20.0	27	38.6	18	25.7	5	7.1	6	8.6			70	100	

Appendix Table 25. (continued) Applications stakeholders would consider when making judgments on biotechnology (*Research foci*)

Research Focus	All the Time		Almost Always		Seldom		Never		Don't Know		No Answer		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
e. Introducing fish genes into strawberries to resist extreme freezing temperature															
Businessmen and traders															
Consumers															
Extension workers															
Farmer leaders and community leaders															
Journalists															
Policy makers	6	17.1	15	42.9	8	22.9	2	5.7	4	11.4			35	100	2.8
Religious leaders															
Scientists	3	8.6	9	25.7	9	25.7	8	22.9	6	17.1			35	100	2.2
Total	9	12.7	24	34.3	17	24.3	10	14.3	10	14.3			70	100	
f. Using genetic testing to detect and treat diseases we might have inherited from our parents															
Businessmen and traders															
Consumers															
Extension workers															

Research Focus	All the Time		Almost Always		Seldom		Never		Don't Know		No Answer		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Farmer leaders and community leaders															
Journalists															
Policy makers	14	41.2	13	38.2	7	20.6	0	0	0	0			34*	100	3.2
Religious leaders															
Scientists	3	8.6	13	37.1	9	25.7	3	8.6	7	20.0			35	100	2.6
Total	17	24.6	26	37.7	16	23.2	3	4.3	7	10.1			69	100	

* One respondent gave no answer.

Appendix Table 26. Issues stakeholders would focus on when making decisions on biotechnology

Research Focus	All the Time		Almost Always		Seldom		Never		Don't Know		No Answer		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	N	%	n	%	n	%	
a. GM foods are safe as conventional ones and have undergone testing by regulatory bodies.															
Businessmen and traders															
Consumers															
Extension workers															
Farmer leaders and community leaders															
Journalists															
Policy makers	14	40.0	19	54.3	2	5.7	0	0	0	0			35	100	3.3
Religious leaders															
Scientists	11	31.4	18	51.4	5	14.3	0	0	1	2.9			35	100	3.2
Total	25	35.7	37	52.9	7	10.0	0	0	1	1.4			70	100	
b. GM crops will be so resistant to pests and diseases that they would become weeds themselves and push native plants into extinction.															
Businessmen and traders															
Consumers															
Extension workers															
Farmer leaders and community leaders															
Journalists															
Policy makers	8	22.9	11	31.4	11	31.4	2	5.7	3	8.6			35	100	2.8
Religious leaders															
Scientists	4	11.4	11	31.4	9	25.7	7	20.0	4	11.4			35	100	2.4
Total	12	17.1	22	31.4	20	28.6	9	12.9	7	10.0			70	100	

Appendix Table 26. (continued) Issues stakeholders would focus on when making decisions on biotechnology

Research Focus	All the Time		Almost Always		Seldom		Never		Don't Know		No Answer		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
c. There is no evidence GM crops harm the environment or have potential harm to the environment any more than conventional agricultural farming methods.															
Businessmen and traders															
Consumers															
Extension workers															
Farmer leaders and community leaders															
Journalists															
Policy makers	8	22.9	15	42.9	10	28.6	2	5.7	0	0			35	100	2.8
Religious leaders															
Scientists	7	20.0	20	57.1	6	17.1	1	2.9	1	2.9			35	100	3.0
Total	15	21.4	35	50.0	16	22.9	3	4.3	1	1.4			70	100	
d. Pollen from genetically modified crops will contaminate native plant species and further reduce biodiversity.															
Businessmen and traders															
Consumers															
Extension workers															
Farmer leaders and community leaders															
Journalists															
Policy makers	9	25.7	9	25.7	14	40.0	1	2.9	2	5.7			35	100	2.8
Religious leaders															
Scientists	5	14.3	8	22.9	13	37.1	3	8.6	6	17.1			35	100	2.5
Total	14	20.0	17	24.3	27	38.6	4	5.7	8	11.4			70	100	

Appendix Table 26. (continued) Issues stakeholders would focus on when making decisions on biotechnology

Research Focus	All the Time		Almost Always		Seldom		Never		Don't Know		No Answer		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
e. Farmers want GM crops because they make crop production cheaper, increase yield, and increase income															
Businessmen and traders															
Consumers															
Extension workers															
Farmer leaders and community leaders															
Journalists															
Policy makers	11	31.4	21	60.0	3	8.6	0	0	0	0			35	100	3.2
Religious leaders															
Scientists	10	28.6	22	62.9	2	5.7	0	0	1	2.9			35	100	3.2
Total	21	30.0	43	61.4	5	7.1	0	0	1	1.4			70	100	
f. Groups that oppose modern biotechnology have no factual evidence for their claims of negative health consequences or environmental impact.															
Businessmen and traders															
Consumers															
Extension workers															
Farmer leaders and community leaders															
Journalists															
Policy makers	6	17.1	15	42.9	11	31.4	2	5.7	1	2.9			35	100	2.7
Religious leaders															
Scientists	5	14.3	15	42.9	9	25.7	2	5.7	4	11.4			35	100	2.7
Total	11	15.7	30	42.9	20	28.6	4	5.7	5	7.1			70	100	

Appendix Table 26. (continued) Issues stakeholders would focus on when making decisions on biotechnology

Research Focus	All the Time		Almost Always		Seldom		Never		Don't Know		No Answer		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
g. Plant breeders and farmers want access to modern biotechnology to improve their crops. Everyone knows that this will not solve world hunger. It is simple another tool to increase productivity and reach that goal.															
Businessmen and traders															
Consumers															
Extension workers															
Farmer leaders and community leaders															
Journalists															
Policy makers	15	42.9	15	42.9	5	14.3	0	0	0	0			35	100	3.3
Religious leaders															
Scientists	10	28.6	19	54.3	2	5.7	1	2.9	3	8.6			35	100	3.2
Total	25	35.7	34	48.6	7	10.0	1	1.4	3	4.3			70	100	
h. Pest-resistant GM crops would also harm non-target organisms like butterflies.															
Businessmen and traders															
Consumers															
Extension workers															
Farmer leaders and community leaders															
Journalists															
Policy makers	5	14.3	9	25.7	17	48.6	2	5.7	2	5.7			35	100	2.5
Religious leaders															
Scientists	5	14.3	8	22.9	11	31.4	5	14.3	6	17.1			35	100	2.4
Total	10	14.3	17	24.3	28	40.0	7	10.0	8	11.4			70	100	

Appendix Table 27. Issues/concerns respondents have heard or known about biotechnology*

Stakeholder	Cultural	Moral/ Ethical	Political	Religious	Others	TOTAL
	n	n	n	n	n	n
Businessmen and traders	19	24	13	11	22	50
Consumers	46	57	20	1	8	100
Extension workers	27	32	9	14	1	62
Farmer leaders and community leaders	38	41	6	19	18	71
Journalists	16	17	4	10	12	35
Policy makers	13	22	11	14	7	35
Religious leaders	13	18	4	18	3	35
Scientists	9	19	11	9	14	35
TOTAL	**181**	**230**	**78**	**96**	**85**	**423**

*multiple responses

Table 1. Age and understanding and perception of and attitude towards agricultural biotechnology

Independent Variable	Dependent Variable	Value of r_s	Significance	Probability
Age	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION			
	Rate of understanding of science	-0.007	NS	>.05
	Rate of knowledge about the uses of biotechnology in food production	0.0326	NS	>.05
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY			
	Government agencies are doing their best to ensure that the food we eat is safe.	0.184	S	<. 05
	Biotechnology in food production only benefits large agricultural companies.	0.042	NS	>.05
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.044	NS	>.05
	Vital information about the health effects of genetically modified foods is being held back.	-0.027	NS	>.05
	The risks of genetic engineering have been greatly exaggerated.	-0.058	NS	>.05
	Biotechnology is good for Philippine agriculture.	-0.077	NS	>.05
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	0.097	NS	>.05
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	0.111	NS	>.05
	Regulations on biotechnology should include inputs from the non-government sector.	0.088	NS	>.05
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	0.126	S	<. 05
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY			
	Science as a part of agricultural development in the Philippines	0.056	NS	>.05
	Interest in using agricultural biotechnology in food production	0.113	S	<. 05
	Concern in using agricultural biotechnology in food production	0.131	HS	<. 01

Table 2. Education and understanding, perception, and attitude towards agricultural biotechnology

Independent Variable	Dependent Variable	Value of r_s	Significance	Probability
Education	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION			
	Rate of understanding of science	0.171	VHS	<. 001
	Rate of knowledge about the uses of biotechnology in food production	0.0664	NS	>. 05
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY			
	Government agencies are doing their best to ensure that the food we eat is safe.	0.161	S	<. 05
	Biotechnology in food production only benefits large agricultural companies.	-0.031	NS	>.05
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	0.068	NS	>.05
	Vital information about the health effects of genetically modified foods is being held back.	-0.056	NS	>.05
	The risks of genetic engineering have been greatly exaggerated.	0.007	NS	>.05
	Biotechnology is good for Philippine agriculture.	0.031	NS	>.05
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	0.001	NS	>.05
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	0.076	NS	>.05
	Regulations on biotechnology should include inputs from the non-government sector.	0.014	NS	>.05
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	-0.033	NS	>.05
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY			
	Science as a part of agricultural development in the Philippines	-0.009	NS	>.05
	Interest in using agricultural biotechnology in food production	-0.065	NS	>.05
	Concern in using agricultural biotechnology in food production	0.065	NS	>.05

Table 3. World view **(a)** values and understanding and perception of and attitude towards agricultural biotechnology.

Independent Variable (Worldviews and Values)	**Dependent Variable**	**Value of r_s**	**Significance**	**Probability**
(a) The use of biotechnology in food production is against my moral values.	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION			
	Rate of understanding of science	0.023	NS	>.05
	Rate of knowledge about the uses of biotechnology in food production	-0.041	NS	>.05
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY			
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.013	NS	>.05
	Biotechnology in food production only benefits large agricultural companies.	0.202	VHS	<. 001
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.049	NS	>.05
	Vital information about the health effects of genetically modified foods is being held back.	-0.182	S	<. 05
	The risks of genetic engineering have been greatly exaggerated.	-0.071	NS	>.05
	Biotechnology is good for Philippine agriculture.	-0.182	S	<. 05
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.105	NS	>.05
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.094	NS	>.05
	Regulations on biotechnology should include inputs from the non-government sector.	0.041	NS	>. 05
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	-0.157	S	<. 05
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY			
	Science as a part of agricultural development in the Philippines	0.078	NS	>.05
	Interest in using agricultural biotechnology in food production	0.129	S	<. 05
	Concern in using agricultural biotechnology in food production	0.101	NS	>.05

Table 4. World view **(b)** and understanding and perception of and attitude towards agricultural biotechnology

Independent Variable (Worldviews and Values)	**Dependent Variable**	**Value of r_s**	**Significance**	**Probability**
If my community would hold an information session on biotechnology in food production, I would attend.	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION			
	Rate of understanding of science	-0.047	NS	>. 05
	Rate of knowledge about the uses of biotechnology in food production	-0.029	NS	>.05
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY			
	Government agencies are doing their best to ensure that the food we eat is safe.	0.119	S	<. 05
	Biotechnology in food production only benefits large agricultural companies.	0.004	NS	>.05
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	0.139	S	<. 05
	Vital information about the health effects of genetically modified foods is being held back.	0.111	NS	>.05
	The risks of genetic engineering have been greatly exaggerated.	0.102	NS	>.05
	Biotechnology is good for Philippine agriculture.	0.095	NS	>.05
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	0.138	S	<. 05
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	0.087	NS	>.05
	Regulations on biotechnology should include inputs from the non-government sector.	0.085	NS	>.05
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health	-0.035	NS	>.05
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY			
	Science as a part of agricultural development in the Philippines	-0.073	NS	>.05
	Interest in using agricultural biotechnology in food production	-0.319	VHS	<. 001
	Concern in using agricultural biotechnology in food production	-0.146	HS	<. 01

Table 5. Relationship between mass media as information sources and understanding and perception of and attitude towards biotechnology

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Read or watched about biotechnology in the mass media (TV, newspapers, radio)	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.086	NS
	Rate of knowledge about the uses of biotechnology in food production	0.132	NS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.142	S
	Biotechnology in food production only benefits large agricultural companies.	0.161	VS
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	0.069	NS
	Vital information about the health effects of genetically modified foods is being held back.	-0.103	NS
	The risks of genetic engineering have been greatly exaggerated.	-0.136	S
	Biotechnology is good for Philippine agriculture.	-0.129	S
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.109	NS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.046	NS
	Regulations on biotechnology should include inputs from the non-government sector.	0.096	NS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health	-0.123	S
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	-0.078	NS
	Interest in using agricultural biotechnology in food production	0.116	S
	Concern in using agricultural biotechnology in food production	0.221	NS

Table 6. Relationship between informal interpersonal sources of information and understanding and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Talked to or heard from family/friends/ neighbors/officemates about biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.092	NS
	Rate of knowledge about the uses of biotechnology in food production	0.189	VS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.111	NS
	Biotechnology in food production only benefits large agricultural companies.	-0.023	NS
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.161	VS
	Vital information about the health effects of genetically modified foods is being held back.	-0.188	NS
	The risks of genetic engineering have been greatly exaggerated.	-0.162	VS
	Biotechnology is good for Philippine agriculture.	-0.015	NS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.124	S
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.073	NS
	Regulations on biotechnology should include inputs from the non-government sector.	-0.131	S
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health	0.113	NS
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	0.035	NS
	Interest in using agricultural biotechnology in food production	0.05	NS
	Concern in using agricultural biotechnology in food production	0.186	S

Table 7. Relationship between religious leaders as information sources and understanding, perception and attitude towards biotechnology in food production

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Talked to or heard from a religious figure (e.g., nun, priest, monk, imam, cleric) about biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.047	NS
	Rate of knowledge about the uses of biotechnology in food production	0.041	NS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.0007	NS
	Biotechnology in food production only benefits large agricultural companies.	-0.015	NS
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.093	NS
	Vital information about the health effects of genetically modified foods is being held back.	-0.068	NS
	The risks of genetic engineering have been greatly exaggerated.	-0.014	NS
	Biotechnology is good for Philippine agriculture.	-0.024	NS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.067	NS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.016	NS
	Regulations on biotechnology should include inputs from the non-government sector.	-0.175	NS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health	-0.03	NS
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY	-0.0064	NS
	Science as a part of agricultural development in the Philippines	-0.002	NS
	Interest in using agricultural biotechnology in food production	0.043	NS

Table 8. Relationship between formal interpersonal sources of information and understanding and perception of, and attitude towards biotechnology in food production

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Talked to or heard from experts/ professionals or scientists about biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.181	VS
	Rate of knowledge about the uses of biotechnology in food production	0.215	VHS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	0.165	NS
	Biotechnology in food production only benefits large agricultural companies.	0.015	NS
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	0.222	VHS
	Vital information about the health effects of genetically modified foods is being held back.	0.128	S
	The risks of genetic engineering have been greatly exaggerated.	0.218	VHS
	Biotechnology is good for Philippine agriculture.	0.122	S
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	0.201	NS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	0.161	VS
	Regulations on biotechnology should include inputs from the non-government sector.	0.175	VS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	0.03	NS
	ATTITUDE TOWARDS AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	0.026	NS
	Interest in using agricultural biotechnology in food production	0.202	VHS
	Concern in using agricultural biotechnology in food production	0.212	VHS

Table 9. Relationship between NGOs as information sources and understanding and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Talked to or heard from a Non-Government Organization (NGO) about biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.007	NS
	Rate of knowledge about the uses of biotechnology in food production	0.041	NS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	0.016	NS
	Biotechnology in food production only benefits large agricultural companies.	0.126	NS
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	0.132	S
	Vital information about the health effects of genetically modified foods is being held back.	0.228	VHS
	The risks of genetic engineering have been greatly exaggerated.	0.042	NS
	Biotechnology is good for Philippine agriculture.	0.051	NS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	0.022	NS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	0.029	NS
	Regulations on biotechnology should include inputs from the non-government sector.	0.137	S
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	0.065	NS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	-0.16	VS
	Interest in using agricultural biotechnology in food production	-0.024	NS
	Concern in using agricultural biotechnology in food production	0.006	NS

Table 10. Relationship between local politicians or leaders as information sources and understanding and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Talked to or heard from a local politician/ local leader about biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.086	NS
	Rate of knowledge about the uses of biotechnology in food production	0.003	NS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.128	S
	Biotechnology in food production only benefits large agricultural companies.	-0.075	NS
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.201	VHS
	Vital information about the health effects of genetically modified foods is being held back.	-0.082	NS
	The risks of genetic engineering have been greatly exaggerated.	0.163	NS
	Biotechnology is good for Philippine agriculture.	-0.104	NS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	0.004	NS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.07	NS
	Regulations on biotechnology should include inputs from the non-government sector.	-0.075	NS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health	0.049	NS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	0.132	S
	Interest in using agricultural biotechnology in food production	0.003	NS
	Concern in using agricultural biotechnology in food production	0.004	NS

Table 11. Relationship between websites as information sources and understanding and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Accessed a web site on biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.113	NS
	Rate of knowledge about the uses of biotechnology in food production	0.116	NS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.003	NS
	Biotechnology in food production only benefits large agricultural companies.	-0.051	NS
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.007	NS
	Vital information about the health effects of genetically modified foods is being held back.	0.128	S
	The risks of genetic engineering have been greatly exaggerated.	-0.238	NS
	Biotechnology is good for Philippine agriculture.	0.042	NS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.007	NS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.098	NS
	Regulations on biotechnology should include inputs from the non-government sector.	-0.087	NS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	0.052	NS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	-0.076	NS
	Interest in using agricultural biotechnology in food production	0.157	VS
	Concern in using agricultural biotechnology in food production	0.214	VHS

Table 12. Relationship between books as information sources and understanding and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Read books on biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.136	NS
	Rate of knowledge about the uses of biotechnology in food production	-0.12	S
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.133	S
	Biotechnology in food production only benefits large agricultural companies.	-0.171	VS
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.093	NS
	Vital information about the health effects of genetically modified foods is being held back.	-0.142	NS
	The risks of genetic engineering have been greatly exaggerated.	-0.168	NS
	Biotechnology is good for Philippine agriculture.	0.029	NS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.021	NS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.059	NS
	Regulations on biotechnology should include inputs from the non-government sector.	-0.1	NS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	0.29	NS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	-0.032	NS
	Interest in using agricultural biotechnology in food production	0.143	S
	Concern in using agricultural biotechnology in food production	0.144	S

Table 13. Relationship between popular publications as information sources and understanding and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Read newsletters/ pamphlets/brochures on biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.153	S
	Rate of knowledge about the uses of biotechnology in food production	0.254	VHS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	0.122	S
	Biotechnology in food production only benefits large agricultural companies.	-0.071	NS
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.081	NS
	Vital information about the health effects of genetically modified foods is being held back.	-0.161	NS
	The risks of genetic engineering have been greatly exaggerated.	-0.222	VHS
	Biotechnology is good for Philippine agriculture.	0.003	NS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.248	VHS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.109	NS
	Regulations on biotechnology should include inputs from the non-government sector.	-0.104	NS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	-0.092	NS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	-0.004	NS
	Interest in using agricultural biotechnology in food production	0.066	NS
	Concern in using agricultural biotechnology in food production	0.144	S

Table 14. Relationship between food regulators as information sources and understanding and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Talked to or heard from food regulators on biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.053	NS
	Rate of knowledge about the uses of biotechnology in food production	0.054	NS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	0.136	S
	Biotechnology in food production only benefits large agricultural companies.	-0.053	NS
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.179	NS
	Vital information about the health effects of genetically modified foods is being held back.	-0.119	S
	The risks of genetic engineering have been greatly exaggerated.	-0.146	S
	Biotechnology is good for Philippine agriculture.	-0.069	NS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.108	NS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.191	VS
	Regulations on biotechnology should include inputs from the non-government sector.	-0.083	NS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	0.111	NS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	0.055	NS
	Interest in using agricultural biotechnology in food production	0.093	NS
	Concern in using agricultural biotechnology in food production	0.179	VS

Table 15. Relationship between seminars and forums as information sources and understanding and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Attended seminars, public forums on biotechnology	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.033	NS
	Rate of knowledge about the uses of biotechnology in food production	0.153	S
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.074	NS
	Biotechnology in food production only benefits large agricultural companies.	-0.12	S
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.168	NS
	Vital information about the health effects of genetically modified foods is being held back.	-0.114	NS
	The risks of genetic engineering have been greatly exaggerated.	-0.183	VS
	Biotechnology is good for Philippine agriculture.	-0.032	NS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.092	NS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.124	S
	Regulations on biotechnology should include inputs from the non-government sector.	-0.053	NS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	0.061	NS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	-0.134	S
	Interest in using agricultural biotechnology in food production	0.142	S
	Concern in using agricultural biotechnology in food production	0.1	NS

Table 16. Relationship between agricultural biotechnology companies as information sources and understanding and perception of and attitude towards biotechnology in food production

Independent Variable (Information Sources)	**Dependent Variable**	**Value of r_s**	**Significance**
Talked to or heard from agricultural biotechnology companies	LEVEL OF UNDERSTANDING OF BIOTECHNOLOGY IN FOOD PRODUCTION		
	Rate of understanding of science	0.088	NS
	Rate of knowledge about the uses of biotechnology in food production	0.05	NS
	PERCEPTION OF AGRICULTURAL BIOTECHNOLOGY		
	Government agencies are doing their best to ensure that the food we eat is safe.	-0.148	NS
	Biotechnology in food production only benefits large agricultural companies.	0.019	NS
	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	-0.223	VHS
	Vital information about the health effects of genetically modified foods is being held back.	0.009	NS
	The risks of genetic engineering have been greatly exaggerated.	-0.16	VS
	Biotechnology is good for Philippine agriculture.	-0.122	S
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	0.0168	VS
	Current regulations in the Philippines are sufficient to protect people from any risks linked to modern biotechnology.	-0.183	VS
	Regulations on biotechnology should include inputs from the non-government sector.	0.066	NS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	0.016	NS
	ATTITUDE TOWARD AGRICULTURAL BIOTECHNOLOGY		
	Science as a part of agricultural development in the Philippines	0.021	NS
	Interest in using agricultural biotechnology in food production	-0.116	S
	Concern in using agricultural biotechnology in food production	0.109	NS

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