International Service for the Acquisition of Agri-biotech Applications (ISAAA)
SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA)
College of Development Communication, University of the Philippines Los Baños (CDC-UPLB)

Public Understanding and Perception of and Attitude Towards Agricultural Biotechnology in Indonesia

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Cleofe S. Torres
Ma. Theresa H. Velasco
Ma. Celeste H. Cadiz
Rhodora Ramonette M. de Villa

ISAAA

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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

Focusing on the Indonesian context, this study sought to determine the socio-cultural characteristics of the various stakeholders in agricultural biotechnology; their worldviews related to agricultural biotechnology; their information sources on agricultural biotechnology; their level of understanding and perception of and attitude towards agricultural biotechnology; and the relationships between the socio-cultural factors, worldviews, and information sources on one hand, and the stakeholders' level of understanding and perception of and attitude towards agricultural biotechnology, on the other hand.

Respondents included 432 agricultural biotechnology stakeholders comprising businessmen and traders, consumers, extension workers, farmer leaders and community leaders, journalists, policy makers, religious leaders, and scientists from selected rural, suburban, and urban areas in Indonesia. Data were analyzed using frequency counts, percentages, ranges, weighted means and Chi-square and Spearman Rank Correlation tests.

About two-thirds of the present respondents were males and married. There was no considerable difference in educational attainment with a fair distribution of those who have finished high school, college degrees, and post graduate degrees. The distribution of rural and urban dwellers (about half in sub-urban areas and a little more than 10 percent in the rural areas). Most of the farmer-leaders and community-leaders, religious leaders, extension workers, and businessmen and traders lived in the rural areas whereas, more policy makers, scientists, consumers, and journalists lived in the suburban areas.

Significant findings of the study with strong implications on the planning and designing of communication strategy to enhance public understanding and perception of and attitude towards agricultural biotechnology are as follows:

1. Among the Indonesian stakeholders, the journalists and religious leaders have the most conservative view of agricultural biotechnology. Both view biotechnology in food production as against their moral values.

2. Religious leaders are active information seekers and receivers when it comes to biotechnology but they have low understanding of science and claim that they know nothing at all on uses of biotechnology in food production.

3. The journalists have some contradicting stance as illustrated by these findings:

   - While they claim to have high understanding of science, they find the information they get on agricultural biotechnology only as "somewhat scientific."

   - While they are most concerned with factual knowledge of all food characteristics when considering the uses of biotechnology in food production, they give only

moderately interested in the use of biotechnology in food production and don't see biotechnology as a means for providing nutritious and cheaper food for the public.

4. Stakeholders have multiple information sources when it comes to agricultural biotechnology. University-based scientists and science magazines come out as the most trusted sources of information. Information obtained are perceived as very useful and very scientific.

5. All stakeholders perceive themselves as having moderate knowledge about the uses of biotechnology in food production, except the religious leaders who claim that they have low understanding of the subject.

6. There's a general tendency for the various stakeholder groups to perceive agricultural biotechnology as hazardous but at the same time beneficial. A little more than 30 percent have no opinion yet as to the hazards of agricultural biotechnology.

7. All stakeholder groups, except the journalists, are willing to attend information sessions on agricultural biotechnology that their community will hold.

8. All stakeholder groups:

   - are not willing to pay the cost for labeling GM foods;
   - are willing to support the consumers right to choose what to eat and to know what they are eating; and
   - believe that the public should be consulted in formulating food regulations and laws.

9. In terms of frames used when making judgments on biotechnology, Indonesian policy makers and scientists are not strongly inclined towards biotechnology applications that would improve food quality, make crops more resistant, or cure diseases.

10. The higher the education of the stakeholders, the more favorable is their perception and attitude towards agricultural biotechnology.

11. The current sources of information on agricultural biotechnology involving both mass media and interpersonal ones tend to influence the Indonesian public into thinking that agricultural biotechnology is not good for their country's agriculture.

12. The worldviews and values of stakeholders impinge greatly on their perception of and attitude towards agricultural biotechnology. Conservative worldviews and values, such as the application of agricultural biotechnology being against their moral values, consistently lead to negative perception and attitude towards the use of biotechnology in food production.

The above findings and implications point out the necessity to promptly conduct aggressive public education and strategic communication to address knowledge gaps and misconceptions. The latter usually lead to undue negative perception and unfavorable attitude towards agricultural biotechnology.

Part 1 Introduction

Rationale

Why does the public 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 of or risks surrounding biotechnology? This mixed reception of biotechnology particularly in agricultural production 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 seven sectors, namely: policy makers, journalists, scientists, farmer leaders and community leaders, extension workers, consumers, and businessmen and traders.

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 this earlier study was conducted in 2002, Indonesia was already commercializing Bt cotton. But in 2005, Indonesia stopped planting Bt cotton. Such decision raises the need to know what trends in public understanding and perception of and attitude towards biotechnology will emerge now that its practice in Indonesia has been stopped. Based on these, appropriate communication initiatives could be recommended and undertaken so that public understanding and perception of and attitude towards biotechnology can be enhanced. This 2005 study aims to respond to that need.

Objectives

This study aimed to determine:

1. The socio-cultural characteristics of the various Indonesian stakeholders in agricultural biotechnology;
2. The information sources on agricultural biotechnology of these stakeholders;
3. Their level of understanding and perception of and attitude towards agricultural biotechnology; and
4. The relationships between socio-cultural factors and stakeholders' understanding and perception of and attitude towards agricultural biotechnology.

Significance of the Study

Issues about biotechnology have segmentized the public into those who are for it, against it, and still undecided pending availability of more information and more proofs. Results of this study will, therefore, help provide indicative status on where the Indonesians stand now in terms of understanding and perception of as well as attitude towards biotechnology. Identified gaps will serve as basis for formulating and undertaking education and communication activities that will help promote better understanding and appreciation of agricultural biotechnology among defined sectors in the society.

Limitations of the Study

While a statistically sound sampling technique was employed in the study, it should be emphasized that only 432 were interviewed to represent the 200 million population of Indonesia. They came from four major areas, namely Bogor, Java, Yogyakarta and Jakarta. This sets the limitations of the study in terms of generalizing the results only to the selected, and not the entire, population of Indonesia.

Conceptual Framework

The study sought to determine the relationships between the socio-cultural factors, including communication factors, and the stakeholders' understanding and perception of and attitude towards agricultural biotechnology.

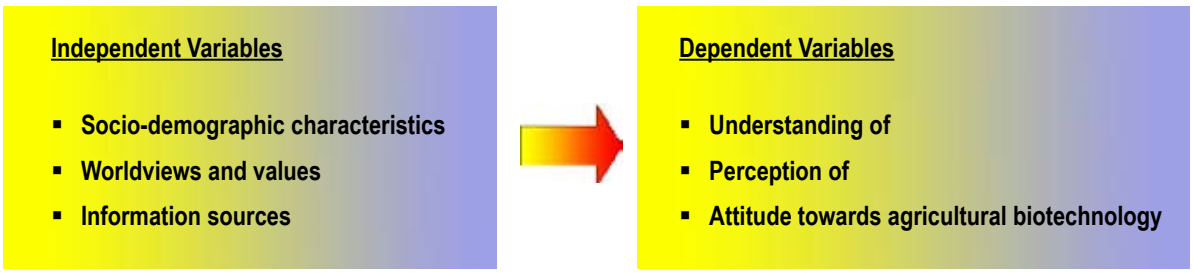

Figure 1. Conceptual framework of the study

The variables and their operational definitions were patterned after those used in the ISAAA 2002 study. However religion (as a socio-demographic characteristic) and worldviews and values were added in this 2005 study to broaden the socio-cultural dimensions in relation to understanding and perception of and attitude towards agricultural biotechnology. The sets of variables used in this study are listed below.

1. Independent variables – the three independent variables indicated in the objectives and conceptual framework were operationally defined as follows:

    a. Socio-demographic characteristics – gender, civil status, age, education, area of residence, and religion
    b. Worldviews and values – inferred from scores in a pop quiz
    c. Information sources – frequency, perceived trust; characteristics of information sought or received (i.e., quality, scientific); issues and concerns heard or known about biotechnology, (i.e., moral, political, cultural, religious)

2. Dependent Variables - these were composed of understanding, perception, and attitude and their corresponding measures as follows:

    Understanding
    a. Self-rating on understanding of science
    b. Self-rating on understanding of biotechnology
    c. Factual knowledge on biotechnology

    Perception
    a. Perceived risks
    b. Perceived benefits
    c. Perception of institutional concern about health and safety
    d. Perception of institutional responsibility for risk assessment and risk management
    e. Perception of role of science in agricultural development

    Attitude
    a. Interest in biotechnology
    b. Concern for biotechnology
    c. Attitude towards biotechnology
    d. Frames to be used when making judgments about biotechnology applications (only for policy makers and scientists)

Definitions of Stakeholders

Eight groups of stakeholders were included in this 2005 study and they are as follows:

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 an ordinary one)

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 – officers of farmer associations and cooperatives and non-elected members of community councils at the community level, 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. If possible, respondents should have covered biotechnology.

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 representatives at the national level, members of legislative level 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

8. Scientists – individuals who are not part of the country's crop biotechnology research consortium, who conduct research or develop technologies related to agricultural production and are based at the 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 (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 leads 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 Indonesia
Two similar research studies on public knowledge and perception of and attitudes towards agricultural biotechnology in Indonesia were examined. Key findings are presented to establish a trend and to determine the gaps that this study hopes to address.

The UIUC-ISAAA study in 2003 employed an extensive survey of journalists, scientists, farmer leaders and community leaders, extension workers, consumers, businessmen and traders, and religious leaders. The survey focused on the following variables: 1) interest in and concern about agricultural biotechnology; 2) perceived risks and benefits 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.

Most stakeholders, except for policy makers, showed high interest in and concern about agricultural biotechnology. Farmer leaders and community leaders led the stakeholders in expressing such high interest in agricultural biotechnology (UIUC- ISAAA, 2003).

However, the AFIC study in 2003 found otherwise. Although Indonesian respondents showed low concern about biotechnology, they put much importance to food safety in general. When asked if they were concerned about the food they eat, Indonesian respondents (99%) expressed the greatest concern compared with those in China and the Philippines. Most of the respondents, not only in Indonesia but also in China and the Philippines, indicated that their main concern is food content, specifically the nutritional value of the food. Another significant finding was that Indonesian respondents were also concerned about the preservatives or additives (20%) contained in the food they eat, and adequate food packaging (28%) (AFIC, 2003).

In terms of the respondents' perception of agricultural biotechnology, survey results showed that in general, Indonesian stakeholders do not really see biotechnology as posing high risks to public health and food safety. Indeed, the majority of Indonesia's stakeholders view agricultural biotechnology as having moderate to high benefits. This view was particularly evident among consumers, farmer leaders, policy makers, extension workers, and scientists (UIUC-ISAAA, 2003).

In support of the aforementioned findings, the AFIC study found that Indonesia tops the other

two countries in believing that biotechnology foods have associated benefits. Eighty six percent of Indonesian respondents cited "improved eating quality" as the benefit they most expect. More than half of Indonesian respondents (57%) believed that "improved shelf life" could be a significant benefit of agricultural biotechnology (AFIC, 2003).

As to their understanding of science and knowledge about agricultural biotechnology, majority of Indonesia's stakeholders gave themselves moderate to low ratings. In a pop-quiz of 12 statements to measure their knowledge on biotechnology, most of the stakeholders obtained moderate scores. Among those who obtained relatively high scores in the pop-quiz were businessmen and consumers (UIUC-ISAAA, 2003).

Regarding respondents' awareness of terminologies used in biotechnology, researchers found such awareness to be low among all the stakeholders in the three countries. For those few who reported level of awareness of these terms, the most common definitions are: 1) changing the genetic code content of a product, 2) production of a better product, and 3) addition of other components to a product. Moreover, respondents also rated themselves "very low" in the awareness of the terms 'genetically modified foods' and 'biotechnology derived foods' (AFIC, 2003).

The study also looked into the respondents' awareness of the scope of food biotechnology. When Indonesian respondents were asked to give an example of biotechnology-derived foods, tomato was found to be the most popular (AFIC, 2003).

Regarding respondents' attitude towards agricultural biotechnology, like in the Philippines, Indonesian stakeholders took an overwhelmingly moderate position on agricultural biotechnology. Sixty-nine percent of the stakeholders expressed at least an above-moderate stance on biotechnology with the exception of policy makers at 40 percent. However, no remarkable numbers suggest strongly positive attitudes toward biotechnology (UIUC-ISAAA, 2003).

Indonesia's stakeholders put enormous trust on scientific organizations. All seven stakeholders also perceived university scientists and agricultural biotechnology companies as highly concerned entities with regard to agricultural biotechnology issues (UIUC-ISAAA, 2003).

Among all the stakeholders, journalists, consumers, policy makers, and scientists tend to get information on biotechnology from both mass media and interpersonal sources more frequently than the other stakeholders. When asked about the sources of information they trusted most, Indonesian stakeholders cited university scientists as highly trustworthy sources, followed by science magazines and newspapers (UIUC-ISAAA, 2003).

Similar findings were presented by the AFIC study. Seventy-five percent of the Indonesian respondents got information from the newspapers. However, 52 percent of the Indonesian respondents preferred the government, specifically the Department of Health, to be their primary source of information. About 49 percent of Indonesians wanted such information to be in magazines, while 36 percent said they preferred supermarkets to inform them about food biotechnology (AFIC, 2003).

Part 3 Methodology

Research Design

This study used the survey design, which was deemed appropriate in obtaining a picture of the behavioral pattern of a cross-section of stakeholders' population in selected areas in Indonesia concerning agricultural biotechnology.

Locale of the Study

Criteria for choosing the areas in Indonesia where respondents were selected from were as follows:

- There is an existing institution linked with the Biotechnology Information Center through which data gathering may be coordinated with; and
- People are familiar with or have basic knowledge of biotechnology.

Based on the above criteria, the identified project sites included Banten/Tangerang, Lampung, Jawa Barat in Bogor Province, Jabar in West Java, Daerah Istiemwa in Yogyakarta and in Indonesia's capital, Jakarta.

Sampling of Respondents

Sample respondents were chosen from the following eight stakeholder groups:

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

A statistically-determined sample size for the different stakeholders was derived by a statistician.

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 was increased to 432 upon the advice of the statistician to minimize having a sample size of less than 30 per stakeholder group in case there are drop outs or unavailable respondents during actual survey. The number of respondents per stakeholder group was distributed based on the assumed trend about its population relative to the population of the other stakeholders. As a rule of thumb, however, each stakeholder group should have respondents of not less than 30 to warrant the use of statistical tests. The 432 sample respondents were distributed based on the defined stakeholder groupings.

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 number of respondents in the sampling design was the prescribed minimum and the researchers increased it as the opportunity warranted it. 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

The survey made use of structured interview schedule for data gathering. In case this was not possible (e.g., policy makers not available for interview), self-administered questionnaires were employed instead. The interview schedule and questionnaire contained substantially the same questions.

Data Analyses

Data were analyzed using a combination of quantitative and descriptive techniques. Frequency counts, percentages, ranges, and weighted means were used to describe the stakeholders' socio-demographic characteristics, worldviews and values, information sources, understanding and perception of and attitude towards agricultural biotechnology. Relationships between the socio-cultural factors and the stakeholders' understanding and perception of and attitude towards agricultural biotechnology were analyzed using measures of association such as the Chi-square test and the Spearman Rank Correlation test.

Part 4 Results and Discussion

Socio-Demographic Characteristics

The Indonesian respondents were mostly male (70.8%) and married (67.6%). In terms of age, they were nearly equally distributed into the 21-30 (30.5%), 31-40 (27.7%) and 41-50 (27.1%) age brackets. Though not a majority, many came from rural (44.1%) and suburban (41.3%) areas. No majority trend was noted in terms of education as respondents were quite distributed into those with college degrees (29.1%) , high school graduate (25.25%), and some college education. As expected, the respondents were predominantly Muslims. Details of distribution of respondents based on these socio-demographic characteristics are shown in Appendix
Tables 1-6.

Other trends showed that extension workers tend to be of older age and the consumers, younger. Also, a greater number of policy makers (57.6%), scientists (57.1%) usually came from suburban areas. Though not a majority, many of the journalists tend to come from suburban (42.9%) and urban areas (37.1%). These are usually the areas where they practice their beat.

Worldviews and Values

To determine the worldviews and values of the respondents, they were asked to rate their degree of agreement or disagreement with 11 statements pertaining to the use and application of biotechnology, Four-point rating scale was used with 1 as the lowest and 4 , the highest.

Of these 11 items, only the statement pertaining to their attendance in information session on biotechnology in food production that their community will hold garnered majority (60%) agreement from all the stakeholders (Appendix Table 7). The trend of more than 50% agreeing to the statement was common for all stakeholder groups, except for the journalists, many (44%) of whom disagreed. Responses were more dispersed for the other 10 items. Details are discussed below.

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

Religious leaders (60%) expressed reservations about the moral and ethical considerations of agricultural biotechnology. Considerably more from their ranks agreed that the use of biotechnology in food production was against their moral values (Appendix Table 7). This

was further corroborated by their weighted mean of 2.5 (nearly agree). On the other hand, policy makers (66.7%), extension workers (63.9%), consumers (50.5%), and scientists (50.0%) disagreed that the use of biotechnology in food production was against their moral values.

Highest weighted mean of 2.6 was observed for journalists and 2.5 for farmer and community leaders suggesting that these two groups tend to agree with the statement above, just like the religious leaders with 2.5.

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

Many of the journalists (44%) disagreed with the above statement implying their non-preference for community information sessions on biotechnology. Though their weighted mean of 2.8 reflects agreement with the statement, it was the lowest among all weighted means for the different stakeholders. All the other stakeholders, based on frequency and weighted mean, indicated their support to this activity (Appendix Table 7).

Foods that have been genetically altered should be labeled.

No majority trend was noted but many agreed with the statement. For the journalists, it does not matter that genetically altered foods be labeled as indicated by only 5.7 percent agreeing to do so (Appendix Table 7). Stakeholders who strongly agreed to do so based on their weighted means were the businessmen and traders (3.4) , consumers (3.3), farmer leaders and community leaders (3.3), and scientists (3.5).

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

Those who did not conform with this statement were from the ranks of policy makers (63.6%) and scientists (54.3%). These two sectors are actually heavily involved in the use of science in their work, thus, their view. Very few respondents agreed with this statement. As indicated by the weighted mean of 2.6, the journalists were inclined to agree that genetic manipulation takes mankind into realms that belong to God alone.

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

Combining the percentages for 'strongly agree' (16.1%) and 'agree' (21.35) and comparing their sum (47.4%) with combined percentages (45.7%) of those who disagreed (36.4%) and strongly disagreed (9.3%), it can be said that many took side with the statement. This means that many in Indonesia still believe that genetically altered foods should be banned until it is proven that they are safe. Majority of the stakeholders, though, expressed disagreement with this stand. The weighted mean of scientists (3.2) and journalists (3.1.) indicate their conservative stand to favor the statement (Appendix Table 7).

We have no business meddling with nature.

About 50 percent of the stakeholders did not agree with this claim. Scientists (62.9%) and policy makers (60.6%) were the leading oppositionists to this statement. While there were generally a few who agreed with this view, it is noteworthy that many of them came from the journalists (42.9%) more than the religious group (22.9%) (Table 7). Based on weighted mean of 2.5 for both journalists and farmer/community leaders, it can be said that these groups tend to agree that we have no business meddling with nature.

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

There was no majority trend as to this statement. There was, however, an almost equal number of respondents, regardless of stakeholder groups, who were willing (26.3%) and not willing to pay the extra cost for labeling genetically modified foods (25.4%). Those willing were mostly the businessmen and traders as indicated by their mean of 2.7. Unwilling were the farmer and community leaders with a weighted mean of 1.8 and scientists with 1.7 signifying disagreement.

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

Based on the weighted mean of nearly 2.0, all stakeholder groups did not agree that regulation of biotechnology should be left mainly to industry. Majority of the policy makers (62.5%) and the businessmen (57.5%) opposed this stand.

Genetic engineering means nutritious and cheaper foods for consumers.

No majority trend was observed for this item. Worth noting was the fact that about one-fifth of the stakeholders (21.2%) did not know anything about this concern (Table 7). Weighted means indicate that extension workers (2.9%), consumers (2.7%), and businessmen and traders (2.6) support this statement while journalists (2.1) do not.

Consumers have a right to choose what they eat; hence, to know what they are eating.

Respondents from all sectors were one in saying that consumers have a right to choose what they eat, hence, to know what they are eating. Most of those who held this view came from the policy makers (60.6%) and the scientists (60.0%) (Table 7). Weighted means for all stakeholder groups, except for journalists, ranged from 3.0 to as high as 3.6. The latter's view falls on a borderline between agree and disagree.

On the whole, it can be said that among the Indonesian stakeholders in agricultural biotechnology, it is the **journalists** which consistently exhibited unfavorable attitude towards biotechnology. They would not attend community sessions on biotechnology, believed that biotechnology is against their moral values, were not willing to pay for extra cost of labeling, believed that we have no right meddling with nature, and did not agree that biotechnology would lead to nutritious and cheaper food.

Information Sources on Biotechnology

Information Exposure

On the average, all the stakeholders had low exposure to information on biotechnology in the last two months. About one-third each had been exposed only once and none at all to mass media (Appendix Table 8). Talking to or hearing from person sources about biotechnology was generally not practiced by the different stakeholders.

Information Sources on Biotechnology

Majority of the respondents in all stakeholder groups had not accessed the mass media on matters pertaining to biotechnology in the past two months. The few who made use of mass media came from the groups of religious leaders (25.7%) and the scientists (22.9%). The following sources were also not frequently accessed by the respondents: Internet; books on biotechnology; newsletter/pamphlets/brochures on biotechnology; and seminars/public forums on biotechnology (Appendix Table 8).

The pattern of responses on sources of information on biotechnology, likewise, revealed that the stakeholders did not refer much to interpersonal sources for information on agricultural biotechnology. These person sources were in fact not contacted on biotechnology-related matters by majority of respondents from all groups in the past two months.

However, a considerable number of religious leaders had talked to or heard about biotechnology from fellow religious figures (42,9%); accessed a website (45.7); read books, newspapers, pamphlets, brochures (31.4%); talked to and heard from food regulators (40.0%); and attended seminars and public forums (48.6%). These suggest that religious leaders are quite interested in biotechnology as they have been actively seeking and receiving information. It further implies that they have high potential as sources of biotechnology-related information.

Extent of Trust in Information Sources

In general, respondents from all stakeholder groups had only moderate trust on various information sources on biotechnology (Appendix Table 9). University-based scientists (59.0%) and science magazines and newsletters (49.2%) were the only information sources identified by all stakeholders as the ones they "totally" trusted . This is understandable since they are looked upon as having the competence on biotechnology, being more familiar with science.

Trustworthy information sources based on the weighted means of 3.0 and above among all stakeholder groups were the agricultural workers/services, newspapers, private sector scientists, radio broadcasts, TV broadcasts, and websites. Those having relatively low trust (with weighted means ranging from 2.2 to 2.7) were family/friends/neighbors and dealers of agricultural inputs. Trust on religious leaders as sources of information on biotechnology was generally moderate (Appendix Table 9).

Usefulness of Information in Making Judgments

Despite low exposure to information sources on biotechnology, there was a general agreement among all the stakeholders that the available information on biotechnology was very useful (53.6%) in making judgments about the applications of biotechnology in food production. The weighted means further support this. Those who found the biotechnology information "very useful" included the extension workers (65.5%), religious leaders (62.9%), farmer and community leaders (62.9%), businessmen and traders (52.6%), and scientists (51.5%) (Appendix Table 10).

It is interesting to note that 61.8 percent of the journalists found the information from various sources only as only "useful." This suggests that the journalists also have some degree of reservation regarding the stories their colleagues and the other information sources write about agricultural biotechnology (Appendix Table 10).

Usefulness of information was measured using a 3-point scale, with 1 as the lowest and 3 as the highest. For all stakeholder groups, perceived usefulness of information ranged from a weighted mean of 2.3 to 2.6, implying a rating of "very useful."

Perception of How Scientific the Information on Biotechnology Are

The apparent trend based on frequency counting and weighted means is for the stakeholders (50.%) to perceive the information they get on biotechnology as "very scientific." This view was highest among the extension workers (67.2%), farmer leaders and community leaders (67.1%), and religious leaders (57.1%). Consistent with earlier findings, the journalists (71.4%) were quite conservative in saying that the information they usually get was "somewhat scientific" (Appendix Table 11).
From a scale of 1 (lowest) to 3 (highest), the weighted means ranged from 2.3 to as high as 2.7 for the various stakeholders indicating that they perceive the information they get on agricultural biotechnology as very scientific.

Understanding of Biotechnology

Understanding of Science

Stakeholders were asked to rate their understanding of science from 1 (poor) to 3 (very good). No stakeholder group claimed to having very good understanding of science. Even the scientists rated themselves only as 2.2 or having only adequate understanding of science (Appendix Table 12).

Of the eight groups, the religious leaders (57.1%) owned to having poor understanding of science. They had the lowest weighted mean rating of 1.5 . A considerable percentage of extension workers (45.8%) also rated themselves as having poor understanding of science and their weighted mean rating of 1.6 was very close to that of religious leaders.

The rest of the stakeholder groups– businessmen and traders, consumers, extension workers, farmer leaders and community leaders, journalists, policy makers, and scientists –felt they

had adequate understanding of science. The group with the greatest number who said they understood science was that of journalists (77.1%), followed by the groups of scientists (71.4%), and policy makers (69.7%) (Appendix Table 12).

Knowledge on the Uses of Biotechnology in Food Production

Knowledge on the uses of biotechnology in food production was rated using a 3-point scale, where: 1=know nothing at all, 2= know some, and 3= know a great deal.
Weighted means for the different stakeholder groups ranged from 1.6 to 2.2 suggesting that respondents only knew some (and not a great deal) of the uses of biotechnology in food production.

Close to half of the religious leaders (45.7%) claimed knowing nothing at all and their weighted mean of 1.6 further supports this claim. The eight stakeholder groups were unanimous in claiming moderate knowledge about the uses of biotechnology in food production. Leading the pack were the policy makers (87.9%), journalists (85.7%), extension workers (78.7%), and consumers (75.7%) (Appendix Table 13).

Understanding of the Uses of Biotechnology in Food Production

To gauge the respondents' understanding of biotechnology in general and its role in food production in particular, they were asked to evaluate the veracity of 13 statements (Appendix Table 14).
Majority of the respondents in all the stakeholder groups correctly assessed the following five statements to be true:

- In reality, all crops have been "genetically modified" from their original state through domestication, selection, and controlled breeding over long periods of time.
- 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.
- Plant viruses infect vegetables and fruits.

However, majority (65.1% and 67%) were wrong in believing that genetically modified crops were being grown and sold in Indonesia at the time this study was conducted. This was actually a misconception since growing of GM crops such as cotton was not anymore going on in Indonesia at that time. Religious leaders (60.0%) in fact were not aware of this
(Appendix Table 14).

Six of the eight stakeholder groups correctly perceived that plant viruses infect vegetables and fruits. Majority of the scientists (60%) thought the statement was false. This could imply that the scientists are holding on to wrong knowledge about uses of biotechnology in food production. The religious leaders, on the other hand, were almost divided into believing this statement as either false (37.1%) or they did not know at all (34.3%) (Appendix Table 14). .
Meanwhile, four statements were correctly perceived to be false by the majority of the stakeholder

groups. These were:

- Ordinary tomatoes do not contain genes, while genetically modified tomatoes do.
- Plant viruses are transferred to humans when they eat vegetables and fruits infected with plant viruses."
- Science can guarantee zero-risk.
- By eating genetically modified corn, a person's genes could also be modified.

There was only one statement which majority claimed they did not know much about and this was: Golden rice (genetically modified rice) contains beta-carotene. Only the scientists (62.9%) correctly declared that golden rice contained beta-carotene.

The fact "More than half of human genes are identical to those of a monkey" was considered true by many (41.3%), though not a majority, of the respondents. Worth noting is the fact that about one-third (33.4%) did not know the answer (Appendix Table 14).

Factual Knowledge of Biotechnology: Use of Biotechnology Crops

Theoretical scenarios of possible biotechnology crops were given to the stakeholders. They were asked what they would do if a number of these biotechnology crops are developed. They were 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).

In most instances, Indonesian respondents were more interested to use agricultural biotechnology products such as tomato, papaya, eggplant, corn, and rice for food and as planting material rather than as animal feed and industrial by-products. These are shown by higher frequency counts obtained for these uses based on multiple responses of stakeholders (Appendix Table 15). Only biotechnology corn was highly preferred to be used for industrial by-products.

Factual Knowledge of Biotechnology: Importance of Food Characteristics

Respondents were asked to rate this item using a 4-point scale as follows: 1- very unimportant, 2- moderately unimportant, 3- moderately important, and 4- very unimportant.

When using biotechnology in food production, food characteristics considered important by majority of the stakeholders were as follows: non-poisonous (60.8%), nutritional quality (60.4%), and pesticide residue content (51.9%) (Appendix Table 16). Other characteristics such as being non-allergenic, price, food appearance, and better taste did not come as high. The weighted means for most items , though, ranged from 3.0 and above indicating that all food characteristics are considered either moderately or very important.

Notable was the trend for the journalists, among all other stakeholders, to express highest concern on all food characteristics. This is indicated by their consistently high frequency counts and weighted means (3.0 and above) for all the food characteristics cited. The scientists, on the other hand, considered taste as moderately unimportant (85.7%) when considering biotechnology for food production (Appendix Table 16).

Perception of Agricultural Biotechnology

Perceived Risks

Those who considered the use of biotechnology hazardous in food production outnumbered those who thought otherwise across all categories. However, responses veered more towards "somewhat hazardous" (39.3%) than "very hazardous" (9.6%). A sizeable number (36.4%) had no opinion on the matter, topped by extension workers (42.6%), businessmen and traders (40%), and scientists (40%) (Appendix Table 17).

Based on the 3-point rating scale (where 1=very hazardous, 2= somewhat hazardous, and 3= not at all hazardous), weighted means for all stakeholders suggest that they find the perceived risks associated with the use of biotechnology as somewhat hazardous. This supports the trend depicted by frequency counts (Appendix Table 17).

Perceived Benefits

The same rating scale used for perceived risk was used for this item. Based on weighted means, the extension workers (2.7), religious leaders (2.6), and policy makers (2.5) found the benefits of agricultural biotechnology as very beneficial (Appendix Table 18).

Based on frequency counts, however, only the group of extension workers (54.1%) had a majority perceiving the benefits as very beneficial. No majority trend was depicted for other stakeholders. It should be noted though that about one fourth or more among all the stakeholder groups indicated no opinion on the perceived benefits of biotechnology in food production. These people have yet to form their opinions; hence, they comprise an important segment that communication campaigns about biotechnology may still influence (Table 18).

Perception of Agricultural Biotechnology

For this part, respondents were asked to rate 12 items pertaining to regulations in biotechnology using a 4-point scale: 1= strongly disagree; 2=disagree, 3=agree, and 4=strongly agree.

Based on frequency counts, majority (55.4%) of all the stakeholder groups strongly agreed that government agencies in Indonesia are doing their best to ensure that the food they eat is safe (Appendix Table 19). Based on weighted means, strong agreement came from the businessmen and traders (3.7), religious leaders (3.7), and extension workers (3.6) (Appendix Table 19).

Mere agreement was given to the three statements below and this is supported further by the weighted means obtained for the various stakeholders:

- Biotechnology is good for Indonesian agriculture.
- Expert statements on biotechnology are based on scientific analysis and are, therefore,

objective.
- Regulations on biotechnology should include inputs from the non-government sector.

Among the stakeholder groups, the scientists believed that biotechnology is good for the Indonesian agriculture (65.7%), and that expert statements are based on scientific analyses and are, therefore, objective (65.7%) . Similarly, the policy makers believed that regulations on biotechnology should include inputs from non-government sector (60.6%) (Appendix Table 19).

On the other hand, a little less than 50 percent of stakeholders did not believe that:

- Biotechnology in food production only benefits large agricultural companies (46.6.%).
- Vital information about the health effects of genetically modified foods is being held back (46.3%).

Weighted means also suggest respondents' disagreement with these items.

Stakeholders are quite distributed when it comes to the statement that "genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health." Mean ratings, though, suggest agreement with this item (Appendix Table 19).

Institutional Concern About Health and Safety

The respondents perceived the following sectors to be highly concerned about public health and safety with regard to agricultural biotechnology: international research institutions (64.6%), university-based scientists (64.2%), government research institutions (59.6%), and consumer groups (53.7%) (Appendix Table 20).

They perceived the rest as being just "somewhat concerned" and this is supported further by the trend in weighted means for all items to approximate the rating of 3 or "somewhat concerned."

Perception that Science Should be a Part of Agricultural Development

Majority of respondents from all stakeholder groups (78.6%) indicated that science should be very much a part of agricultural development in Indonesia, with the most frequent positive response expressed by farmer leaders and community leaders (88.0%) and scientists themselves (85.7%). None of the scientists and extension workers agreed with the negative statement that science should not be a part at all of agricultural development in Indonesia (Appendix Table 21). All the weighted means ranging from 2.5 to 2.8 (with 3 as the highest) suggest strong support to this item.

Attitude Towards Agricultural Biotechnology

Interest in Biotechnology in Food Production

No majority trend was observed for this item. Despite the stakeholders' belief that science should be a part of agricultural production, it is ironic that most of them (46.4%) were only moderately interested in the uses of biotechnology in food production. Most came from the groups of journalists (58.8%), policy makers (54.5%), extension workers (52.5%), and businessmen and traders (50.0%) Weighted means ranging from 1.9 to 2.4 (with 3 as the highest) support this finding (Appendix Table 22).

Concern on Uses of Agricultural Biotechnology in Food Production

Similarly, the respondents from all sectors were generally "somewhat concerned" (59.2%) about the uses of agricultural biotechnology in food production. This is further confirmed by the weighted means for this item ranging from 1.6 to 2.2 (with 2 being equivalent to somewhat concerned). It should be noted that two out of five among the religious leaders (42.4%), were not at all concerned with this issue (Appendix Table 23).

Attitude Towards Biotechnology

To determine the various stakeholders' attitude towards biotechnology, they were asked to indicate their degree of agreement or disagreement with six statements concerning activities or actions about biotechnology. A 4-point rating scale was used with 1 as the lowest and 4 as the highest.

Majority trend (53.2%) was noted only for the statement "*If my community would hold an information session on biotechnology in food production, I would attend."* Level of agreement for all stakeholder groups as shown by the weighted mean ratings revolves around the rating of 3 or agree and not strongly agree (Appendix Table 24).

Stakeholders were not willing to contribute their time and money to an organization that promotes a ban on genetically modified foods. This is best reflected by the weighted means of the various stakeholders that ranged from 1.8 to 2.3 indicating disagreement. The most who disagreed (51.5%) came from policy makers. One-fourth have uncertain stand on this issue and many came from religious leaders (38.2%) and policy makers (33.3%) (Appendix Table 24).

As to labeling of genetically altered foods, weighted means (3.2 to 3.5) for all stakeholders reflect agreement, though intensity was not very strong. Majority were from religious leaders (54.3%), businessmen and traders (52.5%), and policy makers (50.0%) (Appendix Table 24). Though there was agreement to label genetically altered foods, stakeholders were, however, not inclined to pay for such based on both frequency distribution and weighted means (2.1 to 2.4). Again, religious leaders had a majority disagreeing to this (Appendix Table 24).
There was a general trend for all stakeholders to either agree (46.9%) or strongly agree (41.9%) with regard to the public being consulted in formulating food regulations and laws. Weighted means (3.1 to 3.5) indicate agreement. All stakeholders believed that the public should be directly consulted in approving R&D in agricultural biotechnology. Majority of the scientists (51.4%) strongly supported this and extension workers (54.1%) also agreed to this (Appendix

Table 24).

Frames to be Used When Making Judgments About Biotechnology Applications

This issue was asked only to the policy makers and scientists and not all the stakeholders. There were six biotechnology applications which these two stakeholders were asked to rate if ever they would consider them when making judgments on biotechnology. A 4-point rating scale was used, with 1 as the lowest and 4 as the highest.

The trend indicated that the Indonesian policy makers and scientists did not have any strong inclination towards biotechnology applications that would improve food quality, make crops more resistant, produce medicines and vaccines, study human diseases like cancer, produce temperature resistant strawberries, and detect and treat diseases we might have inherited from our parents (Appendix Table 25). Frequency counts did not show majority trend for any particular item or stakeholder. Similarly, the weighted means, ranging from 1.8 to 2.6, reflect that they seldom consider these applications when making judgments about biotechnology (Appendix Table 25).

Based on these findings, there is not enough data to support or identify what particular application stakeholders really consider when making judgments about biotechnology.

Relationships Between Socio-Demographic Characteristics and Understanding of Agricultural Biotechnology

Chi-square (X^2) test was used to determine the relationships between gender, civil status, and area of residence with the stakeholders' understanding and perception of and attitude towards agricultural biotechnology. For age and education, the Spearman Rank Correlation (r_s) test was used. Religion was not anymore included in the test since the respondents were predominantly Muslims. Only those variables with significant relationships are discussed below.

Except for age, all socio-demographic characteristics are significantly related with certain statements associated with level of understanding of agricultural biotechnology.

Gender

Results of statistical test showed that gender was related with the understanding that: yeast for brewing consists of living organisms. Females tend to label the statement as true while males tend to label it as false (Table 1). It may be attributed to the fact that females, being the food handlers at home, are more familiar with the nature of yeast being used in food preparation.

Civil Status

Civil status was found to be significantly related with the understanding that with every new emerging technology, there will always be potential risks. The married ones tend to take such statements as true (Table 1).

Education

Statistical results indicated that the higher the education of the respondents, the better was their understanding of science and of the knowledge about the uses of biotechnology in food production (Table 1). This has always been a proven relationship as education provides one with more scientific knowledge.

Area of Residence

Those living in suburban areas tend to believe that: yeast for brewing consists of living organisms; with every new emerging technology, there will always be potential risks; science can guarantee zero-risk; and that by eating genetically modified corn, a person's genes can also be modified. The last two statements are of course incorrect implying that those from suburban areas are misinformed about certain aspects about biotechnology (Table 1). Their distance from reliable information sources can help explain this occurrence.

Table 1. Relationships between socio-demographic characteristics and level of understanding of agricultural biotechnology

Independent Variable	Dependent Variable	Value of X^2	Significance
Gender	Yeast for brewing consists of living organisms.	9.164	S
Civil Status	With every new emerging technology, there will always be potential risks.	10.117	S
Education	Rate of understanding science	0.441	VHS
	Rate of knowledge about the uses of biotechnology in food production	0.356	VHS
Area of Residence	Yeast for brewing consists of living organisms.	17.074	VS
	With every new emerging technology, there will always be potential risks.	11.885	S
	Science can guarantee zero risk.	11.278	VS
	By eating genetically modified corn, a person's genes could also be modified.	11.750	VS

Relationships Between Socio-Demographic Characteristics and Perception of Agricultural Biotechnology

Only age and education were found to be significantly related with certain items dealing on perception of agricultural biotechnology. The younger the age, the more the respondent will perceive biotechnology as good for agriculture in Indonesia.

On the other hand, the older the respondents, the more likely that they would perceive that expert statements on biotechnology are based on scientific analyses and are, therefore, objective.

It was also shown that those who have higher education tend to perceive the government agencies as having the scientific facts and technical information they need in order to make good decisions about biotechnology in food. Similarly, they tend to agree that the risks of genetic engineering have been greatly exaggerated.

On the contrary, respondents with lower education perceived that vital information about the health effects of genetically modified foods is being held back and that biotechnology in food production only benefits large agricultural companies.

The younger the age, the more the respondent will perceive biotechnology as good for agriculture in Indonesia. On the other hand, the older the respondents, the more likely that they would perceive that expert statements on biotechnology are based on scientific analyses and are, therefore, objective.

Table 2. Relationships between socio-demographic characteristics and perception of agricultural biotechnology

Independent Variable	Dependent Variable	Value of r_s	Significance
Age	Biotechnology is good for Indonesian agriculture.	-0.164	VHS
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	0.104	S
Education	Government regulatory agencies have the scientific facts and technical information they need in order to make good decisions about biotechnology in food.	0.147	VS
	Vital information about the health effects of genetically modified foods is being held back.	-0.115	S
	Biotechnology in food production only benefits large agricultural companies.	-0.114	S
	The risks of genetic engineering have been greatly exaggerated.	0.102	S

Relationships Between Socio-Demographic Characteristics and Attitude Towards Agricultural Biotechnology

The measure of association showed that civil status and area of residence were significantly related with some statements pertaining to attitude towards agricultural biotechnology.

Civil Status

Significant relationship was found between civil status and agreement with a number of statements pertaining to attitude. That is, married ones tend to agree that foods that have been genetically altered should be labeled and that the public should be directly consulted in approving R&D in agricultural biotechnology. The married ones also tend to disagree that they should contribute time or money to an organization that promotes a ban on genetically modified foods (Table 3).

Area of Residence

Relationship between the area of residence and attitude indicated that those from urban areas tend to believe that the public should be consulted in formulating food regulations and laws (Table 3).

Table 3. Relationships between socio-demographic characteristics and attitude towards agricultural biotechnology

Independent Variable	Dependent Variable	Value of X^2	Significance
Civil Status	I would contribute my time or money to an organization that promotes a ban on genetically modified foods	15.792	S
	Foods that have been genetically altered should be labeled.	23.273	VS
	The public should be directly consulted in approving R&D in agricultural biotechnology.	35.366	VHS
Area of Residence	The public should be consulted in formulating food regulations and laws.	18.527	VS

Relationships Between World Views and Values and Understanding of Agricultural Biotechnology

Three worldviews were found to be associated with the stakeholders understanding and perception of and attitudes towards agricultural biotechnology. These were:

Worldview A: The use of biotechnology is against my moral values.
Worldview B: If my community would hold an information session on biotechnology in food production, I would attend.
Worldview C: Until we know that genetically altered foods are totally safe, those products should be banned.

In terms of level of understanding, however, only Worldview A was found to be associated very significantly with the respondents' understanding of science as well as knowledge of the uses of biotechnology in food production. The stronger the respondents hold on to this worldview, the higher is their rate of understanding science but the lower is their knowledge of the uses

of biotechnology in food production (Table 4). The earlier relationship seems dubious since dogmatism is usually the result of one's low understanding of science.

Table 4. Relationship between world views and values and understanding of agricultural biotechnology

Independent Variable	Dependent Variable (Understanding of Biotechnology)	Value of r_s	Significance
Worldview A The use of biotechnology in food production is against my moral values.	Rate of understanding of science	0.164	VS
	Rate of knowledge about the uses of biotechnology in food production	-0.154	VS

Relationships Between World Views and Values and Perception of Agricultural Biotechnology

The three worldviews were significantly related with a number of perception statements about agricultural biotechnology.

Worldview A

Those who regard the use of biotechnology in food production as against their moral values tend to perceive the following statements positively :

- Vital information about the health effects of genetically modified foods is being held back.
- Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health
- Biotechnology in food production only benefits large agricultural companies.
- The risks of genetic engineering have been greatly exaggerated.
- Current regulations in Indonesia are sufficient to protect people from any risks linked to modern biotechnology.

Except for the last item, there is logic in the relationship that the more conservative ones would usually perceive things negatively and doubt about their authenticity.

Worldview B

Those who hold on to this worldview tend to perceive and agree that regulations on biotechnology should include inputs from the non-government sector. The relationship is logical in that attendance to information session is one of the venues for gathering inputs from non-government sector (Table 5).

Worldview C

The above worldview has strong association with the perceptions that:

1) biotechnology in food production only benefits large agricultural companies;
2) genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health; and
3) regulations on biotechnology should include inputs from the non-government sector.

Such positive relationships support the earlier implication that respondents still feel quite wary about the social and health consequences of food biotechnology. Respondents also tend to trust and favor civil society participation in setting food biotechnology regulations.

Relationships Between World Views and Values and Attitude Towards Agricultural Biotechnology

No significant relationship was found between world views and values and attitude towards agricultural biotechnology.

Relationships Between Information Sources and Understanding of Agricultural Biotechnology

The Spearman Rank Correlation test was used to determine the relationship between information sources and the stakeholders' understanding, perception, and attitude towards agricultural biotechnology. Twelve variables under information sources were shown to be associated with understanding of agricultural biotechnology, namely:

1. Read or watched about biotechnology in the mass media (TV, newspapers, radio)
2. Talked to or heard from family/friends/neighbors/officemates
3. Talked to or heard from religious figures
4. Talked to professionals or experts
5. Talked to or heard from NGOs
6. Talked to or heard from a politician/leader
7. Accessed a website
8. Read books
9. Read newsletters, pamphlets, or brochures
10. Talked to or heard from food regulators
11. Attended seminars and public forums
12. Talked to or heard from agricultural biotechnology companies

Table 4. Relationships between world views and values and perception of agricultural biotechnology

Independent Variable	Dependent Variable (Perception of Agricultural Biotechnology)	Value of r_s	Significance
Worldview A: The use of biotechnology in food production is against my moral values.	Vital information about the health effects of genetically modified foods is being held back.	0.343	VHS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	0.336	VHS
	Biotechnology in food production only benefits large agricultural companies.	0.292	VHS
	The risks of genetic engineering have been greatly exaggerated.	0.216	VHS
	Current regulations in Indonesia are sufficient to protect people from any risks linked to modern biotechnology.	0.139	S
Worldview B: If my community will hold an information session on biotechnology, I will attend.	Regulations on biotechnology should include inputs from the non-government sector.	0.124	S
Worldview C: Until we know that genetically altered foods are totally safe, those products should be banned.	Biotechnology in food production only benefits large agricultural companies.	0.319	VHS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.	0.299	VHS
	Regulations on biotechnology should include inputs from the non-government sector.	0.186	VS

In general, measurement of association indicates that information sources, either from the mass media or interpersonal sources, were significantly associated with the rate of understanding science and knowledge about the uses of biotechnology in food production (Table 5). All relationships were positive indicating that the more the respondents are exposed to these sources, the better will their understanding and knowledge of uses of biotechnology for food production would be. This implies further that for creating awareness and understanding about biotechnology, either or both sources can be maximized to provide the correct and high quality information to the various stakeholders. This also suggests that a multimedia approach can produce better results (Table 5).

Table 5. Relationships between information sources and understanding of agricultural biotechnology

Independent Variable (Information Sources)	Dependent Variable (Understanding of Biotechnology)	Value of r_s	Significance
1. Read or watched about biotechnology in the mass media (TV, newspapers, radio)	Rate of understanding of science	0.412	VHS
	Rate of knowledge about the uses of biotechnology in food production	0.420	VHS
2. Talked to or heard from family/friends/ neighbors/officemates about biotechnology	Rate of understanding of science	0.373	VHS
	Rate of knowledge about the uses of biotechnology in food production	0.368	VHS
3. Talked to or heard from a religious figure (e.g., nun, priest, monk, imam, deric) about biotechnology	Rate of understanding of science	0.114	S
4. Talked to or heard from experts, professionals or scientists about biotechnology	Rate of understanding of science	0.323	VHS
	Rate of knowledge about the uses of biotechnology in food production	0.278	VHS
5. Talked to or heard from NGOs about biotechnology	Rate of understanding of science	0.204	VHS
	Rate of knowledge about the uses of biotechnology in food production	0.158	VHS

Table 5. (cont'n)

6. Talked to or heard from politicians or leaders about biotechnology	Rate of understanding of science	0.299	VHS
	Rate of knowledge about the uses of biotechnology in food production	0.111	VS
7. Accessed a website on biotechnology	Rate of understanding of science	0.259	VHS
	Rate of knowledge about the uses of biotechnology in food production	0.226	VHS
8. Read books on biotechnology	Rate of understanding of science	0.279	VHS
	Rate of knowledge about the uses of biotechnology in food production	0.316	VHS
9. Read newsletters, pamphlets, or brochures on biotechnology	Rate of understanding of science	0.236	VHS
	Rate of knowledge about the uses of biotechnology in food production	0.221	VHS
10. Talked to or heard from food regulators	Rate of understanding of science	0.113	S
11. Attended seminars, public forums on biotechnology	Rate of understanding of science	0.201	VHS
	Rate of knowledge about the uses of biotechnology in food production	0.147	S
12. Talked to or heard from agricultural biotechnology companies	Rate of knowledge about the uses of biotechnology in food production	0.153	S

Relationships Between Information Sources and Perception of Agricultural Biotechnology

Table 6 summarizes the significant relationships between sources of information and the stakeholders' perception of biotechnology. On the whole, it can be said that information sources can either have a positive or negative relationship with perception of biotechnology.

The important findings which can be derived from Table 6 are as follows:

- As stakeholders acquire more information about biotechnology in the mass media, their outlook becomes more positive in that they do not believe that vital information about the health effects of GM foods are held back and that the risks of genetic engineering are

exaggerated. Mass media as source can, however, lead to the negative perception that biotechnology is not good for Indonesian agriculture (Table 5). The latter implies that the Indonesian mass media may be convincingly carrying negative rather than positive images of food biotechnology.

- Getting information from their immediate social circle, such as family, friends, neighbors, officemates can lead to negative results in that they tend to believe that 1) biotechnology is not good for Indonesian agriculture; 2) that expert statements on biotechnology, though based on scientific analyses, are not objective; and 3) the risks of biotechnology are not exaggerated. This may imply that the respondents' informal interpersonal communication sources of biotechnology information may not be properly equipped with correct information about biotechnology.

- Religious figures as sources of biotechnology information have a very significant negative relationship with the stakeholders' perception of how good biotechnology is for agriculture in Indonesia. This could mean that although talking to a religious figure about agricultural biotechnology contributes to enhancing the respondents' understanding of science, it does not necessarily make them think that biotechnology is good for Indonesia's agricultural economy. This suggests that the religious leaders' stock of knowledge in biotechnology needs to be enhanced so that they can contribute positively in enhancing public perception of agricultural biotechnology.

- A very significant negative relationship came out between exposure to professionals, experts, and scientist as biotechnology information sources and the respondents' perception that "the risks of genetic engineering have been greatly exaggerated." This finding supports the logic that scientists and biotechnology experts, aside from helping enhance the respondents' understanding of science, can positively influence their perception about biotechnology applications in food production.

- Talking to or hearing from an NGO about biotechnology has a very significant negative relationship with the stakeholders' perception that government agencies are doing their best to ensure that the food they eat is safe; implying their distrust of these government regulatory bodies. Thus, NGOs as sources of information tend to create a more negative perception of biotechnology.

- While talking with politicians and leaders about food biotechnology may contribute to the respondents' understanding of science and knowledge on its uses, this may not necessarily contribute to creating in these stakeholders a positive outlook on the potential contributions of biotechnology to Indonesian agriculture. This could belie the earlier finding that Indonesian politicians and leaders agree and believe that biotechnology is good for Indonesian agriculture.

- Access to websites was found to relate negatively with other perception statements. This means that the better is the access to websites, the higher is the tendency for stakeholders to perceive 1) the risks of genetic engineering as greatly exaggerated; 2) biotechnology as not good for agriculture in Indonesia; and 3) expert statements on biotechnology as not being based on scientific analyses and are, therefore, subjective.

Thus, while websites enhanced the respondents' scientific appreciation of food biotechnology, they did not necessarily contribute to making the respondents' perceptions of it more favorable. This implies that the content of these websites may be conveying more negative information about biotechnology to the Indonesian public.

- Reading biotechnology books also tends to significantly negate the stakeholders' perceptions that 1) the risks of genetic engineering have been greatly exaggerated; 2) biotechnology is good for agriculture in Indonesia; 3) expert statements on biotechnology are based on scientific analyses and are, therefore, objective; and 4) genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health.

  The negative relationship with the first three perception statements imply that reading more about biotechnology in books tends to paint a somewhat unfavorable picture of it in the minds of the stakeholders. However, reading biotechnology books may have informed them that fears of unexpected new allergens or contaminants in biotechnology food products may be unfounded.

- Analyses revealed a significant negative relationship on the use of newsletters/pamphlets/ brochures with the perception that biotechnology is good for agriculture in Indonesia; but a significant positive relationship with the perception that current regulations in Indonesia are sufficient to protect people from any risks linked to modern biotechnology.

- Having food regulators as one's information source on biotechnology also has a very highly significant negative relationship with the perception that biotechnology is good for agriculture in Indonesia. It seems that talking to these information sources on food biotechnology gave the stakeholders a negative outlook on its benefits to their country's agriculture. In a related vein, talking to food regulators tend to significantly give the stakeholders doubts that "expert statements on biotechnology are based on scientific analyses and are, therefore, objective."

- Attendance in seminars and forums does not necessarily mean that stakeholders will gain a positive outlook about the benefits of biotechnology to agriculture in Indonesia. Rather, it significantly raised their concern in using agricultural biotechnology in food production.

Table 6. Relationships between information sources and perception of agricultural biotechnology

Independent Variable (Information Sources)	Dependent Variable (Perception of Biotechnology)	Value of r_s	Significance
1. Read or watched about biotechnology in the mass media (TV, newspapers, radio)	Wild information about health effects of genetically modified foods is being held back.	-0.145	0
	The risks of genetic engineering have been greatly exaggerated.	-0.135	0
	Biotechnology is good for Indonesian agriculture.	-0.202	.000
2. Talked to or heard from family, friends, neighbors, colleagues about biotechnology	The risks of genetic engineering have been greatly exaggerated.	-0.214	.00
	Biotechnology is good for Indonesian agriculture.	-0.230	.000
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.200	.000
3. Talked to or heard from a religious figure (e.g., nun, priest, monk, imam, cleric) about biotechnology	Biotechnology is good for Indonesian agriculture.	-.0180	.00
4. Talked to or heard from experts, professionals or scientists about biotechnology	The risks of genetic engineering have been greatly exaggerated.	-0.157	.00
	Biotechnology is good for Indonesian agriculture.	-0.252	.000
5. Talked to or heard from NGOs about biotechnology	Government agencies are doing their best to ensure that the food we eat is safe.	-0.153	.00
	Biotechnology is good for Indonesian agriculture.	-0.161	0
6. Talked to or heard from politicians or leaders about biotechnology	The risks of genetic engineering have been greatly exaggerated.	-0.157	0
	Biotechnology is good for Indonesian agriculture.	-0.164	0
7. Accessed a website on biotechnology	The risks of genetic engineering have been greatly exaggerated.	-0.180	.00
	Interest in using agricultural biotechnology in food production	0.149	.00
	Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.142	0
	Biotechnology is good for Indonesian agriculture.	-0.134	0

Table 6. (cont'n)

8. Read books on biotechnology	Expert's statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.156	S
	The risks of genetic engineering have been greatly exaggerated.	-0.138	S
	Biotechnology is good for Indonesian agriculture.	-0.134	S
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health	-0.115	S
9. Read newsletters, pamphlets, or brochures on biotechnology	Expert's statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.294	VHS
	Genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats to public health	0.162	VS
	Biotechnology is good for Indonesian agriculture.	-0.138	S
	Current regulations in Indonesia are sufficient to protect people from any risks linked to modern biotechnology.	0.126	S
10. Talked to or heard from food regulators	Biotechnology is good for Indonesian agriculture.	-0.204	VHS
	Expert's statements on biotechnology are based on scientific analyses and are, therefore, objective.	-0.135	S
11. Attended seminars, public forums on biotechnology	Biotechnology is good for Indonesian agriculture.	-0.142	S

Relationships Between Information Sources and Attitude Towards Agricultural Biotechnology

Out of the 12 variables on communication sources earlier associated with level of understanding of agricultural biotechnology, only six were found to be statistically significant in affecting attitude. These were:

1. Read or watched about biotechnology in the mass media (TV, newspapers, radio)
2. Talked to or heard from family/friends/neighbors/officemates
3. Talked to professionals or experts
4. Read books
5. Read newsletters, pamphlets, or brochures
6. Attended seminars and public forums

Communication variables 1,2,3 and 5 were positively associated with respondents' interest and concern in using agricultural biotechnology in food production , while variables 4 and 6 positively affected only their concern (Table 7). There is, however, a very thin line between "interest" and "concern"; thus, either one will be a sufficient indicator of attitude towards biotechnology.

These results imply that the tri-media (TV, newspapers, radio), printed materials particularly books, newsletters, pamphlets, or brochures and interpersonal communication with immediate social circle and experts as well as attendance in public forums tend to enhance interest and concern towards agricultural biotechnology. This interest or concern, however, do not necessarily translate to favorable attitude. As shown by earlier findings, these information sources can also stir up negative perception such as biotechnology being perceived as not good for Indonesian agriculture.

Table 7. Relationships between information sources and attitude towards agricultural biotechnology

Independent Variable (Information Sources)	Dependent Variable (Perception of Biotechnology)	Value of r_s	Significance
1. Read or watched about biotechnology in the mass media (TV, newspapers, radio)	Interest in using agricultural biotechnology in food production	0.136	S
	Concern in using agricultural biotechnology in food production	0.289	VHS
2. Talked to or heard from family/friends/ neighbors/officemates about biotechnology	Interest in using agricultural biotechnology in food production	0.262	VHS
	Concern in using agricultural biotechnology in food production	0.255	VHS
3. Talked to or heard from experts, professionals or scientists about biotechnology	Interest in using agricultural biotechnology in food production	0.154	VS
	Concern in using agricultural biotechnology in food production	0.245	VHS
4. Read books on biotechnology	Concern in using agricultural biotechnology in food production	0.254	VHS
5. Read newsletters, pamphlets, or brochures on biotechnology	Concern in using agricultural biotechnology in food production	0.201	VHS
	Interest in using agricultural biotechnology in food production	0.125	S
6. Attended seminars, public forums on biotechnology	Concern in using agricultural biotechnology in food production	0.119	S

Part 5 Summary and Conclusions

Summary

With Indonesia as the focal area, this study sought to determine the socio-cultural characteristics of the various stakeholders in agricultural biotechnology; their worldviews related to agricultural biotechnology; their information sources on agricultural biotechnology; their level of understanding and perception of and attitude towards agricultural biotechnology; and the relationships between the socio-cultural factors, worldviews, and information sources on one hand, and the stakeholders' level of understanding and perception of and attitude towards agricultural biotechnology, on the other hand.

Respondents included 432 agricultural biotechnology stakeholders comprising businessmen and traders, consumers, extension workers, farmer leaders and community leaders, journalists, policy makers, religious leaders, and scientists. They came from the selected areas in Banten/ Tangerang, Lampung, Jawa Barat in Bogor, Jabar in West Java, Daerah Istiemwa in Yogyakarta, and Jakarta, Indonesia. They were interviewed or were asked to accomplish self-administered questionnaires when they were difficult to gather. Data were analyzed using frequency counts, percentages, ranges, weighted means and Chi-square and Spearman Rank Correlation tests.

Socio-Demographic Characteristics

The respondents were mostly males, married, Muslims, and aged 21 to 50 years old. Many of the older respondents were extension workers and the younger ones were consumers. Their educational attainments were quite varied, from high school, some college education, and college degrees. They mostly lived in rural and suburban areas. Residing in the rural areas were the farmer leaders and community leaders, religious leaders, extension workers, and businessmen and traders. More of the policy makers, scientists, consumers, and journalists lived in the suburban areas.

Worldviews and Values

Religious leaders considered the use of biotechnology in food production as against their moral values, followed closely by journalists. Majority of the respondents would attend information session on biotechnology in food production that their community would hold. Many among the stakeholder groups, approximating a majority, agreed that genetically altered foods should be labeled, but journalists disagreed. Very few agreed that manipulation takes mankind into realms that belong to only to God; while the ever conservative journalists agreed.

Majority disagreed to ban GM foods until it is known that they are totally safe. There was also a general trend for all stakeholders to disagree that we have no business meddling with nature. As to labeling of GM foods, respondents were almost equally distributed to those who were and were not willing. Most willing were the businessmen and traders; most unwilling were the farmer leaders and community leaders.

All stakeholder groups were not willing to pay the cost for labeling GM foods. There was no distinct trend as to their agreement or disagreement that genetic engineering means nutritious and cheaper foods for consumers. In fact, about a third did not know much and could not decide. All the stakeholder groups expressed support to the statement that consumers have a right to choose what they eat and to know what they are eating.

Information Sources on Biotechnology

Except for the religious leaders, all the stakeholders have low level of exposure to sources of information on agricultural biotechnology.

The study found that no single source of information on biotechnology stood out among the stakeholders. However, it is interesting to note that the Indonesian stakeholders were starting to recognize religious leaders or figures as potential sources of biotechnology-related information.

Ironically, while religious leaders were emerging as potential sources of biotechnology-related information, they were those among the group, along with businessmen and traders, and farmer leaders and community leaders, who have relatively low exposure to information on biotechnology. In fact, it may be a cause of concern that the Indonesian stakeholders sought less information on biotechnology as indicated by the results of this study.

Nevertheless, despite the lower information seeking behavior on biotechnology, the religious leaders were getting more exposed to information on biotechnology as borne by the fact that many of them have consistently been exposed to mass and interpersonal communication sources three times or more in the last two months before they have been interviewed.

In general, the scientists and science magazines or newsletter were regarded as the most trusted sources of information on agricultural biotechnology by the respondents across stakeholder groups. Information obtained were found to be very useful and very scientific by these groups.

Level of Understanding of Biotechnology

Stakeholders unanimously claimed to have obtained 'moderate' knowledge about the uses of biotechnology in food production. Upon validation, most of the respondents in all the stakeholder groups indeed had correct understanding of biotechnology.

It is also worth noting that stakeholders were confident in rating themselves modestly in terms

of level of understanding. All stakeholders—including the farmer leaders and community leaders— unanimously self-rated themselves as having 'moderate' knowledge about the uses of biotechnology in food production.

Ironically, the religious leaders, who were emerging as potential sources of biotechnology-related information, were found to have the lowest understanding of biotechnology.

Perception of Agricultural Biotechnology

Majority of the respondents viewed biotechnology as "hazardous" in food production. Expanded media coverage on human health issues and the growing hype on wellness programs may have influenced respondents to become more cautious in the food they eat. Also, their increased level of understanding on biotechnology may signify that they now understood more facets and issues regarding biotechnology, including its risks, challenges, potentials, and benefits.

Nevertheless, the above perception may be limited to the use of biotechnology for food production because majority of the respondents perceived agricultural biotechnology as either *moderately or very beneficial.* Agricultural biotechnology encompasses a broader context than food production including forestry and environment, animal production, water resources, and others. Extension workers topped the list of those who believed in the benefits of agricultural biotechnology in food production, followed by religious leaders, and policy makers.

There was a prevailing perception that biotechnology regulations in Indonesia are quite insufficient to protect people from risks. While majority of the scientists contended against this perception, they comprised only a sector among the many stakeholders in agricultural biotechnology.

Indonesian stakeholders put high regard in government research institutions and consumer groups in their perception of who should be concerned about health and safety concerning biotechnology.

Attitude Towards Agricultural Biotechnology

Most of the respondents from all sectors were not overly concerned with the uses of agricultural biotechnology in food production. Majority were not willing to contribute money and time to ban genetically modified foods. In fact no one in the ranks of consumers, extension workers, journalists, and policy makers 'strongly agreed' with the idea. Moreover, majority from each stakeholder group expressed their willingness to attend an information session on biotechnology in their community. These imply that Indonesian stakeholders are becoming more open-minded to discuss issues related to agricultural biotechnology. However, there was a very strong sentiment in favor of labeling GM foods although many disagreed or were undecided about paying for the labeling. Generally, the respondents also agreed that the public should be consulted in formulating food regulations and laws.

In terms of frames used when making judgments on biotechnology, the trend indicated that the Indonesian policy makers and scientists did not have any strong inclination towards biotechnology applications that would improve food quality, make crops more resistant, produce

medicines and vaccines, study human diseases like cancer, produce temperature resistant strawberries, and detect and treat diseases we might have inherited from our parents. This could be explained by the religious beliefs that Muslims have about man, nature and a Supreme Being.

Relationships of Socio-demographic Characteristics with Understanding and Perception of and Attitude Towards Agricultural Biotechnology

Socio-demographic Characteristics and Level of Understanding

Except for age, all socio-demographic characteristics are significantly related with certain statements associated with level of understanding of agricultural biotechnology. Females tend to label the statement that "yeast for brewing consists of living organisms" as true while males tend to label it as false.The married ones tend to take the statement that "with every new emerging technology, there will always be potential risks" as true.

Statistical results indicated that the higher the education of the respondents, the better was their understanding of science and of the knowledge about the uses of biotechnology in food production. Those living in suburban areas tend to believe that: yeast for brewing consists of living organisms; with every new emerging technology, there will always be potential risks; science can guarantee zero-risk; and by eating genetically modified corn, a person's genes can also be modified. The last statement is of course false.

Socio-demographic Characteristics and Perception

Only age and education were found to be significantly related with certain items dealing on perception of agricultural biotechnology. The younger the age, the more the respondent will perceive biotechnology as good for agriculture in Indonesia. On the other hand, the older the respondents, the more likely that they would perceive that expert statements on biotechnology are based on scientific analyses and are, therefore, objective.

It was also shown that those who have higher education tend to perceive the government agencies as having the scientific facts and technical information they need in order to make good decisions about biotechnology in food. Similarly, they tend to agree that the risks of genetic engineering have been greatly exaggerated.

On the contrary, respondents with lower education perceived that vital information about the health effects of genetically modified foods is being held back and that biotechnology in food production only benefits large agricultural companies.

Socio-demographic Characteristics and Attitude

Married ones tend to agree that foods that have been genetically altered should be labeled and that the public should be directly consulted in approving R&D in agricultural biotechnology. The married ones also tend to disagree that they should contribute time or money to an organization that promotes a ban on genetically modified foods.

Relationship between the area of residence and attitude indicated that those from urban areas tend to believe that the public should be consulted in formulating food regulations and laws.

Relationships of Sources of Information with Understanding and Perception of and Attitude Towards Agricultural Biotechnology

Sources of Information and Level of Understanding

The study showed that while all the forms of media or information sources increased the stakeholders' level of understanding about science and the uses of biotechnology in food production as shown by positive and significant correlations, not all these media necessarily promoted positive perception or attitude of the stakeholders towards biotechnology.

Those exposed to a religious figure for biotechnology information had a better understanding of science but not necessarily of biotechnology. On the other hand, those who talked or heard from food regulators and representatives of agricultural biotechnology companies were the opposite - they had higher level of knowledge about the uses of biotechnology for food production but their level of knowledge on science was not significantly higher.

Sources of Information and Perception

What should be addressed by policy makers and communication planners is the disturbing finding that those exposed to mass media, interpersonal sources, religious figures, experts or scientists, NGOs, local politician or leader, website, books, other publications, food regulators, seminars/fora, and especially agricultural biotechnology companies perceived that 'biotechnology was not good for Indonesian agriculture.'

Further, those exposed to interpersonal sources for biotechnology information not only perceived that biotechnology was not good for Indonesian agriculture, but that expert statements were not objective, that genetic engineering was risky to public health, and that there was insufficient information about the risks of genetic engineering available to the public.

Those who talked to NGOs did not perceive that the government agencies were doing their best to ensure food safety. Further, those who talked to local leaders/politician, accessed the web, and read books, perceived that there was inadequate dissemination of information about the risks to genetic engineering or that indeed, there were risks to genetic engineering.

Sources of Information and Attitude

In terms of attitude, stakeholders who were more exposed to mass media, interpersonal sources, experts or scientists, websites, books, other publications, and seminars were more interested and/or concerned in using agricultural biotechnology in food production. These had significant to highly significant and positive relationships.
Meanwhile, no such significant relationships were found in the perception of stakeholders and their exposure to a religious figure, representative from an NGO, politicians/local leader, and food regulator.

Worldviews and Attitude

Those who believed that the use of biotechnology is against their moral values also perceived that biotechnology benefits only large agricultural companies, that vital information about the health effects of GM foods are held back, that genetic engineering of food products could create unexpected new allergens or contaminate products in unanticipated ways, resulting in threats in public health, and that current regulations in Indonesia are not sufficient to protect people from many risks in biotechnology.

Those who were uncertain or believed that GM foods should be banned unless they are proven safe, also perceived that benefits accrue only to large companies, that genetic engineering has risks, and that NGOs should input in formulating regulations on biotechnology.

Conclusions

1. Among the Indonesian stakeholders, the journalists and religious leaders have the most conservative view of agricultural biotechnology. Both view biotechnology in food production as against their moral values.

2. Religious leaders are active information seekers and receivers when it comes to biotechnology but they have low understanding of science and claim that they know nothing at all on uses of biotechnology in food production.

3. The journalists have some contradicting stance as illustrated by these findings:

    - While they claim to have high understanding of science, they find the information they get on agricultural biotechnology only as "somewhat scientific."

    - While they are most concerned with factual knowledge of all food characteristics when considering the uses of biotechnology in food production, they are only moderately interested in the use of biotechnology in food production and don't see biotechnology as a means for providing nutritious and cheaper food for the public.

4. Stakeholders have multiple information sources when it comes to agricultural biotechnology. University-based scientists and science magazines come out as the most trusted sources of information. Information obtained are perceived as very useful and very scientific.

5. All stakeholders perceive themselves as having moderate knowledge about the uses of

biotechnology in food production, except the religious leaders who claim that they have low understanding of the subject.

6. There's a general tendency for the various stakeholder groups to perceive agricultural biotechnology as hazardous but at the same time beneficial. A little more than 30 percent have no opinion yet as to the hazards of agricultural biotechnology.

7. All stakeholder groups, except the journalists, are willing to attend information sessions on agricultural biotechnology that their community will hold.

8. All stakeholder groups:

   - are not willing to pay the cost for labeling GM foods;
   - are willing support the consumers right to choose what to eat and to know what they are eating; and
   - believe that the public should be consulted in formulating food regulations and laws.

9. In terms of frames used when making judgments on biotechnology, Indonesian policy makers and scientists are not strongly inclined to towards biotechnology applications that would improve food quality, make crops more resistant, or cure diseases.

10. The higher the education of the stakeholders, the more favorable is their perception and attitude towards agricultural biotechnology.

11. The current sources of information on agricultural biotechnology involving both mass media and interpersonal ones tend to influence the Indonesian public into thinking that agricultural biotechnology is not good for their country's agriculture.

12. The worldviews and values of stakeholders impinge greatly on their perception of and attitude towards agricultural biotechnology. Conservative worldviews and values, such as the application of agricultural biotechnology being against their moral values, consistently lead to negative perception and attitude towards the use of biotechnology in food production.

Part 6 Recommendations

Based on major and significant findings, the following immediate and practical recommendations are being made in line with the communication and public education efforts on agricultural biotechnology:

1. The group of journalists need to be educated on agricultural biotechnology first and foremost as they play a pivotal role in informing the public and shaping the latter's perception and attitude towards biotechnology. Hence, if strategic communication is to be formulated, it has to address this sector first. Media education on agricultural biotechnology may include among others seminars/workshops, forums, and study tours to be complemented by quality reference materials in printed and electronic forms.

2. Religious leaders are highly potential information sources. The latter's potential as influential sources of information can be explored further and possibly tapped in future communication programs. However, their understanding of science and of the uses of biotechnology in food production have to be greatly enhanced. This calls for special education classes such as attendance to short courses in agricultural biotechnology supplemented by reading materials. The topic in biotechnology may also be integrated in their special topic college courses. In addition to equipping the religious leaders with knowledge of the subject matter, they also need to have capacity building on communication. The latter may include clear and effective writing, public speaking and presentation, strategic communication, risk communication, and even design and production of communication materials.

3. Partnership needs also to be established with university scientists since they have been regarded as most trusted sources of information on agricultural biotechnology. These scientists can be organized into a bureau or pool of resource persons whose services as writers, speakers, advisers, reactors, and discussants may be tapped every now and then. Publication of regular science magazines or newsletters can also be done to complement the communication efforts.

4. Much has yet to be done in terms of informing and educating the many segments of the public as shown by their moderate level of knowledge about agricultural biotechnology. Information about a shared responsibility would be more appropriate as the commercialization of biotechnology products follows a continuum from the scientist to the extension workers, farmers and consumers as well as the regulatory bodies and policy makers.

5. Another communication strategy is to conduct information sessions at the community

level about agricultural biotechnology. Findings indicate its strong viability in terms of number of people attending.

This may be organized jointly with LGUs or barangays. The advantage of this is that it gives more opportunity to the local people to participate in the discussion about biotechnology.

6. Education is a key to developing favorable perception and attitude towards agricultural biotechnology. Hence, a sustained effort in making the information accessible to and in providing venues for discussion among the various stakeholders are important guidelines for making the public more educated about issues and concerns in agricultural biotechnology. Multiple venues can be established through multiple partnerships with institutions and groups having the same mandate and interest in biotechnology.

7. The disturbing finding that the current sources of information in Indonesia seem to influence the Indonesian public to think that agricultural biotechnology is not good for their country's agriculture should be probed further. It may be related to religion or some other factors. Finding out the more definite reasons would enable communication planners to come up with more strategic communication approaches. This is where the conduct of focus group discussions would help.

8. Now is the best and most appropriate time to address the gap in public understanding, perception and attitude towards agricultural biotechnology in Indonesia. A considerable segment (about one-third based on this study) have yet to form their stand about biotechnology. They are, therefore, potential supporters. Based on the principle of primacy, the first set of information received can have better and lasting impact than the succeeding ones. Hence, it is but timely to support and complement the developments happening in biotechnology now with communication.

On a longer term basis, it is suggested that a well thought out communication strategy in agricultural biotechnology be developed to guide the systematic planning and implementation of communication activities geared towards promoting better public understanding and perception of and attitude towards agricultural biotechnology. To pursue this, the following are further recommended :

1. Develop an Integrated Communication Strategy (ICS) for promoting use of agricultural biotechnology in Indonesia.

Findings of the study lay down the foundation for the development of an Integrated Communication Strategy (ICS) for the promotion of agricultural biotechnology in Indonesia. An ICS would address directly the concerns arising from discrepancies between and among the various stakeholders' understanding of science, their knowledge about biotechnology, their attitudes towards agricultural biotechnology, and their ratings of attendant risks and hazards, which the results of statistical tests have established.

An ICS anchored on the tenets of strategic communication and the philosophy of multi-stakeholder participation and capability building should engender an environment that positively

influences awareness, attitudes, and behavior towards use of biotechnology in agriculture. The journey towards desired behavior change goes through three main stages: a) awareness-knowledge; b) practice; and c) advocacy.

It is assumed that messages and approaches using a variety of communication channels will be developed along each stage to promote and sustain individual behavioral change. Furthermore, an ICS would ensure a comprehensive, carefully-coordinated, and participatory development and dissemination of messages on agricultural biotechnology for the benefit of the various publics concerned. The process can be best illustrated using the following diagram (Figure 2):

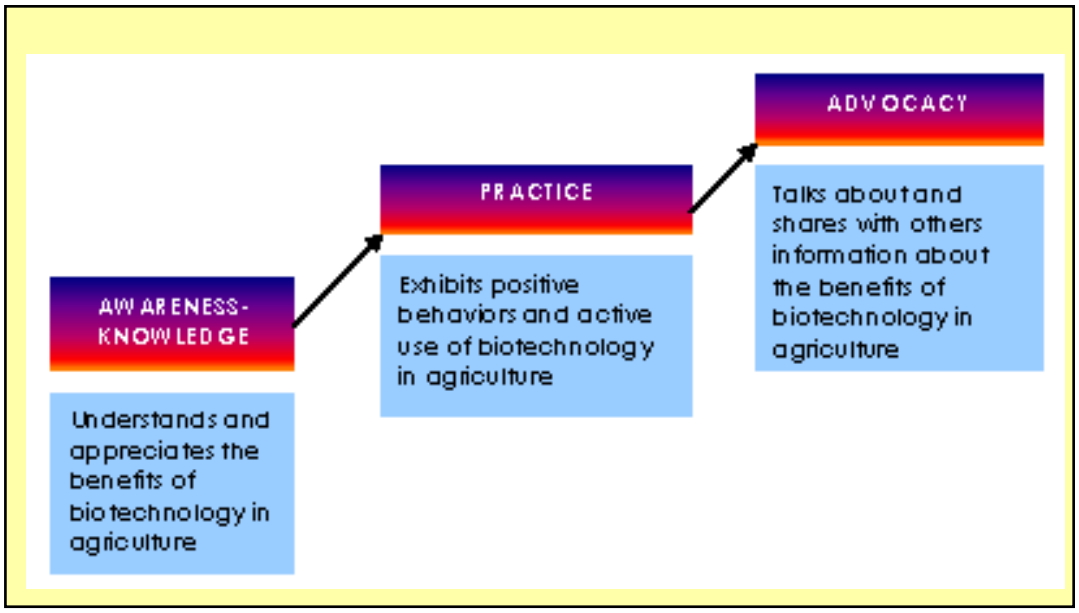

Figure 2. Behavior Change Continuum for Key Stakeholders of Agricultural Biotechnology in Indonesia (Adapted from Juanillo and Velasco, 2004)

An ICS should also be able to create mechanisms at the community and national levels that can reinforce the changes towards desired behavior change. The three main components of an ICS are: a) individual behavior change; b) community support; and c) national and policy advocacy. The interrelationship of the various components in the process is shown below (Figure 3).

2. Bring together key representatives of the various stakeholders in a series of workshops that would lead to the development of an Integrated Communication Strategy.

Together, the consumers, farmer leaders and community leaders, extension workers, journalists, businessmen and traders, religious leaders, scientists, and policy makers can develop the various components of the ICS. The series of workshops should also offer an excellent opportunity for the various stakeholders to express their respective sectors' information needs, as well as to assess the strengths, weaknesses, opportunities, and threats in drawing up specific communication strategies and approaches to meet those needs.

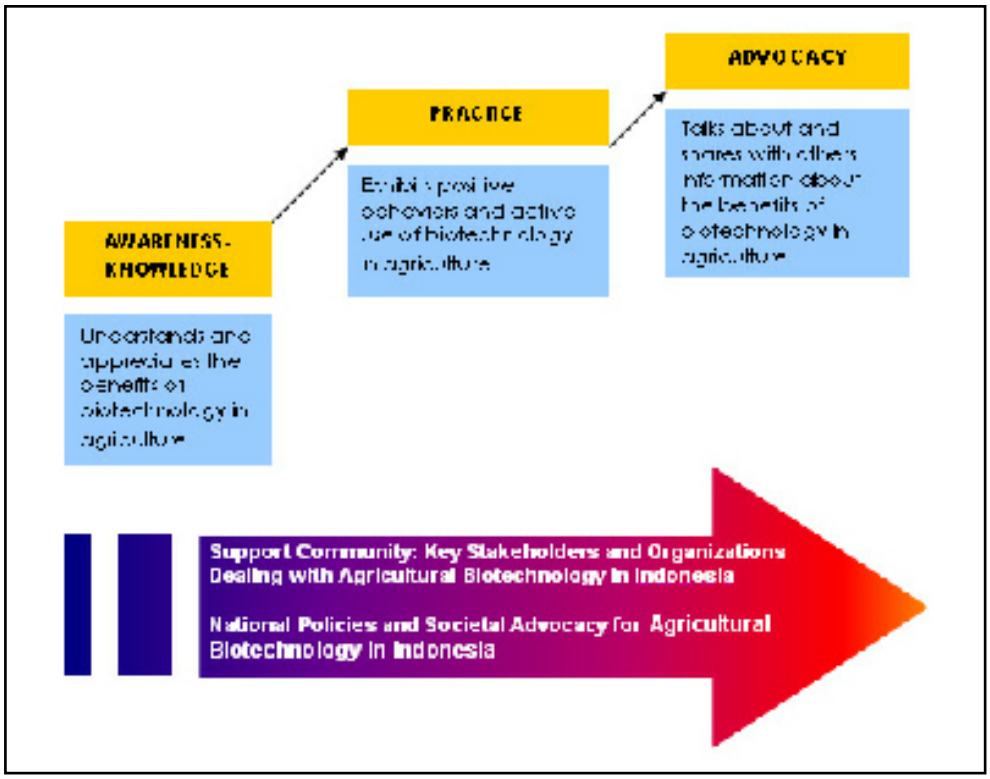

Figure 3. Context of ICS for Promoting Agricultural Biotechnology in Indonesia (Adapted from Juanillo and Velasco, 2004)

The ICS should be a work in progress that enables stakeholders to periodically review their concerns and needs.

3. Develop a capability-building program for the key stakeholders who would take part in the development of the Integrated Communication Strategy.

There is a need to train the stakeholders in the various aspects of strategic communication, namely: a) problem, program, stakeholder, and environmental analysis; b) objective setting and strategic positioning; c) message and materials development, including pre-testing and production of communication materials; d) implementation; and e) monitoring and evaluation. Management and leadership, as well as resource generation, should also be emphasized. These efforts should result in several campaigns promoting agricultural biotechnology that are tailor-fit for the needs of specific groups of stakeholders.

4. Make the most use of the complementation of mass and community media to promote use of biotechnology in agriculture.

It would be useful to remember the unique strengths of the different media of communication. The mass media (radio, television, and newspapers) should be particularly effective in drumming up interest on biotechnology for agriculture. Through constant mention in various programs, the mass media could whet people's appetites for more information on a relatively

new topic, encourage debate and dialogue on important issues, and generally allow for the concept of agricultural biotechnology to carve a niche in people's consciousness. Meanwhile, the smaller, community-based channels of communication that allow for interpersonal exchanges could encourage more in-depth discussions of issues through community assemblies and public discussions.

The mass media are effective in the awareness-knowledge stage while the community media are critical in the practice and advocacy stages. However, it would be useful to remember always that complementation should work for the greatest good considering that planners could take advantage of the various channels' strongest features. The religious leaders, for instance, are emerging as formidable sources of information on agricultural biotechnology.

5. Develop action-research programs employing participatory development communication (PDC) techniques among a community of learners in promoting agricultural biotechnology.

PDC, with its 10 steps, could be a useful complement to the development of an ICS. These steps are: a) developing a relationship with the community/understanding the local setting; b) working with the community to identify the problem; c) identifying the stakeholders; d) identifying communication needs, objectives, and activities; e) identifying appropriate communication tools; f) preparing and pre-testing communication content and materials; g) facilitating the building of partnerships; h) producing an implementation plan; i) monitoring, documentation, and evaluation; and j) sharing and facilitating the utilization of results.

Sharing of research results could be facilitated through an electronic forum. Participants in PDC-related programs and other activities concerning agricultural biotechnology promotion could learn from one another's experiences through sharing via a web-based forum.

The forum would be a good opportunity for the community of learners to know what works or does not work in certain circumstances, as well as to gain access to evidence-based data quickly.

6. Develop and produce advocacy cum research information kits that contain evidence-based information on biotechnology applications in agriculture.

These kits could be distributed to participants in biotechnology-related symposia, media people, public relations officers of media outfits, information officers of government agencies, and independent print and broadcast journalists. Emphasis should be on evidence-based information that the above-mentioned stakeholders could quote safely. These materials should also direct users to sources where they can get additional information on biotechnology for agriculture.

REFERENCES

Asian Food Information Centre (AFIC). 2003. *Consumer perceptions of food biotechnology in Asia: Public report on the AFIC 2002 Consumer Survey*. http://www.afic.org/2002%20consumer%20survey%20public%20report.doc.

Hoban, Thomas. (2004). *Public Attitudes Toward Agricultural Biotechnology.* ESA Working Paper No. 04-09.Agricultural Economics and Development Division, Food and Agriculture Organization of the United Nations. Available at: www.fao.org.es/esa

Hoban, Thomas. (1998). *Trends in Consumer Attitudes About Agricultural Biotechnology. AgBioForum*, *1*(1), 3-7. http://www.agbioforum.org

Initiative for Future Agriculture and Food Systems (IFAFS) 2006. Participatory Assessment of Social and Economic Impacts of Biotechnology, A Collaborative Research Project http://www.agecon.vt.edu/biotechimpact/index.htm

Juanillo, Napoleon Jr. and Ma. Theresa H. Velasco. Integrated Communication Strategy for PhilTIPS (unpublished report), 2004.

Mataia, A., Cataquiz, G., Francisco, R., Sebastian, I., Bernardino, M., Hossain, M., & Garcia, L. *Public Knowledge, Attitude and Perception on Rice Biotechnology Research in the Philippines*. PhilRice – IRRI Collaborative Project, 2003.

Nevitt, J., Mills, B.F., Reaves, D.W., & Norton, G.W. *Perceived Social Costs of Agricultural Biotechnology. Participatory Assessment of Social and Economic Impacts of Biotechnology*. Working Paper No. 03, September, 2004.

Pew Initiative on Food and Biotechnology. 2003. *Public Sentiment on Genetically Modified Food. http://pewagbiotech.org/research/2003update/*

UIUC-ISAAA Survey: *Southeast Asians positive towards agri-biotech, exhibit high trust in university scientists and research institutes* http://www.seedquest.com/News/releases/2003/may/5864.htm

Appendix Table 1. Distribution of respondents by gender

Stakeholder	Male		Female		TOTAL	
	n	%	n	%	n	%
Businessmen and traders	27	67.5	13	32.5	40	100
Consumers	58	52.3	53	47.7	111	100
Extension workers	46	75.4	15	24.6	61	100
Farmer leaders and community leaders	66	79.5	17	20.5	83	100
Journalists	29	82.9	6	17.1	35	100
Policy makers	26	78.8	7	21.2	33	100
Religious leaders	29	85.3	5	14.7	34*	100
Scientists	25	71.4	10	28.6	35	100
TOTAL	**306**	**70.8**	**126**	**29.2**	**432**	**100**

*One respondent gave no answer.

Appendix Table 2. Distribution of respondents by civil status

Stakeholder	Single		Married		Others		TOTAL	
	n	%	n	%	n	%	n	%
Businessmen and traders	11	27.5	29	72.5	0	0	40	100
Consumers	55	49.5	51	45.9	5	4.5	111	100
Extension workers	11	18.0	48	78.7	2	3.3	61	100
Farmer leaders and community leaders	15	18.1	63	75.9	5	6.0	83	100
Journalists	13	37.1	21	60.0	1	2.9	35	100
Policy makers	5	15.2	27	81.8	1	3.0	33	100
Religious leaders	7	20.0	27	77.1	1	2.9	35	100
Scientists	8	22.9	27	77.1	0	0	35	100
TOTAL	**125**	**28.9**	**293**	**67.6**	**15**	**3.5**	**433**	**100**

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	2	5.0	16	40.0	12	30.0	5	12.5	3	7.5	2	5.0	40	100
Consumers	20	20.2	45	45.5	19	19.2	14	14.1	1	1.0	0	0	99*	100
Extension workers	0	0	16	28.6	11	19.6	27	48.2	2	3.6	0	0	56*	100
Farmer leaders and community leaders	3	4.0	10	13.5	28	37.8	24	32.4	7	9.5	2	2.7	74*	100
Journalists	1	3.0	13	39.4	14	42.4	5	15.1	0	0	0	0	33*	100
Policy makers	0	0	5	17.2	6	20.7	11	37.9	7	24.1	0	0	29*	100
Religious leaders	0	0	6	18.8	11	34.4	10	31.2	4	12.5	1	3.1	32*	100
Scientists	0	0	9	29.0	8	25.8	11	35.5	3	9.7	0	0	31*	100
TOTAL	**26**	**6.6**	**120**	**30.5**	**109**	**27.7**	**107**	**27.1**	**27**	**6.8**	**5**	**1.3**	**394**	**100**

*Some respondents gave no answer

Appendix Table 4. Distribution of respondents by educational attainment

Stakeholder	Some Elementary		Elementary Grad		Some High School		High School Grad		Some College		BS/BA		Grad/ Post Grad		Others		TOTAL	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Businessmen and traders	2	5.0	3	7.5	18	45.0	7	17.5	9	22.5	1	2.5	0	0	0	0	40	100
Consumers	1	0.9	1	0.9	9	8.1	40	36.0	31	27.9	28	25.2	1	0.9	0	0	111	100
Extension workers	0	0	0	0	3	4.9	16	26.2	14	23.0	23	37.7	2	3.3	3	4.9	61	100
Farmer leaders and community leaders	2	2.4	5	6.0	15	18.1	29	34.9	12	14.5	18	21.7	1	1.2	1	1.2	83	100
Journalists	0	0	1	2.9	1	2.9	1	2.9	11	31.4	19	54.3	2	5.7	0	0	35	100
Policy makers	0	0	0	0	2	6.1	6	18.2	5	15.2	13	39.4	7	21.2	0	0	33	100
Religious leaders	0	0	0	0	3	8.6	10	28.6	7	20.0	10	28.6	3	8.6	2	5.7	35	100
Scientists	0	0	0	0	0	0	0	0	0	0	14	40.0	21	60.0	0	0	35	100
TOTAL	**5**	**1.2**	**10**	**2.3**	**51**	**11.8**	**109**	**25.2**	**89**	**20.6**	**126**	**29.1**	**37**	**8.5**	**6**	**1.3**	**433**	**100**

Appendix Table 5. Distribution of respondents by area of residence

Stakeholder	Rural		Suburban		Urban		TOTAL	
	n	%	n	%	n	%	n	%
Businessmen and traders	16	40.0	15	37.5	9	22.5	40	100
Consumers	43	38.7	57	51.4	11	9.9	111	100
Extension workers	32	52.5	24	39.3	5	8.2	61	100
Farmer leaders and community leaders	59	71.1	16	19.3	8	9.6	83	100
Journalists	7	20.0	15	42.9	13	37.1	35	100
Policy makers	10	30.3	19	57.6	4	12.1	33	100
Religious leaders	19	54.3	13	37.1	3	8.6	35	100
Scientists	5	14.3	20	57.1	10	28.6	35	100
TOTAL	**191**	**44.1**	**179**	**41.3**	**63**	**14.6**	**433**	**100**

Appendix Table 6. Distribution of respondents by religion

Stakeholder	Roman Catholic		Protestant		Islam		Others		TOTAL	
	n	%	n	%	n	%	n	%	n	%
Businessmen and traders	4	10.0	2	5.0	33	82.5	1	2.5	40	100
Consumers	10	9.0	11	9.9	89	80.2	1	0.9	111	100
Extension workers	5	8.2	6	9.8	50	82.0	0	0	61	100
Farmer leaders and community leaders	8	9.6	4	4.8	70	84.3	1	1.2	83	100
Journalists	4	11.4	5	11.3	26	74.3	0	0	35	100
Policy makers	2	6.1	4	12.1	27	81.8	0	0	33	100
Religious leaders	2	5.7	1	2.9	32	91.4	0	0	35	100
Scientists	4	11.4	4	11.4	27	77.1	0	0	35	100
TOTAL	**39**	**09.0**	**37**	**08.5**	**354**	**81.8**	**3**	**0.7**	**433**	**100**

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	2.5	6	15.0	19	47.5	7	17.5	7	17.5	40	100	2.0
	Consumers	7	6.4	16	14.7	55	50.5	15	13.8	16	14.7	109*	100	2.2
	Extension workers	2	3.3	3	4.9	39	63.9	11	18.0	6	9.8	61	100	1.9
	Farmer leaders and community leaders	11	13.3	10	12.0	36	43.4	3	3.6	23	27.7	83	100	2.5
	Journalists	1	2.9	14	40.0	5	14.3	2	5.7	13	37.1	35	100	2.6
	Policy makers	0	0	3	9.1	22	66.7	5	15.2	3	9.1	33	100	1.9
	Religious leaders	2	5.7	21	60.0	6	17.1	6	17.1	0	0	35	100	2.5
	Scientists	4	11.8	5	14.7	17	50.0	3	8.8	5	14.7	34*	100	2.3
	Total	28	6.5	78	18.1	199	46.3	52	12.1	73	17.0	430	100	
b.	If my community would hold an information session on biotechnology in food production, I would attend.													
	Businessmen and traders	8	20.0	24	60.0	3	7.5	0	0	5	12.5	40	100	3.1
	Consumers	18	16.5	71	65.1	6	5.5	1	0.9	13	11.9	109*	100	3.1
	Extension workers	15	24.6	38	62.3	7	11.5	1	1.6	0	0	61	100	3.1
	Farmer leaders and community leaders	29	34.9	44	53.0	0	0	2	2.4	8	9.6	83	100	3.3
	Journalists	8	22.9	11	31.4	14	44.0	1	2.9	1	2.9	35	100	2.8
	Policy makers	2	6.1	29	87.9	2	6.1	0	0	0	0	33	100	3.0
	Religious leaders	6	17.1	24	68.6	2	5.7	1	2.9	2	5.7	35	100	3.1
	Scientists	8	23.5	21	61.8	1	2.9	0	0	4	11.8	34*	100	3.2
	Total	94	21.9	262	60.9	35	8.1	6	1.4	33	7.7	430	100	
c.	Foods that have been genetically altered should be labeled.													
	Businessmen and traders	14	35.0	20	50.0	0	0	0	0	6	15.0	40	100	3.4
	Consumers	38	35.2	54	50.0	4	3.7	3	2.8	9	8.3	108*	100	3.3
	Extension workers	12	19.7	33	54.1	14	23.0	1	1.6	1	1.6	61	100	2.9
	Farmer leaders and community leaders	21	25.3	34	41.0	2	2.4	1	1.2	25	30.1	83	100	3.3

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
Journalists	13	37.1	2	5.7	8	22.9	8	22.9	4	11.4	35	100	2.6
Policy makers	11	33.3	13	39.4	4	12.1	2	6.1	3	9.1	33	100	3.1
Religious leaders	6	17.1	22	62.9	4	11.4	3	8.6	0	0	35	100	2.3
Scientists	17	48.6	16	45.7	0	0	0	0	2	5.7	35	100	3.5
Total	132	30.7	194	45.1	36	8.4	18	4.2	50	11.6	430	100	
d. Genetic manipulation takes mankind into realms that belong to God and God alone.													
Businessmen and traders	3	7.5	5	12.5	15	37.5	6	15.0	11	27.5	40	100	2.2
Consumers	8	7.5	22	20.6	45	42.1	18	16.8	14	13.1	107*	100	2.2
Extension workers	0	0	15	24.6	28	45.9	4	6.6	14	23.0	61	100	2.0
Farmer leaders and community leaders	12	14.5	15	18.1	18	21.7	3	3.6	35	42.2	83	100	2.5
Journalists	4	11.4	12	34.3	11	31.4	2	5.7	6	17.1	35	100	2.6
Policy makers	2	6.1	3	9.1	21	63.6	3	9.1	4	12.1	33	100	2.1
Religious leaders	3	8.6	7	20.0	16	45.7	6	17.1	3	8.6	35	100	2.2
Scientists	3	8.6	7	20.0	19	54.3	2	5.7	4	11.4	35	100	2.4
Total	35	8.2	86	20.0	173	40.3	44	10.3	91	21.2	429	100	
e. Until we know that genetically altered foods are totally safe, those products should be banned.													
Businessmen and traders	4	10.0	10	25.0	16	40.0	4	10.0	6	15.0	40	100	2.3
Consumers	17	15.6	34	31.2	38	34.9	10	9.2	10	9.2	109*	100	2.1
Extension workers	4	6.6	7	11.5	32	52.5	6	9.8	12	19.7	61	100	2.2
Farmer leaders and community leaders	14	16.9	15	18.1	18	21.7	8	9.6	28	33.7	83	100	2.4
Journalists	10	28.6	8	22.9	9	25.7	3	8.6	5	14.3	35	100	3.1
Policy Makers	2	6.1	3	9.1	16	48.5	5	15.2	7	21.2	33	100	2.1
Religious Leaders	7	20.0	7	20.0	16	45.7	3	8.6	2	5.7	35	100	2.5
Scientists	11	31.4	8	22.9	12	34.3	1	2.9	3	8.6	35	100	3.2
Total	69	16.1	92	21.3	157	36.4	40	9.3	73	16.9	431	100	

*Some respondents gave no answer

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	5.0	7	17.5	19	47.5	5	12.5	7	17.5	40	100	2.2
	Consumers	6	5.6	17	15.7	64	59.2	12	11.1	9	8.3	108*	100	2.2
	Extension workers	1	1.6	8	13.1	34	55.7	13	21.3	5	8.2	61	100	1.9
	Farmer leaders and community leaders	11	13.3	12	14.5	29	34.9	4	4.8	27	32.5	83	100	2.5
	Journalists	6	17.1	15	42.9	9	25.7	1	2.9	4	11.4	35	100	2.5
	Policy makers	3	9.1	7	21.2	20	60.6	1	3.0	2	6.1	33	100	2.4
	Religious leaders	3	8.6	8	22.9	17	48.6	4	11.4	3	8.6	35	100	2.3
	Scientists	4	11.4	6	17.1	22	62.9	1	2.9	2	5.7	35	100	2.4
	Total	36	8.4	80	18.6	214	49.8	41	9.5	59	13.7	430	100	
g.	I am wiling to pay the extra cost for labeling genetically modified foods.													
	Businessmen and traders	0	0	18	45.0	6	15.0	1	2.5	15	37.5	40	100	2.7
	Consumers	8	7.3	30	27.5	22	20.2	26	23.9	23	21.1	109*	100	2.2
	Extension workers	1	1.6	20	32.8	20	32.8	9	14.8	11	18.0	61	100	2.3
	Farmer leaders and community leaders	2	2.4	15	18.1	18	21.7	18	21.7	30	36.1	83	100	1.8
	Journalists	5	14.3	5	14.3	11	31.4	8	22.9	6	17.1	35	100	2.2
	Policy makers	3	9.4	7	21.9	12	37.5	5	15.6	5	15.6	32*	100	2.3
	Religious leaders	2	5.9	8	23.5	12	35.3	3	8.8	9	26.5	34*	100	2.4
	Scientists	2	5.7	10	28.6	8	22.9	11	31.4	4	11.4	35	100	2.1
	Total	23	5.4	113	26.3	109	25.4	81	18.9	103	24.0	429	100	
h.	The regulation of modern biotechnology should be left mainly to industry.													
	Businessmen and traders	2	5.0	1	2.5	23	57.5	5	12.5	9	22.5	40	100	2.0
	Consumers	6	5.6	13	12.1	50	46.7	28	26.2	10	9.3	107*	100	2.1
	Extension workers	1	1.7	6	10.0	30	50.0	18	30.0	5	8.3	60*	100	1.8
	Farmer leaders and community leaders	1	1.2	9	10.8	27	32.5	20	24.1	26	31.3	83	100	2.1
	Journalists	7	20.0	7	20.0	6	17.1	11	31.4	4	11.4	35	100	2.3
	Policy makers	2	6.3	2	6.3	20	62.5	5	15.6	3	9.4	32*	100	2.0

	Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
		n	%	n	%	n	%	n	%	n	%	n	%	
	Religious leaders	2	5.9	7	20.6	14	41.2	5	14.7	6	17.6	34*	100	2.2
	Scientists	1	2.9	3	8.6	15	42.9	14	40.0	2	5.7	35	100	1.7
	Total	22	5.2	48	11.3	185	43.4	106	24.9	65	15.2	426	100	
i.	Genetic engineering means nutritious and cheaper foods for consumers.													
	Businessmen and traders	7	17.5	15	37.5	8	20.5	1	2.5	9	22.5	40	100	2.6
	Consumers	16	14.7	36	33.0	32	29.4	4	3.7	21	19.3	109*	100	2.7
	Extension workers	10	16.7	27	45.0	13	21.7	1	1.7	9	15.0	60*	100	2.9
	Farmer leaders and community leaders	8	9.6	31	37.3	4	4.8	15	18.1	25	30.1	83	100	2.6
	Journalists	3	8.6	4	11.4	12	34.3	8	22.9	8	22.9	35	100	2.1
	Policy makers	4	12.1	15	45.5	5	15.2	1	3.0	8	24.2	33	100	2.5
	Religious leaders	6	17.1	12	34.3	11	31.4	1	2.9	5	14.3	35	100	2.8
	Scientists	2	5.7	14	40.0	6	17.1	7	20.0	6	17.1	35	100	2.4
	Total	56	13.0	154	35.8	91	21.2	38	8.8	91	21.2	430	100	
j.	Consumers have a right to choose what they eat; hence, to know what they are eating.													
	Businessmen and traders	23	57.5	16	40.0	1	2.5	0	0	0	0	40	100	3.6
	Consumers	54	49.5	41	37.6	6	5.5	4	3.7	4	3.7	109*	100	3.4
	Extension workers	14	23.3	35	58.3	6	10.0	5	8.3	0	0	60*	100	3.0
	Farmer leaders and community leaders	37	44.6	36	43.4	0	0	0	0	10	12.0	83	100	3.5
	Journalists	12	34.3	2	5.7	13	37.1	8	22.9	0	0	35	100	2.5
	Policy makers	20	60.6	11	33.3	0	0	1	3.0	1	3.0	33	100	3.6
	Religious leaders	16	45.7	11	31.4	8	22.9	0	0	0	0	35	100	3.2
	Scientists	21	60.0	12	34.3	0	0	0	0	2	5.7	35	100	3.6
	Total	197	45.8	164	38.1	34	7.9	18	4.2	17	4.0	430	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	42.2	6	15.4	9	23.1	6	15.4	39*	100
Consumers	38	35.5	32	29.9	17	15.9	20	18.7	107*	100
Extension workers	13	21.7	24	40.0	15	25.0	8	13.3	60*	100
Farmer leaders and community leaders	34	41.9	33	40.7	6	7.4	8	10.0	81*	100
Journalists	10	29.4	13	38.2	5	14.7	6	17.1	34*	100
Policy makers	6	18.2	18	54.5	4	12.1	5	15.2	33	100
Religious leaders	16	45.7	4	11.4	6	17.1	9	25.7	35	100
Scientists	4	11.4	13	37.1	10	28.6	8	22.9	35	100
Total	139	32.8	143	33.7	72	17.0	70	16.5	424	100
b. Talked to or heard from family/friends/ neighbors/officemates about biotechnology										
Businessmen and traders	19	47.5	7	17.5	4	10.0	10	25.0	40	100
Consumers	51	46.8	27	24.8	23	21.0	8	7.3	109*	100
Extension workers	27	45.0	24	40.0	6	10.0	3	5.0	60*	100
Farmer leaders and community leaders	42	51.2	22	26.8	9	11.0	9	11.0	82*	100
Journalists	18	51.4	10	28.6	2	5.7	5	14.3	35	100
Policy makers	10	30.3	15	45.5	5	15.2	3	9.1	33	100
Religious leaders	13	38.2	3	8.8	12	35.3	6	17.6	34*	100
Scientists	14	40.0	9	25.7	6	17.1	6	17.1	35	100
Total	194	45.3	117	27.3	67	15.7	50	11.7	428	100
c. Talked to or heard from a religious figure (e.g., nun, priest, monk, imam, cleric) about biotechnology										
Businessmen and traders	34	85.0	4	10.0	1	2.5	1	2.5	40	100
Consumers	92	84.4	14	12.8	1	0.9	2	1.8	109*	100
Extension workers	52	86.7	7	11.7	1	1.7	0	0	60*	100
Farmer leaders and community leaders	73	89.0	2	2.4	4	4.9	3	3.7	82*	100
Journalists	34	97.1	0	0	1	2.9	0	0	35	100
Policy makers	26	78.8	3	9.1	3	9.1	1	3.0	33	100
Religious leaders	13	37.1	4	11.4	3	8.6	15	42.9	35	100
Scientists	30	88.2	3	8.8	1	2.9	0	0	34*	100
Total	354	82.7	37	8.6	15	3.5	22	5.1	428	100

*Some respondents gave no answer

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	27	67.5	9	22.5	1	2.5	3	7.5	40	100
Consumers	66	61.1	20	18.5	9	8.3	13	12.0	108*	100
Extension workers	27	45.8	25	42.4	7	11.9	0	0	59*	100
Farmer leaders and community leaders	46	56.1	26	31.7	5	6.1	5	6.1	82*	100
Journalists	16	45.7	9	25.7	7	20.0	3	8.6	35	100
Policy makers	14	42.4	10	30.3	5	15.2	4	12.1	33	100
Religious leaders	16	45.7	2	5.7	7	20.0	10	28.6	35	100
Scientists	14	40.0	8	22.9	7	20.0	6	17.1	35	100
Total	226	53.0	109	25.5	48	11.2	44	10.3	427	100
e. Talked to or heard from a non-government organization (NGO) about biotechnology										
Businessmen and traders	32	80.0	6	15.0	2	5.0	0	0	40	100
Consumers	84	77.1	17	15.6	4	3.7	4	3.7	109*	100
Extension workers	45	75.0	14	23.3	1	1.7	0	0	60*	100
Farmer leaders and community leaders	54	65.9	21	25.6	5	6.1	2	2.4	82*	100
Journalists	22	62.9	8	22.9	5	14.3	0	0	35	100
Policy Makers	22	66.7	8	24.2	2	6.1	1	3.0	33	100
Religious Leaders	15	42.9	3	8.6	2	5.7	15	42.9	35	100
Scientists	21	60.0	7	20.0	4	11.4	3	8.6	35	100
Total	295	68.8	84	19.6	25	5.8	25	5.8	429	100
f. Talked to or heard from a local politician/ local leader about biotechnology										
Businessmen and traders	36	90.0	4	10.0	0	0	0	0	40	100
Consumers	96	88.1	6	5.5	4	3.7	3	2.8	109*	100
Extension workers	53	86.9	6	9.8	2	3.3	0	0	61	100
Farmer leaders and community leaders	71	86.6	7	8.5	2	2.4	2	2.9	82*	100
Journalists	31	88.6	3	8.6	1	2.9	0	0	35	100
Policy makers	26	78.8	6	18.2	1	3.0	0	0	33	100
Religious leaders	15	42.9	2	5.7	3	8.6	15	42.9	35	100
Scientists	30	85.7	3	8.6	1	2.9	1	2.9	35	100
Total	358	83.3	37	8.6	14	4.2	21	4.9	430	100

*Some respondents gave no answer

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	82.5	3	7.5	3	7.5	1	2.5	40	100
	Consumers	67	61.5	19	17.4	12	11.0	11	10.1	109*	100
	Extension workers	48	78.7	9	14.8	4	6.6	0	0	61	100
	Farmer leaders and community leaders	67	81.7	10	12.2	2	2.4	3	3.7	82*	100
	Journalists	22	62.9	6	17.1	4	11.4	3	8.6	35	100
	Policy makers	23	69.7	8	24.2	1	3.0	1	3.0	33	100
	Religious leaders	14	40.0	2	5.7	3	8.6	16	45.7	35	100
	Scientists	16	45.7	6	17.1	4	11.4	9	25.7	35	100
	Total	290	67.4	63	14.7	33	7.7	44	10.2	430	100
h.	Read books on biotechnology										
	Businessmen and traders	32	80.0	5	12.5	1	2.5	2	5.0	40	100
	Consumers	60	55.6	17	15.7	25	23.1	6	5.6	108*	100
	Extension workers	36	60.0	19	31.7	3	5.0	2	3.3	60*	100
	Farmer leaders and community leaders	50	63.3	18	22.8	5	6.3	6	7.6	79*	100
	Journalists	27	77.1	5	14.3	2	5.7	1	2.9	35	100
	Policy makers	13	39.4	16	48.5	3	9.1	1	3.0	33	100
	Religious leaders	15	42.9	3	8.6	6	17.1	11	31.4	35	100
	Scientists	14	40.0	7	20.0	8	22.9	6	17.1	35	100
	Total	247	58.1	90	21.2	53	12.5	35	8.2	425	100
i.	Read newsletters/ pamphlets/ brochures on biotechnology										
	Businessmen and traders	23	57.5	13	32.5	3	7.5	1	2.5	40	100
	Consumers	64	58.7	23	21.1	14	12.8	8	7.3	109*	100
	Extension workers	36	59.0	21	34.4	3	4.9	1	1.6	61	100
	Farmer leaders and community leaders	48	59.3	21	25.9	5	6.2	7	8.6	81*	100
	Journalists	22	62.9	8	22.9	4	11.4	1	2.9	35	100
	Policy makers	16	50.0	11	34.4	2	6.3	3	9.4	32*	100
	Religious leaders	13	37.1	3	8.6	8	22.9	11	31.4	35	100
	Scientists	15	42.9	17	48.6	2	5.7	1	2.9	35	100
	Total	237	55.4	117	27.3	41	9.6	33	7.7	428	100

*Some respondents gave no answer

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	35	87.5	4	10.0	0	0	1	2.5	40	100
Consumers	94	86.2	8	7.3	5	4.6	2	1.8	109*	100
Extension workers	42	68.9	14	23.0	2	3.3	3	4.9	61	100
Farmer leaders and community leaders	64	79.0	11	13.6	0	0	6	7.4	81*	100
Journalists	32	91.4	3	8.6	0	0	0	0	35	100
Policy makers	21	63.6	11	33.3	1	3.0	0	0	33	100
Religious leaders	14	40.0	1	2.9	6	17.1	14	40.0	35	100
Scientists	31	88.6	2	5.7	1	2.9	1	2.9	35	100
Total	333	77.6	54	12.6	15	3.5	27	6.3	429	100
k. Attended seminars, public forums on biotechnology										
Businessmen and traders	35	87.5	4	10.0	0	0	1	2.5	40	100
Consumers	93	85.3	6	5.5	7	6.4	3	2.8	109*	100
Extension workers	56	91.8	3	4.9	2	3.3	0	0	61	100
Farmer leaders and community leaders	56	68.3	21	25.6	3	3.7	2	2.4	82*	100
Journalists	22	62.9	11	31.4	2	5.7	0	0	35	100
Policy makers	23	69.7	8	24.2	1	3.0	1	3.0	33	100
Religious leaders	16	45.7	1	2.9	1	2.9	17	48.6	35	100
Scientists	27	77.1	5	14.3	2	5.7	1	2.9	35	100
Total	328	76.3	59	13.7	18	4.2	25	5.8	430	100
l. Talked to or heard from agricultural biotechnology companies										
Businessmen and traders	35	87.5	1	2.5	2	5.0	2	5.0	40	100
Consumers	92	85.2	4	3.7	9	8.3	3	2.8	108*	100
Extension workers	43	70.5	13	21.3	3	4.9	2	3.3	61	100
Farmer leaders and community leaders	69	84.1	9	11.0	2	2.4	2	2.4	82*	100
Journalists	25	75.8	4	12.1	0	0	4	12.1	33*	100
Policy makers	28	84.8	1	3.0	3	9.1	1	3.0	33	100
Religious leaders	16	45.7	2	5.7	17	48.6	0	0	35	100
Scientists	30	85.7	4	11.4	1	2.9	0	0	35	100
Total	338	79.1	38	8.9	37	8.7	14	3.3	427	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	7	17.5	23	57.5	2	5.0	8	20.0	40	100	2.7
	Consumers	32	28.8	63	56.8	6	5.4	10	9.0	111	100	2.5
	Extension workers	20	32.8	32	52.5	2	3.3	7	11.5	61	100	3.1
	Farmer leaders and community leaders	23	28.0	46	56.1	0	0	13	15.9	82*	100	3.0
	Journalists	9	25.7	20	51.7	4	11.4	2	5.7	35	100	3.0
	Policy makers	5	15.2	23	69.7	3	9.1	2	6.1	33	100	2.9
	Religious leaders	13	37.1	18	51.4	0	0	4	11.4	35	100	3.1
	Scientists	13	37.1	15	42.9	2	5.7	5	14.3	35	100	2.7
	Total	122	28.2	240	55.6	19	4.4	51	11.8	432	100	
b.	Agricultural workers/services											
	Businessmen and traders	13	32.5	24	60.0	0	0	3	7.5	40	100	3.1
	Consumers	30	27.0	69	62.2	5	4.5	7	6.3	111	100	3.1
	Extension workers	33	54.1	27	44.3	0	0	1	1.6	61	100	3.5
	Farmer leaders and community leaders	48	57.8	33	39.8	1	1.2	1	1.2	83	100	3.5
	Journalists	3	8.6	28	80.0	2	5.7	2	5.7	35	100	2.9
	Policy makers	10	30.3	22	66.7	1	3.0	0	0	33	100	3.3
	Religious leaders	4	11.8	14	41.2	16	47.1	0	0	34*	100	2.6
	Scientists	8	22.9	22	62.9	0	0	5	14.3	35	100	2.9
	Total	149	34.5	239	55.3	25	5.9	19	4.4	432	100	
c.	Farmers/Farmer groups											
	Businessmen and traders	8	20.0	20	50.0	1	2.5	11	27.5	40	100	2.6
	Consumers	30	27.0	63	56.8	6	5.4	12	10.8	111	100	3.0
	Extension workers	22	36.1	31	51.8	1	1.6	7	11.5	61	100	3.1
	Farmer leaders and community leaders	32	39.0	41	50.0	1	1.2	8	9.8	82*	100	3.2
	Journalists	3	8.6	28	80.0	2	5.7	2	5.7	35	100	2.9
	Policy makers	5	15.2	18	54.5	4	12.1	6	18.2	33	100	2.7
	Religious leaders	10	28.6	15	42.9	1	2.9	9	25.7	35	100	2.6
	Scientists	10	28.6	17	48.6	2	5.7	6	17.1	35	100	2.9
	Total	120	27.8	233	53.9	18	4.2	61	14.1	432	100	

*Some respondents gave no answer

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	8	20.0	19	47.5	1	2.5	12	30.0	40	100	2.6
Consumers	17	15.3	71	64.0	6	5.4	17	15.3	111	100	2.2
Extension workers	15	25.4	28	47.5	0	0	16	27.1	59*	100	2.7
Farmer leaders and community leaders	11	13.3	44	53.0	11	13.3	17	20.5	83	100	2.6
Journalists	0	0	26	74.3	4	11.4	5	14.3	35	100	2.6
Policy makers	2	6.1	23	69.7	2	6.1	6	18.2	33	100	2.6
Religious leaders	3	8.6	21	60.0	0	0	11	31.4	35	100	2.5
Scientists	4	11.4	16	45.7	1	2.9	14	40.0	35	100	2.3
Total	60	13.9	248	57.5	25	5.8	98	22.7	431	100	
e. Newspapers											
1. National Dailies											
Businessmen and traders	11	28.2	21	53.8	0	0	7	17.1	39*	100	2.9
Consumers	35	31.5	65	58.6	2	1.8	9	8.1	111	100	3.1
Extension workers	12	19.7	46	75.4	1	1.6	2	3.3	61	100	3.1
Farmer leaders and community leaders	16	19.3	55	66.3	4	4.8	8	9.6	83	100	3.0
Journalists	8	22.9	19	54.3	4	11.4	4	11.4	35	100	2.9
Policy makers	5	15.2	25	75.8	0	0	3	9.1	33	100	3.0
Religious leaders	13	37.1	21	60.0	0	0	1	2.9	35	100	3.3
Scientists	13	37.1	18	51.4	0	0	4	11.4	35	100	3.1
Total	113	26.2	270	62.5	11	2.5	38	8.8	432	100	
2. Tabloids											
Businessmen and traders	5	14.3	21	60.0	1	2.9	8	22.9	35*	100	2.7
Consumers	24	22.4	63	58.9	10	9.3	10	9.3	107*	100	2.9
Extension workers	14	25.0	37	66.1	2	3.6	3	5.4	56*	100	3.1
Farmer leaders and community leaders	13	17.1	52	68.4	3	3.9	8	10.5	76*	100	2.9
Journalists	6	17.6	21	61.8	3	8.8	4	11.8	34*	100	2.8
Policy makers	2	6.5	21	67.7	2	6.5	6	19.4	31*	100	2.6
Religious leaders	12	41.4	14	48.3	1	3.4	2	6.9	29*	100	3.2
Scientists	7	21.9	20	62.5	0	0	5	15.6	32*	100	2.9
Total	83	20.8	249	62.2	22	5.5	46	11.5	400	100	

*Some respondents gave no answer

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	9	22.5	23	57.5	0	0	8	20.0	40	100	2.8
Consumers	32	28.8	70	63.1	2	1.8	7	6.3	111	100	3.1
Extension workers	16	26.2	37	60.7	1	1.6	7	11.5	61	100	3.0
Farmer leaders and community leaders	22	26.5	48	57.8	5	6.0	8	9.6	83	100	3.0
Journalists	3	8.6	23	65.7	7	20.0	2	5.7	35	100	2.8
Policy makers	4	12.1	27	81.8	1	3.0	1	3.0	33	100	3.5
Religious leaders	10	28.6	18	51.4	1	2.9	6	17.1	35	100	2.9
Scientists	8	22.9	16	45.7	5	14.3	6	17.1	35	100	2.7
Total	104	24.0	262	60.5	22	5.1	45	10.4	433	100	
g. Radio broadcasts											
Businessmen and traders	6	15.0	27	67.5	0	0	7	17.5	40	100	2.8
Consumers	33	30.0	68	31.8	0	0	9	8.2	110*	100	3.1
Extension workers	17	27.9	39	63.9	1	1.6	4	6.6	61	100	3.1
Farmer leaders and community leaders	18	21.7	54	65.1	3	3.6	8	9.6	83	100	3.0
Journalists	5	14.3	25	71.4	1	2.9	4	11.4	35	100	2.9
Policy makers	3	9.1	29	87.9	0	0	1	3.0	33	100	3.0
Religious leaders	13	37.1	19	54.3	0	0	3	8.6	35	100	3.2
Scientists	7	21.2	19	57.6	1	3.0	06	18.2	33*	100	2.8
Total	102	23.7	280	65.1	6	1.4	42	9.8	430	100	
h. Agricultural biotechnology companies (e.g., Aventis, Dupont, Monsanto, Novartis, Syngenta)											
Businessmen and traders	9	23.1	18	46.2	1	2.6	11	28.1	39*	100	2.6
Consumers	40	36.0	53	47.7	10	9.0	8	7.2	111	100	3.1
Extension workers	24	39.3	30	49.2	2	3.3	5	8.2	61	100	3.2
Farmer leaders and community leaders	19	22.9	48	57.8	5	6.0	11	13.3	83	100	2.9
Journalists	4	11.8	17	50.0	10	29.4	3	8.8	34*	100	2.7
Policy makers	4	12.1	25	75.8	1	3.0	3	9.1	33	100	2.9
Religious leaders	10	28.6	19	54.3	2	5.7	4	11.4	35	100	3.0
Scientists	8	24.2	21	63.6	1	3.0	3	9.1	33*	100	3.0
Total	118	27.5	231	53.8	32	7.4	48	11.2	429	100	

*Some respondents gave no answer

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	5	12.8	17	43.6	1	2.6	16	41.0	39*	100	2.3
Consumers	9	8.2	70	63.6	15	13.6	16	14.5	110*	100	2.6
Extension workers	10	16.4	30	49.2	3	4.9	18	29.5	61	100	2.5
Farmer leaders and community leaders	8	9.8	39	47.6	15	18.3	20	24.4	82*	100	2.4
Journalists	2	5.9	16	47.1	11	32.4	5	14.7	34*	100	2.4
Policy makers	0	0	24	72.7	5	15.2	4	12.1	33	100	2.6
Religious leaders	8	22.9	12	34.3	3	8.6	12	34.3	35	100	2.5
Scientists	0	0	17	51.7	6	18.2	10	30.3	33*	100	2.2
Total	42	9.8	225	52.4	59	13.8	101	23.5	427	100	
j. Religious leaders/groups											
Businessmen and traders	12	30.8	17	43.6	1	2.6	16	41.0	39*	100	3.0
Consumers	26	23.4	65	58.6	9	8.1	11	9.9	111	100	2.8
Extension workers	21	34.4	26	42.6	4	6.6	10	16.4	61	100	3.0
Farmer leaders and community leaders	20	24.4	27	32.9	13	15.9	22	26.8	82*	100	2.5
Journalists	3	8.8	21	61.8	6	17.6	4	11.8	34*	100	2.7
Policy makers	5	15.2	17	51.5	4	12.1	7	21.2	33	100	2.6
Religious leaders	12	35.3	15	44.1	1	2.9	6	17.6	34*	100	2.8
Scientists	2	6.1	23	69.7	3	9.1	5	15.2	33*	100	
Total											
k. Science magazines or newsletters											
Businessmen and traders	12	30.8	24	61.5	0	0	3	7.7	39*	100	3.2
Consumers	63	57.3	44	40.0	1	0.9	2	1.8	110*	100	3.5
Extension workers	32	52.5	29	47.5	0	0	0	0	61	100	3.5
Farmer leaders and community leaders	39	47.6	36	43.9	3	3.7	4	4.9	82*	100	3.3
Journalists	10	29.4	18	52.9	2	5.9	4	11.8	34*	100	3.0
Policy makers	15	45.5	18	54.5	0	0	0	0	33	100	3.4
Religious leaders	21	60.0	12	34.3	2	5.7	0	0	35	100	3.5
Scientists	18	54.5	12	36.4	2	6.1	1	3.0	33*	100	3.4
Total	210	49.2	193	45.2	10	2.3	14	3.3	427	100	

*Some respondents gave no answer

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	14	35.9	20	51.3	0	0	5	12.8	39*	100	3.1
	Consumers	38	34.2	66	59.5	1	0.9	6	5.4	111	100	3.2
	Extension workers	25	41.0	34	55.7	0	0	2	3.3	61	100	3.3
	Farmer leaders and community leaders	30	36.6	42	51.2	3	3.7	7	8.5	82*	100	3.2
	Journalists	7	20.6	21	61.8	3	8.8	3	8.8	34*	100	2.9
	Policy makers	8	24.2	24	72.7	0	0	1	3.0	33	100	3.2
	Religious leaders	15	42.9	16	45.7	0	0	4	11.4	35	100	3.2
	Scientists	9	27.3	20	60.6	1	3.0	3	9.1	33*	100	3.1
	Total	146	34.1	243	56.8	8	1.9	31	7.2	428	100	
m.	University-based scientists											
	Businessmen and traders	22	56.4	14	35.9	0	0	3	7.7	39*	100	3.4
	Consumers	67	60.4	41	36.9	0	0	3	2.7	111	100	3.5
	Extension workers	45	73.8	14	23.0	0	0	2	3.3	61	100	3.7
	Farmer leaders and community leaders	41	51.2	35	43.8	2	2.5	2	2.5	80*	100	3.4
	Journalists	18	52.9	15	44.1	1	2.9	0	0	34*	100	3.5
	Policy makers	16	48.5	15	45.5	1	3.0	1	3.0	33	100	3.4
	Religious leaders	22	62.9	11	31.4	1	2.9	1	2.9	35	100	3.5
	Scientists	20	60.6	11	33.3	1	3.0	1	3.0	33*	100	3.5
	Total	251	59.0	156	36.6	6	1.4	13	3.0	426	100	
n.	Web sites on biotechnology											
	Businessmen and traders	6	15.8	22	57.9	0	0	10	26.3	38*	100	2.6
	Consumers	38	34.2	58	52.3	1	0.9	14	12.6	111	100	3.1
	Extension workers	29	47.5	19	31.1	0	0	13	21.3	61	100	3.0
	Farmer leaders and community leaders	23	28.0	34	41.5	2	2.4	23	28.0	82*	100	2.7
	Journalists	5	14.7	26	76.5	1	2.9	2	5.9	34*	100	3.0
	Policy makers	11	33.3	20	60.6	0	0	2	6.1	33	100	3.2
	Religious leaders	14	40.0	13	37.1	0	0	8	22.9	35	100	2.9
	Scientists	13	39.4	17	51.5	1	3.0	2	6.1	33*	100	3.2
	Total	139	32.6	209	48.9	5	1.2	74	17.3	427	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	20	52.6	17	44.7	1	2.6	38*	100	2.5
Consumers	51	45.9	59	53.2	1	0.9	111	100	2.4
Extension workers	40	65.6	17	27.9	4	6.6	61	100	2.6
Farmer leaders and community leaders	51	62.2	19	23.2	12	14.6	82*	100	2.5
Journalists	12	35.3	21	61.8	1	2.9	34*	100	2.3
Policy makers	16	48.5	16	48.5	1	3.0	33	100	2.4
Religious leaders	22	62.9	9	25.7	4	11.4	35	100	2.5
Scientists	17	51.5	16	48.5	0	0	33*	100	2.5
TOTAL	**229**	**53.6**	**174**	**40.7**	**24**	**5.6**	**427**	**100**	

*Some respondents gave no answer

Appendix Table 11. Stakeholders' perceptions 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	33.3	23	59.0	3	7.7	39*	100	2.6
Consumers	51	45.9	60	54.1	0	0	111	100	2.4
Extension workers	41	67.2	20	32.8	0	0	61	100	2.7
Farmer leaders and community leaders	55	67.1	27	32.9	0	0	83	100	2.6
Journalists	10	28.6	25	71.4	0	0	35	100	2.3
Policy makers	14	42.4	19	57.6	0	0	33	100	2.4
Religious leaders	20	57.1	14	40.0	1	2.9	35	100	2.5
Scientists	13	39.4	17	51.5	3	9.1	33*	100	2.3
TOTAL	**217**	**50.6**	**205**	**47.8**	**7**	**1.6**	**429**	**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	1	2.5	25	62.5	14	35.0	40	100	1.7
Consumers	6	5.4	65	58.6	40	36.0	111	100	1.7
Extension workers	2	3.3	38	62.3	21	34.4	61	100	1.7
Farmer leaders and community leaders	5	6.0	40	48.2	38	45.8	83	100	1.6
Journalists	3	8.6	27	77.1	5	14.3	35	100	1.9
Policy makers	6	18.2	23	69.7	4	12.1	33	100	1.9
Religious leaders	3	8.6	12	34.3	20	57.1	35	100	1.5
Scientists	8	22.9	25	71.4	2	5.7	35	100	2.2
TOTAL	**34**	**7.8**	**255**	**58.9**	**144**	**33.3**	**433**	**100**	

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	8	20.0	29	72.5	3	7.5	40	100	2.1
Consumers	9	8.1	84	75.7	18	16.2	111	100	1.9
Extension workers	7	11.5	48	78.7	6	9.8	61	100	2.0
Farmer leaders and community leaders	9	10.8	52	62.7	22	26.5	83	100	1.8
Journalists	1	2.9	30	85.7	4	11.4	35	100	1.9
Policy makers	3	9.1	29	87.9	1	3.0	33	100	1.9
Religious leaders	1	2.9	18	51.4	16	45.7	35	100	1.6
Scientists	4	11.4	20	57.1	11	31.4	35	100	2.2
TOTAL	**42**	**9.7**	**310**	**71.6**	**81**	**18.7**	**433**	**100**	

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	29	72.5	3	7.5	8	20.0	40	100
Consumers	84	75.7	13	11.7	14	12.6	111	100
Extension workers	54	88.5	7	11.5	0	0	61	100
Farmer leaders and community leaders	55	66.3	15	18.1	13	15.7	83	100
Journalists	25	71.4	5	14.3	5	14.3	35	100
Policy makers	22	66.7	8	24.2	3	9.1	33	100
Religious leaders	19	54.3	7	20.0	9	25.7	35	100
Scientists	27	77.1	2	5.7	6	17.1	35	100
Total	315	72.7	60	13.9	58	13.4	433	100
b. Yeast for brewing consists of living organisms.								
Businessmen and traders	25	62.5	12	30.0	3	7.5	40	100
Consumers	92	83.6	7	6.4	11	10.0	110*	100
Extension workers	61	100.0	0	0	0	0	61	100
Farmer leaders and community leaders	65	78.3	11	13.3	7	8.4	83	100
Journalists	29	82.9	3	8.6	3	8.6	35	100
Policy makers	23	69.7	9	27.3	1	3.0	33	100
Religious leaders	22	62.9	8	22.9	5	14.3	35	100
Scientists	29	82.9	1	2.9	5	14.3	35	100
Total	346	80.1	51	11.8	35	8.1	432	100
c. Ordinary tomatoes do not contain genes, while genetically modified tomatoes do.								
Businessmen and traders	7	17.5	23	57.5	10	25.0	40	100
Consumers	22	20.4	63	58.3	23	21.3	108*	100
Extension workers	13	21.3	43	70.5	5	8.2	61	100
Farmer leaders and community leaders	25	30.1	22	26.5	36	43.4	83	100
Journalists	12	34.3	16	45.7	7	20.0	35	100
Policy makers	6	18.2	15	45.5	12	36.4	33	100
Religious leaders	6	17.1	16	45.7	13	37.1	35	100
Scientists	10	29.4	21	61.8	3	8.8	34*	100
Total	101	23.5	219	51.1	109	25.4	429	100

*Some respondents gave no answer

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	36	90.0	1	2.5	3	7.5	40	100
Consumers	88	79.3	10	9.0	13	11.7	111	100
Extension workers	43	71.7	10	16.7	7	11.7	60*	100
Farmer leaders and community leaders	61	73.5	6	7.2	16	19.3	83	100
Journalists	30	90.9	2	6.1	1	3.0	33*	100
Policy makers	23	71.9	6	18.8	3	9.4	32*	100
Religious leaders	26	74.3	3	8.6	6	17.1	35	100
Scientists	29	82.9	4	11.4	2	5.7	35	100
Total	336	78.3	42	9.8	51	11.9	429	100
e. In genetic engineering, genes of interest are transferred from one organism to another.								
Businessmen and traders	27	67.5	4	10.0	9	22.5	40	100
Consumers	84	75.7	9	8.1	18	16.2	111	100
Extension workers	51	83.6	4	6.6	6	9.8	61	100
Farmer leaders and community leaders	54	65.1	5	6.0	24	28.9	83	100
Journalists	26	74.3	1	2.9	8	22.9	35	100
Policy makers	25	75.8	5	15.2	3	9.1	33	100
Religious leaders	20	57.1	6	17.1	9	25.7	35	100
Scientists	31	88.6	0	0	4	11.4	35	100
Total	318	73.4	34	7.9	81	18.7	433	100
f. Golden Rice (genetically modified rice) contains beta-carotene.								
Businessmen and traders	15	37.5	1	2.5	24	60.0	40	100
Consumers	39	35.1	6	5.4	66	59.5	111	100
Extension workers	26	42.6	4	6.6	31	50.8	61	100
Farmer leaders and community leaders	29	34.9	3	3.6	51	61.4	83	100
Journalists	13	37.1	1	2.9	21	60.0	35	100
Policy makers	16	48.5	1	3.0	16	48.5	33	100
Religious leaders	8	22.9	2	5.7	25	71.4	35	100
Scientists	22	62.9	1	2.9	12	34.3	35	100
Total	168	38.8	19	4.4	246	56.8	433	100

*Some respondents gave no answer

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	18	45.0	5	12.5	17	42.5	40	100
Consumers	47	42.3	26	23.4	38	34.2	111	100
Extension workers	23	38.3	15	25.0	22	36.7	60*	100
Farmer leaders and community leaders	29	35.4	25	30.5	28	34.1	82*	100
Journalists	17	48.6	9	25.7	9	25.7	35	100
Policy makers	16	48.5	6	18.2	11	33.3	33	100
Religious leaders	11	31.4	12	34.3	12	34.3	35	100
Scientists	17	48.6	11	31.4	7	20.0	35	100
Total	178	41.3	109	25.3	144	33.4	431	100
h. Science can guarantee zero-risk.								
Businessmen and traders	4	10.0	31	77.5	5	12.5	40	100
Consumers	17	15.3	77	69.4	17	15.3	111	100
Extension workers	7	11.5	45	73.8	9	14.8	61	100
Farmer leaders and community leaders	12	14.5	50	60.2	21	25.3	83	100
Journalists	2	5.7	31	88.6	2	5.7	35	100
Policy makers	2	6.1	29	87.9	2	6.1	33	100
Religious leaders	0	0	29	82.9	6	17.1	35	100
Scientists	4	11.4	28	80.0	3	8.6	35	100
Total	48	11.1	320	73.9	65	15.0	433	100
i. By eating genetically-modified corn, a person's genes could also be modified.								
Businessmen and traders	8	20.5	15	38.5	16	41.0	39*	100
Consumers	30	27.0	43	38.7	38	34.2	111	100
Extension workers	5	8.3	37	61.7	18	30.0	60*	100
Farmer leaders and community leaders	27	32.5	22	26.5	34	41.0	83	100
Journalists	9	25.7	10	28.6	16	45.7	35	100
Policy makers	12	36.4	14	42.4	7	21.2	33	100
Religious leaders	5	14.3	15	42.9	15	42.9	35	100
Scientists	4	11.4	21	60.0	10	28.6	35	100
Total	100	23.2	177	41.1	154	35.7	431	100

*Some respondents gave no answer

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 Indonesia.								
	Businessmen and traders	30	75.0	1	2.5	9	22.5	40	100
	Consumers	77	69.4	7	6.3	27	24.3	111	100
	Extension workers	37	61.7	3	5.0	20	33.3	60*	100
	Farmer leaders and community leaders	49	59.0	3	3.6	31	37.3	83	100
	Journalists	26	76.5	4	11.8	4	11.8	34*	100
	Policy makers	24	72.7	2	6.1	7	21.2	33	100
	Religious leaders	20	58.8	2	5.9	12	35.3	34*	100
	Scientists	25	71.4	4	11.4	6	17.1	35	100
	Total	288	67.0	26	6.0	116	27.0	430	100
k.	Genetically modified crops are now being commercially grown in the Indonesia.								
	Businessmen and traders	27	67.5	2	5.0	11	27.5	40	100
	Consumers	71	64.0	9	8.1	31	27.9	111	100
	Extension workers	39	63.9	6	9.8	16	26.2	61	100
	Farmer leaders and community leaders	56	67.5	1	1.2	26	31.3	83	100
	Journalists	25	75.4	1	2.9	9	25.7	35	100
	Policy makers	27	81.8	1	3.0	5	15.2	33	100
	Religious leaders	11	31.4	3	8.6	21	60.0	35	100
	Scientists	26	74.3	4	11.4	5	14.3	35	100
	Total	282	65.1	27	6.2	124	28.7	433	100
l.	Plant viruses infect vegetables and fruits.								
	Businessmen and traders	35	87.5	3	7.5	2	5.0	40	100
	Consumers	74	66.7	14	12.6	23	20.7	111	100
	Extension workers	51	83.6	7	11.5	3	4.9	61	100
	Farmer leaders and community leaders	66	79.5	3	3.6	14	16.9	83	100
	Journalists	23	67.6	5	14.7	6	17.6	34*	100
	Policy makers	29	87.9	2	6.1	2	6.1	33	100
	Religious leaders	10	28.6	13	37.1	12	34.3	35	100
	Scientists	6	17.1	21	60.0	8	22.9	35	100
	Total	294	68.1	68	15.7	70	16.2	432	100

*Some respondents gave no answer

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	9	22.5	22	55.0	9	22.5	40	100
	Consumers	27	24.3	50	45.0	34	30.6	111	100
	Extension workers	15	24.6	40	65.6	6	9.8	61	100
	Farmer leaders and community leaders	25	30.1	30	36.1	28	33.7	83	100
	Journalists	15	42.9	9	25.7	11	31.4	35	100
	Policy makers	7	21.2	19	57.6	7	21.2	33	100
	Religious leaders	10	28.6	13	37.1	12	34.3	35	100
	Scientists	6	17.1	21	60.0	8	22.9	35	100
	Total	114	26.3	204	47.1	115	26.6	433	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 responses
		n	n	n	n	n	n	n
a.	Tomato resistant to tomato virus diseases							
	Businessmen and traders	21	23	4	5	5	0	58
	Consumers	40	58	10	15	12	0	135
	Extension workers	28	30	7	16	2	0	83
	Farmer leaders and community leaders	42	27	6	10	24	0	109
	Journalists	13	17	5	5	2	0	42
	Policy makers	18	15	7	7	4	0	51
	Religious leaders	15	22	2	2	7	0	48
	Scientists	6	12	3	14	0	0	35
	Total	183	204	44	74	56	0	561
b.	Papaya resistant to papaya virus disease							
	Businessmen and traders	21	25	4	5	5	0	60
	Consumers	42	53	11	16	16	0	138
	Extension workers	34	31	11	16	1	0	93
	Farmer leaders and community leaders	34	21	6	8	21	0	90
	Journalists	15	14	4	8	1	0	42
	Policy makers	18	15	0	4	4	0	41
	Religious leaders	17	23	2	3	5	0	50
	Scientists	3	9	13	8	0	0	33
	Total	184	191	51	68	53	0	547
c.	Eggplant resistant to borer insect infestation							
	Businessmen and traders	18	27	2	2	5	0	54
	Consumers	42	41	11	11	24	0	129
	Extension workers	32	29	5	10	7	0	83
	Farmer leaders and community leaders	36	21	10	5	27	0	99

*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 Responses
	n	n	n	n	n	n	n
c. Eggplant resistant to borer insect infestation							
Journalists	14	13	6	6	2	0	41
Policy makers	19	14	0	10	7	0	50
Religious leaders	15	23	3	3	7	0	51
Scientists	10	11	8	8	0	0	37
Total	186	179	45	55	79	0	544
d. Corn tolerant to herbicide							
Businessmen and traders	18	19	12	6	5	0	60
Consumers	30	43	23	20	20	0	136
Extension workers	35	16	22	11	1	0	85
Farmer leaders and community leaders	41	13	18	8	24	0	104
Journalists	11	13	9	10	2	0	45
Policy makers	16	12	9	6	7	0	50
Religious leaders	12	21	4	6	8	0	51
Scientists	17	10	4	4	0	0	35
Total	180	147	101	71	67	0	566
e. Corn resistant to borer insect infestation							
Businessmen and traders	22	15	8	6	4	0	55
Consumers	33	48	27	16	16	0	140
Extension workers	34	19	22	11	3	0	89
Farmer leaders and community leaders	43	20	13	8	22	0	106
Journalists	13	14	8	9	1	0	45
Policy makers	13	16	9	1	9	0	48
Religious leaders	15	22	4	4	5	0	50
Scientists	13	7	7	6	3	0	36
Total	186	161	98	61	63	0	569

*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 Responses
	n	n	n	n	n	n	n
f. Rice resistant to blight disease							
Businessmen and traders	23	21	4	5	5	0	58
Consumers	33	51	17	8	20	0	129
Extension workers	14	29	7	12	2	0	64
Farmer leaders and community leaders	44	25	11	7	19	0	106
Journalists	13	15	5	5	3	0	41
Policy makers	18	17	1	2	5	0	43
Religious leaders	15	20	2	5	7	0	49
Scientists	12	4	10	9	0	0	35
Total	172	182	57	53	61	0	525
g. Rice with more Vitamin A							
Businessmen and traders	20	24	4	4	3	0	55
Consumers	30	66	9	16	16	0	137
Extension workers	29	36	8	12	1	0	86
Farmer leaders and community leaders	41	25	6	9	24	0	105
Journalists	13	16	5	7	1	0	42
Policy makers	16	21	0	1	3	0	41
Religious leaders	14	27	1	2	4	0	48
Scientists	11	8	8	3	4	0	34
Total	174	223	41	54	56	0	548
h. Papaya that takes longer to ripen							
Businessmen and traders	14	13	4	5	12	0	48
Consumers	30	47	10	20	19	0	126
Extension workers	29	14	9	20	4	0	76
Farmer leaders and community leaders	37	13	7	15	28	0	100
Journalists	10	12	5	7	3	0	37

*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 Responses
	n	n	n	n	n	n	n
h. Papaya that takes longer to ripen							
Policy makers	15	13	4	6	9	0	47
Religious leaders	13	20	2	5	7	0	47
Scientists	16	5	5	9	1	0	36
Total	164	137	46	87	83	0	517
i. Cotton resistant to insect infestation							
Businessmen and traders	15	6	4	14	9	0	48
Consumers	26	20	11	33	24	0	114
Extension workers	26	6	9	25	10	0	76
Farmer leaders and community leaders	37	8	10	17	25	0	97
Journalists	12	3	5	9	8	0	37
Policy makers	16	9	2	9	6	0	42
Religious leaders	12	10	3	13	9	0	47
Scientists	9	22	2	2	0	0	35
Total	153	84	46	122	91	0	496

*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	21	53.8	5	12.8	3	7.7	2	5.1	8	20.5	39*	100	3.4
Consumers	34	31.2	18	16.5	10	9.2	42	38.5	5	4.6	109*	100	2.4
Extension workers	37	60.7	17	27.9	3	4.9	2	3.3	2	3.3	61	100	3.5
Farmer leaders and community leaders	46	57.5	18	22.5	6	7.5	2	2.5	8	10.0	80*	100	3.5
Journalists	27	79.4	5	14.7	0	0	0	0	2	5.9	34*	100	3.8
Policy makers	14	42.4	11	33.3	1	3.0	2	6.1	5	15.2	33	100	3.3
Religious leaders	19	55.9	7	20.6	1	2.9	2	5.9	5	14.7	34*	100	3.5
Scientists	2	5.7	3	8.6	17	48.6	5	14.3	8	22.9	35	100	2.0
Total	200	47.1	84	19.8	41	9.6	57	13.4	43	10.1	425	100	
b. Non-poisonous													
Businessmen and traders	31	77.5	0	0	1	2.5	7	17.5	1	2.5	40	100	3.4
Consumers	38	34.9	17	15.6	2	1.8	52	47.7	0	0	109*	100	2.4
Extension workers	45	73.8	8	13.1	1	1.6	7	11.5	0	0	61	100	3.5
Farmer leaders and community leaders	56	71.8	14	17.9	3	3.8	3	3.8	2	2.6	78*	100	3.6
Journalists	28	80.0	4	11.4	1	2.9	1	2.9	1	2.9	35	100	3.7
Policy makers	24	72.7	4	12.1	1	3.0	2	6.1	2	6.1	33	100	3.6
Religious leaders	22	62.9	8	22.9	0	0	3	8.6	2	5.7	35	100	3.4
Scientists	15	42.9	19	54.3	1	2.9	0	0	0	0	35	100	3.4
Total	259	60.8	74	17.4	10	2.3	75	17.6	8	1.9	426	100	
c. Price													
Businessmen and traders	16	41.0	14	35.9	7	17.9	1	2.6	1	2.6	39*	100	3.2
Consumers	25	23.1	32	29.6	32	29.6	19	17.6	0	0	108*	100	2.6
Extension workers	25	41.0	24	39.3	12	19.7	0	0	0	0	61	100	3.2
Farmer leaders and community leaders	46	57.5	30	37.5	4	5.0	0	0	0	0	80*	100	3.5
Journalists	20	58.8	11	32.4	2	5.9	0	0	1	2.9	34*	100	3.5
Policy makers	13	40.6	17	53.1	2	6.3	0	0	0	0	32*	100	3.3
Religious leaders	18	51.4	15	42.9	2	5.7	0	0	0	0	35	100	3.2
Scientists	17	48.6	18	51.4	-	-	0	0	0	0	35	100	3.5
Total	180	42.4	161	38.0	61	14.4	20	4.7	2	0.5	424	100	

*Some respondents gave no answer

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	15	39.5	14	36.8	8	21.1	0	0	1	2.6	38*	100	3.2
Consumers	24	22.0	34	31.2	30	27.5	21	19.3	0	0	109*	100	2.6
Extension workers	27	46.6	24	41.4	5	8.6	2	3.4	0	0	58*	100	3.3
Farmer leaders and community leaders	37	47.4	32	41.0	7	9.0	1	1.3	1	1.3	78*	100	3.4
Journalists	20	58.8	9	26.5	3	8.8	1	2.9	1	2.9	34*	100	3.5
Policy makers	11	36.7	13	43.3	6	20.0	0	0	0	0	30*	100	3.2
Religious leaders	11	32.4	17	50.0	6	17.6	0	0	0	0	34*	100	3.1
Scientists	5	14.3	10	28.6	9	25.7	8	22.9	3	8.6	35	100	2.3
Total	150	36.1	153	36.8	74	17.8	33	7.9	6	1.4	416	100	
e. Nutritional quality													
Businessmen and traders	34	85.0	4	10.0	0	0	1	2.5	1	2.5	40	100	3.8
Consumers	32	29.4	20	18.3	11	10.1	45	41.3	0	0	108*	100	2.4
Extension workers	40	65.6	19	31.1	1	1.6	1	1.6	0	0	61	100	3.9
Farmer leaders and community leaders	55	68.8	22	27.5	3	3.8	0	0	0	0	80*	100	3.6
Journalists	31	88.6	3	8.6	0	0	0	0	1	2.9	35	100	3.9
Policy makers	22	66.7	11	33.3	0	0	0	0	0	0	33	100	3.7
Religious leaders	26	74.3	7	20.0	2	5.7	0	0	0	0	35	100	3.7
Scientists	18	51.4	10	28.6	7	20.0	0	0	0	0	35	100	3.3
Total	258	60.4	96	22.5	24	5.6	47	11.0	2	0.5	427	100	
f. Better taste													
Businessmen and traders	27	67.5	10	25.0	0	0	1	2.5	2	5.0	40	100	3.7
Consumers	28	25.9	25	23.1	24	22.2	31	28.7	0	0	108*	100	2.5
Extension workers	33	54.1	24	39.3	3	4.9	1	1.6	0	0	61	100	3.4
Farmer leaders and community leaders	49	61.3	26	32.5	4	5.0	0	0	1	1.3	80*	100	3.6
Journalists	23	65.7	11	31.4	0	0	0	0	1	2.9	35	100	3.7
Policy makers	12	36.4	20	60.6	1	3.0	0	0	0	0	33	100	3.3
Religious leaders	15	44.1	15	44.1	4	11.8	0	0	0	0	34*	100	3.3
Scientists	0	0	5	14.3	30	85.7	0	0	0	0	35	100	2.1
Total	187	43.9	136	31.9	66	15.5	33	7.7	4	1.0	426	100	

*Some respondents gave no answer

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	%	
g. Pesticide residue content													
Businessmen and traders	25	62.5	8	20.0	1	2.5	3	7.5	3	7.5	40	100	3.4
Consumers	34	31.2	17	15.6	7	6.4	49	45.0	2	1.8	109*	100	2.3
Extension workers	40	65.6	14	23.0	1	1.6	6	9.8	0	0	61	100	3.4
Farmer leaders and community leaders	52	65.0	18	22.5	5	6.3	3	3.8	2	2.5	80*	100	3.5
Journalists	27	77.1	4	11.4	1	2.9	0	0	3	8.6	35	100	3.8
Policy makers	16	48.5	10	30.3	5	15.2	1	3.0	1	3.0	33	100	3.3
Religious leaders	23	65.7	7	20.0	2	5.7	3	8.6	0	0	35	100	3.4
Scientists	5	14.3	17	48.6	13	37.1	0	0	0	0	35	100	2.8
Total	222	51.9	95	22.2	35	8.2	65	15.2	11	2.5	428	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	4	10.0	15	37.5	5	12.5	16	40.0	40	100	2.0
Consumers	7	06.4	56	51.4	7	6.4	39	35.8	109*	100	2.0
Extension workers	2	03.3	23	37.7	10	16.2	26	42.6	61	100	1.8
Farmer leaders and community leaders	16	19.5	19	23.2	16	19.5	31	37.8	82*	100	2.0
Journalists	4	11.8	14	41.2	5	14.7	11	32.4	34*	100	2.0
Policy makers	1	03.0	16	48.5	10	30.3	6	18.2	33	100	1.7
Religious leaders	4	11.8	13	38.2	4	11.8	13	38.2	34*	100	2.0
Scientists	3	17.1	12	34.3	6	8.6	14	40.0	35	100	1.9
TOTAL	**41**	**09.6**	**168**	**39.3**	**63**	**14.7**	**156**	**36.4**	**428**	**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	15	38.5	15	38.5	2	5.1	7	17.9	39*	100	2.4
Consumers	38	34.9	34	31.2	7	6.4	30	27.5	109*	100	2.4
Extension workers	33	54.1	11	18.0	2	3.3	15	24.6	61	100	2.7
Farmer leaders and community leaders	36	43.4	11	13.3	12	14.5	24	28.9	83	100	2.4
Journalists	12	35.3	11	32.4	3	8.8	8	23.5	34*	100	2.3
Policy makers	15	46.9	14	43.8	0	0	3	9.4	32*	100	2.5
Religious leaders	15	46.9	6	18.8	1	3.1	10	31.3	32*	100	2.6
Scientists	13	39.4	9	27.3	3	9.1	8	24.2	33*	100	2.4
TOTAL	**177**	**41.9**	**111**	**26.2**	**30**	**7.1**	**105**	**24.8**	**423**	**100**	

*Some respondents gave no answer

Appendix Table 19. Perceptions 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	26	65.0	13	32.5	0	0	0	0	1	2.5	40	100	3.7
	Consumers	55	49.5	43	38.7	9	8.1	2	1.8	2	1.8	111	100	3.4
	Extension workers	41	67.2	16	26.2	4	6.6	0	0	0	0	61	100	3.6
	Farmer leaders and community leaders	46	55.4	30	36.1	5	6.0	0	0	2	2.4	83	100	3.5
	Journalists	15	42.9	16	45.7	3	8.6	1	2.9	0	0	35	100	3.3
	Policy makers	15	49.5	13	39.4	5	15.2	0	0	0	0	33	100	3.3
	Religious leaders	26	74.3	9	25.7	0	0	0	0	0	0	35	100	3.7
	Scientists	16	45.7	15	42.9	3	8.6	1	2.9	0	0	35	100	3.0
	Total	240	55.4	155	35.8	29	6.7	4	0.9	5	1.2	433	100	
b.	Biotechnology in food production only benefits large agricultural companies.													
	Businessmen and traders	5	12.5	7	17.5	22	55.0	4	10.0	2	5.0	40	100	2.3
	Consumers	17	15.5	33	30.0	46	41.8	4	3.6	10	9.1	110*	100	2.6
	Extension workers	3	4.9	14	23.0	36	59.0	7	11.5	1	1.6	61	100	2.2
	Farmer leaders and community leaders	13	15.7	13	15.7	31	37.3	6	7.2	20	24.1	83	100	2.5
	Journalists	8	22.9	11	31.4	14	40.0	1	2.9	1	2.9	35	100	2.8
	Policy makers	1	3.0	11	33.3	18	54.5	1	3.0	2	6.1	33	100	2.4
	Religious leaders	0	0	7	20.0	16	45.7	2	5.7	10	28.6	35	100	2.2
	Scientists	5	14.3	9	25.7	18	51.4	1	2.9	2	5.7	35	100	2.5
	Total	52	12.0	105	24.3	201	46.6	26	6.0	48	11.1	432	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	6	15.0	17	42.5	4	10.0	0	0	13	32.5	40	100	3.1
	Consumers	19	17.1	52	46.8	19	17.1	1	0.9	20	18.0	111	100	3.0
	Extension workers	19	31.1	27	44.3	9	14.8	0	0	6	9.8	61	100	3.2
	Farmer leaders and community leaders	20	24.4	44	53.7	13	15.9	1	1.2	4	4.9	82*	100	3.1
	Journalists	8	22.9	11	31.4	14	40.0	2	5.7	0	0	35	100	2.7

*Some respondents gave no answer

Appendix Table 19. (continued) Perceptions 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	8	24.2	15	45.5	7	21.2	2	6.1	1	3.0	33	100	2.6
	Religious leaders	7	20.0	19	54.3	2	5.7	7	20.0	0	0	35	100	2.7
	Scientists	2	5.7	13	37.1	17	48.6	1	2.9	2	5.7	35	100	2.5
	Total	89	20.6	198	45.8	85	19.7	14	3.2	46	10.7	432	100	
d.	Vital information about the health effects of genetically modified foods is being held back.													
	Businessmen and traders	3	7.5	2	5.0	22	55.0	6	15.0	7	17.5	40	100	2.1
	Consumers	11	9.9	24	21.6	45	40.5	12	10.8	19	17.1	111	100	2.4
	Extension workers	1	1.6	5	8.2	39	63.9	14	23.0	2	3.3	61	100	1.9
	Farmer leaders and community leaders	6	7.2	13	15.7	32	38.6	12	14.5	20	24.1	83	100	2.2
	Journalists	8	22.9	5	14.3	11	31.4	4	11.4	7	20.0	35	100	2.6
	Policy makers	0	0	11	33.3	20	60.6	1	3.0	1	3.0	33	100	2.3
	Religious leaders	0	0	3	8.6	12	34.3	9	25.7	11	31.4	35	100	1.8
	Scientists	0	0	6	17.6	19	55.9	2	5.9	7	20.6	34*	100	2.1
	Total	29	6.7	69	16.0	200	46.3	60	13.9	74	17.1	432	100	
e.	The risks of genetic engineering have been greatly exaggerated.													
	Businessmen and traders	1	2.5	7	17.5	17	42.5	2	5.0	13	32.5	40	100	2.2
	Consumers	7	6.3	41	36.9	34	30.6	10	9.0	19	17.1	111	100	2.5
	Extension workers	2	3.3	26	42.6	24	39.3	6	9.8	3	4.9	61	100	2.4
	Farmer leaders and community leaders	5	6.0	14	16.9	35	42.2	2	2.4	27	32.5	83	100	2.4
	Journalists	5	14.3	5	14.3	16	45.7	3	8.6	6	17.1	35	100	2.4
	Policy makers	0	0	10	30.3	16	48.5	1	3.0	6	18.2	33	100	2.3
	Religious leaders	1	2.9	8	22.9	11	31.4	2	5.7	13	37.1	35	100	2.4
	Scientists	2	5.7	13	37.1	12	34.3	1	2.9	7	20.0	35	100	2.6
	Total	23	5.3	124	28.6	165	38.1	27	6.2	94	21.8	433	100	

*Some respondents gave no answer

Appendix Table 19. (continued) Perceptions 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 Indonesian agriculture.													
Businessmen and traders	10	25.0	21	52.5	4	10.0	0	0	5	12.5	40	100	3.2
Consumers	24	21.8	51	46.4	20	18.2	1	0.9	14	12.7	110*	100	3.0
Extension workers	16	26.2	34	55.7	9	14.8	2	3.3	0	0	61	100	3.0
Farmer leaders and community leaders	14	16.9	34	41.0	14	16.9	2	2.4	19	22.9	83	100	2.9
Journalists	8	22.9	9	25.7	9	25.7	1	2.9	8	22.9	35	100	3.1
Policy makers	7	21.9	17	53.1	4	12.5	1	3.1	3	9.4	32*	100	3.0
Religious leaders	7	20.0	18	51.4	2	5.7	8	22.9	0	0	35	100	2.7
Scientists	3	8.6	23	65.7	3	8.6	0	0	6	17.1	35	100	3.0
Total	89	20.6	207	48.0	65	15.1	15	3.5	55	12.8	431	100	
g. Expert statements on biotechnology are based on scientific analyses and are, therefore, objective.													
Businessmen and traders	5	12.5	24	60.0	4	10.0	0	0	7	17.5	40	100	3.6
Consumers	20	18.0	58	52.3	15	13.5	4	3.6	14	12.6	111	100	3.0
Extension workers	14	23.0	34	55.7	9	14.8	3	4.9	1	1.6	61	100	3.0
Farmer leaders and community leaders	10	12.0	45	54.2	10	12.0	4	4.8	14	16.9	83	100	2.9
Journalists	8	22.9	20	57.1	2	5.7	1	2.9	4	11.4	35	100	3.1
Policy makers	9	27.3	19	57.6	4	12.1	0	0	1	3.0	33	100	3.2
Religious leaders	7	20.0	18	51.4	3	8.6	2	5.7	5	14.3	35	100	3.0
Scientists	6	17.1	23	65.7	4	11.4	0	0	2	5.7	35	100	3.1
Total	79	18.2	241	55.7	51	11.8	14	3.2	48	11.1	433	100	
h. Current regulations in the Indonesia are sufficient to protect people from any risks linked to modern biotechnology.													
Businessmen and traders	2	5.0	8	20.0	13	32.5	3	7.5	14	35.0	40	100	2.3
Consumers	8	7.2	27	24.3	51	45.9	7	6.3	18	16.2	111	100	2.4
Extension workers	5	8.2	23	37.7	22	36.1	7	11.5	4	6.6	61	100	2.5
Farmer leaders and community leaders	8	9.6	20	24.1	31	37.3	5	6.0	19	22.9	83	100	3.3
Journalists	6	17.1	3	8.6	15	42.9	4	11.4	7	20.0	35	100	2.4
Policy makers	3	9.1	9	27.3	13	39.4	3	9.1	5	15.2	33	100	2.4
Religious leaders	3	8.6	7	20.0	13	37.1	2	5.7	10	28.6	35	100	2.4

*Some respondents gave no answer

Appendix Table 19. (continued) Perceptions of agricultural biotechnology

Statement	Strongly Agree		Agree		Disagree		Strongly Disagree		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
i. Current regulations in the Indonesia are sufficient to protect people from any risks linked to modern biotechnology.													
Scientists	0	0	5	14.3	24	68.6	1	2.9	5	14.3	35	100	2.1
Total	35	8.1	102	23.6	182	42.0	32	7.4	82	18.9	433	100	
j. Regulations on biotechnology should include inputs from the non-government sector.													
Businessmen and traders	17	42.5	17	42.5	2	5.0	0	0	4	10.0	40	100	3.4
Consumers	39	35.1	53	47.7	11	9.9	4	3.6	4	3.6	111	100	3.2
Extension workers	22	36.1	33	54.1	4	6.6	1	1.6	1	1.6	61	100	3.3
Farmer leaders and community leaders	27	32.5	48	57.8	1	1.2	1	1.2	6	7.2	83	100	3.3
Journalists	19	54.3	13	37.1	2	5.7	0	0	1	2.9	35	100	3.5
Policy makers	10	30.3	20	60.6	1	3.0	1	3.0	1	3.0	33	100	3.2
Religious leaders	12	34.3	18	51.4	4	11.4	1	2.9	0	0	35	100	3.2
Scientists	18	51.4	14	40.0	3	8.6	0	0	0	0	35	100	3.4
Total	164	37.9	216	50.0	28	6.4	8	1.8	17	3.9	433	100	
k. 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	2	5.0	14	35.0	12	30.0	1	2.5	11	27.5	40	100	2.6
Consumers	15	13.6	51	46.4	21	19.1	4	3.6	19	17.3	110*	100	2.8
Extension workers	7	11.5	13	21.3	21	34.4	3	4.9	17	27.9	61	100	2.5
Farmer leaders and community leaders	9	11.0	22	26.8	19	23.2	0	0.0	32	39.0	82*	100	2.8
Journalists	5	14.3	11	31.4	6	17.1	1	2.9	12	34.3	35	100	2.9
Policy makers	5	15.2	11	33.3	8	24.2	0	0.0	9	27.3	33	100	2.9
Religious leaders	6	17.1	9	25.7	6	17.1	2	5.7	12	34.3	35	100	2.8
Scientists	10	28.6	16	45.7	4	11.4	1	2.9	4	11.4	35	100	3.1
Total	59	13.7	147	34.1	97	22.5	12	2.8	116	26.9	431	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	13	32.5	17	42.5	4	10.0	6	15.0	40	100	2.9
	Consumers	42	37.8	48	43.2	8	7.2	13	11.7	111	100	3.1
	Extension workers	13	21.3	28	45.9	13	21.3	7	11.5	61	100	2.8
	Farmer leaders and community leaders	15	18.1	43	51.8	8	9.6	17	20.5	83	100	2.7
	Journalists	6	17.1	18	51.4	5	14.3	6	17.1	35	100	2.7
	Policy makers	1	3.0	19	57.6	9	27.3	4	12.1	33	100	2.5
	Religious leaders	8	22.9	12	34.3	6	17.1	9	25.7	35	100	2.5
	Scientists	8	22.9	20	57.1	6	17.1	1	2.9	35	100	3.0
	Total	106	24.5	205	47.3	59	13.6	63	14.6	433	100	
b.	Consumer groups											
	Businessmen and traders	20	50.0	15	37.5	0	0	5	12.5	40	100	3.0
	Consumers	59	53.6	44	40.0	2	1.8	5	4.5	110*	100	3.4
	Extension workers	36	59.0	23	37.7	1	1.6	1	1.6	61	100	3.5
	Farmer leaders and community leaders	35	42.2	36	43.4	5	6.0	7	8.4	83	100	3.2
	Journalists	21	60.0	12	34.3	0	0	2	5.7	35	100	3.5
	Policy makers	16	48.5	15	48.5	1	3.0	1	3.0	33	100	3.1
	Religious leaders	23	65.7	8	22.9	3	8.6	1	2.9	35	100	3.5
	Scientists	22	62.9	11	31.4	2	5.7	0	0	35	100	3.6
	Total	232	53.7	164	38.0	14	3.2	22	5.1	432	100	
c.	Non-government organizations											
	Businessmen and traders	15	37.5	17	42.5	0	0	8	20.0	40	100	3.0
	Consumers	41	36.9	52	46.8	3	2.7	15	13.5	111	100	3.1
	Extension workers	16	26.7	33	55.0	2	3.3	9	15.0	60*	100	2.9
	Farmer leaders and community leaders	21	25.6	39	47.6	9	11.0	13	15.9	82*	100	2.8
	Journalists	16	45.7	12	34.3	1	2.9	6	17.1	35	100	3.1
	Policy makers	11	34.4	15	46.9	2	6.3	4	12.5	32*	100	2.7
	Religious leaders	14	40.0	15	42.9	0	0	6	17.1	35	100	2.8
	Scientists	14	40.0	16	45.7	2	5.7	3	8.6	35	100	3.2
	Total	148	34.4	199	46.3	19	4.4	64	14.9	430	100	

*Some respondents gave no answer

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	10	25.0	18	45.0	2	5.0	10	25	40	100	2.7
Consumers	38	34.5	51	46.4	7	6.4	14	12.7	110*	100	3.0
Extension workers	21	34.4	30	49.2	6	9.8	4	6.6	61	100	3.1
Farmer leaders and community leaders	31	37.8	42	51.2	2	2.4	7	8.5	82*	100	3.2
Journalists	8	22.9	20	57.1	2	5.7	5	14.3	35	100	2.9
Policy makers	7	21.2	20	60.6	3	9.1	3	9.1	33	100	2.9
Religious leaders	13	37.1	12	34.3	2	5.7	8	22.9	35	100	2.9
Scientists	8	22.9	21	60.0	3	8.6	3	8.6	35	100	2.3
Total	136	31.6	214	49.6	27	6.3	54	12.5	431	100	
e. Agricultural biotechnology companies (e.g., Aventis, Dupont, Monsanto, Novartis, Syngenta)											
Businessmen and traders	15	37.5	13	32.5	5	12.5	7	17.5	40	100	2.9
Consumers	52	46.8	40	36.0	3	2.7	16	14.4	111	100	3.2
Extension workers	27	44.3	23	37.7	3	4.9	8	13.1	61	100	3.1
Farmer leaders and community leaders	32	38.6	29	34.9	9	10.8	13	15.7	83	100	3.0
Journalists	12	34.3	13	37.1	7	20.0	3	8.6	35	100	2.7
Policy makers	11	33.3	13	39.4	4	12.1	5	15.2	33	100	2.9
Religious leaders	10	28.6	16	45.7	9	25.7	0	0	35	100	3.0
Scientists	14	40.0	12	34.3	5	14.3	4	11.3	35	100	3.0
Total	173	40.0	159	36.7	45	10.4	56	12.9	433	100	
f. Mass media/Journalists											
Businessmen and traders	16	40.5	19	47.5	0	0	5	12.5	40	100	3.2
Consumers	45	40.5	56	50.5	1	0.9	9	8.1	111	100	3.2
Extension workers	24	39.3	32	52.5	1	1.6	4	6.6	61	100	3.2
Farmer leaders and community leaders	26	31.3	44	53.0	6	7.2	7	8.4	83	100	3.1
Journalists	17	48.6	13	37.1	2	5.7	3	8.6	35	100	3.3
Policy makers	4	12.1	20	60.6	2	6.1	7	21.2	33	100	2.6

*Some respondents gave no answer

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	17	48.6	1	2.9	5	14.3	35	100	3.0
Scientists	22	62.9	13	37.1	0	0	0	0	35	100	3.6
Total	166	38.3	214	49.4	13	3.0	40	9.3	433	100	
g. International Research Institutions (e.g., IRRI, CIMMYT, etc.)											
Businessmen and traders	20	50.0	12	30.0	0	0	8	2.0	40	100	3.1
Consumers	68	62.4	28	25.7	1	0.9	12	11.0	109*	100	3.4
Extension workers	47	77.0	11	18.0	0	0	3	4.9	61	100	3.7
Farmer leaders and community leaders	48	57.8	26	31.3	7	8.4	2	2.4	83	100	3.2
Journalists	22	62.9	9	25.7	3	8.6	1	2.9	35	100	3.5
Policy makers	18	58.1	11	35.5	1	3.2	1	3.2	31*	100	3.5
Religious leaders	22	62.9	9	25.7	1	2.9	3	8.6	35	100	3.4
Scientists	32	91.4	2	5.7	0	0	1	2.9	35	100	3.9
Total	277	64.6	108	25.2	13	3.0	31	7.2	429	100	
h. Religious leaders/groups											
Businessmen and traders	9	22.5	14	35.0	3	7.5	14	35.0	40	100	3.4
Consumers	36	32.4	41	36.9	11	9.9	23	20.7	111	100	2.8
Extension workers	18	29.5	27	44.3	6	9.8	10	16.4	61	100	2.9
Farmer leaders and community leaders	16	19.3	27	32.5	25	30.1	15	18.1	83	100	2.5
Journalists	8	22.9	12	34.3	7	20.0	8	22.9	35	100	2.6
Policy makers	5	15.2	10	30.3	7	21.2	11	33.3	33	100	2.3
Religious leaders	13	37.1	10	28.6	3	8.6	9	25.7	35	100	2.8
Scientists	11	31.4	18	51.4	4	11.4	2	5.7	35	100	3.1
Total	116	26.8	159	36.7	66	15.2	92	21.3	433	100	

*Some respondents gave no answer

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	20	22.5	18	45.0	0	0	2	5.0	40	100	3.4
Consumers	61	55.0	43	38.7	0	0	7	6.3	111	100	3.4
Extension workers	45	73.8	16	26.2	0	0	0	0	61	100	3.7
Farmer leaders and community leaders	49	59.0	28	33.7	1	1.2	5	6.0	83	100	3.5
Journalists	21	60.0	13	37.1	0	0	1	2.9	35	100	3.5
Policy makers	17	51.5	12	36.4	0	0	4	12.1	33	100	3.3
Religious leaders	18	51.4	17	48.6	0	0	0	0	35	100	3.5
Scientists	27	77.1	8	22.9	0	0	0	0	35	100	3.8
Total	258	59.6	155	35.8	1	0.2	19	4.4	433	100	
j. University-based scientists											
Businessmen and traders	21	52.5	16	40.0	0	0	3	7.5	40	100	3.4
Consumers	79	71.2	24	21.6	1	0.9	7	6.3	111	100	3.6
Extension workers	45	73.8	14	23.0	0	0	2	3.3	61	100	3.7
Farmer leaders and community leaders	47	56.6	29	34.9	2	2.4	5	6.0	83	100	3.4
Journalists	25	71.4	10	28.6	0	0	0	0	35	100	3.7
Policy makers	16	48.5	14	42.4	1	3.0	2	6.1	33	100	3.3
Religious leaders	20	40.0	14	57.1	0	0	1	2.9	35	100	3.5
Scientists	25	71.4	10	28.6	0	0	0	0	35	100	3.7
Total	278	64.2	131	30.2	4	0.9	20	4.7	433	100	

*Some respondents gave no answer

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

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	29	72.5	10	25.0	1	2.5	40	100	2.7
Consumers	82	73.9	26	23.4	3	2.7	111	100	2.7
Extension workers	48	80.0	12	20.0	0	0	60*	100	2.8
Farmer leaders and community leaders	73	88.0	8	09.6	2	2.4	83	100	2.8
Journalists	25	73.5	4	11.8	5	14.7	34*	100	2.5
Policy makers	24	72.7	6	18.2	3	9.1	33	100	2.6
Religious leaders	27	79.4	4	11.8	3	8.8	34*	100	2.7
Scientists	30	85.7	5	14.3	0	0	35	100	2.8
TOTAL	**338**	**78.6**	**75**	**17.4**	**17**	**4.0**	**430**	**100**	

*Some respondents 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	14	35.0	20	50.0	6	15.0	40	100	2.2
Consumers	35	31.5	54	48.6	22	19.8	111	100	2.1
Extension workers	28	45.9	32	52.5	1	1.6	61	100	2.4
Farmer leaders and community leaders	39	47.0	24	28.9	20	24.1	83	100	2.2
Journalists	7	20.6	20	58.8	7	20.6	34*	100	2.0
Policy makers	14	42.4	18	54.5	1	3.0	33	100	2.4
Religious leaders	9	26.5	15	44.1	10	29.4	34*	100	1.9
Scientists	13	37.1	17	48.6	5	14.3	35	100	2.2
TOTAL	**159**	**36.9**	**200**	**46.4**	**72**	**16.7**	**431**	**100**	

*Some respondents 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		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	
Businessmen and traders	4	10.3	25	64.1	10	25.6	39*	100	1.8
Consumers	13	11.8	64	58.2	32	29.1	109*	100	1.8
Extension workers	18	29.5	40	65.6	3	4.9	61	100	2.2
Farmer leaders and community leaders	18	21.7	40	48.2	25	30.1	83	100	1.9
Journalists	4	12.1	22	66.7	7	21.2	33*	100	1.9
Policy makers	8	24.2	21	63.6	4	12.1	33	100	2.1
Religious leaders	1	3.0	18	54.6	14	42.4	33*	100	1.6
Scientists	7	20.0	22	62.9	6	17.1	35	100	2.0
TOTAL	**73**	**17.1**	**252**	**59.2**	**101**	**23.7**	**426**	**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	11	27.5	20	50.0	3	7.5	0	0	6	15.0	40	100	3.2
	Consumers	27	24.5	65	59.1	3	2.7	2	1.8	13	11.8	110*	100	3.2
	Extension workers	27	44.3	32	52.5	0	0.0	0	0	2	3.3	61	100	3.5
	Farmer leaders and community leaders	37	44.6	38	45.8	2	2.4	3	3.6	3	3.6	83	100	3.3
	Journalists	8	23.5	21	61.8	3	8.8	0	0	2	5.9	34*	100	3.2
	Policy makers	11	33.3	17	51.5	0	0	0	0	5	15.2	33	100	3.4
	Religious leaders	15	44.1	14	41.2	5	14.7	0	0	0	0	34*	100	3.3
	Scientists	9	25.7	22	62.9	2	5.7	0	0	2	5.7	35	100	3.2
	Total	145	33.7	229	53.2	18	4.2	5	1.2	33	7.7	430	100	
b.	I would contribute my time or money to an organization that promotes a ban on genetically modified foods.													
	Businessmen and traders	1	2.5	7	17.5	13	32.5	7	17.5	12	30.0	40	100	2.1
	Consumers	0	0	16	14.5	37	33.6	33	30.0	24	21.8	110*	100	1.8
	Extension workers	0	0	6	9.8	28	45.9	13	21.3	14	23.0	61	100	1.9
	Farmer leaders and community leaders	5	6.0	15	18.1	22	26.5	18	21.7	23	27.7	83	100	2.0
	Journalists	0	0	7	20.6	10	29.4	7	20.6	10	29.4	34*	100	2.0
	Policy makers	0	0	3	9.1	17	51.5	2	6.1	11	33.3	33	100	2.0
	Religious leaders	2	5.9	6	17.6	10	29.4	3	8.8	13	38.2	34*	100	2.3
	Scientists	2	5.7	3	8.6	17	48.6	5	14.3	8	22.9	35	100	2.1
	Total	10	2.3	63	14.7	154	35.8	88	20.5	115	26.7	430	100	
c.	Foods that have been genetically altered should be labeled.													
	Businessmen and traders	16	40.0	21	52.5	0	0	0	0	3	7.5	40	100	3.4
	Consumers	45	40.9	54	49.1	4	3.6	0	0	7	6.4	110*	100	3.4
	Extension workers	22	36.1	28	45.9	4	6.6	3	4.9	4	6.6	61	100	3.2
	Farmer leaders and community leaders	20	24.1	34	41.0	2	2.4	3	3.6	24	28.9	83	100	3.2

*Some respondents gave no answer

Appendix Table 24. (continued) Attitude towards 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	17	50.0	16	47.1	1	2.9	0	0	0	0	34*	100	3.5
Policy makers	13	39.4	13	39.4	5	15.2	1	3.0	1	3.0	33	100	3.2
Religious leaders	10	29.4	17	50.0	1	2.9	1	2.9	5	14.7	34*	100	3.2
Scientists	15	42.9	19	54.3	1	2.9	0	0	0	0	35	100	3.4
Total	158	36.7	202	47.0	18	4.2	8	1.9	44	10.2	430	100	
d. The public should be consulted in formulating food regulations and laws.													
Businessmen and traders	18	45.0	18	45.0	1	2.5	0	0	3	7.5	40	100	3.4
Consumers	47	42.7	51	46.4	6	5.5	2	1.8	4	3.6	110*	100	3.3
Extension workers	20	33.9	34	57.6	5	8.5	0	0	0	0	59*	100	3.2
Farmer leaders and community leaders	29	35.4	37	45.1	2	2.4	2	2.4	12	14.6	82*	100	3.3
Journalists	16	47.1	15	44.1	1	2.9	0	0	2	5.9	34*	100	3.1
Policy makers	14	42.4	16	48.5	2	6.1	0	0	1	3.0	33	100	3.4
Religious leaders	18	52.9	11	32.4	2	5.9	3	8.8	0	0	34*	100	3.3
Scientists	17	48.6	18	51.4	0	0	0	0	0	0	35	100	3.5
Total	179	41.9	200	46.9	19	4.4	7	1.6	22	05.2	427	100	
e. I am wiling to pay the extra cost for labeling genetically modified foods.													
Businessmen and traders	2	5.0	10	25.0	11	27.5	5	12.5	12	30.0	40	100	2.3
Consumers	6	5.5	20	18.2	37	33.6	20	18.2	27	24.5	110*	100	2.4
Extension workers	4	6.6	17	27.9	17	27.9	9	14.8	14	23.0	61	100	2.3
Farmer leaders and community leaders	7	8.4	11	13.3	24	28.9	19	22.9	22	26.5	83	100	2.1
Journalists	5	14.7	7	20.6	11	32.4	6	17.6	5	14.7	34*	100	2.4
Policy makers	4	12.1	6	18.2	14	42.4	3	9.1	6	18.2	33	100	2.4
Religious leaders	0	0	6	17.6	17	50.0	3	8.8	8	23.5	34*	100	2.1
Scientists	5	14.3	10	28.6	9	25.7	8	22.9	3	8.6	35	100	2.3
Total	33	7.7	87	20.2	140	32.5	73	17.0	97	22.6	430	100	

*Some respondents gave no answer

Appendix Table 24. (continued) Attitude towards 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	11	27.5	19	47.5	6	15.0	0	0	4	10.0	40	100	3.1
Consumers	25	22.7	28	25.5	41	37.3	13	11.8	3	2.7	110*	100	2.6
Extension workers	19	31.1	33	54.1	7	11.5	1	1.6	1	1.6	61	100	3.2
Farmer leaders and community leaders	30	36.1	29	34.9	8	9.6	0	0	16	19.3	83	100	3.3
Journalists	10	29.3	6	42.4	9	26.5	7	20.6	2	5.9	34*	100	2.6
Policy makers	9	27.3	14	42.4	9	27.3	0	0	1	3.0	33	100	3.0
Religious leaders	10	29.4	15	44.1	4	11.8	0	0	5	14.7	34*	100	2.9
Scientists	18	51.4	10	28.6	7	20.0	0	0	0	0	35	100	3.3
Total	132	30.7	154	35.8	91	21.2	21	4.9	32	7.4	430	100	

*Some respondents gave no answer

Appendix Table 25. Biotechnology applications stakeholders would consider when making judgments on biotechnology

	Research Focus	All the Time		Almost Always		Seldom		Never		Don't Know		TOTAL		Weighted Mean
		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	5	15.2	12	36.4	12	36.4	3	9.1	1	3.0	33	100	2.6
	Scientists	5	14.3	6	17.1	14	40.0	7	20.2	3	8.6	35	100	2.3
	Total	10	14.7	18	26.5	26	38.2	10	14.7	4	5.9	68	100	
b.	Taking genes from plant species and transferring them into crop plants to make them more resistant to pests and diseases													
	Policy makers	0	0	11	33.3	14	42.4	5	15.2	3	9.1	33	100	2.2
	Scientists	6	17.1	9	25.7	11	31.4	7	20.0	2	5.7	35	100	2.4
	Total	6	8.8	20	29.4	25	36.8	12	17.6	5	7.4	68	100	
c.	Introducing human genes into bacteria to produce medicines and vaccines, for example to produce insulin for diabetes													
	Policy makers	3	9.1	5	15.2	10	30.3	10	30.3	5	15.2	33	100	2.2
	Scientists	7	20.0	4	11.4	10	28.6	10	28.6	4	20.0	35	100	2.3
	Total	10	14.7	9	13.2	20	29.4	20	29.4	9	13.2	68	100	
d.	Modifying genes of laboratory animals such as a mouse to study human diseases like cancer													
	Policy makers	2	6.1	7	21.2	10	30.3	7	21.2	7	21.2	33	100	2.2
	Scientists	7	20.6	4	11.8	10	29.4	10	29.4	3	8.8	34*	100	2.3
	Total	9	13.4	11	16.4	20	29.9	17	25.4	10	14.9	67	100	

*One respondent gave no answer

Appendix Table 25. (continued) Biotechnology applications stakeholders would consider when making judgments on biotechnology

Research Focus	All the Time		Almost Always		Seldom		Never		Don't Know		TOTAL		Weighted Mean
	n	%	n	%	n	%	n	%	n	%	n	%	
e. Introducing fish genes into strawberries to resist extreme freezing temperature													
Policy makers	2	6.1	5	15.2	9	27.3	10	30.3	7	21.2	33	100	2.0
Scientists	5	14.3	1	2.9	6	17.1	16	45.7	7	20.0	35	100	1.8
Total	7	10.3	6	8.9	15	22.1	26	38.2	14	20.5	68	100	
f. Using genetic testing to detect and treat diseases we might have inherited from our parents													
Policy makers	3	9.1	6	18.2	15	45.5	6	18.2	3	9.1	33	100	2.2
Scientists	7	20.0	9	25.7	5	14.3	7	20.0	7	20.0	35	100	2.6
Total	10	14.7	15	22.1	20	29.4	13	19.1	10	14.7	68	100	

RESEARCH TEAM

College of Development Communication
University of the Philippines Los Baños

Lead Researcher:	**Cleofe S. Torres** *Associate Professor*
Researchers:	**Ma. Theresa H. Velasco** *Professor*
	Maria Celeste H. Cadiz *Dean and Associate Professor*
	Rhodora Ramonette M. de Villa *Instructor*
Editor:	**Serlie B. Jamias**
Translator:	**Ines Vivian D. Domingo**
Statistician:	**Mariano B. de Ramos**
Encoder:	**Nilo B. Argañosa**
Research Assistants:	**Laila M. Garcia** **Elisa S. Banasihan** **Winifredo B. Dagli** **Marie Cddyqa Jaya G. Rogel**
Administrative Support Staff:	**Bernabe M. Remoquillo** **Romeo C. Estimado**