

PUBLIC AWARENESS, PERCEPTION, AND ATTITUDE TOWARD GMOs IN THAILAND

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ABSTRACT

A survey has been conducted in Thailand to understand the current status of public knowledge, perception and attitude toward genetically modified organisms (GMOs) and genetically modified foods (GM foods). Approximately 500 people has answered a questionnaire in two occasions during the year 1999 and 2000. Questions ranged from basic scientific knowledge about genes and genetic engineering to attitudes toward public policy on GM food labeling and roles of governmental institutes. Collected questionnaires were analyzed and data were categorized into awareness (including basic knowledge), perception, and attitude of Thailand's public toward biotechnology and GMOs. Results obtained through this study are intended for the formulation of implementable policy options on this highly controversial issue.

Key words: genetically modified organisms, GMOs, public awareness, public perception, public attitude, national policy, biotechnology

1. INTRODUCTION

Public interest and concern over genetically modified organisms (GMOs) issues have been growing rapidly over the past several years, and are now on Thailand's national agenda (Damrongchai, 2000A). There have been increasing trade dispute over GM products between Thailand and its trade partners, especially in the EU countries, where the standards on food safety is relatively high (EU White Paper on Food Safety, 2000). In the EU debate over agricultural biotechnology has grown to the extent that it became a highly political issue (Leisinger, 2000).

The enormous sentimental debate in Europe has raised similar concerns among the general public all over the world. In Thailand, several NGOs started arguing to the public and farmers about the threat of domination by multinationals(Manager Daily, 1999), the risk of losing indigenous species through unintended gene flow and adverse effects to non-target organisms after field release. As a result, the commercial release of *Bt* cotton (already passed the regulations) has been suspended for political reasons. A new ad hoc fact-finding committee has now been appointed with NGO representatives invited to join the committee.

Meanwhile, it became apparent that the country has been legally importing corn and soy bean from GM crops producing country such as the USA and Argentina, mainly for food feed and processing. The uncertainty over whether GMOs has enter Thailand's food chain and the

doubt about its safety has seemed to gradually captured the concerns of general consumers. (Damrongchai, 2000B)

According to a resolution adopted by the Committee on International Trade Policy, chaired by the Deputy Prime Minister on October 18, 1999, Thailand will not enforce any mandatory labeling but leave it as a voluntary measure. The resolution was greeted with furious reaction from consumer protection organizations; some are arguing about “the consumers’ right to know”. Given the situation that there is an urgent need to certify products shipped to the EU of its GMO contents, and labeling them has raised are arguments that the government is protecting consumers in other countries rather than its own people. (Damrongchai, 1999)

Over this several-year period, scientists and governmental institutes in the country were trying exhaustively to raise public understanding in gene technology, to dismiss many myths forged by either the pro-GM or anti-GM camp, and to persuade the public to weigh risk against benefit. It is not clear at this point whether these public education efforts are fruitful.

Moreover, these public concern in Thailand over GMO issues and products thereof has made the challenges in formulating sound national policy on biotechnology increasingly complex and interdisciplinary. Although in other countries including the USA and EU there were report on public attitude toward GMOs (IFIC, 1997 and 1999), there has so far been no quantitative study in Thailand on the public perception and attitude toward these specific issues. This study aimed at providing a first step toward understanding the current status of public knowledge in the technology, their awareness, perception and attitude, in an attempt to offer effective and practical public policy option on this issue.

2. MATERIALS AND METHODS

This study was conducted basically by mean of questionnaires. The questionnaires were distributed and were collected in two occasions. In the first occasion, the target group were people attending a conference “The 1st Science and Technology for Development: National Visions and Strategies (S&T 2020)” hosted by Thailand’s National Science and Technology Agency (NSTDA) during October 25-26, 1999. The second time the questionnaires were distributed was at “The 2nd Science and Technology for Development: National Visions and Strategies (S&T 2020)” on August 21, 2000.

It should be noted that, in both occasions, the respondents are assumed to have relatively high educational background and are thought to be concerned of national development with regard to the development of science and technology in Thailand.

Data analysis was performed using the application programs Statistical Packages for Social Science (SPSS) and Microsoft Excel 97 for calculations and presentations of data. Most of the data obtained from the questionnaires are qualitative, with no prior information on distribution of population, therefore the non-parametric test method were used in the analytical process. Also, some data were coded, analyzed and processed, then transformed back to numerical data for presentations. The range of error for a sample size of 500 is $\pm 5\%$ at the 95% confidence level.

The questionnaire used in this study was compiled by the authors and is shown below.

A survey on public understanding and attitude toward GMOs

1. What is your occupation?
 - Civil servant
 - University lecturer (public and private)
 - Academia
 - Business owner, SMEs
 - Private company employer
 - Farmer
 - Mass media
 - Student
 - Etc. (please specify.....)
2. Have you heard about genetically modified organisms (GMOs)?
 - Yes. From.....
 - Never
3. GMOs are plant, animal or microorganisms made by altering their genes using....
 - Any method including traditional breeding.
 - Only through genetic engineering or gene technology.
 - Don't know / Not sure.
4. Every day when you eat rice, are you eating rice genes?
 - Yes.
 - No.
 - Don't know / Not sure.
5. When you eat chicken meat, are you eating genes from soy bean that are ingredients of chicken feed?
 - Yes.
 - No.
 - Don't know / Not sure.
6. What is your safety concern in food? Please give the order from high to low (1,2,3,...)
 - Chemical residues, pesticides
 - Cholesterol
 - Heavy metals
 - Bacterial contamination
 - GMOs
7. What impact do you think GMO issues have on the country? Please give the order from high to low (1,2,3,...)
 - International trade
 - Subsistent farmer's self-sufficiency
 - Consumer's safety
 - Environment and biodiversity
 - Domestic intellectual property rights protection
 - No impact / Don't know.

8. Should Thailand conduct research on genetic engineering (the technology used to develop GMOs)? Please choose one or more appropriate answer(s).
 - Yes, we should, because it is essential in development and competitiveness.
 - Yes, we should, because we need the capacity to detect, monitor and assess GMOs.
 - No, we should not, because it makes no difference.
 - No, we should not, because it brings disadvantage and no advantage.
9. What are Thailand's problems at the moment concerning GMOs? Please choose one or more appropriate answer(s).
 - Unclear public policy
 - Weak regulatory system
 - Insufficient regulator
 - Not enough public understanding
 - Incompetent technology
 - Over-reaction to the media campaign
 - No problem
 - Etc. (please specify.....)
10. What is the best way to address GMO issues? Please choose one or more appropriate answer(s).
 - Conduct more research to build capacity
 - Educate young people, increase public understanding
 - Have risk assessment system in place, employ stringent management
 - Have a specific organization to detect and certify products whether they contain GMOs or not
 - Modify or formulate new laws on GMOs
 - Ban import
 - Ban research
 - Ban production
 - Just leave it this way
 - Etc. (please specify.....)
11. Do you think labeling is the best way to protect consumers, so it become clear which products contain GMOs?
 - Agree with mandatory labeling
 - Agree with voluntary labeling
 - Do not agree because it will cost more and may affect price
 - Do not think it will have any effect because consumers don't read labels anyway
12. Thailand's National Center for Genetic Engineering and Biotechnology (BIOTEC) is an institute with mandate on research, development, and managing biotechnology including services. It doesn't have legal authority therefore no regulatory function. What

role should BIOTEC play? Please choose one or more appropriate answer(s).

- Continue with R&D
- Give correct basic understanding to the public
- Provide information and facts that are neutral and reliable
- Provide technical services by testing GMOs
- Provide service on human resource development and training
- Etc. (please specify.....)

13. Other comments.....

14. Your nationality

- Thai
- Else (please specify.....)

15. Your religion

- Buddhism
- Else (please specify.....)

16. Sex

- Male
- Female

17. Age.....

18. Educational background

- Below bachelor degree (high school, etc.)
- Undergraduate
- Graduate school

3. RESULTS AND DISCUSSION

3.1 Profiles of Respondents

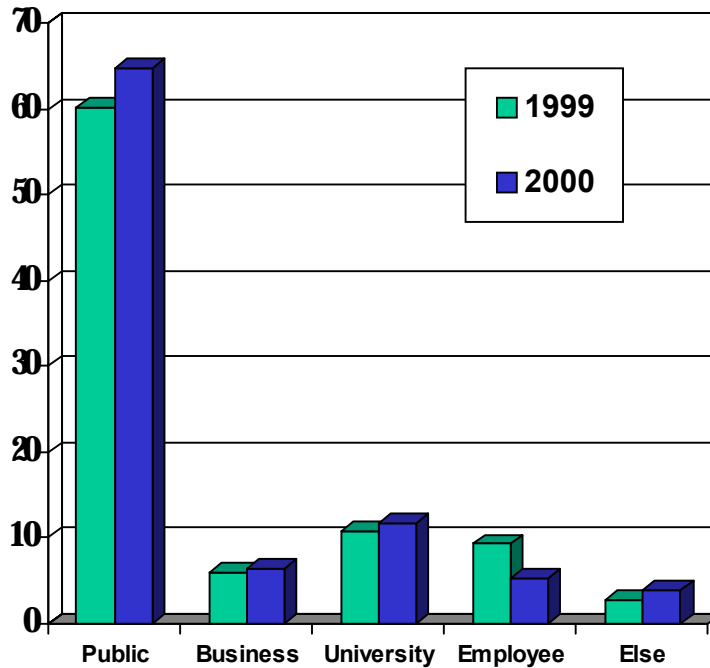


Figure 1. Profiles of respondents comparing results between surveys conducted in 1999 and 2000.

Surveys conducted in this study were 10 months apart in time (October 1999 and August 2000), with number of respondents as different as 366 in the first survey and 158 in the second. Yet the profiles of respondent are similar. Majority of the respondents belong to the public sector (60% or more) in both studies.

As expected, the educational background of respondents are relatively high, considering the average educational level in Thailand or even in Bangkok alone. In both surveys, most people who responded to this questionnaire holds graduate school degree (also 60% or more).

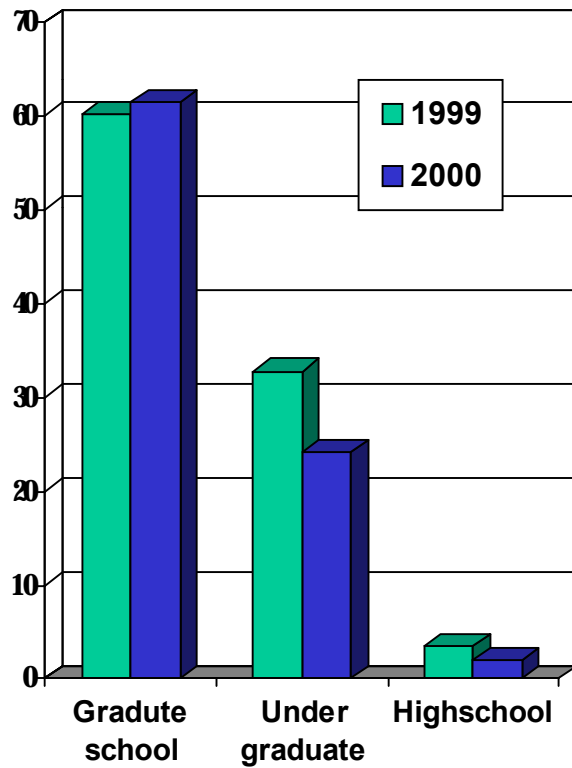


Figure 2. Educational background of respondents

3.2 Awareness and some basic knowledge concerning GMOs

In this study, the basic knowledge involves basic biology, biochemistry, biotechnology (with gene technology as part of it). Three questions were asked in incremental difficulties, with the first question being easiest and the last most difficult.

Naturally, the majority rightly answer the first question by choosing “genetic engineering”. But as the questions become more difficult, the degree of uncertainty increased. Although most people chose the correct answer (Yes) to the second question in this section, the number of people who answered “Don’t know / Not sure” outnumbered the correct answer (No) in the last question of this section.

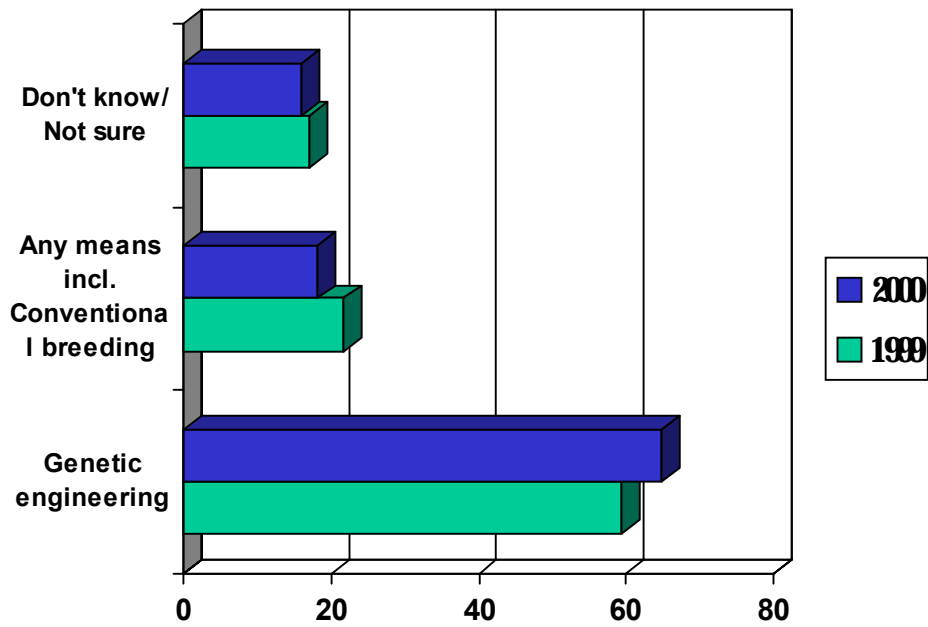


Figure 3. GMOs are plant, animal or microorganisms made by altering their genes using what kind of techniques or technologies?

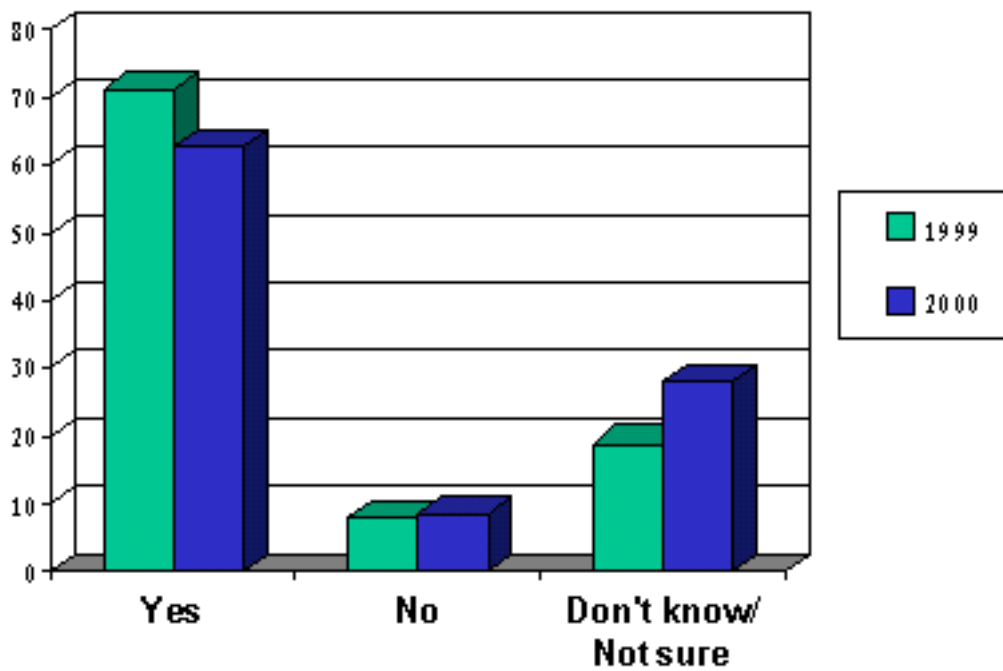


Figure 4. When you eat rice, is that you are eating rice genes also?

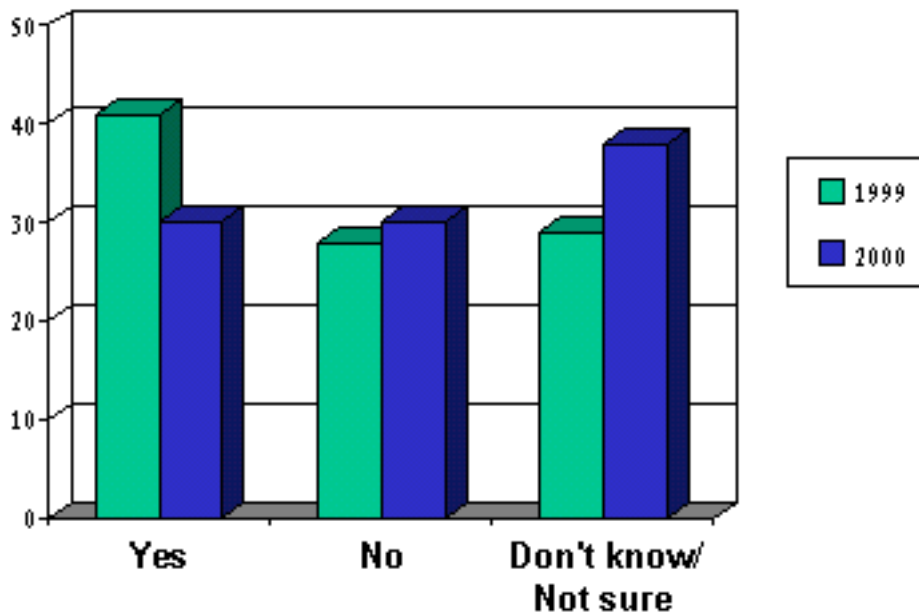
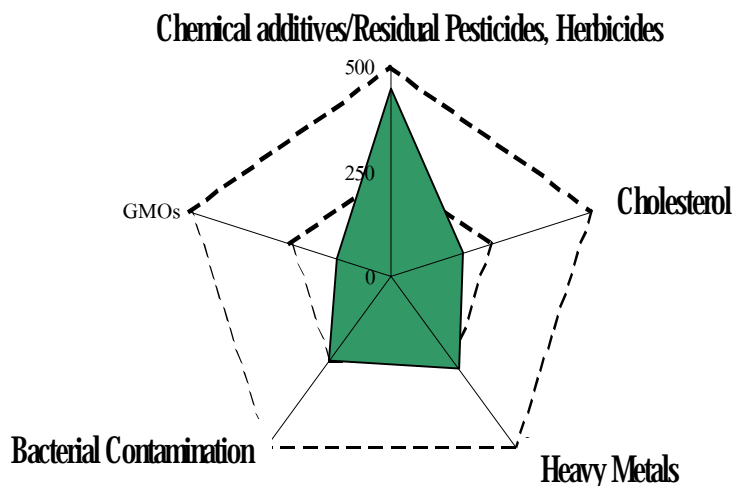


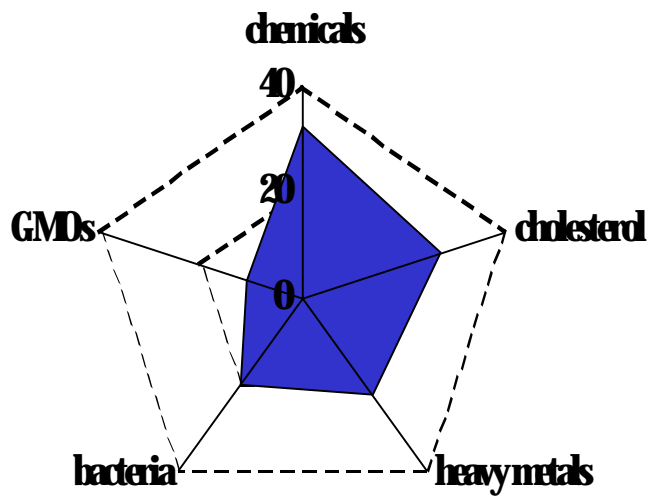
Figure 5. When you eat chicken meat, is that you are eating genes from soy bean that are ingredients of chicken feed?

3.3 Perception of GMO issues

It was apparent from questions in the previous section that respondents have some basic knowledge on genetic modification. It was then interesting to understand whether, as consumers, the respondents are more concerned about GM food than other safety concerns. Surprising enough, most people rated their concern over GM food the last on the list, in both studies.



(a)



(b)

Figure 6. What is your food safety concern? (a) 1999 (b) 2000.

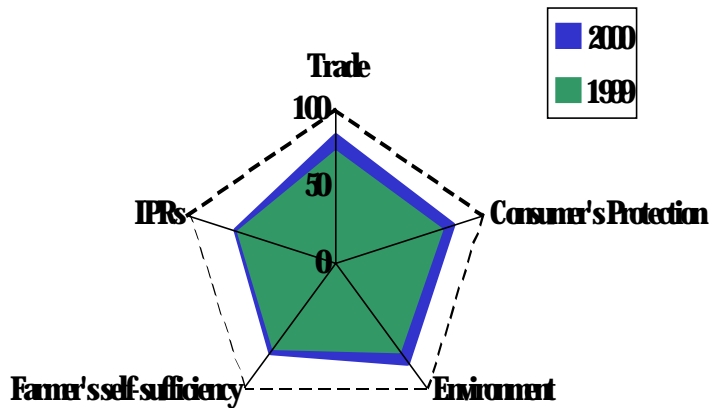


Figure 7. What impact do you think GMO issues have on the country?

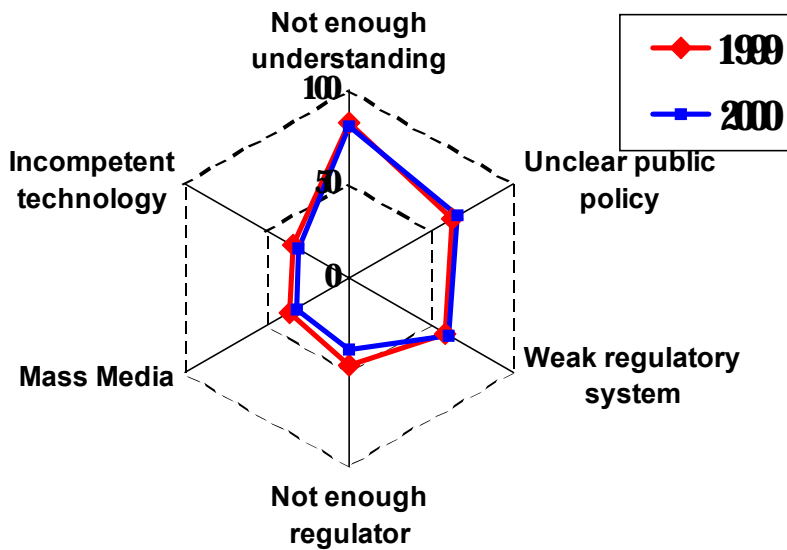


Figure 8. What are Thailand's problems at the moment concerning GMOs?

Figure 7. gave a high score on the trade aspect of the issue, implying that most respondents see trade at stake in GMO issues. But other area of concerns also followed closely. From Figure 8. It is apparent that the respondent have high level of uncertainty concerning their basic knowledge in the issue, over other aspects of the problem.

3.4 Attitude toward GMOs and related public policy

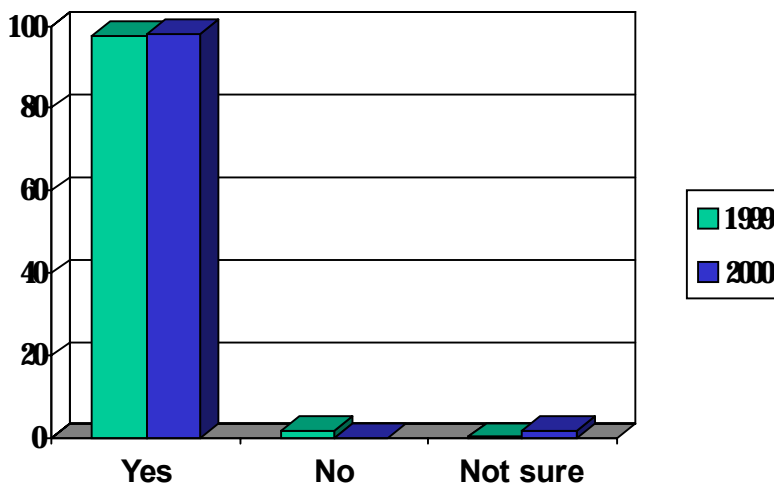
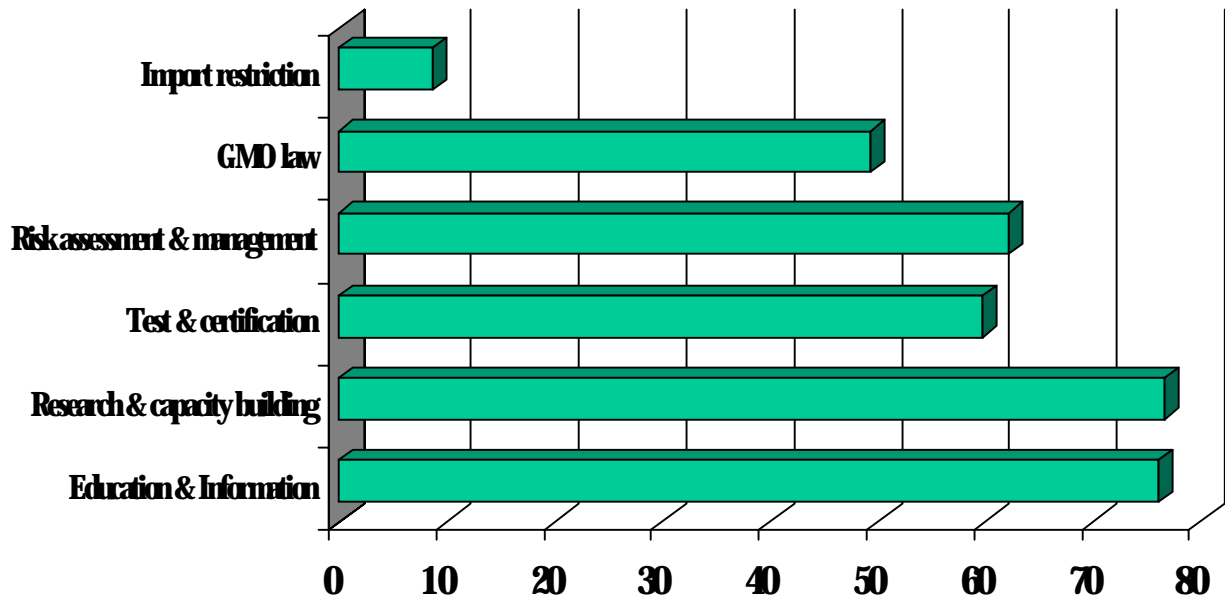
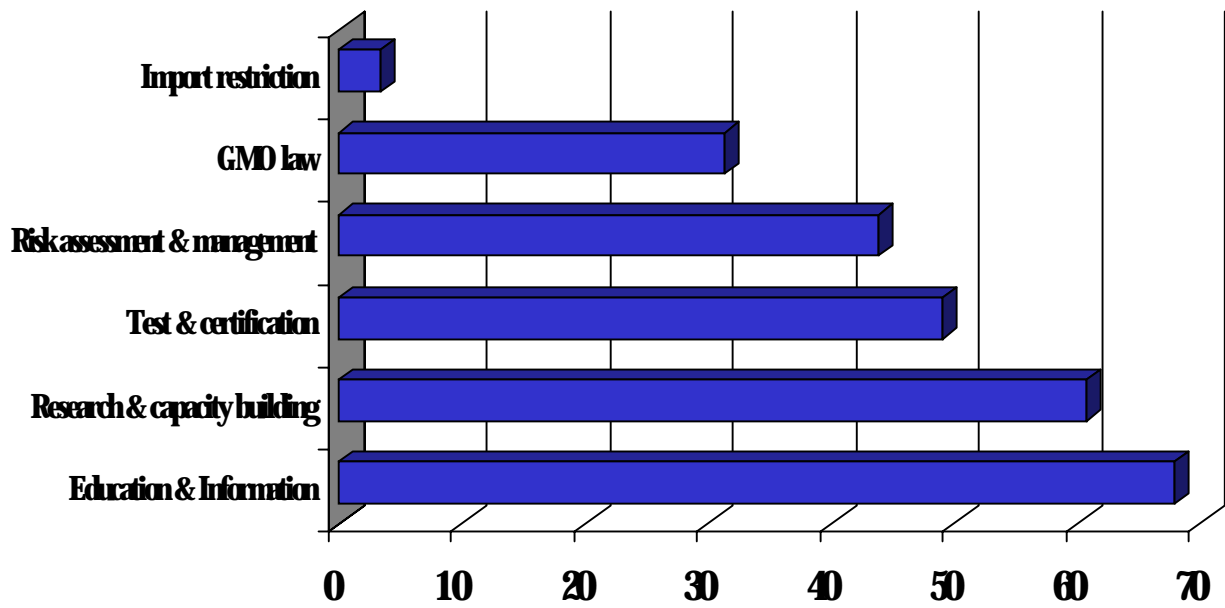


Figure 9. Should Thailand conduct research on genetic engineering (the technology used to develop GMOs)?



(a)



(b)

Figure 10. What is the best way to address GMO issues? (a) 1999 (b) 2000

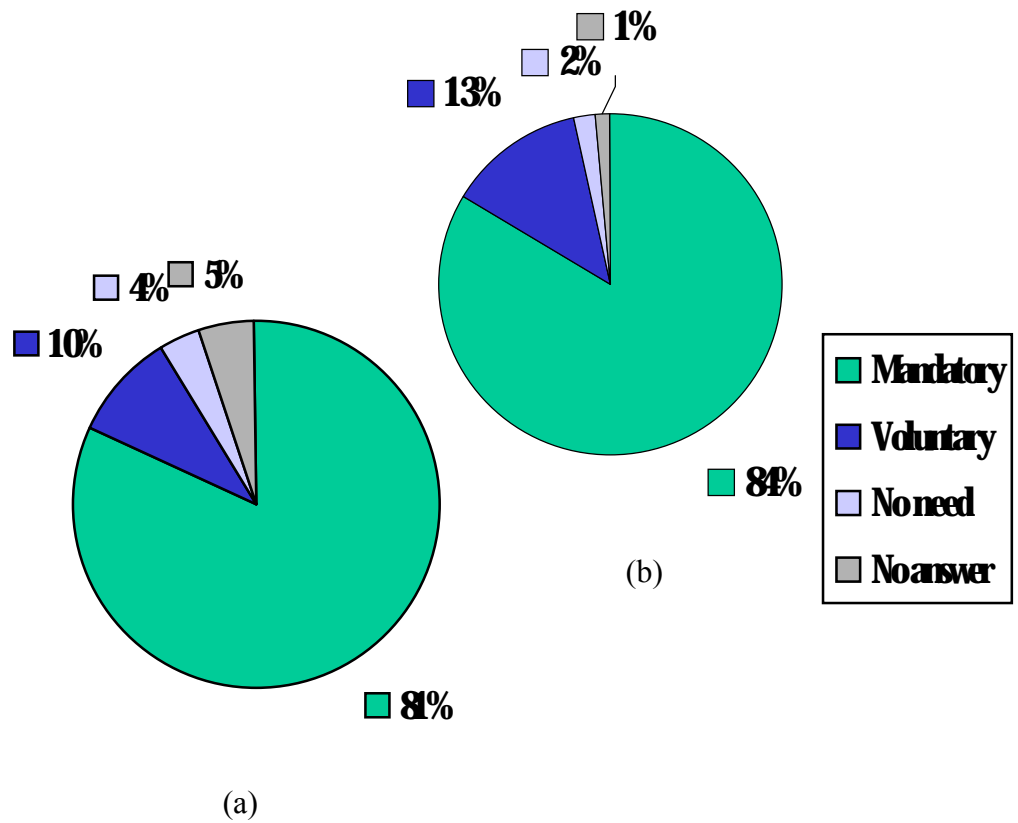


Figure 11. Do you think labeling is the best way to protect consumers, so it become clear which products contain GMOs? (a) 1999 (b) 2000

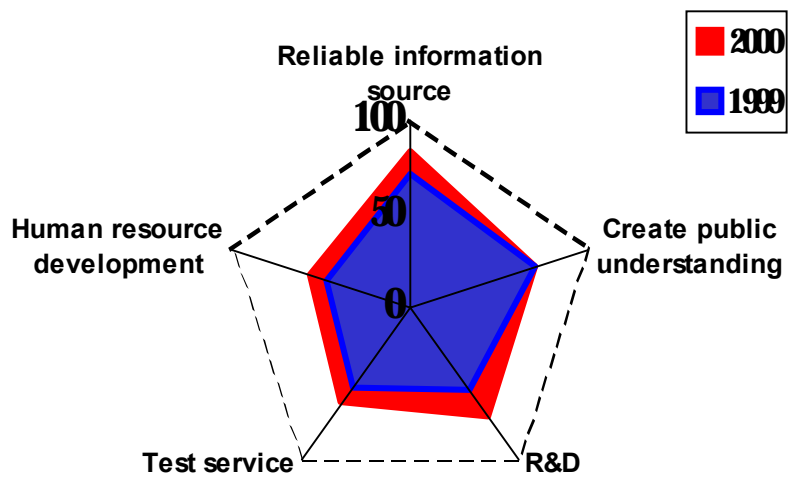


Figure 12. What role should BIOTEC play?

4. DISCUSSIONS AND CONCLUSION

This study was conducted in 1999 and 2000, the time during when GMOs issue were of high concern among Thailand's well-informed citizen, mainly because of media campaign by anti-GMO camp and trade dispute occurring between Thailand and its trade counterpart. Assuming that they are well aware of the issue, still the questions remain whether this group of people have the accurate scientific knowledge in the nature of GMOs and its potential impact, both positive and negative ones.

In this regard, this study should be considered, evaluated and used carefully. As shown in section **3.1 Profiles of respondents**, it could hardly be said that the population studied here represent the average Thai citizen, therefore an incomplete set of stakeholders. While this, on one hand, may be regarded as a limitation in the interpretation of the result of this study, the authors believe that the population studied represented people who have high influence on public policy of the country. Therefore a study should be conducted on awareness, perception and attitude of this part of the Thai population first.

Having thus convinced, target group were carefully chosen by having the survey conducted at two assemblies of scientists, regulators, academics, people from private sector and students, who are concerned with science and technology impact on the development of the country. As expected, the overall respondents have high educational background and most are working in the public sector.

In section **3.2 Awareness and some basic knowledge concerning GMOs**, the target group has shown largely accurate knowledge about GMOs and some basic biology, though degree of uncertainty increase with the deepening of the questions. On the question about animal feed genes in chicken meat, for example, the total number of people who either gave the wrong answer or don't know overwhelmed the number of people who rightly answered. In section **3.3 Perception of GMO issues**, respondents showed a tendency not to worry very much about the safety of eating GMOs, in relation with other "known" dangerous elements. Perceived risks are more apparent in trade and environmental issues. Also, it should be emphasized that although the respondents are highly educated, they stressed the importance of public education in GMO issues.

Section **3.4 Attitude toward GMOs and related public policy** gave tremendous insights and is the most important part of this study. The results made apparent the weight people put on research and development in Thailand despite the overall anti-GM sentiment in the media. In regard to what measures the country should take to address the GMOs problem, scientific capacity building and public education / information dissemination were given the two highest priority in both 1999 and 2000, leaving other candidates substantially far behind. On the labeling issue it appeared that the majority wanted mandatory labeling (about 80%). This is understandable, given the fact that in the questionnaire many relevant information to consider *e.g. what kind of label, how much more prices would the consumers have to pay to have the products labeled, how to detect the integrity and maintain consistency of the label, compliance with international standards*, were all absent. From the last question, it seemed that besides R&D and regulators, the respondent feel they need an institution who creates public understanding and being a reliable source of information.

It was striking that although the survey was conducted at two different places over 10 months period of time interval, the result showed a very high consistency. There were virtually no

significant difference between the two sets of data. This should be attributed mainly to the resemblance of the profile of respondents presented in section 3.1.

Further studies should be conducted, hopefully on a broader range of population, to understand the awareness, perception and attitude of the more “general” consumers, in a way that would be complementary to this study.

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