

# 8

## *Malaysia*

### **Biotechnology Awareness: From the Ivory Towers to the Masses**

**Mahaletchumy Arujanan  
and Azizan binti Baharuddin**

**S**cience and technology has always been a top agenda item in Malaysian policies. The National Agriculture Policy, Vision 2020, Malaysia's five-year plans, and the National Biotechnology Policy heavily emphasize the importance of science and technology (S&T) as an economy driver. Vision 2020 was conceived to see Malaysia bloom into a developed nation by the year 2020. One of the key points in Vision 2020 is to establish a scientific and progressive society. To materialize this goal, several vigorous steps were taken to boost the growth of S&T field in the country. The emergence of a strong manufacturing sector, information and communication technology (ICT), and biotechnology saw the country moving closer to its aspiration.

**M**alaysia is strategically located in the center of Southeast Asia with Thailand in the north and Singapore in the south. It is the combination of Peninsular Malaysia and two states of Sabah and Sarawak on the Island of Borneo. An interesting country,



Malaysia is well known for its various faces and cultures. The population stands at 27 million with Malays accounting for 60%; Chinese, 26%; Indians, 8%; and the rest are composed of indigenous people and other races. Malaysia is one of the most vibrant economies in Southeast Asia with a prosperous manufacturing sector. Its Gross Domestic Product (GDP) reached US\$195 billion in 2008. Literacy rate among the youth aged 15 to 24 by 2007 was 98% as reported by the United Nations Children's Fund. Malay is the national language, with English being widely used for official transactions. Other major languages are Mandarin and Tamil.

Malaysia is covered mostly by tropical forest and is rich in biodiversity. It has been recognized as one of the 12 mega biodiversity countries in the world by the United Nations Environment Programme's World Conservation Monitoring Center. Biotechnology is expected to play an important role in driving the economy with the abundance of natural resources and biodiversity. Under the National Biotechnology Policy (Ministry of Science, Technology and Innovation, 2005), biotechnology is expected to contribute 2.5% to its GDP by 2010; 4% by 2015; and 5% by 2020. The investment in this field by 2020 is expected to grow up to RM30 billion (US\$10 billion) and create 280,000 jobs. More than 100 biotechnology-based companies are to be established which would generate a revenue of RM625 billion, with a compounded annual growth rate of 23.7%.

This chapter discusses the various communication strategies employed in Malaysia as well as the players who transmit biotechnology information from the universities and research institutes to the general public. Demystifying biotechnology information and building an information bridge between the ivory towers (including research institutes) and the general masses is the root to public understanding of biotechnology.

## Biotechnology Status

Coupled with a strong background in agriculture, manufacturing, electronics, and information technology (IT) industry, Malaysia started focusing on biotechnology as one of the main engines of economic growth. The emergence of biotechnology in the country is further strengthened by the

existence of a number of research institutions, thriving public and private higher learning institutions, a vibrant private sector, and the mushrooming of venture capitals.

Realizing that something has to be done to take biotechnology to greater heights, the National Biotechnology Policy was launched in April 2005 with nine policy thrusts:

- Thrust 1: Agriculture Biotechnology Development
- Thrust 2: Healthcare Biotechnology Development
- Thrust 3: Industrial Biotechnology Development
- Thrust 4: R&D and Technology Acquisition
- Thrust 5: Human Capital Development
- Thrust 6: Financial Infrastructure Development
- Thrust 7: Legislative and Regulatory Framework Development
- Thrust 8: Strategic Positioning
- Thrust 9: Government's Commitment

The Malaysian Biotechnology Corporation, also known as BiotechCorp, was established in 2005 to serve as a one-stop center with the main objective of developing the country's biotech industry. The Biotechnology Implementation Council oversees the BiotechCorp, while the Biotechnology International Advisory Panel serves as its adviser. Both the Council and the Panel are chaired by the prime minister. Some of the main functions of BiotechCorp include catalyzing commercial spin-offs to the private sector; facilitating market-driven research and development (R&D) and commercialization via funding and industry development services; and advancing R&D and commercialization in agriculture biotechnology, healthcare biotechnology, and industrial biotechnology.

BiotechCorp promotes the growth of Malaysian biotechnology companies by rewarding them BioNexus status. This is a recognition awarded to qualified companies that participate in and undertake value-added biotechnology activities. BioNexus status is awarded to deserving biotechnology-based companies which fulfill a number of criteria such as having research capabilities in focus areas, and employing significant percentage of knowledge workers. These companies are eligible for tax deduction, tax exemption, research grants, and work permits for foreign expatriates.

One of the key agenda items under the National Biotechnology Policy is to promote, support, and encourage collaboration in the R&D program in biotechnology. In order to achieve this, three centers of excellence have been set up, namely: Agro-Biotechnology Institute (ABI) located in Malaysian Agricultural Research and Development Institute (MARDI), Serdang; the Malaysian Genome Institute (MGI) located in University Kebangsaan Malaysia; and Pharmaceutical and Nutraceutical Institute in University Sains Malaysia.

Agri-biotechnology is a prominent research field in Malaysia with agriculture contributing to around 10% of its GDP. Much research is carried out in the fields of marker assisted selection, GM technology, tissue culture, biofertilizers and biopesticides, livestock, fisheries, and forestry. MARDI is the leading agricultural research institute together with Malaysia's three commodities board, namely: Malaysian Palm Oil Board, Malaysian Rubber Board, and Malaysian Cocoa Board. Public universities also play an important role in agri-biotechnology. Universiti Putra Malaysia, University of Malaya and Universiti Kebangsaan Malaysia are the three leading universities in this field. GM research is still in its infancy which involves crops like rubber, oil palm, pineapple, papaya, chili, banana, teak, orchid, and rice.

Coupled with the efforts to enhance research, development and commercialization, creating public understanding of biotechnology is also picking up momentum albeit lack of coherent strategies by the players involved.

## **Biotechnology Awareness**

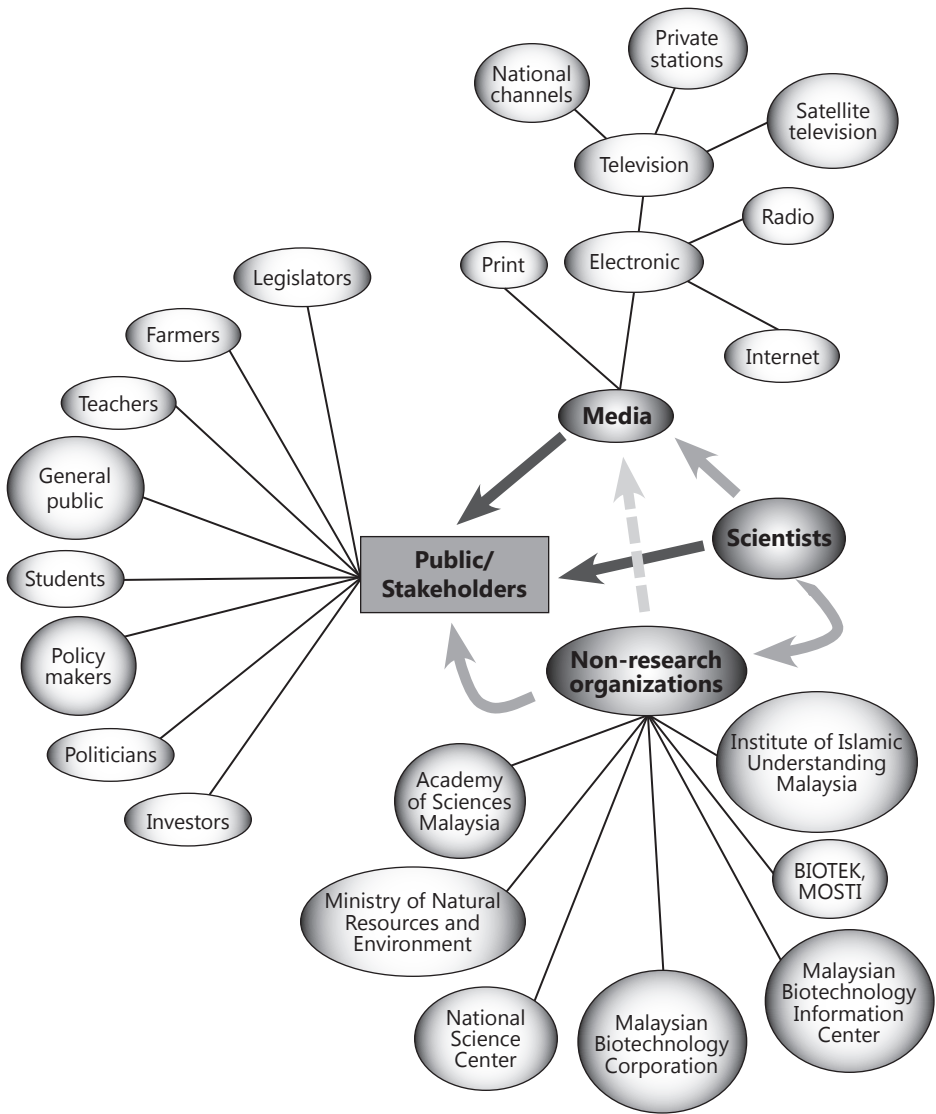
Although biotechnology has been accorded top priority as the driver of the nation's economy, awareness in this field among the public and key stakeholders is still low. This is attributed to the following reasons: science communication is not a priority area unlike in countries like Australia and United Kingdom (UK); severe lack of science communicators; absence of a dedicated government agency or focal point in communicating science; and lack of media interest in the area of science and biotechnology (Arujanan, 2009). In comparison, public understanding of science (PUS) has been emphasized in UK for more than a decade. Policies on PUS such

as the Bodmer report by the House of Lords in UK (Bodmer, 1985) and the Wolfendale report (Wolfendale, 1995) strongly recommended that scientists should specify their communication activities with the public in their research proposal to get public funds. In 2000, the House of Lords continued to call for more dialogue, discussion, and debate between scientists and the public. These initiatives have led more than half of UK scientists to communicate with the public about their research activities. Such initiatives do not exist in Malaysia.

A national survey on science and biotechnology literacy rate is also long overdue. A survey conducted by the University of Illinois at Urbana-Champaign and the International Service for the Acquisition of Agri-biotech Applications (ISAAA) (Juanillo, 2003) on public understanding, perception, and attitude towards agricultural biotechnology in Malaysia revealed that interest in agri-biotechnology was moderately high. Scientists topped the list followed by journalists and policy makers. However, this was not parallel to knowledge level. Stakeholders obtained scores between low and moderate reflecting somewhat poor knowledge of biotechnology. Only 8% of consumers and 4% of extension workers obtained high scores. On the other hand, businessmen thought that their understanding of science was below average. The survey also indicated that mainstream media such as radio, television, and newspapers, books and other special print media, family and friends, experts and professionals, were the main sources of information on biotechnology. However, with the encroaching of Internet in Malaysian lives over the past 10 years, these results call for updates.

## **Biotechnology Communication Initiatives**

In spite of shortcomings, communication of biotechnology has been undertaken by various players, though not in a coherent manner. Communication strategies, target audience, and content are often based on the objectives of the communicating organization. The following sections will discuss the various players involved in this area, their role, activities, and objectives. A summary of stakeholders involved in communicating biotechnology and the flow of biotechnology information is shown in Figure 1.



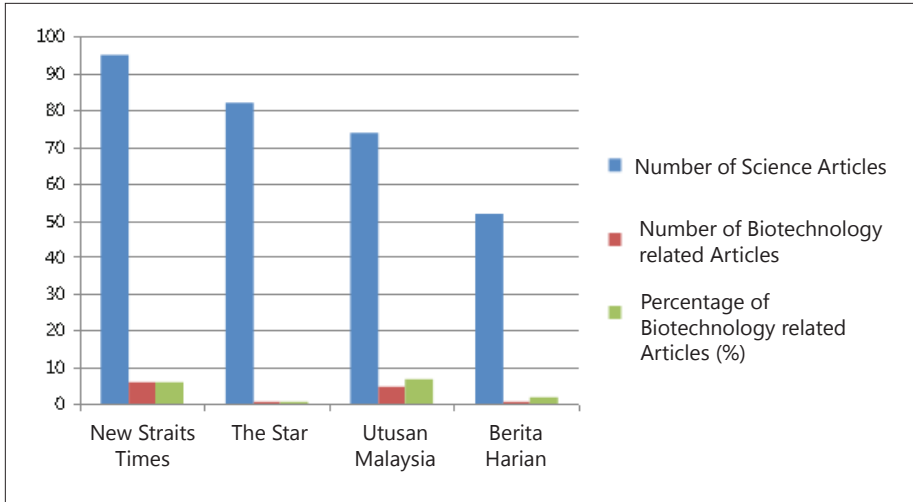
**Figure 1. Communication flow and biotech communication players in Malaysia (Arujanan, 2009)**

Media and scientists are the two main players, followed by a number of organizations ranging from ministries, government agencies, and non-governmental organizations (NGOs). These groups are clustered as non-research organizations as they are not involved in carrying out biotechnology studies. The organizations discussed are the National Science Center, Academy of Sciences, Malaysian Biotechnology Corporation, Institute for Islamic Understanding Malaysia, Ministry of Natural Resources and Environment (NRE), Ministry of Science, Technology and Innovation (MOSTI), and the Malaysian Biotechnology Information Center (MABIC).

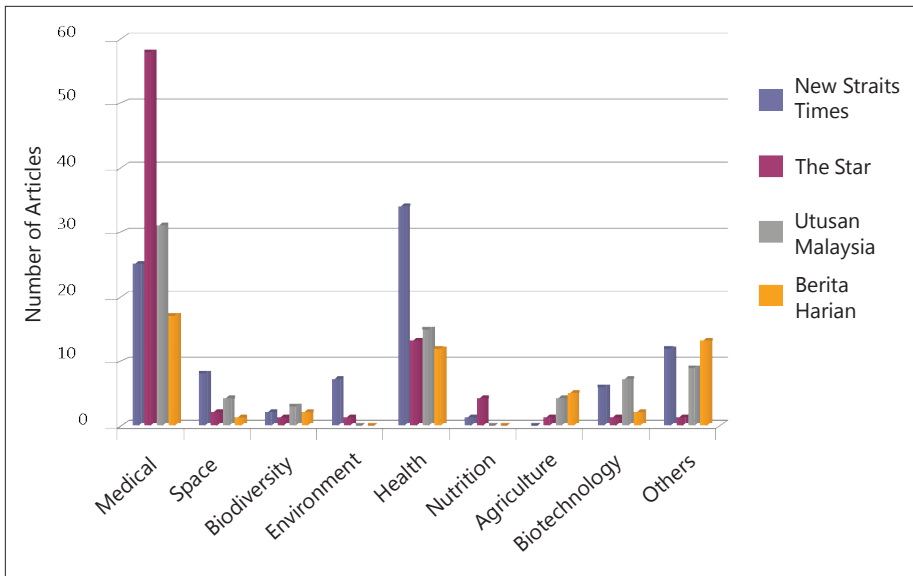
### **Media as Science Communicators**

For most people, media is the source of science information after completion of formal education. According to Juanillo (2003), media is the most frequently used source to obtain information on biotechnology. Thus, media is expected to play an important role in educating and in shaping public perception of biotechnology. A study conducted by Arujanan (2009) shows the prominence given to biotechnology by local newspapers compared to other science fields and journalists' source of science information. Four main newspapers were studied, namely: *New Straits Times*, *The Star*, *Berita Harian*, and *Utusan Malaysia*. *The Star* is Malaysia's most widely read English newspaper with a readership of 1,082,000 (daily) and 1,022,000 (Sundays). *New Straits Times*, with a readership of 308,000 (daily) and 263,000 (Sundays), is the number two English newspaper in Malaysia. *Berita Harian* is the top Malay newspaper with a readership of 1,470,000 (daily) and 1,780,000 (Sundays). *Utusan Malaysia* is the number two Malay newspaper with a readership of 947,000 (daily) and 1,612,000 (Sundays).

Figure 2 shows the number of science articles published by these newspapers from January until March 2009. The extremely low number of biotechnology news in the four main newspapers indicates the level of importance accorded to this field by the media. A number of reasons were stated by prominent science journalists. Among the inhibiting factors were: low level of understanding of biotechnology among journalists, lack of science writers, low news value of biotechnology news, and inability of scientists to create newsworthiness. Science news in local newspapers only appear on the days when newspapers have special sections devoted to health which is generally



**Figure 2. Number of science articles published in major Malaysian newspapers from January to March 2009 (Arujanan, 2009)**



**Figure 3. Number of articles in major Malaysian newspapers from January to March 2009 based on science disciplines (Arujanan, 2009)**



on Sundays. Medical and health news filled up the biggest portion of science pages (Figure 3). This is consistent with many content analysis studies conducted on major newspapers worldwide, where medical and health news enjoy bigger space compared to other science news. The scenario is the same in Malaysia in spite of the priority given to biotechnology and agriculture. The main reason lies on the news value and relevance of the information to readers. *Utusan Malaysia* gives prominence to biotechnology and agriculture news as this is the only newspaper in Malaysia with a science desk and journalists trained in science. This newspaper also has space allocated for science on a more regular basis. Its special sections are as follows: Health (Sunday), Mode (Tuesday), Campus and Mode (Wednesday), Science, Megabait, and Focus (Thursday), and Biotechnology and Agro (Friday). For *Berita Harian*, science news is covered under its Education section on Thursdays where research work in local universities is given some prominence besides the regular health section on Sundays.

Due to the lack of science writers and the inability to translate scientific jargon into simple layman's language, most media houses resort to the easy option of getting science news from foreign news portals such as Agence France-Press (AFP), Reuters, HealthNewsDigest, and Los Angeles Times-Washington Post. A large portion of science news is written by external contributors who are mainly traditional health practitioners and medical personnel. *Berita Harian* and *Utusan Malaysia* journalists write their own science articles with inputs from various players. However, only a small portion of science news published in *The Star* and *New Straits Times* is written by journalists. A large number of their articles are sourced from foreign news providers or contributed by external writers.

Media's role in communicating biotechnology is still not prominent in Malaysia. Lack of a science desk, journalists trained in science, and editors' support; existence of communication divide between scientists and journalists; and scientists' inability to translate research work into exciting stories are some of the reasons for media's lack of involvement in communicating biotechnology.

## Scientists as Biotech Communicators

In many countries, scientists are perceived to be one of the most credible sources of scientific information. This perception enjoyed by scientists must be put to full use to bring science to the public. However, various constraints deter the scientists from becoming effective science communicators. For one, scientists are not required to undertake public awareness activities as a core part of their duties. This fails to encourage scientists to be involved in public understanding of science and in bringing their research to the public. Senior scientists through experience believe that science communication is the fundamental step to create and increase awareness among stakeholders on science particularly on biotechnology. Scientists are aware that public perception of biotechnology influences research priorities, funds, and policies. Therefore, scientists understand the need to communicate to the public. However, a number of challenges keep them in the ivory tower instead of reaching out to the public. The challenges faced by scientists in Malaysia in communicating science to the public are discussed by Dr. Umi Kalsom Abu Bakar, Director of Biotechnology Research Center, MARDI; Dr. Ravigadevi Sambanthamurthi, Head, Advanced Biotechnology and Breeding Center, Malaysian Palm Oil Board; Prof. Nazalan Najimudin, Professor, University Science Malaysia; and Dr. Kodiswaran Kandasamy, former Senior Researcher, Forest Research Institute Malaysia. They are all from the public sector who have been involved in creating awareness among the public.

Time is one of the main constraints for scientists as their core duties call for research, publication, and teaching in addition to administrative tasks. Hence, communicating to the public often takes a backseat. Moreover, this is reinforced by lack of incentives to communicate to the public. There is no ruling for scientists to be involved in public understanding of science in order to secure research grants.

The other key challenge for scientists is the lack of skills in popularizing their research work. It is a global phenomenon that scientists speak a language fully laced with scientific jargon that is not understood by the public. They are unable to simplify scientific texts for laymen and attract their attention. Most often, scientists are not able to filter out the salient point that appeals to the general public. This is also made worse by the communication divide

that exists between scientists and the media due to different work culture and ethics. Media has a much shorter deadline for writing an article and is faced with the urgency to publish even if the research is not completed yet. The material needs to be relevant to readers, thus, media tends to sensationalize news to attract readers; omits scientific discussion of procedures; and focuses on breakthroughs instead. This is the direct opposite of how scientists work.

On the other hand, scientists lack media-related skills. They are not trained in media relations, simplifying messages, identifying key issues relevant to the public, writing press releases, and performing media interviews.

### **Public Relations Office: Mediating between Scientists and Journalists**

*By Sharifah Robiaah Tengku Embong*

*Former MARDI Assistant Director of Public Relations and Corporate Communication Division*

The public relations office in research institutes can bridge the communication divide between the scientists and the media. During the early days of my work, I learned that scientists are not media savvy and are also unaware of what the media can do for them. It was not easy working with scientists as they are reluctant to be exposed to the media. Despite that, I went all out to convince scientists to work closely with the media.

Scientists often expect me to speak to the media on their behalf, but I managed to convince them that they are the only authorities who have the credibility to talk on their field of research. In the process, I realized that the main constraint faced by scientists is repackaging their research findings for general reading.

It is vital for scientists to have the ability to process technical materials and put them in simpler words for popular writing. The reading materials should contain benefits to appeal to the general public and should not use scientific jargons that could not be understood by them. My motto has always been "what is in there for the public."

It is unfortunate that most research organizations do not provide any science communication training for scientists as they do not see the need for it. It is inevitable for a leader or someone from top management to have science communication skills. Therefore, I think it is time for research institutes to start providing science communication training to their scientists.

I love media and I also enjoy working with them. In the past, the ways to approach the public were through the television and radio but it has changed now. There are so many other alternatives such as the internet, billboards, and mobile advertisements.

It is much easier to train scientists to be media savvy rather than training media to do science writing. I have attended an event themed “Turning Scientists into Celebrities” in UK a few years back which was appealing to me because it is an extraordinary approach in bringing scientists closer to the media and the general public. I hope this type of events could be adopted and be implemented in Malaysia.

Generally, there is only a small number of Malaysian scientists from research institutes and universities who are involved in public understanding of science. They would need support from their organization, MOSTI, and the media to effectively bring their research to the public.

### **Role of Non-Research Organizations**

There are players involved in communicating biotechnology in Malaysia who come from non-scientific or non-research organizations. For ease of reference these players are clustered under a category called the non-research organizations and this group comprises of ministries, government agencies, NGOs, and government-linked organizations. The role of these organizations, their activities, areas covered in biotechnology and target audience are discussed in this section.

### ***Ministry of Natural Resources and Environment***

As a party to the Cartagena Protocol on Biosafety (Secretariat of the Convention on Biological Diversity, 2000), Malaysia has an obligation to involve the public in decision making related to living modified organisms (LMOs) or genetically modified organisms (GMOs). Malaysia is urged to promote and facilitate public awareness and public participation regarding activities related to the protocol and the products of modern biotechnology (Secretariat of the Convention on Biological Diversity, 2000). As the NRE is the focal point for biosafety, it plays an important role in creating awareness on modern biotechnology dealing with LMOs. NRE is responsible for making decisions pertaining to the release, importation, exportation, and contained use of any LMO derived from modern biotechnology with the objective of protecting human, plant and animal health, and the environment and biological diversity.

The Malaysian Biosafety Act, approved in August 2008, calls for better understanding among scientists, traders, industry, regulators, and general public on issues related to LMOs. A Biosafety Core Team was established to enforce the Biosafety Act and to ensure compliance with its provisions. With funding from the United Nations Development Programme-Global Environment Facility (UNDP-GEF) to create public awareness on biosafety and modern biotechnology related to LMOs, the Biosafety Core Team plays an important role in communicating biotechnology. It has also produced several publications and organized outreach programs to educate the general public and stakeholders on biotechnology and the importance of the Biosafety Act. The outreach events and publications are mostly carried out as collaborative programs between NRE, other government agencies and NGOs. Currently, NRE is working with the Malaysian Nature Society and MABIC to produce materials on LMOs for public use. NRE's target audience is the general public, particularly students and teachers.

### ***BIOTEK (National Biotechnology Division, Ministry of Science, Technology and Innovation)***

Another ministry that plays an important role in science communication is MOSTI. It has two agencies under its purview which are active science

communicators – the Academy of Sciences Malaysia and National Science Center. Within MOSTI, BIOTEK is a division responsible for driving the national biotechnology agenda through R&D, technology development, and promotion of biotechnology programs. Besides providing grants to researchers, BIOTEK's role is also to ensure that the public is well-informed of biotechnology. As part of its promotion of biotechnology programs, various events such as biotechnology seminars and workshops are held to reach out to various stakeholders namely school teachers, scientists, general public, industry, and entrepreneurs. In the past, BIOTEK has organized road shows for schools giving students hands-on experience in simple biotechnology techniques. It is pivotal that BIOTEK initiates a roadmap for science communication in Malaysia given the importance accorded by the government to science and technology (S&T).

Being the custodian of biotechnology in Malaysia, it is crucial for BIOTEK to be an active player in communicating biotechnology. With the clout it carries, BIOTEK should be the champion in this area and should unite all science communication players so that they can contribute in a more coherent manner.

### ***National Science Center***

The National Science Center (PSN) was launched in November 1996 as an institution of non-formal learning with a mandate to promote awareness, appreciation, interest, and understanding of S&T. PSN is affiliated with international science centers in the U.S., UK, Australia, and Singapore.

The center houses different exhibits designed to instill interest in science and technology among their visitors. It bridges science with environment and religion, as well as relates science with all aspects of life, knowledge, and its applications in our daily life. Thematic programs are organized by PSN on a monthly basis and one of them is biotechnology.

PSN is an ideal place for the general public and various stakeholders to enhance their understanding of biotechnology due to its accessibility and its programs on biotechnology. It has a biotechnology laboratory program whereby schools nationwide are invited to participate in mainly hands-

on activities such as DNA extraction and basic tissue culture. One of the objectives of the program is to instill interest to learn biotechnology among students and teachers through the out-of-classroom experience.

PSN also highlights the opportunities for career advancement in S&T by engaging speakers from the Malaysian Scientific Association to give talks on science as a career. In addition, they engage scientists from MARDI and other well known organizations to talk about their research to increase public awareness of the latest developments in science.

Besides government agencies, the center also receives assistance from private sectors such as the prominent satellite television network ASTRO to do road shows around Malaysia.

### ***Academy of Sciences Malaysia***

The Academy of Sciences Malaysia's (ASM) mission is to pursue, encourage, and enhance excellence in the fields of science, engineering, and technology for the development of the nation and the benefit of mankind. It aims to promote national awareness, understanding, and appreciation of the role of science, engineering, and technology in nation building.

ASM introduced a science awareness program mainly for school students which became a very important component of the academy's thrust. Activities include national and international quizzes and competitions, special projects involving schools, science camps, S&T expositions, and collaborative programs with corporations and NGOs.

The academy attempts to document and publish all research reports and studies, being a repository of scientific knowledge for the public, especially the scientific community. It is developing an effective system of information dissemination to ensure that all parties, including the non-scientific community, are well-informed of the latest developments taking place in the science industry. One of the key activities ASM organizes is its seminar series on various S&T topics. Prominent scientists from all over the globe are invited to talk in seminars which are open to the public.

### ***Malaysian Biotechnology Corporation (BiotechCorp)***

BiotechCorp plays a role in communicating biotechnology to the public. However, given its mandate to ensure industry growth and investment in this sector, the target audience of BiotechCorp is mainly limited to industry players, scientists, entrepreneurs, life science graduates, regulators, and investment fraternity.

With the National Biotechnology Policy moving towards the second phase of implementation, i.e., commercialization, BiotechCorp's main target has evolved from the public to entrepreneurs and scientists. The main aim of the organization in communicating biotechnology is to create a brand name for Malaysia as a biotechnology player at the national and international scenes.

BiotechCorp is also involved in creating awareness on career opportunities in this field. One of its initiatives is introducing Biotechnology Entrepreneurship Special Training (BeST) Program aimed at enhancing the knowledge and skills of all graduates in technical, communication, and entrepreneurship areas. BeST program also gives unemployed graduates relevant 'real world' skills as well as industry experience and exposure. BiotechCorp is one of the main organizers of BioMalaysia, a key annual event for the Malaysian biotechnology industry that provides key stakeholders further opportunities for networking and collaboration as well as funding and investment opportunities. Other workshops, conferences, dialogues, and seminars are organized for industry players on intellectual property investment, funding, human capital development, good clinical practice, good manufacturing practice, good laboratory practice, and biosafety among others. BiotechCorp has been a key partner of MABIC in creating awareness on biotechnology among the public, policy makers, students, and teachers.

### ***Institute of Islamic Understanding Malaysia***

The Institute of Islamic Understanding Malaysia (IKIM) was established to promote a clear understanding of Islam through various programs and activities such as seminars, workshops, consultations, trainings, and publications. It conducts research activities in various fields particularly those pertaining to Islam and the Muslims. The Center for Science and Environment



Studies under IKIM was established to deal with issues revolving around S&T including biotechnology. This is reflective of the fact that the variety of issues dealt with are not antithetical to the religion of Islam and that Islam is comprehensive in nature. The Center reaches out to the Muslims and also the non-Muslims through their publications and IKIM radio.

The latter has two programs aired once a week: one on Science and Civilization, and the other on Vision of Islam. Efforts are undertaken to attract more Muslims to read their published materials. Writers are encouraged to produce more relevant articles and publications for readers.

IKIM also undertakes a series of expert discussions and other outreach programs such as seminars and conferences. Recently, it held an expert discussion on bioethics and other concerns of religious followers. This will be an on-going platform to discuss the importance and effects of biotechnology on the lives of Muslims.

### **Malaysian Biotechnology Information Center**

The Malaysian Biotechnology Information Center (MABIC) is a registered not-for-profit organization with an NGO status in Malaysia. It is governed by a Board of Directors. MABIC is the first and only NGO that promotes biotechnology in Malaysia and enjoys a good working relationship with ministries, government agencies, research institutes, universities, trade organizations, embassies and high commissions, media, industry, and farmer organizations. Its mission is to provide scientifically accurate and fact-based resources to all stakeholders and support the government efforts in developing the biotechnology sector. Its activities and publications are catered for biotechnology stakeholders comprised of policy makers, scientists, academia, regulators, members of the media, technical experts, trade representatives, legislators, students, religious authorities, members of the industries, farmers, venture capitals and bankers, and the general public. To uphold scientific integrity, an advisory committee known as Distinguished Fellows, is in place to advise and review MABIC's activities and plans. The advisory committee is composed of scientists and stakeholders who are highly respected in their fields and they represent the scientific community, industry, policy makers, media, academia, and legal fraternity.

MABIC's events are organized to create awareness on various issues pertinent to the growth of biotechnology in the country. It has organized international events and has managed to be the top biotechnology information portal with an informative website. As such, it has remained as the single most active organization in creating public awareness and addressing key issues in biotechnology.

Some of the events organized by MABIC are:

1. Media workshops to expose journalists to the world of biotechnology to ensure balanced reporting in this field;



*Biotechnology workshops expose teachers to methodologies which can be easily replicated in schools.*

2. Biotechnology workshop for science teachers involving hands-on experiments on molecular biology such as PCR, DNA fingerprinting, and DNA extraction;
3. Workshops on agri-biotechnology for *ulama* to enable them to make informed decisions on the *halal* status of GM foods;
4. Biotechnology workshops for students to inculcate their interest on biotechnology to ensure human capital development in this sector;
5. Risk communication workshops for scientists;
6. Public seminars on various topics in biotechnology; and
7. Biosafety conferences for scientists and policy makers to ensure a balanced regulatory framework.

To commemorate its tenth anniversary, MABIC organized MyBio Carnival 2010 with an aim to reach out to the general public and students through fun-filled activities. The highlights of the carnival are as follows.

1. 1st National intervarsity and interschool biotechnology debates
2. Interschool biotech spelling competition
3. Interschool biotech quiz
4. Biotech poster drawing competition
5. Biotech essay writing competition
6. Biotech coloring competition
7. Fashion design competition based on biotech motifs
8. Biotech talks
9. Exhibitions by research institutes, universities, and industry
10. Showcasing traditional biotech foods

The carnival was organized in collaboration with BiotechCorp and was hosted by the National Science Center in Kuala Lumpur and in AIMST University in Kedah for the Northern region. It drew more than 5,000 visitors in Kuala Lumpur and around 500 in Kedah.

This was the first time such an event was organized on public understanding of biotechnology. The main impact of the carnival was engaging those who are not related to biotechnology and instilling interest in them on this subject.



*Models show fashion designers' interpretation of biotechnology during the MyBio Carnival.*

The intervarsity debates saw the participation of law and engineering students which made them read up on various biotechnology topics. The other groups alien to biotechnology were the fashion design students and professional designers who were overwhelmed by the inspiration biotechnology

could offer to their designs. All fashion schools and fashion designers who participated are looking forward to the next event to show their biotechnology knowledge in the form of fashion. One school even went a step forward by introducing biotechnology as one of the topics in designing. The inclusion of fashion into the carnival promoted wide media coverage. And for the first time biotechnology was mentioned in the fashion pages of newspapers.

## The Way Forward

Science communication is at its infancy stage in Malaysia. A number of constructive measures must be taken to complement the priority given by the government to S&T, particularly to biotechnology. Based on the evaluation of activities undertaken in Malaysia on public understanding of science and biotechnology and what is practiced overseas, there are higher chances of success if some of the strategies listed below are adopted in Malaysia.

1. **Setting up of a National Committee for Public Understanding of Science.** Like the Bodmer and Wolfendale reports in UK, a National Committee for Public Understanding of Science is crucial to popularize science, enhance science literacy among the populace, increase public acceptance of new technology, and gain support for public funds to be channelled into research and development of S&T. A high level committee which will ensure scientists' involvement in science communication is long overdue compared to UK which saw efforts towards this end in 1985. CoPUS, implemented after the Bodmer Report, set in place a number of schemes to promote public understanding and appreciation of scientific matters. These include a grants line for public understanding of science practitioners, an annual popular science book prize, and a scheme to provide incentives to speakers who can make science relevant to members of the Women's Institute (Miller, 2001). These efforts have to be emulated in Malaysia.
2. **Training of scientists and media.** Various studies conclude that scientists who have undergone media training are more confident in communicating with the media than those who lack media training (Ruth et al., 2005). Training workshops for scientists could be tailored to help

scientists develop messages that are positively presented in the media. Other skills involve repackaging of scientific information into layman's language; identifying news value in their research; establishing media contacts; and responding to interviews in a crisis situation.

3. **Establishing science desk in all media houses.** This will increase quality science news and their frequency in the media.
4. **Developing modules on science communication for science undergraduates and graduate students.** Young scientists, postdoctoral researchers, graduate students, and even undergraduates should be mobilized for public understanding of science similar to what transpired after the Bodmer report in UK. Ruth et al. (2005) say that younger scientists are more confident in being interviewed by media and in communicating effectively in crisis situations. This is due to the media relations and crisis communication curricula recently introduced at the tertiary level.
5. **Provision of grants to scientists for public awareness programs.** Funds should be made available to scientists, research institutes, and universities to institute their own public understanding of science schemes and enable them to participate in science communication activities.
6. **Inclusion of activities in the scientists' proposal for funding.**
7. **Inclusion of modules on science journalism in journalism programs.**
8. **Engaging various related ministries and agencies.** Efforts to synchronize dissemination of scientific information are hugely deficient in Malaysia. There is no champion in this area to lead cooperation among all the ministries, research institutes, and agencies to be actively involved in public communication of science, particularly biotechnology. This is in spite of the government's push to make Malaysia a biotechnology hub.
9. **Creation of more science centers, science museums, and science parks.** The 20th century witnessed the beginning of interactive science museums mainly in England, France, Germany, Canada, and the U.S. They focus on their learning potential by enabling the learners to manipulate reality through interactive modules and stimulate their emotion with an objective to incite appreciation and understanding of science and draw people's opinion about it (Nepote, 2007). These institutions currently welcome more than 275 million people each year (Ecsite, 2003). Interactive science museums, science centers, and science parks should be established as the convergence point among scientists, those who fund

and administer research, and those who use science and research outputs. This can be done by means of establishing cooperation among schools, universities, industries, homes, mass media, libraries, research centers, enthusiasts' groups, and community centers.

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## Personal Interviews

1. Dr. Umi Kalsom Abu Bakar, Director of Biotechnology Research Center, MARDI
2. Dr. Ravigadevi Sambanthumurthi, Head of Advanced Biotechnology and Breeding Center (Malaysian Palm Oil Board)
3. Prof. Nazalan Najimudin, University of Science Malaysia
4. Sharifah Robiaah Tengku Embong, former Deputy Director, Corporate Communication, MARDI
5. Dr. Kodiswaran Kandasamy, former Senior Researcher, Forest Research Institute Malaysia
6. Theresa Manavalan, *New Straits Times*