Academics and scientists as biotech communicators: perspectives, capabilities, and challenges in Southeast Asia

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Abstract

University professors and public sector scientists are regarded as highly credible sources of information on biotechnology. Hence, their role in science communication, particularly on biotechnology is critical. A survey was conducted to investigate how academics and scientists involved in crop biotechnology in Indonesia, Malaysia, and the Philippines view science communication and their role in public awareness and understanding. Although they noted the importance of science communication, respondents devoted an average of 11 percent of their working time to it with most focused on research and instruction. Most of them (40%) had low level of engagement activity (1 to 10 activities/year) mostly conducted for students or staff from other institutions and farmers with an objective of fostering awareness and understanding on biotech, creating public acceptance towards biotech, and addressing issues concerning the risks and benefits of biotech. A total of 31 respondents (10%) have attended training on science communication, which were mostly sponsored by non-governmental organizations. With more funds for science communication activities, additional training, and career incentives, they would be more encouraged to conduct more science communication activities. The respondents feel that an integration of science/biotech communication activity in mainstream organizations or professional societies to enable

growth in the field through constant exchange of ideas and experiences will lead to a more informed public about biotechnology.

Introduction

Science is part of almost every aspect of a human's daily life as it attempts to explain phenomena, address issues and concerns, and provide alternatives to ways of doing things. Knowledge is produced to build scientific theories, develop new technologies, and to inform and guide behavior, decision-making and problem-solving. As such science has to be discussed with the public particularly in aspects that involve policy issues that require collective decisions (Peters, 2008). People feel excluded in dialogues regarding science and its different fields. As with new sciences, biotechnology involves polarized views leading to muddled public awareness. Hence, proper communication of biotechnology is vital to achieve public understanding and engagement. Nicolia, et al., (2013) particularly noted that "an improvement in the efficacy of scientific communication could have a significant impact on the future of agricultural genetic engineering".

Studies have shown that university professors and public sector scientists in Asia are regarded by various stakeholders as highly credible, trustworthy, and key information sources on biotechnology. They are seen to be highly concerned about public health and safety issues and are deemed capable of assessing and managing benefits and risks (Juanillo, 2003; Torres et al., 2006). There is a high significant relationship in the level of understanding about biotechnology among stakeholders who talked to professionals, experts, or scientists. The need for experts to communicate is widely recognized and has been accepted as a crucial part of their myriad of activities.

This study was intended to find out how academics and scientists in crop biotechnology in the Philippines, Malaysia, and Indonesia are fulfilling their role as biotech communicators with the public.

Methodology

Crop biotechnology practitioners from the academic and research institutions from the Philippines, Malaysia, and Indonesia were identified and given questionnaires onsite or through electronic mail. Malaysia Biotechnology Information Center (MABIC) and Indonesia Biotechnology Information Center (IndoBIC) assisted in the distribution and collection of questionnaires in the two countries. A total of 217 respondents with at least 5 years of experience in biotechnology were collected as final sample. Results were coded and tallied for analysis. Sets of data were analyzed using Pearson's coefficient to identify possible linear relationships among the values.

Results

A total of 217 academics and researchers with at least 5 years of experience in biotechnology participated in the study. The academics (71%) involved in this study were mostly engaged in both instruction and research while the researchers (29%) were solely involved in conducting studies relating to biotechnology. For Philippines and Indonesia, majority of the respondents were 51 years old or older. The respondents from Malaysia were mostly 31 to 40 years old.

More than half (70%) of the respondents, regardless of profession, were female. The predominance of women professionals was also reported in a directory of 321 Philippine biotechnology experts (PCASTRD and BIOTECH, 1997) where 69 percent were female. Consistent with the existing literature, there appears to be the feminization of biotechnology with a significant number of women in this scientific field of interest. For Philippines and Malaysia, most of the academics and scientists have doctorate degrees; while for Malaysia, mostly have attained their MS degrees. The 1997 expert directory likewise indicated a high percentage (58%) of professionals with doctorate degrees suggesting a very educated group involved in biotechnology.

Though most of the respondents were aged 51 or higher, it was revealed that majority (24%) of the respondents had only 5 to 10 years of experience working in the field of biotechnology. There is possibility that these professionals took advanced degrees to enable them to shift from their original research interests to biotech. The field is considered a relatively new area that requires advanced studies.

One hundred thirty one respondents (60%) are especially involved in crop biotechnology among other fields. Others were involved in livestock (6%), marine (4%), medical (4%), food (3%), and industrial (2%) fields. The dominance of those involved in crop biotech was also seen in the 1997 biotech directory where 74 percent were also in this field.

Time for Science Communication

Ninety percent (90%) said that they conduct science communication activities but only an average of 10.8% of their time was devoted to such activities. Consistent in the three countries, most of the biotech experts' time was spent on research (49.1%), or instruction (27.3%), administration (15.7%), and other professional activities (12.8%). This implies that even if many academics and researchers are involved in engaging with the public, they only devote minimal time for science communication.

Perceptions of Science Communication

Statements on common perceptions of scientists on science communication were rated using a 5-point Likert scale. Conflicting statements were given to check the actual attitude of the respondents on their role as science communicators. Among the respondents from the Philippines, 64 percent strongly agree that scientists have a responsibility to communicate with the general public, while in Malaysia and Indonesia, majority also agree with the statement. This result is in line with the major ratings given to other statements that most respondents said they disagree that the job of communicating biotechnology to the public is the function of communication practitioners and not of scientists and academics (55%); scientists should not deal with controversial and contentious issues but only with science (44%); and scientists should only communicate their research through peer reviewed journals (54%). These results indicate that the science practitioners perceive the need to conduct science communication and value their role as science communicators.

When asked about time for conducting science communication activities, 43 percent said they disagree that they don’t have more time left for such tasks. Even if they only devote minimum time (10.8% of their working time) for science communication,

they think that they could still devote more time for this kind of activities – an expression of willingness in their part. Advantages of engaging in science communication activities were also rated positively. Most of them agree that it helps them advance their career (54%), it is personally rewarding (53%), and strongly agree it encourages networking beyond the experts' immediate peers (56%). There is thus the recognition that science communication goes beyond informing the public but also beneficial for their personal and professional growth.

Majority of the respondents (41%) disagree that lack of communication skills is an impediment for them to communicate with the public. This may signify that they think they have enough skills for such task or they have other obstacles in engaging with the public. However, they agree (61%) that they are interested to engage more in science communication activities with proper training and opportunities.

Engagement with Stakeholders Intended Audience

Science communicators deal with various stakeholders in their engagements. The respondents were asked to rank different stakeholders depending on the frequency of their engagement with each of them. For the three countries, majority (50%) ranked students/staff from other institutions as 1, or the most frequently engaged stakeholder. In the Philippine samples, farmers and private sector representatives were ranked as 2 and 3 (20%), respectively. In Malaysia, the private sector was ranked as second most engaged stakeholder, while in Indonesia, the policy makers was chosen as the second. In both countries, the farmers were the third most engaged stakeholder.

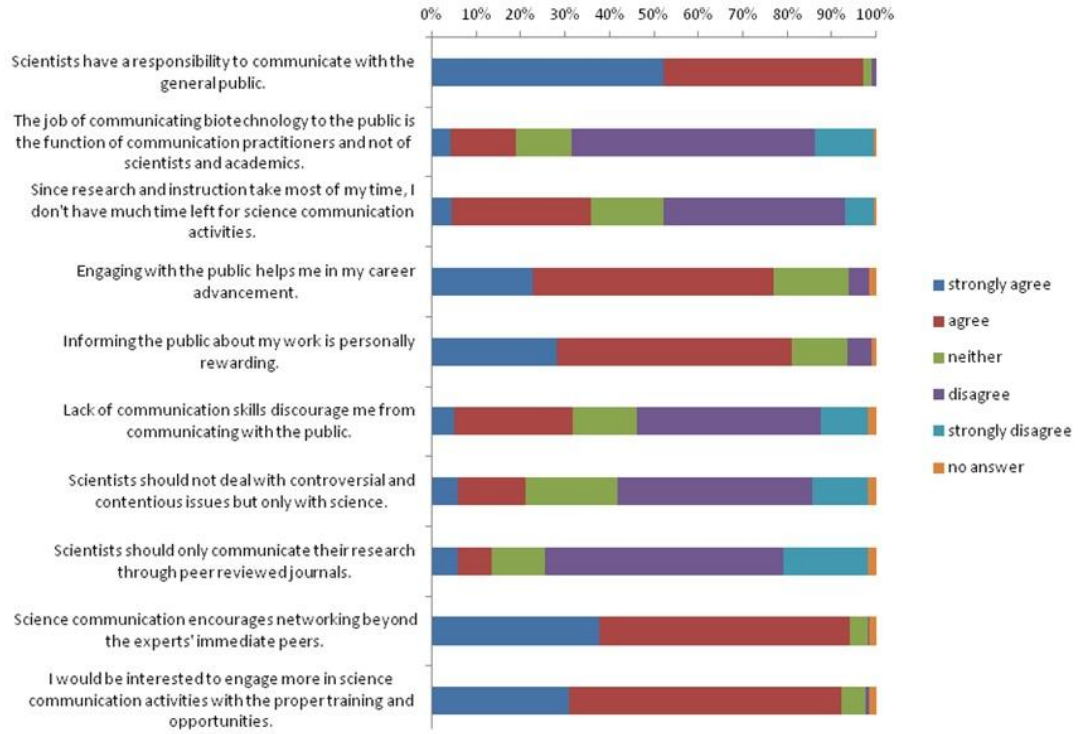

Figure 1. Perceptions of science communication

Science communication activities

The respondents were asked to scale how many times they conducted different science communication activities. The activities with the highest frequencies (three to five times or more) are engagement with engagement with farmers, and field day or stakeholder visit, and act as resource person for non-technical audience. This indicates that the most frequent activities are live or face-to-face events which are described by Bultitude (2010) as more personal interactions because of the direct discourse with stakeholders. Only a few said that they have been interviewed for television or responded to questions from general public through e-mail, letter or phone (Figure 2).

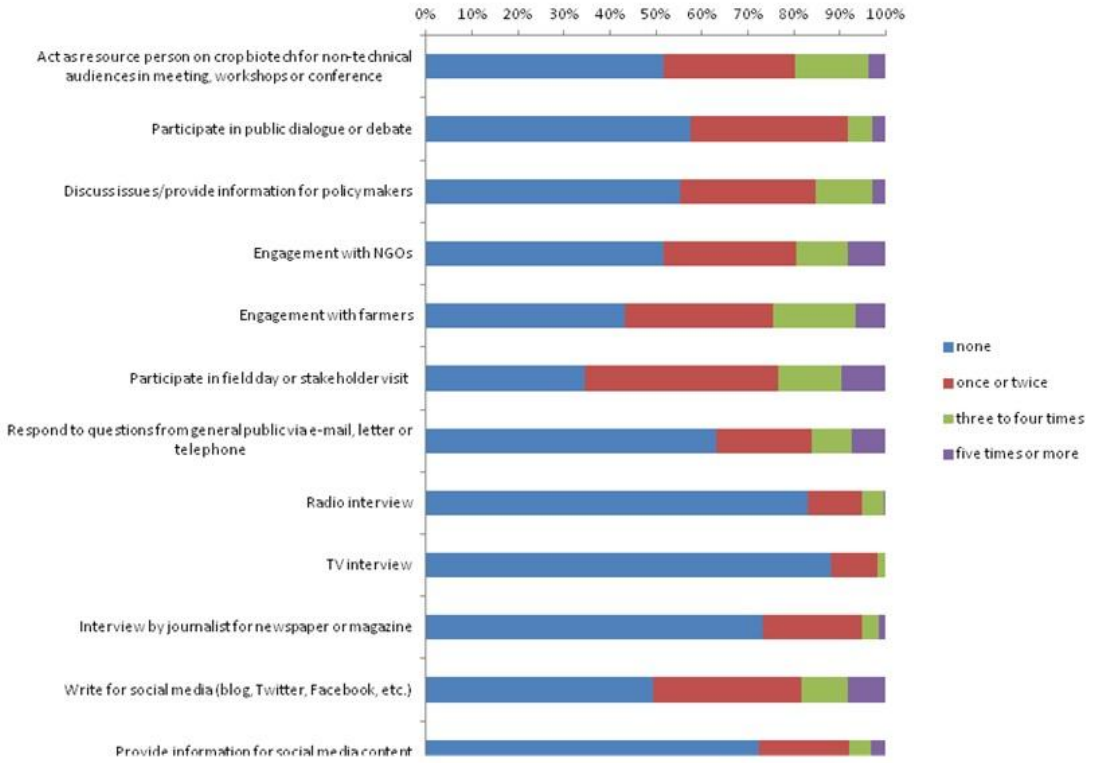

Figure 2. Science communication activities conducted during the immediate year

Level of public engagement activity

Of those surveyed, 90 percent reported having taken part in at least one public engagement activity during the immediate year. This is equivalent to the percentage of the respondents who devoted a portion of their time for science communication in another section of the questionnaire.

Based on the answers to the frequency of conducting science communication activities, three levels of public engagement activity emerged (Figure 5): those who conduct no activity (5%); low, defined as 1-10 activities per year (42%); moderate, with 11-20 activities per year (32%); and high, with 21 or more activities per year (21%). For the three countries, majority only had low level of engagement during the immediate year.

Reasons in conducting science communication

When asked about their top three reasons in conducting science communication activities, majority (71%) of the biotech experts said that they want to foster awareness and understanding of the subject matter. The secondary reasons turned out to be creating public acceptance towards biotech (57%) and addressing issues (risks and benefits) about the technology (52%).

Obstacles to science communication

The main problem encountered in conducting science communication activities was the difficulty in translating technical concepts into layman's terms (62%) (Figure 3). Thirty five percent (35%) of respondents think that dealing with audiences that had negative views about biotechnology hindered them in transmitting their message across. Lack of interest by the audience (32%) and their institution (30%) were also significant obstacles to address in effectively communicating biotechnology.

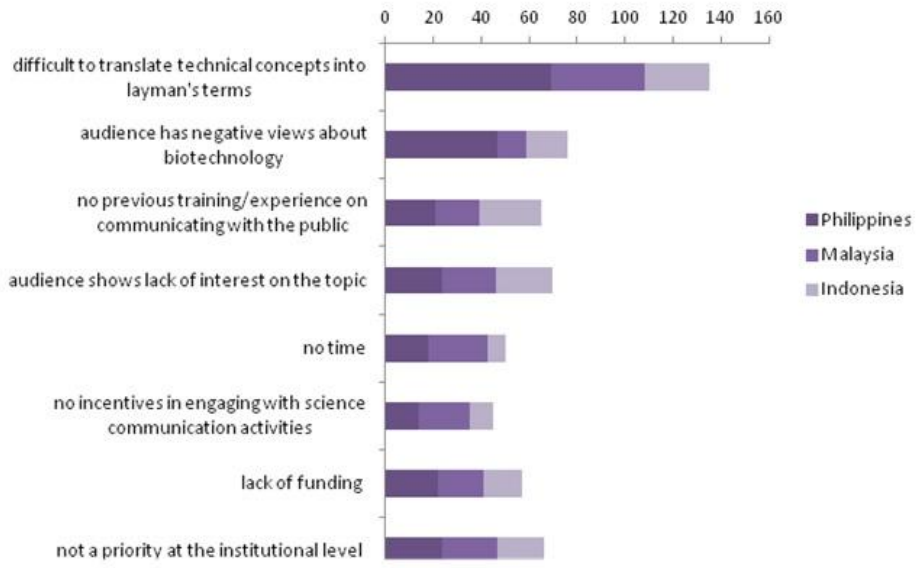

Figure 3. Problems encountered in conducting science communication activities

Training in Science Communication

Ten percent of the subjects revealed that they have attended at least one training on science communication. In the respondents from the Philippines, 20 percent have attended the training on risk communication or enhancing skills on communicating about Bt eggplant organized; creating public awareness on biotechnology; media training; dealing with media; biotechnology outreach program; enhancing biotech knowledge and communication skills for regulators; biotechnology workshop for teachers; and science communication. Of the 25 trainings attended by the Filipino respondents, 19 were organized by non-governmental organizations.

Of the 61 Malaysian respondents, only five individuals (8%) have attended a training on either risk communication, scientific communication, e-learning, or writing. The trainings they indicated were organized by government institutions (50%) or the academe (50%).

In Indonesia, only six individuals (11%) have attended training on biotech communication, media communication, or risk communication. All of these trainings were organized by non-governmental organizations.

The preponderance of biotech trainings organized by non government organizations speak of the minimal government support for science communication in general and biotechnology communication in particular.

Science Communication: Motivations, Needs, and Recommendations

Academics and researchers motivations' in engaging with the public were also investigated. When asked if more funds, incentives, and training would be given for science communication, majority (33%, 27%, and 25%, respectively) said they are "very certain" that they would be motivated. Encouragement from supervisor would probably be a motivation to 38 percent; and fewer loads in research and instruction would certainly motivate 29 percent of the subjects. On the respondents' need to improve their science communication skills, 34 percent of the experts indicated that they need for training in science communication. Six percent (6%) specified the need knowledge in translating technical concepts into layman's terms. More information or updates on biotechnology

would be helpful accounting to another 6 percent of the answers. Other needs mentioned were time, funds, opportunity, and support from the institution.

Recommendations on enhancing science communication among experts were also solicited from the science specialist subjects. Majority (25%) of the respondents mentioned training on science communication for scientists. It is consistent with the finding that only 10 percent of the respondents have attended training on science communication.

Correlation Analysis

Pearson's coefficients of the variables were computed to identify linear relationships among each other. Most of the variables had negligible or weak relationships except for two sets of data from the samples in Indonesia. A moderate positive relationship was found between gender and perception on networking, indicating that female respondents from Indonesia more likely agree that science communication encourages networking. A moderate negative relationship was also found between years of experience and perception on networking, wherein those with more years of experience believe that conduct of science communication activities encourages networking.

Conclusion

The survey shows that while researchers and academics see the value of science communication, they devote minimal time for science communication activities. A lot of them had low level of public engagement and majority have not attended any training on enhancing their science communication skills. However, most of them expressed their interest to do science communication. With the current status of GM crops in the three countries, it is about time that the public would be equipped with fact based information on biotech crops for crucial discourse and decision-making. Since scientists are at the forefront of research on biotech crops and are highly regarded as credible sources of information, they would be important actors in the communication of biotech crops and related aspects. Based on the findings of this study, the following recommendations are presented:

1. **Conduct of science communication trainings**. More trainings on biotechnology must be offered by the government and other concerned organizations. These opportunities will enable them to appreciate science communication and learn the appropriate skills. Aside from formal, classroom type trainings or workshops, biotech professionals should be also exposed to actual science activities.

2. **Strong support system for science communication**. Based on the percentage of time devoted by the respondents on their tasks, it is evident that most of them are not required to conduct science communication activities. Thus, a strong organizational support system that includes encouragement from management, incentives, and funding would be helpful to establish the science communication activities among academics and researchers.

3. **Active search for new funding sources**. Since not all institutions mandate conduct of science communication activities, scientists and academics should actively search for new sources of funding. Various organizations and foundations have been known to provide support such activities.

4. **Situated learning practice**. A community of practice or a group of people with the same profession or sharing the same craft should be developed for science communication. Through sharing of information and experiences among the group, the members can develop individually in their profession. Situated learning through regular forum or through a virtual platform could help scientists in developing their science communication skills.

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