

Communication Challenges and Convergence in Crop Biotechnology

Mariechel J. Navarro
Randy A. Hautea
Editors



Communication Challenges and Convergence in Crop Biotechnology

Mariechel J. Navarro
Randy A. Hautea
Editors



Published by: The International Service for the Acquisition of Agri-biotech Applications (ISAAA) and SEAMEO Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA)

Citation: Navarro, Mariechel J. and Randy A. Hautea. 2011. Communication Challenges and Convergence in Crop Biotechnology. International Service for the Acquisition of Agri-biotech Applications (ISAAA): Ithaca, New York and SEAMEO Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA): Los Baños, Philippines.

ISBN: 978-1-892456-50-8

©2011 ISAAA and SEARCA

All rights reserved. Except for brief quotations in a review, this book, or parts thereof, must not be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, duplicating or otherwise, without prior permission in writing of the publisher and copyright owner.

Contents

<i>Preface</i>	<i>iii</i>
<i>Acknowledgments</i>	<i>v</i>
<i>Contributors</i>	<i>vi</i>
<i>Acronyms</i>	<i>ix</i>

Part I Crop Biotechnology and Science Communication

1	Global Scenario for Crop Biotechnology: Communication Setting <i>Von V. Mark Cruz and Randy A. Hautea</i>	1
2	Science Communication: Building Consensus on Crop Biotechnology <i>Mariechel J. Navarro</i>	26

Part II Case Studies of Communication Initiatives in Biotech Countries

3	Philippines Drama and Communication Behind Asia's First Commercialized Bt Corn <i>Jenny A. Panopio and Mariechel J. Navarro</i>	43
4	India Biotech Science Communication: Bridging Science and Society <i>Bhagirath Choudhary and Kadambini Gaur</i>	81
5	China Beyond Technology: Popularizing Genetic Modification <i>Huang Dafang, Zhang Tian, Yue Tongqing, and Zhang Hongxiang</i>	112
6	Australia Understanding the Target Audience for Better Communication <i>Craig Cormick</i>	131

Part III Case Studies of Communication Initiatives in Potential Biotech Countries

7	Thailand Information Tug-of-War: Saga of Biotech Papaya <i>Supat Attathom and Mariechel J. Navarro</i>	156
---	---	-----

8	Malaysia Biotechnology Awareness: From the Ivory Towers to the Masses <i>Mahaletchumy Arujanan</i>	180
9	Bangladesh Contribution of Science Communication to Biotech Crop Commercialization <i>Khondoker Nasiruddin</i>	203
10	Vietnam Paving the Way for Greater Awareness and Understanding of Biotechnology <i>Hien Le and Mariechel J. Navarro</i>	224
Part IV Regional Initiatives on Biotech Science Communication		
11	Initiating Science Communication in the Organization of Islamic Conference Countries <i>Muhammad Iqbal Choudhary and Sammer Yousuf</i>	244
12	Knowledge Sharing and Exchange in Plant Biotechnology: Experiences from the Plant Science Industry <i>Sonny P. Tababa and Siang Hee Tan</i>	260
Part V Synthesis		
13	Convergence in Science Communication: The Tipping Point <i>Mariechel J. Navarro and Randy A. Hautea</i>	286

Index

Preface

Debates on crop biotechnology have polarized stakeholders due to conflicting messages and opinions that span socio-cultural, political and even religious issues. These have elevated the technology into a social phenomenon beyond the realm of science. Indeed the dynamics of science and society affect technology acceptance and adoption. Hence, the need for mutual understanding and a planned mechanism that enables stakeholders to actively participate in its discussion and arrive at a consensus. It is in this scenario that the discipline of science communication has found a calling. Science communication allows key stakeholders to create greater awareness and understanding about the technology, and contribute to public opinion and action through informed decision making.

While the U.S. is the largest agricultural biotechnology market, the Asia Pacific region is forecast to be a significant player. Asia and Australia provide rich case studies of how science communication is being operationalized in the field of crop biotechnology. This book documents how countries, mostly in the developing world, have addressed communication challenges in the research and development process, and in some cases, actual commercialization of biotech crops. From the experiences of these countries emerge lessons learned which contribute to a better appreciation and understanding of the crucial role of science communication in the laboratory to farmers' field continuum.

Part 1 consists of two chapters that define the status of crop biotechnology and science communication and how they relate to each other. To set the communication setting, Chapter 1 gives an overview of the global status of crop biotechnology in general, and the scenarios in Asia and Australia in particular. It highlights the tremendous opportunities of the technology especially in developing countries where numerous products await commercialization to address food and fiber production challenges as well as related issues on nutrition and bioenergy. The future of crop biotechnology, however, will rely on a favorable policy atmosphere for commercialization as well as consumer acceptance. Situating science communication in the context of crop biotechnology is the focus of Chapter 2. To address the challenges set in Chapter 1, science communication's role is presented. A cadre of trained science communicators make possible an informed public, science-based decision making, and stakeholders with increased capability, equity, and empowerment.

Part 2 presents eight case studies of representative countries in Asia and Australia. These are biotech mega-countries (those which grew 50,000 hectares or more

of biotech crops) namely China, India, Philippines, and Australia; and potential biotech countries of Bangladesh, Malaysia, Thailand and Vietnam. Except for Australia's case study which was authored by a science communication expert from Australian Government's Department of Innovation, Industry, Science and Research, the rest are written by members of the Global Knowledge Center on Crop Biotechnology as well as the Biotechnology Information Centers (BICs). They are part of the information network of the International Service for the Acquisition of Agri-biotech Applications (ISAAA) in Asia, Africa, Latin America, and Europe. The network, along with other public and private sector players in different countries are working together to create an enabling environment for the safe application of crop biotechnology; generate, process, and package information on crop biotechnology; facilitate sharing of knowledge among various stakeholders; and develop and validate appropriate science communication modalities.

Case studies of regional science communication activities are presented in Part 3. These showcase inter-country strategies to widen awareness and understanding of crop biotechnology as exemplified by activities of the Organization of Islamic Countries (OIC). Realizing the importance of science communication initiatives, initial resources are now being allotted to institutionalize such efforts in member countries. Experiences of the plant science industry in knowledge sharing and exchange in plant biotechnology are also discussed. It notes the need to foster balanced discussions by engaging stakeholders in open conversations; and in respecting the interconnectedness of ecosystems that integrates biotechnology within the gamut of the natural and social sciences, and ethics.

The last chapter is a synthesis of the case studies consolidating the lessons learned on science communication, and the way forward. The case studies show that despite diversity in culture, political set-up, economic development, religious beliefs, and language, countries have been able to address specific communication issues that impede or hasten the development of crop biotechnology. An appreciation of science communication and appropriate strategies have led to a better understanding of the societal environment where the technology can best thrive. The collective and collaborative efforts of countries and regional initiatives have converged to form a consensus on crop biotechnology.

This book is meant for all those involved in science communication. It is not only for those directly doing work in the field, but also to a growing breed of stakeholders who view science and communication not as separate disciplines, but as synergistic components necessary to bring about change, development, and transformation in individuals, institutions, and society.

Mariechel J. Navarro and Randy A. Hautea

Acknowledgments

This book is the sum total of the contribution and assistance of many people. Foremost are the authors who have taken time to research, interview, document, and write about crop biotechnology developments, and knowledge sharing initiatives in their respective countries or regions. The authors' insights into science communication learnings and their willingness to share them (failed attempts in particular) with the greater number deserve admiration. We acknowledge also the people who willingly participated in the interviews and served as reviewers at the same time, thus, enriching the chapters with their experiences and critical eye.

The International Service for the Acquisition of Agri-biotech Applications (ISAAA) supported the completion of this book and allowed the authors time to do interviews, gather secondary data, and write and edit chapters. Dr. Clive James, ISAAA chair, provided encouragement to see this book to fruition. In addition to ISAAA, the SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA) through its director Dr. Gil C. Saguiguit, Jr. agreed to co-publish this book and make it available to as many interested readers as possible.

Dr. Cynthia T. Hedreyda, director of the Molecular Biology and Biotechnology of the University of the Philippines (UP) Diliman, gave constructive comments to improve the manuscript and highlight key findings for emphasis. Dr. Cleofe S. Torres, dean of the College of Development Communication in UP Los Baños (CDC UPLB), provided a meticulous editorial eye that smoothed the rough edges of this publication. Dr. Rhodora R. Aldemita of ISAAA checked on technical accuracy and organizational flow.

Those who shared the stress and excitement in the production of this book also deserve acknowledgment. Clement Dionglay conceptualized the overall design, did the layout, and improved figures, tables and photos. Eric John Azucena designed the cover and discovered the secrets of InCopy to reduce editorial work. Donna Bae Malayang did literature review and assumed responsibility for the details involved in formatting references, acronyms, and index. Kristine Grace Natividad assisted in the proofreading of chapters and in finalizing specific portions of the book. Thanks also to the rest of the ISAAA staff who provided various forms of assistance and interest in this book.

Lastly, two people provided the motivation to complete this book. Dr. Gelia T. Castillo, National Scientist (Philippines), encouraged the authors to contribute to the robust knowledge of science communication and share the lessons learned from ISAAA's global knowledge sharing initiatives. The pioneering and passionate discourses in science communication by the late Dr. Juan F. Jamias, professor emeritus of CDC UPLB, provided the spark for the field to develop.

Contributors

Supat Attathom is the Director of the Biotechnology and Biosafety Information Center based at the College of Agriculture, Kasetsart University in Nakhon Pathom, Thailand. He holds a PhD in Plant Pathology from the University of California at Riverside, USA.

Mahaletchumy Arujanan is the Executive Director of the Malaysian Biotechnology Information Center (MABIC) in Petaling Jaya, Malaysia. She holds a BS degree in Microbiology and Biochemistry, and an MS in Biotechnology. She is currently pursuing her PhD in Science Communication at University Malaya. She has been with MABIC since 2003 and is a strong advocate of biotechnology. In November 2010 she won the Third World Academy of Sciences (TWAS) Regional Prize for Public Understanding of Science for East and Southeast Asia and the Pacific region.

Azizan binti Baharuddin is Professor of the Department of Science and Technology Studies as well as the Director of the Center for Civilization Dialogue at the University of Malaya. She completed her doctoral degree at the University of Lancaster, United Kingdom in the field of Philosophy of Science: Science and Religion. She has special interests in environmental ethics, interactions and relationships between religion and science, and the impact of science on society.

Bhagirath Choudhary is the National Coordinator of the South Asia Office of ISAAA based in New Delhi, India. He obtained his Bachelor in Agricultural Engineering and Masters of Business Administration in Technology Management from Asian Institute of Technology in Thailand. He is currently pursuing his PhD at the Ghent University in Ghent, Belgium.

Muhammad Iqbal Choudhary is the Director of the Pakistan Biotechnology Information Center and concurrent Director of the International Center for Chemical and Biological Sciences (H.E.J. Research Institute of Chemistry), Dr. Panjwani Center for Molecular Medicine and Drug Research of the University of Karachi. He has a PhD in Bioorganic Chemistry from the University of Karachi and completed his doctoral research at the Pennsylvania State University, USA, as a transfer student on a National Science Foundation Fellowship.

Craig Cormick is the Manager of Public Awareness and Community Engagement for the Australian Government's Department of Innovation, Industry, Science and Research. He has previously worked as a science journalist and has taught public relations and writing in a university. He has widely published on drivers of public attitude towards new technologies, and is a regular commentator in the media and industry and research conferences, both in Australia and overseas, on causes of public concern towards applications of nanotechnologies and biotechnologies. In 2006, he authored the report "Cloning Goes to the Movies," a study of how Hollywood portrayals of human reproductive cloning influence public knowledge

and attitude. In 2005 he authored the report "What you really need to know about what the public really thinks about GM foods." He has also published several books and has won numerous awards including the ACT Chief Minister's Book of the Year Award (1999) and a Queensland Premier's Literary Award (2006).

Von Mark Cruz was Program Manager at the ISAAA SEAsiaCenter and provided support to the center director on crop biotechnology project management activities and collaborations with project team leaders on research and development and various crop specific communication and outreach efforts in the Philippines and the Asian region. He is currently a post-doctoral Research Geneticist at the USDA-ARS National Center for Genetic Resources Preservation. He obtained his BS and MSc in Genetics from UPLB and has a PhD in plant breeding from Iowa State University, obtained through a Fulbright grant from the Philippine Department of Agriculture and the U.S. Department of State.

Kadambini Gaur is Scientific Officer of the ISAAA South Asia Center based in New Delhi, India. She is a biotechnologist by profession and has worked with the Biotech Consortium of India Ltd (BCIL) on many projects and biosafety/regulatory-related activities. She obtained a post graduate degree from Thapar Institute of Engineering and Technology, Patiala, Punjab. She is actively involved in many activities and programs on biotech outreach and communication in India.

Randy A. Hautea is the Global Coordinator of the International Service for the Acquisition of Agri-biotech Applications (ISAAA). He also has been the Director of the ISAAA SEAsiaCenter since 1998. Prior to joining ISAAA, he served as Director of the Institute of Plant Breeding, and Research and Extension Coordinator of the College of Agriculture, University of the Philippines Los Baños. Dr. Hautea completed his PhD in Plant Breeding from Cornell University, and his MSc and BS degrees in Agronomy and Plant Breeding from the University of the Philippines Los Baños. He was also a Visiting Scientist in Agronomy and Plant Genetics at the University of Minnesota.

Dafang Huang is the Director of China Biotechnology Information Center (ChinaBIC) and Vice President of Chinese Society of Biotechnology. He is also professor and former director of the Biotechnology Research Institute, Chinese Academy of Agricultural Sciences. He has an MS degree in Agri-biotechnology from China Agricultural University. He is the key scientist who promotes GM in China.

Hien Le was a former Senior Assistant of Agbiotech Vietnam. She obtained her undergraduate degree in Foreign Trade, major in journalism, from Hanoi Foreign Trade University in Vietnam.

Khondoker Nasiruddin is the National Coordinator of the Bangladesh Biotechnology Information Center hosted by the Bangladesh Agricultural University (BAU). He obtained his PhD from London University and pursued postdoctoral study at the International Center for Genetic Engineering and Biotechnology. He is concurrently a professor and founder/head of BAU's

Biotechnology Department with 21 years of teaching and research experience. He is the General Secretary of Bangladesh Association for Biotechnology and Genetic Engineering and Editor of Molecular Biology and Biotechnology Journal.

Mariechel J. Navarro is Manager of ISAAA's Global Knowledge Center on Crop Biotechnology (KC). She has a PhD in Development Communication from the University of the Philippines Los Baños. She has been with the KC since its inception in September 2000. Her internship at the CAB International in the United Kingdom on managing a biotechnology information system on the Internet led to the development of the weekly e-newsletter *Crop Biotech Update* which has over a million subscribers.

Jenny A. Panopio is the Network Administrator of the SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA) Biotechnology Information Center in Los Baños, Laguna, Philippines. She holds an MS degree in Molecular Biology and Biotechnology from the University of the Philippines Los Baños.

Sonny Tababa is the Biotechnology Affairs Director for Crop Life Asia, and coordinates the agricultural biotechnology information and regulatory advocacy programs of CropLife Asia. From 2000 – 2008, she served as Network Administrator at the Southeast Asian Center for Graduate Study and Research in Agriculture (SEARCA) Biotechnology Information Center, and from 1981-2000 she worked as a Senior Science Research Specialist at the Crops Research Division of the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development. She received an MS in Agriculture from the University of the Philippines Los Baños in 1998.

Siang Hee Tan is Executive Director of CropLife Asia, the Asian operation of an international trade association with a presence in 91 countries. At CropLife Asia, he is responsible for directing regulatory, crop protection, biotechnology and outreach programmes in 15 Asian countries. He holds a B.Sc. in Plant Pathology from the Universiti Pertanian Malaysia, a M.Sc in Genetic Engineering from Universiti Putra Malaysia and a PhD in Molecular Biology (Plant Virus) from Okayama University in Japan. Professional recognition includes a Silver Award at the 2005 Geneva Intl Exhibitions & Inventions of New Techniques and Products, a US Government Cochran Fellowship for biological research at Case Western Reserve University in Ohio, and UPM awards for Research & Development.

Yue Tongqing was a former project staff of ChinaBIC. She has a doctoral degree in agri-biotechnology from the Chinese Academy of Agricultural Sciences.

Sammer Yousuf is an Assistant Professor at the H.E.J. Research Institute of Chemistry of the International Center for Chemical and Biological Sciences (ICCBS), University of Karachi. She concurrently works as Coordinator of the

Pakistan Biotechnology Information Center. (PABIC). She obtained her PhD from ICCBS and has been actively involved in many programs and activities organized on biotechnology and chemistry by PABIC and ICCBS.

Tian Zhang is an assistant of ChinaBIC, and the editor of *China Biotechnology*. She earned her MS degree in Biochemistry and Molecular Biology from the Graduate University of Chinese Academy of Sciences.

Hongxiang Zhang is the Coordinator of ChinaBIC, executive editor-in-chief of *China Biotechnology*, Deputy Secretary General of Chinese Society of Biotechnology (CSBT), and the director of Science Communication Committee of CSBT. He is also a research fellow (professor) of the National Science Library of Chinese Academy of Sciences and has over 10 years experience in strategy and policy research on biotechnology.