



# Science and Popular Media:

How Cartoonists Visualize Crop Biotechnology



**ISAAA**  
INTERNATIONAL SERVICE  
FOR THE ACQUISITION  
OF AGRI-BIOTECH  
APPLICATIONS

# CROP BIOTECHNOLOGY



Cartoons and other popular art forms such as comic strips and animation can sometimes be more powerful than words in conveying messages. They go beyond just giving information. By reflecting on popular contemporary ideas, cartoons elicit emotions that encourage interest, inquiry, and empathy. Readers are attracted to cartoons because of its subtle humor and ability to communicate several messages in a visual and simple way.

A study conducted by the International Service for the Acquisition of Agri-biotech Applications (ISAAA) aimed to determine how cartoonists in Philippine national newspapers “define” biotechnology. A sample of cartoons published during 2000-2009 were analyzed as to message, tone (negative, positive or neutral), and use of frame, visual metaphor, and symbols. Absence of concrete products and unfamiliarity with the topic in the initial years of media coverage resulted in cartoons that favored the use of the fear appeal.

In 2011, ISAAA and the SEAMEO Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) - Biotechnology Information Center organized BiotechToons, a contest for cartoonists on biotechnology in collaboration with the Philippine International Cartoons, Comics, and Animation (PICCA), Inc. When provided with science-based resources in media and expert formats, cartoonists were able to provide a broader perspective or more substantive overview of the technology.

Aside from the Philippines, other countries within the ISAAA biotech information network such as China, Kenya, and India are using different cartoon formats to help popularize crop biotechnology concepts and issues.

## Cartoons as Popular Media



Symbols, icons, lines, and words – these are the codes and tools that cartoonists use to simplify complex messages and transform multiple concepts into condensed ideas. Within a small space, visual metaphors masked through humor, wit, satire, and exaggeration enable a community of readers to share common concerns, values, beliefs, and aspirations.

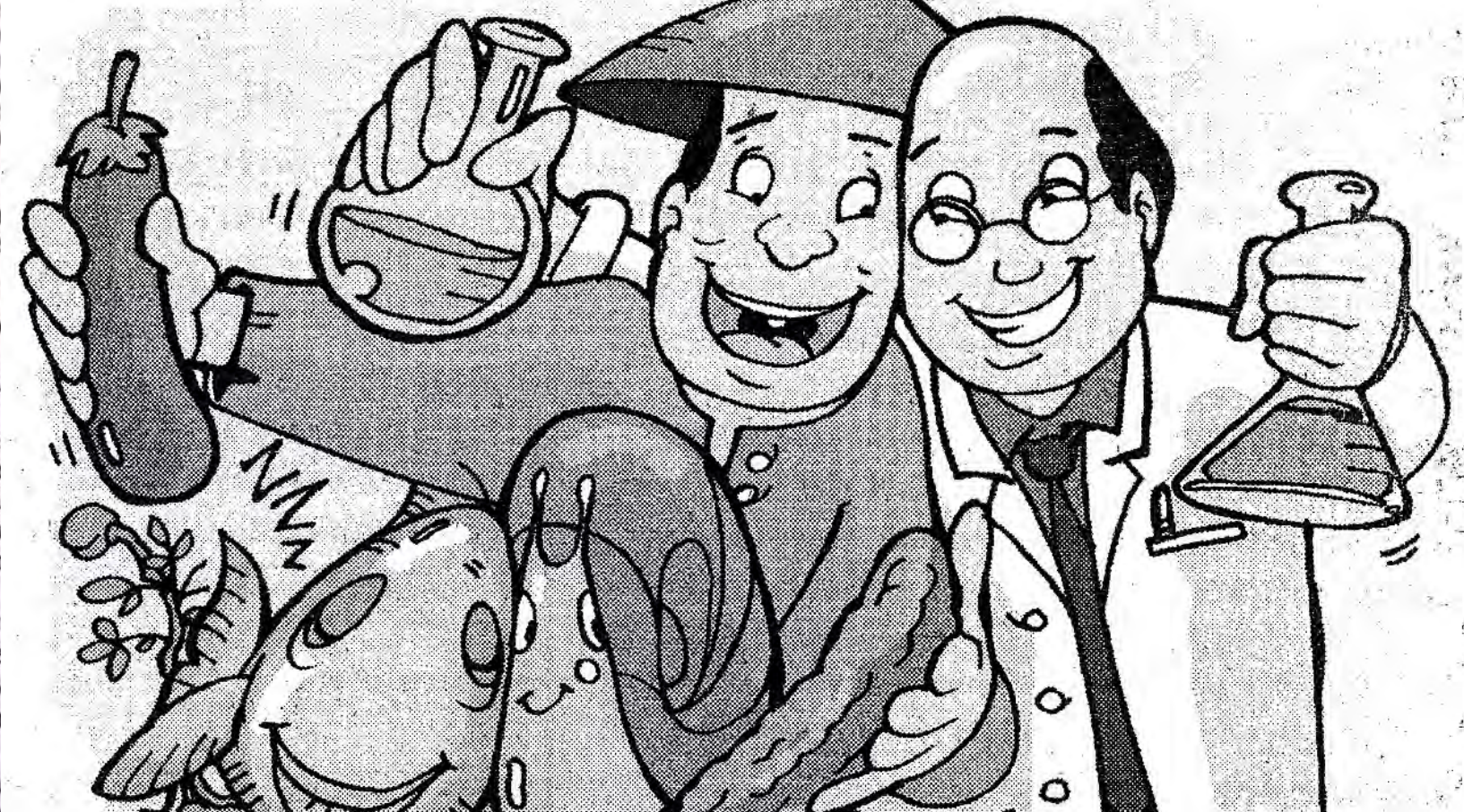
Studies have shown that the mass media is the most frequently used source of information on science and technology. Reporters and cartoonists interpret events and societal concerns which may border on perception and perceived reality. These symbolic representations contribute to the formation of public opinion. It is important therefore to understand how media “defines” biotechnology as it contributes to informal learning and decision making.

The value of cartoons lies in the fact that public perception is often defined by a visual image. For example, the visual portrayal of “scientist” is often a detached, impersonal person in white lab coat and eyeglasses or stereotyped as having powers to wreak havoc on mankind. Neither of these two stereotypes is accurate but the general images are what the public sees and ascribes to the word “scientist”.

On the other hand, cartoons can be effective channels in science education. A novel tool in science communication is the combination of caricature and satire in presenting science concepts. Cartoons are able to humor and at the same time convey scientific information in a simple, understandable, and interesting manner.



# Visual Media & Biotechnology



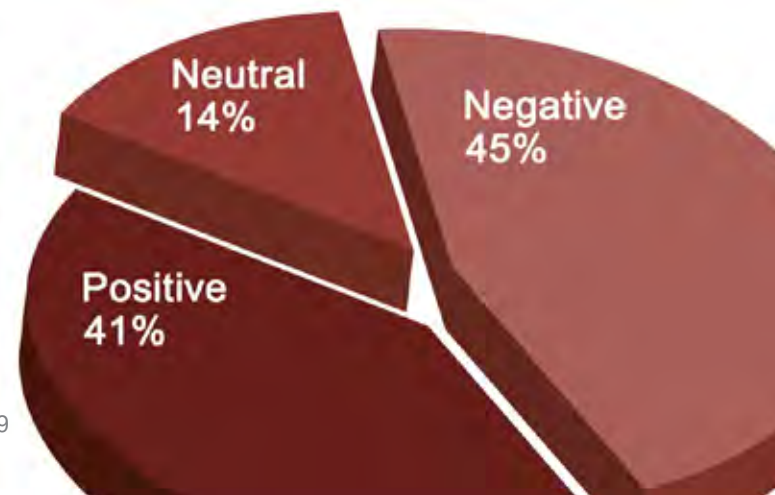
The International Service for the Acquisition of Agri-biotech Applications (ISAAA) conducted an online and manual search of articles on biotechnology from 2000 to 2009 to determine Philippine media coverage. From a list of 1,355 articles collected from three national newspapers, a sample set of 22 cartoon illustrations or editorial cartoons was evaluated in terms of message, tone, and use of framing device, characters, and visual metaphors.

While the *Manila Bulletin* and *Philippine Star* accounted for about 70% for all newspaper articles on crop biotechnology, about 59% of cartoons were generated by at least five artists of the *Philippine Daily Inquirer* (PDI). The cartoons provided the visual counterpart to the text in the absence of photos. The PDI had the only female artist among the 11 cartoonists, however, she was responsible for contributing the most number of cartoons for the period. Four of the identified cartoonists were senior artists who also did the editorial cartoons of their respective newspapers or had regular individual comic strips.

## Message

Artists highlighted biotech crops, particularly biotech corn, on 50% of the cartoons. This can be attributed to the fact that most of the articles during the initial years of media coverage coincided with the approval and eventual

commercialization of the crop. At a time when the crop was not yet available on farmers' fields, and its safety as a food and feed crop was being debated, Bt corn symbolized either the uncertainty felt by the public or the promise that the crop had to offer. The science of biotechnology was also a favorite message, showing how the research community was doing its share to bring benefits to farmers and consumers, thus assuring food security. Scientists were shown with the products they created in the laboratory.



Majority of cartoons in the initial years of biotech reporting were generally negative in tone, preferred the fear appeal, and used exaggeration in the absence of concrete products and unfamiliarity with the concept. They often reflected the articles they accompanied. With the commercialization of a biotech crop, cartoons were more positive in perspective, highlighting the technology's benefits.



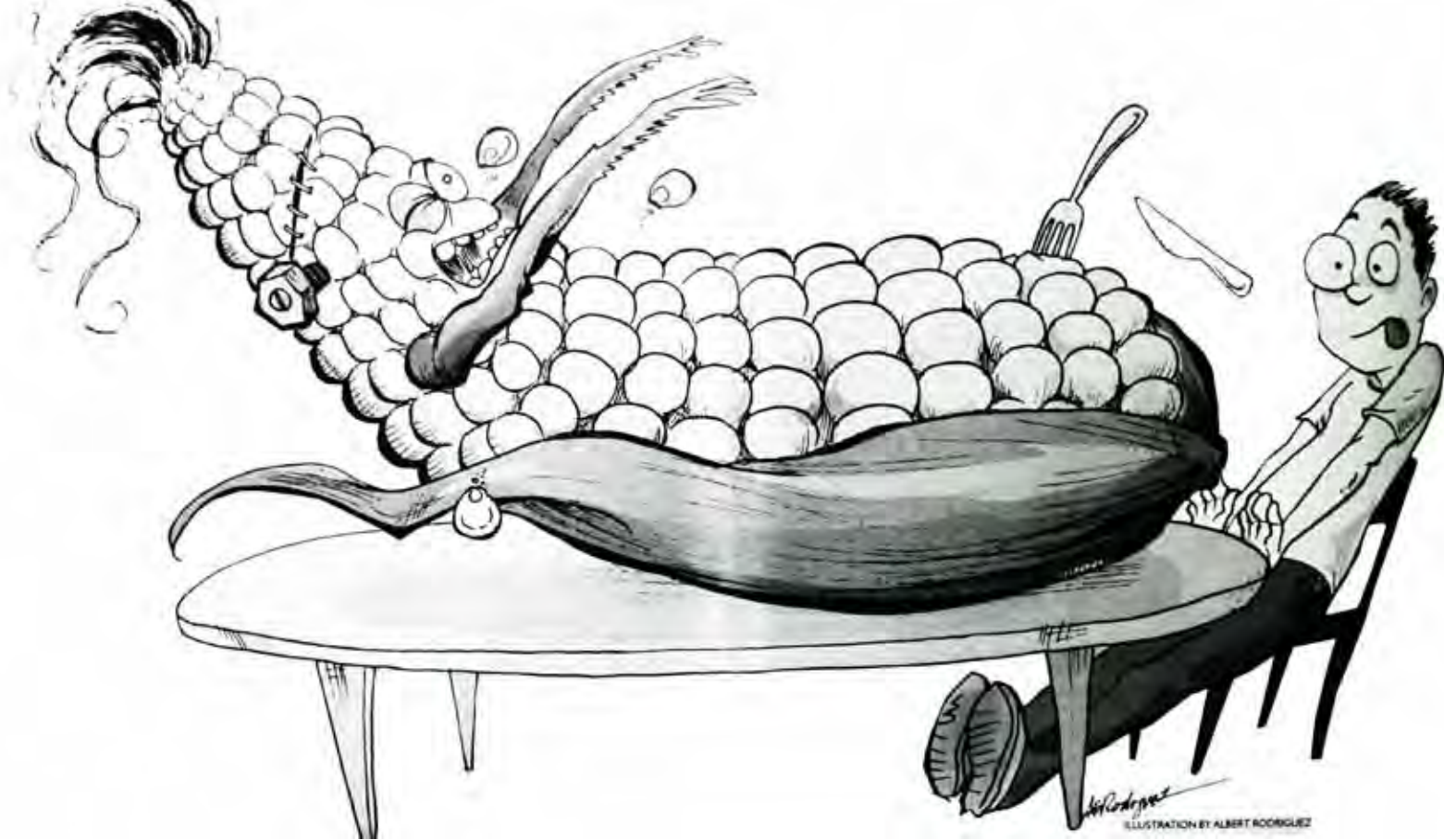
## Frame

Story frames determine the importance of a topic or issue. Framing establishes indicators for what concerns or affects society, thus representing public opinion. About 26% of cartoonists framed biotech from a social progress perspective, showing how the technology can improve or affect the quality of life through a variety of improved crops and savings to the farmer and government. Public accountability frame was used by 22% to show uncertainty in the technology and government's support and role in assuring its safety. Since the technology was

perceived as unfamiliar territory, the scientific validity frame was chosen by 22% of the artists. This frame elaborates expert understanding of what is known versus the unknown and calls on the science community to address this concern.

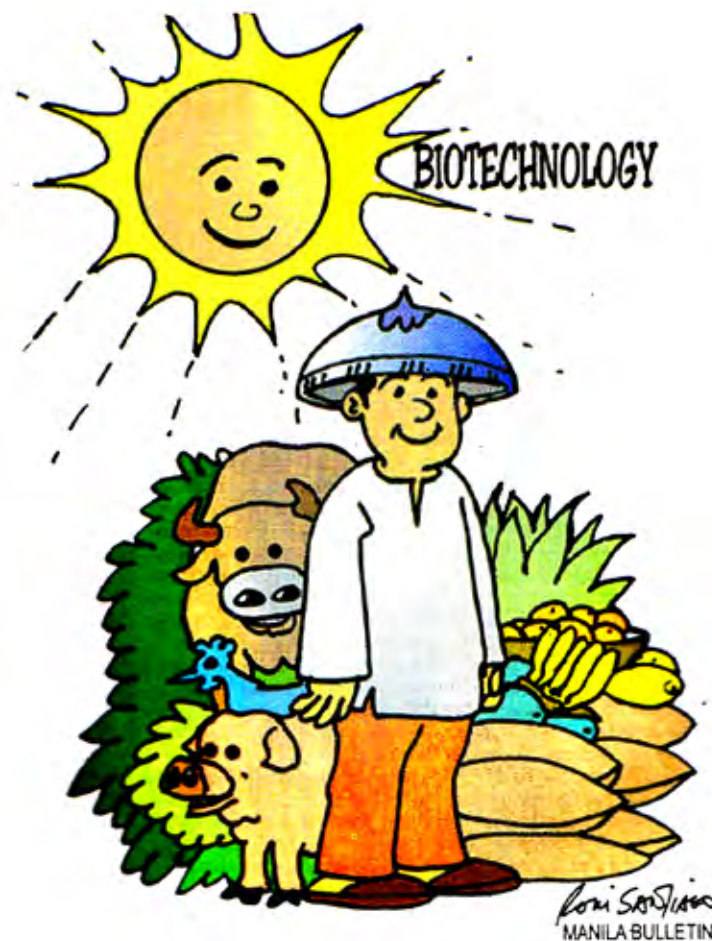
## Characters and Visual Metaphors

Cartoons were male-centered in the depiction of characters or symbols used. Over 64% of the characters had male attributes. Preferred characters were the scientist, biotech corn, farmer, and the consumer. Science



symbols were the DNA (building block of life), a scientist portrayed as a man in a laboratory gown, magnifying glass, flask, and test tube. Corn, whether a conventional or biotech variety, was the most drawn crop. It was either depicted as either a super crop or an abnormal food that attempted to instill fear among consumers. The public was represented by both male and female characters, either as being undecided in accepting a biotech crop or a recipient of the bounties of biotechnology. The tomato was also a favorite object despite not being a biotech crop that was introduced in the country.

There was a trend to use the fear appeal in conveying messages about biotech. The visual metaphor was depicted through the graphic equivalent of the then popular word "Frankenfood", and the image of scared consumers rallying against Bt corn. Also appealing was the use of the potential or promise metaphor shown through a sun smiling over a happy farmer and his agricultural plants and animals.



## BiotechToons



In 2011, ISAAA and the SEAMEO Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA)-Biotechnology Information Center organized BiotechToons, a contest for cartoonists on biotechnology, in collaboration with the Philippine International Cartoons, Comics, and Animation, (PICCA), Inc.

The contest was open to two levels: professionals or practicing cartoonists who are affiliated with media networks and/or related professional organizations; and amateurs who draw cartoons as a hobby. Contestants were asked to submit an original hand drawn, one-frame editorial cartoon on the theme *The Benefits and Potentials of Crop Biotechnology*. They were encouraged to conceptualize their entries based on science-based information.

ISAAA gave a 10-minute briefing to members of PICCA on what biotechnology is, the science behind the technology, and benefits of existing and potential biotech crops. This interaction enabled the cartoonists to understand the





1st Place, Professional Category: Norman B. Isaac



2nd Place, Professional Category: Stephanie Bravo-Semilla



3rd Place, Professional Category: Eulogio T. Gibas II



Special Citation, Professional Category: Maciste B. Alegre



technology better and ask questions from experts. The Facebook page BiotechToons provided links to information to help contestants conceptualize the theme. A total of 76 entries were submitted and evaluated by five judges from the biological sciences, visual communication, and media fields. Professional cartoonists from the mass media and advertising companies were joined by hobbyists, students, and graphic enthusiasts. Entries were judged based on adherence to theme, execution/originality and visual impact. Three major prizes were given to winners in each level in addition to special citations to meritorious entries.

The winning cartoons were exhibited during the 7th National Biotechnology Week Celebration at the Department of Environment and Natural Resources

***“There is low interest in science among readers but it is vital to the country’s progress. Cartoons provide nuggets of wisdom through visual symbols. To understand biotech better I interviewed a government expert from the Bureau of Plant Industry. We need to get the correct messages out.”***

Norman B. Isaac, Professional Category winner

***“ Biotech is a new topic for me. I read about it on the internet but we have to be selective about the publications we read. I see the potential of the technology but farmers must still make the choice of whether to use it or not.”***

Merry Joyce P. Bautista, Amateur Category winner

in Metro Manila. The cartoon exhibit was one of other exhibits on biotechnology which were set up by different government agencies and academic institutions. The cartoons were also displayed at an exhibit in SM Fairview Mall during the anniversary program of PICCA where other cartoon displays and drawing sessions were held. This venue attracted a more diverse audience as the exhibit was in the center of activities inside a shopping mall.

#### Message and Frame

Since the theme of BiotechToons was on the benefits of crop biotechnology, the prevailing message was the progress or improvement in the quality of lives among farmers and consumers. The cartoons depicted the

concept of crop biotechnology “benefit” through the products, e.g. biotech crops which are pest or insect resistant, can thrive under adverse conditions, are high yielding and thus, contribute to food security. Hence, the preferred frame or dominant concept among 71% of the artists was social progress.

Key characters used were male scientists or farmers who were portrayed as happy, smiling people. Scientists were featured as developing biotech products that enabled farmers to reap the benefits of high yielding and pest resistant crops. A cartoonist explained his concept of a “super” farmer as “one who uses biotech that gives power to increase crop yield and protects him from the agony of pest attacks and weather discrepancies.”



Tag cloud of words or phrases used in cartoons about the benefits of biotech crops

Among the biotech crops, biotech corn, eggplant, papaya, and rice were often included in the cartoon frame. The crops were often depicted as “super” crops with one artist identifying them as Captain Corn, Wonder Tomato, and Super Papaya. As one artist said to explain his cartoon: *My editorial cartoon is about how biotechnology has been able to transform certain crops into more resilient varieties making them among others, virus and insect resistant, able to survive in abnormal conditions like drought or flooding. This technology will be able to lessen the impact of global food shortages by making crops more hardy especially*

*now at the time of climate change. Stronger crops would mean higher crop yield and more food for the growing world population.*

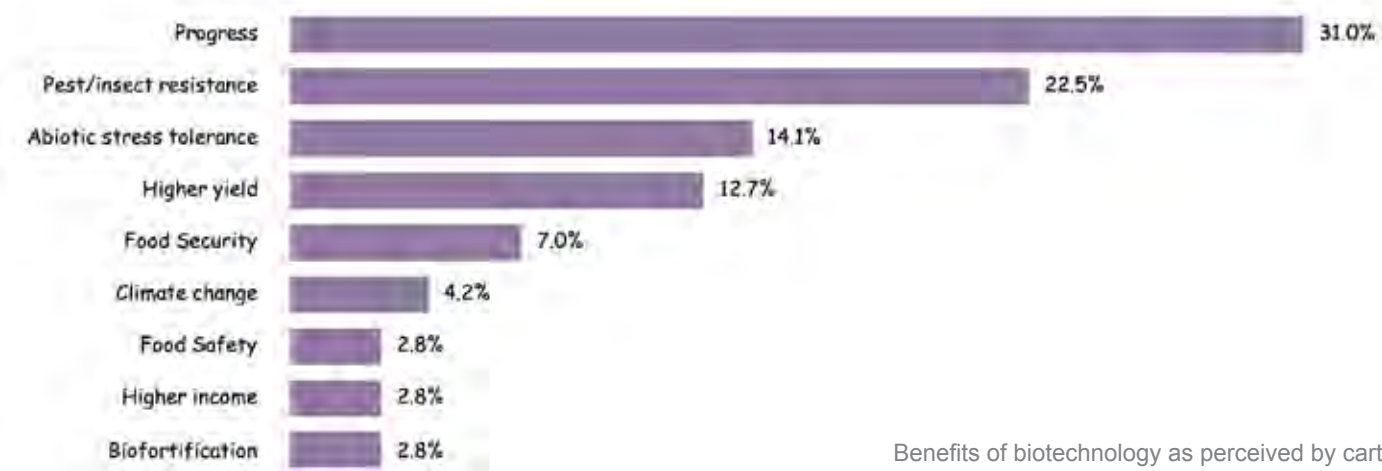
Interestingly, the inclusion of the DNA structure to symbolize biotech by 17 cartoonists showed their ability to go beyond “given” concepts and introduce a scientific viewpoint into the frame. One artist elaborated his inclusion of the symbol: *The double helix code/DNA symbolizes crop biotechnology which helps bridge the gap between poverty*

*and increased productivity/food security. The benefits and potentials of crop biotechnology show the brighter side of genetic engineering.*

Biotech crops were identified as either a papaya, eggplant, rice or corn with any of the following attributes: drought tolerant, vitamin-enriched, virus resistant, or insect resistant.

The dominant (70%) visual metaphor used was potential or promise. This category refers to positive images or developments that will affect people in the future or as an artist articulated: *The potential of biotechnology is essential for a brighter future ahead for our country and the world.* The choice for this category is consistent with the symbols and frames used.

Cartoons that tackled problems used the following words or phrases to clarify images in artwork: health, poverty, flood, climate change, and hunger.



Benefits of biotechnology as perceived by cartoonists

### Word Text

In addition to visual images, cartoonists use words or phrases to highlight certain concepts. A visual representation of the frequency of key words referred to as a tag cloud was developed. The tag cloud of frequently used words in the cartoons showed preference for the following terms or phrases: higher yield, improved (plants and animals), increased nutrients, health, more food, and safer environment. Again, artists conceptualized “benefit” in terms of these key words which are similar to the visual images used.



# Adding Value to Cartoons



The use of cartoons in the popularization of science and technology in general and biotechnology in particular is a continuing activity. The BiotechToons exhibit is shown during events sponsored by academic institutions and research and development agencies. Biotech cartoons are used in publications, story boards, workshop presentations as well as in designs for institutional giveaways.

## Biotech sQuizBox

A publication referred to as Biotech sQuizBox was developed by the creative team of ISAAA's Global Knowledge Center on Crop Biotechnology and illustrated by a professional cartoonist who joined BiotechToons. It is an accordion-type cartoon publication that aims to introduce crop biotechnology to secondary school students (although it will appeal to all ages). One side of the booklet contains bites of information about the history, development, benefits and global status of biotech crops. The other side of the booklet encourages learning through fun exercises, puzzles, and games. ReRBiotech sQuizBox

was pretested on students who found the material very informative, simple to understand, and a fun way to learn new concepts. To widen the reach of this booklet, a copy is available for download on the ISAAA website ([www.isaaa.org](http://www.isaaa.org)). A digital interactive version of the games is being developed to accompany the publication. Games are presented by conceptual level with a virtual teacher providing background information.



Mandy and Fanny in India

## Mandy and Fanny

Biotechnology Information Centers (BICS) are also using cartoons in their public awareness activities. India BIC developed a 60-page educational publication *Mandy and Fanny: The Future of Sustainable Agriculture*, a tale of two biotech crops (Mandy as corn and Fanny as cotton). The cartoon characters discuss the attributes of biotech/

genetically modified (GM) crops, and how they are gaining rapid adoption, increasing income and creating an impact on millions of farmers and consumers worldwide. It is also available as a four-minute video, thus offering an exciting way to learn about biotech crops through a combination of audio, animation, and interactive info graphics. The materials are available on the ISAAA and South Asia Office websites.



Mandy and Fanny in Kenya

Inspired by the cartoon book developed by India, the BIC in East and Central Africa produced its own version entitled *Adventures of Mandy and Fanny in Kenya*. It narrates the story of the maize and cotton characters that take an educational tour in the country and interact with major stakeholders (government representatives, politicians and opinion leaders, journalists, farmers and consumers). During the tour, they give insights on biotechnology and its benefits and correct misconceptions.

## Lele, Dodo and Mimi

China BIC also uses cartoons in their story boards to introduce principles, applications, safety assessment, benefits and related issues on genetic modification. These



Mimi, Dodo, and Lele

story boards are used during the Biotechnology into Campus series, where students learn in a fun way through games, plays, and story telling. Three key biotech crops in China are portrayed by Dodo (cotton), Lele (corn), and Mimi (rice).

**Cartoon Newsletter**

Another activity with students in China is creating hand written newspapers where students write articles and add cartoons to demonstrate their understanding of biotech concepts based on the science popularization activities organized by the BIC. Feedback from the students has been very favorable in terms of awareness, information retention, and interest. A survey of 316 students who attended the Biotechnology into Campus series revealed that 89% of them would accept GM technology and would recommend its products to their families.

Cartoons as a popular art form can contribute to greater awareness and understanding of the technology through the use of images that the public can relate to. These visual media can be a springboard into a transparent debate and discussion



Cartoon newsletter by a Chinese student

on a technology that has benefits just waiting to be tapped. By providing science-based information to cartoonists, particularly those in the mass media, these visual communicators can play an important role in making this possible.



2nd Place, Amateur Category: Marjorie S. Sazon

3rd Place, Amateur Category: Merry Joyce P. Bautista

Special Citation, Amateur Category: Apolinario L. Aquino Jr

MODERN BIO-TECH

BIOTECH

BIOTECH

Biotechnology  
DROUGHT-TOLERANT CORN

ECONOMY

GMO

BIOTECH

EXPORTING

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Navarro, Mariechel, Kristine Natividad, Sophia Mercado, and Jenny Panopio. 2012. Visual Representation of Science: How Cartoonists Define Biotechnology. International Service for the Acquisition of Agri-biotech Applications (ISAAA) and SEAMEO Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA): Los Banos, Laguna, Philippines.

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