Dimensions of Radio Coverage and Content Generation of Agricultural Biotechnology News in Kenya

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Acknowledgment

This research was supported by the International Development Research Center (IDRC) of Canada

Abstract

This paper presents findings of a just concluded research designed to better understand radio usage in communicating the newly emerging field of agricultural biotechnology in

Africa. While various national and international fora have acknowledged the importance of mass media in shaping perceptions and informing decision-making processes, very little has been done to gauge dimensions of coverage and the whole spectrum of content generation and capacities needed in respect to agricultural biotechnology. Quantitative and qualitative content analysis of the coverage of biotechnology issues in nine radio stations and five newspapers in Kenya over a period of one year was conducted. The articles and programmes were written or presented during a period when the country was experiencing heightened media coverage of biotechnology due to debates on enactment of a Biosafety Bill to regulate modern biotechnology. Findings revealed that agricultural biotechnology is not adequately covered by Kenyan media in a way that could enable informed public debate and policy choices. This was demonstrated by few number of items presented, little space allocated and placement of the stories in the newspapers. Radio producers cited various challenges that hindered adequate coverage of biotechnology which included: their low scientific knowledge, scientists' use of technical jargon and unavailability of experts well versed and confident to speak in local languages. Measures should be taken to improve both quantity and quality of coverage of biotechnology issues by improving relationship between journalists and scientists. Production of a local glossary of biotechnology terms in local languages could greatly enhance confidence of radio producers and presenters. Training of journalists to increase accuracy of coverage and that of scientists on science communication skills cannot be overemphasised.

Key words

Agri-biotechnology, radio, GMOs, communication, mass media

Background

Evolution and growth of agricultural biotechnology, including its applications has been characterised by controversy, divergent views and polarized positions on perceived risks and real benefits. Proponents view the technology as one that adds value and complements traditional breeding systems with promising solutions to intractable agricultural challenges. In contrast, anti-biotechnology groups focus on perceived risks. They caution for treatment of biotechnology with a high degree of scepticism, framing it as a technology capable of fundamentally transforming nature in ways different from conve ntional practices. And, as Attah et al (2004) note, undertaking "communication effect" studies to provide accurate information for strategic design of programs that incorporate all diverse views is therefore timely and needs-based.

It is well-documented that the mass media are the first and most important sources of information when it comes to judging new and perceived complex technologies (Brossard et al 2007; Bonfadelli 2005). Radio in particular has been singled out as one of the most powerful public communication systems, and is still the dominant mass-medium in Africa in terms of audience numbers (BBC AMDI report 2007). Radio owes its success to its pervasive and oral medium, and, broad local appeal in terms of language adaptability (local dialect) that is easily comprehensible by local communities. It thus transcends literacy limitations and accessibility in the remotest of areas where other forms of media modes cannot reach. In this regard, radio has been acknowledged as a highly effective medium for influencing developmental initiatives all over the world (see for example Dagron, A.G., 200; Bruce Girard, 2003; Skuse, A., 2006).

A study in Kenya in 2004 found that radio was especially important among low-income groups for communicating information about GM foods (Kimenju, Groote et al. 2004). In Nigeria, a 'person in the street' study of consumers in four metropolitan areas in the north of the country in 2003 found that awareness of GM terminology was high, and the largest single source of information was international radio broadcasts in the Hausa language from the BBC, Voice of America and Deutsche Welle (Kushwaha, A.S. Musa et al. 2004). Another study among mainly subsistence farmers in Tanzania (Lewis, Newell et al. 2010) showed that, although awareness of GM technology among them was very poor, those who were aware of the term 'genetically modified' had heard it on the radio.

Elsewhere, it has been widely acknowledged that stakeholders' confidence in agricultural biotechnology largely influences the extent of investment and trickle down effects of benefits in a responsible, equitable and safe manner. On the other hand, perceptions of the risks and benefits influence the direction of innovation *viz:* acceptance or rejection. These perceptions are largely influenced by the information available to stakeholders or exposure through hands-on experiences. With so many communication actors and each espousing their own viewpoints, this study sought to scrutinise the kind of messages disseminated through the radio as an important communication channel in this field with a view to identifying the specific challenges faced covering a highly technical and polarised subject as agri-biotechnology.

While abundant literature points out to radio as effective carriers of information and educational materials for national development processes, its impact in communicating agricultural biotechnology has not been thoroughly investigated. More specifically, contributions of radio in enhancing the communication process of a highly polarised issue such as biotechnology through popular vernacular-language, interactive FM radio modes and emerging opportunities presented by new information communication technologies such as cell phones remain poorly understood. The findings would contribute to the body of knowledge in this area and increase understanding of the significance of radio programming to specific development outcomes and other agricultural radio-mediated programming initiatives.

Research Questions

1. How has radio covered agricultural biotechnology in Kenya?
2. How does radio compare with other media and other means of communication in influencing public opinion about biotechnology?
3. What institutional arrangements can be undertaken to increase effectiveness of radio as an interactive development communication tool for enhancing impartial communication about agricultural biotechnology?

Objectives

i) To establish nature, trends and motivation for radio coverage of agricultural biotechnology in Kenya

ii) To explore extent of radio use and perceived advantages over other media and/or other communication modes for communicating agricultural biotechnology

iii) To examine institutional arrangements that could improve effectiveness of radio in promoting balanced viewpoints on agricultural biotechnology across key stakeholder groups

Methodology

The study employed multifaceted and participatory approaches which included i) content analysis of print and radio programs covering agri-biotechnology, ii) situational analysis of sources of information on agri-biotechnology ii) capacity assessment of radio broadcasters and iv) focus group discussions among extension service providers and scientists on radio use patterns. Since agri-biotechnology has not yet been considered a public agenda issue for regular coverage, the study purposively identified occasions that may have triggered intense coverage of biotechnology in order to get a fairly large sample of articles to analysis.

Selection of print media

In Kenya, the period November 1, 2006 to November 30, 2007 was selected. This was a period of heightened public interest in biotechnology issues due to debates on the Kenya Biosafety Bill, which was assented into law in February 2009 and operationalized in April 2011. The analysis examined the quality and quantity of print media coverage of biotechnology issues in two major local daily newspapers, that is, Daily Nation (including *Saturday Nation and Sunday Nation)* and The Standard, and one regional weekly newspaper, The *EastAfrican*. Three hundred and sixty five (365) issues of each of the daily newspapers and 52 editions of the weekly *EastAfrican* were examined. Data were coded in terms of frequency of coverage; sources of biotechnology articles; type of stories published; prominence of stories; accuracy; fairness and balance of published the biotechnology articles.

In the study context, an article refers to news, features, commentary/opinion, an analysis, editorial and letters to the editor. Advertorials were excluded from the study because they are

paid for by the source and may not reflect or prove an own initiative by the paper. Besides, they may not necessarily reflect the editorial policy of the paper.

Selection of radio stations:

Since not all radio stations prioritize agricultural programming, purposive sampling was used to select appropriate radio stations that usually host or air agricultural programmes. The following radio stations were selected from a sampling frame of radio stations in the country: KBC Kiswhahili Service, KBC English Service, Musyi FM station, KASS FM, Mbaitu FM, Mulembe FM, Coro FM, Egesa FM and West FM. The researchers selected the radio stations purposefully.

Content analysis indicators for radio

The following were the content analysis indicators used to capture relevant information for the study:

i. Name of radio station
ii. Title of radio program and language
iii. Duration of agricultural program
iv. Date and time of presentation of program
v. How long the program has been running
vi. Program format
vii. Sponsorship of the program
viii. Feedback system
ix. Issues covered
x. Coverage of agricultural biotechnology
xi. Sources of agricultural biotechnology information
xii. Comments on fairness, balance
xiii. Comments on challenges for production of agricultural programs
xiv. Comments on challenges for covering agricultural biotechnology

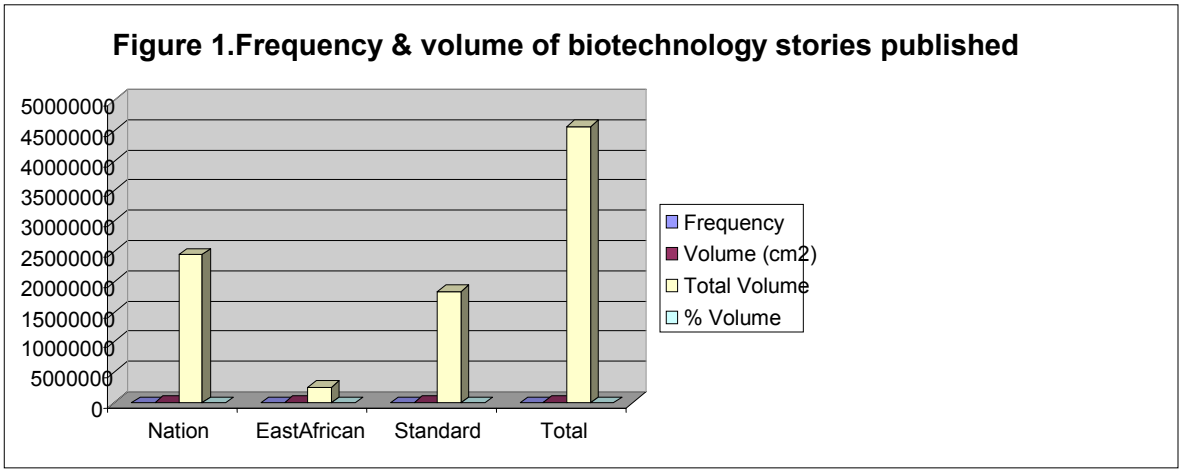
A standardized data collection checklist was used to gather the required information.

Findings

Content Analysis of print media articles

From the three hundred and sixty five (365) issues of each of the daily newspapers and 52 editions of the weekly *EastAfrican* examined, there were a total of 140 articles on biotechnology published by the three newspapers over the selected period. The *Daily Nation, Saturday Nation, Sunday Nation combined* published a total of 30 articles on biotechnology. Their sister weekly Newspaper aimed at regional readers, the *EastAfrican* published a total of 15 articles. *The Standard* (including Saturday and Sunday editions), published the highest number of articles on biotechnology (95) over the same period. The frequency of articles in general was much lower, almost negligible compared to non-biotech articles. Biotechnology articles only accounted for a paltry 0.14 % editorial space for the 12 months under study.

Fig 1 Frequency and volume of biotechnology articles



A large majority of the articles published were locally sourced (Table 1). Articles by foreign correspondents accounted for only 7.4, 19.4 and 13.3% of articles published by the Standard, Nation and EastAfrican respectively. Only the Sunday Standard had a regular column on biotechnology.

Table 1: Writers who published more than one article over the study period

	Author	**Publication**	**No. of Published articles**	**% of total articles published**

The Standard				
1.	Wandera Ojanji	Standard	46	48.4
2.	Samuel Otieno	Standard	4	4.2
3.	Elizabeth Mwai	Standard	3	3.2
4.	Judy Oguttu	Standard	3	3.2
5.	Dann Okoth	Standard	2	2.1
6.	Maore Ithula	Standard	2	2.1
7.	Author Not Mentioned	Standard	15	15.8
8.	Foreign/Agencies	Standard	7	7.4
The Nation				
9.	Boniface Mwangi	Nation	6	20
10.	Gatonye Gathura	Nation	5	16
11.	Isaiah Esipisu	Nation	3	10
12.	Bob Odalo	Nation	3	10
13.	Kennedy Senelwa	Nation	2	6.7
14.	Foreign/Agencies	Nation	6	20
The EastAfrican				
15.	John Mbaria	EastAfrican	10	66.7
16.	Esther Nakkazi	EastAfrican	2	13.3
17.	Foreign/Agencies	EastAfrican	2	13.3

In relation to type of stories published (Table 2), 51 % were news features and 40% were hard news. None of the newspapers under investigation carried an editorial on biotechnology. This may mean that either the editors did not think the subject was important enough to warrant an editorial comment or that they did not have sufficient knowledge to offer an educated opinion on the subject. Equally less covered were letters-to-the-editor on biotechnology. While The Standard published just two letters on biotechnology, the Nation group of newspapers had none.

Table 2 Type of Stories Published

Type of Article	**Nation**		***EastAfrican***		**Standard**		**Total**	
	No.	%	No.	%	No.	%	No.	%
Hard News	5	16.6	2	13.3	50	40.6	57	40.7
News features	24	80	9	60.0	39	35.9	72	51.4
Opinion/Commentary/ Analysis	1	3.3	0	0	4	18.8	5	3.6
Editorials	0	0	0	0	0	0	0	0
Letters to Editor	0	0	0	0	2	1.6	1	0.7
Q&A	0	0	3	20	1	1.6	4	2.9
Excerpts	0	0	1	6.7	0	0	1	0.7
Total	**30**	**100**	**15**	**100**	**95**	**100**	**140**	**100**

Prominence of biotechnology stories

Length and placement of stories are indicators of prominence bestowed on a story by the editor. Therefore, an article placed on page one, two, three and back of a newspaper are considered to be very important. Positioning of a story in the newspapers depends mainly on the editor's perception of the article in terms of importance or newsworthiness. But placement may also be determined by unavailability of good articles from the editors' preferred themes, the editorial policy and advertising interests of the newspaper.

In the period under review, only the EastAfrican placed two biotechnology stories on pages 1 to 3. The other two newspapers placed their articles in the inside pages. No paper placed a biotechnology article in the back page (Table 3 below). This shows that the editors did not place high value on the biotechnology articles and therefore they did not see the need to publish them in the most important/prominent pages of the newspapers.

Table 3 Placement of articles

Placement	**Front Page (1-3)**		**Inside Pages**		**Back page**	
	No.	%	No.	%	No.	%
Nation	0	0	30		0	0
EastAfrican	2	13.3	13	86.7	0	0
Standard	0	0	95	100	0	0
Total	**2**	**1.4**	**138**	**98.6**	**0**	**0**

On individual story treatment, editors tended to give big space to biotechnology stories, whenever they were published. For instance, of the 140 stories, only 40 stories (35%) were allocated space below 300 cm^2. Six of the stories were allocated an average of 700 square centimeters. This was not because they necessarily attached superior value to the stories but mainly because most of the biotechnology stories published were features and commentaries as opposed to news items.

Balance in published biotechnology articles

A balanced article is one that gives both sides of an issue, especially a controversial one like modern biotechnology. The EastAfrican had a higher number of inaccurate, imbalanced and unfair stories than the rest as shown in Table 4 below. The weekly newspaper carried 15 biotechnology stories over the period out of which 11 were found to be accurate while four were inaccurate. Most of the other articles published by the three daily newspapers were found to be balanced, fair and accurate.

Table 4 Accuracy/Balance/Fairness of articles

Paper	**No. of articles Accurate/Balanced/Fair**		**No. of articles Not Accurate/Balanced/Fair**	
	No.	%	No.	%
Nation	29	96.7	1	3.3
EastAfrican	11	73.3	4	26.7
Standard	91	85.8	4	4.2
Total	131	93.6	9	6.4

Most of those inaccurate and unfair stories (66.7%) were written by one freelance stringer affiliated to a group of non-governmental organizations that are opposed to modern biotechnology. In contravention of journalistic code of ethics and practice, this may have skewed his articles towards the positions held by the activists.

Content analysis of radio programs

The initial plan was to analyse radio programmes aired between the same period as that of the print media. However, it proved difficult to access past aired programs. It dawned on the researchers that there is no archival system of aired broadcast materials in the country. The only option was to bring together radio producers in a workshop forum to share their experiences on the radio programs they had aired. A workshop of radio broadcasters was then organised with a focus group discussion session incorporated. At the workshop broadcasters and producers were requested to provide information on the nature and trend of coverage of agricultural information from their respective radio stations over a period of four years. FGD sessions helped to moderate views expressed by individual producers. It corrected misconceptions about radio and biotechnology as well as ensuring accuracy of facts presented for the content analysis.

Findings of the Radio programs content analysis

Table 5 presents data on the programs covered by the radio stations and time aired. From the table, it is evident that all the agricultural programs had been aired for more than one year.

Table 5: Title of agricultural radio program and time aired

Radio station	Title of the agricultural program	Duration of program	Day and time transmitted	Duration program has been on air
KBC Kiswahili Service	Mali Shambani (Wealth from the farm)	1 hour	8 pm, Monday	4 years
KBC English Service	Agriculture For Life	15 minutes	5.45 am, Saturday	1 and half years
Musyi FM (in Kikamba)	Nima ya matuku aa- (Modern farming)	30 minutes	10.30- 11 am Daily	3 years
KASS FM	Farming	1 hour	Once a week	4 years
Mbaitu FM (in Kikamba)	Uthui muundani (Wealth in the farm)	30 minutes	12-12.30 pm, Monday	2 years
Mulembe FM (in Luyha)	Obulimi (agriculture)	45 minutes	5.00 pm, Wednesday	5 years
Coro FM (in Kikuyu)	Ngorono ya ureithi (Cream of farming)	30 minutes	8.30 pm, Tuesday	3 years
Egesa FM (in Ekegusi)	Emonga (Farming)	15 minutes to 1 hour	8.00 pm – 8.00 pm, Monday 7.15 pm -7.30 pm, Thursday	3 years
West FM (Swahili)	Soko hewani (Market on air)	30 minutes	30 minutes on Tuesday 7.30pm -8.30pm, Friday	4 years

The majority of the programs were interactive and took the format of news, expert interviews, discussions and call-ins. The results are summarised in Table 6.

Table 6: Radio program formats

Radio station	Radio program formats
KBC Kiswahili Service	Interactive (news, experts interviews, discussions and call ins)
KBC English Service	Feature (news, case studies and experts' opinion)
Musyi FM	Magazine (question and answer format, call ins, interviews)
KASS FM	Interactive (Interviews and call ins)
Mbaitu FM	Interactive (expert interviews, call ins, features)
Mulembe FM	Interactive (interviews with experts, call ins)
Coro FM	Interactive (news, experts interviews, discussions and call ins)
Egesa FM	Interactive (discussion with experts, interviews, phone ins)
West FM	Interactive talk shows

Radio program sponsors

In order to understand the motivations behind airing the programs, the producers were asked to indicate how the programs are run. Most of the radio agricultural programs were sponsored. Among the regular sponsors included: New Kenya Commercial Creameries, Osho Company, Coopers Limited, Syngenta East Africa, Kenya Seed Company, FIT Resources, DFID, Kenya Agricultural Research Institute (KARI), Githunguri Dairies, Amaco Insurance and Mumias Sugar among others. Only KBC English Service did not have sponsors for their agricultural radio programs. This is indicative of the small base for sponsorship for radio agricultural programs through the national service.

On the question of feedback mechanisms for aired programs, the producers reported using different feedback systems in response to questions and concerns of the audiences. The interactive format for example allowed prompt feedback to respondents during the talk shows through mobile phones, dedicated wireless telephone numbers, short text messages (sms), and email services through designated internet service providers. Some of the responses were filtered before airing. Other radio stations used mail correspondence to receive feedback and to also respond to audience queries. Some stations allowed audiences to send in either hard copy or soft copy letters (email or short message Service (SMS) to producers, sponsors and experts who in turn replied either directly or indirectly during subsequent programs. For the Mali Shambani

program by KBC, experts often replied to audience concerns live on air in addition to pre-recorded responses.

Agricultural issues covered in the programs

Radio agricultural programs covered diverse topics and issues. These included: seed selection, agronomy, genetically modified organism (GMOs), proper use of fertilizers, green houses, preservation and storage, disease and pest control, rabbit keeping, broilers and layers keeping, artificial insemination, keeping farm records, plant breeding, zero grazing, testing of soil PH and how to improve the soil, organic agriculture, tillage, nutrient management, water management, fish keeping, weeding, top dressing, cereals production, horticulture production, compost manure preparation, banana production, agro forestry, chicken rearing, avocado soap making, juice manufacturing, climate change, and bee keeping among others.

Most radio stations tailored their agricultural messages and provided information based on the farming calendar thus topics varied according to seasons and audience interests.

Frequency of covering agricultural biotechnology issues

All the producers reported having paid little attention to biotechnology citing lack of knowledge by the production teams as the major hindrance.

A few of the stations had covered agricultural biotechnology issues. For instance, KBC English Service covered four episodes highlighting what biotechnology is, forms of biotechnology, tissue culture, and biosafety laws in Kenya.

Mali shambani, a very popular agricultural radio program presented by KBC Kiswahili Service, addressed biotechnology issues during the parliamentary debate on the Biosafety Bill. During the same period, issues on genetically modified organisms were serialized in three programmes in the farming techniques segment of the program in the form of a 3-minute advertisement. The program had also done well in disseminating information on tissue-cultured banana which had been perceived wrongly as a genetically modified crop.

Mbaitu FM aired two programs on the use of agricultural biotechnology to produce maize and cassava. Mulembe FM had highlighted the use of biotechnology to produce clonal

eucalyptus trees. Stations such as KASS FM and West FM had never covered agricultural biotechnology issues.

Sources of information on agricultural biotechnology

The radio stations obtained information from diverse sources that included: research institutions, government and corporate organizations. The dominant organisations that provided experts were Africa Harvest, The International Services for the Acquisition of Agri-biotech Applications (ISAAA), KARI and some law firms.

Farmers were also good sources of information especially on practical aspects of farming especially on tissue-cultured banana. The Ministry of Agriculture and Livestock was singled out as another major source of expertise and information on agricultural biotechnology. However, procedures for getting experts from the Ministry were found to be very bureaucratic, a situation that at times delayed production. Agricultural extension officers at the grass root levels also played an important role in dissemination of relevant information to farmers.

The producers and journalists reported getting information from several internet data bases such as http://www.usda.gov/wps/portal?navid=BIOTECH, http://agribiotech.info/, http://www.bio.org/foodag/faq.asp, and www.isaaa.org/kc. The ICTs are also becoming significant sources of information on agricultural biotechnology.

Some Agricultural companies such as Mea Fertilizer, Syngenta and Twiga Chemicals were mentioned as sources of information on agricultural.

.***Professionalism in covering agricultural biotechnology***

The question on professionalism generated a heated debate among the producers. Contrary to what they had heard from scientists the producers asserted that they were professionals in packaging and presentation of agricultural programs. They indicated that their information originated from experts in credible research institutions, government and other stakeholders in the biotechnology sector. They argued that the use of different expert sources ensured balance in the production of their radio programs. To ensure fairness, accuracy and credibility, most producers reportedly preferred using government policy makers and public research institutions like KARI as sources of information.

Musyi FM asserted that they presented three sides of the coin especially in addressing sensitive issues such as the debate over GMOs. This new approach ensured fairness and balance as it paid all sides of the argument.

Mali Shambani reported inviting resource persons from institutions the management considered credible. Some of them included: the Ministry of Agriculture, the Ministry of Fisheries and Livestock Development, KARI, Kenya Forestry Research Institute, (KEFRI), Cereal Growers Association, Kenya Farmers Association Program (KENFAP), International Center for Research on Agro-forestry (ICRAF) , Honey Care, Farmers Dairy Goat Association, Coffee Farmers Association, Cotton Farmers Association, Farm Africa, Africa Harvest, Kenya Phytosanitary and Health Inspection Service (KEPHIS), Horticultural Crop Development Authority (HCDA), and the Veterinary Association of Kenya.

For some stations, they merely reported the facts and hardly included personal comments and opinions on biotechnology issues to ensure high level accuracy in their reportage. Generally, producers affirmed that most stations verified and validated doubtful information before airing it. The stations also used expert comment to ensure accuracy of information.

Challenges in producing agricultural programs

The study sought to find out from the radio producers what they considered as the major challenges in covering agricultural issues in general and specifically on agri-biotechnology issues. A number of challenges were highlighted as discussed in this section.

Unavailability of experts:

The radio producers reported getting experts to participate in the radio interviews was very difficult. The scheduling of agricultural programs (either late evening or very early morning) also discouraged the experts from coming to the studios for interactive programs. It was instructive to note that most the agricultural programs started from 7.00 pm to 8.30 pm or early morning at 7.30am resulting in many cancellations for late night or early morning live talks. This forced the producers to pre-record the programs thus losing the opportunities for instant feedback through phone calls. The experience from Mali Shambani was that agricultural

topics are very specialized requiring that specific experts be sought for the radio programs. Unfortunately, there are very few available experts for radio interviews on these specific topics of farmer interest.

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Language:

Language was cited as a major barrier in communicating agricultural information. The radio programs on agriculture relied heavily on experts. Unfortunately, most experts found it difficult to communicate in Kiswahili or vernacular languages preferring to do interviews in English.

Lack of adequate resources:

The producers reported that radio stations often lacked sponsorship to produce high quality agricultural programs. High production costs compromised quality of the programmes. The cost of actual work involved in terms of facilitation, the cost of equipment, shooting and airing are prohibitive in most cases.

Challenges for producing agricultural biotechnology programs

The field of biotechnology is considered relatively new and a fairly complex topic. In most of the developing world, the apathy and low uptake of biotechnology has specifically been attributed to low knowledge levels among general citizenry and the fact that biotechnology is still considered an emerging field in the media circles. Elsewhere, it has been argued that poor coordination of communication efforts and weak mechanisms for increasing collaboration among key players with diverse views to inform unbiased debate has exacerbated the problem. Lack of exposure to commercial biotech crops for demonstrating real advantages and disadvantages compounds the problem further (ABSF 2002).

Following were the specific challenges faced in covering agricultural biotechnology:

Technical jargon:

Agricultural biotechnology is a specialized discipline with many new technical terminologies. Some of the new technical words used in agricultural biotechnology have no

equivalent in Kiswahili or local languages. The situation is worsened by absence of popular dictionary or glossary of agricultural biotechnology terms. The radio producers said that even where words are available in Kiswahili or local languages, they are rarely generally understood by the listeners.

Therefore lack of content providers who could discuss the subject comfortably and accurately translate some of the technical terms in the vernacular was cited as a key challenge.

Lack of funds for producers:

The study found that producers and production staff were often demotivated by lack of funds for field trips meaning they could not get first hand information from farmers. Most of them had to rely on secondary information, some of which was inaccurate or biased.

Lack of equipment:

Lack of field production equipments was also cited as another hurdle for the production of agricultural biotechnology stories. Transcriptting for programming was tedious with low quality equipment which made it difficult to try various packaging modes.

Low scientific knowledge among radio producers:

A critical challenge was the lack of science knowledge amongst radio producers and the abstract nature of some of the terms used. Poor understanding of biotechnology terms and jargon made packaging of the stories very difficult for the journalists. The experts also appeared unaware of simpler terms or analogues they could or were simply unwilling to use a language that the journalists could comprehend.

Recommendations

The apathy and low uptake of the technology in Africa has been attributed to low knowledge levels among general citizenry, misinformation, risk perceptions perpetuated by the mass media and lack of exposure due to limited number of commercial biotech crops to

demonstrate real impacts. As of 2010, only three countries, South Africa, Burkina Faso and Egypt had commercialised biotech crops. Yet documented evidence and fifteen years experience with biotech crops indicate that biotechnological tools can provide promising opportunities for achieving greater food security while improving the quality of life (FAO 2004; AU/NEPAD 2007; James 2010; Brookes 2011). One of the most compelling cases to support this fact is the wide application of tissue culture techniques on banana in Kenya (and Eastern Africa) which has greatly improved livelihoods and raised household incomes by about 38% of adopters (KARI/ISAAA 2003; Karembu 2002; Nguthi 2007). Some of the documented benefits include: reduced pesticide residues in foods and increased nutritional value; and, increased productivity per unit of land thus reducing encroachment into marginal lands.

Biotechnology however is not a magical bullet and will not by itself solve the problems of the poor. Some aspects of modern biotechnology, particularly the socio-economic impacts, food safety and environmental implications need to be carefully addressed. Indeed, FAO (2004), the Nuffield Council on Bioethics (1999), the Africa Union (AU/NEPAD 2007), civil society groups, researchers and national governments have acknowledged the potential side effects that can be precipitated by some biotechnological applications. There is for example, heightened sensitivity to possible emergence of new pests, diseases and weeds, and, socio-cultural, ethical and trade impacts such as distribution of benefits and risks; intellectual property rights (IPR), loss of indigenous knowledge and rights to new varieties of seeds. This realisation has culminated into development of elaborate national biosafety laws and establishment of biosafety committees to evaluate and monitor biotechnological developments.

From the findings of this study, agricultural biotechnology is not adequately covered by the media in Kenya to enable appropriate public intervention and participation in the biotechnology development process. This minimum coverage has been demonstrated by the inadequate treatment given to three of the four variables of effective news reporting such as number of items, space allocation, and placement of the stories.

In the case of print media, only two out the 140 of the biotechnology stories made headlines, showing that editors accord biotechnology articles little prominence. Measures should be taken to improve both quantity and quality of coverage of biotechnology issues in both print and radio. A good starting point could be improvement of relationship between journalists and scientists, so that the former could have access to accurate biotechnology information from the

latter, since that was found to be part of the problem. Biotechnology stakeholders could also improve relationship with the media through incentives such as establishment of annual awards, capacity building trainings, production of a local guide to biotechnology writing in the form of a manual, and also developing rapport through informal meetings where biotechnology issues are discussed informally without formal presentations.

Training of journalists needs to be enhanced to increase accuracy of articles as well as promoting investigative journalism. Trained biotechnology journalists should be monitored to ascertain their effectiveness and the impact of their articles and/or programmes. Strengthening of journalists' peer associations on science matters should be given serious attention by various organizations in biotechnology, so that they may attract and maintain talented and competent writers and hence continue to write high quality articles on biotechnology. At the same time, editors should be included as part of sensitisation and education on all aspects of biotechnology so they can appreciate the technology and give it priority in terms of coverage.

Scientists, as sources of biotechnology information, need to be trained in communication skills so that they can be more forthcoming with information. Through such training they may also learn how to package complex scientific information into a more accessible language. They should also be trained on effective media relations. There is need to encourage more biotechnology experts to expose major on-going projects, activities and who the beneficiaries are. Such kind of initiative could start by scientists organizing science cafes to talk in ordinary language about some critical and beneficial research and science projects being carried out or planned. This would make society to appreciate more on the role of science and specifically biotechnology in their daily lives.

Media houses should establish Biotechnology desks where all biotechnology issues could be channelled in a creative, sustainable and effective manner. Biotechnology spokespersons need to be identified so that there is constant flow of current or regular flow of biotechnology information to interested journalists. Such communication channels and the spokespersons could be used for verification of facts, reporting of upcoming events and releases.

In the case of radio, the radio stations in Kenya still seldom cover agricultural biotechnology issues. Despite this, there is interest to cover the subject by a majority of the radio stations studied. The key challenges facing the reporting of agricultural biotechnology include non-availability of experts in agricultural biotechnology, language barriers owing to the nature of

technical language of biotechnology, lack of funds and sponsorships, lack of equipments and low scientific knowledge by radio producers. Another key challenge is the small advertising base for agricultural commodities and services in the country despite the fact that agriculture holds a prominent place in the country's GDP.

There is need to build capacity of radio stations to effectively report on agricultural biotechnology. Additionally, there is need to link the interested radio stations to potential donors and sponsors of agricultural services and products. The language barrier can be addressed by the production of resource materials such as dictionaries and glossaries on agricultural biotechnology that use analogues and familiar terminologies that communities can rely on.

More such studies needs to be conducted so that a trend on the coverage of biotechnology stories can be determined and appropriate longer term actions be taken to address the many challenges that have been reported.

Conclusion:

In view of the current low usage of radio to communicate about agricultural biotechnology in both countries, there is a need to re-think and devise innovative approaches that would harness the full potential of radio's advantage of language flexibility and national reach. This would however require building the necessary capacities through training of broadcasters and developing simplified factsheets with terminologies to be used by experts, extension workers and policy makers for full application of the research findings. This would ensure both the pros and cons of agricultural biotechnology are communicated accurately and in a balanced manner to enable informed decisions and policy choices.

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