



Communicating Aflatoxin Messages:

Recent Tanzanian Experience

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1. Introduction and Purpose

There is strong consensus that aflatoxin contamination of important crops such as maize and groundnut poses a significant threat to public health, trade and livelihoods in Tanzania (Abt Associates 2012, 2013; Kimanya 2014). As concern has grown, national, regional and international R&D organisations are taking up the challenge of addressing aflatoxin across the agriculture, trade and public health sectors in a coordinated way.

Part of the problem is widely acknowledged to be very low public and institutional awareness of aflatoxin (and mycotoxins) generally. Virtually every factor that could influence behavior of the groundnut value chain stakeholders and support organisations towards action to manage aflatoxin risk has been largely missing or hardly effective (Abt Associates 2012, 2013; Coote 2011). Activities aimed at raising awareness about mycotoxins particularly aflatoxin from the community level to decision makers are therefore important in draft action plans developed during a multi-sector meeting organised by the Tanzanian Food and Drugs Authority (TFDA) and the Programme for Aflatoxin Control in Africa (PACA) in Dar Es Salaam in 2012. At that meeting the National Steering Committee for Mycotoxins Control was established as the official structure to manage coordination and collaboration between the various projects and programmes, institutes and organisations that are turning their attention to efforts to publicise the aflatoxin problem and its mitigation.

The challenge of addressing aflatoxin is also increasingly a regional issue. A meeting of experts (agriculture, health, trade, environment and communications) from the East African Community (EAC), EAC Secretariat and the five Partner States, and international experts, held in June 2014 on Zanzibar, Tanzania, under the auspices of the EAC, has set the scene for preparing a regional communication strategy to increase public awareness about aflatoxin.

The purpose of this brief review is to help make recent experiences from aflatoxin communication efforts primarily in Tanzania more accessible to Tanzanian organisations and their regional and international colleagues and partners who are tasked to implement information and awareness raising campaigns. In preparing this report, I have sought examples of work that has experimented with procedures to try to provide information users with reasons why they should consider change in their practices as well as inform on available mitigation practices. Recent efforts to communicate on the aflatoxin issue have been mostly relatively isolated initiatives rather than broader campaign. Information is mostly so far to be found in 'grey' literature such as project reports or experiences from meetings and training events. I have also to the extent possible looked at mentions of aflatoxin in the Tanzanian press/news media. Given the difficulty of accessing some of this kind of experience, this report is not comprehensive and there may be occasional unintentional misinterpretations on my part which I apologize for. The report is seen as one source of ideas and reference, rooted in Tanzanian experience that can contribute to the more coordinated initiatives that are under preparation to raise public awareness about aflatoxin.

2. The aflatoxin communication challenge

Communicating effectively on aflatoxin and its management is challenging for several reasons.

Aflatoxins are colourless and odourless toxic metabolites – chemical by-products – of the growth of common species of the *Aspergillus* mould fungus in crop plants. Even before growth of mould is visible on the surface plant parts, aflatoxins may have been formed by the mould growing inside affected plant parts.

Aflatoxins are not removed by normal cooking of edible plant parts (e.g. grain, nuts) and can be present in produce such as peanut butter and paste made from contaminated crops.

Translating results of aflatoxin analyses. Though scientists and regulatory authorities use sophisticated analytical methods to detect aflatoxin and are mapping occurrence of aflatoxin (and fumonisin for maize) in produce in fields and markets as part of efforts to establish risk (e.g. IITA 2013), translating the survey results in a way that is informative for a majority of stakeholders must be seen as a challenge.

Low basic knowledge about moulds among the public makes it a challenging task in itself to explain about aflatoxin in relation to mould – often perceived as a harmless surface covering. Knowing more about mould may be a good foundation for appreciating the dangers of toxigenic mould and why current control measures can work.

Biocontrol of aflatoxin is a control method which shows promise in tests at farmer level in West Africa (Nigeria) and is to be trialled in Tanzania. Biocontrol is based on research that shows that *non-toxicogenic* (non aflatoxin producing) strains of *Aspergillus* mould – the ‘good moulds’ – exist that can compete with and replace the currently commonly occurring *aflatoxin-producing strains* of *Aspergillus* mould – the ‘bad mould’ – when introduced into the soil of fields where susceptible crops such as maize are to be grown. Then, even if ‘good mould’ does invade the crop plant due to unavoidable crop plant growth stresses, insect damage or contamination at harvest or during shelling etc, growth by the ‘good mould’ in the crop plant does not produce harmful aflatoxin. Explanations of why biocontrol works and reduces risk of contamination require careful explanations about the current situation, in which toxigenic aflatoxin-producing strains of mould prevail, and about the risk these pose to susceptible crops, which the ‘good moulds’ are intended to address.

The large number and categories of stakeholders and sectors that need to cooperate and collaborate to effectively address aflatoxin (Hellin et al 2010). Under the conditions prevailing in Tanzania and other EAC countries, large numbers of ordinary citizens produce and consume food crops at risk of aflatoxin contamination. The same crops are also traded directly and through networks of middle men in rural and urban markets that are not regulated for aflatoxins. Until recently, very few of these value chain stakeholders and service provision and other intermediary actors were effectively knowledgeable about aflatoxin or contributed actively to spread of awareness and training in aflatoxin control measures such as GAP and improved post-harvest handling (Abt Associates 2012, 2013; Coote 2011).

Capacity of various organisations to communicate on aflatoxin and its control. Information intermediaries (farmer associations, schools, the media, local and national decision makers, agricultural extension services, and a variety of researchers not necessarily specialists in aflatoxin) may need support to be credible sources of information, including having access to Swahili-language reference materials and further information and training where and when necessary.

Resources available for educational and communication action. Communication research and development may tend to be “the poor relation” in agricultural development projects and programmes. Communication and communication processes will be in need of due priority to address the challenge of raising public awareness on the scale and to the required standard.

Ethics. The growing weight of evidence (direct and inferred) supports the view that aflatoxins are present to a substantial degree, albeit in a non-uniform way (‘hotspots’), in environments where large numbers of users are at risk of exposure to negative health effects. It is important to inform the public now on what they can do and on what is being done while avoiding unintended negative consequences of information

campaigns especially on the poorest.

3. Tanzanian experiences in communicating aflatoxin

This section reports on actions, achievements and challenges of aflatoxin communication activities implemented in Tanzania directly or through collaborative arrangements with institutes in neighbouring countries. It has not been possible during this review to access details nor effects of awareness raising activities undertaken for all of these, and there may be others that could not be sourced in the time available. The overview which follows is necessarily incomplete. The report therefore focuses primarily on efforts to raise awareness and inspire to action to control aflatoxin amongst the general rural/peri-urban population of producers, traders, consumers and intermediary organisations (service providers) over the last three to four years during which attention to aflatoxin has intensified.

3.1 Overview of some major actors associated with aflatoxin (mycotoxin) awareness raising activities

The principle organisations identified that have implemented aflatoxin/mycotoxins awareness raising activities over the last five to 10 years are listed in Table 1.

Table 1. Some principle organisations implementing aflatoxin/mycotoxin public awareness raising activities, Tanzania 2010-2014. Kenyan based organisations are collaborating in the work of Tanzania based organisations. Action by some Kenyan based media organisations may have been accessed by Tanzanian stakeholders. This list is not exhaustive and may be updated.

Organisation	Information meeting, training events	Print/text	Radio	Video/ Animation/ TV	Additional Comments
TFDA Tanzania Food and Drug Authority	<p>Since 2004 TFDA has made efforts to raise awareness to district health and agricultural officers about mycotoxins in foods and effects on human health in Iringa, Ruvuma, Tabora.</p> <p>In 2010 several press conferences held on effects of mycotoxins and strategies to reduce contamination (news clippings in Appendix)</p> <p>Since 2012, TFDA in collaboration with NM-AIST and SUA, has been creating awareness in Manyara (Hanang') , Mbeya (Tukuyu) and Morogoro (Kilosa) on measures to minimize aflatoxins and fumonisins exposure from complementary foods. No further details were available on results at time of writing.</p>				Hosts the Tanzania National Forum for Mycotoxins Control, established 2012
NM-AIST Nelson Mandela Africa Institute of Science and Technology	<p>High level awareness raising at the Ministry of Health and Social Welfare HQ, USAID-Dar es Salaam office and in several food safety meetings including those organised PACA in Dar es Salaam (April 2013).</p> <p>Starting 2014 NM-AIST teaches a course on food mycotoxicology to MSc and PhD students of Life Sciences.</p>	Contributed to expert panel to advise on technical content of NARI aflatoxin leaflet		Contributed to expert panel to advise on technical content of NARI aflatoxin video-animation	Dr Kimanya is chair of National Steering Committee for Mycotoxins Control
TFNC Tanzania Food and Nutrition Centre	<p>Contributions to TFDA-PACA multi-stakeholder meeting to discuss aflatoxin and establish a base for coordinated action in Tanzania.</p> <p>Recently completed design of a National Nutrition Strategy.</p>	<p>Developed content including risk posed by mould for food safety training in Mara and Mwanza.</p> <p>Contributed to expert panel to advise on technical content of NARI aflatoxin leaflet</p>		Contributed to expert panel to advise on technical content of ARIO Naliendekele aflatoxin video-animation	Dr Kaganda is head of the sub-committee on communication in the National Steering Committee for Mycotoxins Control

Organisation	Information meeting, training events	Print/text	Radio	Video/ Animation/ TV	Additional Comments
Agricultural Research Institute (ARI), Naliendele (Min Ag & Food Coop, DRD)	<p>Mtwara market traders' information meeting 2011.</p> <p>Multi-stakeholder aflatoxin review meetings Mtwara 2011, 2012.</p> <p>High level awareness raising at national and international meetings. 2011-14</p> <p>Training of extension staff (Mtwara Region) on pre- and post-harvest control of aflatoxin in groundnut 2014.</p>	<p>Aflatoxin, its health effects and control in groundnut – Swahili language 2013/4.</p> <p>Aflatoxin awareness poster, 2014.</p>	<p>Aflatoxin, its health effects and control in groundnut – Swahili language local radio programmes, 2011 and 2012.</p>	<p>Aflatoxin, its health effects, and control in groundnut – Swahili language draft video 2012.</p>	<p>Dr Mponda, head of oilseeds section and plant breeder, sits on the National Steering Committee for Mycotoxins Control sub-committee for aflatoxin.</p>
IITA Eastern Africa Hub	<p>Meetings to introduce aflatoxin/ mycotoxins R&D component to District officials, extension and communities in pilot villages in Babati District under Africa Rising WP4.</p>	<p>Mycotoxins Factsheet English and Swahili language 2013.</p> <p>Mycotoxins poster English 2013.</p> <p>Summary of results of aflatoxin & fumonisin testing in maize-Babati – Swahili language 2013</p>			<p>Africa RISING works to support sustainable intensification of integrated cereal/legume farming systems. WP 4 specifically is evaluating strategies for prevention of mycotoxin contamination along food and feed value chains in Babati District.</p>
ICRISAT	<p>Introduction of Innovation Platform planned to engage with stakeholders in Babati and in Kiteto-Kongwa under Africa Rising.</p>	<p>Contributed to expert panel to advise on technical content of NARI aflatoxin leaflet</p>		<p>Contributed to expert panel to advise on technical content of NARI aflatoxin video-animation</p>	<p>As above: the Kiteto-Kongwa component focuses on introduction and testing of integrated legume/cereals technologies, food safety including reducing aflatoxin contamination, and integration of livestock into cropping systems.</p>
DALDO offices in 11 groundnut growing Districts Nachingwea, Masasi, Nanyumbu, Ruangwa, Kongwa, Bahi,	<p>Received aflatoxin leaflets from ARI Naliendele and have run or are running training events for extension officers and farmers/farmer associations on aflatoxin and its control in groundnuts 2012-2014.</p>	<p>Some DALDOs/their staff contributed to pretesting of the ARI Naliendele aflatoxin leaflet in 2012.</p>		<p>Some DALDOs/their staff contributed to pretesting of the ARI Naliendele video-animation in 2012.</p>	

Organisation	Information meeting, training events	Print/text	Radio	Video/ Animation/ TV	Additional Comments
Chamwino, Kahama, Bukombe Tunduru, Mtwara					
Lindi and Mtwara Agribusiness Support (LIMAS) project under NIRAS		Have distributed ARI Naliendele aflatoxin leaflets to groundnut farmers, extension and some schools in Newala, Nanyumbu & Liwale Districts.			LIMAS (Finnish funded) contributed to visual design of ARI Naliendele aflatoxin leaflet and to costs of printing.
ILRI Beca Hub Nairobi, Kenya	Briefed science journalists in Nairobi on multi-institutional efforts to combat aflatoxins in the food chains of Kenya. 2014.	Are developing print media to inform on aflatoxin in maize and its control also in Tanzania		Are developing video media to inform on aflatoxin in maize and its control also in Tanzania	Capacity and Action for Aflatoxin Reduction (CAAREA), Bioscience Eastern and Central Africa (Beca) at ILRI in Nairobi. Key focal activities are development of rapid diagnostic tools for aflatoxin, and support to aflatoxin resistance breeding, including alerting breeders consider aflatoxin in their work.
Shamba Shape Up/The Mediae Company, Nairobi, Kenya.				Series 4, episode 2, aired on TV in Kenya April 2014, has a 10 min section on groundnuts where groundnut GAP is linked to aflatoxin management explained by Dr Sam Njoroge ICRISAT-Chitedze/Malawi – The episode is in English and Swahili and available online.	Shamba Shape Up is an entertaining TV produce by Mediae and aired on Citizen TV (Kenya) and on ITV (Tanzania). The programmes show farmers and helpful experts discussing typical farming problems, explaining solutions (assisted by animated sequences) both verbally and in practice right on the spot. The programmes are in English and Swahili and available online. Audience reactions are tracked via SMS responses and regular KAP surveys are conducted by Mediae Company.

Organisation	Information meeting, training events	Print/text	Radio	Video/ Animation/ TV	Additional Comments
Tanzanian press		<p>There have been articles in the English press, e.g. Daily News online 3 March 2014 'Aflatoxin contamination poses huge challenge to food safety'; Several articles in The Citizen between 2012-14, earlier articles in the Daily News</p> <p>And in the Swahili press, Mwananchi December 2012 'Mazao hayo ni hatari hasa kama hayatahifadhiwa vizuri',</p> <p>Online Blog post 2012 by Info Radio Mtwara journalist Elia Migongo: 'Naliendle Mtwara wafanya kongomano kuhusu athari zitokanazo na sumu kuu 'aflatoxin' zinazotokana na uhifadhi duni wa karanga' (This is the stakeholder meeting 2 referred to on page 12)</p>	TBC radio – interviews have been broadcast where researchers have spoken about mycotoxins and aflatoxin, but assessment of effects beyond scope of this review.	TBC TV – as for radio.	It has not been possible to perform a fuller search and review of new media reports about aflatoxin on this occasion. A fuller study would be valuable.

3.2. Achievements, challenges, lessons and potential

This section summarises key achievements, highlights challenges and responses, and seeks lessons from aflatoxin communication interventions. At time of writing the most detailed information was available from IITA Eastern Africa Hub and ARI Naliendele for District/village level stakeholders for communication-related activities in Babati District (Manyara Region) and in Masasi, Nanyumbu and Mtwara Districts (Mtwara Region), respectively. This discussion refers mostly to these cases.

3.2.1. IITA-Eastern Africa Hub

Face to Face meetings, Babati

Achievements

- 2012. A **familiarisation meeting** held by IITA researchers and partners responsible for Africa RISING Work Packages (WP), Babati District officials and village leaders and community in three selected villages (Long, Seloto and Sabilo). The purpose was to introduce the Africa RISING programme including the topic of mycotoxins, why this was a threat and how the programme would work to establish the extent of contamination and develop improved control methods (IITA 2012).
- November 2013. **Village meeting** in Long, Seloto and Sabilo organised in collaboration between IITA staff, village leaders, farmers and agricultural extension officer to present preliminary results of aflatoxin and fumonisin analysis from bean and maize samples taken earlier in the year. (IITA 2013a)
- November 2013. **Village meeting** organised in Matufa, Shaurimoyo, Hallu in collaboration between IITA staff, village leaders, farmers and agricultural extension officer to plan for extending maize and bean sampling in these villages in 2013/14. (IITA 2013a)
- **Conversations** between March and June 2014 between IITA staff and farmers held periodically during village meetings and sampling visits (between March and June 2014) in Long, Seloto and Sabilo and (from June 2014) in Matufa, Shaurimoyo, Hallu villages. [Swahili language mycotoxin factsheets](#) distributed during these sampling and feedback meetings (see p 9). Farmers used the opportunity to seek further explanations about what causes mycotoxin, expressed concerns about how to cope with the new (to them) information that maize can have toxins and why has this problem come now, and have also voiced ideas on new action they were contemplating such as no longer giving grade out maize to livestock.
- Implementation of a **working communication strategy** based on an initial meeting with District officials, villagers and village leaders, distribution of mycotoxin factsheets and posters at these meetings, and follow-up meetings in the villages to inform on preliminary mycotoxin testing results/plan further sampling. The opportunity was taken to distribute further mycotoxin factsheets and to respond to verbally to farmers' concerns and requests for further information.

Observations, challenges, responses and gaps

- Though the meetings clearly raised awareness about health threats from toxins in mouldy maize amongst those attending and through distribution of factsheets, the indications are that the information given out was challenging for farmers. According to Simon Boniface (IITA Research Associate, pers. comm.) the recognised Swahili term for mycotoxin (*sumu kuvu*) is hardly known to farmers and the news that maize may be poisonous was worrying. IITA staff have responded by using alternative common words (used for mould) such as *ukungu*, *miozo* or *fangasi*, and have explained that ‘moulds (*ukungu* or *miozo*) are caused by fungi but not all fungi produce toxins’ (Simon Boniface, IITA pers.comm). Similarly, IITA field staff have encouraged farmers who express concerns over what to do if maize has toxins to follow the recommendations in the factsheet for control of mycotoxin. Staff have explained further that the programme is currently finding out the extent of the mycotoxin problem and will develop more methods to control it (Simon Boniface, IITA; pers. comm.). It is likely that many other stakeholders, who do not meet the IITA field staff so regularly, may have similar need for further clarification in appropriate Swahili language that does not confuse mould and aflatoxin.
- These formal and informal meetings are potentially a rich source of insight on reactions of participants to the new information, and on an unfolding dialogue between research staff and communities, which can alert researchers to user information needs. But these interesting aspects of the meetings do not seem to be routinely documented. This is an important gap in the records being collected.

Lessons and potential

- The experience described by the IITA research associate point to the importance of considering what affect particular ways of expressing or presenting information about mycotoxins will have on the intended audiences. This point is taken up again below under Print Materials.
- In their in talks with farmers and in the villages, the IITA staff have demonstrated transparency and acquired experience that is invaluable for improving both future written and spoken communication. Their innovative use of Swahili expressions and explanations to make the mycotoxin topic and its solutions more comprehensible to farmers should be documented. A checklist or format could be developed as a guide to ensure this experience is captured in a structured easy way, even during visits that have another purpose (such as sampling maize).

Print materials

- **Mycotoxin factsheet** A4 format in English and in Swahili (title: *Ukweli kuhusu sumu kuvu*) (Appendix 1a, 1b) and a mycotoxin poster (not yet confirmed if there is a Swahili version) (Appendix 2) were developed and printed in 2012/13. The purpose was to raise awareness of the risks to human and livestock health posed by mycotoxins in maize and legumes and inform on current control practices.
- In total about **700** farmers including local government officials, **30** vendors and processors given Swahili factsheet version (in the six project villages), **5** district officials and 5 extension officers received the English version.
- A written sheet, entitled in Swahili ‘*Muhtasari wa utafiti kuhusu hali ya sumu kuvu kwenye mahindi wilayani Babati*’ (Appendix 3), was used to update villagers in Long, Seloto and Sabilo of mycotoxin analysis results to date from the first rounds of sampling of maize; copies of these results were possibly given to farmers and village officials at the meeting (to be confirmed).

Observations, challenges, responses and gaps

- As noted under the previous section, there may be comprehension difficulties with at least some of the language and with the design used in the mycotoxin factsheet and the summary of results sheet (if it was intended as written information for farmers). The Swahili factsheet is highly informative and uses several alternative words more commonly used to mean 'mould' to explain the meaning of *sumu kuvu* ('mould poison(s)'), the official Swahili word for mycotoxin. But the factsheet also presents readers with relatively dense blocks of text, small text size due to small overall factsheet size (A4), few subtitles, and pictures which, though well labelled, are placed far from the relevant sections of the text and are not referenced in the text. For those wishing for further information, for example on how specifically to implement some of the control practices listed in the factsheet, there is no local contact given to whom the inquirer can turn. The English language version presents the same challenges and is even more informative. It may be doubted whether it would be an easy read for District officials and village extension officers. The extent of the comprehension and usability challenge of these documents is not known, however, because the factsheets were not user tested (Simon Boniface, pers. comm.).
- Problems reported with interpreting the phrase *sumu kuvu*, and other concerns and queries from farmers who have received the factsheet, have led the IITA staff meeting with farmers in the field, and at meetings, to supplement the explanations in the factsheet with further information. As mentioned above, this experience has not been documented, despite its value for improving design of written material.

Lessons and potential

- IITA factsheets were ready in time for use in initial meetings and follow-up at district and village level; recipients including farmers in the villages could refer to and reflect on the messages in the factsheet after the departure of experts. In the villages, during their regular visits, field staff were able to expand on and supplement the written materials when farmers asked questions.
- Complementary communication methods – print and direct supporting dialogue – were employed during village visits. Even if the factsheets may benefit from improvement, use of complementary communication methods is an important principle for future awareness raising – no single method may on its own solve the information needs of all users.
- The current factsheets (both versions) on their own, based on available information, though intended to create awareness, may not be sufficiently informative. This may relate to language, stylistic aspects (size, layout, etc). It may have proven more effective to provide District officials and extension officers with Swahili versions rather than or in addition to the English versions both for comprehension and for assisting these officials in conversing about the topic to farmers and others.
- Subjecting print materials to a pretest with a sample of intended users may greatly improve their value. It may also be very beneficial for staff, who are to talk with District and village level stakeholders, to discuss the pros and cons of various ways of expressing the issues in Swahili and prepare themselves through prior informal testing of the proposed expressions and formulations. Preparation should include definition of what the intended user is expected to understand from the print material, or particular formulations of language, and then how best to convey the relevant information.

3.2.2. ARI Naliendele

Specific communication development activities at ARI Naliendele to raise awareness of aflatoxin and its control began in 2011 with a small pilot project entitled *Innovation Communication Media and Methods* (ICMM). This was followed by a follow-on project with the same name implemented over the period 2012-2014 (See Box for brief summary of the ICMM).

Background of the ICMM, ARI Naliendele, Mtwara, Tanzania

The ICMM was originally envisaged as a complement to the efforts of the McKnight Foundation- supported Collaborative Crops Research Program (CCRP) Groundnut Breeding and Aflatoxin Project (GBA) in Malawi and Tanzania. The aim was to improve awareness and understanding about aflatoxin and its control in groundnuts by participating farmers groups and organisations in CCRP projects. Already at inception, however, GBA and ICMM project coordinators appreciated that the aflatoxin issue spanned a very wide range of stakeholders - in many roles and networks - in addition to stakeholders then seen as direct beneficiaries of the GBA in pilot Districts in the two countries. The ICMM therefore became an opportunity to identify, develop, test, refine, and evaluate ways to influence the understanding and decisions of a diverse range of groundnut stakeholders in society towards contributing to reduced risk of aflatoxin contamination.

The ICMM has worked with two interrelated lines of enquiry and action: 1) development of user-tested educational aflatoxin materials (print, radio and audio-visual) for groundnut; 2) constructive engagement with stakeholders to enrich the quality and use of the project's aflatoxin educational products and to function as a debating and sharing forum through which participants' understanding, motivations to act, and subsequent action may change.

ICMM was intended as a study in communication and was not designed as a communication campaign, though it acquired features of a campaign with time.

The ICMM has mostly conducted communication methods development within Mtwara Region (Mtwara Urban and primarily Masasi and Nanyumbu Districts). The majority of research staff involved in the ICMM, either directly or in an advisory capacity, had natural science and agricultural science backgrounds. The ICMM brought together ARI Naliendele, ICRISAT-Malawi and a consultant via Danish Management to collaborate as partners in the work.

Face to face meetings, Mtwara town and Districts

- **Achievements 2011.** Information Meeting at Mtwara town market to raise awareness on the importance of aflatoxin and its control amongst 11 local groundnut traders and small scale women's groundnut processing businesses. A mapping exercise and survey in 2011 had shown these stakeholders to have wide networks and extension contacts with suppliers and consumers within the groundnut value chain. Raising their awareness on aflatoxin was seen as an efficient way to reach other stakeholders.
- Information presentation included use of a microscope to show spores of *Aspergillus* mould (and thereby create a new understanding of mould), picture-based powerpoint shows linked to Swahili oral narratives, and practical exercises (e.g. studying a groundnut sheller to learn how to adjust so as to reduce breakages). Participants enjoyed the meeting and indicated particular actions that they would take based on what they had learned: these included sharing the information about aflatoxin with others, encouraging their farmer suppliers to do more to provide good quality nuts (ICMM 2011)
- **2011. Stakeholder Meeting 1** attended by 17 invited participants mostly from Mtwara Region including groundnut town market traders, small scale women's groundnut processing businesses, District officials

(Council leader Masasi, agricultural extension heads Masasi and Mtwara, nutrition and medical officers, Mtwara), MVIWATA (national small farmers association), Association of Seed Agents, local media and national media (TBC). The meeting aimed both to inform stakeholders about aflatoxin, using available information, but also to engage with them in decisions about how best to formulate and spread the messages, and motivate them to use their own networks for action against aflatoxin in groundnuts. The meeting was regarded as highly promising as evidenced by the wealth of ideas from stakeholders on what action they but also research would and should take to continue to address aflatoxin in groundnut (ICMM 2011).

- **2012. Stakeholder meeting 2** attended by 24 invited participants, including several from the 2011 meetings, mostly from Mtwara Region – groundnut town market traders Mtwara and Masasi, small scale women’s groundnut processing businesses Mtwara, local farmer cooperatives, agricultural extension heads and council chairmen Masasi and Nanyumbu Districts, Mtwara Regional medical officer and district nutrition officers, MVIWATA. Institutional stakeholders included SIDO (Mtwara), SUA and TFNC. The purpose was to build on stakeholder meeting 1, updating with recent aflatoxin analyses results, share experience on actions taken since 2011, and if possible provide informative materials on aflatoxin to participants.

There was enthusiastic and active participation by invitees, ARI Naliendele researchers and project partners. Researchers contributed new information on aflatoxin levels in groundnut in sample districts (Nanyumbu, Bahi, Bukombe - see Appendix 4)(Mponda 2012). Returning participants reported on what they had tried to do to address aflatoxin since the previous 2011 meeting. The topic was closely debated. Farmer organisation representatives, agricultural and health service provider participants expressed intentions to instruct, teach or inform others (e.g. other farmers, processors teaching other farmers, processors, or subordinates and traditional clients) about aflatoxin and its control; senior District officials affirmed that the aflatoxin topic would be introduced at District Council Quarterly Meetings, and District Health Management Team meetings (ICMM 2013).

Observations, challenges, responses and gaps

- Unavailability of good reference materials is likely to have made many stakeholders’ own follow-up actions less effective at the time. When the meetings were held, neither detailed print materials nor sufficiently well-developed radio or video materials had yet been developed and user tested for distribution to participants as a source of reference on aflatoxin and its control.
- Gathering diverse and busy stakeholders together in one place is expensive in time and resources. The challenge was to facilitate a forum that went beyond the more conventional presentation of technical information (often heavily influenced by research communication custom) to other stakeholders, and to encourage sharing and exchange of information and knowledge that included the perspectives of non-research participants.
- At all meetings deliberate efforts were made to employ user-friendly ways to present information and encourage discussion and commitment: use of Swahili for all communication ensured that all participants, who represented a diversity of backgrounds and formal education levels, could feel comfortable and able to express themselves; powerpoint presentations by researcher participants used mostly informative pictures and efforts made to simplify charts and graphs (see Appendix 4); and oral Swahili narrative to accompany slides rather than presenting a lot of text. The presentation style copied that first tried out and rewarded by participants’ appreciation at the market traders’ information 2011 meeting. A video recording was used where human health effects of aflatoxin had to be explained by

an expert who could not attend the meeting in person; breakout discussion groups ensured fuller discussions, and group spokespersons and groups reported orally to plenary; video and audio recordings were used to capture key spoken outputs rather than rely on English language written reports -the advantage was not only as a verbatim record for process and results documentation; these recordings can also be used as input for other communication activities (meetings, radio, etc.) without users having to be literate or familiar with English to grasp what was said (ICMM 2011, 2013).

- It was relatively straightforward to record what happened at meetings (particularly through increased use of video and audio recordings of key outputs). It was considerably more challenging to organise to track and record to what extent and how ideas from such meetings had begun to influence the actions taken later by meeting participants in their own networks, jobs and roles.

Lessons and potential

- Good reference materials, which participants of face to face meetings can take away is an important way to consolidate the informative exchanges at the meetings. These were not sufficiently available in these meetings.
- The experience built up over three meetings with a variety of stakeholders demonstrates the importance of paying keen attention to methods to foster debate around and action on new ideas. The approaches used were time efficient – short 1-day meetings suitable for busy people. Methods of presentation and for fostering discussion were fairly easily mastered with available research staff and collaborators. Though more can be done to make presentations even more user-friendly, the lesson is clear – meetings should have a focus on communication, which means the non specialist participants’ needs need to take centre stage. In support of this all meetings were facilitated by a skilled local NGO moderator from the NGO ROSDO. He was familiar with the institute and with the local context and was able to ensure that all participant groups gained a voice, act as time keeper where necessary, and prompt specialists again when necessary to repeat or more fully explain their points.
- The stakeholder meeting approach is a potentially potent forum style through which new understandings around aflatoxin/mycotoxins and also concerns from the ‘field’ can be shared with influential leaders, policy and research stakeholders. It is also a space in which researchers and communicators can submit communication materials drafts to scrutiny; the ensuing discussion informs the communicators on the need for changes in their materials while also building stakeholders’ deeper understanding on the issues. These discussions need clear objectives and good facilitation for success.
- Monitoring is essential for acquiring further evidence that ideas and insights shared at stakeholder meetings (either directly or indirectly via participating stakeholders’ networks) contributes to the public discourse on aflatoxin and is contributing to changes that can reduce aflatoxin risk, including bringing important feedback to researchers. This requires capacity building and adequate resources.

Print materials

Achievements

- 2013. **Information leaflet** on aflatoxin and its control in groundnut (Swahili title: *Jinsi ya kudhibiti sumu kuvu katika karanga*) produced, reviewed, pretested and revised, and 6000 copies printed (early 2014) as an A3 folder with colour illustrations (Appendix 5; Appendix 6, picture 1 shows pretesting). At the pretest stage, responses to questions in the questionnaire on ‘what are the key messages for you?’ and ‘what new understanding/new actions do you have/will you take?’ provided encouraging evidence that

the leaflet had been able to convey several key messages, which users have understood and begun to think about them in their own context (ICMM 2013).

- 2014. **500** copies of the **Swahili-language leaflet** distributed to agricultural extension departments in 9 Districts; close to **2000** copies distributed to groundnut farmers directly or via agricultural extension services in 11 Districts in the southern, central and lake zones; **80** copies given to school students, village authorities and village health attendants in 2 Districts; copies also given to Ministry of Agriculture (DRD) and national research institutes and centres (Ukiliguru, Uyole, Makutopora, Tumbi, SUA, TFNC, TFDA), ICRISAT; copies also made available at national and regional aflatoxin meetings (ICMM 2014).
- 2014. **Swahili-language aflatoxin information leaflet** used as source material by agricultural extension offices in Nanyumbu, and Masasi Districts (Mtwara Region) in providing training of trainer (TOT) courses for extension staff and training of farmers and farmer associations (AMCOS), and extension offices in other Districts are planning to do so (ARI Naliendele 2014)
- 2014 (June). **Training of Trainers** on aflatoxin and its control in groundnut run by ARI Naliendele for 76 agricultural extension officers mainly from Mtwara Rural District but also from 5 other Districts (Masasi, Nanyumbu, Nachingwea, Ruangwa, Tunduru); **Swahili-language aflatoxin information leaflet** used as reference material and further copies distributed in the TOT. (Dr Mponda pers. comm.)
- 2014. **Follow-up initial mini-survey** of use and effects of distribution of the aflatoxin leaflet conducted by ARI Naliendele and the Masasi-based NGO ROSDO, 2014. According to these surveys (ARI Naliendele) the leaflets have contributed to increased awareness and understanding by 32 farmers on aflatoxin, its relation to toxigenic mould and about control methods in groundnut. Some farmers were trying different control practices such raised drying and better storage. Several of these stakeholders were members of farmer research groups who had enjoyed earlier training inputs. A few detailed open-ended interviews by the NGO ROSDO with stakeholders with no connection to researchers provide further evidence that the leaflet can be highly informative to ordinary farmers. The farmers who had no prior knowledge of aflatoxin were able to mention key health effects of aflatoxin and that mould (using the commonly used local word '*ukungu*') causes aflatoxin. Further, respondents were able to distinguish between mould and aflatoxin and had appreciated that mould spread aflatoxin and that even non mouldy looking nuts might already be contaminated. Importantly, respondents could relate control practices and intentions to try them out. (see examples Appendix 7 and 8) (ROSDO 2014, ARI Naliendele 2014) . Farmers in the two surveys also expressed a wish for additional ways to be informed, such as video and facilitated meetings, to improve their understanding because not all read or read regularly.

Observations, challenges, responses and gaps

- Finding the language to explain aflatoxin and its relation to mouldy groundnuts was a challenge. *Sumu kuvu* is the accepted technical term for mycotoxins. Most stakeholders did not know the term. Project staff wished to describe mould in terms that would enhance readers' conceptual world. Such new knowledge would strengthen readers' grasp of the reason for currently recommended control practices along the value chain and help motivate them to act. Another difficulty was to go beyond simple translations such as 'mould produces aflatoxin' (which may require prior appreciation that mould and aflatoxin are different kinds of entities) and find translations that help readers' understand the relationship of aflatoxin to (toxigenic) mould so as better to understand the value of control methods.

- Careful formulation, use and recording of open-ended questions were important to test readers' perceptions of each section the draft aflatoxin leaflet in a detailed way. Project staff were not necessarily very familiar with this method of questioning and recording the answers in Swahili.
- Overreliance on informants from groups familiar with researchers may weaken the value of pretesting. In the pretest work, it was understandable that a proportion of test persons were drawn from farmer groups participating in groundnut breeding work with ARI Naliendele staff; contact with these groups was straightforward and research staff were interested in increasing these groups' knowledge on aflatoxin so they could act as ambassadors and spread the message.
- Written materials may not be the only or even the best means to convey information about aflatoxin and its control in every situation; some stakeholders not accustomed to regular reading or to seeking information in written form may not find leaflets so immediately useful compared to an oral source of information.
- In ICMM, efforts were also made to develop radio and audio-visual communication products with the intention that these should complement each other. But for various reasons beyond the control of the project, development of the various communication materials (leaflets, radio and video-animation, as well as face to face meetings) could not be programmed so as to most effectively support each other (ICMM 2012).
- A single training event, or receipt of a written information leaflet, may not be sufficient to create credible and confident trainers or fuller understanding amongst other stakeholders of aflatoxin issues. Most of the extension officers who took part in the June 2014 TOT (see above p 14) heard about aflatoxin for the first time there, and have expressed a need for more training to increase their capacity. Villagers in the first follow-up surveys of effects of the leaflet said that written materials were not so important to some of them, and they called for other information approaches, such as use of video shows, and direct training (ARI Naliendele 2014).

Lessons and potential

- It is important that pretesting of written and other communication is conducted with different categories of intended users to check on comprehension and improve the communicators' understanding of user concerns and ways of expression. This pretest procedure will improve most materials that are aimed at people with very different backgrounds from those who are tasked to draft the communication. Use of pretest methods in ARI Naliendele were instrumental in alerting researchers to several shortcomings of their draft, as well as prompting them to seek solutions from other media and experience (such as the radio programme – see below p 17 – which predated finalisation of the aflatoxin information leaflet).
- Time and practice are needed to master pretest techniques such as open-ended questioning including careful probing to elicit responses, and accurate recording of what the respondents say in Swahili. Audio recording of responses followed by transcription and analysis is preferred. Use of these methods provides rich information at the design stage of educational print and other communication materials.
- The preliminary results of feedback from communities with no connection to ARI Naliendele, who had received the aflatoxin leaflet, is also very promising. This has encouraged the view that educational materials need not be designed solely to be as simple as possible but to achieve a desired effect – in this case, the leaflet starts from what is familiar to users (e.g. mould as a harmless surface covering)

and introduces new concepts (mould as a living structure that can spread and produce poisons) as a way to expand understanding and promote action.

- It is important to seek a wide range of pretest persons, particularly those who have are not linked in any way to the organisation developing the communication product. This helps increase confidence in the value of the product to convey the intended message.

Audio-visual

In recognition that aflatoxin is a difficult topic to explain, ARI Naliendele and partners drafted a video-animation (video combined with animated sequences). The intention was to develop a communication product that could both raise awareness on aflatoxin and convey information about the reasons for control to a Swahili speaking public.

Achievements

- **2013. Video-animation with Swahili narration and entitled “Sumu kuvu kwenye karanga”**, 10 minutes in duration, developed and subjected to expert review and audience pretest (see Appendix 6, pictures 2, 3 and 4 for views of the pretest). The draft video-animation describes mould, the relation of mould to aflatoxin, and how recommended control practices at each step in the chain from field to store helps control mould attack and is the key to why these particular control measures work. To date there have been no funds to revise and upgrade the video-animation based on suggestions and ideas from the review and pretest.

Observations, challenges, responses and gaps

- The pretest gave promising results: *“Respondents appreciated the easy simple Swahili language, pictures and video/animation that reflected ‘reality’ (uhalisia) in their view, the good brief explanations, use of pictures and arrows, and the opportunities afforded in the three repeats/recaps to be reminded of the main messages in each section. A few respondents indicated they have grasped that mould is a parasite that spreads aflatoxin, that understanding the conditions that favour mould can control aflatoxin, and that (certain) storage methods can avoid conditions that favour mould and aflatoxin”* (ICMM 2013).
- The pretest elicited interesting evidence that the video-animation had conveyed new information. In responding to a question on whether they had gained new understanding compared to the past, three farmers had heard about aflatoxin verbally from ARI Naliendele¹ but now had better understanding. The SIDO Manager, Mtwara), had not known that aflatoxin was spread invisibly by a parasite, and a Mtwara town market trader said that they had used to wait until the nuts were mouldy to recognise they were contaminated, but now knew that even non obviously mouldy nuts can have been contaminated. Both the SIDO manager and the market trader are excellently placed to share new understanding with very many other stakeholders in their trade (market trader) and training (SIDO) networks; they can also be valuable participants in debates (including on radio) of the opportunities and challenges connected with addressing aflatoxin risk in practice (ICMM 2013).
- The draft video-animation still faced challenges in translating and expressing the new concepts about mould as a living organism (not a harmless surface covering), able to spread and produce toxins, and

¹ Members of ARI Naliendele’s farmer research groups participating in joint variety selection and crop management improvement trials in CCRP projects.

not all the information appeared to be grasped as intended. When the draft of video-animation (as with the aflatoxin leaflet) was made, discussion on suitable terms and phrases in Swahili to describe mould and its relation to aflatoxin was in its early stages. The pretest results suggested that part of the difficulty was that phrases such as mould 'causes' or 'produces' aflatoxin were used, which may not have conveyed a fuller idea of what aflatoxin is to people with no prior microbiological understanding to use as a reference. The response used in finalisation of the aflatoxin leaflet (ICMM 2013, and page 13) was to use a descriptive 'word picture' (aflatoxin as being like a waste product of mould) coined by Dr Mponda in the 2012 radio programme (see below p 18) to help clarify the difference between mould and aflatoxin. Without funds to finalise the video-animation, it was not possible to adjust and re-test to see if there were improvements significantly improve the performance of the video-animation.

- The qualitative pretest methods used were challenging in that they required posing and recording open-ended questions. These skills take practice to acquire and a good grasp of what the pretest exercise is intended to achieve and what is hoped users will gain from the product.

Lessons and potential

- Despite imperfections and need for a variety of improvements, the video-animation approach is regarded as highly promising. It is a still largely underexploited method for expanding the general understanding of the public about moulds and their relation to mycotoxins in groundnut and other crops, including the logic behind various control practices.
- The video-animation could be made more vivid if still background pictures of 'bad' and 'good' pre- and post-harvest practices were substituted for video clips showing peer groups (farmers, traders) using mould-encouraging practices such as rough harvesting, drying on the ground, poor shelling, and storage and contrasting these live scenes of recommended practices (gentle harvest, drying on racks, shelling with properly adjusted shellers, storage in well ventilated conditions).
- The biocontrol method that uses non-toxigenic mould as a competitor of the toxigenic strains has not yet been directly referenced in the ARI Naliendele work. However, explanations supported by informative computer animations of mould can readily be expanded to introduce the concept of toxigenic 'bad' moulds and non-toxigenic 'good' moulds. Indeed it will be far easier to appreciate the function of the 'good' moulds, and how their effects will be monitored and publicised, through a better understanding of how the generally predominant 'bad' moulds grow and spread.
- It is important to acquire practice with unfamiliar interviewing and recording techniques, such as were essential to trying to determine how different sections, language, presentation etc. of the video-animation influenced the understanding of pretest viewers. Trying out the methods before having to put them to use in the field is also highly desirable.

Radio

At time of report preparation, detailed information on radio programmes was accessible only from ARI Naliendele. I am informed that TBC Radio and TV have run interviews with researchers about aflatoxin, but have no access to follow-up or audience responses to these to date. This section therefore highlights work done at ARI Naliendele.

Achievements

- **2013. Two radio programmes on aflatoxin, its health effects and its control in groundnut** were developed by ARI Naliendele and broadcast locally on INFO Radio FM Mtwara in January & March 2013 under the guidance of a Tanzanian radio advisor. The first programme was a redevelopment of a pilot radio programme from 2011 which had been judged by the radio advisor to have included too many topics and lacked clarity and consistency of language use. The radio advisor suggested a series of programmes, each building on the previous one, introducing and re-emphasising topics in step with the groundnut season and in response to feedback from listeners. But due to resources, only the first two programmes in the series were produced (Appendix 9).
- **Programme 1** introduced aflatoxin, its effects on human health, and key recommended control measures in groundnuts, and invited local (Mtwara town) audience response by SMS. In programme 2, a groundnut specialist and a medical doctor responded to listener feedback and to direct calls to clarify and further explain the aflatoxin issue and its control particularly in groundnuts.
- **Programme 2**, which followed the advisor's recommendations (except that it had to be broadcast live without pretest) was judged of suitable presentation quality and technical accuracy by the radio advisor and by Tanzanian mycotoxicologist Dr Kimanya (Chairman, Tanzanian National Steering Committee for Mycotoxins Control), respectively, for use to spread awareness on aflatoxin more widely in the country.

Observations, challenges, responses and gaps

- As in the initial face to face meetings (see p 11 above) it was understandably challenging for researchers to express themselves in suitably easy to understand language and to structure messages on a complex topic such as aflatoxin for the non-research public, particularly when talking without listener pretest on live radio.
- Audience pretest and feedback capture are as important to testing and improving programme content prior to airing as they are for print and audio-visual communication products. In the ARI Naliendele initiative, resources, competing tasks, the newness of the idea, and unforeseen events in Mtwara made it a challenge to consistently organise for audience pretest and feedback capture from the radio programmes.
- Info Community Radio FM Mtwara receives many calls from listeners during or after its popular programmes that are aired in the town area, and thus maintains good event-based contact to its listeners. Yet the station, possibly in common with many small local radio stations, appeared not to have a way to store messages elicited from a particular broadcast separately in a systematic way, such as via a dedicated modem to a computer. In practice an ordinary studio mobile phone was used and this made it a challenge for the research team staff to obtain the verbatim responses. At the time, the research staff did not have necessary experience or time to organise for collecting audience response via SMS themselves.
- Radio programme 2, available as an audio file, has not yet been re-broadcast with measures in place to capture feedback. Though the experience of producing the programme has been put to good use in presenting the topic of aflatoxin in groundnut at a variety of meetings, the time and effort put into radio programme 2 has not been fully utilised.

Lessons and potential

- The research station team experienced the importance of thorough preparation for structuring and moderating a radio production, for developing a more descriptive and explanatory language, and for engaging in ways to enhance the interactivity of radio programmes with listeners.

Collaboration with an expert advisor was needed to achieve this quality. The advisor also had to immerse himself in the topic and understand the issues. Only then was the advisor in a position to guide the research team in programme development. In knowledge translation of this nature, researchers and radio (or other media) specialists both benefit from learning from each other.

- The programme series idea introduced by the advisor is still valid; developing a connected series of programmes about aflatoxin and its control where each builds on audience feedback to the previous one. The value of this approach started to bear fruit while resources lasted, but remains to be further exploited.
- In collaboration with radio stations, it is of key importance that researchers or suitable partners take responsibility for collecting audience feedback or for ensuring that audience feedback is collected. Researchers and communication campaign staff need access to the original feedback messages in order to learn and improve communication efforts, gain ideas for new programmes, and conduct more detailed analyses of audience interests and reactions.
- ARI Naliendele has noted the value of mobile telephony (SMS) in eliciting feedback from radio broadcasts. Yet the potential of SMS has hardly been used so far, for example to make additional spoken information on aflatoxin, control measures, ongoing research etc., available on demand to callers wishing for more information. This could be done through a suitable arrangement with a mobile phone service provider such that calling a short code enables access to a menu of spoken information about specific areas of interest to the user.

Communication Theory of Change

Achievements

- An improved Theory of Change was created mid-way through the ICMM. This was important for increasing understanding among the partners on the logic of the whole project as a piece of work. The basic structure and paths towards change are described in Appendix 10. This model ToC may be beneficial as a source of ideas on working through the logic of other communication initiatives that have to operate in multi-disciplinary programme environments.

Observations, challenges, gaps.

- The purpose of the ToC was to help set out the project in such a way that there was coherence in its many actions. It had not always been clear to implementers how and why a variety of actions were needed nor how they were interrelated. Specifically, the ToC tries to show paths towards the development goals, about the suitability of activities needed at each step including skills and capacity building, links with new partners, and about what evidence was needed to demonstrate achievements

at each step. These reflections facilitate selecting methods, drawing up of budgets and skills and resources requirements for each step.

- The most helpful feature of the ToC is that it sets out a number of Preconditions, which are formulated as outcomes or changes at the level of various stakeholders (including researchers/implementing organisations) and includes some key outputs too. These preconditions or changes have to be met or achieved to lead on to the next and contribute towards the overall goal. This technique encourages project planners to think in terms of achievements and change right from the start. From there, planners are then enabled to work back towards what is needed, how feasible this is, are there hidden assumptions that need to be brought out, and which indicators can show achievements against the preconditions, plus how to obtain these. In the case of the ICMM, it was fairly straightforward using this approach to appreciate better the need for several of the actions (such as pretest, careful choice of meeting methods, importance of taking records, encouraging debate etc) noted in the foregoing discussions. Also it became clearer why there was so much interaction between the two lines of enquiry of the ICMM – they were in fact mutually reinforcing. Individual project staff appreciated that the ToC provided a far better overview of the elements of the ICMM, and why they were needed, than the original ToC in the project document (Swathi Sridharan, ICRISAT, pers. comm.; Juma Mfaume, Plant Breeder, ARI Naliendele).
- Ideally the ToC should also have contributed to design of individual communication initiatives and guided elaboration of methods and resources needed in each case. Yet this further practical use of the ToC approach has not yet been achieved despite some attempts in the sister ICMM project in Malawi. Part of the problem is that ToCs need to be developed in a collaborative process. Key actors need to participate in discussions, contribute their ideas and jointly build up a robust scheme of how proposed work will progress towards measureable outcomes. This was not achieved for a variety of reasons that meant full team meetings were infrequent while other factors decreased time and resources available to joint learning.

3.2.3 *Shamba Shape Up (run by The Mediae Company)*

This increasingly popular Kenyan agricultural TV show broadcast an episode on groundnut management and how to control aflatoxin in April 2014. A legume scientist who also is researching on aflatoxin issues, Dr Njoroge, ICRISAT-Malawi, participated as one of the visiting experts in the programme. Clips from the ICMM Malawi sister project's own draft video-animation were included amongst the visuals in the show (Series 4, episode 2). *Shamba Shape Up* is also aired on ITV in Tanzania and Tanzanians may have seen the show. At time of writing no analysis of audience feedback to that particular broadcast was available, but I am informed that some 800 SMS messages were received by Mediae after the Swahili language broadcast in Kenya. Feedback from Mediae on the kinds of responses received, and whether SMS were also received from Tanzanian viewers, is still pending. There may be much potential in the style of entertaining action and discussion-based programmes where farmers and experts and TV presenters all interact in a variety of practical tasks interspersed by discussion, questions and explanations. Computer animated sequences are also used to further explain aspects of a particular activity that cannot be seen at the time of the broadcast. For those interested the links to this particular episode are given here. The section that leads into mention of GAP and control of aflatoxin starts at around 9 minutes:

Swahili <http://www.shambashapeup.com/viewepisode/75/2>

English <http://www.shambashapeup.com/viewepisode/75>

3.2.4 Tanzanian News Media

It was only possible to source two examples of recent articles available online but published originally in newspapers.

- Daily News (Sunday 9 March 2014) is a well written informative feature written by Mashemba Tambwe reporting on an inception workshop by the EAC partner states to initiate a programme to address aflatoxin. It covers the main points and describes contributions by IITA and ICRSIAT to address the problem.

<http://www.dailynews.co.tz/index.php/features/28956-aflatoxin-contamination-poses-huge-challenge-to-food-safety>

- The Swahili article in Mwananchi by Hadija Jumanne from December 2012 ‘Mazao hayo ni hatari hasa kama hayatahifadhiwa vizuri’ (these crops are dangerous if not stored well) informs readers about concern expressed by the director of TFDA that aflatoxin presence is widespread due to poor practices in the villages from field to consumer.

<http://www.mwananchi.co.tz/habari/Siasa/-/1597332/1636032/-/item/1/-/enkcm4z/-/index.html>

It is not possible to say what effects these particular articles and similar ones have had at the present time. However, the writers do express the issues clearly. These and other writers who are gaining experience on writing about aflatoxin may be a potential source of journalists to specialise on correct reporting on aflatoxin in both English and Swahili. Given that many journalists, like other citizens, may have little understanding about the nature of moulds let alone mycotoxins, projects should also consider training courses specifically for journalists. The training could include opportunities to see mould under microscopes, try out rapid aflatoxin testing methods, visit farmers and field trials, and generally gain an understanding of the reality behind the words in official press releases.

4. Observations highlights and some further options

- Use of a **combination of communication media and methods** builds understanding. This is happening under the IITA initiative in Babati and also was part of ARI Naliendele’s ICMM project design. Methods that convey information (such as the IITA mycotoxin Factsheet and the ARI Naliendele aflatoxin information leaflet and radio programme) are important. Methods that provide opportunities for interaction, dialogue, discussion and learning are equally so. It has perhaps been traditional to view only the first kind of methods as communication per se. But the second kind of process-related methods, under a variety of names – e.g. Innovation Platforms, Learning Alliances, multi-stakeholder processes – will be of central importance where, as is the case with mycotoxins in food and feed, a variety of actors with widely different interests need to collaborate together to mitigate contamination. At ARI Naliendele, a deliberate process of interaction was set up along the lines of an Informal Learning Alliance; in Babati under Africa RISING, a more formal Innovation Platform approach has recently been initiated – this can be an important arena for learning around mycotoxins and their control.

- **Mobile telephony** is an as yet underexploited option in the experiences reviewed here. ARI Naliendele experimented briefly with SMS as a means to capture listener feedback to pilot radio programmes. But use of SMS has not been systematised for example through arranging for a short code SMS number to which people are invited to send responses that can then be analysed and used in follow up communication. The Shamba Shape Up farm information TV series (Kenya) uses such a system and is demonstrating its value for audience contact and programme evaluations. Interactive voice messaging (IVM) is another method with high potential for enabling people to take action themselves to access further information on demand: there is no doubt that IVM should be considered for piloting as a means to increase the public's access to information about mycotoxins.
- A **pretest process** adds value to print, audio and audio visual communication products, particularly when the intended audiences do not necessarily share the same education and life experience as those responsible for the content of the communication product. Useful methods are described here: National Cancer Institute (1989). Making Health Communication Programs Work. Office of Communications. NCI, USA).
- A **communication strategy** is important as an organising framework to set out objectives and formulating a plan of activities to achieve them and monitor progress. A communication **Theory of Change** (ToC) that focuses attention on the intended outcomes of the initiative can improve the quality of the communication strategy planning process. At ARI Naliendele, the revised project ToC was valuable in clarifying the logic of the multi-faceted project as an operationalisation of communication for development. ToCs can be developed for whole projects and for individual communication product development and use. Julia Coffman (2013) provides a useful guide.
- **Monitoring and evaluation** of communication is a critical component of the strategy and plan. Documentation of results is as important for a pretest as it is for a radio broadcast and an informal discussion. Tracing what has happened back in stakeholders' own networks, after their participation in dialogue and learning meetings (such as ARI Naliendele's stakeholder meetings), is particularly challenging in terms of methods and time. But the value of feedback from activity in stakeholders' own networks, both as a contribution to stakeholders' own learning process in future meetings and as evidence of early positive effects of such meetings, justifies more rather than less attention to this aspect of M&E. In the IITA Babati process very important learning on the part of IITA staff in conversations with farmers on mycotoxin issues is so far little documented. Feedback from farmers and others is also so far not systematically captured. Yet this experience can contribute to improved selection and formulation of messages in print and other communication products. In ARI Naliendele's work, though there was systematic capture of feedback in print pretests, the project faced methodological and resource challenges to ensure feedback from radio and to trace what actions stakeholders had undertaken after participation on dialogue and information meetings. An descriptive and well argued ToC, developed through a participatory process, is going to be a very useful practical tool to provide direction for M&E plans precisely because it encourages project planners to consider outcomes. Developing ToCs needs to be a team exercise with opportunities for critique, revision and changes, in step with emerging experience from practice.
- **Capacity building/skills training.** With the exception of specially hired communication professionals, such as the radio specialist who assisted ARI Naliendele on radio programme development, the frontline staff in the experiences reviewed here on aflatoxin/mycotoxin communication tended to have agricultural and natural science research backgrounds. The benefits of this are that the staff are knowledgeable on mycotoxins and agriculture, interested in evidence, and passionate about using their knowledge for the benefit of farmers and the public. The growing skills and understanding of these

staff, gained through practical engagement in communication efforts, can be enhanced further by training in communication skills and study methods. Training that includes creating awareness on one's own assumptions about what communication is may in particular provide a stronger basis for understanding the communication issues and needs of others and therefore which methods and procedures, and which checks and balances, are important and why.

- **Strategic partnerships** are going to continue to be important between research organisations charged with mycotoxin communication tasks and other organisations that have a comparative advantage in working with communication. The benefits brought by the radio specialist to ARI Naliendele are a good example of this. But it is also as important to seek collaborations with other organisations/individuals that can improve the quality of surveys and special studies to track and document change amongst a variety of actors.

5. Ideas and suggestions to support implementation of Output 3 from Africa RISING Babati project on aflatoxin awareness raising and Aflasafe testing in Tanzania

- Experiences currently being built in Tanzania and the coordination and implementation capacity offered by the National Steering Committee on Mycotoxins and its member organisations are an important basis on which to elaborate ideas for mycotoxin awareness raising (Output 3 Africa RISING Babati) and for communication around Aflasafe testing in Tanzania. The following points could be among those for further consideration. These also draw on my own reflections from participation over three years as a partner in ARI Naliendele's work on raising awareness about aflatoxin in groundnut.
- Efforts to raise public awareness on aflatoxin have clearly already started not only in Babati under Africa RISING but also in several other areas of the country through the efforts of several other actors. Awareness raising under Output 3 can be seen as in effect a *work in progress* in this wider setting of actions and learning about mycotoxins and their mitigation.
- Given this situation, there may be value in considering Output 3 itself to be a formative process and to plan and evaluate it as such. The evolution of this process, reflected in perceptions, concerns, interests and activities of its many actors, can be tracked and evaluated over a defined period of time. This idea fits well with the Innovation Platform model that is being initiated under Africa RISING across Work Packages in Tanzania. The Learning Alliance approach that was one of ARI Naliendele's promising lines of enquiry offers additional useful experience and key lessons on operationalising a similar process, albeit in an informal manner.
- A coalition of partners to supplement IITA-Eastern Africa Hub staff may be a way forwards. This may include on a needs basis creative media professionals, specialist media advisors and temporary staff, such as students, who with supervision can be invaluable for in-depth more detailed and time consuming studies. It will be important to ensure capacity is put in place to implement work to the required standard.
- A first step may be a rethink or clarification of the objectives of Output 3 and of the proposed biocontrol (Aflasafe) testing, including due attention to principles of respect and transparency (Africa RISING 2014). Engaging in a participatory process of constructing a Theory of Change (ToC) is likely to

be enormously helpful to formulation of a realistic communication strategy and implementation and M&E plan. This includes consideration of overall guiding principles, and the capacities and resources needed for each activity or sub-component. Though initially challenging, the ToC formulation process, where the programme of work is framed in terms of outcomes and planners are forced to face their assumptions, is hugely educational (Coffman 2003). The ICMM generalized ToC may also serve as a source of inspiration.

- There is clearly a need to take stock of what has already been achieved and seek ideas from experience of other projects, such as effective ways to manage meetings for learning. This review tries to show some available experiences. For example, valuable non documented experience that has a bearing on communication has already been gained during the course of Africa RISING Babati activities to date. This experience can be mobilised as input to efforts to harmonise messages, one of the concerns of the Africa RISING Babati team.
- Message harmonisation may be seen as a participatory process. Even though experts may determine technical content, interactions with intended users are critically important in the reframing and development of messages that convey meaning to the users. This may occur in a process of repeated opportunities to interact, exchange views, contribute to design of information materials (including pretests), and assimilate new evidence that becomes available about mycotoxins and their control.
- Using complementary and supplementary communication media and methods is important. There is perhaps a tendency for overreliance on written media and talk, which may reflect research traditions, while audio-visual media and radio remain underexploited. This could be corrected through productive partnerships as noted above.
- Audio-visual methods, including computer animated sequences, as was tried out by ARI Naliendele, may be a powerful way to explain the difference between 'good' and 'bad' mould in the case of biocontrol (Aflasafe). The otherwise hidden and currently rather counterintuitive phenomena could be readily illustrated via a video-animation, including explaining how trials would be monitored and mycotoxin levels measured. Such a production made and narrated in Swahili would go a step beyond written and spoken explanations and would inform decision makers and ordinary citizens alike. Use of similar methods by Shamba Shape Up shows the potential of mixtures straight video with explanatory animations (see for example Series 4 Episode 2 which includes a section groundnut production p 20).
- There are also far more opportunities nowadays to use mobile telephony to elicit feedback via SMS and facilitate monitoring and make evaluation more participatory. Mobile telephony also has enormous potential as a means to supplement other interventions to improve mycotoxins understanding and action. Methods such as IVM will allow information users to seek further information on demand. This information would be spoken and in Swahili and could provide regular updates on any important trials that were on-going, as well as basic information that, as we have seen, may not be fully understood when offered in written form. It is highly recommended that the coalition team consider mixes of methods and opportunities for information users to independently seek information.
- Another potential means to present evidence to the public is through the use of rapid aflatoxin test kits. Available models (e.g. Romer Labs, and there may be newer cheaper kits now) can demonstrate various levels of aflatoxin contamination on samples at point of sampling. Such kits do not seem to be used to obtain gross measures of aflatoxin contamination at markets, farms, or at assemblers. Their use as a pedagogical tool could be an exciting way to strengthen impact of messages about various aflatoxin-conducive practices and conversely help send the message that recommended practices have

a positive effect through providing evidence of presence of aflatoxin on the spot.

- Implementation of a mix of communication activities proved challenging in the cases reviewed. An important lesson is the need to pay attention to preparation throughout. It will clearly be helpful to build deliberate steps and allocate resources especially for preparation in the implementation plan. Examples include pretesting methods for interviewing, testing of language, reviewing how meetings will be run, how presentations will be made, particularly the first time, and trialling how information will be gathered by pretesting any survey methods. Feedback and lesson learning throughout need to be frequent and sufficient. Programmed meetings for this will provide opportunities to share field experience, regularly discuss both successes and shortcomings of methods, and contribute to corrective or new actions.
- To conclude this section, resources will ultimately determine the scope of these initiatives and the quality of the results. Much can be achieved with few resources and many highly valuable methods can be readily acquired by field staff. More will be possible through well thought out and structured initiatives that engage with stakeholders on several fronts, encourage learning all round, effectively mount results gathering surveys, and actively use lessons to improve further actions.

6. Acknowledgements

Thanks to Simon Boniface, Emmanuel Kayano and Dr Mateete Bekunda (IITA Eastern Africa Hub), Dr Omari Mponda, Happy Daudi and Juma Mfaume (ARI Naliendele), John Julius Bakari (ROSDO, Masasi), Dr Martin Kimanya, Candida Phillip and Analice Kamara (Nelson Mandela Africa Institute of Science and Technology), Dr Arnold Mushongi (ARI Uyole), Anne-Marie D'Olier and Kai Mausch (The Mediae Company), Karen Hampson (Farm Radio International) and all others who contributed to this review. A special thanks to Dr Fen Beed for inviting me to prepare this review.

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8. Appendices



Research to Nourish Africa

Ukweli kuhusu sumu kuvu

Sumu kuvu ni sumu zitolewazo na aina ya ukungu kuvu (fangasi) unaoota kwenye mbegu za nafaka na jamii ya kunde, mazao ya mizizi, karanga, vyakula na malisho ya wanyama vikiwa shambani au kwenye ghala. Ingawa aina nyingi za kuvu zinaweza kuota na kukua katika vyakula hivi, ni wachache tu amabao hutoa sumu kuvu. Endapo vayakula anavyokula binadamu au mnyama vina sumu kuvu nyingi afya zao hudhurika kwa kiwango cha juu. Sumu kuvu haionekani kwa macho, haina harufu, haina kionjo, wala rangi, lakini kuvu anayetoa sumu hizo anaweza kuwa na rangi ya kijani, chungwa, kijivu au njano chafu na anaweza kutoa harufu ya uvuondo. Karibia asilimia 25 ya vyakula ulimwenguni vina maambukizi ya sumu kuvu na watu bilioni 2.5 wako katika hatari ya kudhurika. Kuvu wanaotoa sumu hii hustawi ikiwa mazao yamekumbwa na ukame yakiwa shambani au kushambuliwa na wadudu waharibifu, na kwenye ghala ikiwa joto na unyevu viko katika kiwango cha juu.

Hatari zitokanazo na sumu kuvu

Kama chakula au kinywaji chenye sumu kuvu kitatumiwa na binadamu au mnyama ataugua kwa kutegemea na kiasi cha sumu kuvu kilichomo. Vyakula ambavyo vinaweza kuambukizwa sumu kuvu ni kama vile mahindi na unga wake, karanga na mazao yanayotokana na karanga, muhogo, nyama, mayai na maziwa (vitokanavyo na mnyama au ndege aliyeambukizwa pamoja na mazao yao) na vyakula vya mifugo (vyenye mbegu zilizoambukizwa au nyasi au vyaluka vya mifugo vya kutengenezwa). Saratani, hasa ya ini, kushusha kinga ya mwili, kudumaa hasa kwa watoto, sumu kwenye figo na vifo kwa binadamu na wanyama ikiwa viwango vya sumu kuvu ni vikubwa. Baadhi ya sumu kuvu hutoka kwa mama kwenda kwa mtoto akiwa bado tumboni. Kutokana na madhara ya afya yanayosababishwa na sumu kuvu kwa binadamu na wanyama sumu kuvu haziruhusiwi kuwepo katika mazao yaliyokusudiwa kwa biashara na kama zikigunduliwa katika mazao ya kilimo hayatauzika na badala yake yatateketezwa. Kwa kiwango kikubwa sumu kuvu huathiri biashara, faida na afya za wazalishaji.

Njia za kudhibiti maambukizi ya sumu kuvu

- Lima aina za mazao zenye ukinzani dhidi ya kuvu wanaotoa sumu kuvu (kama aina hizo zinapatikana)
- Vuna mazao yakiwa yamekauka vizuri kama inavyoshauriwa na bwana/bibi shamba na epuka kutia majeraha kwenye mazao yako
- Usianike mazao yako kwenye udongo mtupu. Anika sehemu iliyoitika kama meza na utumie turubai au aina nyingine ya kifaa cha kuanikia
- Wakati na baada ya kuvuna tupa mbegu au mazao yaliyoza
- Hifadhi mazao mahali pakavu na pasipo na joto. Hakikisha mazao yaliyohifadhiwa hayalowi
- Ghala liruhusu mzunguko wa hewa, zuia wadudu waharibifu na kuvu kwa kunyunyiza madawa yaliyokubalika na kushauriwa
- Kama yanapatikana, tumia madawa ya kibayologia kama vile AflaSafe™ (aina ya kuvu ambaye hukinzana na yule atoaye sumu kuvu)
- Tumia madawa yanayodhibiti na kuondoa sumu kuvu wakati wa usindikaji wa vyakula vya binadamu na vile vya wanyama



Mahindi yaliyoshambuliwa na kuvu wa sumu kuvu



Karanga zilizoshambuliwa na kuvu wa sumu kuvu

Ndege waliokuzwa na vyakula vyenye maambukizi ya sumu kuvu



Kwa taarifa zaidi wasiliana na Simon Boniface b_simon@cqiqr.org au Fen Beed f_beed@cqiqr.org wa IITA



Mycotoxin fact sheet

Introduction

Mycotoxins are poisons produced naturally by moulds (fungi) growing on cereal and legume grains, tubers, groundnuts, feed and silage in the field and also in storage. Although many different types of mould are capable of growing on these foods, only a few mould species produce mycotoxins. Health of humans and animals are seriously affected from consumption of food and feed containing mycotoxins. Mycotoxin contamination is common in Africa. Mycotoxins are invisible; odourless, tasteless and colourless but the moulds that produce them may be green, pink, white, orange, gray or dirty yellow colour and can smell wet. About 25% of world food is contaminated with some level of mycotoxins and 2.5 billion people are regularly exposed to them. Mycotoxin producing moulds grow well when crops in the field suffer drought after flowering, harvested and dried under wet conditions, or are attacked by insects and in storage when temperatures and humidity is high.

Major types of mycotoxins

- **Aflatoxins** are produced by *Aspergillus spp.* of fungi such as *A. flavus* and *A. parasiticus*. There are four types of Aflatoxins which are B₁, B₂, G₁, G₂. Aflatoxins are associated with maize, peanuts, cassava, spices, pistachios, tree nuts, cotton and dairy products.
- **Fumonisin**s are produced by *Fusarium spp.* of fungi which have a history of infecting the grain of cereals such as maize, wheat and silage.
- **Trichothecenes** are produced by *Fusarium spp.* of fungi and infects several grains.
- **Zearalenone** is produced by *Fusarium spp.* of fungi which infect several grains and grasses.
- **Ochratoxins** are produced by *Aspergillus spp.* and *Penicillium spp.* of fungi. *A. ochraceus* is found as a contaminant in beverages like beer and wine. *A. carbonarius* is the main species found on vine fruits, cereal grains and coffee.
- **Ergot Alkaloids** are compounds produced from the sclerotia of the fungi *Claviceps sp.* which are common parasites of various grass species like wheat, barley, millet, rice, sorghum, etc. The hard sclerotia replace cereal and grass seeds.
- **Patulin** is a toxin produced by *Penicillium spp.*, *Aspergillus spp.* and *Paecilomyces spp.* of fungi. The fungi cause mould on fruits and vegetables; they are however destroyed by fermentation.

Hazards caused by mycotoxins

When mycotoxin contaminated food is eaten or drunk by people or animals they will become sick depending on the amount of mycotoxins consumed. Food that can be contaminated includes maize and maize flour, peanuts and their products, cassava, meat, egg and milk (from infected animals or birds and their products) and feeds (containing infected grains or grass or manufactured animal feeds).

Cancer, especially of the liver, suppressed immune-system, suppressed growth especially of young ones, kidney toxicity, altered brain development in fetus, less absorption of nutrient from food are some of the health effects of chronic exposure to mycotoxins. When consumed in large amounts mycotoxins may cause death to both human and animals. Some mycotoxins (like aflatoxins) can pass through the umbilical cord from the mother to the fetus and from mother's milk to babies. Chickens are particularly more susceptible to mycotoxins. Because of the damaging effect on human and animal health, mycotoxins are not allowed to be present in traded produce beyond permissible limits, and if found in agricultural produce this material it cannot be sold and will be destroyed. Mycotoxins seriously affect trade, profit and the health of workers.

Measures to control mycotoxin infection and spread

- Grow crop varieties (if available) with resistance to moulds that produce mycotoxins
- Harvest crops at recommended moisture content levels without causing grain damage
- Do not dry grains on bare ground. Dry crops on raised platforms or over a tarpaulin or plastic sheet
- At harvest or after storage throw away grain that is mouldy
- Store grains under cool and dry conditions. Do not allow the grains to become wet
- For storage aerate well and prevent insect infestation and moulds by using approved insecticide and fungicides
- When available use biological control agent e.g. AflaSafe™ (types of moulds that naturally prevent the mycotoxin producing moulds)
- Use of mycotoxin binding agents and deactivators for production of animal feed

Appendix 1b. Mycotoxin factsheet cont'd. IITA.



A maize cob infected with *Aspergillus*



Maize cobs infested *Fusarium*



Peanuts infected with *Aspergillus*



Birds raised with feed containing aflatoxins

Two current initiatives in Tanzania:

1. Mycotoxin contamination in Tanzania: quantifying the problem in maize and cassava in households and markets
Donor: AFRICA RISING initiative of USAID Feed the Future
Partners: IITA, Tanzania Food and Drugs Administration, Tropical Pesticides Research Institute, Ministry of Agriculture Food Security and Cooperatives, Sokoine University of Agriculture, Cesope and DALDOs
2. Biological Control to Manage Aflatoxin in Maize and Groundnut Using Regionally-Adapted Beneficial Fungi in Eastern and West Africa
Donor: Meridian Institute (on behalf of Partnership for Aflatoxin Control in Africa – PACA)
Partners: IITA, USDA-ARS, Doreo Partners, African Agricultural Technology Foundation (AATF), and several national institutions in Ghana, Mali, Nigeria and those mentioned above for Tanzania.

Further information

Aflatoxin Mitigation in Africa, <http://www.aflasafe.com> www.iita.org

International Institute of Tropical Agriculture (IITA) www.iita.org

Please contact Simon Boniface s.boniface@cgiar.org or Fen Beed f.beed@cgiar.org of IITA, Tanzania





Mycotoxins and maize based cropping systems

What are mycotoxins?

Myco = fungal and *toxins* = poisons. There are many types of toxins produced by different fungi on different crops. Contamination occurs in the field and during storage. The most infamous are aflatoxins produced by *Aspergillus* species of fungi that are common, attacking > 40 crops, with maize and groundnut being the most vulnerable.



A. flavus on maize and groundnut



Poultry fed with aflatoxin contaminated (a) and healthy maize (b)

Why are aflatoxins important?

Aflatoxins are invisible and odourless but drastically harm the health of humans and animals. Aflatoxins suppress immune systems, impede growth and development and cause liver disease and death. Women and children are particularly vulnerable as are poverty stricken families who consume poor quality, contaminated foodstuffs. Because the effects of aflatoxins are so well known international trade is strictly regulated. Globally, about US\$1.2 billion in commerce is lost annually due to aflatoxin contamination, with African economies losing US\$450 million each year.

What is being done in Tanzania?

Studies have been limited in terms of crops, regions and seasons but results have shown that aflatoxin (and fumonisin) can reach alarming levels with significant impacts on health of humans and animals and on realising trade opportunities. However, efforts are now becoming integrated across different institutions to 1> increase awareness of mycotoxins and how to limit their production in field, at harvest and during storage, 2> regional harmonisation of sampling protocols to test for aflatoxin contamination and to set agreed standards of acceptability, 3> develop field and lab based methods for aflatoxin quantification. Tanzania experienced positive progress in 2012 as the largest survey ever undertaken was completed (where aflatoxin was quantified alongside 200 other potential mycotoxins) and a national Steering Committee for Mycotoxins was established. In 2013 PACA (Partnership for Aflatoxin Control in Africa) selected Tanzania as the host country for its Strategy Development - Stakeholder Consultation Workshop and a Tanzania specific aflasafe product will be developed. Such continued concerted efforts are expected to reduce risks due to mycotoxins in Tanzania and beyond.



200 Kenyans died after consuming maize contaminated with high levels of aflatoxins (2004-6) and > 2 million bags of contaminated maize not trade-able (2010)

Appendix 3. Results summary for feedback on mycotoxin sampling to villagers. 2013,



MUHTASARI WA UTAFITI KUHUSU HALI YA SUMU KUVU KWENYE MAHINDI WILAYANI BABATI

Muhtasari

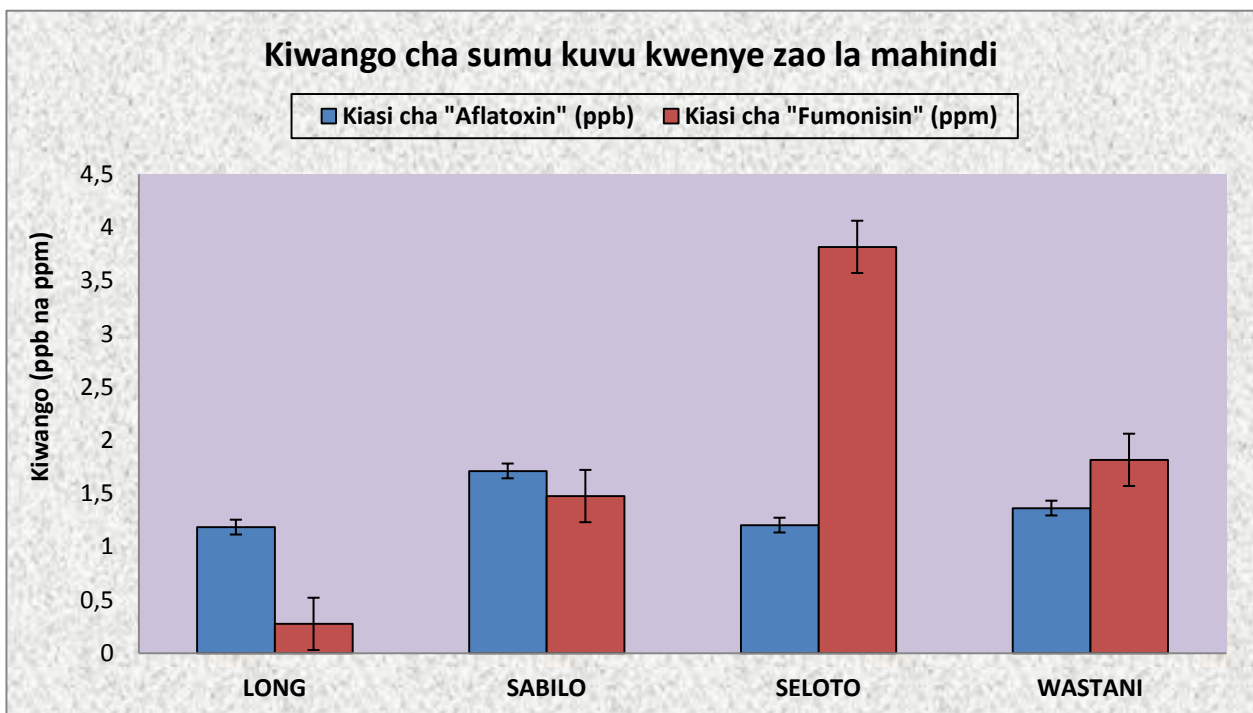
Taarifa hii ni muhtasari wa utafiti uliofanyika katika vijiji vya Seloto, Long na Sabilo ili kubaini kiasi cha sumu kuvu kwenye mazao ya mahindi na maharage na njia hatarishi zinazosababisha kuenea kwa sumu hiyo mashambani, maghalani na kwenye masoko katika vijiji hivi ambavyo vinawasilisha kanda tatu za kilimo (Agro-ecological zones) pamoja na kutoa huduma za ugani kwa kuelimisha jamii juu ya sumu kuvu na njia mbadala za kupunguza tatizo hili.

Ukusanyaji wa takwimu ulianza mwezi wa Aprili mwaka 2013 ukitanguliwa na vikao vya utambulisho na mipango katika ngazi za wilaya, kata na vijiji. Kazi hii ilihusisha wananchi na watafiti kutoka taasisi mbalimbali za utafiti na zisizokuwa za utafiti.

Matokeo ya awali ya utafiti

Matokeo haya ni ya awali yanayohusisha sampuli 454 za mahindi zilizofanyiwa utafiti kutoka vijiji vyote vitatu. Takwimu zinaonesha kuwa kwa wastani sumu kuvu ya "Aflatoxin" ipo kwa kiwango cha 1.4 na "Fumonisin" ipo kwa kiwango cha 1.8 kwa vijiji vyote. Kijiji cha Sabilo kina wastani wa kiwango cha 1.7 cha sumu kuvu ya "Aflatoxin" na wastani wa 1.5 wa sumu kuvu ya "Fumonisin"; kijiji cha Seloto kina wastani wa kiwango cha 1.2 wa sumu kuvu ya "Aflatoxin" na wastani wa 3.817 wa sumu kuvu ya "Fumonisin". Aidha, kijiji cha Long kina wastani wa kiwango cha 1.2 wa sumu kuvu ya "Aflatoxin" na wastani wa 0.275 wa sumu kuvu ya "Fumonisin";

Kwa kuwa kiwango cha juu cha chenye madhara ya muda mrefu ya kiafya (Chronic toxicity) kinachopedekezwa na mashirika mengi yanalosimamia viwango vya sumu za chakula ni wastani wa kiwango cha 10 kwa "Aflatoxin" na kiwango 2 cha Fumonisin, ni dhahiri kuwa tatizo la sumu kuvu katika maeneo haya lipo ingawa bado halijazidi viwango vinavyoweza kusababisha vifo (Acute toxicity). Hivyo basi, jamii ya maeneo haya inashauriwa kufuata njia bora za ukulima, uandaaji na uhifadhi wa mazao ya shamba hasa mahindi na maharage na karanga ili kuepuka madhara ya kiafya.



Ushauri

- Vuna mazao yakiwa yamekauka vizuri kama inavyoshauriwa na bwana/bibi shamba na epuka kutia majeraha kwenye mazao yako
- Usianike mazao yako kwenye udongo mtupu. Anika sehemu iliyoinuka kama meza na utumie turubai au aina nyingine ya kifaa cha kuanikia
- Wakati na baada ya kuvuna tupa mbegu au mazao yaliyoza

- Hifadhi mazao mahali pakavu na pasipo na joto. Hakikisha mazao yaliyohifadhiwa hayalowi
- Ghala liruhusu mzunguko wa hewa, zuia wadudu waharibifu na kuvu kwa kunyunyiza madawa yaliyokubalika na kushauriwa

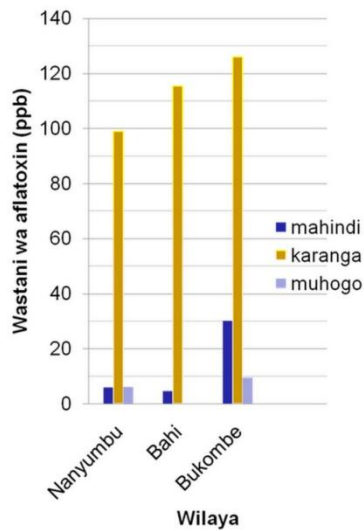
Kwa taarifa zaidi wasiliana kwa email na Emmanuel Koyano; e.koyano@cgiar.org, Simon Boniface; s.boniface@cgiar.org au Fen Beed; f.beed@cgiar.org

Upatikanaji na mtawanyiko wa sumu kuu Tanzania –
Mazao na idadi ya sampuli zilizochukuliwa

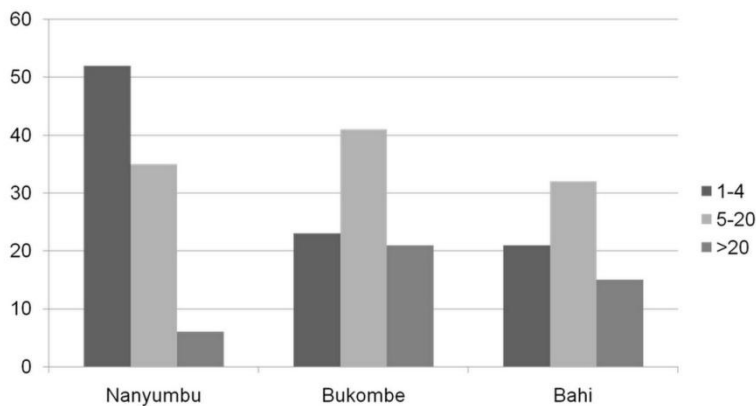
Wilaya	Idadi ya sampuli za karanga	Idadi ya sampuli za Mahindi	Idadi ya sampuli za Muhogo	Jumla
Bahi	68	44	0	112
Bukombe	81	68	2	151
Nanyumbu	87	46	5	138
Jumla kuu	236	158	7	401

Appendix 4
Slides with Swahili text used to update a cross section of groundnut stakeholders on results of mycotoxin analysis in Tanzania. ARI Naliendele, Mtwara, 2012.

Kiwango cha Sumu Kuu (Aflatoxin) katika wilaya tatu Tanzania 2011



Kiwango cha sumu kuu katika wilaya tatu Tanzania



Sampuli 93 121 115

Appendix 5. The Swahili language leaflet on aflatoxin and how to control it in groundnut printed and distributed in 2014. The leaflet is A3 with two folds. ARI Naliende. 2013/14.

Jinsi ya Kudhibiti Sumu Kuvu Katika Karanga

Karanga ni zao la chakula na biashara. Tanzania kama zilizyo nchi nyengine hufanya biashara ya uzazi wa karanga nchi za nje ili kukua pato la taifa.

Kiwango cha Sumu kuvu katika karanga ni kipezo kikubwa sana nje ya nchi hususan nchi za Ulaya na Amerika. Takwimu za maizo nchi za nje zinaonyesha kuwa Tanzania iliuzi tani 15,000 za karanga mwaka 2008 na kupata bei ya chini sana ya dola 424 kwa tani kwa ukosefu wa ubora kama kuwepo kwa kisaji kikubwa cha Sumu kuvu katika karanga zake. Lakini nchi nyengine, infano Afrika ya Kusini ambayo ilipeleka karanga salama zaidi iliuzi kwa dola 1473 kwatani. Bei halisi inabuniwa kuwa katika ya dola 1580 - 2800 kwa tani kutegemea msimu na ubora.

Hii inaamisha Tanzania ilipata hasara ya karibu sh. bilioni 25. Kutokana na kushindwa kutimiza vigezo vya biashara nchi za nje karanga nyingi huwa ndhimi bila kujali madhara yake kiasi. Haya ndhimi karanga hutumika kama kungu muhimu katika mapishi.

Fia karanga hukwa kwa wingi zikwa mbichi, zimchemshwa au kukaangwa na hutimika kutengeneza chakula cha liche ya watoto. Kwa maantiki hiyo Sumu kuvu inathitiri kwa kiwango kikubwa uhamu na aya zetu.

Kipeperushi hiki kina maelezo ya hatua kwa hatua ya namna ya kuzuia tatizo la ukungu (kuvu) unaosababisha Sumu kuvu katika karanga.

Sumu kuvu ni nini?

Kitaalamu sumu hii ambayo hupatikana katika karanga inajulikana kwa jina aflatoxin. Mambo muhimu ya kufahamu kuhusu Sumu kuvu:

- Sumu kuvu (aflatoxin) husababisha madhara ya Sarafati ya ini, kudumaa kwa watoto na kupungua kwa kinga mwilini dhidi ya magonjwa.
- Sumu kuvu katika karanga halwezi kuondolewa kwa njia za kawaida kama vile kupika, kuohemsha au kukaangwa karanga.
- Sumu kuvu haina rangi hiyo halonekani hata kama utaimenya na kukunja karanga.

Kwa masana hiyo ni jambo la muhimu sana kuzingatia kanuni bora za kilimo, uhitidhi, usambazaji na usindikaji wa karanga ili zidhambuliwe na Ukungu (kuvu) ambao huzafisha sumu kuvu ndani yake.

Ukungu ama kuvu ni nini?

- 1** Ukungu au Kuvu unaovuna juu ya karanga (ona picha na. 1) ni vilini vya maambukizi vya vimelea ambavyo vinaenea ndani ya karanga.
- 2** Kawaida vimelea vya ukungu (kuvu) hupatikana katika udongo.
- 3** Vimelea hivi vikishambulia karanga, huenea mithili ya mitizi midogo midogo sana ndani ya karanga na haviwezi kuonekana kwa macho (ona picha na. 2). Hapo ndipo vimelea vinapoanza kutengeneza sumu kuvu.
- 4** Vimelea vinapokua kwa muda na kujilisha kutokana na karanga iliyokoma, vimeleleka juu ya juu ya karanga kama ukungu wa rangi ya kijani (ona picha na. 3).
- 5** Ukifuzama unga huu kwa darubini unaonekana mithili ya matawi madogomadogo yaliyoshenei mamiloni ya vilini vya maambukizi vya ukungu ndogo ndogo sana (ona picha na. 4).

Kwa sababu vilini vya vimelea hivi huwa ni vingi sana kwa mamiloni na kuonekana kama ukungu (kuvu) kwa macho ya binadamu uliolelea rangi ya kijani iliyochanganyika na njano.

Kutengenezwa kwa Sumu Kuvu (Aflatoxin)

- Ukungu au Kuvu unatoa sumu ndani ya karanga. Sumu inaweza kuwepo katika karanga hata kama ungaunga huonekani juu ya karanga kwa sababu mitizi ya ukungu (kuvu) itakuwa imeshatena ndani ya karanga.

Sumu kuvu siyo ukungu (kuvu). Sumu kuvu kwa lugha nyepesi ni kama kinyesi cha ukungu (kuvu). Ukungu (kuvu) ni klumbe hal, lakini sumu kuvu ni sumu tu.

Sumu kuvu haina rangi hiyo halonekani hata kama utaimenya na kuvunja karanga.

Ukungu (kuvu) unaenea namna gani?

- Kwa sababu ukungu (kuvu) huishi ardhini, mitizi midogo ya vimelea hivi vinaligiza moja kwa moja kutoka kwenye udongo na kushambulia karanga zilzokauka au kukaa muda mrefu ardhini (ona picha na. 5).
- Ukungu (kuvu) huenea pia kwa njia ya vilini vyake (chembe zake) ndogo sana. Vilini hivi ambazo vinaonekana kama ungaunga juu ya karanga iliyochambuliwa husafirishwa kwa njia ya upoko kutoka sehemu moja hadi nyingine (ona picha na. 6).
- Vilini vya ukungu (kuvu) vikivika kwenye karanga nyinyine huota na kuuzwa mashambulizi mpya (ona picha na. 7).
- Mashambulizi hayo hutoka karanga inapokuwa katika mazingira ya unyevu na joto.

Mazingira yanayopendelewa kwa Ukungu (kuvu) kushambulia

- Panahitajika hali ya joto na unyevu. Hii ina maana kwamba karanga zilzokauka vizuri, na kuhadhiwa sehemu iliyokuvu, ni vigumu kwa ukungu (kuvu) ni vilini vyake kuzishambulia.
- Sasa umefahamu ukungu (kuvu) ni kitu gani, hiyo upo kwenye nafasi nzuri ya kuzuia uvamizi/kuenea kwake katika karanga zako. Soma Kipeperushi Na. 2.

Unaopozia mashambulizi ya ukungu (kuvu), kushambulia karanga unazuia sumu kuvu kutengenezwa katika karanga.

Mashambani wakati wa kupanda na kukuza karanga

Mimea zilizohi, karanga zilzokauka, hurahisisha mashambulizi ya ukungu (kuvu). Zula hali jii kama ifuatayo:

- Panda karanga kwa wakati. Panda mbegu zihakazokoma kwa muda mrefu ili uweze kuvuna kabla ya kijindi cha ukame mkali.
- Chagua mbegu inayostahimili mashambulizi na uvamizi wa ukungu (kuvu). Pata mawadha ya misalamu wako wa Kilimo.
- Tumia njia za kuhitidhi maji shambani kama patii nzuri ya kupandishwa/infia udongo kwenye mashina kuingia maji na kutimika karanga zinazozalwa ili huchangia kwa na zao lenye aya na kupungua mashambulizi ya ukungu (kuvu).
- Hakikisha karanga zimefiniwa kabisa na udongo ili zilzopasuke kwa sababu ya juu au namna yoyote ili ukungu (kuvu) isipate nafasi kushambulia. (Ona picha na. 8)

Wakati wa kuvuna

Epuka jambo lolote litakalosalabisha ganda la karanga kupasuka/ kukatika na kusababisha udongo kukutana na karanga hiyo ukungu (kuvu) kushambulia karanga. Kuweza kuepuka hayo, unashauriwa:

- Vuna karanga iliyokoma kwa wakati. Karanga iliyokoma ni ile yenye mbegu iliyjaa katika ganda lake. Ni vema kuzingatia aina ya karanga na muda wa kukoma ili kufanya maandalizi mapema.
- Wakati wa kuvuna, ng'oa shina la karanga kwa uangalifu.
- Kung'uta shina kuondoa udongo kwa uangalifu.

Kausha ukipepuka karanga kugusana na udongo. Simamisha karanga otiti juu katika mafungu (karanga kuangalia juu) kwa kutengeneza vifurushi vyaayo ruhusu kupenyeza hewa au kausha juu ya chanya (ona picha na. 9). Ihachani na mwa ya ghafla kwa kukaa karibu na mahali ulipo anika karanga ili usame nara unapo ona dafili za via. Karanga zilzokauka vizuri zinatoa mlio wakati zinapokiswa.

Wakati wa kuchagua Karanga

Kumbuka kuwa vimelea vya ukungu (kuvu) huishi katika udongo. Vilini vya maambukizi vyake (mbegu zake) vipo hewani na juu ya karanga zilzovunwa. Ukungu na vilini vyake huenea kama chembechembe ndogo hewani. Kwa hiyo unashauriwa kuondoa karanga zote zilzoshambuliwa na ukungu (kuvu), zenye rangi rangi iliyoye kwa kawaida, zilzodonya, zilzopasuka au kukatwa na jembe wakati wa kuvuna na zilzotobolewa na wadudu. Kwa kuondoa karanga zenye ukungu utakuwa umeondoa vyanzo muhimu vya madhara ya maambukizi ya ukungu (kuvu) kwa karanga zingine. Utisahau kwa ukungu (kuvu) husababisha mafalengezo ya sumu kuvu ndani ya karanga.

Wakati wa Kubangua

Kumbuka kuwa vimelea vya ukungu (kuvu) huishi katika ardhini, katika karanga zilzopasuka na juu ya karanga zilzokauka. Vilini vyake ndogo mno vipo kote hewani na juu ya karanga zilzokauka.

Kwa maantiki hiyo basi, ni rahisi karanga zilzopasuka au kurehubika wakati wa kubangua kuingiwa na ukungu (kuvu). Pia hali inapokuwa ya unyevu kutokana na karanga kutokauka vizuri, vilini vya ukungu (kuvu) huota, kukaa na huzalisha sumu kuvu ndani ya karanga. Hiyo faida yafuatayo wakati wa kubangua:

- Ondoa karanga zote zilzoharibika; bangusa tu karanga zilizo nzuri. Hakikisha ganda la karanga limekauka ipasavyo kabla ya kubangua.
- Usinyirize maji kwenye karanga wakati wa kubangua. Tafuta aina ya mashine itakayoweza kubangua karanga zenye ganda gumu kwa urahisi.
- Jiweze namna ya kutumia mashine ya kubangua karanga kusudi upunguze idadi ya karanga zinazopasuka.

Wakati wa Kuhifadhi

Kumbuka kuwa ni yeyote Karanga zilidwe dhidi ya mashambulizi ya ukungu (kuvu) zibhe kwenye maganda. Endapo karanga zimekauka vizuri na kutoa mlio zinapokiswa, ukungu (kuvu) na vilini vyake ndogo ndogo havitashambulia kirahisi.

Aidha kumbuka kuwa karanga zilzoharibika ni chanzo cha ukungu (kuvu). Hiyo unshauriwa kufanya yafuatayo katika kuhifadhi karanga:

- Ondoa karanga zote zilzoharibika; baki na karanga nzuri tu na zilzokaukwa vizuri tu.
- Tumia magunia kuhifadhi karanga kwa sababu yanapitisha hewa. Matumizi ya vitroba huchangia kuongezeka kwa unyevu.
- Panga magunia ya karanga juu ya mbaao au magogo/ vipande vya mli karubusu hewa kuzunguka mahali potole. (Ona picha na. 10).
- Hakikisha ghafla inakawa na hewa ya kutofa.

Mfidhili: Collaborative Crops Research Program, McKnight Foundation, 2013.

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Jinsi ya Kudhibiti Sumu Kuvu Katika Karanga

Kipeperushi hiki kina maelezo ya hatua kwa hatua ya namna ya kuzuia tatizo la ukungu (kuvu) unaosababisha Sumu kuvu katika karanga.

Appendix 6. Pretest of aflatoxin leaflet and video-animation, ARI Naliendele 2013



Appendix 7. Results of focus group discussion with four members of an organic farmer group from Chigweje village, Nanyumbu District, using the given shown. The farmers received copies of the ARI Naliendele aflatoxin leaflet in March 2014. This interview was part of a mini-survey conducted in June 2014 by the Masasi based NGO ROSDO.

Question.
1. Umesikia kuwepo kwa sumu kuvu katika karanga Tumesikia
2. Sumu kuvu ni nini na ina madhara gani? Sumu iliyopo katika ardhi inayoingia katika karanga Madhara yake ni; i) magonjwa ya ini, ii) kukosa soko, iii) mifugo kupata madhara pia
3. Je, kuna uhusiano kati ya sumu kuvu hiyo na ukungu katika karanga? <i>Fafanua kidogo.</i> Ukungu husababisha kuwepo kwa sumu kuvu, kwa sababu huruka na kuambukiza karanga zingine nzima mahali nengine
4. Je, karanga zinaweza kuwa na sumu (kuvu) hata kama hakuna kiashiria kinachoonekana? Fafanua kidogo. inawezekana kwa sababu sumu huweza kuota ndani ya karanga hata kabla ya ukungu kujionesha. Tunashuhudia kuona rangi ya kahawia ukiipasua karanga sehemu ya katikati
5. Wewe (kama mkulima, mfanyabiashara n.k.) unaweza kufanya nini ili kudhibiti sumu hiyo katika karanga zako? i) zianike karanga katika chanja, ii) zivune wakati hakuna mvua, iii) zianike kwenye jua na zikauke vizuri, iv) toa udongo wote katika karanga wakati wa kuvuna
6. Je, utafanya mabadiliko gani katika kilimo /biashara ya karanga zako siku za mbele? <i>Fafanua kidogo na utoe sababu (kwa nini?).</i> Tutapanda karanga ili tuvune wakati mvua zimekatika. Kipindi kizuri cha kupanda ni kati ya tarehe 20th December mpaka Januari 17) kila mwaka
7. Kuna tofauti ipi kati ya mabadiliko haya ya sasa na ulivyokuwa unafanya hapo mwanzo? Hatujafanyia kazi bado haya maelezo ni mageni kwetu
8. Je, umempa mtu mwingine habari ulizoielewa kuhusiana na sumu kuvu? <i>Fafanua kidogo. Nani, vipi, lini ?</i> Ndiyo. Wahudumu wa afya, wanafunzi, watu maarufu, wataalamu wa ugani
9. Umewahi kusikia chochote kuhusu sumu kuvu kwa njia yoyote hapo kabla? <i>Fafanua kidogo –(nani, vipi, lini?)</i> Hatujawahi kusikia isipokuwa tulipopata vipeperushi hivi

Mapendekezo ya kuboresha kuenea kwa habari

- Iwe ni AJENDA ya kudumu katika mikutano ya serikali ya kijiji

Appendix 8. Results of focus group discussion with seven members of an organic farmer group from Miyuyu village, Newala District, using the given shown. The farmers received copies of the ARI Naliendele aflatoxin leaflet in March 2014. This interview was part of a mini-survey conducted in June 2014 by the Masasi based NGO ROSDO.

Question.
5. Umesikia kuwepo kwa sumu kuvu katika karanga Ndiyo tumesikia
6. Sumu kuvu ni nini na ina madhara gani? Sumu inayopatikana katika karanga Madhara yake ni i) kusababisha kansa ya ini na ii) kukosa soko la uhakika
7. Je, kuna uhusiano kati ya sumu kuvu hiyo na ukungu katika karanga? <i>Fafanua kidogo.</i> Ndiyo upo; ukungu ndiyo hubeba sumu kuvu
4. Je, karanga zinaweza kuwa na sumu (kuvu) hata kama hakuna kiashiria kinachoonekana? <i>Fafanua kidogo.</i> karanga ambayo haijatobolewa, bado ni salama ila zile zilizo na vidonda ndiyo mbovu
5. Wewe (kama mkulima, mfanyabiashara n.k.) unaweza kufanya nini ili kudhibiti sumu hiyo katika karanga zako? kutosababisha karanga kupata vidonda, kutoa udongo wote katika karanga baada ya mavuno, anika karanga zikauke vizuri, chagua na uzitoe karanga zilizo mbovu wakati wa kuvuna na kuhifadhi
6. Je, utafanya mabadiliko gani katika kilimo /biashara ya karanga zako siku za mbele? <i>Fafanua kidogo na utoe sababu (kwa nini?).</i> Tutaboresha namna ya kupanda, kuvuna na kuanika kwa sababu maeneo haya ndiyo yanayosababisha ongezeko kubwa la sumu kuvu pale yanapofanyika vibaya
7. Kuna tofauti ipi kati ya mabadiliko haya ya sasa na ulivyokuwa unafanya hapo mwanzo? Hatujaweza kuibaini kwa sababu mafunzo tumeyapokea wakati tayari msimu umekuwa katikati na tunasubiri kuvuna tu
8. Je, umempa mtu mwingine habari ulizozielewa kuhusiana na sumu kuvu? <i>Fafanua kidogo. Nani, vipi, lini ?</i> Ndiyo; wakulima 12 nje ya kikundi, Majirani 20, na Kijiji jirani cha Mkalenda vipeperushi 5
9. Umewahi kusikia chochote kuhusu sumu kuvu kwa njia yoyote hapo kabla? <i>Fafanua kidogo –(nani, vipi, lini?)</i> Hatujawahi kusikia isipokuwa tulipopata vipeperushi hivi

Maelezo mengine

- Wakulima wamekuwa na desturi ya kuzichambua karanga zao na kuzitoea mbovu wakati wa kuhifadhi

Mapendekezo ya kuboresha kuenea kwa habari

- Muda wa vikao vya serikali ya kijiji iwe ni AJENDA ya kudumu kujadili sumu kuvu
- Tarehe 21/06/2014 ni siku ya kuwapima watoto clinic itakuwa ni mwanzo wa kuelimishana kabla ya upimaji kwa waliohudhuria wote

Appendix 9. Comments and recommendations by an external radio advisor on the pilot radio programme produced in a collaboration between ARI Naliendele and Info Community Radio Station Mtwara.

“Experts were not ‘speaking’ the language of the listener- they were a bit fast on the main subject, and repeatedly talked aflatoxin (the English word) instead of Sumu Kuvu (which is not widely known but could have been explained).

Experts tried to cover many issues in one programme thus making it too much for the listener – the programme was a bit jumbled in terms of organisation with lots of jumbled messages as the moderator attempted to invite experts and guests to say something on the subject.

The key message was not ‘hammered’ enough to arouse interest and action from listeners

Background music was too loud thus distracting”

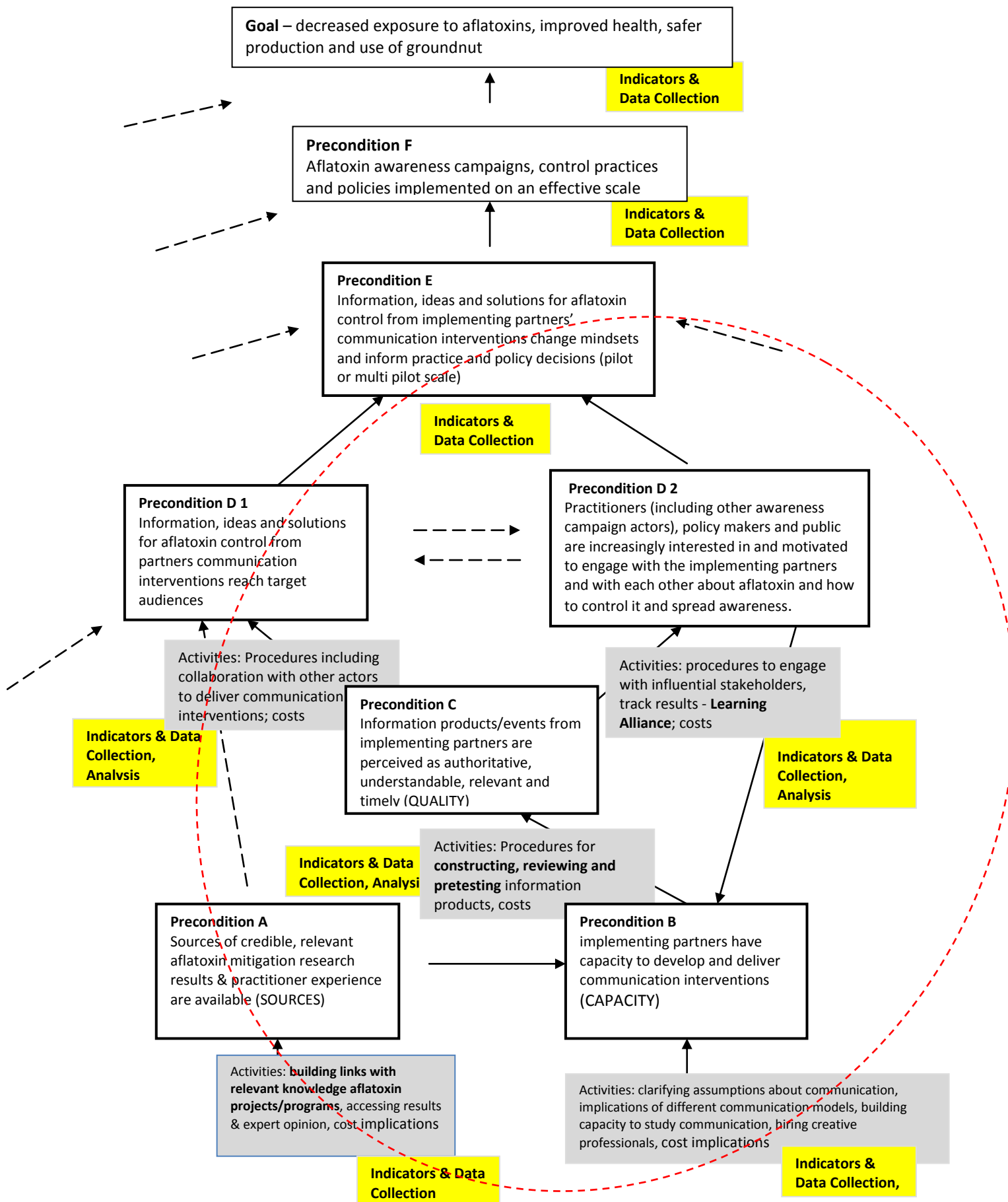
The radio advisor, Mr Jack Mena, concluded that the 2011 programme should not be re-edited, but rather that a new series of programmes should be crafted. These should be more focused and participating experts should *identify their listeners and prepare much more thoroughly* for the programme in collaboration with the radio production staff.

The programme should be pre-recorded and pretested before airing. Subject to funding, the programmes should be considered for airing as part of a regular series on Info Radio at a popular time with repeats after two weeks to reinforce the topic and raise its profile with the public.

To continuously improve quality of the programmes and connection with audiences, feedback from each broadcast should be used to inform ideas for further explanations, topics, additional experts and presentation styles in each subsequent programme.

Source: ICMM (2013).

Appendix 10. Basics of the ICMM Theory of Change 2013-4



The ICMM generalized ToC may be beneficial to as a means to improve design, monitoring and evaluation of similar projects. The inspiration was a retrospectively derived ToC (The Policy Influence of LIRNEasia. External Evaluation Final Report. Z Ofir, Evalnet, 2010, RSA).

The ToC can encourage project partners to reflect on assumptions they/others hold about communication, about the suitability of activities needed at each step including skills and capacity building, linking with new partners etc, and about what evidence is needed to demonstrate achievements at each step. These reflections will facilitate drawing up of budgets and skills requirements for each step.

In the ToC, each Precondition (formulated as Outcomes/changes at the level of stakeholders, including researchers) has to be met to lead on to the next and contribute towards the overall goal. The ICMM was concerned mostly with activities within the dotted red circle (Appendix 10), but formulating a ToC that included higher level goals was useful to seeing the larger picture within which the communications study project was operating. The steps include paying attention to sources of validated information and practice about aflatoxin control (Precondition A) – this entails efforts to obtain this information. The capacity of the implementing partners to deliver (Precondition B) is also crucial. Information products need to be perceived as authoritative, understandable, relevant and timely (Precondition C), which reflects project efforts to pay attention to content accuracy and relevance, easy-to-understand language, attractiveness of the information products evaluated via pretesting procedures. To contribute to creating awareness, the communication needed to reach audiences, as indicated by Precondition D 1. In the ICMM information alone is not sufficient for behavior change. Therefore the project also seeks via our informal **Learning Alliance** (effected through Stakeholder Review Meetings-SRM) to engage with influential stakeholders and broker links between them around aflatoxin, its effects and control issues (Precondition D 2). The SRM forum is also a space for stakeholders to review and provide critiques of project communication products; if they find them useful, they may offer their services as a channel for distributing them and contribute feedback. Therefore Preconditions D1 and D2 are strongly linked. Without change in mindsets and influence on practice and policy, efforts to address aflatoxin contamination cannot be effective, and this is indicated by Precondition E. Actual implementation of information campaigns, control practices and supportive policy on an effective scale (Precondition F) complete this logic path towards the goal.

But the links between the steps are not necessarily linear. There are many other stakeholder interactions, while other projects and influences (dotted arrows) also will play a role, as more attention is given to aflatoxin mitigation in Tanzania and regionally. There is clearly scope and the need for feedback loops between the project implementers, sources of aflatoxin control information and knowledge. Interaction with information/knowledge users is fundamental for making progress towards Preconditions C, D1/D2 and E.

For practical reasons, the ICMM is most directly concerned with and affected by **Preconditions A – D (2)**, while we aim to expand activities to reach target audiences/users (**Precondition D1**) and track and measure change at the level of **Precondition E and F** in collaboration with other projects and programmes. The ICMM has mostly operated within the boundaries indicated by the **red (dashed)** line and this has emerged as the *de facto* limit of direct project involvement.

Source: ICMM (2013). Innovative communication media and methods for more effective aflatoxin mitigation, variety uptake and use interventions in groundnut in Malawi and Tanzania (ICMM). Annual Report for 2012/13. CCRP. McKnight Foundation.