



RESEARCH  
PROGRAM ON  
Agriculture for  
Nutrition  
and Health

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Fourth Aflatoxin Research Coordination Meeting  
20 March 2014  
IFPRI – Washington, DC

Prepared by Amanda Wyatt and Christine Atherstone

## Meeting summary

On 20 March 2014, participants from five CGIAR centres and partners met in Washington, DC, at the International Food Policy Research Institute (IFPRI) headquarters to share their current aflatoxin research activities, to continue work on developing a theory of change and business case for scaling up the aflatoxin research and to plan for papers capturing ongoing activities and pathways for future impact. This report summarizes the discussion. The agenda and a list of participants are at the end of this report.

### Business case for scaling up aflatoxin research

The vision for the coordinated aflatoxin research in the CGIAR Research Program on Agriculture for Nutrition and Health (A4NH) is to create a research program built around a theory of change and impact pathways that can quantify the health and economics benefits of aflatoxin control. The development of the theory of change and impact pathways will require that the group come to a common agreement on how research will have impact at scale and what can be done.

It is expected that within this group, capacity will be aligned around agronomy, practical knowledge about value chains, epidemiology, risk assessment and economics. The research does not necessarily have to be done collaboratively, but planning and evaluation should be a coordinated effort.

Although this group recognizes that there is a huge demand in Africa and Asia for food safety research, a lot of donors do not believe this is the case. One immediate objective of this group and A4NH is to make the case to donors that aflatoxin research is a good investment. Part of this is increasing the body and quality of causal evidence on aflatoxin and health. Although there is quite a bit of evidence on exposure and supporting evidence that in some places it is high, there is no clear evidence on the health results of long-term exposure. Quantitative estimates of human health risk and the economic impacts will make a convincing case to policymakers, but this requires population-based research which is costly.

Awareness of aflatoxin as a public health priority varies by country and sector. It is important to have people in-country, on the ground to understand the local political context. As an example, policymakers in South Asia think about it more in terms of its implications for trade and less in terms of human health impacts. In Ghana, aflatoxin is not on the radar of the Ministry of Agriculture; farmers recognize they get diarrhoea from eating contaminated maize, but it does not stop them from eating it. In Nigeria, the poultry industry has high awareness of aflatoxin and members charged with food safety in the Ministry of Health are very aware and are working with industry to increase awareness and compliance. We need to improve our understanding of what would motivate different sectors to change behaviours. In order to have development impact, A4NH needs to look for the umbrella of commonalities among its partners and maximize these.

Other research trends, not necessarily limited to research by CGIAR:

- Solutions which consider the food basket, instead of crop-specific solutions
- Analysis of food consumption data in light of prevalence data
- United States Centers for Disease Control and Prevention (CDC) has been collecting more data on serum aflatoxin levels in humans, particularly in Kenya (CDC-Kenya)
- Growing interest in focusing on the 1000 days window of opportunity; Tufts University is doing work in Uganda – following a cohort women ( $n=600$ ) for three years

### **Updates on aflatoxin activities from the centres**

George Mahuku reported that the International Maize and Wheat Improvement Center (CIMMYT) is finding that most of the maize coming from the field is contaminated. This, coupled with poor storage conditions, is creating a huge problem. The focus is on preventing contamination in the field. For the maize breeding activities, the aflatoxin resistance traits are bred in the background of productivity and high-yielding attributes.

Farmers are not adopting the newer varieties and some of this is a distribution issue. CGIAR is not the best institution for scaling out. We need to identify the partners and how we will work with them. Some suggestions are the small seed companies and organizations like Farm Input Promotions Africa. Another issue is farmers' confidence that seeds sold to them are 'real'. Some have experimented with trial-size seed packets with a scratch-off card with a number farmers can SMS to confirm the seeds are not counterfeit.

Ranajit Bandyopadhyay updated the group on the Aflasafe™ work at the International Institute of Tropical Agriculture (IITA). Major work is ongoing in Nigeria and this is where the work is most advanced. They also have activities in Senegal, Zambia and, very soon, in Kenya using different models in each country. In Kenya, Aflasafe™ will likely be driven by the public sector; county governments are willing to buy Aflasafe™ and give it to the farmers. Pressure to control aflatoxin comes from the public sector. In Nigeria, they have public sector investment, but the pull comes from the private sector. In Senegal, demand is driven by awareness of the large areas where farmers are treating their farms. Farmers who have used Aflasafe™ are advertising that they have aflatoxin-free maize on television and they are seeing an increase in sales to traders.

The group discussed the question as to how many farmers would need to be reached in order to have an aflatoxin-free food supply. In Nigeria, Ranajit said that in four years, they estimate they will have reached 3% of the maize supply. Part of this reach comes from the AgResults pilot project. In AgResults, the target farmer has 1-5 hectares, producing approximately 4.5 tonnes of maize per hectare. They provide training to implementers (private companies or aggregators/cooperatives) on best practices and introduce different types of improved seeds. They have an advisory council which is made up of important aflatoxin stakeholders, some at the government level. In Nigeria, they observed a large gap in awareness between the north, primarily where maize is produced, and the south. Consumers in the south heard that aflatoxin-free maize was available and started demanding it and were willing to pay a premium. AgResults farmers are selling a set percentage of their maize to the cooperatives, but are finding these other buyers and incentives that the project had not planned to introduce. Buyers are from both the feed and food industry. IITA is doing the sampling to confirm the levels and the aflatoxin-free bags of maize are labelled as aflatoxin-free.

Farid Waliyar provided an update on activities at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), mainly in West Africa. Some staff have engaged with the Economic Community for West African States in the development of a regional aflatoxin control plan. In Ghana, ICRISAT is testing several small technologies. ICRISAT has a portfolio of aflatoxin research that spans 30 years. They have tested many different pre- and post-harvest interventions. This research may be of interest to other CGIAR centres in planning and designing research plans. Currently ICRISAT is studying soil characteristics that influence aflatoxin production in West and central Africa, incentives for adoption of good agricultural practices among farmers in West and central Africa and documenting aflatoxin levels in groundnuts in Tanzania and Malawi.

Delia Grace explained that a group of scientists at the International Livestock Research Institute (ILRI) are looking at the risks of aflatoxin in cow's milk and the associated economic costs. They, along with ICRISAT, are conducting serum testing on a massive scale across the region and conducting feeding trials in terms of the impacts of aflatoxin on pigs and poultry. The goal of these studies is to understand the present burden on the livestock industry and estimate costs of mitigating the burden. Updates on work by the Biosciences eastern and central Africa (BecA) hub at ILRI were shared at the previous meeting in February.

### **Directions for policy approaches**

The first question raised on policy was to the audience for aflatoxin policy advice. Francesca Nelson described the project she is coordinating between IITA and the East African Community (EAC). IITA is working with the EAC to scour the policy parameters that would need to be in place to have an aflatoxin safe community. [Note: a more detailed description of IITA's policy activities can be found in the summary of the small group discussions section of this report.] Activities fall into six clusters:

- Communications
- Health
- Agriculture
- Alternative uses and disposal systems
- Animal health
- Impacts on trade

The remainder of the discussion identified a need for investment in more accurate and affordable quick tests targeted towards the stakeholders who have the incentive to test. Another opportunity for coordinated A4NH research could be in the area of opportunity costs on nutrition. Purvi Mehta cited how due to reports of contaminated groundnuts, the Government of India excluded groundnuts from the midday meal served to primary school students.

### **Inventory of current aflatoxin research activities**

Christine Atherstone provided a short presentation on the inventory she is developing of the current aflatoxin research activities in all five centres. These activities are not just A4NH projects. The purpose of this database is to identify where projects fit in the theory of change and to identify current and future research gaps. The database currently includes 37 projects. Most activities or people on the ground are in Kenya, followed by Tanzania. The group provided some suggestions for ways to organize and improve the database. Christine will share the revised database with the meeting participants and will continue to refine it during her consultancy.

### **Preparation for the food safety external evaluation**

Nancy Johnson provided an overview of the first CGIAR Research Program Commissioned External Evaluation (CCEE) on food safety – aflatoxins and perishable products – that A4NH is preparing to complete in 2014. The IFPRI Board will oversee it. The evaluation team will begin its work in June 2014. The chair of the evaluation team is Sanjeev Sridharan, a health systems evaluator based at the University of Toronto and St. Michael's Hospital, who is familiar with A4NH's work. The database Christine presented is the sort of information that the evaluation team will want and they will want to talk to those involved and visit some sites. Another area that A4NH would like the evaluation team to consider is the feasibility of an expansion of food safety research. The assessment will consider whether or not the CGIAR Research Program has the systems in place to absorb more resources that would come with an expanded portfolio.

Their assessment will be based on the theory of change, how we work together and coordination. A donor representative from GIZ will be part of the reference group.

Nancy asked everyone to send her any impact assessments that had been conducted in at least the past five years, although earlier impact assessments might also be included.

### **Written products**

The group is working on two written products: a paper for a special issue of *Food Security* and the theory of change for the overall A4NH evaluation work, led by Nancy. The paper is based on the food safety presentations from the Science Forum 2013 in Bonn. The first draft is due in May. The proposed list of authors is: Delia, Moses, Hari, Ranajit, Peter, Vivian and George. Delia clarified that this is a request for a single paper, which can include references to original research being conducted by members of the group. It was not a request for several papers to the special issue. Delia will re-send her original email and the paper outline.

The other product is a written description of the theory of change for aflatoxin research and activities. Nancy is leading this effort across the CGIAR Research Program and compiling theories of change for the research activities across the portfolio. The original idea was to compile all of this work into a book or as part of a special issue for a journal. Although neither of these is definite, there is strong potential that efforts on the theory of change will be publishable. The initial theory of change outline will be circulated for review.

### **Summary of small group discussions**

*Theory of change: Aflasafe™*

Participants: Debo, Nancy, Christine, Ranajit, Peter and Amanda

In terms of scaling up, Kenya, Senegal and Nigeria have the most potential. The group identified a few models that could be considered for theory of change.

- AgResults pilot in maize in Nigeria. The AgResults pilot in Nigeria is promoting Aflasafe™ alongside other activities: awareness, marketing, health education and regulation. The product is being sold beyond the AgResults farmers and their monitoring and evaluation system tracks who purchases the product, which so far has been poultry producers and processors and other large food processors. These buyers find out through the awareness activities that aflatoxin-free maize is available and they want to know where they can buy it. Nestlé is not a large buyer compared to others in the poultry value chain. Although they will pay a high premium, they do not buy much maize. The farmers participating in AgResults are subsistence farmers participating in a cooperative. In Nigeria, the growth of the middle class is driving demand for nutrient values on packaged foods and this could create an avenue for aflatoxin-free branding. The transport costs of Aflasafe™ are greatly reduced by these local manufacturing plants. In Africa, the plant material is sorghum and this is where the costs of Aflasafe™ are concentrated.
- Aflasafe™ in Kenya. In Kenya, it is likely there will be two plants: one owned by the Kenya Agricultural Research Institute (financed through a donor) and the other owned and financed by the public sector (the National Irrigation Board). The one owned by the public sector will be tied to an irrigation scheme to increase maize production to address food security. This year, and until these plants are running, the product distributed in Kenya comes from the Nigerian plant, but with Kenyan traits.

- Groundnut in Senegal. Aflasafe™ has only been registered for groundnut in Senegal. Last year, a farmer organization bought some and gave to all of its farmers to treat their fields. A local Aflasafe™ champion went on national television to talk about aflatoxin and Aflasafe™, which increased demand from traders and farmers noticed an increase in sales. China was one of the major buyers of groundnuts, but due to contamination, they rejected it. If they heard Aflasafe™ was in use, Ranajit thinks exports to China could resume.

In terms of next steps, Nancy thought the AgResults pilot in Nigeria would be a promising project to start her review. Ranajit will share the proposal with Nancy.

*Theory of change: Public health*

Participants: Vivian, Giselle, Farid and Delia

This group discussed strategies to strengthen the human health evidence base. Some ideas were to look for opportunities in large-scale consumption and anthropometric studies to add on a component for aflatoxins and target studies among people living HIV/AIDS. They suggested that maybe separate theories of change should be developed for on-farm consumption (how much contaminated grain is consumed on farm? Is this significant?), maize and groundnuts. Farid mentioned that ICRISAT's long-term village-level studies in India and West Africa (Burkina Faso and Niger) would be a good opportunity to add an aflatoxin component. This project is mapped to the CGIAR Research Program on Policies, Institutions and Markets.

*Theory of change: Good agricultural practices (GAP)*

Participants: Delia, Vivian, Farid, George, Nancy and Amanda

This group shared updates on GAP research within the different centres. In 2013, ICRISAT had 580 demonstration sites in Mali and a similar number in Niger. Around 1700 farmers visited the demonstration sites where they saw the improved variety in the fields and received educational materials on aflatoxins. These improved varieties have been officially released and although it is not the characteristic that is promoted, it is resistant to aflatoxin. One role of this group could be to adopt a strategy similar to HarvestPlus and target CGIAR centre directors to sign a commitment that all improved varieties of groundnuts should also have a certain degree of resistance to aflatoxins.

The work on groundnuts in Nigeria has just started, so an impact may be evident in 2–3 years. They will encourage agriculture extension services to contact the private sector on the seed multiplication side. They also plan to work with a number of non-governmental organizations (NGOs). The project is subsidizing extension workers to do education by paying them around 50 United States dollars (USD) per month. Dissemination is done through extension service providers who train private-sector technicians and give them the hybrids. There is no monitoring and evaluation plan for the project, but they are hoping to hire an economist to develop it. Their activities are targeted at farmers, no other actors along the value chain. The Nigerian government has requested assistance in making people more aware of aflatoxins. More research questions could be added to this project to accommodate the potential for A4NH collaboration.

ICRISAT's work in Malawi is a very different case. There, they are working with the National Smallholder Farmers' Association of Malawi (NASFAM), an NGO. ICRISAT is training the NASFAM staff who transfer the technology to the farmers. They were also providing training on how to conduct laboratory tests for aflatoxin. ICRISAT is planning an impact assessment of their aflatoxin work.

### *Policy*

Participants: Francesca, Vivian, Delia, Christine, Peter, Nancy and Amanda

Francesca Nelson provided an overview of her work with the EAC and how the organization develops regulations and policies. The EAC is a regional intergovernmental organization made up of representatives from the participating countries' ministries. There is a complex process by which regulations are proposed by the EAC and then implemented as policies at the country level. The EAC receives recommendations which then go through review in technical/validation workshops. Once the recommendations are finalized, they are presented to a working group. Once the policies are adopted by the ministerial council, the ministers are charged to adopt or implement them in their respective countries. The ministries have an obligation in the EAC treaty to implement these policies. The policy is announced ('gazetted') in the countries.

IITA has started the project with inception workshops where country reports were presented. Francesca's impression was that aflatoxin myths persist among both the general population and people working in animal health, human health, law and trade. Some of these beliefs were shared at the workshop, for example, aflatoxin is visible in foodstuffs and cooking can eliminate it, and that aflatoxin was introduced into East Africa by the United States of America through contaminated commodities. The communication strategy will be very important and it would be interesting to monitor how the communication strategy affects risk perception among different populations. Following the inception workshops, IITA will lead brainstorming workshops in the next few weeks to develop work plans and activities; this will provide a good opportunity to add a policy tracking or evaluation component. IITA will coordinate the development of technical packages for the EAC, which will be a set of technical papers on situational analysis, scientific basis for aflatoxin control and policy recommendations. The assumption is that these technical packages would use the best scientific thinking as the basis for the policy recommendations. It is IITA's intention to develop single recommendations for all of East Africa. The process of developing the technical packages will take 6–12 months.

The group discussed how likely it would be that the policies would be implemented. Francesca said it was reasonable to expect that they would not be implemented in every country or at the same time. The first phase of IITA's work with policy development through the EAC will take place over the next five years while the second phase will be dedicated to developing programs that implement these policies. She emphasized how important it would be to simplify the aflatoxin standards for East Africa. As an example, the current EAC standards on maize is 30 pages long, which is more complex than the Codex Alimentarius standard and too excessive to be practically implemented.

### *Evidence for health impacts*

Participants: George, Farid, Delia, Giselle and Vivian

Perspectives on the strength of current evidence supporting a causal relationship between aflatoxin exposure and child growth outcomes, and the types of evidence that could potentially strengthen the evidence base, were discussed. One idea was to conduct light monitoring of aflatoxin prevalence over time in high risk areas and to introduce (or scale up) a randomized intervention to reduce exposure at a time when prevalence is particularly high. This would overcome the problem currently faced by IFPRI's team in Kenya of observing relatively low levels of aflatoxin exposure in the control group. Another strategy discussed was to combine existing or emerging longitudinal data including child growth outcomes (for example, DHS survey data) with data on aflatoxin prevalence.

*Evidence: Aflasafe*

Participants: Christine, Ranajit, Peter, Debo and Nancy

Currently, Aflasafe™ costs USD 18.75 per hectare. Using Aflasafe™ with good agricultural practices, farmers in Nigeria are producing 4.5 tons of maize per hectare. Without good management practices and Aflasafe™, farmers typically only produce 1.5 tons of maize per hectare. The average farm size is 1–5 hectares. The regulatory standard for aflatoxins in maize is 10 parts per billion in Nigeria. One model that IITA uses for Aflasafe™ promotion is cooperatives. The cooperatives aggregate maize, provide training, seed and Aflasafe™ and a price premium for aflatoxin-safe maize. The average profit per ton of maize produced is USD 28 for these farmers in the cooperative. The cooperative sells this aflatoxin-safe maize to the feed and food industry. IITA is currently working on sampling strategies for aflatoxins at farm level and traceability of maize in the cooperative system.

Peter and Ranajit discussed several of the marketing models developed for Aflasafe™. There is a large scale production facility in Nigeria. They are developing smaller scale production facilities to enable farmers in rural areas to access Aflasafe™. Additionally, IITA is working to develop regional varieties of Aflasafe™ that could be used, for instance, throughout East Africa. This is a new project, as in the past, Aflasafe™ has been country-specific. Due to the number of different target groups and marketing models, Aflasafe™ would be a technology worth developing a theory of change for and identifying the impact pathways to scale up production, dissemination and adoption of the technology.



**CGIAR Research Program on Agriculture for Nutrition and Health (A4NH)**  
**Fourth Aflatoxin Research Coordination Meeting**  
**20 March 2014**  
**IFPRI, Washington, DC**  
**Chair: Delia Grace**

**Objectives of the meeting**

1. To continue inter-centre dialogue and collaboration on aflatoxins
2. To continue work on developing a theory of change and business case for scaling up aflatoxin work
3. To plan for papers capturing ongoing activities and pathways for future impact

8:30 – 9:00	Arrival and light breakfast
9:00 – 9:10	Welcome – Session 1 Opening remarks/introduction: John McDermott Purpose of meeting: Delia Grace
9:10 – 10:10	Share information on center aflatoxin activities and look for synergies Christine reports and centres comment
10:10 – 10:45	Report back on A4NH supported aflatoxin activities: ILRI, IITA, IFPRI TBC
10:45 – 11:00	Coffee Break
11:00 – 12:00	Work on invited paper for the Phil Trans Royal Soc based on the Bonn Science Council session and work on mycotoxin impact chapter/paper Bonn: Delia, Farid, Ranajit/Peter, George, Amanda Mycotoxin theory of change: Nancy, Vivian, Debo, Ranajit/Peter, Christine
12:00 – 1:00	Continue planning for an expanded aflatoxin agenda in phase 2 of A4NH Working group's feedback: Christine
1:00 – 2:00	Lunch
2:00 – 3:00	Progress on developing the theory of change of impacts from aflatoxin research: Nancy Johnson
3:00 – 3:45	Preparation for the food safety external evaluation (the CCEE): Nancy Johnson
3:45 – 4:15	AOB
4:15 – 4:30	Conclusion and closing

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