



## PROPOSED GLOBAL MYCOTOXIN ALLIANCE

The World Food Preservation Center® LLC in concert with Gent University and BioIntelliPro are proposing a Global Mycotoxin Alliance to attack the major shortcomings that exist in addressing a critical global health and food security problem that exists in developing countries.

We would appreciate your support of this proposal that for the first time brings the world's leading expertise and resources to bear on this problem globally. If this proposal interests you, we would be happy to supply a budget.

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# International Mycotoxin Alliance

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## Rationale

The International Mycotoxin Alliance (IMA) aims to coordinate expertise around the globe to integrate actions tackling mycotoxin, the most critical problem damaging the health of many people in developing countries.

## Problem Statement

Food Safety takes a prominent role in the Food Security problem. Mycotoxins, toxic fungal secondary metabolites, are one of the main food safety threats currently encountered in developing countries. Aflatoxins for instance cause liver cancer while aflatoxins and fumonisins are related to stunting in African children (IARC, 2015). Co-occurrence of multiple mycotoxins in one crop as well as effects of climate change make this research complex. The mycotoxin problem needs to be tackled in a multi-disciplinary way primarily focusing on prevention measures, but mycotoxin analysis for monitoring and control purposes is definitely needed.

The developing countries suffer from several problems related to mycotoxin analysis. First, analytical tests are expensive and there is a lack of expertise. Only a limited number of laboratories perform the tests. These laboratories do have high-end equipment available but fail to maintain these instruments leaving many of them just unused in the laboratories. Most pronounced is the lack of training in analytical methods as well as in use and trouble-shooting of the analytical equipment. This makes it difficult for developing countries to be engaged in mycotoxin monitoring activities as their developed counterparts do. The gap in capacity needs to be addressed.

### **Previous and ongoing initiatives at Ghent University**

At Ghent University, the MYTOX research group ([www.mytox.be](http://www.mytox.be)), organized short training initiatives (VLIR-UOS-STI) on mycotoxin analysis in the years 2012, 2013 and 2014 for people from developing countries. Next, training is provided on an individual basis since 2009 in the frame of developmental cooperation, but depends on the funding each individual can obtain. Applications for training are received on a daily basis but they cannot be accomplished.

## **Project Description**

This project has three distinct stages centering on a core question (Fig. 1)—“Do the technical competencies suffice?” Not only does it serve as a deciding criterion that evaluates the progress of each stage before advancing, but it also serves as a feedback loop that connects the latter stage back to the former when needed. Each of the stage has its own specific objectives and will be carefully assessed to establish solid foundation for the next. We aim to equip the people in different regions suffering from mycotoxin with proper equipment and instrumentation to understand their environmental baseline, then by bringing in biological control adequate for the region to alleviate the problem, and collectively establish a database to provide guidelines to farmers on their control strategies.

### **Stage 1 Technical Training**

There are four specific tasks during this initial stage:

1. Online basic training

During this stage all participants will enroll in the online mycotoxin-training program coordinated by the Ghent University (GU), which has years of training experience on the subject. It is crucial for all participants to gain the baseline knowledge of the wide spectrum of issues related to mycotoxin and its complexity pertaining to soil and weather conditions.

2. Lab hands-on training

At the same time during the online training period, efforts need to be made to strengthen the laboratory training capacity at GU. Presently GU's mycotoxin group has only one lab and will have to be expanded to have sufficient analytical lab space and instrument designated for the training. Those who satisfactorily passed the online training can be accepted into the hands-on

wet-lab training at GU. Besides a pilot training during year one, the total of 8 groups will be trained during this project period if each goes for 6 months. The number could be doubled if the training is shortened to 3 months.

3. Train regional trainers

Qualified individuals who are likely to be in charge of a regional center will be trained on the operation of a mycotoxin analytical lab. Five different regions are involved in the project, namely Africa, Latin America, India, Southeast Asia, and China. We will carefully select applicants to represent each of the regions. The main focus will be on equipment and instrument setup, Standard Operating Procedures (SOP) for each equipment, and quality assurance approaches and standards. Additional information on how to comply with ISO requirements will be provided besides precision and accuracy in analytical performance.

4. Standard training manual

The laboratory training materials developed by GU will be standardized and translated into different languages to meet the needs of different regions. The training will be organized as a 'train-the-trainer' program. Trainees who followed the program at Ghent University will further upon their return train the people they are collaborating with. The mentor will follow-up.

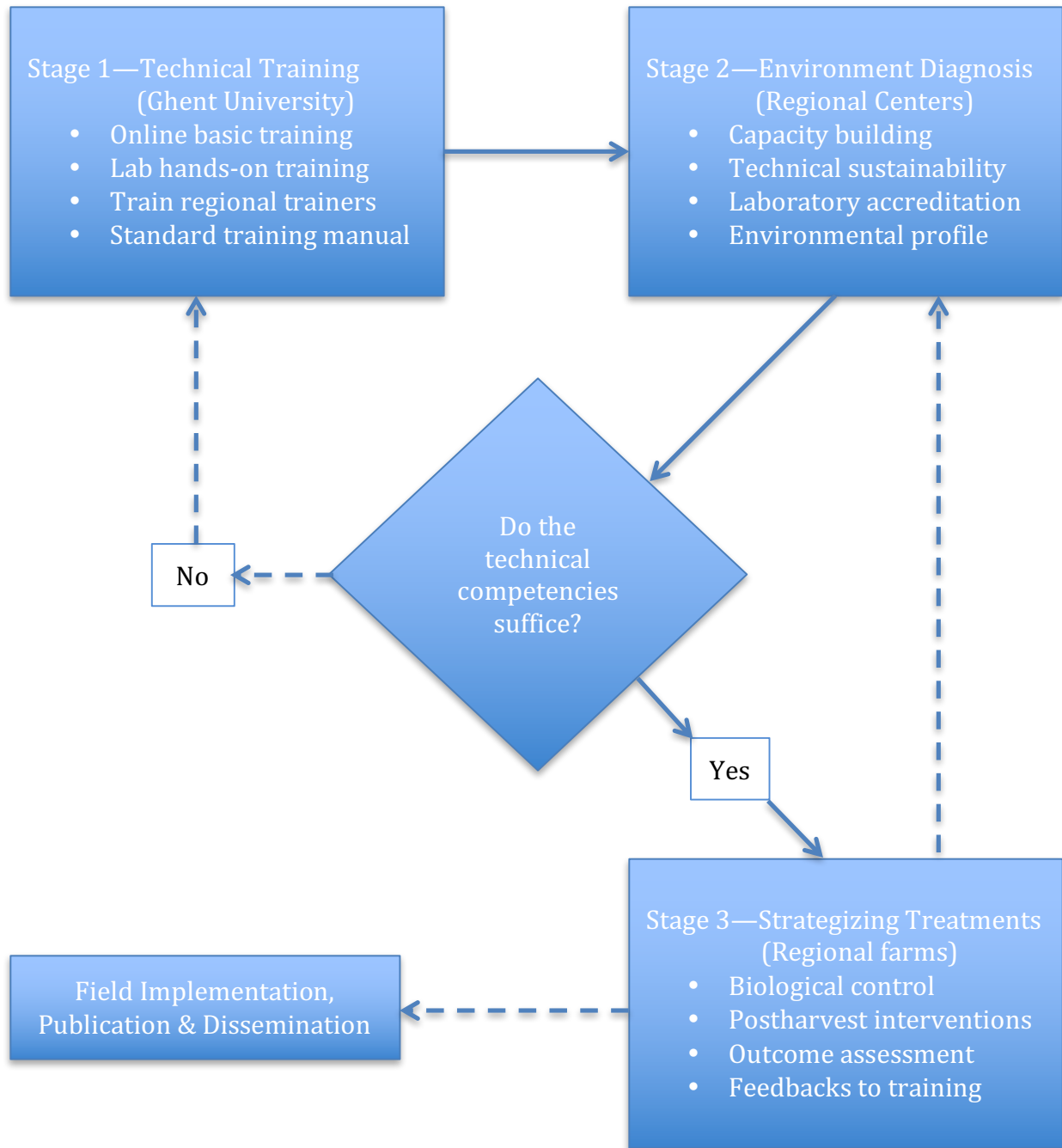
## Stage 2

The key element in Stage 2 is to equip regional centers with proper instrument, supplies, and personnel. The regional centers will be selected through and overseen by the World Food Preservation Center (WFPC). A mentoring system will be established; each trainee will be attributed a mentor who will follow-up the trainees progress from start till when back in his/her home institute. A report has to be made regularly and needs to be discussed between mentor and trainee. This mentor does not need to be a Ghent university expert, but preferably is an external expert. On-site visits from experts from Ghent University to the host institute of the trainee will be organized in order to further support the trainee in setting up/maintaining an analytical lab in the home institute. Capacity building in terms of instrumentation and facilities is also needed in the developing countries.

## Stage 3

The most critical aspect of the project is the idea to use benign fungi as our control agent to deter toxin-producing fungi. Only the species existing in the area will be selected and tested for the purpose. The biological control strategies will be provided by a USDA consultant, whereas postharvest advisory as well as drying and GAP training will be provided by WFPC and Biointellipro, respectively.

# Global Mycotoxin Alliance



## Timetable

### Stage 1:

Tasks	Time											
<b>Online training</b> <ul style="list-style-type: none"> <li>Develop &amp; update contents</li> <li>Web testing &amp; hosting</li> <li>Implementation &amp; management</li> </ul>	Y1		Y2			Y3		Y4		Y5		
	Develop		Update training contents									
	Test		Web hosting									
Implement		Manage online course										
<b>Lab training</b> <ul style="list-style-type: none"> <li>Lab equipment &amp; supplies</li> <li>Training of lab technicians</li> <li>Application &amp; bench training</li> </ul>	Y1		Y2			Y3		Y4		Y5		
	Equipment											
	Technician training											
	Accept application	Pilot	Gp. 1	Gp. 2	Gp. 3	Gp. 4	Gp. 5	Gp. 6	Gp. 7	Gp. 8		
<b>Train of trainers</b> <ul style="list-style-type: none"> <li>Assemble technical team</li> <li>Set up regional centers</li> <li>Trainer certification</li> </ul>	Y1		Y2			Y3		Y4		Y5		
	Assemble	Africa	C & S America	India	SE Asia	China	Assist regional centers					
	Select	Assess needs	Equipment setup	SOP implementation		Quality control						
		Africa	C & S America	India	SE Asia	China	Regional training courses					
<b>Training manual</b> <ul style="list-style-type: none"> <li>Assemble editorial team</li> <li>Manual outline &amp; book proposal</li> <li>Develop manual &amp; publication</li> </ul>	Y1		Y2			Y3		Y4		Y5		
	Team											
	Outline & proposal											
			Manual development		Proof	Publish & Review	Collect feedbacks		Revise manual			

## Stage2:

Tasks	Time													
<b>Capacity building</b> <ul style="list-style-type: none"> <li>• Select &amp; set up regional centers</li> <li>• Equipment &amp; supplies</li> <li>• Strengthen lab capacity</li> </ul>	Y1			Y2			Y3			Y4		Y5		
	Select	Initial setup		Receive training as outlined in Stage 1										
		Inventory		Order lab supplies										
		Equipment installation		Regional centers conduct trainings for respective regions										
<b>Tech. sustainab.</b> <ul style="list-style-type: none"> <li>• Partner with equip. vendors</li> <li>• Evaluate tech. challenges</li> <li>• Develop in-house troubleshooters</li> </ul>	Y1			Y2			Y3			Y4		Y5		
	Develop partnerships			Expand partnerships										
		Understand troubled areas during analysis			Continue feedbacks on technical challenges									
				Develop tech. expertise			Continue education & training							
<b>Lab accreditation</b> <ul style="list-style-type: none"> <li>• SOP &amp; quality implementation</li> <li>• Correction &amp; verification</li> <li>• International accreditation</li> </ul>	Y1			Y2			Y3			Y4		Y5		
				General lab preparation			SOP & QC		Update SOP with QC checks					
							Corrective actions		Verify		Continue documentation			
							Document preparation		ISO17025 for regional centers					
<b>Environ. profile</b> <ul style="list-style-type: none"> <li>• Acquire existing regional info</li> <li>• Environmental survey</li> <li>• Create database of mycotoxin</li> </ul>	Y1			Y2			Y3			Y4		Y5		
				Info collection & analysis			Identify test plots for Stage 3							
							Profile regional mycotoxin		Additional profile data		Additional profile data			
									Integrate info into database		Update database			

### Stage 3:

Tasks	Time														
<b>Biological control</b> <ul style="list-style-type: none"> <li>• Identify feasible control strategy</li> <li>• Prepare land for treatment</li> <li>• Implementation &amp; analysis</li> </ul>	Y1			Y2			Y3			Y4			Y5		
							Strategize based on soil profile			Modify/update strategies					
						Select sites	Prepare the study sites								
									First treatment			Second treatment			
<b>Postharvest int.</b> <ul style="list-style-type: none"> <li>• Proper sorting &amp; handling</li> <li>• Effective drying techniques</li> <li>• Proper storage options</li> </ul>	Y1			Y2			Y3			Y4			Y5		
							Evaluate proper sorting methods			Implement sorting practice			Optimize operation		
						Build adequate solar dryers				Apply proper drying			Optimize operation		
				Develop partnership with suppliers						Introduce storage options			Optimize operation		
<b>Outcome assess.</b> <ul style="list-style-type: none"> <li>• Online &amp; lab assessment</li> <li>• Regional center competencies</li> <li>• Biocontrol &amp; interventions</li> </ul>	Y1			Y2			Y3			Y4			Y5		
				Collect & analyze evaluation			Continue assessment								
							Evaluate regional centers			Continue assessment					
									Mycotoxin reduction?			Sustainable control?			
<b>Cont. feedbacks</b> <ul style="list-style-type: none"> <li>• Training feedbacks</li> <li>• Technical feedbacks</li> <li>• Field control feedbacks</li> </ul>	Y1			Y2			Y3			Y4			Y5		
				Use training feedbacks to strengthen training course and manual											
							Use technical feedbacks to tackle commonly faced challenges								
									Use field control results to optimize the strategies						