INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
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MITIGATING AFLATOXIN EXPOSURE TO IMPROVE CHILD GROWTH IN EASTERN KENYA

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MTID PROJECT SPOTLIGHT

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INITIAL SITUATION

Aflatoxin is a fungi-produced toxin that resides in the soil and affects crops. It thrives in humid conditions and is prevalent throughout much of the developing world in such staple crops as maize and groundnuts. While aflatoxin is a known carcinogen that is fatal to humans in large doses, little is known regarding the specific impacts of consuming small to moderate amounts of aflatoxin over long periods of times. Of particular concern is the potential for stunting in children exposed to aflatoxins; while a few studies have found some association between aflatoxin exposure and child stunting, their results were not based on controlled intervention studies and remain inconclusive. This project takes a two-pronged approach that will i) identify and utilize post-harvest and storage technologies to reduce aflatoxin exposure and ii) study the impact that this reduced exposure has on child growth. The project will take place in 65 villages in Meru in the Eastern province of Kenya. High levels of both child stunting and aflatoxin exposure have been found in this region of Kenya, making it an appropriate site to study whether reducing aflatoxin exposure will improve child growth.

PROJECT APPROACH

Determining the causal impact of aflatoxin exposure on child stunting in developing countries is challenging for a number of reasons. Environmental stresses such as low rainfall can increase the presence of aflatoxin, particularly in maize; however, these same stresses can also result in lower harvests, making it difficult to distinguish between the health effects caused by aflatoxin and those caused by smaller harvests and thus lower food consumption. Along the same lines, the sub-standard storage conditions that contribute to post-harvest aflatoxin contamination are more common among poorer households, making it challenging to disentangle the health effects of aflatoxin exposure from other causes of ill health among the poor. To address these challenges, our study includes an intervention to reduce aflatoxin levels in a group of randomly selected study households. Given the known health effects of aflatoxin exposure, an intervention benefitting only a subset of study households would raise ethical issues. We are therefore providing information on how to reduce aflatoxin exposure to all study households, both those in the intervention group and those in the control group.

Our project utilizes a three-armed longitudinal cluster-randomized controlled trial that assigns each of the 65 study villages into either one of two treatment groups or a control group. The first treatment (Group A) is designed to examine the effects of improved post-harvest and storage practices on aflatoxin levels in maize stores. Households in this group will receive intensive training regarding the hazards of aflatoxin consumption, how maize and other crops become infected with aflatoxin, and which storage and post-harvest techniques can reduce aflatoxin levels in their food stores. Farmers in these households will also be given access to improved maize drying and storage equipment and will receive SMS messages throughout the harvest season reminding them of proper harvest and storage practices.

The second treatment (Group B) is designed to examine whether aflatoxin exposure impacts child linear growth. Households in this group will be offered testing of their household maize stores at least every two months over a period of two years, and will be given the opportunity to switch out any aflatoxin-contaminated maize for maize that does not contain detectable levels of aflatoxin. The linear growth of children born during the study period in these households will be compared to growth of those in the control group.

The study began with extensive group and individual discussions with residents of all the study villages, as well as meetings with the Kenyan Ministries of Agriculture and Public Health and Sanitation. These ministries both supplied official letters of support for the project. Fully informed prior consent was obtained from all study participants, and

households were informed that they could withdraw from the study at any time. We also worked with all study villages to ensure that the results of the study will be fully disseminated in an accessible manner to all households in a participatory forum.

In addition to baseline data, follow-up data collection will occur in all villages one year after enrolment, as well as two years after enrolment in Group B and the control group. A blood sample will also be collected from all mothers and children, as will anthropometric information for each study child. At the conclusion of the intervention, study results will be reported back to all villages; we will provide information regarding the most successful post-harvest and storage techniques, as well as the cost of those techniques. We will also ensure that all households have access to these storage and testing technologies for a small fee.

EXPECTED IMPACT

We expect this project to provide crucial information regarding whether aflatoxin has a causal impact on children's growth; children at risk for stunting and malnutrition will also be referred to health services for further care. On a broader societal level, our results will provide important information regarding cost-effective and successful post-harvest and storage techniques, and the causal relationship between aflatoxin exposure and child stunting. This information will be key in raising awareness of and attention to the various effects of aflatoxin contamination, as well as advancing awareness and use of sustainable, low-cost storage and post-harvest practices to reduce aflatoxin contamination.

For more information, visit our online Q&A page.

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