Aflatoxin Contamination and Consumer Valuation of Maize in Western Kenya

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Poster prepared for presentation at the Agricultural & Applied Economics Association 2010 AAEA,CAES, & WAEA Joint Annual Meeting, Denver, Colorado, July 25-27, 2010

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Research Team

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Background: Aflatoxin and Maize in Kenya

• The fungus that produces aflatoxin is present in many tropical soils. Contamination of crops is exacerbated by drought stress, pest damage before and after harvest, and inadequate drying prior to storage.

• Populations in many developing countries are chronically exposed to high levels of aflatoxin (Wild et al., 1993)

• Chronic exposure interferes with immune system function, retards child growth, and leads to cancer (Strosnider et al., 2006).

• Maize, the main dietary staple in Kenya, is one of the crops most susceptible to aflatoxin contamination

• Occasional epidemics of aflatoxicosis receive media attention in Kenya, but awareness of the probability and effects of chronic exposure are low.

Research Questions

• What are the relative levels of aflatoxin contamination in own-produced and marketed maize?

• Does consumer valuation of maize categories correspond to average aflatoxin content?

• Are consumers willing to pay more for higher quality, less contaminated maize?

References

• Strosnider, H., E. Azziz-Baumgartner, M. Banziger, and R.V. Bhat. 2006. “Workgroup Report: Public Health Strategies for Reducing Aflatoxin Exposure in Developing Countries.” *Environmental Health Perspectives 114(12): 1898–* 1903.

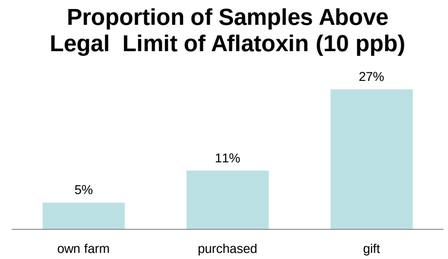
Wild, C.P., L.A. Jansen, L. Cova, and R. Montesano. 1993. “Molecular Dosimetry of Aflatoxin Exposure: Contribution to Understanding the Multifactorial Etiopathogenesis of Primary Hepatocellular Carcinoma with Particular Reference to Hepatitis B Virus.” *Environmental Health Perspectives* 99: 115–122.

Hammer Mill Survey

• Samples of maize were taken from 649 customers at village hammer mills around 23 market cetners in Western, Nyanza and Rift Valley provinces and matched to a questionnaire about the source of the maize, drying and storage practices

• A brief questionnaire about the source of the maize, drying and storage practices was administered

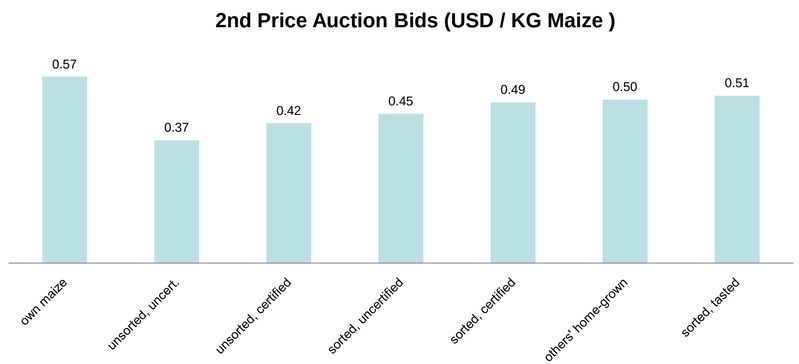
•Highest aflatoxin levels were found in maize that had been received as a gift (n=30; $p<0.001$) . Own-produced maize had slightly higher aflatoxin content than purchased maize (n= 375; n=216; $p<0.1$)



Consumer Valuation of Maize Quality

155 participants across 8 villages around Bungoma Town were invited to a session in which they could purchase maize of different qualities and origins through a second-price auction.

So as not to overwhelm participants, each session involved only four of the above types of maize. Both the composition of maize types offered, and the order in which they were offered, was varied across sessions to avoid order and comparison effects.



Maize Valuation Results

• Consumers were willing to pay the most for their own, maize they could taste before bidding was next, and then maize produced by fellow farmers for their own consumption.

• Maize purchased from traders in a local market was valued 35% less than own-produced maize.

• Part of the difference is visual quality; removing rotten and broken grains reduces the difference to 21%

• Certification as below the legal acceptable level of aflatoxin contamination has approximately the same effect as visual sorting, and combining these reduces the discrepancy still further.

Design Effects

Before the second-price auction, quantities of one or two KG of maize were purchased from farmers. Both the quantity, and the mechanism used to purchase the maize were varied randomly in order to test for robustness of results to design effects. No significant difference was found between the price charged under the BDM vs. posted-offer mechanism, nor for one vs. two KG of maize.

Conclusions and Policy Implications

• Aflatoxin levels in maize samples taken were relatively low compared to previous studies in Kenya.

•Maize received as gifts had the highest level of contamination, suggesting that the poor are particularly at risk; awareness of the dangers of eating contaminated maize may be important for reducing exposure.

• Maize purchased from informal traders has significantly higher aflatoxin levels than maize grown for own consumption by farmers, suggesting that information asymmetry is leading to a market for lemons.

• Consumers’ valuation of their own maize is significantly higher than for maize of typical quality purchased in a local market. Certification and differentiation by quality and taste have the potential to narrow this gap.

• Regulation of the commercial maize market could improve the safety of food consumed by households and allow smallholder farmers to diversify their production away from maize.

Acknowledgements

We are grateful to a large field team for survey data and sample collection, and to colleagues at Biosciences east and central Africa for their assistance with the laboratory analysis.