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IMPACT OF AFLATOXIN CONTAMINATION ON GROUNDNUT EXPORTS IN MALAWI¹

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(Received 27 April 1994; accepted 16 June 1994)

ABSTRACT

Aflatoxin contamination is a serious quality problem at various stages of groundnut production, from crop growth to transportation. This paper presents an economic analysis of the impact of aflatoxin contamination on groundnut exports and trade balance in Malawi. Export losses due to aflatoxins ranged from MK 0.16 million (= US \$ 0.057 million) in 1988/89 to MK 1.58 million (= US \$ 0.845 million) in 1985/86 with a mean of MK 0.943 million (US \$ 0.586 million). The export losses in groundnut as a percentage of the trade balance ranged from 0.01% in 1988/89 to 1.77% in 1981/82. Policy implications that would minimize aflatoxin contamination in groundnut are derived based on the results of the analysis.

Key Words: *Aspergillus flavus*, economic analysis, peanut, seed quality, trade balance.

RÉSUMÉ

La contamination pour l'aflatoxine affecte sérieusement la qualité de la production arachidière à différents stades, depuis la croissance jusqu' au transport. Le présent article rapporte une analyse économique de l'impact de la contamination par l'aflatoxine sur les exportations de l'arachide et la balance commerciale au Malawi; les pertes d'exportation dues à l'aflatoxine ont varié de MK 0,16 million (US \$ 0,057 million) en 1988/89 à MK 1, 59 million (US \$ 0,845 million) en 1985/86 avec une moyenne de MK 0,945 (= US \$ 0,586 million). Les pertes d'exportation de l'arachide exprimées en pourcentage de la balance commerciale se sont situées entre 0.01% en 1988/89, et 1,77% en 1981/82.

Les résultats de cette analyse ont eu comme implications l'adoption d'une politique susceptible de minimiser la contamination de l'arachide par l'aflatoxine.

Mots Clés: *Aspergillus flavus*, analyse économique, arachide, qualité de la remence, balance commerciale.

¹Submitted as Journal Article No. 1634 by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT).

INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is the second most important crop after maize in smallholder agriculture in Malawi, providing approximately 25% of the agricultural cash income (Anon., 1987). More than 63% of the crop is produced in the Central region covered by the Lilongwe and Kasungu Agricultural Development Divisions. Pod yields are low, averaging 700 kg ha⁻¹ (Babu et al., 1994).

Prior to 1989, the Agricultural Development and Marketing Corporation (ADMARC), a parastatal of the Government of Malawi, was the sole purchaser of groundnut from farmers. Some groundnut is traded locally, and some is consumed domestically as food. Most of the groundnut purchased by ADMARC is exported. A portion of the produce is crushed for oil and some is sold to farmers as seed. Groundnut is procured as seed from different parts of the country and is transported to the Liwonde Groundnut Factory located in southern Malawi. The seed is then electronically graded to remove any foreign matter and mouldy seeds. A representative sample of groundnut from each bag is taken and analyzed for aflatoxins, the secondary toxic metabolites produced by fungi of the *Aspergillus flavus* Link ex Fries group. Aflatoxins are known to be hepatotoxic, carcinogenic, and teratogenic. The groundnut consignment is exported only when it has a very low level of aflatoxins (below 5 µg kg⁻¹). The graded seeds are then fumigated and sprayed with an insecticide before being exported (Anon., 1977; Kisyombe, 1989).

Aflatoxin contamination may occur at different stages of crop production, drying, and storage. To design appropriate control strategies, it is important to understand the stages during which the crop is vulnerable to aflatoxin contamination. Groundnut is exposed to *A. flavus* invasion and subsequent aflatoxin accumulation at the farm level before harvest (during pod development phase), during post-harvest drying, storage (Kisyombe, 1989; McDonald, 1966, 1969, 1989; McDonald and Harkness, 1967; Mehan and McDonald, 1984; Mehan et al., 1986), and transportation to markets. This is particularly so when groundnut is transported and stored at market places without proper storage facilities. While it is possible to

reduce contamination by aflatoxins at each of these stages, the control method at each stage should be different. For example, at the farm level, proper crop production, processing, and storage practices should be emphasized (Kisyombe, 1989). Price policies that differentiate groundnut quality may also provide incentives for preventing contamination by aflatoxins at the market level.

The objective of this paper is to provide information on the economic losses incurred in export earnings and trade balance due to aflatoxin contamination of groundnut in Malawi and to derive policy implications that would minimize this contamination.

DATA SOURCES

The data on area, production, and yield of groundnut for the past 11 years were taken from the Guide to Agricultural Production, published by the Ministry of Agriculture, Malawi. Data on groundnut prices, ADMARC purchases, and the volume and value of exports were taken from various economic reports published by the Office of the President and Cabinet. Data for 11 years on quantity of groundnut handled for export, number of samples analyzed for aflatoxins and quantity rejected were obtained from ADMARC. The data on contribution of groundnut to trade balance were taken from various issues of the Economic and Financial Review of the Reserve Bank of Malawi.

TRENDS IN GROUNDNUT PRODUCTION IN MALAWI

In analyzing the impact of losses in export earnings due to aflatoxin contamination on the general economy of the country, it is important to recognize the changes in crop production. Figure 1 presents the data on area, production, average seed yield, and value of groundnut in Malawi for 11 years (1980/81 to 1990/91). The area under groundnut is highly responsive to its price relative to the price of maize, the major staple food crop of Malawi. The total area under groundnut cultivation was stable in the first half of the 1980s, and started declining after 1988/89 with an average decline of about 5.2% per year (Fig. 1 A). The total

