

Estimating the social costs of the impacts of fungi and aflatoxins in maize and peanuts

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Abstract

This paper first describes five important potential impacts of fungi and aflatoxins in maize and peanuts, namely:

- quality deterioration in the agricultural products;
- spoilage of the agricultural products;
- mutagenic and carcinogenic effects on humans who consume aflatoxin-contaminated food over a long time-period;
- livestock health and productivity effects arising from the use of aflatoxin-contaminated feedstuffs; the emphasis is on increases in mortality rates and reductions in feed to weight conversion ratios for chickens, ducks, egg layers, and pigs; and
- the loss of export markets due to aflatoxin regulations restricting international trade in aflatoxin-contaminated grains.

Next, the paper describes the approach for estimating the social costs of these impacts and then estimates the social costs of aflatoxins in Indonesia, Philippines and Thailand. The social cost of the spoilage effects of fungi and aflatoxins is estimated using a product wastage economic model, and is equal to the surplus lost by producers and consumers as a result of fungal

attack and aflatoxin contamination of maize and peanuts. The social cost of human health effects of aflatoxins is estimated as the value of lost productive capacity due to premature death and morbidity from aflatoxin-related primary liver cancer. The social costs to the livestock sector of aflatoxins are estimated as the change in producer and consumer surplus from the increase in costs to livestock producers as a result of using aflatoxin contaminated feed. These social costs are summarised in tabular form below.

The total annual social cost, in Indonesia, Philippines and Thailand, due to aflatoxins in maize in 1991 was about \$A319 million. Indonesia incurred 62% of this cost, Philippines 27% and Thailand incurred 11% of the cost. The total annual social cost of aflatoxins in peanuts in 1991 was about \$A158 million — Indonesia incurred 84% of this cost, Thailand incurred 13% and Philippines 3% of the cost. These estimates do not include the cost from loss of foreign markets which for these commodities in these countries are not expected to be substantial at this time.

Estimates of the 1991 annual social costs of aflatoxins in Indonesia, Philippines and Thailand (\$A million)

Sector	Impact of aflatoxin considered	Parameter used in social cost estimation	Total for three countries		
			Maize	Peanuts	Maize and peanuts
Grains sector households	Product spoilage effects	Change in wastage rates and postharvest costs	\$70.9	\$36.8	\$107.7
	Human health effects	The cost of premature death due to aflatoxin-related primary liver cancer	\$112.7	\$73.2	\$185.9
	Human health effects	The cost of disability due to aflatoxin-related primary liver cancer	\$63.8	\$41.5	\$105.3
Poultry	Increased mortality rates and reduced feed to weight conversion	Reduction in the unit cost of production when the aflatoxin content of feed is reduced	\$28.9	\$2.5	\$31.4
Hen eggs	Increased mortality rates and reduced feed to weight conversion	Reduction in the unit cost of production when the aflatoxin content of feed is reduced	\$6.6	\$0.6	\$7.2
Pig meat	Increased mortality rates and reduced feed to weight conversion	Reduction in the unit cost of production when the aflatoxin content of feed is reduced	\$36.2	\$3.1	\$39.3
Total			\$319.1	\$157.7	476.9

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