

## OUTCOME SUMMARY OF PROJECT BSA 11-001

### **BSA 11-001: The Socio-Economic Consequences of Biosafety Regulation on Agricultural Trade: The Case of Maize Trade Between Zimbabwe and South Africa**

**Project Leader:** Dr Marnus Gouse

**Research Institution:** University of Pretoria

**Duration:** 2 years, 8 months

#### **EXECUTIVE SUMMARY**

The project set out to study the socio-economic consequences of biosafety regulation on agricultural trade with focus on maize trade between Zimbabwe and South Africa. The study analysed the effects of complying with the Zimbabwean regulatory requirements, focusing on Zimbabwean consumers. The price effect of the added costs of complying with the regulation was considered to represent the costs of the regulation while the concerns of the consumers regarding GMOs, based on the government's concerns as implied and delimited by the regulations, were assumed to be indicative of the benefits.

The regulation has resulted in a dual maize grain import channel differentiating between GM and non-GM maize imports. As the only commercial producer of GM crops in southern Africa, South Africa supplies both channels. In the non-GM channel South Africa competes with Zambia, who only produces non-GM crops and has produced substantial surpluses in recent years. It was found that the GM grain import channel only officially functions during times of severe food shortages. The GM channel is characterised by an elaborate compliance process aimed at preventing the grain from being used as seed. The results of the cost analysis show that despite the purchase price of GM grain being significantly lower than non-GM grain the compliance procedures in the GM maize meal channel results in a more expensive consumer product. The study found that the regulatory cost effects have acted as a protectionist measure for local producers who sell at comparatively high government gazetted prices.

Analysis of risk and benefit perceptions of Zimbabwean consumers reveals that consumers are undecided about GMOs, as they perceive both high benefits and risks. The most perceived benefit is that GM crops can increase food supply while the major perceived risk surrounds impacts on human health. Generally, and based on these indications, it would appear as if the current provisions of the Zimbabwean National Biotechnology Act are aligned with the concerns of the consumers. However, the occasional acceptance of GM grain or food in times of severe food shortages is in contrast with the government's position and has resulted in considerable confusion among consumers.

## PROJECT OUTCOMES

### *The Cost Component*

- The GM food import regulatory requirements stipulated by the Government of Zimbabwe have separated the maize supply chain into two marketing channels that only come together when the grain is milled, namely the GM channel and the non-GM channel. The two channels are differentiated by the specific requirements importers must comply with. The main distinguishing feature is that while compliance in the GM channel occurs all along the supply chain as the grain enters the country and is milled under the supervision of the National Biotechnology Authority; compliance in the non-GM channel is directed at certain points in the supply chain. Of note is that the GM channel operates only on occasion and as an exception in times of severe food shortages and during those times the involving compliance procedures importation is limited to large scale importers with economies of scale.
- Given the major presence of GM maize in the South African maize markets and the recent increases in maize productivity and production in Zambia, there has been a shift in Zimbabwe's trade patterns with Zambia emerging as an alternative supplier for Zimbabwe's maize imports. Zambia has become the preferred supplier because of Zambia's policy that prohibits the production of GM crops thus guaranteeing non-GM maize. As a result there are two main competing sources of maize in the non-GM channel. Important to note is that although maize from both channels is expected to be subjected to the same compliance procedures, all maize from South Africa is treated with suspicion and is subjected to a higher level of scrutiny than maize from Zambia.
- The first and foremost observed cost difference is the price differentials for maize grain between the two main channels and the sources of non-GM maize. Non-GM maize in South Africa is priced at a premium of almost 15% on the normal SAFEX price. The premium covers the costs of the identity preservation processes of ensuring that the maize remains within the stipulated threshold for non-GM maize especially considering the widespread production of GM maize in South Africa. Maize prices in Zambia are 36% and 10% higher than prices of South African GM and non-GM maize, respectively.
- Despite the high prices of maize in Zambia and notwithstanding the differences in transport costs, the differences in the regulatory compliance cost associated with the consignment of grain being shipped across the border are significant. The main difference is attributed to the GM import regulatory requirements. To import GM maize it costs importers three times more and four times more than importing non-GM maize from South Africa and Zambia, respectively. The main contributor to the high cost of the regulatory cost of GM maize is the cost of the supervision that is met by the importer. When comparing the cost on non-GM maize from South Africa and Zambia the cost in the South African channel are 30% more than the costs of the Zambian channel.
- Examining the final Total Landed Costs of maize in the different channels and from the country of origin, it was found that regardless of the regulatory costs in the GM channel being significantly higher than the non-GM channel, the Landed Cost for GM is considerably less than non-GM maize from South Africa and marginally higher than non-GM maize from Zambia. Therefore the main cost for the preferred non-GM is derived from the premium price.

- In the GM channel the costs of the regulatory compliance are mainly driven by the loss of about \$200/ t from the non-sale of by-product that have to be incinerated. This figure represents an added cost to the production of maize meal in the channel.
- The consumer maize meal market does not distinguish between maize according to price, source and channel.

### ***The Benefit Component***

- The majority of consumers interviewed perceived GM crops to have both high benefits and high risks. While there were a notable number of consumers that perceived low benefits and high risks in Bulawayo, there was also a considerable number in South Africa that perceived high benefits and low risks. In Harare there was generally uniform perception of high benefits and high risks.
- An analysis of specific benefit components separately revealed that the majority of the consumers agree or strongly agree that GM crops increase food production and supply. However, the consumers disagreed with the potential for GM crops to enhance nutritional value of crops. In terms of the reduction in use of chemicals in food and the environment, and the ability of strict regulations to ensure safety, the consumers were largely unsure.
- On the risk perception, the major concern for consumers in Zimbabwe and South Africa was the effect on human health and the development of allergic reactions.
- Factors that would influence consumers' GM food buying decision include: if the food was more nutritious and it reduced the use of chemicals in crops and foods. Consumers largely had a more positive attitude towards GM medicinal applications than in food production.
- Attitude to Science & Technology: More than 80% of consumers indicated that they are amazed at science and believe science is important to make a better living today. More than 50% are also fearful of the achievements of science. Consumers generally consider themselves to be medium adopters of technology.
- Awareness and Knowledge on Genetically Modified Organisms: Almost 90% of the respondents had heard or read about GMOs and at least a third of that number classified themselves as moderately to very informed. A test revealed that the majority of the consumers had general knowledge on science of digestion but on specific genetic modification science the knowledge levels were low.
- Trust in Information Source, Food Chain Actors and Regulators: Besides family and friends, internet, TV and newspapers are the most common sources of information. Most respondents indicated that the information available on GMOs are negative or strongly negative. Generally there is a high level of trust of the information sources. Considering food actors consumers trust farmers the most and food processors the least. When it came to regulators, although the consumers had high trust in them there were also high numbers that did not know the regulations or the organisations involved in regulation.
- Ethical, Equity and Moral Concerns: the main concern was that GM food is "unnatural".

## **PRESENTATIONS**

A conference paper on the project was submitted, approved and presented at the 54th AEASA Conference from 30 Sept to 2 Oct 2015 at Khaya iBhubesi in North West.

## **CAPACITY BUILDING**

A master's degree was obtained as a result of this study.