Can GMOs play a role in adapting sub-Saharan Africa’s agriculture to climate change?

Barbara M Zawedde, Department of Horticulture and Environmental Science and Policy Program (ESPP), Michigan State University

Introduction

Sub-Saharan Africa (SSA) is the most vulnerable region to climate change due to low adaptive capacity, high exposure to drought and floods, high population growth & heavy dependence on agriculture. Agriculture employs over 70% of the labor force and accounts for over 25% GDP in most countries. Impacts of climate change are already being felt in SSA (Fig 1). Africa has about 35,000 native plant species. Increasing extreme events, pest and disease, plus land use change are expected to cause about 25-42% loss in this biodiversity by 2050.

• A 2°C temperature rise, expected by 2080, will cause 9-20% arable land loss. In Uganda for example, this is likely to heavily affect coffee production, resulting in 40% export earning loss (Fig 3).

Adaptation strategies for agriculture

• Adoption of crop varieties that tolerate drought, pest and disease, as well as having improved nutrient composition is one of the adaptation strategies suggested by IPCC (2007).

• Some important African crops are difficult to improve using traditional breeding methods.

• Techniques for developing genetically modified organisms (GMOs) broaden opportunities for crop improvement. There is increasing adoption of GM crops globally (Fig 4).

Challenges for GMO adoption in SSA

• Lack of a clear national policy and legislation on GMOs.

• Decline in public funding of agricultural research, which is necessary to develop products for local needs and priorities.

• Limited capacity in intellectual property rights management, particularly in relation to agricultural products.

• Inadequate capacity for risk assessment, management and risk communication, given the risks associated with GMOs.

• Trade issues with some European countries who are major importers of agricultural products, and they are opposed to GMOs.

• Advocacy for organic agriculture by many donors. Yet FAO Director-General Jacques Diouf has stated “while organic agriculture should be promoted, it cannot feed the 6.8 billion people today nor 9.1 billion expected in 2050.”

• Diffusion of GMOs into social system. GMO products must be superior, yet compatible with existing farming systems, and affordable.

Conclusion

The high population growth in SSA, and its heavy dependence on agriculture is likely to exacerbate the region’s vulnerability to climate change. This calls for consideration of all potential adaptation options including GMOs. External assistance may be needed by some nations to develop appropriate legislation, and strengthen institutions for effective decision-making, monitoring and management of these new adaptation strategies.

Literature cited


Acknowledgement

MSU Department of Horticulture for the Graduate assistantship, and ESSP for technical assistance.