

FREQUENTLY ASKED QUESTION

These questions and concerns were raised during a workshop organized to strength the understanding for agricultural biotechnology by Extension workers (21-23 Feb 2007, Kampala, Uganda).

1. Explain the regeneration of seeds and planting materials of GM plants:

- Regeneration of GMO seed will depend on how the variety is constructed. In many cases GM can be similar to composite seed that is the seed will maintain a steady yield across generations but where it is made as a hybrid, subsequent crossing/growing will result in reduced yields as typical of hybrids.
- Regeneration of vegetative planting material requires developing protocols that can enable cells of plants to grow into new plants. The growing requirements are sometimes different for varieties of the same crop, so different protocol maybe required.

2. What crops/plants can be regenerated and what cannot be regenerated?

- A lot of crops can be regenerated or multiplied using tissue/cell culture but dicots are easier to regenerate than monocots so currently 90% of the developed protocols are for dicots.

4. What are implications of GM technology to seed and breeding systems?

- Implication on breeding includes use of markers for trait identification which accelerates selection. Biotech increases speed of breeding, uses less manpower and the results are more precise.
- The GM seeds are more expensive than the conventional but the proceeds from the crop should make up for the seed cost otherwise farmers will reject the GM.
- In the case of vegetative propagation, tissue culture is adapted to ensure uniform and disease free planting material. Biotech will result in more seeds (planting material and more efficiency).
- To avoid high seed prices, whether grain or vegetative, there is need to increase and strengthen public-private partnerships.

5. What is the guarantee on safety of GMO food products to human?

- Safety of a product is case-by-case basis. But currently all GM products on the market have undergone thorough risk assessment by scientists and also by a combined effort of WHO and FAO and proved to be as safe as the equivalent products from conventional breeding
- However we need to have legal and regulatory systems to take care of safety and public concerns. We also need have human capacity for risk assessment through data analysis and infrastructural to carry out our own assessments where necessary.
- GM products are considered to be more safe than products from conventional breeding because the trait transfer is more precise. There 2 methods used in conventional breeding: 1. Crossing of 2 parents: In process many other traits

would be transferred from the donor parents. 2. Mutation breeding by radiation: It's unknown what levels of mutation take place.

- There is nothing like zero risk so there is no absolute guarantee.

6. Will application of biotech especially Genetic Engineering not create new problems e.g. new pests and diseases?

- It is true that plant dynamic changes with introduction of GMOs may create new problems but this is not unique to biotech it is also common with conventionally bred cultivars and all these have to be taken into account in the recommendations on a particular variety.

7. How sure are we about the safety of GMO? There could be inefficient transfer of genes which may cause retention of the dangerous genes that may cause widespread problems e.g. use of tumor-causing Agro-bacterium

- The rigorous testing that GMOs undergo before they are released ensures that the tumor forming genes are not carried on.

8. How is the stability of transferred genes over along period of time?

- In most cases the stability of transferred gene is assured except in crops like maize which traditionally have a problem of jumping genes.

9. Wont the excitement with GMOs undermine biodiversity conservation?

- It is possible that this could happen but the genetic resources programs at the different institutions will have to play a role in avoiding this. Again this is not unique to biotech but could happen with any improved varieties coming on the market.

10. Have the priorities from the different country zones been considered?

- Zonal priorities are being considered in research for example in the case of cassava biotech research has dealt with the preferred varieties for the different regions in the country. As you have heard biotech is expensive and so it can only be used where the conventional methods cannot help.

11. What is the critical stage for involving stakeholders like farmers, politicians, environmentalists e.t.c. ?

- All stakeholders must be involved from the very beginning to ensure transparency, ownership and buying –in. However the level of stakeholder involvement and the mechanism of doing so needs more investigations, discussions and streamlining

12. Does Uganda have a common stand on biotechnology and a policy in place to regulate its application?

- Not exactly but it is indeed important that we achieve a common stand for all those involved in biotechnology research and development. Dialogues continue.
- Most people are convinced that research in contained conditions can be conducted under the present regulatory framework under the UNCST as has been done in several countries but there are some authorities who believe that nothing can be done until the approved policy and legal framework are in place.
- All concur with the need for an approved biotechnology policy and legal framework to allow for open release and placing on the market of GM products.

13. What is the strategy to ensure funding and sustainability of biotech research?

- There is need to involve government in the funding of research to avoid it being donor-driven

14. Do we have enough human capacity to man application of biotechnology?

- Currently there are many projects training people at the different education levels in biotechnology. Makerere is training many people including many from outside the country.

15. How have we prepared to handle smugglers of GMOs from other countries?

- There is need to have a legal framework in place so that such issues are dealt with effectively.

16. Is biotech the same as organic farming?

- No, biotech is involved with the plant traits, while organic farming is one of the ways of managing a crop in the field
- Currently biotech products can not be considered as organic.

17. Does the country have the capacity to regulate biotech products?

- Some capacity has been built by carrying out a number of trainings and this is going to continue until we have adequate regulatory capacity.

18. Will GMO products have same market share with current products?

- The market share of GMOs is a case-by-case depending on the customers' preference. It is a marketing issue and studies need to be done before introducing the products.
- In the case of European market, currently 60% of their imported cotton is GM coming from USA and China. European buys a lot of other products from USA yet USA is the largest produced of GMOs. It is also reported that Europe has a large number of institutions carrying out biotech research.