The Role of Agricultural Biotechnology in Hunger and Poverty Alleviation for Developing Countries.

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Top of the agenda for world leaders today is the alleviation of poverty and hunger, with the goal to cut poverty 50% by 2015. However ten years after the 1996 World Food Summit, which promised to reduce the number of undernourished people by half by 2015, there are more hungry people in 2006 than there were in 1996 and the number is increasing at the rate of four million a year. Therefore, new approaches are required to ensure sustainable food production in developing countries, especially in Africa because, of the 50 countries listed by the UN as least developed countries, 35 are in Africa, and agriculture provides a livelihood for 70% of the population yet Sub-Saharan Africa's soil fertility is largely degraded and declining.

Over the last decade, agricultural biotechnology has demonstrated that it can play a role in alleviating poverty and hunger because it has the potential to make farming more efficient and to generate higher yields. Satisfaction with agricultural biotechnology is reflected in the adoption rate by farmers since 1996, which has stood at a double digit rate of increase every year. Agricultural biotechnology can increase crop productivity and the stability of productivity and therefore improve food security. Genetically Modified (GM) crops are less labour-intensive and easier to use for resource poor farmers. This is hugely beneficial as it increases food security and makes it easier for a largely female, elderly, or underage population to work the land. Furthermore, the Green Revolution of the 1960s had little benefit for Africa because it required large scale upfront investments but GM crops are knowledge intensive, not capital/labour intensive and therefore accessible to resource-poor farmers.

Some examples of the benefits of commercialisation of GM crops can be seen in various developing countries that have adopted them. Argentina commercialised its first GM crop in 1996 and by 2006 had 18 million hectares of them. Benefits generated by GM crops were estimated to be in excess of $20 billion. South Africa is estimated to have enhanced farm income from GM crops by R76 million from 1998 to 2005. Brazil is an example of what happens when bureaucratic obstacles hinder adoption of this technology; red tape immobilised the R&D into agricultural biotechnology and as a result farmers have lost out on profits in excess of $6 billion only with GM soybeans. Furthermore, Brazilian farmers will fail to profit by $6.9 billion over the next decade if the adoption of GM maize is made difficult and an estimated at $2.1 billion if they fail to adopt GM cotton.

Estimated overall global economic benefit of GM crops at farm level, from 1996-2004, amounted to $27 billion. In 2004 of the 8.25 million farmers growing GM crops, 90% of them were resource-poor, small-scale farmers. GM crops have directly contributed to the alleviation of poverty for some 7.7 million of these farmers. A World Bank study done on GM *Bt* cotton showed that 'developing country welfare could be enhanced more by allowing GM cotton adoption than by the removal of all cotton subsidies and tariffs'.

In 2002 a study was carried out in South Africa on both *Bt* maize and *Bt* cotton to compare *Bt* to non-*Bt* crop varieties. The researchers found that, for *Bt* cotton, over 80%

of farmers noticed a reduction in insecticide-related health problems and a higher income as a result of higher yields since using *Bt* cotton. Higher yields and revenues were also noted in the case of *Bt* maize. Mr. Motlatsi Musi, a small-scale farmer in Olifantsvlei, South Africa said "I plant *Bt* maize because it has increased my yield and my income. I earn R3000.00 [$430.00] more from a *Bt* crop than from a non-*Bt* crop". Ms. Thandiwe Myeni, a small-scale farmer from Makhatini Flats, South Africa has been planting *Bt* cotton since 1999 and said "I get more than double yield per hectare from my *Bt* crops than from my non-*Bt* crops and I am also saving on pesticides by spraying only twice before harvest for *Bt* cotton, but weekly on my non-*Bt* cotton".

GM crops are invaluable because they can be engineered to be resistant to diseases and insect pests and they have the potential to increase the nutritional value of foods. 'Golden Rice", which is an example of this, is genetically modified to provide a source of vitamin A. Possibly the most important development in GM crops in the near future will be the development and commercialisation of drought-tolerant crops. Drought is possibly one of the biggest problems currently facing the developing world. Drought-tolerant maize is undergoing field trials in South Africa and in the next 2 to 3 years drought resistant wheat will be ready for commercialisation in Egypt. GM crops are good news for the environment as well, reducing pesticide use for the period 1996 to 2004 by an estimated 172 500 MT. Additionally, advances in biotechnology have made it possible to genetically enhance plants to produce pharmaceuticals and excellent progress has been made in using plants as vaccine-manufacturing systems and because protein-producing plants require relatively little capital investment and production costs are low, they may provide the only economically viable option for the independent production of therapeutic proteins in developing countries.

Despite the above, Europe has adopted a "go-slow" approach with regards to agricultural biotechnology. Present EU policies and perceptions hinder the development of agricultural biotechnology, especially in developing countries that engage in agricultural trade with the EU, because European consumers generally perceive GM foods to be 'contaminated', which make GM products less competitive on European markets. Unless European consumers become more accepting of GM crops, developing countries that are dependent on the markets in Europe will not wish to grow them and will lose out on vast socio-economic benefits. There are also issues regarding the strict traceability requirements specified in the EU regulations, which most developing countries will find difficult and costly to adhere to and will therefore fall short of the EU's required standards of monitoring.

EU policy has been developed primarily to protect European consumers and the environment from potential dangers but after a decade of use, there have been no cases of GM crops being harmful to human health or the environment. Therefore, there is a considerable imbalance between the hypothetical benefits afforded by the EU policy for its own citizens, and the probable and substantial benefits that could be afforded to developing countries. The EU has not taken into account the negative effect that its policies are likely to have on those working in the agricultural sector in developing countries.