

# Biotechnology can contribute to sustainable development

Agriculture provides income and employment for the majority of the poor, so that it has to be one of the key sectors in any poverty reduction strategy. But there are also other major challenges that global agriculture is confronted with, including climate change, increasing natural resource scarcities, and rapidly rising food, fiber, and fuel demand. These challenges can only be addressed through tapping modern science, especially in the area of crop improvement. Combined with conventional breeding, use of biotechnology and genetically modified (GM) crops can (i) raise yields, (ii) reduce environmental externalities associated with agrochemicals and greenhouse gas emissions, (iii) increase crop tolerance to heat, drought, and other stress factors, and (iv) enhance the nutritional value of food.

Even though the portfolio of commercialised GM crops is still limited, some of these benefits are already observable, including in developing countries, as our own research and that of others demonstrates. Herbicide-tolerant crops have reduced the use of fossil fuels and have boosted the spread of conservation agriculture in North and South America. Insect-resistant Bt crops reduce chemical pesticide use often by more than 50 percent, and increase yields and farm profits, especially among small-scale farmers in Asia and South Africa. In a study carried out over several years in India we showed that Bt cotton generates new employment opportunities in rural areas and has contributed to sizeable household income increases, including for families living below the poverty line. In India, over 90 percent of the smallholder cotton producers have already adopted Bt technology. Other promising GM technologies were commercialised recently, such as Bt rice in China, or will be released within the next few years, such as Golden Rice in the Philippines and other countries of Asia. Research on traits such as fungus resistance, drought and heat tolerance, or higher nutrient efficiency is also progressing fast.



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## ■ Scepticism vis-à-vis GM crops is still alive

These examples underline that the potentials of GM crops to contribute to sustainable development are huge. Nonetheless, especially in Europe GM technology is met with great scepticism. From my perspective, the main reason is widespread public misperception due to biased communication. The benefits, such as outlined above, are not broadly recognised, or they are depicted as industry propaganda by anti-biotech activists – in spite of clear evidence published in peer-reviewed academic journals. Unfortunately, it is hard for laypersons to differentiate between activist allegations and objective research results. On the other hand, the risks of GM crops are overrated due to far-fetched horror scenarios portrayed in the media. This is not to say that GM crops are entirely free of risks, but scientific evidence suggests that the risks are not specific to the technique of genetic modification and can be managed through standard biosafety and food safety analysis.

Policy and regulatory processes are driven to a large extent by public perceptions. Thus, the negative attitudes towards GM crops in Europe and widespread fears have contributed to complex regulatory hurdles, which make the commercialisation of new GM products extremely costly. These hurdles hardly lead to higher safety standards, but they contribute to further concentration in the biotech industry, because only large companies are able to bear the excessive regulatory costs. Overregulation drives smaller companies out of the market and obstructs public sector research and development. It also leads to a bias against small countries and against crops and traits with lower commercial potential, which hurts the poor in developing countries the most. These undesirable trends need to be rectified through more efficient regulatory systems and more honest public communication.

Biotechnology and GM crops should not be misunderstood as magic bullets against hunger, poverty, and environmental degradation. They cannot replace improvements in education, infrastructure, market efficiency, and social service provision. They should also not be seen as alternatives to other locally-adapted agricultural innovations. But, if well managed, they can be a very powerful tool as part of a broader sustainable and pro-poor development strategy. Given the challenges ahead, we cannot afford to abandon modern crop science and technology.