

## **Chapter 10: Managing potential risks and enhancing potential benefits—Identification and analysis of management tools and policy options**

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### **Abstract**

This chapter focuses on recommending a set of tools and policy options to manage potential risks and to enhance potential benefits derived from applications of modern biotechnology in maize. Specific questions to be addressed in the chapter—with particular reference to the situation in Mexico—include the following:

#### ***Rationale for applying GM technology in developing countries***

To date, most of the developments in plant gene transfer technology and the different strategies to produce improved transgenic plant varieties have been driven by the market value of the species or the trait. These economical values are in turn mainly determined by their importance to agriculture and/or the economy in the developed world, particularly the United States and Western Europe. This is understandable because significant investments are needed to develop, field-test and commercialize new transgenic plant varieties. It may actually be in the rural and small farm where biotechnology could have a major impact on increased crop production, especially in areas of the world where yields are low due to a lack of technology. This may also contribute to the survival of the small farmer and all the cultural traditions that they represent.

#### ***Enhancing the potential benefits***

Many of the biological pest problems that affect large-scale maize growers are shared by the smallholder using landraces. Among these are insect pests, rootworms and weeds (in many cases teosinte). Besides these, because the rural communities in many cases use marginal soils, there are specific problems such as drought, soil fertility and aluminum toxicity typical of acidic or basic soils. However, regardless of how many important genetic traits scientists think may be part of the solutions required by rural communities, the only way to ensure that the technology reaches these people is by including them in the research and development process from the very early stages, keeping in mind that the interests of smallholders are different from the large commercial growers. The technology needs to be understood by the people who are going to use it and they must agree to test and compare the new materials with whatever they are using. Benefits should be clear to them in the field rather than in the discourse.

#### ***Managing potential risks***

Whatever the benefits are, qualitative or quantitative, of applying biotechnology to solve agricultural problems in the developing world, and particularly in the case of Mexico, one thing must be completely clear to all those involved—growers, regulators, scientists, NGOs, politicians, and the public: that the introduction of transgenes into an open pollinated crop, and in particular the maize landraces, which are subject to agricultural practices that promote extensive

seed exchange, can inevitably lead to the widespread distribution of transgenes among these crops, maybe with the future impossibility of going back to the original state.

The identification of management tools to mitigate or avoid potential risks involved with the release of transgenic maize will vary according to the specific situation. In general, risk management options can be classified as avoiding, mitigating or tolerating risk. The chapter discusses the available options in two broad categories: (1) Biological tools available to avoid GMO risks associated with gene flow; and (2) Policies and regulations to manage GMO risks.

### ***Monitoring the release of GM crops***

Effective management of potential risks depends very much on the efficiency of the monitoring system to detect any possible alterations at the very early stages. Most scientists and regulators agree with the idea of monitoring post-market releases of GMOs. However, they also agree that monitoring is a very difficult process. Monitoring should be sensitive and timely enough so that it can trigger an alarm if things go wrong, with sufficient notification to permit the application of measures designed to remediate and reverse whatever effect the GMOs have had. Nevertheless, it is impossible to monitor every single parameter that may be associated with a particular release of GMOs as this should take into account the crop, the sexually compatible species, agricultural practices, the environment, and biodiversity directly and indirectly associated with the crops, among others.