

## GMOs and IPRs are Key Weapons in Fight against Hunger

The introduction of genetically modified organisms (GMOs) into the food system and the assignment of intellectual property rights (IPRs) for plant genetic resources are among the most notable features of the increasingly industrialized agri-food marketing system of numerous developed and developing countries around the world. IPRs have provided innovating firms with incentives to aggressively pursue improvements of crop characteristics (such as herbicide tolerance, insect and virus resistance, drought tolerance and increased nutritional value) through gene splicing techniques, and the agronomic benefits associated with the genetically modified (GM) products have resulted in their embrace by a significant number of agricultural producers around the world.

Intriguingly, in the midst of this, so-called, gene revolution about 1 billion people worldwide are facing malnutrition and hunger, the majority of them living in water-constrained regions of Africa and Asia. With GMOs and IPRs being at the epicenter of innovation activity in the agri-food system, the question that naturally arises is: *Can IPRs and GMOs help reduce hunger in a water-constrained world?*

### **CAFIO-PRG Research**

Understanding that *hunger can be reduced through access to increased quantities of nutritious food offered at affordable prices*, CAFIO-PRG research has been focusing on the effects of different GM technologies and IPRs' policies on quantities produced, the quality of production, the prices of food products, and the number of people with access to food in hunger-stricken less developed countries (LDCs). In doing so, the research explicitly considers the empirically relevant (1) heterogeneity in consumer preferences for GM products, (2) differences in producer agronomic characteristics, and (3) imperfect competition in the supply channels of interest.

### **CAFIO-PRG Findings**

Research has shown that:

- *Properly designed GM technologies* (i.e., technologies adapted to the idiosyncrasies and needs of an area) can facilitate production, increase yields, reduce production costs, and enhance the nutritional value of food.
- Key input traits of the GMOs needed in the fight against hunger are *drought resistance* and/or *water use efficiency* of plants, as water has been a key constraining factor in many hunger-stricken countries. The necessary output traits (e.g., vitamin, iron or zinc enhancements), will have to be case-specific and dependent on the nutritional needs of the different areas.

CAFIO-PRG research shows that:

- Important determinants of the effectiveness of these GM technologies in combating hunger are (i) the public attitudes towards GMOs; (ii) the magnitude and distribution of benefits of the GM technology; (iii) the regulatory and labeling regimes governing GMOs; (iv) the structure of the agri-food marketing system; (v) the market power of the innovating companies; and (vi) the strength and enforcement of IPRs in LDCs.
- The level of IPRs' enforcement affects the welfare of the interest groups involved (i.e., producers, consumers, and innovators), and has important ramifications for the pricing and adoption of the new technology – the weaker the enforcement of IPRs in a country, the lower the price of the new technology, the greater its adoption by producers, and the greater the number of consumers that have access to this technology.
- While GM technologies and certain IPRs' policies *can* result in increased quantities of nutritious food in hunger-stricken LDCs, there are some major challenges in the quest to utilize such technologies in the fight against hunger. These challenges include: (i) the limited availability of suitable GM crops/technologies; (ii) the limited capacity for R&D in most LDCs; (iii) the role of NGOs in shaping public attitudes towards GMOs; (iv) the trade relationships of LDCs with countries hostile to GMOs; and (v) the inefficiency of the regulatory system in most LDCs.
- The role of government agencies (like USAID) and Universities, innovating firms, the World Bank, major foundations, philanthropists and NGOs in overcoming these challenges is critical.

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