



PUBLIC-PRIVATE PARTNERSHIPS IN BIOTECHNOLOGY RESEARCH AND IMPACTS ON TECHNOLOGY ADOPTION

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1. Introduction

Genetically modified (GM) crops have been adopted rapidly over the last decade, though the range of GM crops commercialized so far is still rather limited. More public research, focusing on the problems of the poor, and public-private partnerships are needed to ensure an equitable biotechnology evolution in developing country agriculture. Although there are numerous examples of public-private research cooperation, none of these joint projects has yet led to a commercialized transgenic crop. Accordingly, there is still uncertainty as to who will actually benefit from public-private partnership and how particular institutional arrangements influence the outcome. The present study analyzes such aspects for Bt eggplant in India, a technology which is being developed under a unique collaborative agreement.

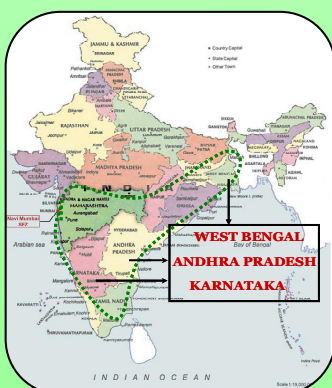
2. Background

For the first time in the world, eggplant has been genetically engineered to impart resistance towards lepidopteron borer pests, through introduction of genes encoding for *Cry* proteins produced by strains of *Bacillus thuringiensis* (Bt). The first Bt eggplant hybrids, developed by the Maharashtra Hybrid Seed Company (MAHYCO), are expected to be commercialized by 2007. In addition, MAHYCO has shared its technology and know-how with public research institutes. With financial assistance of the Agricultural Biotechnology Support Project (ABSP II), these institutes are now developing Bt open-pollinated varieties (OPVs) – especially targeted at resource-poor farmers.

However, although proprietary Bt hybrids will probably have a head start of two or three years, the company's market share might shrink once Bt OPVs are going to be released. If many of MAHYCO's actual or potential customers would substitute low-cost Bt OPVs for more expensive Bt hybrids, the agreement would be associated with a high opportunity cost for the company. The present study projects the adoption profile of Bt eggplant hybrids and estimates farmers' willingness to pay (WTP) in the presence and absence of Bt OPVs.

3. Data

In total, 360 eggplant farmers were visited and interviewed in three leading eggplant-producing states of India – Andhra Pradesh, West Bengal and Karnataka. Stratified random sampling method was employed. Sample farmers were briefed about potential impacts of Bt hybrids in terms of yield increase and pesticide use reduction. Their WTP for hybrid seeds was elicited before and after indicating the option of comparatively lower yielding, low cost Bt OPVs. A contingent valuation dichotomous choice approach was used.



4. Results

Given the economic importance of insect pests in eggplant cultivation, the average WTP for Bt hybrids (US\$ 98.5/acre) is more than four times the current price of conventional hybrid seeds. Later released Bt OPVs will reduce farmers' WTP for Bt hybrids by about 35% (Figure 1; Table 1), thus decreasing the scope for corporate pricing policies. Nonetheless, ample private profit potential remains. Larger and richer farmers will generally prefer adopting Bt hybrids, whereas resource-poor farmers would opt for Bt OPVs, once these become available. Hence, the development of Bt OPVs under the public-private partnership is indeed an important means to promote equitable technology development in the Indian eggplant sector.

Figure 1. Potential adoption rate of Bt hybrids before and after introduction of Bt OPVs

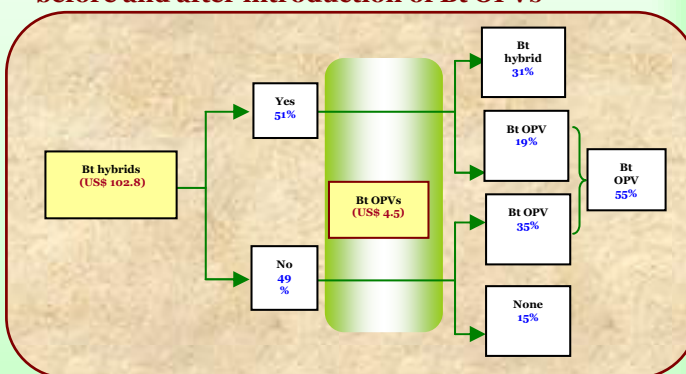


Table 1. Change in farmers' WTP for Bt hybrids after introduction of Bt OPVs*

	Without Bt OPVs	With Bt OPVs	Reduction in WTP value
WTP (US\$/acre)	98.5	64.3	34.1 (35%)

* Farmers WTP values were calculated using the non-parametric Turnbull estimator

5. Conclusion

Innovative models of public-private partnership, like the one analyzed here, can be beneficial for all parties involved: the private sector, which improves its image and can reduce the cost and hurdles of technology approval processes; the public sector, which gets access to proprietary technologies and know-how; and farmers, who receive productivity-enhancing transgenic seeds at affordable prices, including varieties that are suitable for the poor. More political effort and financial support are needed to make such types of collaborative agreements successful on a larger scale.

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