Costs and Benefits of PRSV-resistant Technology in the Philippines

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The Philippines has a flourishing papaya industry with its growing domestic and export markets. In recent years, however, the papaya ring spot virus (PRSV) has become a major limiting factor to papaya production in the country. While available commercial varieties are susceptible to the virus, a biotech papaya variety totally resistant to PRSV has been developed at the Institute of Plant Breeding, University of the Philippines Los Baños which could provide alternative solution to address the problem and alleviate the losses attributed to PRSV. The development of the technology, which is currently undergoing regulatory compliance, requires a long and costly process. This study assessed the various development and regulatory stages, as well as the costs and potential benefits of the PRSV-resistant papaya in the Philippines.

Assessment Approach

Since PRSV-resistant papaya has not yet been released for commercial use in the Philippines, an *ex-ante* analytical framework was adopted in estimating the benefits and part of the costs. Data on development and regulatory costs were collected from secondary sources and through personal interviews with scientists directly involved in technology development and regulators from the Department of Agriculture and the National Committee on Biosafety of the Philippines (NCBP). The two types of social costs considered were the costs of real resources (direct) in the technology development and regulatory compliance as well as the government costs in regulating the technology. A closed economy model was used in estimating potential benefits since the commercialization of the technology is intended for varieties used for domestic consumption.

Results

The technology development stage including breeding, transformation, and line selection already took about four years while regulatory compliance is estimated to take six years before commercial release in 2010. Total costs amounted to PhP20.1 million or an average of PhP2.0 million per year. A large portion (69%) of the total costs accounts for development costs while the rest (31%) are for regulatory compliance. The major cost items were supplies and repair and maintenance at the development stage and multi-location field trials at the regulatory phase. Expenditures on studies to comply with biosafety regulatory requirements contributed substantially to total costs.
Nevertheless, these costs were very small relative to the potential benefits due to the adoption of the PRSV-resistant technology. The net benefits to society amount to PhP4,131.1 million with internal rate of return (IRR) of 78.1 percent. At this IRR level, there is a very good incentive to finally commercialize the technology. In addition, consumers are likely to benefit more than producers. Delaying commercialization of the technology may result to substantial welfare losses and also diminishes the IRR. The economic impact of this scenario is
far greater than the increase in regulatory costs. The impact of the latter becomes imperceptible as long as the regulatory process does not stifle innovation. On the other hand, the reduction in cost would make small farmers better-off because of the smaller price they have to pay for the technology.

**Conclusion**

There could be substantial payoffs to farmers and consumers by further investing in the development and regulatory activities that facilitate the early commercialization of the PRSV-resistant technology. **Streamlining the regulatory process to reduce delays would prove to be beneficial to society and increases the incentive for innovators.** The knowledge on the size of the costs and the process involved becomes indispensable to rationalize the biosafety framework of the country.