Flood-Tolerant Rice Reduces Yield Variability, Benefitting Poor Farmers the Most – Summary

BERKELEY BIOECONOMY CONFERENCE

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Panel Topic: Development of Biotechnology – "Flood-Tolerant Rice Reduces Yield Variability, Benefitting Poor Farmers the Most."

Conference / Location: Berkeley Bioeconomy Conference, March 27-28, 2013, University of California, Berkeley, CA.

Session Topic Description: The results of an agricultural research field study conducted beginning May 2011 in East India, to test the productivity benefits of Swarna-Sub1 rice—a flood tolerant rice variety.

Moderator & Panelists: Kyle Emerick (Presenter), Alain de Janvry, Elisabeth Sadoulet (University of California, Berkeley) and Manzoor H. Dar and David Raitzer, International Rice Research Institute (IRRI).

Design, Methodology, Approach: Presentation with Q&A discussion following.

Main Discussion Points: This presentation focused on an agricultural research field study beginning May 2011 in East India to test the productivity benefits of Swarna-Sub1 rice—a flood tolerant rice variety. The farmers located in this coastal lowland area come from the lowest socio-economic spectrum or caste system in India with some of the poorest quality land lacking irrigation. The study was conducted because the last two decades of rice yield in this flood and drought-prone area have been stagnant or have experienced very low yields and slow growth. Back in the Green Revolution of the 1970s, big rice yields were the result of rice farms being located on the best farmland with good irrigation, but even this land has seen a decline in productivity in recent years.

The research targeted a random selection of 64 treatment villages and 64 control villages located in the Bhadrak and Balasore districts of Orissa, India on the Bay of Bengal. 25 farmers were then identified that cultivate Swarna rice on land prone to flooding. Of these 25, five farmers were chosen in each of the 64 villages and given the Swarna-Sub1 seed that was released in India in 2009. Flooding there typically occurs in September, at the end of the vegetative growth stage, and approximately 60 to 70 days following the planting of the new rice crop. The Swarna-Sub1 variety is identical to the Swarna variety, except that it can withstand being completely submerged in water for up to two weeks. For other rice varieties, being submerged in water for such a period would cause the crop to die following the flooding. But the Swarna-Sub1 variety regenerates following the floodwaters receding, and has proven to be a very stable variety.

Outcomes & Analysis: The results of the study were very positive and revealed that the Swarna-

Sub1 rice planted in highly unproductive farm areas prone to flooding was successful, and regenerated following the 6-14 flood days having a 45% yield advantage for 10 days of submergence in water. In addition, there was a 15.2% larger yield gain compared to the general population of farmers who use the regular Swarna seed during heavy flooding. The key remaining question is whether there can be gains in non-flood years due to the behavioral response to the new technology being introduced.

Going forward, there will be a continued focus on using the Swarna-Sub1 variety in marginal farm areas with a focus on increasing its yield. About 10 percent of India's rice area uses the Swarna-Sub1 variety now. Although the benefits to farmers' fields can vary greatly due to the depth of water during a flood, how long the water remains on the land, whether or not the flood comes during the growing season, and the particular management practices used—the true breakthrough with using Swarna-Sub1 has been in the much larger yields it produces on land that otherwise would have been highly unproductive in growing rice due to flooding.

Keywords: Flood-tolerant rice variety, drought tolerant rice variety, Swarna-Sub1, Swarna, Indian rice farmers, Bhadrak and Balasore districts of Orissa, India, flood prone villages in Orissa, India.

Paper type: Review of conference speaker.

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