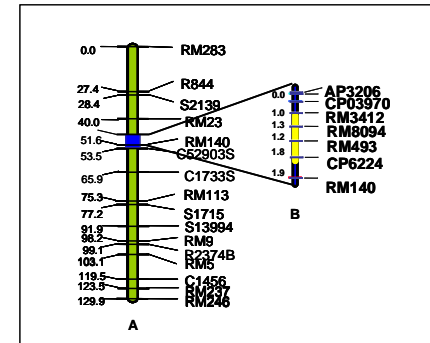


Ex Ante Impact Assessment of Marker-Assisted Selection Technologies



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Project Rationale

- Several GCP projects have potential near-term products such as (a) DNA markers and candidate genes validated for traits of interest and (b) germplasm with specific attributes
- Ex ante impact analysis is needed to: (a) provide early estimates of benefits of GCP investments, (b) validate an approach to impact assessment that might be used in the GCP more broadly, and (c) assist with GCP research prioritization.

Objectives

- Design a methodology to assess CGP economic impacts and to identify future targets for GCP
- Economic impact assessment of the discovery and use of genes for tolerance to saline and phosphorous-deficient soils in rice
- Economic assessment of developing and applying low cost technologies for pyramiding useful genes from wild relatives into elite progenitors of cassava



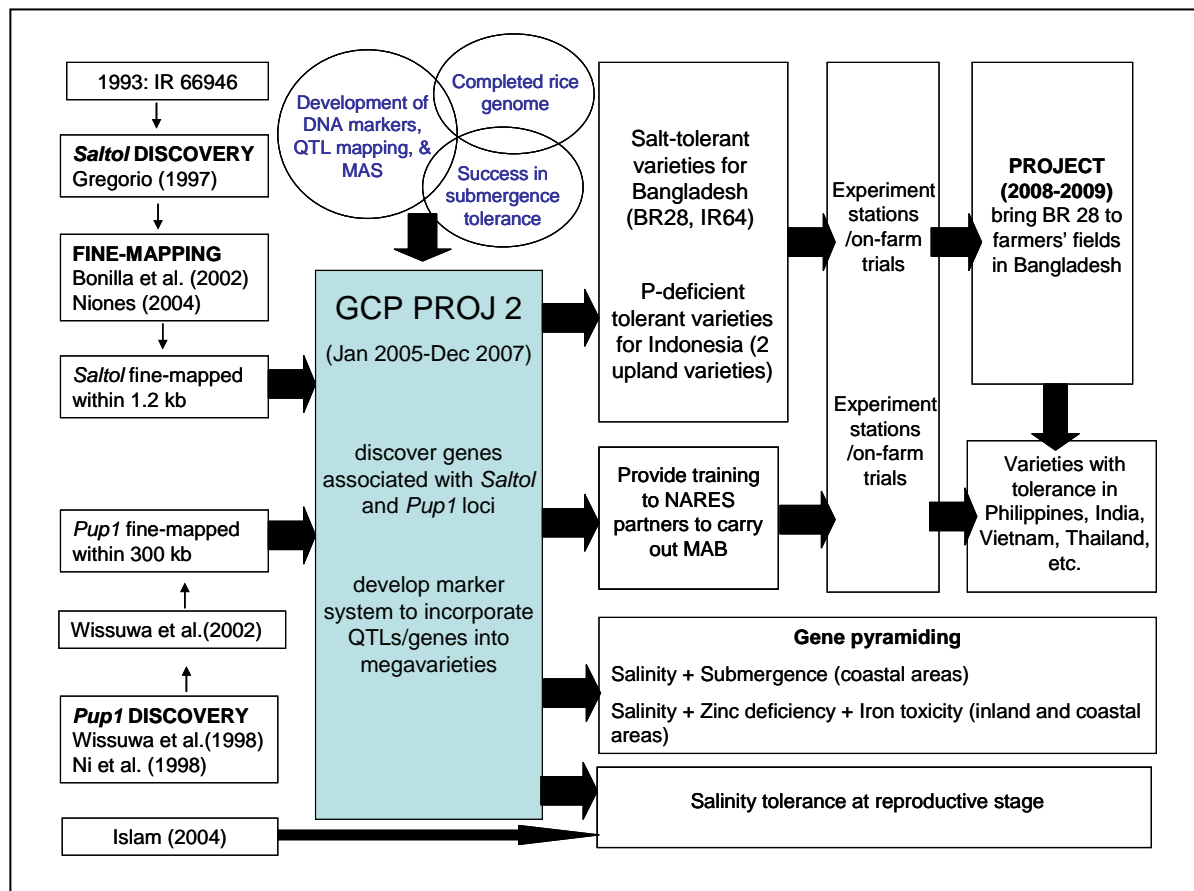
Activities and Results

- Activities
 - Construct technology-impact pathways
 - Gather secondary data on prices, production, area, and trade
 - Gather crop loss data
 - Budgeting
 - Economic Surplus Analyses
 - Benefit cost analyses
 - Reporting



Results: Technology Impact Pathways

- Example: Summary of rice pathway for GCP 2:

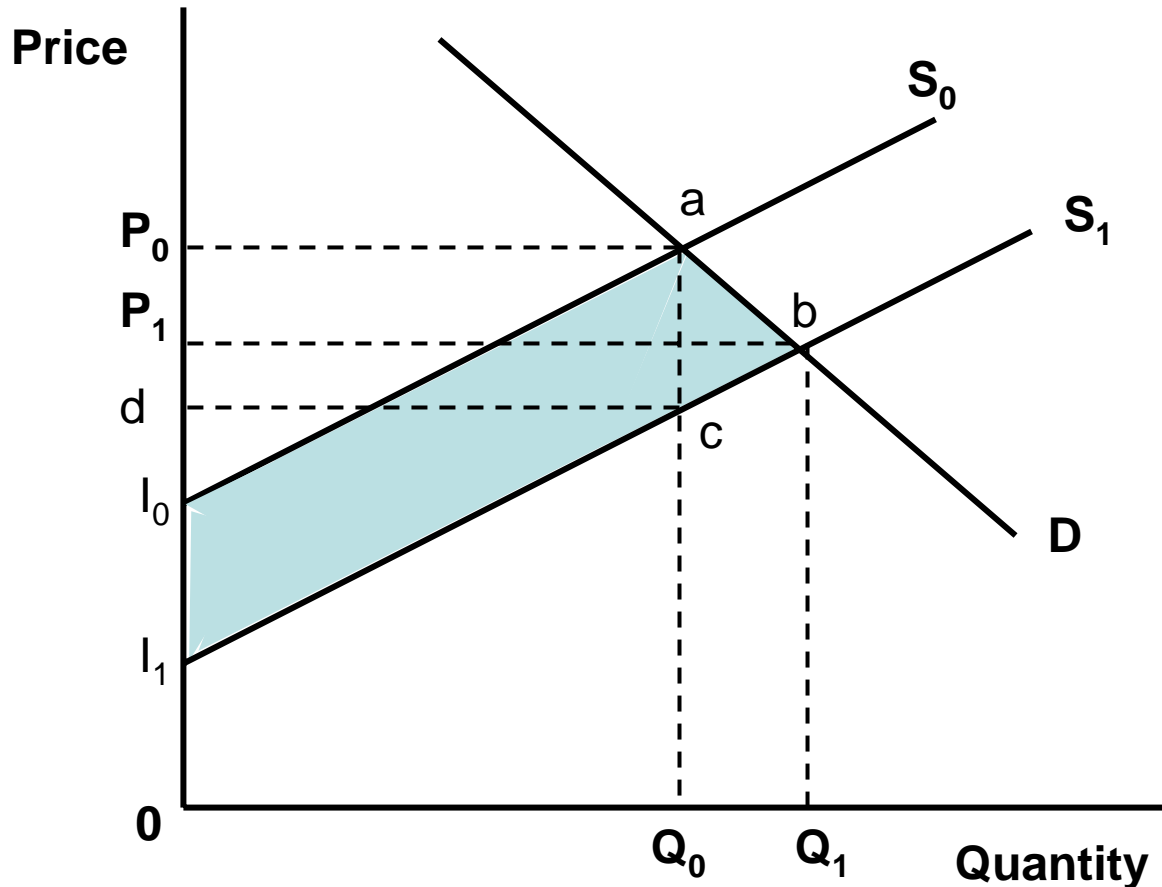


Data on prices, production, area, trade, and crop losses

- Collecting data down to the sub-regional level in Bangladesh, India, Indonesia, and Philippines for rice; and Uganda, Nigeria, Ghana, and Brazil for cassava
- Gathering published data on crop losses in rice due to saline and phosphorous deficient soils in target countries
- Gathering published data on crop losses for cassava mosaic disease, green mites, whitefly
- Gathering information on existing methods to manage targeted stresses. Small surveys of experts in each country to help estimate crop losses



Budgeting, Economic Surplus Analysis, and Benefit Cost Analysis



Research shifts the supply curve from S_0 to S_1

Budgeting, Economic Surplus Analysis, and Benefit Cost Analysis*

- **Salt tolerant and P-deficiency rice:** Lower research cost and greater economic benefits:
 - Quicker variety release (3-5 years)
 - Higher and faster adoption of improved varieties by farmers since in existing varieties
 - Increased rice yield and larger rice area for salt tolerant rice
 - Lower cost of production for farmers with P-deficiency rice
 - Benefits likely to go disproportionately to the poor who live in the marginal areas affected and spend a high proportion of their budget on rice

* Results are still preliminary and therefore numerical estimates of benefits are not presented here



Budgeting, Economic Surplus Analysis, and Benefit Cost Analysis*

- **Low-cost molecular markers and use of wild relatives to transfer resistance to insects (green mites, white flies, hornworm, and diseases (CMD) and delay post-harvest deterioration):**
 - Quicker variety release (3-5 years); moving directly from clonal evaluation to regional trials
 - Higher cassava yield
 - Savings in post harvest losses
 - Benefits go disproportionately to the poor

* Results are still preliminary and therefore numerical estimates of benefits are not presented here



Data Format and Release

- Models and data will be provided in Excel spreadsheets
- Quantitative Results and Data Release will be in 2008

Links with Other Projects

Several projects could have been the subjects for the economic impact assessment, but two GCP projects:

- **“Revitalizing marginal lands: Discovery of Genes for Tolerance of Saline and Phosphorus Deficient Soils to Enhance and Sustain Productivity,”** and
- **“Development of Low-Cost Technologies for Pyramiding Useful Genes From Wild Relatives of Cassava into Elite Progenitors”**

were chosen because they address significant problems on major crops and have advanced sufficiently to facilitate identification of economically useful products.

Linkage to IFPRI projects for data on sub-regional production and prices for each target country

Product Delivery and Impact

- Impact assessment project began in 2007 and numerical results and reports will be available in early 2008
- Three graduate students will complete their theses on the project in 2008
- Donors will have quantitative estimates of benefits of two GCP projects, and the template developed will facilitate assessment of other projects

