GRiSP Impact Assessment Research (IRRI, AfricaRice & CIAT)

Samarendu Mohanty, IRRI
Arouna Aminou, AfricaRice
Ricardo Labarta, CIAT

Impact Assessment Focal Point meeting, Minneapolis, USA, 25 July 2014
GRiSP Impact Assessment Studies

- IRRI focal person for IA: Takashi Yamano
- AfricaRice focal person for IA: Aminou Arouna
- CIAT focal person for IA: Ricardo Laborta

- Annual GRiSP M&E and IA meeting in December every year
  - Other CRP M&E and IA specialists also participate in this meeting

- The funding for IA studies comes from different sources:
  - External grants (SPIA/ATAI/BMGF/DFID)
  - Technology delivery projects (STRASA/CSISA)
  - GRiSP-IRRI M&E budget
  - Social Science division budget
40 impact assessment/adoption studies in the past five years (completed/ongoing)

- Germplasm enhancement: 16
- Management enhancement: 20
- Both: 4

John P. Brennan
Cooiamaine Economic Research, Australia

And

Arelene Malabayabas
International Rice Research Institute
## Estimated benefits from IRRI's contribution to varietal development and releases

<table>
<thead>
<tr>
<th>Study funding</th>
<th>Brennan and Malabayabas, 2011</th>
<th>IRRI study (Raitzer et al., 2013)</th>
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</thead>
<tbody>
<tr>
<td>Adoption years</td>
<td>1985—2009 (25 years)</td>
<td>1990—2010 (21 years)</td>
</tr>
<tr>
<td>Counterfactual &amp; Attribution</td>
<td>Last cross and pedigree rule</td>
<td>Breeder-Pedigree rule</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1990 IRRI shutdown</td>
</tr>
<tr>
<td>Source of benefits</td>
<td>Yield gain</td>
<td>Yield and HPR gains</td>
</tr>
<tr>
<td>Discount rate</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>Unit</td>
<td>2009 US$ million</td>
<td>2005 PPP$ million</td>
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</table>

### Total benefits for the study period

<table>
<thead>
<tr>
<th>Country</th>
<th>Indonesia</th>
<th>Philippines</th>
<th>Indonesia + Philippines</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>16,111</td>
<td>5,088</td>
<td>21,199</td>
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<tr>
<td></td>
<td>6,952</td>
<td>1,114</td>
<td>8,066</td>
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</table>

### Average annual benefits

<table>
<thead>
<tr>
<th>Country</th>
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<th>Philippines</th>
<th>Indonesia + Philippines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>644.44</td>
<td>203.52</td>
<td>847.96</td>
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<tr>
<td></td>
<td>331.04</td>
<td>53.07</td>
<td>384.11</td>
</tr>
</tbody>
</table>
META-IMPACT ASSESSMENT OF THE IRRIGATED RICE RESEARCH CONSORTIUM (IRRC)

• IRRC – identification, development, dissemination, and adoption of NRM technologies suitable for irrigated rice-based ecosystems in Asian countries.

  – Established in 1997 and funded primarily by the Swiss Agency for Development and Cooperation (SDC)
From an investment by SDC of USD12 million, the analysis of a sub-set of technologies across 4 of the 11 countries involved in the IRRC revealed benefits of USD70.5 million and an anticipated benefit of USD297 million by 2016.
Impacts of Alternate Wetting and Drying

Impact of the alternate wetting and drying (AWD) water-saving irrigation technique: Evidence from rice producers in the Philippines

Roderick M. Rejesus, Florencia G. Palis, Divina Grace P. Rodriguez, Ruben M. Lampayan, Bas A.M. Bouman

ARTICLE INFO

Article history
Received 17 March 2010
Received in revised form 24 November 2010
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Keywords:
Alternate wetting and drying
Water-saving
Irrigation
Rice production
Technology

ABSTRACT

This article evaluates the impacts of a controlled irrigation technique in rice production called alternate wetting and drying (AWD). Propensity score matching (PSM) and regression-based approaches applied to farm-level survey data are used to achieve the objective of the study. The PSM and regression-based approach accounts for the potential bias due to selection processes from observable variables. Results of the impact analysis using both empirical approaches indicate that AWD, particularly the “Safe AWD” variant, reduces the hours of irrigation use (by about 38%) without a statistically significant reduction in yields and profits. This reduction in irrigation time translates to corresponding savings in the amount of irrigation water and pumping energy used. However, further analysis of the impact estimates suggests that the potential magnitude of the selection bias based on unobservable variables may still be able to eliminate the measured impact from the PSM and regression-based techniques that only control for selection based on observable variables. Hence, the current impact results have to be interpreted with caution and further data collection is needed to construct a panel data that would allow one to account for selection problems due to unobservable variables and consequently better estimate the AWD impacts.

SLE Publication Series – S241

SLE – Postgraduate Studies on International Cooperation
Study commissioned by the Advisory Service on Agricultural Research for Development of German Technical Cooperation (GTZ-BAEF) in collaboration with the International Rice Research Institute (IRRI)

Water Saving in Rice Production—Dissemination, Adoption and Short Term Impacts of Alternate Wetting and Drying (AWD) in Bangladesh

Dr. Ekkehard Kürschner (Team Leader), Christian Henschel, Tina Hildebrandt, Ema Jülich, Martin Leineweber, Caroline Paul

Dhaka, Berlin, December 2010

Impacts of Alternate Wetting and Drying
IRRI TECHNICAL REPORT
Aerobic Rice Adoption and Its Impact in North Anhui

Shijian Ding¹  Haiuo Wu¹  B.A.M. Bouman¹  Huaqi Wang¹  Shaobing Peng²  Yuping Chen¹

¹ Zhongnan University of Economics and Law, No. 1, South Nanhu Rd., Wuhan, 430074, China
² International Rice Research Institute, DAPO 7777, Metro Manila, the Philippines
³ China Agricultural University, West Yanmingyuan Rd., Beijing, 100080, China

Abstract

With scarcity of water resource and shortage in labor supply, there has been increasingly pressure on lowland rice production in China. Aerobic rice has been experimented since 1980s in China. Farmers in north China have been increasingly adopting aerobic rice. However, a little is known about farmers’ understanding of aerobic rice and impact of adoption on farmers’ livelihoods. This paper aims to get an inspection of number of rice farmers and area of aerobic rice production in the study.
Analysis of agricultural research investment priorities for sustainable poverty reduction in Southeast Asia

David A. Raitzer\textsuperscript{a,}* , Mywish K. Maredia\textsuperscript{b,1}
\textsuperscript{a}International Rice Research Institute, Social Science Division, P.O. Box 7777, Metro Manila, Philippines
\textsuperscript{b}Department of Agricultural, Food and Resource Economics, Michigan State University, East Lansing, MI 48824, USA

\textbf{ARTICLE INFO}

Article history:
Received 24 November 2011
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Available online 16 May 2012

Keywords:
Southeast Asia
Agricultural research

\textbf{ABSTRACT}

Underinvestment in agricultural research reflects the subregion’s agricultural importance and the impact potential for the poor. Patterns of agricultural research investment are used to identify specific gaps and distribution of poverty and the extent to which patterns, consumption patterns, and production patterns are achieved. Patterns of agricultural research investment have been identified to achieve poverty reduction in Southeast Asia.

\textbf{Agricultural Systems}

Volume 106, Issue 1, February 2012, Pages 46–58

Review and analysis of documented patterns of agricultural research impacts in Southeast Asia

Mywish K. Maredia\textsuperscript{b,1}, David A. Raitzer\textsuperscript{b,1}

\textbf{Abstract}

Based on a comprehensive search and review of the literature, 42 studies are identified for in-depth review and analysis of documented impacts of agricultural research from 1959 to 2009. This body of evidence is subjected to a systematic, qualitative scrutiny for the coverage and type of impact to derive patterns, gaps, and trends in documented impacts of research in the subregion. The analysis offers compelling evidence that past investments in agricultural research in the region have been productive. In so doing, the study also reveals some persistent patterns and identifies a number of gaps between investments and documented impacts. Strikingly, the benefits are principally derived from rice improvement research, which has generated...
Ongoing Studies

1. Randomized controlled trials of submergence tolerance (Swarna Sub1) in Odisha, India, 2001-2015 (collaborator: U.C. Berkeley)

2. Randomized controlled trials of drought tolerance (Sahbhagi Dhan) in Odisha, Jharkhand and West Bengal, 2013-2015 (Collaborator: U.C. Berkeley)

3. 3-controls technology in Guangdong, China (Collaborator: Haifu)

4. Impact evaluation of water productivity of dry direct seeding rice in India
Flood-tolerant rice reduces yield variability and raises expected yield, differentially benefitting socially disadvantaged groups

M. H. Dar1, Alain de Janvry2, Kyle Emerick2, David Raitzer2 & Elisabeth Sadoulet2

Figure 3 | Projected impacts of adoption of flood-tolerant rice (Swarna Sub1) on rice production. (a) Bhadrak district and (b) Balasore district. Graphs display forecasted percentage difference in total production between a scenario where all Swarna plots are cultivated with Swarna-Sub1 and a scenario where the plots remain cultivated with Swarna. Differing flood severity is simulated by adding (subtracting) an additional day of submergence for each plot to simulate a flood that is 1 day more (less) severe than 2011 floods. Dots and triangles represent point estimates and whiskers are 95% confidence intervals. Predicted difference in impact between SC/ST and OBC/General farmers is displayed as triangles. Regression estimates from Column 3 of Table 1 are used to generate predictions.
Hyperspectral signature analysis: a proof of concept for tracking adoption of crop management practices

Objective 1
To test the ability of hyperspectral sensors at field level to discriminate crop management practices by identifying key wavelengths and crop stages

Objective 2
To test for scalability by applying discrimination signatures to hyperspectral remote sensing images

Treatments:
1. TPT rice with traditional methods of irrigation
2. TPT rice with alternate wetting and drying
3. DSR without residue retention
4. DSR with residue retention as surface mulch
Planned Studies

1. Economic Impacts of the Rice Crop Manager Smartphone App in the Philippines: An Assessment using Randomized Control Trials

2. Livelihood Impacts of Flood and Salinity Tolerant Rice Varieties in Myanmar: An Assessment using Randomized Economic Experiments (In collaboration with Zacary Brown and Rod Rejesus from N.C. State University)

3. Randomized control trials of drought tolerance (water saving) in Bangladesh (in collaboration with UC Berkeley)
AfricaRice IA framework

• AfricaRice’s Strategic Plan 2011-2020 will be implemented through three mechanisms:

1. Participation in CRPs, in particular the GRiSP;

2. Rice Task Force Mechanism: an Africa-wide systematic collaborative research effort build up of critical mass, and ownership by the NARS;

3. ‘Rice Sector Development Hubs’: zones where rice research products from the CRPs and the Task Forces will be integrated across the rice value chain to achieve development outcomes and impact.
Theory of change and Impact Assessment

<table>
<thead>
<tr>
<th>Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>F: sample of value-chain actors for initial surveys</td>
</tr>
<tr>
<td>N1: a subset of F</td>
</tr>
<tr>
<td>N2: a subset of F, mutually exclusive of N1</td>
</tr>
<tr>
<td>N3: all other value-chain actors in the Hub (i.e. not N1 and N2) and some from beyond the Hub</td>
</tr>
<tr>
<td>N0: a sample of actors involved in the initial survey, but neither N1 nor N2 — used as control group</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
<th>Step 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic and baseline surveys – involving a sizeable sample of farmers (F) from within the Hub</td>
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<tr>
<td>Results of surveys feed into action plan</td>
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<tr>
<td>On-station testing of previously untested technologies</td>
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<tr>
<td>On-farm PLAR with N1 Technology/knowledge/structure ‘exposure’ to N2 Training of trainers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N1 and N2 adopt technologies at will Ex-post adoption and impact surveys Results of technology research and adoption surveys shared with DP</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>DP reach out to N3 both within and outside the Hub at their own cost via training, video, radio, etc.</td>
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<tr>
<td>Ex-post impact assessment (to assess effectiveness of DP outreach)</td>
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</tbody>
</table>
R&D activities a Hub and GRiSP

<table>
<thead>
<tr>
<th>Protocols</th>
<th>GRiSP themes</th>
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</thead>
<tbody>
<tr>
<td>Diagnostic survey</td>
<td>Themes 1, 2, 3, 4, 5 and 6</td>
</tr>
<tr>
<td>Baseline survey (+ ex-ante impact assessment)</td>
<td>Themes 1, 2, 3, 4, 5 and 6</td>
</tr>
<tr>
<td>PVS activities (Garden, baby &amp; mother trials, etc.)</td>
<td>Themes 2 and 6</td>
</tr>
<tr>
<td>Quality seed selection/production training</td>
<td>Themes 2 and 6</td>
</tr>
<tr>
<td>Agronomy (yield gap assessment &amp; GAP testing)</td>
<td>Themes 3, 4 and 6</td>
</tr>
<tr>
<td>Post-harvest (loss assessment &amp; GAP testing)</td>
<td>Theme 4</td>
</tr>
<tr>
<td>Mechanization (on-farm testing &amp; adaptation)</td>
<td>Themes 3 and 4</td>
</tr>
<tr>
<td>GAP training and video, etc.</td>
<td>Theme 6</td>
</tr>
<tr>
<td>Gender Studies</td>
<td>Themes 1, 2, 3, 4, 5 and 6</td>
</tr>
<tr>
<td>Ex-post impact assessment</td>
<td>Themes 1, 2, 3, 4, 5 and 6</td>
</tr>
</tbody>
</table>
Hubs baseline data collection

- Data collected in 41 hubs in 23 countries
  - 1312 villages are involved
  - 13,120 rice farming households concerned
  - 19,885 postharvest actors (10,250 traders, 1,230 restaurants, 4,305 consumers households, 4,100 processors)
- Use of Mlax application (web-based)
- Use of ICT tools (Tablets and smartphones)
- In-country training of NARS collaborators and enumerators
Baseline data collection using Tablets

<table>
<thead>
<tr>
<th>Select questionnaire</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>questionnaire</td>
<td></td>
</tr>
<tr>
<td>Ghana</td>
<td></td>
</tr>
<tr>
<td>Benin</td>
<td></td>
</tr>
</tbody>
</table>

| Select Samples       |  |

| Select enumerator    |  |

<table>
<thead>
<tr>
<th>Select languages</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Text</td>
<td></td>
</tr>
<tr>
<td>Audio</td>
<td></td>
</tr>
</tbody>
</table>

| Select round         |  |

OK
Status of Hub baseline survey

- Data collection on-going
- Sampling completed
- Planned for 2014
- Not yet planned
Highlights Ex-post impact assessment

Actual and potential Nerica Adoption rate

- Benin: 44.6 (Actual), 65.2 (with awareness), 65.1 (with access)
- Gambia: 91.5 (with access)
- Ghana: 33.8 (Actual), 35.2 (with awareness)
- Mali: 22.1 (Actual), 76.3 (with awareness)
- Nigeria: 43.7 (Actual), 82.4 (with awareness)
Highlights Ex-post impact assessment

Total Actual and potential Impact of NERICA adoption on Rice Output (in Thousands of Tonnes)
Examples of IA publication (AfricaRice)


Thank you