IMPACT ASSESSMENT OF RICE RESEARCH: ISSUES AND CHALLENGES

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ABSTRACT

The economic impact of past rice research has been established to be high in terms of the rate of returns on investments. Nevertheless, considerable opportunities exist for further enhancing the impact, in both irrigated and rainfed environments. The presentation provides an overview of the magnitude of the past impact, strategies for increasing impact in the future, and methodological challenges in assessing the future impact, as other indicators such as environmental and poverty impacts are also considered in addition to the usual production gains.

Assessing the impact of rice research: issues and challenges

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Roles of social sciences in international agricultural research and development

- Identify technology needs of farmers through better understanding of farmers' knowledge, production environments and current practices.

- Assess prospective technologies for economic efficiency, farmer acceptability and environmental sustainability.

- Delineate technology recommendation domains for targeting.

- Analyze constraints to adoption/diffusion of improved technologies.

- Assess impact of technologies for research prioritization and accountability.

- Sector level (demand/supply, markets) and policy analyses for strategic planning.
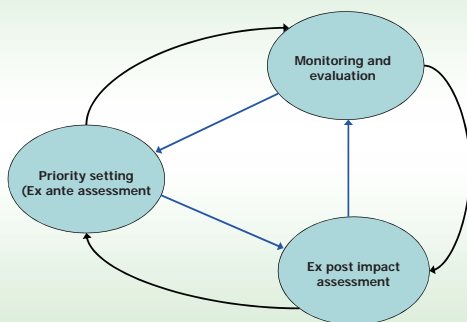

Why impact assessments

- Accountability

- Prioritization and resource allocation
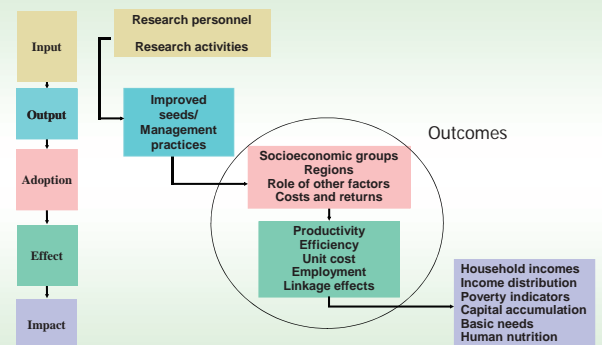

Types of impact assessments

- Ex-ante (based on expected impact)

- Ex-post (based on realized impact)

Impact assessment cycle

Source: Walker et al. 2008

Impact pathway

Research outputs characteristics

Rice Science for a Better World IRRI

- Improved germplasm (embodied technology)
- Improved NRM methods (practices/info: disembodied)
- Policy advice (information)

Past impact of rice research

Rice Science for a Better World IRRI

What has been the impact of Green Revolution?

Trends in world production and real price of rice, 1960-2009

Rice Science for a Better World IRRI

Source: Production: USDA, 27 Oct 2009
Rice Price: Relate to Thai rice 5%-broken deflated by G-5 MUV Index deflator
(adjusted based on Jan-Sep 2009 price, October 2009 data update)
Source: www.worldbank.org

Growth rates in rice area, yield and production in selected Asian countries (1970-2008)

Rice Science for a Better World IRRI
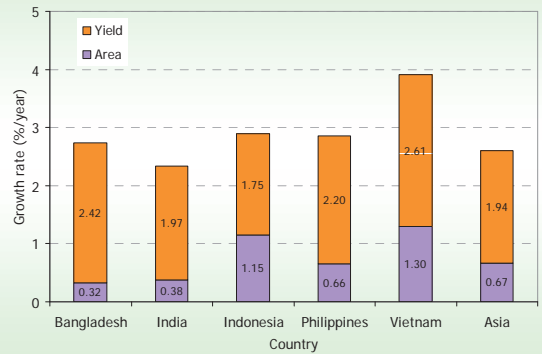
Data source: USDA

Trend in adoption of MV rice in Asia

Rice Science for a Better World IRRI
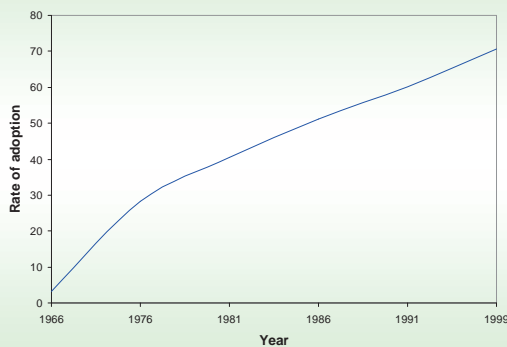
Data source: World Rice Statistics, IRRI

Net gains from the adoption of MV rice

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Country	Rice yield (kg/ha)		Cost in rice equivalent (kg/ha)		Net gain from the adoption of MV (kg/ha)
	MV	TV	MV	TV	
Bangladesh	3980	1970	2614	1600	996
Indonesia	5176	3093	1759	521	845
Philippines	3780	2100	2363	1579	896
Vietnam	4805	2297	4044	2419	883
West Bengal, India	4174	1921	2631	1475	1097
Average	4383	2276	2683	1519	943

Source:: Hossain et al (2003)

Estimated Economic Impact of Rice Research in Asia

Attribute	Estimated Value
Net increase in yield (t/ha)	0.94
Value of yield increase ($/ha)	150
Total annual value of yield increase ($ million)	10800
Adjusted annual value of yield increase ($ million)	4310
Annual Cost of rice research ($ million)	70

Source : All estimates except 'adjusted annual value of yield increase' from Hossain et al. (2003). The adjusted value of annual yield increase was obtained from Raitzer (2003)
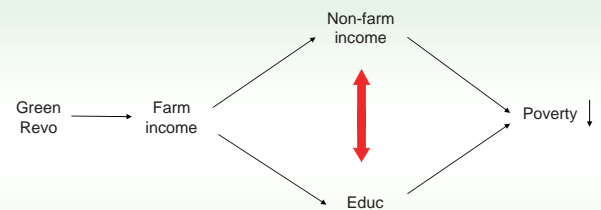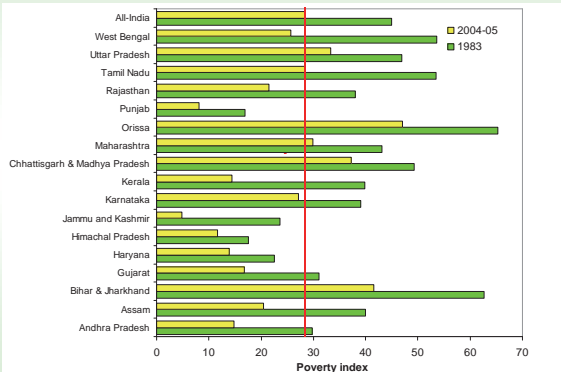

Impact of rice research on poverty reduction

For India, each
$1 million invested on rice research

↓

lifted ≃ 65,000 poor people
above the poverty line every year
during 1991-99.

Source: Fan et al. (2002)

Incidence of poverty in India

All-India, West Bengal, Uttar Pradesh, Tamil Nadu, Rajasthan, Punjab, Orissa, Maharashtra, Chhattisgarh & Madhya Pradesh, Kerala, Karnataka, Jammu and Kashmir, Himachal Pradesh, Haryana, Gujarat, Bihar & Jharkhand, Assam, Andhra Pradesh

2004-05
1983

Poverty index

Green Revo → Farm income → Non-farm income → Poverty ↓

Farm income → Educ → Poverty ↓

Based on Otsuka et al (2008)

Equity concerns

- Scale-neutral
- Small farmers adopted improved varieties after an initial lag
- Increased demand for labor (farm and non-farm)
- Indirect benefit through labor market linkages
- Indirect benefit through price reduction for net purchasers
- Non-rice and non-farm sources of income often inequitably distributed.

Stability of rice production

Coefficient of variation (%)

70-79   75-84   80-89   85-94   90-99   95-04

10-year period

(production for eastern India)

Environmental impact

- **Positive impact through land saving**

  If rice yield had remained at its pre-green revolution level of 1.9 t/ha, current production would have required more than double the current area.

- **Overall environmental impact**

  "Positive environmental effects generated through land saving far outweigh the negative effects" (Gardner 2003).

Some issues and challenges

1. Methodological
2. Data
3. Institutionalization of impact assessment

Some issues and challenges

Methodological

1. Broader impact on poverty, nutrition, environment and gender
2. Attribution issue as one moves down the impact pathway
3. Establishment of 'counterfactual'
4. Measurement of small effects over many small areas
5. Tools for impact assessment of NRM and policy research

Some issues and challenges

Data

1. Adoption data critical but nationally representative data generally not available (even for variety data)
2. Adoption data on different 'vintages' of MV
3. Data on NRM impacts, involving externalities and environmental services
4. Policy influence even more difficult to trace and quantify

Some issues and challenges

Institutionalization

1. Use of formal ex-ante analysis for prioritization
2. Imbuing an impact culture
3. Location of the impact assessment group (program level or institutional level)
4. How much to spend on impact assessment and the source of funds

Take-home messages

- An important area of research (not just a routine task), especially for social scientists
- Tremendous opportunity for inter-disciplinary work and learning
- Spatial analytical tools provide new opportunities
- Need to answer the question "how to increase the impact of impact assessment work?"