Effects of a Participatory Forest Management Project by JICA in Ethiopia on Deforestation

Yasuyuki Todo
Department of International Studies
University of Tokyo

(Based on joint works with Ryo Takahashi)
Share of forests in total land in Ethiopia
35% in early 20\textsuperscript{th} century → 16% in 1950 → 13% in 2005

Reasons
• Expansion of farmland
• Logging
Project Area: Belete-Gera Regional Forest Priority Area
Deforestation in Project Areas: Constructed from Remote Sensing Data

40% of forests have been lost since 1985.
Project Outline

Forest Protection

Participatory forest association

Income generation

Farmer field school

Forest coffee certification
Participatory Forest Management Associations

- Established at the sub-village level
- Identify border of forest
- Prohibit logging in forests
- Monitor illegal logging
- Plant trees in boundary areas and wastelands

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</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>43</td>
<td>126</td>
<td>35</td>
<td>58</td>
<td>32</td>
</tr>
</tbody>
</table>
Forest Coffee Certification

• Coffee naturally grows in some forests.
• Certified by Rainforest Alliance (US-based NGO) ➔ ↑ price by 15-20%
• Farmers have incentive to protect forests.

<table>
<thead>
<tr>
<th>No. of certified</th>
<th>2007-2008</th>
<th>2008-2009</th>
<th>2009-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>WaBuBs</td>
<td>4</td>
<td>21</td>
<td>48</td>
</tr>
<tr>
<td>Farmers</td>
<td>550</td>
<td>1,700</td>
<td>2,808</td>
</tr>
</tbody>
</table>
Farmer Field School

- Established together with establishment of WaBuB
- 1 meeting a week for 1 year
- Technology transfer through lectures & experiments

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<tbody>
<tr>
<td>No. of schools</td>
<td>53</td>
<td>134</td>
<td>82</td>
</tr>
<tr>
<td>No. of graduates</td>
<td>1328</td>
<td>3235</td>
<td>NA</td>
</tr>
</tbody>
</table>
3 Sets of Impact Evaluation

1. Participatory forest association

2. Income generation

3. Farmer field school

3. Forest coffee certification
Why Is Program Evaluation Difficult?

Outcome (e.g. income)

Average of participants

Effect of the program + time trend

The whole economy may have improved income
Why Is Program Evaluation Difficult?

Outcome (e.g. income)

- Average of participants
- Average of non-participants

Effect of the program + difference in potential growth b/w the 2 groups

If only potentially good guys can participate in the program ...
Why Is Program Evaluation Difficult?

Outcome (e.g. income)

Average of participants

Effect of the program

Average of non-participants with potentials similar to participants

Can be selected by randomized control trials

Program
Propensity Score Matching (PSM)

Systematic difference due to arbitrary selection

Participants

Non-participants

Matching

Difference in outcomes b/w 2 groups = effect of project

Non-participants with similar pre-program characteristics
2 Data Sources

• Data from Satellite (Landsat 7) during 1985-2010
  – Identify forests using Normalized Difference Vegetation Index (NDVI) and ground truthing
  – Examine effects of forest associations and forest coffee certifications on forest protection

• Household-level data from 298 HHs in 2008 (pre-program) & 2010 (post)
  – Collected by JICA
  – Examine effects of farmer field schools on income
# Methods of Impact Evaluation

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Forest association</th>
<th>Forest coffee certification</th>
<th>Farmer field school</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Non-participants who later participate</td>
<td>Non-coffee areas within forest associations</td>
<td>Non-participants who later participate</td>
</tr>
<tr>
<td>Data unit</td>
<td>Sub-village</td>
<td>Grid (900m²)</td>
<td>Household</td>
</tr>
<tr>
<td>Estimation</td>
<td>2SLS</td>
<td>PSM</td>
<td>PSM</td>
</tr>
<tr>
<td>IV/ covariates for matching</td>
<td>Geographic and ecological variables</td>
<td>Geographic and ecological variables</td>
<td>Pre-program HH characteristics</td>
</tr>
<tr>
<td>Outcome</td>
<td>Change rate of forest areas</td>
<td>Probability of deforestation</td>
<td>Income per worker/year</td>
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</tr>
<tr>
<td><strong>Effect</strong></td>
<td>Yr of establishment: -12.2%pt, Next yr: +17.4%pt ➔ +5.2%pt in 2 yrs</td>
<td>-1.7%pt in 2 yrs</td>
<td>+US$ 60-160</td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>Average Δ rate w/o association: -3.3%</td>
<td>Average probability without coffee: 4.5%</td>
<td>Average income before project: $60</td>
</tr>
</tbody>
</table>

**Reference**
- Takahashi et al. (2012a)
- Takahashi et al. (2012b)
- Todo et al. (2012)
Summary of the Results from Ethiopia

Large positive effect on forest protection
– Directly through forest associations and forest coffee certification
– Indirectly through income generation due to farmer field schools

Lesson learnt
Effect of forest associations on forest areas in the year of establishment: - (though + in 2 years)
⇒ ”Last-minute logging”
Impact Evaluation of JICA’s Projects: Overview

• JICA’s project evaluation is almost always based on less rigorous, qualitative methods.

• Only a few rigorous “impact evaluations” were/are officially conducted by JICA
  – Third Elementary Education Project in the Philippines
    • Propensity score matching
    • Yamauchi et al. (2011), Yamauchi et al. (2012)
  – “Support to the Improvement of School Management through Community Participation” in Burkina Faso
    • Randomized control trials
    • Sawada et al. (2012)
  – Some more ongoing ones
Impact Evaluation of JICA’s Projects: Overview

• Some “semi-official” impact evaluations were done in and outside JICA (mostly in JICA RI)
  – Irrigation project in Sri Lanka
    • Natural experiments & PSM
    • Sawada et al. (2010)
  – Some were done by Todo
    • Participatory forest management in Ethiopia (funded by JICA RI)
    • Tech assistance in the foundry industry in Indonesia (funded by Research Institute of Economy, Trade and Industry, a public institution related to the Ministry of Economy, Trade and Industry)
Results from current (less rigorous, qualitative) evaluations look very good.

Results of ex-post evaluation of 93 projects conducted in 2010 (A [very good]-D [poor])
Consequence of Few Impact Evaluations?

Ministry of Foreign Affairs (2009), Opinion Survey on ODA
• “What should be done regarding ODA?” 47%: “Clearer information should be provided.”
• “What should be on the web site of MOFA?” 36%: “Outcomes of ODA”
Toward Better International Cooperation on Natural Resource Management

Implications from our study

Foreign aid projects

→ natural resource management in LDCs

But, we need to expand impact evaluation

• To convince beneficiaries in LDCs and tax payers in donor countries
• To improve future projects
References

Cabinet Office of Japan (2011), Gaiko ni Kansuru Yoron Chosa (Opinion Survey on Diplomacy),

JICA (2011), Annual Evaluation Report 2011,

Ministry of Foreign Affairs (2009), ODA ni Kansuru Ishiki Chosa (Opinion Survey on ODA),


