Research webinars on standards’ impacts
No.25: How does agricultural certification influence sustainable farming practices over time?
3 May 2018, 2pm

Photo: Palm oil trees © Jonathan Perugia for Roundtable for Sustainable Palm Oil
How does agricultural certification influence sustainable farming practices over time?

**Researcher**

Matthew Bare  
*Supply Chain Monitoring & Evaluation Manager*  
Rainforest Alliance

**Discussant**

Kristin Komives  
*Impacts Director*  
ISEAL Alliance
How does agricultural certification influence sustainable farming practices over time?

3 May 2018
Matthew Bare, Evaluation & Research Program
Introduction: Strategies for sustainable agriculture

Global need to promote sustainable agriculture

Certification as a strategy, consisting of:

- sustainability standard
- audit and assurance process
- mechanisms for market recognition and incentives

Rainforest Alliance certification:
- 1.2 million farmers,
- 3.5 million ha
- Production in 42 countries
Prior research on the effectiveness of certification

Reach: State of Sustainability Initiatives (2017)

Environmental outcomes related to RA certification:
• Improved tree cover, forest cover or landscape connectivity\(^1\)
• Improved water quality and water resource management practices\(^2\)
• Improved wildlife survival on certified farms\(^3\)
• Limited differences for pesticide use & safety\(^4\)

Economic & social outcomes related to RA certification:
• Increased yields\(^5\)
• Higher farmer income\(^6\)
• Greater educational access\(^7\)
• Worker benefits\(^8\)
• Many of these studies show some results positive and others no effect

Review studies related to certification broadly:
• Practice adoption on social, agronomic, and environmental topics\(^9\)
• Environmental outcomes\(^10\)
• Social outcomes\(^11\)

Citations:
1. Hardt et al. 2015, Rueda, Thomas and Lambin 2015, Takahashi and Todo 2013, 2016
7. Rueda and Lambin 2013a, Bennett et al. 2012
9. ISEAL 2018
10. DeFries et al. 2017
11. Oya et al. 2017
This study

Need to supplement place-specific studies with analysis at wider scale

Certification audit systems provide this opportunity. This study assesses effects of Rainforest Alliance certification:

- 576 certificates (382 with time series data)
- Major growing regions for banana, cocoa, coffee, and tea

Study authors (study currently under final preparation for submission to scientific journal):

Bare, M. ¹, Milder, J.C. ¹,², Burgess, M. ³, Phalan, B. ⁴,⁵, Pinto, L. F. G. ⁶, Tayleur, C. ³,⁵

¹ Rainforest Alliance, New York, New York, 10279, USA.
² Dept. of Natural Resources, Cornell University, Ithaca, New York, 14853, USA.
³ RSPB Centre for Conservation Science, The Lodge, Sandy, Bedfordshire, SG19 2DL, UK.
⁴ Dept. of Forest Ecosystems and Society, Oregon State University, Corvallis, Oregon, 97331, USA.
⁵ Conservation Science Group, Department of Zoology, University of Cambridge, David Attenborough Building, Pembroke Street, Cambridge, CB2 3QZ, UK.
⁶ Imaflora, Piracicaba, SP, Brazil.
Research questions

• To what extent are Rainforest Alliance certified farms and farm groups adopting good practices? How do these patterns of practice adoption vary by crop, region and sustainability topic?

• As farms remain certified for multiple years, how do rates of good practice adoption change? How do these trends differ by crop, region and sustainability topic?

• How do compliance levels and trends vary based on additional predictors such as certificate type (individual vs. group), farm size and group size?

• What do these results indicate about the effectiveness of the certification mechanism, and what changes might be proposed to improve effectiveness in the future?
Methods
Methods: Data sources

Study examines 576 certificates (of approx. 2,000 total)
Focuses on 7 major crops / region combinations
Study examines 576 certificates (of approx. 2,000 total)

Focuses on 7 major crops / region combinations
Methods: Data sources

Data from annual audit reports (2010 SAN Standard)

- 100 individual criteria
- 23 critical criteria
- 77 continuous improvement criteria
- Minimum score = 80%

Selected 37 continuous improvement criteria for analysis

- **Ecosystem conservation (5)**
  - natural area buffer
  - agroforestry shade
  - connectivity
  - wildlife habitat
  - waste deposit areas

- **Good agronomy (5)**
  - IPM
  - reduction of agrochemicals
  - erosion programs
  - fertilization programs
  - vegetative ground cover

- **Water protection (7)**
  - riparian buffer zones
  - water conservation
  - permits
  - wastewater treatment
  - water monitoring
  - septic tanks

- **Farm management (9)**
  - management plan
  - management systems
  - management for service providers
  - training on certification

- **Livelihoods (4)**
  - housing
  - water
  - medical services
  - access to education

- **Working conditions (7)**
  - labor policy
  - direct hiring
  - payment policy
  - Overtime policy
  - agrochemical safety
  - agrochemical training
  - agrochemical medical exams
  - agrochemical wash facilities
Methods: statistical analysis

Audit details

- Scores: 1 / 0.5 / 0
- Most recent audit (2014-2016): n = 576
- Change over time (2011-2013 / 2014-2016): n = 382

Assess all four trend permutations

- Compliance maintained / improved / worsened / unresolved

Assess effect of predictor variables

- Individual vs. group certification (Coffee Central America & Tea East Africa only)
- Size and number of smallholder members

Statistics

- Analysis between regions & topics: Kruskal-Wallis & Dunn post-hoc
- Compliance over time: Paired t-test
- Predictor (individual vs. group): Welch t-test
- Predictor (size & number of members): Logistic regression
Results
For all regions combined, mean compliance score = 92.8%; significant differences by sustainability topic

Mean (all regions)= 92.8%

Differed significantly by topic (n=576, H=171.11, P = <0.001)

- **Highest**: ecosystem conservation and livelihoods
- **Lowest**: farm management
Significant differences by crop-region

Compliance differed significantly by crop-region (n=576, H=171.11, P = <0.001)

- **Highest**: banana Central America, coffee Brazil, tea East Africa
- **Lowest**: cocoa South America, tea India
Scores increased over time in almost all topics

Mean (all regions): increase from **90.9% to 93.0%**
(t= -8.51, n=382, P<0.001)

Results per topic (mean):
• Increase in all topics except good agronomy
• Greatest increase in water protection (84.5% to 89.0%), working conditions (88.2% to 91.5%), and farm management (82.9% to 85.7%)
Farms may prioritize certain changes

- Farms may prioritize some changes but inadvertently improve in others (external support)
- If they prioritize, farms may choose low cost changes – management and policy changes rather than farm-level agricultural practices
- Past research supports this:
  - Developing countries (Marenya and Barrett 2007, Teklewold, Kassie and Shiferaw 2013, Harvey et al. 2017)
  - Developed countries (Davey et al. 2010, Gillespie, Kim and Paudel 2007)

<table>
<thead>
<tr>
<th>Topic</th>
<th>RA Examples</th>
<th>This study</th>
<th>ISEAL (2018) meta review &amp; rate of practice adoption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecosystem conservation</td>
<td>natural area buffer / shade / connectivity / wildlife habitat / waste areas</td>
<td>*</td>
<td>Literature: some evidence Other standards: 0.16 rate</td>
</tr>
<tr>
<td>Farm management</td>
<td>Mgmt. plan / mgmt. systems / mgmt. for service providers / training on certification</td>
<td>***</td>
<td>Literature: some evidence Other standards: 0.30 rate</td>
</tr>
<tr>
<td>Good agronomy</td>
<td>IPM/ reduction of agrochemicals/ erosion programs / fertilization programs / Veg. ground cover</td>
<td>NS</td>
<td>Literature (inputs): little difference / 0.06 rate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Literature (production): some evidence / 0.17 rate</td>
</tr>
<tr>
<td>Livelihoods</td>
<td>Housing / water medical services / access to education</td>
<td>*</td>
<td>n/a</td>
</tr>
<tr>
<td>Water protection</td>
<td>riparian buffer/ water conservation/ Permits/ wastewater treatment/ water monitoring / septic tanks</td>
<td>***</td>
<td></td>
</tr>
<tr>
<td>Working conditions</td>
<td>labor policy / direct hiring / Payment policy / Overtime / agrochemical safety/ training/ medical exams/ wash facilities</td>
<td>***</td>
<td>Literature (OHS): some evidence Other standards: 0.08 rate</td>
</tr>
</tbody>
</table>
Scores increased for most crop-region groupings

Results per crop-region grouping (mean):

- Increase in all except Cocoa South America and Tea India
- Greatest increase in Tea East Africa (92.7% to 95.4%), Cocoa West Africa (89.2% to 91.5%) and Coffee Central America (89.4% to 91.8%)
Difference in changes among crop-region groupings was less clear

Not affected by:

- Production region for a given crop (Cocoa West Africa vs Cocoa South America)
- Baseline performance (Cocoa South America vs Tea India)
- Length of time certified (new crop/regions = Cocoa & Tea)

Possible variability in audit methodology / interpretation of the standard across contexts

Possible variability in level of formalization and external support across contexts region

- Coffee Central America, Coffee Brazil, Banana Central America: mature industries, professional farm organizations, supply chain support
- Tea East Africa & Cocoa West Africa: KTDA and national cocoa board support
- Cocoa South America: declining industry, not the major export crop, less government & external support, higher cost of production; also member turnover in the certified groups
- Tea India: mature and important industry, but less organized than East Africa; higher production costs
- External support cited as a leading contributor to increased practice adoption (ISEAL 2018)
There was more improvement than worsening, but compliance most commonly remained unchanged.

Tracking (over time)

- Worse: 6.3%
- Unresolved: 3.7%
- Maintained: 80.7%
- Improved: 9.3%

Modest improvements levels may indicate:

- Farms initially unaware of non-compliance; audit process identifies foci for improvement
- Farms might first make changes to meet the 80% minimum score, later make further changes
- Farms and groups may receive some external support from supply chain actors (ISEAL 2018)
Other predictors of compliance and trends largely insignificant

Certificate type (individual farm vs group of farms):
- Coffee Central America: group scores significantly higher
- Tea East Africa: NS
- Change over time: NS for both regions

Group size:
- Coffee Central America & Tea East Africa: NS

Individual farm size:
- Most recent audit: NS
- Change over time:
  - Banana Central America: positive
  - Coffee Brazil: negative
Study limitations

• No control group
• Only assesses post-certification trends (no pre-certification baseline data)
• Only some outcome criteria
• Reliance on audit data
Opportunities for the future

• Increased emphasis on continuous improvement within certification programs:
  • RA Standard now provides a three-step improvement trajectory (Levels C, B, and A) in addition to criteria

• Certification as an M&E tool to monitor performance and trends in agricultural sustainability
Matthew Bare, Evaluation & Research Program
mbare@ra.org

www.rainforest-alliance.org
ISEAL Research Webinars

Join us for Spring - Summer research webinar series from April to July 2018. In this series we will be focussing on emerging research findings in the domain of Agricultural sustainability standards

- **19th April 2018:** Causes of forest fires and RSPO certification effect on deforestation and fires in Indonesia
- **3rd May 2018:** Agricultural certification improves uptake of sustainable farming practices over time.
- **17th May 2018:** Where are commodity crops certified, and what does it mean for conservation and poverty alleviation?
- **14th June 2018:** Evaluation of UTZ certification contribution to the socio-economic situation of cocoa farmers in Ivory Coast
- **28th June 2018:** Evaluation of the early impacts of sustainability standards on smallholder coffee farming households in Indonesia
- **12th July 2018:** The Impact of International Cooperative Initiatives on Biodiversity

Find out more at ISEAL’s Events webpage
Upcoming ISEAL training workshops

Sustainability Standards Essentials
São Paulo 22 May 2018

The Future of Assurance
São Paulo 22 May 2018

Visit www.iseal.org/workshops for more information about the workshops and how to sign up
Thank You!

Photo: Photo © Jonathan Perugia for Roundtable for Sustainable Palm Oil