Can property rights reforms help development?  
The case of land certification in Mexico

Alain de Janvry, Kyle Emerick, Marco Gonzalez-Navarro, Daley Kuztman, and Elisabeth Sadoulet

University of California at Berkeley, Tufts University, and University of Toronto

UNU-WIDER International Development Conference in collaboration with the Central Institute of Economic Management  
29-30 June 2014, Hanoi, Vietnam
I. Research questions

- **Literature on property rights**: Security of tenure can improve land allocation across uses and users, and increase investment and productivity.
- **Large certification and titling programs**: Mexico, Ethiopia,
- **Switch from use-based ownership to certificate-based ownership**
  - **Use-based**: Behavior (land use, labor allocation) → Rights
  - **Certificate-based**: Rights → Behavior (land use, labor allocation):
    - **How different is behavior under the two?**
Four specific questions on certification

1. **Labor allocation**: Does it lead to increased outmigration from rural communities?

2. **Heterogeneity**: If so, who leaves and who stays?

3. **Land use**: Does it lead to a change in cultivated area? To land consolidation in larger farms?

4. **Efficiency**: Does it lead to more efficient land use in relation to comparative advantage?
II. History: The first land reform

- **1917-1992 land reform**: Redistributes land to smallholder farmers organized in agrarian communities (ejidos)
- **Land rights**: Usufruct of small plots for farming and common property for forests and pastures. No titles
- **“Use-it-or-lose-it” condition**: If rights-holder did not cultivate land himself with family labor, land reallocated to others by an external commission (but not to industrial development)
- **No land transactions** allowed: cannot sell, lease, or sharecrop

**Huge reform**: Over 50% of Mexican territory was allocated to 3.5 million farm households.
History: The second land reform

- **1992 land reform**: change property rights from use-based to title-based
- **Certification program** (Procede): Gives certificates of ownership for land plot, and shares of common property resources
- **Intervention at the ejido level**: All land disputes must be resolved, and proposed allocation of the land agreed by all
- **Certificates allow**:
  - **Land transactions**: Selling within the community, leasing, sharecropping
  - **Freedom to allocate labor**: Can leave land fallow, hire wage labor
  - But no sales to outsiders; not useable as collateral on loans
PROCEDE rollout: Land certified between 1993 and 2006
III. Theory: Predicted impact of certification

Program allows household to move from constrained to optimal land use
- With use constraint: decreasing returns to scale
- Without use constraint: increasing returns to scale → Migration and consolidation
IV. Data: Use several sources of secondary data

1. **Household panel data** to analyze *household-level* migration 1997-2000 - 7,600 households in 127 ejidos.
2. **Population Census** 1990-2000 to analyze *locality level* migration - 18,000 localities matched to ejidos.
4. INEGI **satellite land use** panel data 1993, 2003, and 2007 for *ejido-level* land use changes (crops, pastures, forests)
5. **Farm subsidies**: annual data for 45 million farmers to analyze ejido-level *land consolidation*
V. Analysis: Identification strategy to measure impact

- Use rollout as **identification strategy**: Late certified ejidos serve as **counterfactual** for early certified ejidos
- Ejido panel regression with fixed effects

\[ y_{ijt} = \delta \text{Certified}_{jt} + \alpha_t + \gamma_j + x'_{ijt}\beta + \varepsilon_{ijt} \]

\[ y_{ijt} = 1 \text{ if household } i \text{ in ejido } j \text{ has migrant away in year } t \]
\[ \text{Certified}_{jt} = 1 \text{ if ejido } j \text{ was certified by start of year } t \]

Parameter of interest is \( \delta \)
Analysis: Test of identification strategy as natural experiment

Tests of parallel trends prior to certification: no bias in rollout over time in terms of change in migration. Results show all pre-certification parallel tests are satisfied. → Can use non-treated communities as controls for treated
VI. Results on migration

Migration effect with household panel data (1997-2000)

- Procede increases the probability that a household has a migrant by 30%
- Households migrate more if they had
  - Weaker property rights before reform (more defensive labor)
  - Better off-farm wage opportunities (pull effect)
  - Worse land quality (more labor misallocation)

Migration effect with locality Population Census data (1990 & 2000)

- Procede exacerbates the decline in population by 4% against a background decline of 21% between 1990 and 2000
Migration effect with qualitative Ejido Census data

- Procede increases the probability that “the majority of the young people emigrate from the ejido”

Heterogeneous migration effect by land productivity with LANDSAT data

- The migration response is 6 times larger in lower productivity areas.
- In high productivity areas, only smaller farmers migrate.
- In low productivity areas, both small and large farmers migrate.
VII. Results on land use

Effect on area used for agriculture with LANDSAT data

- No aggregate change in area used for agriculture in spite of migration
- Decrease in low productivity areas compensated by increase in high productivity areas

Effect on farm size with Farm Subsidies data

- Consolidation of land in larger farms (decline in number)

Effect on land use with LANDSAT data

- Predict land use suitability in forest, pasture, and agriculture based on characteristics of the land in the private sector
  - Predictors include: distance to city, slope, rainfall, altitude
- Procede changes land use in accordance with land suitability
VIII. Conclusions: Shifting from use-based to rights-based property rights is likely to

- Create efficiency gains
  - Re-allocate large amounts of labor away from agriculture
  - Induce more migration from lower land quality environments
  - Induce more migration by smaller farmers in high productivity areas
  - Shift agriculture toward the better lands
  - Concentrate production in larger farms with returns to scale
  - Reorient land use toward private sector norms

- But can have negative social spillover effects: social political risks
  - Large migration may affect urban environments (timing)
  - Political effect of ownership shifts support to more liberal/pro-market political party (other paper)