Influence of spiritual norms and an exogenous income shock on forest management in Guatemala



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Experimental and study design. Participants manage an artificial forest in groups of 5 over a course of 5 rounds. The maximum capacity and initial size of the forest is 100 trees. The value of the standing forest at the end of the 5th round is equally shared among the group members.

Beginning of the Round



Participant's Decision



End of the Round



Main result. (Left) Change in forest size at the end of the round. (Right) Forest size at the end \sim of the 5th round. Only significant differences are indicated (*p<0.1, **p<0.05, ***p<0.01).

Robustness check. Estimates from a random effects model on full sample.

Impact on forest size at the end of the round





Motivation and research question

Avoiding the tragedy of the commons ...

- Local community-based natural resource management approaches are integral to sustainable forest management (Ostrom, 1990).
- In those approaches, social (Ostrom, 1990, 2000) and spiritual (Joa et al., 2018) norms are crucial for conservation behavior.

... even in times of crisis?

- Income shocks like the COVID-19 pandemic increased deforestation rates, both in reality (Brancalion et al., 2020; Céspedes et al., 2022) and in economic experiments (Suri et al., 2024).
- Social norms seem to mute this negative impact, at least in the short-run (Suri et al., 2024).

Treatment overview (see Box 1)

Part 1: Baseline Game

• Game as described in Box 1 + Additional exogenous source of income and cost of living

Part 2: Income Shock

• **Baseline Game** + Removal of exogenous source of income but keeping cost of living

Part 3: Spiritual Norm Activation

• **Income Shock** + Playback of audio file in which locals talk about spiritual norms with regard to the local forest + Answer to the question "How much do you identify yourself with the content of the audio file?"

Part 4: Communication

• **Income Shock** + Possibility of communication prior to the start of round 1

Sample and data collection

Income Shock

Spiritual Norm

Communication

Activation



- Data was collected from 130 smallholder farmers in the Guatemalan regions Totonicapan (gray), Salamá (yellow) and Escuíntla (blue) in May and June 2023.
- 34% of participants are male, 63% of Mayan descent, 46% could not work during COVID-19, 51% consider forest management to follow spiritual rules and norms

 \rightarrow Do spiritual norms foster sustainable forest management, despite the occurrence of an income shock?

Results (see Boxes 2 and 3)

Spiritual norms decrease deforestation despite occurrence of income shock

- Significantly higher forest sizes at the end of the 5th round ...
 - **1** ... after the activation of spiritual norms, with which the majority of participants identify.
- 2 ... in groups which discussed spiritual norms.
- **3** ... in regions in which spiritual values about the forest are high.

Heterogeneity across regions

• Significantly lower forest sizes at the end of the 5th round in Totonicapán. **1** Totonicapáns have significantly lower engagement in real-life forest fire-fighting activities. **2** Totonicapáns have significantly lower spiritual and sacred valuation of the local forest.

Note: The forest is re-filled to 100 trees at the beginning of each part.

and 82% regularly participate in fire-fighting activities within the local community forest.

References

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