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Whose Rules? Which Forest?

Why community rule-making predicts carbon on average but subsistence at the tail, and what that means for restoration finance

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FOR RESTORATION AND CARBON FUNDERS, FOREST DEPARTMENTS, COMMUNITY FORESTRY NETWORKS AND SCHOLARS

ABSTRACT

Restoration finance is learning to reward communities that make their own forest rules, and the evidence backs it: across 314 forest commons in 15 tropical countries, local rule-making is among the most consistent predictors of good outcomes (Fischer et al. 2023). That evidence is an average, and the average hides who is governing for what. This working paper reproduces the published model exactly and then walks it down the tail: forests whose communities depend most on them for fodder, fuelwood, and timber (159), then those among them with low literacy (54). At the tail, rule-making stops predicting carbon and starts predicting subsistence. Across all forests, it raises the chance of the high-carbon cluster by 7.7 percentage points; in dependent, low-literacy communities, that association vanishes (−5.9 points; gap −13.6, 90 percent interval −23.9 to −5.5), while its association with subsistence nearly doubles, from 15.8 to 27.0 points. The communities that depend most on their forests make rules for what they depend on. A carbon program that pays for rule-making as if it were carbon will pay least where community governance is strongest. Rule-making should be judged by what it governs for, not by the single benefit a buyer wants.

KEYWORDS

forest commons; rule-making; carbon; livelihoods; restoration finance; recursive tail; IFRI; Tail-End Research

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Argument

Forest restoration is sold on a triple promise: carbon, biodiversity, and livelihoods, all at once. Community rule-making is the institution that is supposed to deliver it, and the evidence is strong. It runs from Ostrom's design principles through two decades of the International Forestry Resources and Institutions network (Chhatre and Agrawal 2008; Persha, Agrawal and Chhatre 2011) to the latest synthesis, which finds local rule-making among the most consistent predictors of good outcomes across 314 forests in 15 countries (Fischer et al. 2023).

Every one of those findings is an average, and an average is a verdict about a community that does not exist. The communities that decide whether restoration finance is fair are the ones that live off their forests: those that draw most of their fodder, fuelwood, and timber from them and have the least power to bargain over the terms. The evidence has not been read for them. This paper reads it.

This paper makes three claims. First, the published finding holds on average, and it reproduces to the last reported digit. Second, at the tail it changes meaning: among dependent, low-literacy communities, rule-making no longer predicts carbon; it predicts subsistence. Third, this is not a failure of community governance but a statement about whose rules they are. People who depend on a forest make rules for what they depend on. Carbon finance that treats rule-making as a proxy for carbon has made a category error, and the communities at the tail will pay for it.

1

The recursive tail

The tail is relative and recursive. Each level sits inside the one above it, and every level was fixed from the communities' own characteristics before a single outcome was examined.

LEVEL	FRAME	TAIL	FORESTS (RULE-MAKING / NONE)
0	All forests	All forests	314 (163 / 151)
1	All forests	Dependence above the median (53.3 percent of fodder, fuelwood, and timber needs)	159 (100 / 59)
2	Level 1	Low literacy	54 (37 / 17)
3	Level 2	Fewer than 10 months of food self-sufficiency	16 (2 / 14); not testable

Dependence is the share of a community's fodder, fuelwood, and timber needs that the forest meets, averaged across the three. The median is 53.3 percent. A level is tested only with at least 30 forests and at least 8 on each side of the rule-making divide. The third level has 2 forests where communities make rules, so it is reported, not tested.

The record

The data are the International Forestry Resources and Institutions (IFRI) dataset of multiple benefits from forest commons, released on Mendeley Data (Chhatre 2019): 314 forests in 15 countries in Africa, Asia, and Latin America, observed between 1993 and 2016, each assigned by the source study to one of five clusters: Sustainable, Carbon, Conservation, Subsistence, and Degraded. Communities participate in rule-making at 163 of the 314 forests. The design was registered and checksummed before any outcome was broken down by rule-making at any level.

Before any tail statistic was computed, the analysis reproduced the source's model: bivariate multinomial models of cluster membership on each governance variable, reported as marginal effects and as relative risk ratios against degraded forests. Both reproduce to the published rounding.

MARGINAL EFFECT ON CLUSTER MEMBERSHIP	RULE-MAKING, PUBLISHED	RULE-MAKING, REPRODUCED	ASSOCIATION, PUBLISHED	ASSOCIATION, REPRODUCED
Sustainable	0.09	0.092	0.19	0.192
Carbon	0.08	0.077	0.06	0.057
Conservation	−0.29	−0.289	−0.28	−0.282
Subsistence	0.16	0.158	0.11	0.111
Degraded	−0.04	−0.038	−0.08	−0.078

The relative risk ratios against degraded forests also reproduce exactly: for rule-making, 5.24 for the Carbon cluster and 4.07 for the Subsistence cluster. Intervals throughout come from a bootstrap that resamples forests within country, 2,000 times, with 90 percent intervals.

3

What rule-making predicts, level by level

The test is strict: the association between rule-making and an outcome must weaken in the tail by more than 5 percentage points, with the entire 90 percent interval of the gap beyond that line. One association meets it. It is the one restoration finance cares about most.

CLUSTER (MARGINAL EFFECT OF RULE-MAKING, POINTS; 90 PERCENT INTERVAL)	LEVEL 0: ALL FORESTS (314)	LEVEL 1: DEPENDENT (159)	LEVEL 2: DEPENDENT, LOW LITERACY (54)
Carbon	+7.7 (3.3 to 12.5)	−1.8 (−8.2 to 4.3)	−5.9 (−16.7 to 0.0)
Gap from level 0, Carbon		−9.5 (−14.6 to −4.8)	−13.6 (−23.9 to −5.5): meets the test
Subsistence	+15.8 (9.4 to 22.5)	+18.5 (9.1 to 27.6)	+27.0 (15.2 to 40.0)
Sustainable	+9.2 (0.4 to 18.1)	−15.1 (−26.2 to −3.8)	−15.3 (−33.3 to 3.3)
Degraded	−3.8 (−9.2 to 1.3)	0.0	0.0

Across all forests, rule-making raises the chance that a forest is in the Carbon cluster by 7.7 points (90 percent interval 3.3 to 12.5). Among dependent communities it falls to −1.8. Among dependent, low-literacy communities it falls to −5.9, and the gap from the average, −13.6 points (−23.9 to −5.5), clears the test. Over the same two steps, the association with subsistence climbs from 15.8 to 18.5 to 27.0 points (15.2 to 40.0). In dependent, low-literacy communities, 27 percent of forests governed by local rules are in the Subsistence cluster. Where communities do not make the rules, none are.

This is a change in what rule-making delivers, not a loss of what it delivers. Read by carbon alone, the most dependent communities with their own rules look like a governance failure. Read by what the forest gives the people who live off it, they are the commons working exactly as designed.

Why the composition changes, and why it matters

The data do not show a cause, and this paper does not claim one: rule-making is not randomly assigned, and forests differ in many ways at once. But the pattern is exactly what the theory of the commons predicts. Rules are made by the people they bind, for the purposes those people hold. A community that meets most of its fodder, fuelwood, and timber needs from a forest, with few alternatives, will make rules that sustain the harvest, not rules that maximize standing biomass. The tail is not failing to govern. It is governing for subsistence.

This matters now. Restoration and carbon finance are turning community rule-making into an eligibility condition and a performance proxy. Pay for measured carbon, and the communities whose rules deliver livelihoods will be paid least or dropped, precisely where their governance is strongest. The buyer would buy carbon from the communities that can afford to forgo the harvest, and record the communities that cannot as underperforming. The Tail-End Standard judges a program by what reaches the people at the end of the distribution. For forests, that means three things: judge rule-making by what the community governs for; price the carbon trade-off in the open; and never let an average decide who is paid.

What would overturn this finding is stated in advance. Any one of these would: a larger sample of dependent, low-literacy communities in which the carbon gap no longer lies beyond 5 points; the gap disappearing within India, which holds 37 of the 54 forests at the second level; the gap disappearing once forest size, tenure, and market access are held constant; or panel data showing that carbon in these forests rises after communities gain rule-making rights.

5

Conflict, channeled and disruptive

Rule-making does not make conflict disappear. It makes it visible. A second IFRI release (the FLARE network) records whether settlements faced conflict in the two years before the survey and how it played out. It cannot be linked to the forests above, so this section is descriptive. Of 964 settlements that answered, 424 reported conflict. Where local participation in making rules is high, conflict is more often channeled without disrupting normal life, and more often openly disruptive; the middle ground, conflict that disrupts only on occasion, shrinks from 65.9 to 37.5 percent.

LOCAL PARTICIPATION IN MAKING RULES	SETTLEMENTS WITH CONFLICT	CONFLICT CHANNELED WITHOUT DISRUPTING NORMAL ACTIVITIES	CONFLICT DISRUPTIVE OF NORMAL ACTIVITIES
Little or none	57	30.8 percent	3.3 percent
Some	88	34.4 percent	9.9 percent
High	75	47.5 percent	15.0 percent

Participation drags conflict into the open, where it can be settled and where it can also flare. A forest that records more conflict is not failing. A forest that records none may simply be one where nobody is listening.

6

What the test got wrong

The registered gate was wrong, and the record says so. It tested a proxy, within-country differences on standardized outcomes, rather than the source's own model, and on that proxy the published finding failed (mean effect −0.12 standard deviations). The demonstration stopped, as registered. The fault was the gate, not the data: the source's model of cluster membership reproduced exactly. The gate and the tail test were then amended to the source's model, after the as-registered results had been seen and with the author's approval. That sequence is a weakness, and it is disclosed here in full. The as-registered results are kept; on the standardized outcomes, they show no tail-end weakening.

The lesson is now a binding rule of the Tail-End method: reproduce the source's own model, not a proxy for it, and pin it before anything else is run.

Confidentiality, privacy and data sharing

The analysis uses forest-level records released by the IFRI network for research. They describe forests and the communities that use them in aggregate and carry no names of persons or households. The data are licensed under Creative Commons Attribution-NonCommercial 3.0, so this paper is research and the analysis is not sold. Results are reported as verdicts about the relationship between rule-making and outcomes, level by level; no forest, community, or country is ranked, and the companion map shows the same aggregates. When the Tail-End Research service collects new data, it follows the Tailenders Privacy and Confidentiality Policy and the Tail-End Protocol: consent in the respondent's language, the right to decline any question, identifiers stored apart from responses, and findings that travel toward the governed, never against them.

8

Limits

The data are a cross-section, observed between 1993 and 2016, with forests visited in different years. Rule-making is an association, not a treatment. The tail is mostly Indian: India supplies 107 of the 159 forests at the first level and 37 of the 54 at the second, and communities make rules at 83 percent of Indian forests. Until it is tested elsewhere, the finding at the second level is an Indian finding. Countries are few, which the bootstrap stratifies but does not cure. The third level is too small to test. The FLARE section is descriptive. The data are licensed for non-commercial use, and the analysis is research.

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