

Economics and Conservation in the Tropics:
A Strategic Dialogue

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How Do Property Rights
Affect Individual and
Collective Use and
Conservation of Land,
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This is a series of reflections on how institutions and behavior interact and affect the levels of conservation or use of valuable ecosystems. These reflections emerge from new theoretical developments and evidence gathered in the field and the lab regarding the behavior of humans facing the dilemma of ecosystems conservation.¹ These developments and this evidence should yield some lessons for the design and monitoring of conservation projects, as well as lessons for the design of policy aimed at promoting conservation and sustainable use of local ecosystems. Further, there are direct implications on how we think the problem of property rights both at the *de jure* and *de facto* levels. Because, at the *de facto* level, there are failures in the enforcement of property rights, and because not all ecosystem functions can be completely covered by a private or state property system, the understanding of the behavioral foundations in social dilemmas becomes critical when other forms of institutions may emerge as potentially effective to solve the conservation versus extraction dilemma.

Behavioral Foundations

Most social sciences and, more recently, economics have now come to an agreement that the model of a *homo economicus* agent that is selfishly oriented towards its own material short-term interest performs poorly when predicting how humans make choices that affect others because of interdependent interests. In the face of externalities, public goods, and common-pool resource problems, only a few humans confirm the free-riding hypothesis. Laboratory studies show that a majority (that could account for about two-thirds of the individuals involved) behaves in a group-oriented manner. These include unconditional altruists and conditional

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¹ This social dilemma emerges from the conflict between the individual (private) gains from extracting resources from the ecosystem and the group (social) losses from its over-extraction. When these two interests collide, there is typically a public-goods or common-pool resource problem due to rivalry and excludability issues.

cooperators who are able to forego the self-interest payoffs in order to increase the payoffs of others or even to punish others in the group at a private cost.

In the same way that social sciences have agreed to reject the selfish agent for many other social exchange settings, environmental sciences could also explore the possibility that a selfish agent is not a good predictor of the majority of group members that use and extract resources from a local ecosystem (Gintis 2000). In fact, this universal free-riding hypothesis was part of Garret Hardin's (1968) assumptions when he built his "tragedy of the commons,"² and appealing to conscience was not well regarded in his seminal article. The immediate policy implications were on the design of property rights. Because of the *homo economicus* assumption, private and state property of natural resources were highly regarded while common property and open access were severely undervalued.

Nevertheless, millennia of trials and errors, ethnographic work, and laboratory evidence seem to suggest that a universal free-riding behavior within a group is rather rare, even in an open-access setting. Of course, there is always a fraction of free-riders within groups. To respond to such challenges, individuals have been able to devise various kinds of institutions and have also refrained from over-extracting resources, despite the strong incentives not to do so. Although such cooperative behavior is not generalized either, it does often seem to emerge across societies. In highly controlled economic experiments, where anonymity, non-communication, and salient economic incentives are guaranteed within an open access setting, a significant number of individuals show an initial willingness to cooperate or conserve a common-pool resource, deviating from a selfish behavior. However, ethnographic and experimental studies have also shown other behaviors that once again contradict the free-riding hypothesis and bring more complexity into the picture. Reciprocal agents respond to cooperation with more cooperation, and socially concerned individuals have also demonstrated a capacity to sanction others at a private cost, as shown in laboratory experiments of the lobster gangs in Maine.

² As stated by Hardin (1968, 1244), "as a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously he asks, "What is the utility *to me* of adding one more animal to my herd?"

Social Orientations and Behavior

Van Lange (2004) offers a typology of five social orientations that seems to cover the behavioral foundations that lie underneath the actions that individuals may take in a social dilemma. The social orientations are shown in the table below, extracted from the author.

1. Generosity	Enhancement of outcomes for others
2. Pro-social orientation	Enhancement of joint outcomes (cooperation) Enhancement of equality in outcomes (egalitarianism)
3. Individualism	Enhancement of outcomes for self
4. Competition	Enhancement of relative outcomes in favor of self
5. Aggression	Reduction of outcomes for others

Individualism and competition have been major behavioral foundations in the natural resource and environmental economics paradigm that has governed the design of property rights institutions. The design of private and state property systems over natural areas is justified on the assumption that only these two orientations govern motivations of individuals. With the correct prices that internalize externalities, and through the pursuit of the self interest, competition could guide individuals to take actions that maximize social well-being.

On the other hand, generosity and pro-social orientations of cooperation and egalitarianism can best promote behavior in favor of solving our natural resource dilemma when no private or state property rights exist. Successful self-governed institutions show that with the correct rules and norms, groups are able to guide individual actions toward the group interest (Ostrom 2005).

In any case, there are no strong reasons to believe that individuals would only base their choices on individualism and competition when facing environmental problems. In the same manner that individuals incorporate the other social orientations into their behavior with respect to other public issues (taxes, charities, norm compliance, redistribution, voting), we could expect a similar combination of motivations when deciding between conserving or exhausting a natural resource.

Pro-social and Pro-ecological Preferences

Individuals can deviate from individualistic choices with respect to environmental outcomes on two possible and non-exclusive preferences or orientations: (1) other-regarding

preferences, where individuals select pro-conservation measures in order to increase the availability of such resources to others in the group (generosity or cooperation) or to provide a more fair distribution of environmental benefits (egalitarianism); or (2) eco-centric or ecosystem-oriented preferences, where individuals have a taste or utility from the existence of the resource or the ecosystem integrity. In both cases, individuals would be willing to choose lower levels of extraction that could be more closely aligned with the group goal of ecosystem sustainable use, despite the incentives to over exploit the resource.

However, self-regarding individuals will always be part of the game. It is also very likely to find individuals making choices according to a set of preferences that seem to value less the external costs imposed on others and therefore be interested in taking advantage of all possible opportunities in the use of the ecosystem. In fact, a small group of such self-oriented individuals could invade the strategies of the rest of the group and bring the system close to a more generalized behavior of sub-optimal outcomes where over-extraction depletes the ecosystem. Or, in the opposite case, the rest of the group could guide these self-oriented agents towards choices that are closer to the group goals.

On the other hand, our analysis needs to move away from the old assumption of fixed and exogenous preferences to a model where preferences can be shaped by incentives and institutions. There is field and laboratory evidence that some incentives can crowd out group-oriented behavior, and also that certain institutional devices can crowd in pro-social behavior (Bowles 2008).

The Nature of Ecosystem Functions Matter for Designing Institutions

Using the Millennium Development Goals framework, the functioning of ecosystems involves provision, regulation, and cultural and supporting services. The economic value of these has been well documented and even estimated. Much of these flows of economic benefits involves some kind of rivalry and excludability problems and, thus, includes a conflict between individual and social interests because of the externalities involved. In some cases, a well-designed set of property rights could be better enforced at a low cost (e.g., managing pastures using private, state, or common property) with clear rules than can be monitored and sanctioned. In other cases, limiting the rights through exclusion and pecuniary mechanisms is more difficult because of the nature of the ecosystem functioning (e.g., the regulatory and support functions of a mangrove forest and its benefits to coastal fisheries and villages). At larger scales, the difficulty of limiting rights to users and non-users becomes even larger, up to the level of global

commons issues (such as climate change or ozone protection) and excluding non-cooperators from contributors becomes technically unfeasible. In other words, not all ecosystem functions can be corralled for an effective assignment of property rights.

On the other hand, there are specific ecological features of resources and ecosystems that need to be taken into account when designing better institutions for governing the use of resources, if we want to better use the behavioral foundations laid out above. One good example is the management of watersheds. Water externalities only run downstream and therefore any use of reciprocity as a mechanism for promoting cooperative actions would face the problem that upstream users will have a more direct impact over the benefits and losses of downstream users, but not vice versa.

Any Property Rights System Will Involve an Incomplete Contract at the *de Facto* Level.

Although *de jure* rights can clearly mark the limits of duties and responsibilities of resource users and for many—but not all—ecosystem services, at the *de facto* level, many difficulties arise. The most compelling evidence comes from developing countries where the state has very limited capacity to enforce state and private property rights over natural resources. Lack of resources and monitoring capacity, and also issues of political conflict and poverty near or within ecologically valuable areas, make it quite difficult for an external governing system to enforce exclusion and reduce extraction to the socially optimal levels without a substantial social cost. This can be the case for private, state, or collective ownership of areas. In all cases, there will be risks of illegal extraction, corruption, or violation of rules by insiders and outsiders that will not be easily detected and sanctioned.

What Property Rights and Institutions Promote a Better Combination of Pro-Social and Pro-Ecological Preferences?

As a result of the issues discussed above, one could rethink the question of designing the best institutions for solving the dilemma of conservation versus extraction of ecosystems. Once we eliminate the universal free-riding hypothesis as a starting point for any institutional system, and once we accept the incompleteness of formal rules at the *de facto* level because of imperfect monitoring and enforcement, we may move forward by looking at the behavioral foundations of these dilemmas and their possible solutions.

If the different social orientations mentioned before are also included in the analysis and design of new institutions, the question is no longer about the pros and cons of state versus private versus common property at the *de jure* level, but rather the effect of the proposed set of property rights on the pro-social and pro-ecological preferences and choices of individuals. An ideal mechanism would be aimed at harmonizing the individual and group-oriented goals without eroding or crowding out orientations, such as altruism, cooperation, fairness, or equity while enhancing the positive effects (e.g., technological innovation) of competition and individualistic motivations.

Readings

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