

Use and Conservation of Biodiversity in the Commons: A Typological Proposal for the Identification of Levels of Governance

*Pedro Álvarez Icaza*¹

Summary

The cultural management of common-use natural resources is known as the *Governance of the Commons*, building a new paradigm in current environmental and sociological thinking. The debate has revolved around the question of whether collectively appropriated resources are doomed to overexploitation, as the commons—belonging to everybody and nobody—will inevitably be depleted or impaired. This study conceptually demonstrates, with empirical references, that the form of land ownership is not directly responsible for the conservation of natural resources. There is evidence that the form of use, and not the form of ownership, inform whether or not natural resources may be used sustainably.

Mesoamerican cultures were displaced by the Spanish conquest from more hospitable natural zones to zones with lower production profiles, arid zones and temperate mountain jungles and forests, with low agricultural productivity. These conditions were brought upon communities displaced from a vast reservoir of territory and experience in the knowledge of natural biodiversity, but especially the ownership of natural resources that, in some cases, have an immeasurable future value.

The governance of the commons, as defended herein, is based on the strength acquired by peasant groups or communities by applying three fundamental premises: a) acknowledgement of the capacity for self-governance; b) establishment of rules regulating access to, and the use and enjoyment of, natural resources; and c) compliance and enforcement through oversight and penalty mechanisms among actors. This article proposes a typology for the identification of different levels of governance in collective action.

Keywords

Resources

Use

Common

Typology

Communities

Mexico

¹ General Coordinator of Biological Corridors and Resources, National Commission for the Knowledge and Use of Biodiversity (*Comisión Nacional para el Conocimiento y Uso de la Biodiversidad*—CONABIO), Mexico.

INTRODUCTION

The management of natural resources by organized human societies has been an inherent practice since humanity began. Contrary to common belief, the age-old use of natural elements has allowed significant cultures to survive. However, these practices, especially the exploitation of natural resources beyond what ecosystems can bear, have brought about the disappearance of animal and plant species from the face of the earth, the transformation of ecosystems and, as a direct consequence, the fall of several cultures.

In the framework of these uses, while the natural resources used collectively by human societies have led to terrible wars due to ownership shared among different groups, ethnicities and nations, within the culture collectiveness they are regarded as part of a common heritage that has often been managed under successful self-regulation mechanisms. Fishing activities in inland waters or rivers, hunting and the collection of timber and nontimber species, perhaps the oldest form of collective appropriation, are some examples (Olson 1965).

Mesoamerican cultures were displaced by the Spanish conquest from more hospitable natural zones to zones with a lower production profile, arid zones, mountain zones and agriculturally low production zones such as the jungles. These conditions were brought upon communities displaced from a vast reservoir of territory and experience in the knowledge of natural biodiversity, but especially the ownership of natural resources that, on occasion, have an immeasurable future value (Benitez, 1989; Álvarez Icaza, 2000).

In recent years, the international scientific community has been involved in a new development paradigm, fed by the strong economic interests of countries and multinational corporations. In this context, the tacit recognition of environmental services provided by onsite conservation in many common-use resources (*CURs*), namely water, soil, air, timber and nontimber resources and biodiversity in general, new debates have arisen on approaches to the conservation and use of natural resources.²

Questions arise, such as who is to pay for the environmental services associated with the stewardship of natural capital, calling for thought on the old problem of the social appropriation of natural elements and the role of rural communities in the management and conservation of biodiversity in given territorial spaces.

The 1968 publication of Garrett Hardin's work on the *Tragedy of the Commons*,³ and its use as a political argument to foster the privatization of natural resources or the State's direct and exclusive control to conserve the commons, has set aside other forms of management governed by many peasant groups, especially indigenous groups.

² UN Convention on Biological Diversity, 2000. Rio +20.

³ Garrett Hardin. 1968. *The Tragedy of the Commons*. In *Science* 162, pp. 1243-1248.

The cultural management of common-use natural resources is known as the *Governance of the Commons*,⁴ building a new paradigm in current environmental and sociological thinking. The debate has revolved around the question of whether collectively appropriated resources are doomed to overexploitation, as the commons—belonging to everybody and nobody—will inevitably be depleted or impaired.

There are historical conditions and experiences that show that the involvement of the State, as an external agent that implements usage rules and policies outside the particular context, is the primary trigger of overexploitation processes or the irrational use of natural elements. The State, as steward of the natural commons, has also driven environmental failures that, given the scope of its involvement, reach capital proportions.

On the other hand, the privatization of the commons generates social discontent and is attainable solely insofar as the private person sees a commercial benefit in its use, even at the cost of triggering resource depletion and abandonment, without paying the costs of recovery.

The governance of CURs, as defended herein, is based on the strength acquired by the group by applying three fundamental premises: a) acknowledgement of the capacity for self-governance; b) establishment of rules regulating access to, and the use and enjoyment of, natural resources; and c) compliance and enforcement through oversight and penalty mechanisms among actors.

Beyond one argument or another, the complexity of the phenomenon is notable. Given the degradation of our ecosystems, it is clear that new political accords are needed to enable the regulation and protection of biodiversity through nonconventional mechanisms that assure onsite conservation and use. The accords must go beyond establishing protected natural areas, oases surrounded by the social actors seen in the mismanagement or the *Tragedy of the Commons*, whose borders frequently undergo intense impairment processes. Note that more than 50 percent of the zones surrounding these areas are in environmentally unstable conditions, the product of the pressure on their resources (Ostrom 2002).

The exclusion mechanisms for purposes of conservation have spatial and political limits that, if mismanaged, may turn against the overall system they are intended to protect. Likewise, successful CUR management processes that do not regard their own governability will be irreproducible and will tend to be isolated and failed.

⁴ Elinor Ostrom. 2000. *Governing the Commons: The Evolution of Institutions for Collective Action*. Ed. Fondo de Cultura Económica. Mexico.

I. CONTEXT OF THE COMMONS IN MEXICO

Management of common natural resources and the new heritage discourse

In Mexico, forms of collective appropriation have been directly involved in the State-built legal mechanisms to regulate or deregulate access to natural resources. The most important form in recent history was the 1992 amendments to the agrarian laws, particularly Constitutional Article 27, opening up the market for land, proceeds, natural resources and their forms of ownership.

This has given rise to the need to amend the environmental, forestry, wildlife and water laws, among others, to bring them into line with the constitutional amendments, in turn giving rise to a debate between property rights as a mechanism to preserve biodiversity and a new heritage discourse to protect natural resources as common property, regardless of the type of ownership.

The old discussion on forms of land ownership and their relationship with productivity and economic efficiency is broken down into two positions: the first, headed by defenders of private ownership and free enterprise, holding that the profitability of the land is possible only if in the hands of private persons. Collective forms of production are arguably inefficient, ineffective and produce greater environmental impairment. Here, the second position holds that forms of community management of natural resources have historically been to build better conditions for their conservation. In this regard, it may be argued that the search for economic profitability, taken to the extreme, is always at odds with ecological profitability (Toledo 2002. CÉSPEDES and PRONATURA 2002).

This study is expected to demonstrate, conceptually and with empirical references, that forms of land ownership are not directly responsible for natural resource conservation. There is evidence that the forms of use, and not the forms of ownership, determine whether or not natural resources are managed sustainably. In particular, forms of population pressure, and more specifically usage patterns, which determine how ecosystems are transformed.

There are significant regions in excellent states of conservation despite the pressure exercised by the anthropogenic activities carried out, as well as zones with low socio-demographic pressures that are heavily impacted by certain economic activities. The clearest example is the new strip mining carried out by private capital in important and valuable zones regarded as strategic for the conservation of biodiversity.

The alternative to the debate on the forms of ownership in México has been what is known as the *new heritage discourse on the use of natural resources*.⁵ This proposal

⁵ Martín Díaz. 2001. *El Aprovechamiento de los Recursos Naturales Hacia un Nuevo Discurso Patrimonial* (Use of Natural Resources Towards a New Heritage Discourse), Centro Interdisciplinario de Biodiversidad y Ambiente A.C. Mexico.

recognizes the value and worth of reflection on ownership, namely the implications carried by Constitutional Article 27, which established from the outset a dual approach to land ownership, providing that the nation is the original owner of the land, as opposed to being owned by the king in monarchical regimes, granting private persons the right to use and enjoy it.

In a modern sense, private property is exercised by both individual owners and corporate owners (communal farms and communities), which public ownership is managed directly by the State. However, the core thesis of the Mexican Constitution in agrarian matters is to recognize a social function of ownership, and the State may regulate it at any time accordingly.

Perhaps the most important nuance of this position is that individual land ownership expressly brought about clearer constitutional exclusion mechanisms than collective ownership; the former are given full ownership of the land, while the latter are entitled only its use and enjoyment. The inclusion and exclusion mechanisms of both approaches imply that social ownership is governed by the State, which directly and indirectly imposes ways to regulate the use of natural resources (Warman 1972).

Under the new heritage approach, there is a set of natural resources of undefined, inexplicit ownership with no clear territorial settlement. Examples are fauna, flora to a certain extent, water, marine resources and to a lesser extent the genetic resources implied in the components of biodiversity.

As established by M. Díaz,⁶ social responsibility for the exclusive use of natural resources was never sufficiently stressed, and thus non-owners, i.e., the rest of society, is liable and suffers the consequences of an erratic resource management policy.

The modern conception of natural resource heritage stresses the State's role in the conservation of natural elements, above the ownership function; *i.e.*, without failing to recognize private property rights, it engages in use and conservation along with the private owner.

Social stewardship of natural resources and its role in protection

Historically, collective action institutions in Mexico have become stewards of an enormous natural fortune, pointing to the importance of State work to strengthen inclusive policies favoring environmental services provided by these institutions.

The new paradigms in the collective appropriation of natural resources are benchmarked the stewardship of priority conservation areas in forests, jungles, wetlands and in general zones of strategic environmental value, which are usually on collective properties. Conservative calculations find that collective appropriation mechanisms are applied in 85% of Mexican woodlands and jungles.

⁶ Martín Díaz, et al.

There has been much discussion of the informal mechanisms to privatize forestry resources. The tacit recognition of individual privatization in woodland ownership is a consummate fact, particularly with regard to nontimber forestry resources. However, when making a detailed approximation of community-managed woodlands, such as the Purepecha Mountains in Michoacán, the Tarahumara region of Chihuahua or the Sierra Juárez in Oaxaca, community woodland control and management mechanisms tend to be confused with formal or informal parcelization and fragmentation mechanisms.

When community institutions are not subdivided by reason of land ownership, use and enjoyment, the resource is conserved and renewed, its quality is improved and it lasts over time. Farmland fragmentation, low profitability, the imposition of technological models outside the natural ecosystems and a decreased soil production capacity have caused changes in forestry land use.

While the fragmentation of land ownership at the smallholding level is an indisputable fact, the same thing happens in both individual and collective properties. In this sense, in the case of any biodiversity protection issues, the problem does not revolved around the type of land ownership, but the mechanisms and technological processes involved in the use of the associated natural resources.

While the production potential of rural lands of less than 20 hectares is not the topic of this work, we have historical examples of good farm management on small plots in different parts of the world. It should be noted that private forms of natural resource use in the social sector of the Mexican rural economy—fundamentally agricultural production activities—have a logic associated with the community management of natural resources. Farming schedules, forest turnover and work outside the community, among other phenomena, are intimately related to collective decision-making mechanisms.

II. CUR CONCEPTUAL FRAMEWORK

Collective action institutions—A necessary reflection

As noted, the publication of Hardin's *Tragedy of the Commons* has become a common call to justify the state and private intent to steward the conservation of natural resources, undermining community institutions that have managed to preserve and even improve important ecosystems.

The investigation, discussion and knowledge contributed by many researchers and academic and community institutions provide information that helps to distinguish opportunities for the building of conservation policies, but above all, for the consolidation of community institutions that consciously protect and manage their natural resources sustainably.

The *Tragedy of the Commons* is a false problem, since social ownership of the land in community terms does not necessarily imply open access to natural resources; on the

contrary, collective sanction avoids the unfair distribution of a common good. The *Tragedy of the Commons* centers on the impossibility to integrate ownership and full use and enjoyment, implying the State's stewardship of social lands. The actual problem lies in the impossibility of the community's full use of its resources. The main cause is the lack of a legal definition of land ownership, because open access has not historically been overseen autonomously, but by instances outside the collective appropriation and sanction process through the bureaucracies that the Mexican State has created.⁷ This problem is not an error in legal technique or an unfinished action, but rather a deliberate attitude that, in the best of cases, is intended as transitional to give way to forms of individual possession.

In her book *Governance of the Commons*, E. Ostrom proposes to identify inclusive mechanisms that enable, with solid criteria, guidelines for the implementation of public policies for the stewardship of collective natural property. The great challenge is to recognize community institutions' weaknesses and strengths to find, based on complexity, how plural societies appropriate and distribute natural resources, but especially how they assure their permanence; *i.e.*, the building of collective action theories necessarily requires a historical and empirical recognition of opportunity and risk areas in *CUR* management, in determined geographical contexts.

With the agrarian struggle overcome but unresolved in the 1970s, peasant organizations became political spaces where public resources were demanded to strengthen their organizations. Communal farm unions, community unions and farm-community unions created as second-tier institutions, the first tier being communal farms and communities, gave rise to another form of organization, the Collective-Interest Rural Associations (*Asociaciones Rurales de Interés Colectivo—ARICs*). Thereafter, the agglutination of these and other, similar organizations created and recreated regional and national peasant organizations. One of the purposes was to get infrastructure and resources. For many decades, this motivation responded to sector interests in the demand for farming materials.

However, all of these forms of community togetherness do not feature an environmental perspective, and even less so an assessment of markets of opportunities posed by the ownership of natural resources.

The recognition of the building of spaces for collective action on communal farms and communities is not new, although an analysis from the standpoint of the theory of collective action focusing on natural resources is. The current emphasis is not centered on the creation of institutions, but rather on collective arrangements enabling the lasting appropriation of natural resources on the basis of fair and equitable distribution among members and their comprehensive environmental, socio-cultural and productive assessment.

⁷ Pedro Álvarez Icaza. 2000. *Propiedad y Medio Ambiente tiempos de la Revolución Mexicana, Notas en torno al artículo 27 Constitucional* (Property and the Environment in the Time of the Mexican Revolution. Notes on Constitutional Article 27). *Este País* No. 111. pp. 24-33. Mexico,

The logic of collective appropriation

Social capital is maintained solely with respect to mandatory trust relationships, insofar as group survival and the possibility of *CUR* use depend on it. Rules and standards are generally transmitted orally, and are rarely written. However, the members of a rural collectivity, whether or not indigenous, know, accept and abide by them, knowing that otherwise they will be subject to collective scrutiny (Ostrom 2003).

Trust, however, cannot be forced, as capital has its own value and must be part of the existing social relationships. Even at the level of various family units, trust—originally borne of kinship—is in some way overseen within the unit or collectivity. Lastly, collective action institutions are based on relationships of mutual convenience. This points to the meaning of cooperation: joint benefit and recognition as intangible values.

What is won and lost in cooperative relationships? The breaking of rules or the individual use of resources almost always favors the individual appropriators in the short term, and in crisis situations—market problems, the imposition of public policies upon the community, natural disasters—individuals who have been removed from collective decision-making become highly vulnerable.

In some way, pointing to offenders—exposing them to public scrutiny, even before they are penalized—often has good results. Standing and reputation are highly valued in collective action institutions. This is seen in the consequences brought about by acts of corruption by the enforcers of the common-use rules, which may be of three kinds: undermined standing and reputation, direct penalty, and the undermined stewardship of the community's natural resources, which also affects the offender.

Collective action institutions have to build monitoring and oversight mechanisms that are not costly to the group's trust. Beyond the need to amend the usage rules for sundry reasons such as external pressures, there is a threshold of tolerance.

E. Ostrom, as cited by L. Merino (2002), establishes a set of categories to recognize the different behaviors of communities' commons management systems. These principles or conditions of the design of community institutions, she says, makes the collective management of common resources and services viable.

a) Clearly defined limits

Individuals or families entitled to extract *CUR* units must be clearly defined, as much the resource's limits.

As in any analytical system, it is fundamental to determine the process scale and recognize actors in order to clearly define who are the appropriators who assume liability for the management of resources, the building of usage rules and the definition of exclusion mechanisms. But the most important thing is to know the

system's load capacity to support extraction by a given number of individuals in the collective and to profile the natural system's ability to regenerate. In other words, the spatial and temporal thresholds should be clearly delimited so as to not commit appropriators or the natural resource to an uncertain future.

A fundamental characteristic of this first principle is that individuals or families with community appropriation rights to natural resources are clearly defined. This principle diametrically distinguishes *CURs* from the concept of open access. A community institution with these characteristics does not have open access, since access will always be regulated, controlled and sanctioned within the collectivity.

b) Coherence of appropriation and provision rules with local conditions

The appropriation rules that restrict the time, place, technology and quantity of resource units are related to the local conditions and provision rules that demand work, material and money.

Resource usage rules must be clearly defined. Common resources have times, amounts and forms of use. The cost-benefit relationship follows a logic dictated by local conditions, specifically, the limited resource; *i.e.*, offsetting external values that disturb the very capacities of the resources to be used cannot be considered.

c) Collective choice arrangements

Most individuals affected by operating rules may participate in their amendment. The rules must also be fair to the collective, which does not mean that they will be fair in the eyes of individuals outside the community. In times of scarcity, the rules are made more flexible and communities are able to mold them with regard to the prevailing conditions.

It has been precisely the eyes of individuals outside the community that have given the State its role to impose its own rules, which for many years gave rise to the unbridled oversight of government agents in the decision-making of indigenous and agrarian communities. The principle of rule adaptation is the same as above: balance between supply and demand, between socioeconomic and environmental values, the propriety of decreasing or increasing the use of resources when necessary in the collective's judgment.

d) Oversight and monitoring

Overseers who actively supervise *CUR* conditions and the behavior of appropriators are liable to them, or are themselves appropriators.

Internal monitoring of common-use resource management in all collective forms monitors more the behavior of appropriators than the usable resource itself. There is a counterweight vis-à-vis the competent authority; in practically all community

election systems in Mexico, the losers in an election—those coming in second—become the oversight committee of the rightfully elected authorities. While this counterweight often leads to immobility, in rural communities it is a severe self-control mechanism. External oversight is generally not well regarded, and is used, in formal terms, only when an external agent or individual outside the collective group attempts to appropriate natural resources that, in a community's judgment, are its own. The involvement of the agrarian authorities is accepted when there the boundaries between communities are in dispute.

e) Tiered penalties

Appropriators who violate operating rules receive tiered penalties, depending on the gravity and context of the offense, from other appropriators, officials or both.

The costs of enforcing operating rules, such as the costs accrued by a set of offenders in the collectivity, can lead to the paralysis of collective appropriation.

The contingent nature of compliance should be avoided, as the lack of contingency may turn into a "common rule" with exponentially untenable costs. Stint work (*tequio*) or sharecropping (*faena*) types of common work, as well as the involvement of imposed stewardship, are collectively "subtle" mechanisms to enforce and even penalize individual-oriented behaviors or rulebreakers.

Enforcement rules always prefer moral penalty mechanisms over economic penalties, especially when the oversight and monitoring costs are so burdensome that they make compliance unviable.

In collective action institutions, repeated recognition as an offender endangers not only the offender himself, but also the reputation of his collective family unit. A major offense may also set off a process of disarticulation in the collective and may even endanger the application of the rules to use common resources.

Contrary to what might be believed, in crisis conditions, not only economic but also in environmental terms, offenders may be more tolerated than in times of balance; *i.e.*, it creates an axiom enabling the substitution of established rules with temporary rules, provided that the system's established CUR management load capacity is not compromised.

f) Dispute resolution mechanisms

Appropriators and their authorities have quick access to local venues for the low-cost settlement of conflicts between appropriators or between appropriators and their officials.

Environmental mediation issues (*i.e.*, the enforcement, prevention and management of conflicts), and especially those linked to the appropriation of natural resources,

how they are used, their exclusion or inclusion mechanisms, and conservation and usage debates, are an emerging opportunity in Mexico, in high demand and requiring action and reflection. Sufficient professional capacities have not been built or created around these issues. This poses an enormous challenge for collective action institutions to resolve natural resource management disputes.

Mediation has become a multifactorial need in the world. The economic, social and political costs of sectors' stubbornness in most cases are much higher than the benefits obtained. This does not consider the negative impacts on ethics and mutual trust that arise among actors, which sooner or later turn into transaction costs above the opportunities accorded by prompt negotiation.

Given the desire to geographically extend productive activities and services, territory has become the center of the debate, as limited space for different types of development is sought by different actors. Here, the environmental agenda plays an increasingly preponderant role.

In most cases, communities that use a natural resource collectively will refer to an external agent with authority solely in the case of a neighbor dispute. Internal conflicts involving *CURs* will generally be resolved within the collective, based on the rules properly accepted by those involved.

g) Minimal recognition of organization rights

The rights of appropriators to build their own institutions are not questioned by external governmental authorities.

In the context of the conflict between the Mexican State and the indigenous communities in the state of Chiapas in southeastern Mexico, brought together by the Zapatista National Liberation Army (EZLN), an important principle comes into play: the recognition of the right to organize in order collective use and enjoy natural resources, land and territories, understood as the overall habitat to be used by agrarian communities, whether indigenous peoples or peasants, except for those directly owned by the nation.⁸

The full recognition of the forms of organization, but especially the rights of collectives, and the result for rules and disputes, is a principle of *CUR* management. As long as environmental, agrarian or other generally enforced rules are not broken, collective rights should be accepted and formalized by governmental agents.

⁸ The freedom claimed by indigenous groups in terms of territorial and cultural autonomy within the framework of respect for national sovereignty was left out of the bill approved by the Chamber of Deputies. The right to sustainable development, under conditions of fairness and respect for the specificities of Mexico's ethnic groups, is once left as an obligation under Article 2, section V of the law passed by Congress, but not as an integrated right under the San Andrés Accords, which in the end would lead to the full recognition of the forms of collective land ownership, and not just use and enjoyment in useful domain.

h) Embedded entities

The activities of appropriation, provision, oversight, enforcement, dispute resolution and management are organized in various levels of embedded entities.

In collective action arrangements, external activities often contaminate the internal decision-making mechanisms. Until very recently, a communal assembly was not valid if a representative of the Ministry of Agrarian Reform was not present. This not only represented an encroachment into a collective's common-use rules, but also imposed programs and usage rules based on governmental policies that had little to do with the communities' underlying conditions and profiles.

The role of the State as regulator

The introduction to this study asserted that the State's role often works in opposition to community institutions, imposing forms of use of natural resources that overlook their internal operating rules. There have been international experiences in community failures, where the intervention of state bureaucracies have destructured collective action mechanisms, giving rise to sometimes long-standing *CUR* institutions disappearing or being weighted down by imposed resource management mechanisms outside their own culture.

This is not to say that the intervention of government agencies invariably leads to failure. It only asserts that State involvement should be based on a diagnosis of the territory and the specific cultural contexts to be affected, as a fundamental condition for resource management and conservation commitments.

Moreover, when the State finds it necessary to incorporate regulatory mechanisms for the onsite conservation of natural resources through governing public policies, such as the national system of protected natural areas, the definition and application of such mechanisms must ensure the forms of appropriation, ownership and organization of the community actors with whom it interacts.

Building of commons theories and reflection models

The building of theories and models to interpret the logical management of collective use must avoid generalizations. The provocative interest in generalized models runs the risk of taking complex socio-environmental processes as facts, without necessarily leading to a theory of human action with respect to natural resources. While the building of *CUR* conceptual frameworks is based on empirical experience, this does not mean it is conclusive from the sum of its results.

The argument of Hardin (1968) and his followers has led to the generalized management of collective resources based on empirical experience, and the unfettered conclusion that they are doomed to be destroyed.

Moreover, research by the International Association for the Study of the Commons (IASC) has documented and systematized a considerable number of experiences of collective institutions worldwide, many which have been over hundreds of years. However, E. Ostrom was careful not to fall into generalizations, thereby enriching the debate; her greatest contribution was to propose analytical models to be applied in specific cases.

Indicators are built on the basis of the following criteria:

- The system's load capacity.
- The system's profitability, renewability, adaptation or resilience.
- The ability to communicate, to be informed, to exercise autonomy and to govern itself.

As stated by E. Ostrom (2002), the collective action experience too often becomes overstated and a principle of public policy governing community institutions' interactions. When policies are defined as a function of small units, the monitoring and learning processes seem to be neater. On the contrary, when proposals are generalized in public policies with a regional and national scope, efforts fall on infertile ground or adversely affect the structure and dynamic of the community institutions themselves.

Unfortunately, the difficulty in analyzing *CURs* and institutional management at an indispensable scale ends up affecting the Commons' dynamics. Ostrom points to the need to consider mechanisms to measure the reporting and transaction costs of *CURs* as a function of different scales of approximation thereto.

The identification of variables that affect decisions on the use of collective resources based on external involvement is not an easy task. The performance of more precise field studies for the case of Mexico will enable the building of models to analyze public policies and their impact on *CURs*.

The form of appropriation of natural resources in community institutions is unlikely to occur in the case of long-standing rules. Many usage rules have, over the years, turned into cultural and even religious values.

The amendment of a usage rule has to be supported by the observation of clearly maximized benefits and minimized costs. In this regard, increased uncertainty or risk tends to immobilize the intent to amend the usage rule for a given resources.

Based on the adaptation of a proposal by E. Ostrom, I propose a set of considerations that community appropriators—communities and communal farms in common spaces—should take into account when adapting the usage rules to a given resource:⁹

1. Most of the commons accept the opportunity risk posed if they do not make way for an alternative rule.

⁹ Own adaptation of E. Orstom 2000, p. 331.

2. Most must also know that they will be affected if the proposed changes are made.
3. Most appropriators adequately value the continuity of collective appropriation.
4. The costs of reporting, internal transformation and enforcement are relatively low in comparison to the benefits to be obtained.
5. The assumption of new rules reinforces the collective in terms reciprocity and trust, and moreover they are valued as additional social capital.
6. The size of the group of appropriators is manageable.

A typological proposal for the identification of levels of governance

The development of a typology of the commons is not a simple task, for several reasons. First, and perhaps most significantly, the grouping approaches may be very different as a function of the different angles of analysis. For example, grouping by economic or political categories or by the degree of the group's trust, regardless of the outcome in group cohesion, may provide very diverse groupings.

The second reason is that the prudent thing to do would be to develop groupings based on the practical recognition of their existence in a world of natural conditions and the particular circumstances of each context, to avoid gross generalizations. A prior effort may help to shed light on experiences and distinguish among typical cases.

Lastly, a conceptual definition should be deliberately undertaken, to be used to build a grouping that meets at least two conditions: coherence and usefulness to assess the dynamics of collection action institutions to manage the commons, enabling their distinction from other anthropological, political or cultural groupings.

The strengthening of CURs undergoes a transformation process that endangers the community rules, when implied and express dispute resolution mechanisms or the transformation of the status quo are put into play.

In this sense, the purpose of the typology proposal is to recognize the communities' status quo, characterize them, understand their strengths and weaknesses, anticipate their conditions to assess their approaches and implement mechanisms for public action and the management of biodiversity, which must be done with the involvement of community stakeholders. In the end, the purpose is to design environmental mediation strategies for the management and conservation of natural resources in collective properties, stressing those from community appropriation.

The proposed typology is based on certain fundamental concepts. It was developed on the basis of the proposals of Elinor Ostrom (2000) and the building of a new resource heritage, which does not necessarily pass through the sift of full ownership, but only the appropriation of a resource or a set of resources by a fully organized collective for regulated use. This should not be confused with the social stewardship of natural resources (M. Díaz, 2000).

Therefore, the proposed typology constitutes a structured approach to the different degrees of governance of the commons in Mexico, bringing together the following basic indicators for classification purposes:

- Levels of community organization: Social cohesion, structured peasant units,¹⁰ kinship trust, clear trust-building mechanisms, and community relations inside and outside the group.
- Natural resource access mechanisms: There are community regulations to access common resources; a community assembly, council of notables and/or committees exist and operate regularly; there are democratic decision-making mechanisms; access to natural resources is regulated.
- Political autonomy: The community makes its own decisions are there are different degrees of external agents (governmental authorities, an elite with local power, resource buyers or intermediaries, etc.)
- Economic autonomy: The community is capable of managing its natural resources with its own economic resources, or depends on government subsidies, lenders or external buyers; finances are healthy and there is accountability to the collective; the market is encouraging and consolidation is foreseeable; community finances support enforcement costs, which are internalized.
- Monitoring (oversight) and penalty mechanisms: the community has established actual oversight mechanisms for the proper distributive management of its CURs; it contemplates moral, economic and/or political penalties against community offenders; the involvement of the external authority is fundamental to the enforcement of the rules, or only complementary to local actions with respect to CUR usage.

For a precise distinction of community organizations from a CUR standpoint, at least three complex categories need to be applied.

The present social structure must be recognized. As a rule, in the framework of the proposed categorization, a linkage is seen between peasant economics and the family economic unit; there is a kinship-based common trust that has, for many years, even generations, enabled the building of hard-to-destroy trust. The formation, valuation and valorization of social capital are based on more or less rooted relationships, accentuated in indigenous groups and peasant communities.

The express recognition of the complex processes seen in the formation of institutions is also required; this recognition should be stated in the rules for collective action and when the institution decides to change the status quo and the social rules to ensure the better management of its natural resources.

Information and communication within the community is present for decision-making, while participation in such decisions is given to different degrees to its members.

¹⁰ Note that the proposed typology will refer to natural resource management by the rural sector of the economy. No cabe el intento de clasificar por esta vía, e.g., a taxi drivers' guild, whose families a cuyas familias le resultan indistintos los arreglos colectivos regarding the community's natural resources.

The construction of the typology must establish a clear distinction between individual ownership and the individual appropriation of natural resources. There must be clear rules on individual properties with collective access to natural resources. Under the proposal of E. Ostrom (2000), an individual owner who organizes with other individual owners to use a common resource, such as groundwater, acquires a defined place within the evolution of collective action institutions.

In Mexico's case this distinction is not banal, since the forms of individual and collective ownership are set forth in the Mexican Constitution. In a strict sense, the forms of individual, communal and corporate ownership are forms of private land ownership, perfectly distinguished from public ownership such as in the case of national lands, the territorial sea and the exclusive continental shelf.

The proposed typological classification will only address those individual properties (small owners) when there is a relevant structuring mechanism in the access to and management of the commons. Therefore, these properties will be addressed insofar as their access affects the collective resources of community organizations.

Type 1. Unorganized or organizations with open access

There are cooperative organizations that have open, rule-free access to natural resources, or that are organized to openly loot their own or others' natural resources. Only in this case does Hardin's 1968 "Tragedy of the Commons" theory apply, as exemplified by a prisoner who accuses others in order to win his freedom, or the experience of peasants who use a collective resource under the principle that whatever is everyone's is theirs, and they may use it to depletion accordingly.¹¹

This type of "organization" is centered on open, uncontrolled access in terms of the management of natural resources. Political and economic autonomy, as well as the monitoring and oversight tasks described above, are absent. Community or group trust is at risk or has disappeared, and collective relationships no longer exist or have never existed.

Type 2. Managed commons organizations

Decisions in this type of organization are made by external agents: government, private companies, civil organizations, etc. Access to natural resources has little control and decisions are not made with regard to sustainable, lasting and environmentally sound management. Under this type of organization, a single, predominant type of resource is often used, e.g., forests, mineral resources or a tourism service. Profit maximization is achieved at the cost of environmental degradation, with no commitment to strengthen political and economic autonomy, and in most cases there is no community oversight of

¹¹ In the Purepecha community in the mountains of Michoacán, Mexico, there were armed gangs of timber looters who secured the resources of other indigenous communities, as they had already depleted their own.

the control of natural resources. This practice was common in most Mexican woodlands through the 1950s. Communities were paid only for timber rights and sometimes obtained direct employment, but no share of the profits. Of course, the community absorbs the costs of forest degradation and slow recovery.

Under this appropriation category, governmental authorities are responsible for enforcing the environmental and forestry laws, with no community control over resources and without tiered moral, economic and political penalty mechanisms. There are no collective action arrangements and kinship trust is subsumed because collective trust is absent.

Type 3. Assisted commons organizations

This type of organization has relative control over the access to and management of its natural resources. These communities have generally been able to reappropriate their natural resources, and nearly all come from a struggle to recover the control thereof. Their political autonomy is relative, since the fight to recover resources has created partnerships with external agents, cooperative guilds (peasant assemblies, unions, political parties). These organizations have political experience that may lead to consolidated autonomy.

In this type of organization, the building of trust begins to be a constant, as early successes occur. There is incipient economic autonomy and various economic alternatives are often sought to address the community's needs.

Under this category, exclusive access to resources and the involvement of external agents in resource control have been abandoned. While collective enforcement and monitoring mechanisms continue to be overseen by external agents, there are formal oversight and accountability committees reporting to the community assemblies.

Type 4. Semiassisted commons organizations

This type of semiassisted organization has clear control over access to natural resources and there are community rules and regulations to ensure the fair distribution of benefits. These organizations are semiassisted because they are associated with external or government funding whose main purpose is to create the governable management of common resources. The clearest examples of this type of organization in Mexico are those listed in the Forest Conservation and Management Program (*Programa de Conservación y Manejo Forestal*—PROCYMAF), with external resources managed by the National Forestry Commission (*Comisión Nacional Forestal*), which works towards the conservation and sustainable management of natural resources based on the strengthening of the social capital of communities where it operates.

Autonomy is incipient, insofar as the established general rules require the strengthening of internal regulations democratically; kinship trust has given way to collective trust. A particular characteristic of this category is that economic autonomy is present in

organization projects, although external promoters are required to ensure their effectiveness. Monitoring and oversight mechanisms are intermediate, with established ways to enforce community rules that are almost always independent of those established by governmental authorities or external agents.

Type 5. Autonomous commons organizations

This type of community organization is in the process of consolidation; most decisions associated with common resources are adopted in assemblies, committees or councils, and they are linked to mutual trust relationships. There is much greater control over the usage rules and the resources themselves. Political autonomy is present since there is independence of decision-making vis-à-vis government agencies or external agents, there is full trust in the organization's representatives, and community relations empower collective action. Economic autonomy is in the process of consolidation, and there is even an incipient reinvestment of profits in community enterprises and the community's social projects.

Nearly all such organizations have clear, efficient mechanisms to monitor access to natural resources by members of the community and strict control of other actors' encroachment into community resources.

Type 6. Independent commons organizations

Organizations grouped in this category fully regulate access to natural resources and have full political autonomy in the framework of the current rules. This autonomy differentiates them from other experiences. In general, community and group trust criteria are strongly linked. Many of these organizations have an additional condition of membership, such as an exclusive natural resource, a protected area, an ethnic condition, etc.

Economic autonomy enables clear accountability, and training mechanisms operate effectively inward. They do not require, and even reject, the involvement of external agents to enforce and monitor compliance with their usage rules. Penalties on offending members are severe and may lead to repudiation by the community. Community institutions are consolidated; there are clear dispute resolution mechanisms and the community is certain that a change in the status quo and the search for economic options will be favorable. These organizations have generally been in existence for many years.

Form for the Classification of Communities and Experiences by their Collective Action Characteristics in CURs

The proposed checklist appearing below facilitates the classification and determination of characteristics of communities involved in collective actions. This exercise was prepared by the author in other studies. From a practical standpoint, it enables the scoring and assessment of the qualities of collection action institutions, the preparation

of preventive mechanisms for environmental dispute resolution and performance monitoring, and provides elements to propose adjustments that help to improve the management of natural resources.

**Community Typological Analysis Form
(Environmental and Social Assessments)**

Classification, monitoring and assessment mechanism

State	Region:	Microregion	Community:				
Analysis of CUR mediation perspectives			4	3	2	1	0
Are the regulations complied with?							
Are the activities compatible with the current environmental and forestry laws?							
Is there certainty in land ownership?							
Are community agreements reached in assemblies?							
Are environmental services valued/valorized?							
Are there express conflict avoidance mechanisms?							
Are there monitoring and assessment mechanisms?							
Are critical conflict areas identified from an environmental standpoint?							
Is territorial planning a common practice?							
Subtotal (maximum value 36 points)							
Capital strengthening process							
a) Strengthening of natural capital							
Do internal regulations address environmental and forestry issues?							
Is there local knowledge of the ecosystem?							
Are community POAs drafted and do they include socio-environmental issues?							
Is any zoning plan applied in the community?							
Are the environmental impacts generated by production practices addressed?							
b) Strengthening of social capital							
Is community progress periodically assessed?							
Are there records of the historical experience in the appropriation of CURs?							
Are there community regulations for the assignment of responsibilities?							
Are internal disclosure and accountability common practices?							
Is there an inventory of local biodiversity?							
Are there collective mechanisms for tiered penalties on those who break community rules?							
c) Usage rules amendment process							
Does the community institution accept the opportunity risks of amending the rules?							
Do most people believe they will benefit?							
Do most appropriators adequately value the continuity of collective appropriation?							
Are reporting and enforcement costs relatively low in comparison with the benefits?							
Is the group of appropriators manageable?							
d) Confidence building							
Does kinship trust exist?							
Are there established community relations?							
Are there clear mechanisms for community solidarity against offenders?							
Are there conflict resolution mechanisms operating?							
Is there a search for alternatives in the face of pressure from external agents?							

Subtotal (maximum value 84 points)					
Typology ¹²					
Type 1: Unorganized or organized with open access					
Type 2: Managed organization (little control of CURs, no political autonomy and very little monitoring)					
Type 3: Assisted organization (control of CURs, incipient political and economic autonomy, little monitoring)					
Type 4: Semiassisted organization (control of CURs, relative political autonomy and present economic autonomy and monitoring)					
Type 5: Autonomous organization, more controlled access, present political autonomy and in process of economic consolidation, and ongoing resource monitoring processes					
Type 6: Independent organization (highly controlled access to CURs, consolidated political and economic autonomy, and ongoing and progressive control of CURs)					
Subtotal (maximum value 24 points)					
Grand Total					

Values: (checked in the box)

4 = Very good

3 = Good

2 = Fair

1 = Poor

0 = Nonexistent

III. FINAL REFLECTIONS

Property rights held by individuals and not by collective institutions are one of the great paradigms of sustainable development. As mentioned, in the case of Mexico, the limitations established by the Constitution and its complementary laws for the individual use and enjoyment of nationally owned goods and services, insofar as the public good overrides private rights under Constitutional Article 27, gives rise to new reflections based on the exclusion mechanisms established by the State.

There are international organizations that, based on global commitments or a rightful interest in the conservation of worldwide biodiversity, call for the acceleration of social exclusion policies for natural spaces, particularly in megadiverse countries such as Mexico.

The purchase or lease of land and ecological easements, and the creation of protected natural area systems, with or without the participation of owners or holders, constitutes

¹² We add the aforementioned typology here. It was built on the basis of two experiences led by the author: first, the Strategic Environmental Study for PROCYMAF Phase II, and second the Strategic Environmental Study for the Central American Integrated Ecosystem Management Project (*Proyecto Manejo Integrado de Ecosistemas—MIE*), both funded by the World Bank. The typology's values are in addition to the rules assessment, whereby a project, regardless of its type, could be rated favorably or unfavorably.

an exclusionary mechanism. In this approach, the State or private companies would manage properties that, in principle, are in the public domain.

Beyond recognizing that there are possibilities for cooperation—for shared involvement—among community institutions and private conservation agencies, the trend to build islands of conservation without the correlative actions in the rest of the natural spaces would see the same fortunes found in Mexico’s creation of indigenous refuge zones in the mid-20th century or the Indian reservation model in the United States and Canada.

The grave risk of these exclusion mechanisms is that sooner or later border zones and areas contiguous to protected natural areas will be heavily affected, turning into future bounties for the appropriation of natural resources. If offsetting mechanisms are not found for unregulated natural spaces, the possibility of conservation of biodiversity contained in regulated spaces will decline.

The Mexican government, through the Ministry of the Environment and Natural Resources (*Secretaría de Medio Ambiente y Recursos Naturales*—SEMARNAT), concluded in 2006 that more than 50 percent of the areas protected by federal decrees in Mexico are of low ecological quality, and that around 75 percent of border zones are environmentally unstable, which not only affects the protected natural areas themselves, but also the surrounding areas.

These trends require a reflection as to the need for community institutions to implement collective management policies for the onsite stewardship of biodiversity found in unregulated spaces. The proposal on *Sustainable Zoning Development—High Biodiversity Management Zones*, published by the National Commission for the Knowledge and Use of Biodiversity (*Comisión Nacional para el Conocimiento y Uso de la Biodiversidad*, or CONABIO) in 2012, represents progress in this approach.

Behind the management of resources by community institutions is the accumulation of traditional know-how with respect to zoning and rezoning, the sum of joint trust and the protection of the group from external disturbances. As noted by E. Ostrom, in collective actions, “... *avoiding wrong, i.e., the destruction of a production system or the exclusion of an individual or group, is itself a collective good and ... an efficient mechanism to avoid the work of spongers*”.¹³

Social capital is based on shared understandings to abide by the rules, regulations and the desire to *reinvest* community efforts in the collective setting (Coleman 1998, cited by E. Ostrom). It has different structures based on internal relationships, from the peasants’ own economic units to the networked relationships among different *CURs*.

Human capital is based on the premise of knowledge itself, in the accumulation of know-how: traditional technologies, ethnobotanical classifications, soil quality,

¹³ Elinor Ostrom. Conference: Building Social Capital. Instituto de Investigaciones Sociales. Mexico, October 25, 2002.

impairment indicators, production techniques, crop rotation mechanisms and medicinal applications, among other things. This capital is strengthened by the sharing of information within *CURs* and among different *CURs* that share the same type of ecosystems.

From a commons standpoints, human capital always represents new opportunities for strengthening. It is cumulative, not only with regard to the number of individuals involved, but also given the sum of the knowledge and intercommunication among the different appropriators. Moreover, in conditions of emigration, land abandonment and intercommunity disputes, it is the most valuable dispute mediation tool.

The value of environmental services—and not necessarily the payment thereof—now poses an extraordinary opportunity to resignify *CURs* and their direct bearing on the conservation of Mexico's biodiversity, in light of the valuation and valorization of services stewarded by collective communities.

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