Managing natural resources: Coasean bargaining versus Ostromian rules of common governance

Aleksandar D. Slaev\textsuperscript{a,b,⁎}, Marcus Collier\textsuperscript{b}

\textsuperscript{a} Faculty of Architecture, Varna Free University, Varna 9007, Bulgaria
\textsuperscript{b} School of Natural Sciences, Trinity College Dublin, The University of Dublin, Dublin 2, Ireland

A R T I C L E   I N F O

Keywords:
Natural resource management
Privately owned resources
Common resource governance
Coasean bargaining
Theory of clubs

A B S T R A C T

The purpose of this paper is to explore the forms of ownership over natural resources according to the theories of Coase and Ostrom. Coase’s work is regarded as a theoretical basis for establishing private ownership over natural resources, whereas Ostrom’s theory is considered the most influential one supporting common/collective ownership. The key research question of the paper is whether the two theories are indeed opposite and contradictory. The novelty of our approach is that we account for the nature of common property rights in light of Buchanan’s theory of clubs, thereby showing that the opposition between the concepts of Coase and Ostrom is exaggerated. The point is that ownership is generally considered only in its most extreme forms – purely private and purely public. By referring to Buchanan, we show that in contexts of common/collective entitlements with varying degrees of publicness/privateness, Coasean bargaining and Ostromian rules of common/collective governance can coexist and work together effectively. On this basis, this research proposes a framework for defining policies for managing natural resources.

1. Introduction

The current high rates of economic development have accelerated the use of natural resources, and this highlights the importance of natural resource management. Property rights are crucial in this regard. Some researchers (e.g., Demsetz, 1967; Libecap, 2009) believe that common property rights are the main cause of the “tragedy of the commons” (Hardin, 1968), and private entitlements and free markets are essential for effective natural resource management. Coase’s theory (1960) is arguably the soundest basis for this approach. But other researchers (e.g., Wade, 1987; Tucker, 1999; Agrawal, 2001) believe that private property is not the only or the right solution and that common ownership can provide effective management of natural resources by establishing proper systems of regulation. Of the theories supporting common/collective ownership of natural resources, that of Ostrom (1990) is probably the most influential.

The purpose of this paper is to explore the issue of the relevant forms of ownership over natural resources according to the theories of Coase and Ostrom. Our main research question is whether the two theories are indeed contradictory as commonly believed. The novelty of our approach is that we account for the role of common property rights in light of Buchanan’s theory of clubs (1965). Drawing on Buchanan, we show that the opposition between the concepts of Coase and Ostrom is exaggerated. The point is that property is generally considered only in its most extreme forms – individual/private and common/public, whereas Buchanan’s theory explores the wide range of property rights between purely private and purely public. The relationship of Coase’s theory to common forms of ownership is insufficiently explored, but this is an important issue – particularly when it comes to natural resources, as these resources are often collective or public property. On the other hand, Ostrom’s theory emphasizes the advantages of collective property rights in common-pool resources, but at the same time Ostrom is highly critical of the performance of public ownership. In fact, Ostrom’s theory focuses on common forms of ownership, which are of a lower level of publicness than state or public. However, as this paper illustrates, when ownership is viewed not only in its extreme forms (purely private or purely public), it turns out that the concepts of Coase and Ostrom are far from contradictory and should even be considered complementary. Applying Buchanan’s theory to those of Coase and Ostrom yields a deeper understanding of how they relate to each other. Finally, it suggests a framework for defining policies for managing natural resources.

We start by examining the theoretical framework of our study – that is, the types of property rights and their advantages and drawbacks concerning natural resource management – and we ask how the theories of Coase and Ostrom refer to the types of ownership. In the
Discussion section, we first explore how Coase’s theory works in contexts of common/collective ownership. Although this theory is traditionally associated with private ownership and privatization, common property rights should play an important role in Coase’s research – yet he does not investigate the implications of such entitlements. When we account for common/collective entitlements, then we observe that Coase’s and Ostrom’s theories have much in common. This leads to further conclusions concerning the roles of relative privatization and the individualization of responsibilities in natural resource management.

2. Theoretical framework

2.1. The property rights context of resource management

Property rights can be defined as the social consent that an individual is entitled to a specific use of a resource (“socially recognized rights of action”; Alchian and Demsetz, 1973: 17). Thus, although property rights are natural rights of individuals, they must be recognized, enforced and guaranteed by communities and states (Moroni, 2018).

2.1.1. Types of property rights and Buchanan’s theory of clubs

The type of the established property rights over a resource is a key factor for its management. Most researchers consider four main types of entitlements: 1) private, 2) common (shared, collective, communal), and 3) public (state) property rights, and 4) open access, which is actually a lack of property rights (Heller and Dagan, 2001; Cole, 2000).

Two of the three types of property rights – private and public – are regarded as basic, “pure” and opposite to each other, and the third type – common/collective – is seen as intermediate between private and public. Whereas public ownership refers to resources owned by national societies and states, collective ownership refers to resources owned by groups and communities smaller than nations. This type of ownership is the subject of Buchanan’s research. According to Buchanan (1965: 2), “[w]hile it is clear that some goods and services may be reasonably classified as purely private, even in the extreme sense, it is clear that few, if any, goods meet the conditions of extreme collectiveness”. He observes that there is a “whole spectrum of ownership-consumption possibilities, ranging from purely private ... to purely public”. Arguably, the bulk of resources are thus owned in common/shared ownership with different degrees of publicness – e.g., property of collective companies, partnerships, cooperatives, stock companies, corporations, clubs, NGOs, municipalities, condominiums and even families, insofar as a family can be considered a form of partnership. Nevertheless, despite the pervasiveness of common entitlements, to examine the performance of property rights, one should refer to their extreme (pure) forms.

2.1.2. Managing private resources

If an individual or entity owns a resource privately, she or it is entitled to all rights (of access, withdrawal, management, exclusion and control; Ostrom and Schlager, 1996), as well as all responsibilities for this resource. The unity of interests, all types of rights and responsibilities, i.e., the indispensable connection between positive and negative entitlements, is the basis of the efficiency of individual/private property rights.

Individual property rights are exercised either by private planning or by participating in market transactions. When a person owns all resources needed for an activity, she manages these resources through private planning (Moroni, 2010; Slaev, 2016a). A private owner is able to plan the use of the resource(s) strictly and in detail. Moroni (2007, 2010) calls this planning method teleocratic, because it is characterized by strict provisions and detailed definition of all goals and steps towards their achievement. Alternatively, when an individual privately owns only part of the resources needed for an activity, to carry out this activity, she must combine her resources with those owned by the others in market transactions. But in the market, inefficient producers will be replaced by efficient ones; thus the market mechanism is the ultimate guarantor of efficient private management (Caves and Associates, 1992; Leibenstein, 1966; Markovits, 2008). Therefore, regarding resource management, we emphasize the responsibility of private entitlements. Because of the indispensable connection between positive and negative entitlements, between assets and liabilities, and between rights and responsibilities, private ownership is expected to provide for efficient long-term (i.e., sustainable) use of resources (Demsetz, 1967).

2.1.3. Managing shared/collective/common resources

Shared or commonly owned resources are managed collectively. Because one can manage common resources on his or her own, all co-owners first of all need to agree on who can do what within what limits and who is in charge of what – that is, co-owners need to allocate property rights among themselves. This allocation is realized through the adoption of rules, and this is the main “technological” feature of collective management. The proper method of management employed by partners, groups and communities is the nomocratic method (Moroni, 2007, 2010; Slaev, 2016b). In contrast to the strict approach of teleocratic management, nomocratic management uses more general rules that allow the individual members a range of freedom. As the roles of individuals are allocated by rules/regulations established by the community, there are no automatic or innate connections between positive and negative entitlements and between rights and responsibilities, and this is the first major drawback of common entitlements. The allocation of entitlements is never perfectly defined by rules and is even less perfectly enforceable. It is possible and often happens that one co-owner may provide the resources for an activity but receive no share of the benefits, or vice versa. The imperfect allocation of entitlements is the main reason for behaviours such as shirking (Alchian and Demsetz, 1972) and free riding (Ostrom, 1990). Furthermore, the performance of collective management greatly depends on the number of co-owners. Only in small groups is it possible for individuals to exercise their property rights directly (Ostrom and Hess, 2007); in bigger groups, individual co-owners have to transfer their management rights to a central body. Transferred entitlements are more or less distorted, because, as Demsetz (1967: 355) explains, “a small management group becomes de facto owners”. As managers often tend to substitute their own interests for the transferred interests of regular co-owners, other major problems of efficacy emerge: agency issues (Jensen and Meckling, 1976) and issues of collective/public choice (Buchanan and Tullock, 1962). Further inherent problems of collective governance refer to corruption and misuse of administrative and coercive powers.

2.1.4. Advantages of private and common entitlements

Arguably, all authors agree that open access is devastating for natural resource management (e.g., Agrawal, 2001; Heller and Dagan, 2001; Cole, 2000). As Dagan and Heller explain, although Hardin’s (1968) goal was to describe the “tragedy of the commons”, he actually described “the tragedy of the open access”. Still, while it is evident that the lack of any entitlements means total lack of responsibilities, the foregoing analysis outlines the considerable drawbacks of collective management. However, common property rights also have a great advantage – by sharing, individuals economize individual costs. Hence, individual/private entitlements are generally associated with high benefits of exercising property rights, and shared/common entitlements are associated with low costs. Infrastructure is an obvious example. A private irrigation system, its development and use would be managed many times more efficiently than a common system, but the costs of construction and maintenance are so high that private developments very rarely occur. That is, individual entitlements contribute to the efficiency of property rights by enhancing their performance, whereas common property rights contribute to this efficiency by reducing costs.
2.1.5. The role of rules in the definition of private and common entitlements

The prevailing concept of property rights is that they are institutions (Alchian and Demsetz, 1972; Cheung, 1968; Ostrom, 1990), and institutions are social constructs based on rules and regulations (Ostrom, 1990: 51). Any property right, private or common, is established by developing and enforcing social rules; however, regarding rules, there is a basic difference between the two opposite (pure) types of property rights. Private property rights are defined by one simple rule: all entitlements referring to a specific use of a specific resource, positive and negative, accrue to one individual or private entity. In contrast, property rights of collective entities are defined through the establishment of complex systems of rules and regulations allocating benefits and responsibilities between the individual members of the group/community. This is the key problem of collective management, especially regarding the sustainable use of natural resources. In view of the widespread threats of resource depletion, the allocation of negative entitlements (responsibilities and liabilities) is clearly of utmost importance.

2.2. Property rights over natural resources in Coase’s and Ostrom’s theories

2.2.1. Coase’s theory and the roles of privatization and markets for natural resource management

Coase wrote his seminal article “The Problem of Public Cost” as a criticism of the Pigouvian solution to the problems of externalities. According to Pigou (1932), while the market works efficiently for the two parties involved in a deal, third parties may be affected by externalities, sometimes positive, but most often negative. Therefore, in cases of externalities, the action of the market should be corrected. Pigou’s solution to externalities employs centralized measures – such as bans and taxes in cases of negative externalities (e.g., pollution) or subsidies in cases of positive externalities (e.g., producing apples for sale also provides benefits to beekeepers). But according to Coase (1960), centralized solutions are inefficient, because they may not account for all implications of and solutions to an externality problem. Externalities actually result from use of resources with common or imperfectly defined property rights. Coase’s solution to externality problems involves establishing entitlements over all employed resources, as this will allow the functioning of markets. Markets in turn will ensure the efficient management of resources. For instance, if a rancher pollutes the water of a stream running by the ranch, and the stream is also used by a neighbouring farmer to water her land, then the farmer would suffer from an externality, because the water is a resource common to the rancher and the farmer, but with no defined polluting rights. Pigou’s approach prescribes centralized solutions to externalities – a tax should be imposed on the rancher to pay for the damage done, or cattle-raising should be banned. However, the centralized approach misses important considerations – for example, cattle-raising may provide needed jobs, or a new purification technology may solve the problem. As Coase would propose, if polluting rights are defined, the rancher and the farmer will negotiate (Coasean bargaining) and will find the most efficient market solution, whereby each party will be compensated for eventual losses.

Whether such solutions exist in a specific situation is defined by a criterion that can be termed Coase’s entitlement optimization assumption: “a rearrangement of [property] rights will only be undertaken when the increase in the value of production resulting from the reallocation is greater than the costs that would be involved in bringing it about” (Coase, 1960: 15–16). Researchers generally consider Coase’s proposal as an establishment of private property rights and by default ignore common entitlements. Indeed, in “The Problem of Social Cost”, Coase explores only cases between two neighbours, i.e., cases with single third parties (victims of externalities), yet Pigou regards externalities as a public issue. Consider, e.g., pollution, which always involves multiple victims. And finally, the very title of Coase’s article refers to public costs. Common/public entitlements thus fall within the scope of Coase’s research but are not discussed in his article.

2.2.2. Ostrom’s theory and the roles of common-pool resources and common ownership

In contrast to Coase’s theory, Ostrom’s theory is regarded as the theoretical basis for promoting common property rights. Ostrom investigates the interaction between society and ecosystems and focuses on common-pool resources (CPRs) (Ostrom, 1990, 1999). Ostrom (1999: 497) defines a CPR as a “natural or man-made resource from which it is difficult to exclude or limit users once the resource is provided”. Therefore, she does not claim that private ownership of natural resources is inefficient – just that it may be too costly to establish. Rather, she maintains that natural resources and CPRs in particular—e.g., forests, grazing lands or fishing grounds—can be managed efficiently by local communities of direct users. On the other hand, Ostrom is generally critical of public or state ownership and emphasizes that the state is ineffective in managing CPRs. She observes that “[m]any successful CPR institutions are rich mixtures of ‘private-like’ and ‘public-like’ institutions defying classification in a sterile dichotomy” (1990: 4).

Most of Ostrom’s research deals with the characteristics of groups/communitys and their members – direct users of natural resources. A major focus of Ostrom (1990) is on management principles of communities of CPR users that facilitate sustainable use of natural resources such as definition of organizational rules, collective choice arrangements, rules of monitoring, accountability and sanctioning, mechanisms of conflict resolution and building internal trust and reciprocity.

3. Discussion

3.1. Initial establishment of private or common property rights over natural resources

In defining the entitlement optimization criterion, Coase uses the word rearrangement and not establishment of property rights. In fact, Coase’s approach (Coasean bargaining) may be implemented and the market may operate only after entitlements have already been established. Before property rights are established, the market may not operate, so the initial establishment of property rights is not a market process; still, it is a process of interaction between individuals and communities. Since natural resources are “produced” by nature, by origin they belong to no one – unlike one’s labour and talents, for example. But, as already emphasized, property rights are enforced by communities and states. This explains why, despite the deficiencies of collective management, forms of common and state ownership over natural resources are pervasive, especially in societies with high level of centralization, such as monarchies and communist regimes. To a certain extent this is valid even in democracies, because any social structure needs some level of centralization.

The costs of capturing entitlements (Barzel, 1997) and their definition and acceptance/approval by society are additional critical factors in the pervasiveness of common entitlements over natural resources. These costs depend on the resource’s physical characteristics, such as utility and divisibility, and on technologies used to divide resources in portions for economic use and for appropriation (McKean, 1995; Baranell, 2001). Clearly, when separating (extracting) resources and dividing them into portions for individual use is too costly, common ownership will prevail. Entitlements over natural amenities (e.g., ecosystem services and climate) are public or imperfectly established, precisely because the definition of property rights over amenities is prohibitively costly (Krautkreamer, 2005).

3.2. Coasean bargaining in contexts of common property rights: substituting Ostromian for Pigouvian rules of resource governance

Once property rights are established, they can be rearranged in
Box 1
Scenarios of Coasean bargaining.

Scenario 1: The factory owner bargains with all the fishermen individually, one by one, to acquire their polluting rights. Most researchers believe that this is the true Coasean solution (e.g., Holcombe, 2013). But what is the outcome of such bargaining for the factory owner? Has he acquired any rights after signing deals with 51 percent or even with 99 percent of the fishermen? Obviously not. Even if only one fisherman has refused to sell her polluting rights, the factory owner still is not entitled to pollute the water of the lake, because it is not possible to pollute 99 percent of the water without polluting the other 1 percent. Only when the last fisherman has joined the deal has the factory owner indeed acquired the rights to pollute. Yet bargaining with the last fisherman not only is extremely difficult but also qualifies as a market failure, because it is bargaining between a monopolist seller and a monopsonist buyer (Farrell, 1987; Hahnel and Sheehan, 2009; Slaev, 2017b). What is the proper market value of the last fisherman’s polluting entitlements? With a monopolist seller and a monopsonist buyer, it is unknown. In this situation, the buyer is severely disadvantaged because he has already invested in purchasing the rights of all other fishermen. Sellers in such positions may take unfair advantage, and in practice they often do. Buyers in turn tend to resort to vicious or illegal methods of pressure.

Scenario 2: The fishermen form an association to bargain jointly with the factory owner. Before bargaining, neither party has made substantial investments, they are symmetrically positioned, and the market can operate smoothly. Yet for multiple fishermen to bargain jointly, they have to organize and properly exercise common property rights. That is, they have to elect their leadership and employ centralized management, which is typical of the Pigouvian approach. Next, to participate in Coasean bargaining, fishermen will incur costs; for example, they must pay for the effort and time of those who will run the management and negotiate with the factory owner. Thus, they will need to collect contributions, which in fact is tantamount to collecting Pigouvian taxes. Finally, when Coase bargaining is over and the fishermen are paid the value of the sold property rights, the central management will distribute this payment among the fishermen – an act similar to distributing Pigouvian subsidies. Thus, to hold Coasean negotiations under Scenario 2, fishermen will have to employ central management and Pigouvian measures.

Scenario 3: The fishermen found a collective company. It is easy to show that this option is in many ways similar to Scenario 2, although the former is based on collective property rights, and Scenario 3 is based on private entitlements. Indeed, the organization based on private entitlements is much more strictly regulated and private responsibility is assumed, but in this case too fishermen opt for collective organization, and the property is managed collectively with all associated problems and shortcomings. Ultimately, with regard to Coasean negotiations, there is no fundamental difference between Scenarios 2 and 3.

more efficient patterns through Coasean bargaining and market transactions. But first we have to understand how Coasean bargaining works in contexts of common property rights that prevail over natural resources. As already noted, although Coase’s purpose was to discuss solutions to externalities, and externalities usually incur social costs, he analysed only cases with single victims – a fact acknowledged even in some textbooks (e.g., Perman et al., 2003; Tietenberg and Lewis, 2012). Still, this issue is under-investigated. Coasean bargaining is obviously much more complicated when, instead of just two neighbours, multiple parties are involved (Slaev, 2017b). Consider, for instance, a theoretical situation – a number of fishermen and their families live around a lake and make their living by catching fish from this lake, and a company intends to build a factory by the lake, which will pollute the waters. The Pigouvian solution to this situation is for the state either to ban the polluting activities or to impose a tax on the factory equal to the value of environmental damage. According to the Coasean approach, however, the issue is who will use the waters of the lake – a natural resource that may be considered common to the fishermen and the factory owner. What Coase would propose is Coasean bargaining. Three example scenarios in Box 1 analyse alternative bargaining options between multiple co-owners.

In examining the three scenarios in Box 1, we can conclude that individual bargaining is not a solution in contexts of common ownership; therefore, Coasean negotiations over commonly owned resources necessarily employ centralized rules and tools similar to those of the Pigouvian approach: bans, taxes and subsidies. However, as a result of Coasean bargaining, the system of centralized rules and tools that govern the use of natural resources has changed substantially: while the initial Pigouvian measures were typical state (governmental) instruments with a national scope, the new centralized tools have only a local scope, and they concern only the local fishermen. In fact, by conducting Coasean bargaining, fishermen have established a community of local appropriators.

This suggests a direct connection to the theory of Ostrom (1990), which is primarily concerned with communities of local appropriators of natural resources. It appears that, as a result of Coasean bargaining, a system of Pigouvian public governance of national scope has been replaced by a system of Ostromian governance with a smaller number of resource co-owners. The latter system is indeed a collective and centralized one, but it is more effective than the initial system. According to Ostrom, in natural resource management, state control often is “less effective and efficient […], if not disastrous in its consequences” (Ostrom, 1999: 495), whereas a local community of direct resource users is generally efficient in natural resource management, because such communities bear “all responsibility for making decisions related to smaller-scale common-pool resources” (pp. 525, 526). Ostrom outlines six types of advantages of local small-scale (smaller in number) communities, and virtually all of them involve enhancing the potential for a community’s individual members to assume individual responsibilities for resource management.

3.3. Coasean bargaining and Ostromian rules of collective governance: Relative privatization and individualization of responsibilities

In essence, as a result of Coasian bargaining, the level of ownership is reduced – from state/public ownership with a national scope to collective ownership with a local scope. Buchanan and Tullock (1962) and later Ostrom (1990, 1999) and other researchers have highlighted the greater effectiveness of smaller as opposed to larger communities. If Coasean bargaining reduces the number of co-owners, such transformations can be termed “relative privatization”: they do not establish purely private entitlements but rather transfer entitlements to a smaller group/community, i.e., a group with a higher degree of privateness. Furthermore, a smaller group or community can define much stricter individual responsibilities for all its members. This can be termed “individualization of responsibilities”. Whereas the lack of entitlements in a system of common/collective management results in a “tragedy of the commons”, the proper assignment of responsibilities to individual members of the community is the key factor for sustainable resource management.
The idea of relative privatization, i.e., acknowledging that different collective entities have different degrees of publicness/privateness, once again draws a parallel to Buchanan’s concept of club entitlements (1965). Buchanan uses the term “club” to emphasize the privatness of collective/club entitlements. In light of this theory, we consider collective property rights as simultaneously common and private, although with varying degree of privatness/publicness. Collectively owned resources are common to all members of a group/community but are exclusive to all non-members; thus they are private to the union of co-owners. Such unions should be regarded as collective-private in nature – “internally” collective, but “externally” private. As private entities, they are active market participants. Yet the relationship of a governance structure to the market is a feature of fundamental significance. The public (Pigouvian) system of state regulation and the collective system of lower-level associations (like the fishermen’s association) have opposite relationships to the market, even though natural resources are collectively owned within both systems. The state system does not depend on the market mechanism, while associations, just like collective and stock companies, have to cope with market competition. They thus face the same efficiency requirements set by the market, as do the entities based on individual entitlements – they all have to compete in order to exist. In a competitive market environment, the only collective bodies to survive are those whose internal organization has overcome the drawbacks of collective management and proved to be more efficient than that of their individual competitors.

Next, we consider another important aspect of relative privatization in conjunction with Ostrom’s theory of collective governance. Ostromian rules establish greater individual responsibility of group members for the use of resources. For proper organization, the link between benefits and responsibilities is essential, but note that the connection between the two is also the essence of private entitlements. When an individual or a group of individuals within a collective system are assigned both positive and negative entitlements over a resource or some of its attributes, she or they acquire more or less private entitlements. The final result should be termed “individualization of responsibilities” or “partial privatization” insofar as individual entitlements are established over a part of a system of collective governance. Alternatively, within such systems private property rights can be defined temporarily – through leases, concessions or other forms of temporal entitlements. Finally, “partial privatization” and “temporary privatization” may be regarded as forms of relative privatization. Thus, Ostromian rules and relative privatization are intertwined at different levels of social interactions, resulting in various degrees of publicness/privateness.

The optimal degree of publicness/privateness in any form and at any level of interaction is defined by Coase’s optimization criterion, but for this purpose, the criterion must distinguish between private and common property rights. When this distinction is accounted for (Slav, 2016a, 2017a), Coase’s criterion may be restated as follows: At any phase of development, property rights with an optimal degree of privatness/publicness will be established over a resource, if the final benefits of the rearrangement of entitlements exceed the associated costs.

Coasean rearrangements, therefore, will occur only if they provide for higher benefits and enhance entitlements’ efficiency. However, rearrangement may be impossible when the associated costs are prohibitively high. There are two methods to promote high efficiency of the entitlements over natural resources: efficient initial allocation of property rights (Coase, 1960) and maintaining low costs associated with subsequent rearrangements, i.e., transaction costs (Cheung, 1968). For a natural resource, the costs associated both with the initial establishment and rearrangements of entitlements depend on features like utility value, accessibility, separability and divisibility. The higher the value of a natural resource, the greater are the interests in it and the more costly is the establishment of entitlements with high privatness (Demsetz, 1967). The higher the costs to extract a natural resource and divide it into portions for individual consumption, the more likely it is that a number of individuals will share these costs and hold the resource in shared/collective ownership. Buchanan’s concept of the optimal number of co-owners (1965) is relevant here. The number of co-owners is determined by the tradeoffs between the benefits of reducing individual costs by sharing with other individuals and the deficiencies of collective management. That is why forms of ownership over arable land have a high degree of privatness, and entitlements to grazing lands, fishing grounds and irrigation systems usually belong to communities of users, whereas forests fall under various property regimes from individual to state, and mineral rights are most often owned by states. Natural amenities generally have poorly defined public property rights or are open access, resulting in ‘tragedies of the open access’. Hence, the relevant policy approaches are determined by:

- the natural characteristics of the resource(s) employed, e.g., utility, separability, and divisibility,
- the historically established form of use – number of so-users and degree of privatness of the internal organization of the entity,
- the transaction costs associated with rearrangements of entitlements, defined by the legal system and any other established administrative and social practices and traditions.

The examined relationships can be illustrated with examples from the works of Ostrom and other researchers in this field. Most case studies examined by Ostrom are relevant examples, as they concern communities that use resources within territories and aquatories of states, i.e., areas with established state property rights. Thus, by developing internal rules of resource governance, these communities establish communal ownership rights, which have a higher degree of privatness than state ownership. One of the examples cited by Ostrom (1990: 18–21) refers to the inshore fishery in Alanya, Turkey. To cope with problems of poor economic efficiency, the community of fishers in Alanya developed a system for allotting fishing sites. After “a decade of trial-and-error efforts”, an effective system of rules was in place to allocate fishing lots to individual fishers on a daily basis. Apparently, the fishers had to establish an organization with central governance very similar to the theoretical example in this paper. Ostrom (1990c: 58–82) also analyses several historical case studies of managing common resources in Switzerland, Japan, Spain and the Philippines. Although all four case studies confirm the mechanisms of relative privatization and individualization of responsibilities, these relationships are most evident in the example of the Spanish huerta irrigation institutions that have existed since the Reconquista. Ostrom describes three variations of the water rights in the provinces of Valencia, Alicante and Murcia. As in all other cases, communal rights emerged because of the high value of the resource. Water is vitally important for agriculture but scarce in this part of Spain; it is supplied only through expensive irrigation facilities. Water is thus prohibitively costly for individual use, and only collectively can farmers afford to use it, although collective ownership comes with centralized organization and all its associated drawbacks. Farmers are organized into communities and elect syndics, who are the executive officers of the irrigation units and participate in tribunals to resolve disputes between users. The fact that these institutions, created spontaneously centuries ago, are embedded in the system of state governance indicates that management rights have been transferred from the state to the communities. Thus public/state property rights are transformed into entitlements with lower publicness/higher privatness. This system is much more efficient than the system of state regulation, if only because a larger part of the control over water management is in the hands of individual users, who are highly interested in and responsible for sustainable use of water.

Numerous further examples demonstrate that any improvement of natural resource management is inevitably associated with either relative privatization or enhanced collective organization by raising individual responsibility. Lambini and Nguyen (2013) explore the results of the policy of forest privatization in Vietnam. They find that because
of this policy, Vietnam is one of the ten countries in the world with the highest rates of reforestation. Sikor et al. (2017) explore the potential of three different schemes of natural resource management aimed at solving environmental problems. These are the Sloping Land Conversion Program and the Voluntary Carbon Market Project in China, and a tourism revenue-sharing scheme in the NN-NEPL park in Laos. In all three cases, to achieve specific environmental goals, the states transferred property rights to communities and individuals, thereby promoting relative privatization and individualization of responsibilities.

On the other side, virtually any form of privatization of natural resources involves collective action and some degree of collectiveness. Even in Leacock’s classical example of the emergence of private property rights in Indian communities, cited by Demsetz (1967), these private entitlements are assigned to families, groups and clans – entities that have a high degree of privateness but comprise several or a number of individuals and therefore are not purely private.

4. Conclusions and main policy directions

The relationship between the theories of Coase and Ostrom analyzed in light of Buchanan’s theory of clubs is important in understanding the meaning of property rights over natural resources. The term club used by Buchanan underscores that this form of ownership is simultaneously common (to the club’s members) and private (to the entity). This type of entitlement is, in fact, pervasive over natural resources. Therefore, instead of purely private and purely public entitlements, property rights with a high/low degree of privateness or publicness should be considered. This may be a minor difference, but it has important implications.

The conclusions of this study provide a starting point for defining policies aimed at sustainable use of natural resources. Below, we summarize our conclusions and offer a policy framework with three key directions.

Because natural resources by origin are no one’s property, the initially instituted property rights have a high level of publicness. Coasean bargaining is an effective method of establishing entitlements with optimal levels of privatness/publicness, but whereas Coase’s approach is reasonably associated with privatization, in contexts of entitlements with varying degree of publicness, privatization in its traditional meaning of establishing purely private entitlements is rarely possible. Instead, Coasean bargaining generally leads to an increase in the level of privateness, which can be termed “relative privatization”. Yet even though the entity resulting from Coasean bargaining has a high level of privateness, its internal structure is usually collective. Hence, the economical and sustainable use of resources requires relevant Ostromian rules of collective management and – above all – the individualization of responsibilities. In some cases, the use of the Coasean approach may be detrimental to the use of the Ostromian approach or vice versa, but in principle the two are complementary. The Coasean approach, which results in relative privatization, may work well in combination with Ostromian principles of management of private-collective groups/communities. For a private-collective entity, the Coasean approach works at the higher level, i.e., the market level, whereas the Ostromian approach works at the lower internal level, but generally any relevant policy for efficient and sustainable use of natural resources is associated with privatization and/or individualization. The key issue is the establishment of individual responsibilities. This issue highlights the role of individuals and individualization in both approaches. We may even conclude that relative privatization is efficient only insofar as smaller communities are much more successful in enforcing individualization of responsibilities.

Drawing on these general conclusions, we can identify three main directions for efficient and sustainable management of natural resources, creating a framework for development of relevant policy measures. The first direction is establishing property rights through rules and regulations. Researchers may debate whether relevant entitlements should have higher or lower degrees of privateness, but clearly, missing or poorly defined property rights are the major problem. As Coase (1960) explains, even if the initially established entitlements are not optimal, their definition is the first requirement and step towards optimization – Coasean bargaining will do the rest. The second direction is to improve resource governance via relative privatization (i.e., the Coasean approach), and the third direction is to improve it by enhancing the systems of rules of collective management (i.e., the Ostromian approach). Relative privatization is realized either by transfer of property rights to communities, groups or organizations with higher levels of privateness, or by establishment of partial or temporary private entitlements over some resources or their attributes, e.g., by leases, concessions, and tap-and-trade schemes. Relevant policies ought to promote liberal regulations intended mainly to reduce transaction costs. Finally, the enhancement of collective management should seek to compensate for its insufficiencies, i.e., the drawbacks of centralization. High organizing costs can be reduced by establishing systems of simple and effective rules, and some defects of centralism can be rectified by enhanced control by the community’s members, accountability and transparency. For natural resource management, the level of individual responsibility is crucial; therefore, stricter definition of individual obligations and stronger links between benefits and responsibilities are essential.

One may argue that these three directions are not novel in the theory of resource management. Indeed, many theorists have underscored the benefits of privatization, many others have noted the benefits of effective regulation systems, and arguably all acknowledge the importance of proper allocation of entitlements and efficient institutions. Yet the method that we propose is new in that it accounts for the common ground between the two seemingly opposite approaches to natural resource management and may serve as a basis for their cooperation. Those who support resource privatization should bear in mind that full privatization is rarely possible, so they will also have to rely on improvements in collective management. And those who subscribe to collective use of natural resources should acknowledge that relative privatization creates smaller groups and communities with efficient collective management. What this research proposes is a framework for coordination and cooperation between the Coasean and Ostromian approaches comprising three policy directions, determined in practice by 1) the natural resources’ characteristics (e.g., utility, separability and divisibility), 2) the degree of privateness of the existing forms of use, and 3) the national and communal legal and administrative systems of resource governance.

References

Agrawal, A., 2001. Common property institutions and sustainable governance of resources. World Dev. 29 (10), 1649–1672.
Aldrich, A.A., Demsetz, H., 1972. Production, information costs, and economic organization. Am. Econ. Rev. 62, 777–790.
Aldrich, A.A., Demsetz, H., 1973. The property right paradigm. J. Econ. Hist. 33 (1), 16–27.
Barbanel, E.M., 2001. Common-Property Arrangements and Scarce Resources: Water in the American West. Praeger Publishers, Westport.
Barzel, Y., 1997. Economic Analysis of Property Rights. Cambridge University Press, Cambridge.
Buchanan, J.M., 1965. An economic theory of clubs. Economica 32 (125), 1–14.
Buchanan, J.M., Tullock, G., 1962. The Calculus of Consent: Logical Foundations of Constitutional Democracy. University of Michigan Press, Ann Arbor, MI.
Caves, R.E., Associates, 1992. Industrial Efficiency in Six Nations. M.I.T. Press, Cambridge.
Cheung, S.N.S., 1968. Private property rights and sharecropping. J. Law Econ. 76 (6), 1107–1122.
Coase, R.H., 1960. The problem of social cost. J. Law Econ. 3, 1–44.
Cole, D., 2000. New forms of private property: property rights in environmental goods. In: Bourkeart, B., DeGeest, D. (Eds.), Encyclopedia of Law and Economics. Edward Elgar, Cheltenham, pp. 274–314.
Demsetz, H., 1967. Towards a theory of property rights. Am. Econ. Rev. 57, 347–359.
Farrell, J., 1987. Information and the coase theorem. J. Econ. Perspect. 1 (2), 123–129.
Jensen, M.C., Meckling, W.H., 1976. Theory of the firm: managerial behavior, agency costs and ownership structure. J. Financ. Econ. 3, 305–360.
