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## Managing Commons across Levels of Organization

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### Abstract

Co-management has proven effective for sustainable management of natural resources. However, contemporary research indicates that in many cases local communities of resource users have developed sophisticated systems of collaboration, not only with the State but also with numerous other actors. These experiences also show that the State is no unity meaning that a community can establish different types of relations with different units of "the State". In this article the *concept co-management network* is launched as a way to label, and thereby to get a better understanding of these webs of collaborative agreements. It is conjectured that co-management networks normally are developed over significant periods of time, that they in essence nurture cross-scale institutional linkages, and that these characteristics enhance capacity building for better natural resources management. Finally, it is suggested that more research, which would explicitly employ the idea of co-management networks should be conducted.

Key words: co-management, cross-scale linkages, capacity building, network approach

### 1. Towards New Models of Co-Management <sup>15</sup>

Natural resources do not only generate income and welfare, they also provide a number of non-monetary values, for example, forests to hike in, waters to sail on, streams for angling, holy places for worship, and so forth. Thus, management of natural resources, such as forests, is typically a matter of simultaneous provision and production of both public and private goods. Common sense tells us the best actor to provide public goods, e.g. nature reserves, is "the State", while private goods, such as timber, is considered a responsibility for private actors.

Contemporary research regarding sustainable use of natural resources, has given new insights that challenge the idea of the State as the primary provider and safeguard of fresh air, pristine forests, and floundering fish. Traditional management systems seem to have much to teach that might be useful for contemporary management of common-pool resources (CPR)<sup>16</sup> (Bromley, 1992; Feeny, Berkes, McCay and Acheson, 1990; Holling, 1986; Holling, Gunderson, and Peterson, 1993; Ostrom, 1990, 1996).

There is a growing literature, which deals with the so-called linking problem, i.e., the relations between social and ecological systems (Berkes and Folke, 1998; Berkes, Colding and Folke, 2003). The aim has been to search for and theorize around linking arrangements that have been proven successful for long-term utilization of common-pool resources. In the same vein the benefits of, so called, *co-management* have been discussed. The basic idea is that it would be possible to deliberately arrange management systems where, for example, a community of people manages the appropriation, access, and maintenance of a resource together and in collaboration with public authorities.

In this article it is argued that, for sustainable management of natural resources as well as for the aim of introducing co-management as a useful alternative to the prevalent

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<sup>15</sup> I would like to thank Professor Fikret Berkes for fruitful comments on a first version of this article.

<sup>16</sup> "The term 'common-pool resource' refers to a natural or man-made resource system that is sufficiently large as to make it costly (but not impossible) to exclude potential beneficiaries from its use" (Ostrom, 1990:30). A CPR problem (dilemma) occurs when outcomes are suboptimal and when "given existing institutional and constitutional arrangements [it exists]at least one set of coordinated strategies that are more efficient than current decisions and are 'constitutional feasible'" (Gardner, Ostrom and Walker, 1990:336).

management systems, the very concept of co-management should be reconceptualized. This paper is organized as follows: In the next section the concept of co-management is discussed. In section three the underlying ideas and shortcomings of mainstream images of co-management will be discussed, in particular the image of the state. Section four contains an illustrative example of collaborative management that does not easily fit the popular image of the concept. Section five, finally, concludes the paper by proposing ways to refine the concept of co-management.

## **2. The Concept of Co-Management**

In the extensive literature on co-management, the phenomenon is discussed with reference to a number of contexts. However, it has been argued that “co-management cases have accumulated faster than they have been analyzed” (Berkes, 2000:12). Thus, there is a need to reflect upon the phenomenon, to discuss the concept of co-management as well as its theoretical underpinnings. This is the undertaking in the subsequent sections of this article.

Collaborative management, or co-management, has been defined as “the sharing of power and responsibility between the government and local resource users,” (Berkes, George, and Preston, 1991:12). According to other authors, co-management can be understood as “a situation in which two or more social actors negotiate, define and guarantee amongst themselves a fair sharing of the management functions, entitlements and responsibilities for a given territory, area or set of natural resources (Borrini-Feyerabend, Farvar, Nguinguri and Ndangang, 2000:1).

The term 'collaborative management' (also referred to as co-management, participatory management, joint management, shared-management, multi-stakeholder management or round-table agreement) is used to describe a situation in which some or all of the relevant stakeholders in a protected area are involved in a substantial way in management activities. Specifically, in a collaborative management process, the agency with jurisdiction over the PA [protected area] (usually a state agency) develops a partnership with other relevant stakeholders (primarily including local residents and resource users) which specifies and guarantees their respective functions, rights and responsibilities with regard to the PA. [...] Collaborative management regimes and other similar arrangements can and do operate also in territories that do not have a protected area status, and can apply to virtually all types of natural resources. Forests, fisheries and coastal resources, grazing lands, wildlife and even non-renewable resources (e.g., oil and mineral deposits) are included in existing management agreements among various parties. [...] We understand here 'management' as a process by which a site [...] is identified, acquired and declared; relevant institutions are built and/or enter into operation; plans are designed and implemented; research is undertaken; and activities and results are monitored and evaluated, as appropriate. (Borrini-Feyerabend, 1996:8)

Pinkerton utilizes two different models to conceptualize co-management between, what she calls, folk managed systems and the state. A “*horizontal* continuum from nearly total self-management to nearly total state management [and a] top-down, *vertical* 'contracting out' model of state management” (Pinkerton, 1994b:322–25, emphasis added). The same logic can be used to analyze co-management between other types of private and public actors; “the State” can be any public authority and the counterpart can have a number of appearances.

The horizontal model would describe co-management only as a matter of co-operation, or division of labor, between public and private actors. For example, a community of farmers might co-operate with forest authorities, thus, constituting a system of co-management. As a result of this agreement, farmers will get the services they need, for example, in the form

of the drafting of GIS-based management plans or protection from intruders while the authorities receive income for the services they provide. This model assumes that property rights are vested in either party.

According to the vertical model, in which the State is supposed to hold the legal and moral authority, co-management is characterized by devolution of rights. Using the same example, in principle, state authorities decide how forests should be managed while the farmers are given the right to act freely only if they achieve some desirable results. For example, they might be required to maintain the forest in a certain way, replant when they harvest, not run a logging enterprise in ecologically sensitive areas, etc. The State might also “contract out” tasks and let the community handle the management on its behalf.

Most types of agreements can be understood by the characteristics of these models. In Figure 1 they are combined in a way that any admixture might be described as an instance of co-management. For example, co-management arrangements of type *A* are more “state oriented” than those of type *B*. This way of reasoning has proven fruitful for analyzing a number of problems that are associated with management of CPRs (Pinkerton, 1989, 1994a).

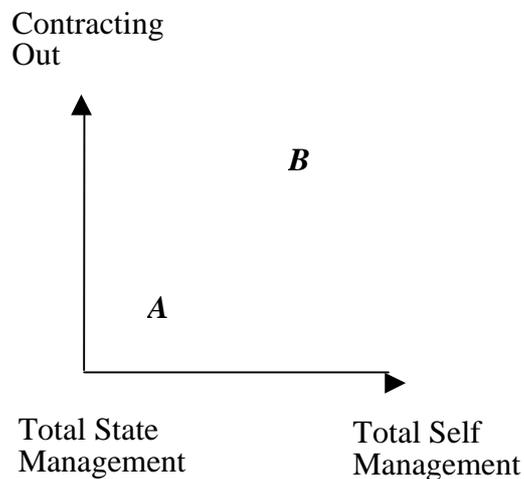


Figure 1. Dimensions of co-management.

For example, it has been discussed “[u]nder what conditions [...] an accommodation of systems to the State and the market take place without destroying the benefits of folk management?” (Pinkerton, 1994b: 321). Too close co-management with state authorities might “strip [the folk system] of political power,” while co-opting by the market may lead to “shedding [the] obligations to be accountable to sound resource management and equity within the folk community” (p. 321). This argument states that the agreements are too far to the right on the x-axis in Figure 1. The idea is that total self-management might leave the field open for some destructive mechanisms of the market, for example, that powerful companies buy, or in other ways dictate the conditions for the use of the local resource. Also, excessive fraternization with the state, on the other hand, might reduce the local community to a tool for public policy. This argument states that such agreements are too far to the left on the x-axis in Figure 1.

Like Pinkerton, also Berkes, George, and Preston (1991) stress the fact that co-management has to be looked upon as a continuum from a simple exchange of information to formal control or partnership. Where on this scale the “optimum” is located is impossible to decide. Generally, such judgements depend on how one considers the trade-off between different criteria for success. For instance, it is likely that high economic efficiency will be achieved at the expense of redistribution and equalization among users (see also Ostrom,

Schroeder and Wynne, 1993: 116 ff.). Since it is implicit that co-management presupposes that parties agree on the arrangement it has also been emphasized that co-management should be seen as a process rather than a fixed state (Beck, 2000:4)

However, research about forest commons, about fisheries, or natural parks (Carlsson, 1999; Rova, 1999; Weitzner, 2000) indicate that these tools (“scales”) for discussing systems of co-management between a community of resource users, the State and other actors, must be further developed.<sup>17</sup> Existing concepts have problems in capturing the complexity and variation in contemporary systems of government, which in many cases are tailored to adapt to the complexities of ecosystems. For instance, within the same resource system different management tasks can be subject to different couplings and agreements with the state. In fact, it can also be the case that different parts of “the State” have different agreements or collaborative connections with the same community. These circumstances indicate that, a reconceptualization of the image of co-management is desirable. This is the topic of the next section.

### **3. Co-management as a Means of Establishing Cross-Scale Linkages.**

The concept of co-management is built on the assumption that some coherent public actor or unit, typically the State, co-operates with some equally unified private actor typically a local community of resource users. This image can be questioned, however. First, it does not reflect the complexity of contemporary governance systems (Pierre and Peters, 2000). Secondly, it may keep us from appreciating how communities of resource users, such as forest commons, tend to develop rather sophisticated systems of relations that span across different scales of organization.

Generally, the State can be understood with the use of different types of definitions. *Organizational definitions* consider the State to be particular configurations of governmental units while functional definitions refer to its function, such as, the maintenance of social order in society (Dunleavy and O’Leary, 1987). A third *mosaic* alternative would be to apply a network approach, i.e., to employ “a decentralized concept of social organization and governance” (Kenis and Schneider, 1991:26).

In most policy areas, different governmental units participate in a number of organized activities, which can be understood as issue networks, implementation networks, policy communities, etc. The network approach does not presuppose that the State is any predominant actor or that political, administrative hierarchy, by definition, structures a policy area. Thus, the policy outcomes of network activities depend on how the networks are structured. To summarize: the network perspective can be distinguished by its (a) nonhierarchical way of perceiving the policymaking process, (b) its focus on functional rather than organizational features, and finally (c) its horizontal scope (Carlsson, 2000:505).

Usually, policy networks are mapped by means on bottom-up methods meaning that empirical problems and problem solving activities, not political decisions, serve as the guiding principle. One straightforward way of summarizing this bottom-up methodology is to say that the analyst basically asks two questions: 1) what is the problem to be solved? 2) Who participates in the problem solving process? (Carlsson, 1996; Sabatier, 1986)

By adopting this approach we acknowledge the fact that the State simultaneously can adopt a number of attitudes and appearances that sometimes are contradicting (Carlsson, 1995,

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<sup>17</sup> This is explicitly discussed in Carlsson L. and F. Berkes (2003). *Co-management Across Levels of Organization: Concepts and Methodological Implications*. Lead paper prepared for the Resilience panel at the Regional Workshop of International Association for the Study of Common Property (IASCP), “Politics of the Commons: Articulating Development and Strengthening Local Practices”, Chiang Mai, Thailand, July 11-14, 2003.

2000). According to this view, the State can hardly be conceptualized as a unity,<sup>18</sup> something that has been discussed long before the network approach became a part of political science (McIver, 1947; Lasswell, 1956; Lindblom, 1965; Ostrom, 1985:14). However, the mainstream image of co-management is built on the image of the State as a unity, as it has been outlined above.

In a seminal article Ostrom, Tiebout and Warren (1961) have stressed the importance of distinguishing between the production and provision of a good. For example, it is a well-known fact that a public agency might provide a good while a private actor (like a group of fishermen) handles the production. Also this insight has implication for the image of the State in relation to co-management. For instance, one can ask if the presumed co-management agreements with the State are based on *provision* or *production* of goods and services. We should also clarify if we talk about *public* or *private* goods. When it comes to public goods the distinction between production and provision is quite important. "The organization of provision [...] relates primarily to consuming, financing, and arranging for and monitoring the production of goods and services" while production has to do with the "manufacturing" of products and services (Ostrom, Schroeder and Lynne, 1993: 75). Without elaborating further on this topic, it is essential to note that the processes of production and provision are associated with different types of transaction costs. It means that in essence co-management agreements have different qualities depending on the type of goods that is involved and whether these are produced, provided, or both (and by whom).

In the next section an example will be used in order to support the idea that co-management systems are often much more sophisticated than is generally assumed. The example also illustrates that the notion "the State" might as well be a "misnomer" for a more complex system of governance (V. Ostrom, 1985:14). The example also demonstrates.

#### 4. Co-management, an Empirical Example

The Swedish community-managed forests have demonstrated a remarkable viability and have succeeded in adapting to industrialized society. This has been accomplished as a result of the development of a rich web of co-management agreements with different types of actors (Carlsson, 1999). Thus, the Swedish forest commons are used to illustrate the main message of this article, i.e., that co-management often is a more complicated enterprise than might be anticipated. This paper is built on the presumption that this is true for many types of commons not only in modern industrialized society.<sup>19</sup>

In Sweden community managed forests, called forest commons, are organized in the following way. Each farmer possesses an individual share in a collectively owned forest area that can be as big as 60.000 hectares. Since the shares coincide with the properties (farms), companies can also hold shares. Research has revealed that these units have succeeded fairly well to keep up with modern forest management and no signs of "the tragedy of the commons" can be detected (Carlsson, 1999). A special law (Swedish Code of Statutes, SFS 1952:167) regulates the community-managed forests, their organization, some of the activities, and the role of state control. In addition, the commons have their own bylaws. To summarize: the whole system is *guaranteed by the State* and the order is codified in laws and regulations.

A chairman and a board elected by the shareholders govern each forest common. The law requires a person with higher education in forestry to be associated with the common. This forest manager manages the forest according to laws and rules and, ultimately, the wishes of the owners. A compulsory forest management plan supplies the framework for the forestry activities. The profit from the commons is distributed as cash amounts to the

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<sup>18</sup> For example, already in the 1980s it was shown that in Sweden more than 80 public authorities were eligible to produce statutory rules (Lane et al., 1988: Ch. 2).

<sup>19</sup> For another example, see Rova and Carlsson, 1999.

shareholders (proportional to their shares) or as subsidies (“contributions”) to the shareholders but also for general purposes in the district. Subsidies are often dedicated to support the forestry of the farmers (the shareholders). For example, they are paid per forest plant or according to the size of draining areas. In some commons all economic yields are reinvested in the district in order to run water a purification plant, a local sawmill, or to maintain roads. In short, the commons participate in authoritative allocation of goods (benefits and burdens) in society, the latter referring to a standard definition of politics. As we shall see, a sophistic system of co-management has been developed.

**Collaboration with State Authorities:** The commons have built alliances with several authorities involved in enforcing the Nature Conservation Act and the National Silvicultural Act, with mutual benefits. State employed and locally stationed forest rangers are responsible for all forestry-related controls. The commons purchase their services for forest inventory and assessment services, and for helping control the distribution of their own subsidies amongst community members. By paying state authorities for this service, the commons do not have to bear all the costs of maintaining their own control system. They also protect themselves from future disputes with authorities regarding the demands for biodiversity, the preservation of protected biotopes, etc. Who is to blame the commons when the State has done the job?

Another type of agreement has to do with the implementation of forest policy. Farmers are no longer required to have written forest management plans for their own private lands. However, by means of subsidies the commons encourage them to draft such plans. Thus, the commons have an agreement with State forest managers for bringing this service to their shareholders. Since details in the management plans must be orally explained to the individual farmer, state officials get extraordinary opportunities to spread and implement state forest policy among private forest owners. The value of this type of face-to-face implementation could hardly be underestimated.

**Collaboration with private companies:** When forestry was a manual enterprise, all commons had their own staff of loggers. Today there are virtually no manual loggers left in Swedish forestry. The commons have faced significant pressure to adjust to these changes. One method of dealing with technological change is to externalize harvesting costs. Thus most commons practice stumpage sale. In this way, the buyer defrays the cost of technology, and of its improvement and renewal. Where no market for stumpage sales exists, delivery agreement and renewal felling contracts are common. These agreements can be based on harvesting with the commons’ own machinery, but generally most commons have kept their machinery ownership to a minimum. The commons have also adapted in other ways through other forms of mechanization and a reduction in personnel.

**Collaboration with the Sámi:** The majority of common forests are located in areas in which reindeer herding by the indigenous Sámi people is practiced. The Silvicultural Act # 20 stipulates that consultations must be held with the Sámi before any logging can be performed on lands they use for all-year-round grazing. The commons have negotiated with the Sámi before constructing roads, harvesting, etc. Since different groups of Sámi have different historical locations and patterns of moving their herds, one basic problem for the commons is to decide which groups they would regard as ‘concerned parties’ or stakeholders. They have solved this problem by letting the Sámi people themselves decide which group they regard as concerned by a particular logging operation. This co-management of the commons seems to function quite well. Since 1971 there has been only one appeal against a logging decision made by a common. Since the commons agree to adjust their activities to reindeer herding, relations with the Sámi have been remarkably free from conflicts.

**Collaboration with the Guarantor of the Rule of Law:** One problem with the Swedish commons forests is the increased number of remote owners. In general, the commons have

adopted the principle that every farm owned by more than two persons must appoint a deputy. This person votes on behalf of the others at the assembly meetings and is also the recipient of the annual cash amounts or other types of support from the common to the single farm. This principle is based on law that is aimed at facilitating the relation between the state authorities and the farmers, *not* between the commons and their members. The commons have simply decided that the law also is convenient for their purposes and as a result they have reached an agreement with the state forest service authorities.

Geographical cross-scale linkages are established in different ways. The forest commons have established an umbrella organization aimed at promoting their joint interests. This organization functions as an interest group and a policymaking organization for the commons in relation to public authorities and other actors that may affect their activities. The umbrella organization also has the role of facilitation exchange of information among its members and to spread information concerning technologies of forest management, etc. For instance, representatives of the commons participate in annual forest excursions that are held on the premises of single commons in different parts of the country. At these occasions, experts may be invited to discuss new forest management techniques or a common might demonstrate how it has chosen to manage its forest. In short, all these activities serve the purpose of linking the forests commons geographically. As a by effect many types of information are exchanged something that makes it possible for the commons to coordinate their activities and promote joint interests.

Other types of agreements are more implicit. For example, in six of the commons companies possess more than 40% of the shares and as a consequence they have the legal rights to appropriate a significant part of the yield. In none of the commons, however, do companies execute their rights in proportion to their holding of shares! This is due to deliberate efforts by the commons to mitigate the effects of the development. Companies are obviously willing to pay this price for keeping good relations with farmers in districts in which they operate. Also this solution can be understood as one type of collaboration agreement in the web of agreements that has been developed. In addition, the commons have developed systems of co-management with local public institutions – schools, non-profit making organizations, etc.

Another example is the practice that allows farmers not to fulfill duties that are regulated by law. For example, the commons are still required to inform and send documents to the county board regarding harvesting, economy, etc. Some of the commons are in fact formally required to deliver their income to the county board and then to apply for the amount of money they want to distribute or reinvest. Even though the law stipulates this, it is not practiced any longer. Other rules they simply escape from. For instance, some of the commons are not allowed to endow their individual shareholders with cash amounts but by renaming a cash amount a “general subsidy for forestry purposes,” the rule is circumvented. The authorities accept this as some kind of unwritten agreement.

There are also a number of other collaborative agreements that could be added to the picture, such as, agreements between a number of communities regarding joint forest management, cooperation with environmental groups, tourist entrepreneurs, etc. However, for the sake of argument, the examples provided might serve as sufficient illustration.

Together, these examples also constitute a good illustration of the mixed or negotiated economy with floating borders between different sectors (Nielsen and Pedersen, 1989). Thus, it is logical to assume that in such societies co-management is arranged accordingly. Obviously the owners of the commons have succeeded in navigating the complexity of modern governance. In fact it has been conjectured that the (many-headed) co-management system, briefly sketched above, that has been developed has been possible because the farmers has retained their “time and place knowledge”.<sup>20</sup> This has reduced transaction costs,

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<sup>20</sup> See, Hayek, 1945. For an application of the concept see, Ostrom, Schroeder and Wynne, 1993:49 pp.

something that might explain the relative success of the Swedish forest commons (Carlsson, 1999:14 pp.).

### 5. Co-management Networks

The principal features of the previous example are illustrated in Figure 2. In the example, a community is supposed to manage a natural resource, for instance a forest. All management systems consist of a number of tasks, illustrated by A – F in the figure. To manage these tasks a number of relations, or agreements, might be established with various public hierarchies (illustrated as pyramids in the figure) comprising something called “the State”. Thus, in the example the State consists of all types of public agencies, from the central level of government down to the local municipality. Of course, there are also tasks that are managed by the community itself. The left part of Figure 2 indicates that some management tasks might be subject to collaborative agreements with companies and other private actors.

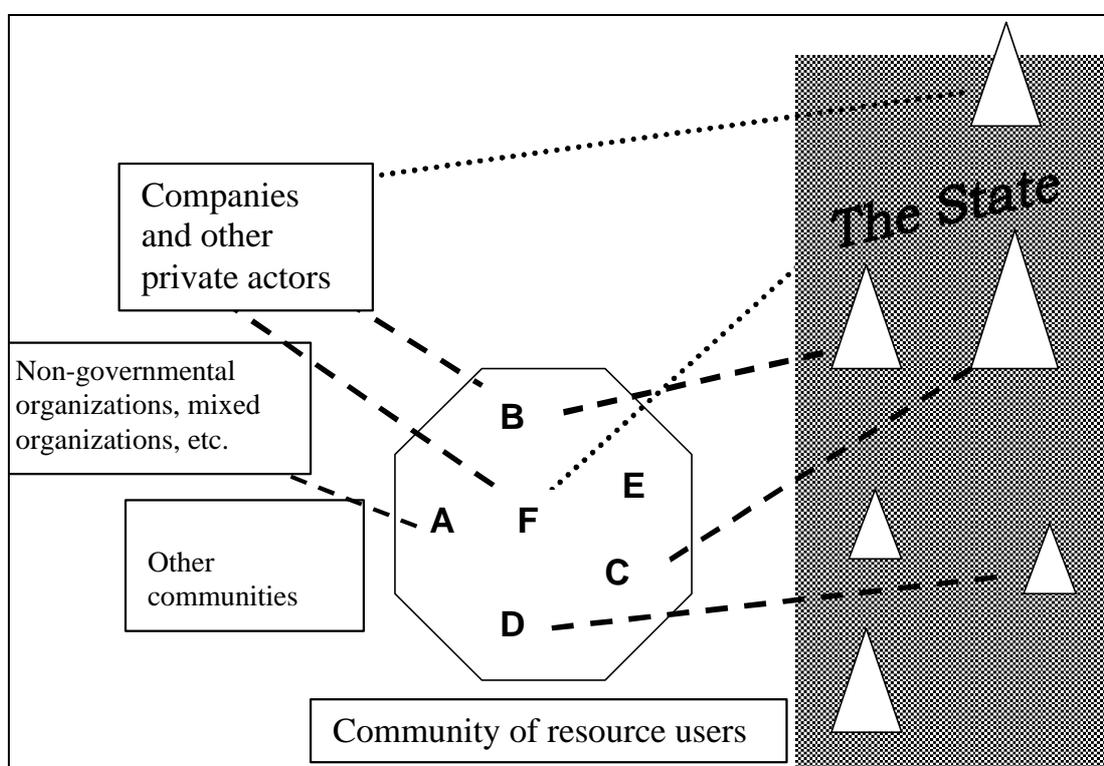


Figure 2. Example of a co-management network.

*The picture would become even more complicated if one incorporates semi-public authorities, quasi non-governmental organizations, non-governmental organizations, etc. that also might have collaborative relations with the community under focus. Together, the whole system can be understood as a co-management network, a structure, consisting of a number of couplings with a multitude of different units, such as, commercial agreements (in our example both with companies and state authorities), legal relations, contracting out agreements, monitoring agreements, enforcement collaboration, and information exchange. Collaboration agreements among single commons, such as those among the Swedish forest commons, would make the picture even more complicated.*

However, there are two more features that add to this complexity, namely the physical attributes of the resource under focus and the institutional arrangement that applies to the single community (not indicated in Figure 2). For example, due to its ecology, a boreal forest requires other management strategies than a tropical rain forest; woods in the Swiss

Alps are different than those on the Siberian taiga, and so forth (Imperial, 1999; Ostrom, Schroeder and Wynne, 1994). Also communities are obviously different, they are organized in various ways, they have different history, culture, etc. To a great extent, attributes of the physical world have shaped the institutional arrangement that has evolved. The implication for the image of co-management is that the rich variety of common-pool resources and an even greater multitude of socioeconomic systems (linked to these systems) are likely to be associated with even more complicated co-management arrangements than has been described above. Many systems are so familiar to us that we do not see the “beauty” of their complexity. To get a better understanding of such systems, more research that explicitly applies a network approach is required (Carlsson, 2000). What are the implications of such an approach?

## **6. Implications for Research**

An integrated part of contemporary research about natural resource management, as well as the concept of co-management, is the idea of power sharing. For example, all instances of collaborative agreements between a community of resource users and the State are, presumably, based on some kind of division, or sharing, of rights and responsibilities. This is not a matter of dispute, however. The basic arguments in this article intend to move the discussion further. Firstly, it is emphasized that co-management is not only a set of agreements between the State and a, likewise unified, counter part, like a community of users but a web of relations across different levels of organization.

Secondly, since both ecological and institutional systems are multifarious and complex it can be assumed that most systems of co-management show the same characteristics. One way of mapping such systems is to start with a list of tasks that are to be performed to manage the resource. Two general questions can serve as guidance for the research: What management tasks are to be performed and what are the problems to be solved? Who will participate in, or put restrictions on, these activities and related problem solving processes? The advantages of starting the analysis with the tasks are twofold. The tasks serve as the guiding principle that leads the researcher to find a relevant unit of analysis, the co-management network. It also has the effect that one appreciates that power sharing is the result, not the start, of the process. This also supports an observation by many researchers, that co-management is the result of extensive deliberation and negotiation a process rather than a fixed state.

Finally, it should be emphasized that the idea of searching for co-management networks also call attention to another important feature of natural resources management, the importance of developing cross-scale institution linkages (Berkes and Folke, 1998; Berkes, 2002). What becomes obvious by studying a co-management network, such as the one discussed earlier in this article, is that the web of agreement that has been developed, is the result of activities over an extensive period of time. The network consists of relations that connect central levels of decision making to those of local choice, past events to present, and one geographical area to another. These types of cross-scale systems have proven essential for the prospect of, so called, capacity building, understood as “the sum efforts needed to nurture, enhance and utilize the skills and capabilities of people and institutions at all levels – nationally, regionally and internationally” (Berkes, 2002; Olsson, 2000).

## **7. Conclusion**

Co-management has proven to be a popular solution to many problems associated with management of common-pool resources. However, before suggesting co-management as a general remedy for various CPR problems, one must ask if the call for co-management is

caused by the fact that power has been taken away from the local community in the first place. If so, for example contracting out might as well be an attempt for state authorities to increase the legitimacy of their domination. To offer a co-management agreement might, in fact, be a means of codifying the existing situation. Thus, co-management is not good or bad *per se*.

In most literature, co-management is analyzed along two dimensions, *horizontal*: from self-management to state management and *vertical*: contracting out from the State. In this article another approach has been launched, *a mosaic model* characterized by a combination of different strategies *and* a fragmented state. These webs of relations have the quality of linking units and organizations across different levels of organization. Based on an example, it has been argued that it is often more appropriate to describe such co-management arrangements as networks, i.e., webs of agreements forming a system of relations to public authorities, companies, and other actors. This insight calls for a reconceptualization of the image of co-management. The introduction of the notion co-management network is an attempt to do this.

However, more research is needed to give better empirical support for this idea. Social network analysis, in combination with policy analysis, provide a number of useful tools that have proven useful to get a better understanding of complicated institutional arrangements with different types of actors involved (Carlsson, 1996, 2000; Scott, J. 1994). Local communities, such as the shareholders of the Swedish forest commons, have noticed that the State is not homogenous, something they have used to their advantage. Generally, communities, which can utilize this fragmentation of state power, have great opportunities to create co-management systems that substantially enhance the ability to manage natural resources in a sustainable way. Such systems, well tailored, help to reduce transaction costs and make management cheaper. However, creating co-management networks requires that the architects of these have a substantial local knowledge. Hence, it is unlikely that such arrangements can be created from above. Local communities stripped of power have few opportunities to create appropriate co-management networks. It is likely that a substantial degree of self-governance is needed to accomplish this.

## References

- Beck, P. (2000). *Collaboration and Credible Commitments: Experiments with Collaborative Resource Management in Uganda*. Paper presented at the 2000 Meeting of the International Association for the Society of Common-pool Property (IASCP), May 31-June 4, Bloomington, Indiana, USA.
- Berkes, F., P. George, and R. Preston, (1991). Co-Management: The Evolution of the Theory and Practice of Joint Administration of Living Resources. *Alternatives*, 18(2), pp. 12-18.
- Berkes, F. and Folke C., eds. (1998). *Linking Social and Ecological Systems, Management Practices and Social Mechanisms for Building Resilience*. Cambridge: Cambridge University Press.
- Berkes, F. (2002). *Cross-Scale Institutional Linkages: Perspective from the Bottom Up*, in Ostrom, Elinor, Thomas Dietz, Nives Dolšak, Paul C. Stern, Susan Stonich, and Elke U. Weber, eds. *The Drama of the Commons*. Washington, DC: National Academy Press, pp. 293–321.
- Berkes, F., J. Colding and C. Folke, eds. (2003) *Navigating Social-Ecological Systems, Building Resilience for Complexity and Change*. Cambridge: Cambridge University Press, pp. 163–185.
- Borrini-Feyerabend, G., M. T. Farvar, J. C. Nguingiri and V. Ndangang (2000). *Co-management of Natural Resources: Organising Negotiation and Learning by Doing*. Heidelberg, Ge: Kasperek Verlag.
- Borrini-Feyerabend, G. (1996). Collaborative management of protected areas: Tailoring the Approach to the Content. <http://www.iucn.org/themes/spg/Tailor/index.html> (18 09 2000).
- Bromley, D., Ed. (1992). *Making the Commons Work*. San Francisco: ICS Press.
- Carlsson, L. (1995). *Skogsallmännigarna i Sverige. (Forest commons in Sweden.)* Research Report, TULEA 1995: 22, Luleå University, Sweden.

- Carlsson, L. (1996). Nonhierarchical Implementation Analysis. An Alternative to the Methodological Mismatch in Policy Analysis. *Journal of Theoretical Politics*, Vol. 8 No. 4, 527–546.
- Carlsson, L. (1999). Still Going Strong, Community Forests in Sweden. *Forestry* 72(1), pp. 11–26.
- Carlsson, L. (2000). Policy Networks as Collective Action. *Policy Studies Journal*. 28(3), pp. 502–520.
- Carlsson L. and F. Berkes (2003). *Co-management Across Levels of Organization: Concepts and Methodological Implications*. Lead paper prepared for the Resilience panel at the Regional Workshop of The International Association for the Study of Common Property (IASCP), “Politics of the Commons: Articulating Development and Strengthening Local Practices”, Chiang Mai, Thailand, July 11-14, 2003.
- Dunleavy, P. and B. O’Leary, (1991). *Theories of the State*. London: Macmillan
- Feeny, D. Berkes, F. McCay, B.J. and Acheson, J.M. (1990). The Tragedy of the Commons: Twenty-Two Years Later. *Human Ecology*, Vol. 18, No. 1, pp. 1-17. 1990.
- Gardner, R., E. Ostrom and J. M. Walker (1990). The Nature of Common-pool Resource Problems. *Rationality and Society*. 2(3), July, pp. 335–358.
- Hayek, F. A., (1945). The Use of Knowledge in Society. *American Economic Review* 35 (Sept.), pp. 519–530.
- Holling, C. S. (1986). The resilience of terrestrial ecosystems: local surprise and global change. In Clark, W. C. and Munn, R. E. (eds.) *Sustainable Development of the Biosphere*, Cambridge: Cambridge University Press.
- Holling, C. S. Gunderson, L. and Peterson, G. (1993). *Comparing Ecological and Social Systems*, Stockholm: Beijer International Institute of Ecological Economics.
- Imperial, M. T. (1999). Institutional analysis and ecosystem-based management: The institutional analysis and development framework. *Environmental Management*, 24(4), 449–465.
- Kenis, P. and Schneider, V. (1991). Policy network and policy analysis: Scrutinizing a new analytical toolbox. In B. Marin & R. Mayntz (Eds.), *Policy Networks, Empirical Evidence and Theoretical Considerations* (pp. 25-59). Frankfurt am Main: Campus Verlag.
- Lane, J-E. et al. (1988). *Byråkrati och administration (Bureaucracy and Administration)*. Sockholm: Studentlitteratur.
- Lasswell, H. (1956). *The Decision Process, Seven Categories of Functional Analysis*. Bureau of Governmental Research, College of Business and Public Administration, University of Maryland, College Park.
- Lindblom, C. E. (1965). *The Intelligence of Democracy*. New York: The Free Press.
- MacIver, R. M. (1947). *The Web of Government*. New York: MacMillan.
- Nielsen, K. and Pedersen, O. K. (1989). *Toward a Theory of the Negotiated Economy*. Working paper no 1/89. Roskilde, Denmark: Institut for Samfundsøkonomi og Planlægning.
- Olsson, P. (2000). *Building Capacity in Social-Ecological Systems to Respond to Change*. Licentiate Thesis 2000:4, ISSN 1401-4106, Stockholm: Stockholm University, Department of Systems Ecology.
- Ostrom, E. (1990). *Governing the Commons*. New York: Cambridge University Press.
- Ostrom, E. (1996). *Private and Common Property Rights*, Workshop in Political Theory and Policy Analysis. Bloomington: Indiana University.
- Ostrom, E., L. Schroeder and S. Wynne, (1994). *Institutional Incentives and Sustainable Development: Infrastructure Policies in Perspective*. Boulder: Westview Press.
- Ostrom, V., C. M. Tiebout and R. Warren, (1961). The Organization of Government in Metropolitan Areas: A Theoretical Inquiry. *American Political Science Review*, 55 (Dec.), pp. 831–842.
- Ostrom, V. (1985). Multiorganizational Arrangements in the Governance of Unitary and Federal Political Systems. In Hanf, Kenneth and Theo A.J. Toonen, eds. *Policy Implementation in Federal and Unitary Systems. Questions of Analysis and Design*. Dordrecht: Martinus Nijhoff Publishers, pp. 1–16.
- Pinkerton, E., Ed., (1989). *Cooperative Management of Local Fisheries, New Directions for Improved, Management and Community Development*. Vancouver: University of British Columbia Press.

- Pinkerton, E. (1994a). Economic and Management Benefits from the Coordination of Capture and Culture. *North American Journal of Fisheries Management*, 14(2), pp. 262–277.
- Pinkerton, E. (1994b). Summary and Conclusions. In Dyer, Christopher L. and James R. McGoodwin, Eds., *Folk Management in the World's Fisheries: Lessons for Modern Fisheries Management*, Niwot Co: University Press of Colorado, pp. 317–337.
- Pierre, J. B. and G. Peters, eds. (2000). *Governance, Politics and the State*. Basingstoke: Macmillan
- Rova, Carl and Lars Carlsson (2001) When Regulation Fails: Vendace Fishing in the Gulf of Bothnia. *Marine Policy*, Vol. 25, pp. 323–333.
- Sabatier, P. (1986). Top-down and Bottom-up Approaches to Implementation Research: A Critical Analysis and Suggested Synthesis. *Journal of Public Policy* 6(1), 21–48.
- Scott, J. (1994). *Social Network Analysis*. London: Sage
- Weitzner, V. and F. Marvin (2000). *Towards a Typology of Power at Play in Co-management: The Case of Cahuita National Park, Costa Rica*. Paper presented at the Eighth Biennial Conference for the International Association for the Study of Common Property (IASCP), Bloomington IN, USA, May 31- June 4, 2000.