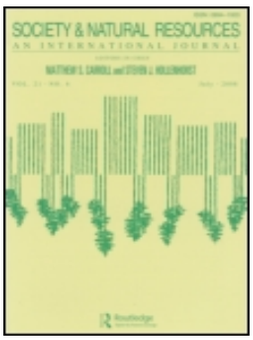

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Collective Action in Common-Pool Resource Management: The Contribution of a Social Constructivist Perspective to Existing Theory

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The question of how to organize the sustainable exploitation of common-pool resources (CPRs) is an important issue on a global environmental agenda. We argue that the current approach to collective action in CPR management has a number of shortcomings related to (1) the focus on single-use CPRs and (2) the formulation of a priori design principles for successful collective action, which hinders rather than facilitates CPR research and policies. We propose a social constructivist perspective for the study of CPRs, and discuss its implications for research and policy programs. This approach studies the CPR as an entity within a wider external environment, focusing on resource users' motivations for certain action strategies. The outcome of collective management is considered to be the result of interactions between stakeholders and nonhuman entities, which depends on the way social actors "socially construct" their everyday reality. A case study of Irish fishermen, who felt alienated from their fishery as a result of the expansion of commercial finfish farms, and who created common property rights to secure access to the fishery, forms the empirical basis for this study.

Keywords collective action, common-pool resources, design principles, fisheries management, social constructivism

The study of common-pool resources has gained increasing popularity in the discussion on the sustainable exploitation of our natural resource base. Common-pool resources (CPRs) are resources for which exclusion of users is difficult to achieve and for which joint use reduces the availability of benefits derived from the resource for others. The debate on their sustainable management has been driven by the "tragedy of the commons" thesis, which predicts the overexploitation and eventual ruin of all common resources due to individual users' rational incentive to maximize utility (Hardin 1968). The thesis has been applied to a variety of resource management issues and policy decisions, most notably in fisheries, forestry, and watershed management (Feeny et al. 1990; Feeny et al. 1996; Penning-Rowsell 1994; Taylor

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1998). Traditionally, privatization and government control have been regarded as solutions to the tragedy (Hardin 1968; Olson 1965). Recently, however, there has been a shift toward the potential of community–based management, driven by empirical evidence that CPR users *are* capable of creating effective governance rules (Bromley et al. 1992; Ostrom 1990).

The "commons debate" has been complicated by a conceptual misunderstanding about the nature of common–pool resources, exacerbated by Hardin's unfortunate use of the term "common" to describe an "open access" regime. CPRs are variously referred to as "open access," "common property," and "the commons." Edwards and Steins (1998a) point out that a wide range of resources might be used in common by more than one person, thus comprising a common pool from which individuals might draw products or benefits. Such resources may or may not be characterized by the presence of formal or informal decision–making arrangements to govern their use. CPRs can be managed under four basic types of regimes: (1) "open access," which refers to a "free for all" situation, where rules regulating access to and allocation of benefits from the resource are absent; (2) "public property," where access rights for the public are held in trust by the Crown or state; (3) "private property," where tradable rights are owned by an individual, household, or company; and (4) "common property," where a set of rules is present to govern access to, allocation of, and control over the CPR. The presence of decision–making arrangements is of particular importance, since it is these rules that may prevent the common–pool resource from degrading (ibid.).

In common–property regimes, some form of organized collective action between the individuals constituting the user community is essential, since a collective effort is required to manage access to the CPR and the allocation of the benefits it produces. The question on the voluntariness of collective action has resulted in a tremendous body of literature. The empirical basis for collective action theories is laid either by research in controlled, laboratory circumstances (Mannix 1991) or, as is the case for this article, by research into real–life cases of CPR management (Bromley et al. 1992; McCay and Acheson 1987).

This article has two objectives. First, we critically review the current approach to the study of collective action processes in common–pool resource management (CPRM) scenarios. Our argument is that CPR theory is too limited to explain either the persistence or the failure of collective action processes, since (1) it is based on the assumption that CPRs are single–use resources; (2) it tends to focus on "internal" factors contributing to collective management, thereby disregarding external factors influencing stakeholders' decisions; and (3) it draws heavily on a postpositivist ontology in assuming that outcomes of collective action processes are determined by a number of predefined design principles, taking attention away from the *process* through which collective action is constructed (and reconstructed) by the stakeholders.

Our second objective is to discuss the contribution of a social constructivist approach to deal with these shortcomings. This perspective studies the state of affairs in an action arena as the outcome of interactions between stakeholders, other people, and nonhuman entities, and assumes that these interaction processes are based on the way actors "socially construct" their every day reality (Berger and Luckmann 1967; Callon and Law 1995; Guba and Lincoln 1989; Knorr–Cetina 1981; Verschoor 1997). We argue that this approach has two benefits for the study of CPRM. First, it explicitly focuses on the resource users' construction and perceptions of the CPR and its external environment, which will assist researchers and

practitioners to be sensitive to both internal and contextual factors influencing resource users' motivations to adopt certain action strategies regarding CPRM. Second, it puts aside any predefined conditions for successful collective action, which obscure the complexities involved in the evolution of collective action and hinder the understanding of its dynamic nature. Rather than describing the outcomes of CPRM, a social constructivist perspective helps to *explain* such outcomes. A case study of CPRM by a group of Irish fishermen forms the basis to support our main arguments.

The article is organized into six subsequent sections. The following section presents a critical reflection on CPR theory and, in particular, its use of design principles to prescribe "successful" collective action. The third section presents a brief introduction to the social constructivist approach. Section four presents the case study of the establishment of a shellfish cooperative in Northwest Connemara, starting with a description of the research setting and research methodology. The case study has two goals. First, it demonstrates that the presence of design principles for collective action does not necessarily lead to what CPR theorists would call "successful collective action" and that the meaning of "success" (and "failure") is constructed differently by different stakeholders. It supports our critique on CPR theory by illustrating how the collective action of the Irish fishermen prevented the expansion of commercial salmon farms in their fishing grounds and explaining the subsequent collective action problems they faced. Second, the case study forms the basis for a discussion of the potential of a social constructivist perspective to the study of collective action in CPRM. The fifth section evaluates the social constructivist perspective in light of the analysis presented in the case study. The final section of the article concludes with recommendations for future research and policy regarding the management of CPRs.

CPR Theory and Design Principles

In a CPR scenario, collective action typically occurs if resource users seek to overcome the problems associated with the "the tragedy of open access" and agree on decision-making arrangements governing CPR use. Collective action processes, however, always go hand-in-hand with the free-rider problem. A free-rider is an individual who chooses to receive a higher payoff for a socially defecting choice than for a cooperative choice, even though all individuals will get a higher payoff if they all cooperate (Hardin 1968; Mannix 1991; Olson 1965).

CPR scholars have developed a large body of literature about the organization of collective action in natural resource management. Two critical themes, which are based on extensive empirical studies, can be identified. First, based on Oakerson's work (1992), analytical frameworks have been developed. These frameworks are tools to study the outcomes of CPRM by exploring patterns of interaction between (1) the physical and technical characteristics of the CPR; (2) the institutional framework for CPRM; and (3) the social characteristics of the user community. We refer to Edwards and Steins (1998a) for a detailed discussion of such frameworks. Second, CPR scholars have started to focus on the formulation of conditions or design principles underlying successful collective action. This practice was initiated at the Panel on Common Property Resource Management at the National Research Council Conference in 1986, where Elinor Ostrom, based on discussions with participants, produced a list of variables "associated with the establishment of coordinated or organized strategies for managing common-pool resources" (Ostrom 1992, 294). The

original list has since been further developed, based on CPRM studies world–wide (Hanna et al. 1995; Libecap 1995; Ostrom 1990; Pinkerton and Weinstein 1995; Wade 1988; White and Runge 1995). Table 1 gives an overview of these principles.

The design principles are increasingly considered to be *requirements* for the organization of collective action[1]; that is, if governing institutions meet these criteria, "successful" collective action is likely to prevail and the institutions will then form "a critical component of environmental outcome" (Hanna et al. 1995, 20). Although Ostrom (1995, 43) stresses that "there is no blueprint that can be used to create effective local institutions," she recommends that "[design] principles can be taught as part of extension programs. Associations of local units can be created to learn more from one another about how successes have been achieved or how to

TABLE 1 Design Principles for Collective Action as Developed in CPR Theory

Wade's conditions for successful CPRM (1988):
1. The nature of the resource
2. The costs of exclusion technology
3. The relationship between resources and user groups
4. The characteristics of the user group
5. Noticeability of cheating
6. The relationship between users and the state

Ostrom's design principles characterizing robust, simple common–pool resource systems (1990):
1. Clearly defined boundaries
2. Congruence between allocation and access rules and local conditions
3. User's ability to modify the operational rules through collective–choice arrangements
4. Monitoring of management system
5. Graduated sanctions
6. Conflict resolution mechanisms
7. Management rights of resource users are not challenged by external agents

Hanna et al. design principles of property rights regimes (1995):
1. Definition of legitimate interests in the CPR
2. Articulation of rules for user participation
3. Congruence of rights and responsibilities
4. Incentive structure of rules reflects long–term sustainability of CPR
5. Congruence of boundaries
6. Distribution of decision–making authority
7. Provision of monitoring, sanction, and enforcement mechanisms

Pinkerton and Weinstein's basic criteria for fruitful collective resource management (1995):
1. Accountability
2. Effectiveness
3. Representativeness
4. Adaptability

avoid some kinds of failures," thereby granting design principles a prescriptive status.

On the basis of our own experiences of applying CPR theory in field settings, we have been able to identify three problems. First, much of the empirical work underlying CPR theory has focused on resources that are subject to one single, extractive resource use (Bromley et al. 1992; McCay and Acheson 1987; Ostrom 1990), which is problematic. Natural resources produce a multitude of resource units; it is unrealistic to assume that people demand only one use of a resource, such as cutting timber, if the same forest can be used for grazing cattle. This implies that present theoretical notions are based on an oversimplified representation of the internal characteristics of use and management of CPRs. Contemporary CPRs have evolved through demographic changes, technological developments, and their integration into the market, to form complex, multiple-use resources. Since theoretical notions originally developed for single-use CPRs are increasingly being applied to complex, multiple-use resources, these notions must be further developed in order to deal with the complexities involved in multiple-use CPRM.

Second, the study of collective action processes in CPR theory focuses on the internal dynamics of resource management; that is, the resource system is studied in isolation from the wider political economy in which it is embedded. In the list of design principles in Table 1, variables linking collective action and the "external world" are remarkably absent. Although, for example, the external world has been recognized as one of the sources of uncertainty that make the organization of collective action processes regarding CPRs a complex undertaking (Hanna et al. 1995; Ostrom 1990), the external world is regarded as a given fact in CPR analysis.[2] The explicit absence of external or "contextual" factors in conceptual tools for the analysis of CPR management seriously limits our understanding of collective action processes, since local resource users will base their decision to cooperate or defect not only on the expected social and economic costs and benefits generated by the CPR, but will also consider the expected costs and benefits from opting for "alternatives."

Third, in addition to the aforementioned methodological problems, a philosophical dilemma is embedded in CPR theory. The organization of collective action is studied in terms of "successes" and "failures." This raises questions related to normativity: (1) What is "successful CPRM"; (2) are the researcher's or policymaker's definition of "success" the same as those of the local resource users; and (3) for whom is a certain outcome desirable? Part of the "normativity problem" is directly linked to the formulation of design principles. Although we acknowledge that any form of evaluation of CPRM is necessarily value laden, the development and use of prescriptive design principles inevitably results in the establishment of normative criteria for measuring outcomes, taking attention away from the users' construction and perception of CPRM and the process through which collective action evolves.

The Social Constructivist Approach

The term "social constructivism" entered sociology through Berger and Luckmann's work *The Social Construction of Reality* (1967). Society, the object of sociological inquiry, is perceived "as part of a human world, made by men, inhabited by men, and, in turn, making men, in an ongoing historical process" (ibid., 189). Thus, human reality is conceived as a socially constructed reality, rather than naturally

given or merely taken for granted, as is the case in traditional positivist approaches. Later, Berger and Luckmann's "men" were called "social actors." A key property of a social actor is his or her "agency," the ability to make decisions based on social experience combined with the capacity to manipulate social relations and to enroll others into his or her projects[3] (Verschoor 1997).

What distinguishes a contemporary social constructivist perspective from other sociological perspectives that consider human beings to be social actors is that it studies the state of affairs in an action arena as the outcomes of interactions between social actors and *nonhuman* entities,[4] thereby breaking with the essentially humanist sociology proposed by Berger and Luckmann (1967).

In a (contemporary) social constructivist perspective, collective action is considered to be a sociotechnical process; collective action involves not only people and their obligations, dreams, desires, and priorities, but also a variety of nonhuman resources, such as a common good or problem, a certain technology, paperwork, money, and so on. Interactions between individual stakeholders and the nonhuman entities in their environment, as well as agreements between resource users and other people, are key factors underlying cooperation and other actions in everyday life (cf. Callon and Law 1995). The stakeholder's choice for a certain course of action, such as the size of the contribution to the CPR, will be influenced by (1) networks of social relations and sociotechnical networks; (2) the meaning that is attributed to the collective management system; (3) perceptions of the wider environment in which the collective action process is embedded; and (4) social experience. Over time, these networks, meanings, perceptions, and social experience will be "reshaped" through the process of collective action itself (cf. Long and Van der Ploeg 1995). However, both the "abider" and the "free-rider" will remain an outcome, product, or effect of the interaction between the individual and his environment (cf. Callon and Law 1995). A social constructivist approach makes no a priori assumptions about the nature of collective action; that is, it does not predefine categories of "success" and "failure." From such a perspective, both compliance and free-riding require explanation and, more particularly, their explanation should be approached in the same way: the so-called principle of symmetry.[5]

Having introduced the basic assumptions underlying social constructivism, we next discuss its potential for CPR theory on the basis of empirical work. The following section sets the scene for the case study and discusses the methodology.

Case Study: Collective Action at a Shellfish Cooperative in Northwest Connemara

Research Setting

Northwestern Connemara is an isolated, sparsely populated region on the Irish west coast. The majority of its population lives in small villages. Since the area, for infrastructural reasons, has been relatively isolated from the rest of the country and since villages are separated by large geographical distances, community members traditionally feel very dependent on each other. The principal source of livelihood is agriculture (sheep farming), followed by inshore fishing. The area's breathtaking scenery attracts many tourists, who provide crucial supplementary income. The lack of permanent employment opportunities has resulted in high emigration levels (Ruddy and Varley 1991).

The government has long attempted to bring about socioeconomic development in this peripheral area, with social, economic, and infrastructural problems being tackled through the implementation of community development projects and by creating favorable conditions for new entrepreneurs. Aquaculture development is considered to be an important mechanism and, since the 1980s, the government, assisted by the European Union (EU), has encouraged aquaculture development by providing grants, tax incentives, training programs, and research and development. Aquaculture, and particularly salmon farming, has important advantages: (1) It provides jobs in areas of the country where job opportunities are scarce; (2) it makes use of existing resources; (3) it supplements depleting natural fish stocks, free from quota restrictions from the EU's Common Fisheries Policy; and (4) it generates a substantial export income (Board Iascaigh Mhara 1992; Ruddy and Varley 1991). However, such advantages are not widely appreciated. During the past decade, nationwide conflicts between salmon farms, fishermen, and freshwater fisheries have emerged (Phyne 1996; Steins 1998).

Over the past two decades, three salmon farms have been established in northwestern Connemara. The expansion of these farms causes two main concerns for local communities, particularly among fishermen. A primary concern for the fishermen is the loss of fishing territory to the farms, which operate in licensed areas inaccessible to fishermen. A second concern is marine pollution, which may be caused by the accumulation of waste matter on the seabed below the cages, nutrient release, and the use of antibiotics and pesticides (Phyne 1996). The adverse environmental effects of salmon farming became a national concern when the wild sea trout stocks in Northwest Connemara (and other regions) collapsed due to an explosion in the sea lice population in 1989. Salmon farms became the national scapegoat. However, despite extensive scientific research, it remains controversial whether or not the sea trout collapse is caused by the practices of the farms (Phyne 1996; Steins 1998). Local frustration is aggravated by the feeling that the economic benefits of salmon farming do not remain within the region and by the lack of local participation in the designation of areas now used by the farms.

The presence of the salmon farms has resulted in the formation of a strong "anti–fish farm" lobby, reaching a peak in April 1996, when one of the farms obtained permission to move its fish cages to a new site, despite local opposition. The new fish cages were sabotaged, resulting in a loss of IR£250,000 worth of juvenile salmon:

> There was a major investigation but nobody was charged although everybody knew who had done it. ... There was an element of territorial protection in their act, people thought they'd lost their territory to us. ... The Government should have had more communication with the locals. Now they've learned a lesson, but it put us nearly out of business. (Manager, Salmon Farm)

In one area, however, opposition is characterized by a more strategic response to prevent the local salmon farm from expanding. In 1991, local fishermen organized themselves to form a shellfish cooperative and created common property rights to a local bay. However, after this initial "successful" collective action, the cooperative now finds itself in a commons dilemma: Two-thirds of its members have become free-riders who do not contribute to collective resource management. The case study focuses on the collective action problems facing the cooperative and explains *why* the members have chosen certain action strategies.

Research Methodology

Fieldwork for this case study was conducted from May to September 1994 and from July to mid August 1996. Primary data were collected through a range of sociological research methods, including (1) participant observation; (2) Participatory Rural Appraisal techniques, such as mapping exercises and identification of critical incidents; (3) two focus groups with fishermen discussing their perceptions on salmon farming and their motivations and expectations when joining the cooperative; (4) informal conversations; and (5) 65 formal, unstructured, open-ended interviews with fishermen (34), their families (3), other local people (4), finfish farm operators (4), tourism operators (5), community development workers (5), the Irish Sea Fisheries Board (6), the Western Regional Fisheries Board (2), and sea fisheries officers (2).

Throughout the fieldwork a "sensitive methodology" (Knorr-Cetina 1981, 17), in which the researcher is engaged in the inquiry process rather than being a neutral observer, was adopted. This position is embedded in our belief that objectivity as an epistemological ideal does not do justice to the complexities of social and socio-technical interaction in "the world out there." Furthermore, previous fieldwork had shown us that research outcomes are "shaped during the course of the inquiry by the interaction of the investigator and the object of inquiry" (Guba and Lincoln 1989, 99). By adopting a social constructivist position, which makes no a priori assumptions about the organization of collective action, we were able to further our understanding of how collective action processes in this one particular community are shaped.

Consolidating Fishing Grounds: A "Successful" Case of Collective Action?

The first public meeting to discuss the establishment of a cooperative was held in 1990, initiated by a marine biologist working in the area and a group of fishermen. After a few meetings, a business plan was written to attract funds and to support the license application. In 1991, the Connemara Shellfish Farming Cooperative[6] (CSFC) was established. The revitalization of the derelict native oyster (*Ostrea edulis*) beds in the local bay was its first priority. Problems with restocking, the collapse of the market price for native oysters in 1992, and a disease scare in 1992/1993 prompted CSFC to diversify, resulting in the production of Pacific oysters (*Crassostrea gigas*) and experiments with scallop (*Pecten maximus*) cultivation.

The cooperative's hidden objective, however, was to keep the local salmon farm, which started the procedure for a new site in 1989, from expanding. According to the farm's manager, the site was intended to be used for rotation and fallowing, which is recommended by the Irish Salmon Growers Association to alleviate environmental impacts (Phyne 1996). However, the locals perceived that "[the salmon farm] says that they need it for rotation, but that's not true, they are going to use it to produce more salmon, we all know that." Moreover, the proposed site would be located in an important fishing ground. Fishermen's statements such as "the first objective for the cooperative was to create our own territory which the salmon farm couldn't get" and "[it] is a good way to stop the fishfarms and big foreign companies from taking over the whole bay" provide a clear illustration of the fishermen's strategic action.

In accordance with the 1959 and 1980 Fisheries Acts, the cooperative was granted aquaculture licenses for parts of the bay. Consequently, the sites where the native oyster beds, Pacific oysters, and scallops are located became a common pro-

perty resource, accessible to shareholders only. The Irish Sea Fisheries Board (BIM) and an EU–sponsored community development project provide CSFC with financial, administrative, educational, and technical support. Between 1991 and 1995, CSFC received an estimated grant aid of IR£77,500.

CSFC is managed by a Board of Management, elected by its members on the annual general meeting. In 1996, the cooperative had a total of 92 members, who paid an annual fee of IR£20. Seventy–five members have a share in the restocking project, referred to hereafter as shareholders. Their share consists of a cash payment of IR£150 plus 18 days of voluntary work valued at IR£25 a day. The democratically formulated rules certify that only those shareholders who are fully paid up will receive dredging permits. In 1991, it was forecasted that the first output would be in the fall of 1995.

If we compare the design principles formulated in CPRs theory (see Table 1) with the fishermen's collective action through the CSFC, the cooperative's future seems to be promising. First, the fishermen have a common interest, considered vital for successful cooperation (Wade 1988). Scarcity (a decreasing number of fishing grounds) and the risk of eventually losing the resource to outsiders were, for the Connemara fishermen, the main incentives to establish a cooperative. The net collective benefit of the group's initiative is twofold. The fishermen need the licensed areas to secure access to a more vital resource, their fishing grounds. Access is guaranteed through their membership of CSFC. In addition, shareholders will get an extra income from oyster sales.

Second, a set of decision–making arrangements was negotiated, with the basic starting point being accountability of the shareholders to common property resource management. The rules are mutually agreed upon by all members; they are simple, democratically formulated, and considered legitimate. These factors are considered to be important prerequisites for effective regulations (cf. Table 1; Galjart 1992).

Third, the nature of the resource and the relation between resource and user group are characterized by favorable factors: (a) the boundaries of the resource are small and clearly (visibly) defined; (b) the distance between the location of the oyster beds and residence of the majority of the shareholders is small, increasing the noticeability of rule violation; and (c) indirectly, the shellfish resource is very significant, since the users need the licensed beds to secure access to vital fishing grounds (cf. Table 1).

Fourth, the boundaries of the group are clearly defined and shareholders know each other well. Although only a small number of shareholders visit the general meeting, discussions and negotiations with representatives of the board frequently take place in the local pub. Noticeability of cheating on agreements is very high, since contributions are recorded and defectors are well known through the grapevine (cf. Table 1).

Finally, a number of external agencies and specialists work closely together with representatives from the cooperative. The former are prepared to adapt their support if the representatives feel that CSFC's needs are changing (cf. White and Runge 1995).

Notwithstanding the presence of these design principles, "successful" collective action was granted only a short life. Soon after the cooperative's inception, the first collective action problems emerged: The voluntary work scheme failed. In 1994, two–thirds of the shareholders had become free–riders, who are identified as shareholders who "don't show up for work at the oyster sites, [so that] the work

always comes down to the same group of people" or who "still have to pay loads of money to the [cooperative] and have to fulfill their labor obligation."[7] In order to keep the work at the resource going, the Board of Management applied for a government–sponsored Social Employment Scheme. In the years between 1992 and 1996, the work at the native oyster beds and Pacific oysters site (that was supposed to be done as part of the members' shares) has been done by a team of locals paid by the government.

The case study clearly challenges the assumptions in CPR theory concerning the application of design principles. Why is collective action such an uphill battle? The explanation must be sought in the way that shareholders perceive and construct their everyday reality.

Collective Action Problems Explained

Restocking the native oyster beds was carried out through an experimental technique, which on a small scale had proved successful. Soon after the cooperative's inception, a newsletter (05.09.91) informed the members that only a few seed transfers had been successful due to problems with the spat collectors, bad weather, and adverse effects caused by silt and seaweed. In early 1992, bonamiasis was identified in the bay, affecting its production capacity. These setbacks caused much disappointment: "Lots of the spat died. ... The expected survival rate of one oyster per mussel shell became one on every ten shells. ... The aims were set too high from the start" [Shareholder] and "The Business Plan was written to get grants, but it gave the members a very optimistic feeling about the potential of the cooperative. When the expectations didn't become true they became demoralized" [BIM field staff].

The frustration caused by these physical and technical problems was an important reason for a number of shareholders to renege on their agreements, resulting in a "knock on effect," or as one of them said: "listen, why should I do the work voluntarily if the others don't do it." This was aggravated by the collapse of the native oyster price by 50%: "My expectation was to make fast money. It just didn't happen." When an independent survey revealed that the bay's carrying capacity was only an annual 70 tons of oysters, rather than the 200 tons projected in the business plan, a large number of the remainder of the committed shareholders decided to call it a day.

Besides the disappointment caused by physical and technical problems and the collapse of the market price, another factor influenced collective action. Many shareholders felt that once the cooperative was established, they had achieved their hidden objective.

Collective action is also complicated by socioeconomic factors. The period when the shareholders' labor at the oyster sites is needed concurs with the tourist season. One of the shareholders put it like this: "If O'Donaghue can make some money by taking some tourists on an inshore fishing trip, he will not take us on his boat to check the scallops even though he is a very active shareholder. He needs the money." The problem of seasonality is aggravated by the fact that while tourism–related activities result in direct economic rewards, returns from the cooperative were not expected until 1995. In the end, many shareholders preferred a direct reward over a postponed one (cf. Galjart 1992; Ostrom 1990). Furthermore, they could only speculate about the size of their future reward: There was no indication about the quantity of the first yield in 1995, while the market price for native oysters

collapsed. In terms of socioeconomic considerations, the shareholders perceive the net collective benefit of collective action to be minor.

When the cooperative was established, the shareholders agreed on management rules, some of which were related to sanctioning non–contributors and poachers. However, in reality none of the free–riders have been punished. People perceive that sanctioning a fellow community member will turn *them* into the scapegoat rather than the defector:

> "My house overlooks the bay and I have seen people picking oysters, but what can I do? It's the bailiff's job to watch the bay and catch them. ... It is difficult to tell other people what to do or not to do in a community like this; we depend on each other.

Even though the actual dependence on fellow community members has reduced due to infrastructural and socioeconomic developments, the traditional dependence on others is a social construction that is used as an excuse to back out of one's obligations despite the existence of a framework of universalistic rules and regulations (cf. Callon and Law 1989). Although the community is loosely structured in the sense that corporate groups are not present, people's social networks– such as close or distant kinship, neighbors, friends, colleagues– still form a constraint to execute the rules. The effects of social control mechanisms as a way to back up the execution of the rules (cf. Taylor 1987) are minor, since people are not willing to do things that will make them unpopular, despite their action being legitimate and fair. For these reasons, sanctioning free–riders can only be done by bailiffs who, by law, are legitimized to do so.[8]

Free–riding must also be considered in a historical context. In the late 1970s, there was a very successful service cooperative for fishermen in the region. Members sold their fish through this cooperative and also benefited from other services it provided. In the early 1980s, the service cooperative collapsed. At the time of its breakdown, it was managed by some of the initiators and current Board members of CSFC. When the shareholders were asked about this past experience, they were reluctant to tell why the cooperative failed. The answers were always related to the lack of financial resources. However, in a number of conversations with nonmembers of CSFC another perception emerged, summarized by the following statement:

> "There was a lot of struggle within the committee. They didn't listen to [the employed manager] ... they wanted it their way. One of its members wanted to become chairman, the others didn't agree but in the end he won. ... The committee became greedy and wanted to make a profit. They became careless. After [the manager] left, they did not check anymore if buyers had enough money but sold on credit.

The prevailing feeling within the community is that the service cooperative was managed badly by its Board of Management once the employed manager had left. This negative past experience affects shareholders' willingness to contribute: "Look at what happened to the fishermen's cooperative, the same may happen again." The fact that there are some people in CSFC's Board of Management who were heavily involved in the collapsed service cooperative influences shareholders' trust in the board's capability and, as a result, their willingness to become actively involved in CSFC.

The lack of trust also negatively affects the board's authority to enforce the rules. Even if the universalistic rules of an association are formulated democratically, this will not guarantee their automatic execution– particularly not in this setting, which is characterized by particularistic behavior and multistranded relations. An authority structure is vital to protect the individual's contribution to the collective management system[9] (Ostrom 1990; Wade 1988).

A final set of factors influencing collective action is constituted in the political–institutional environment. The interventions of the external agencies supporting the cooperative are characterized by a so–called "cargo image" (Long and Van der Ploeg 1989, 230), the idea that, without external aid, target groups cannot manage their own life circumstances and solve the problematic situations they face. Although shareholders do not value their dependence on external agents positively, a certain opportunism can be identified. The supportive organizations cannot withdraw since the cooperative is not yet able to stand on its own, in which case a large sum of development money and personal efforts would be wasted.[10] The shareholders exert this knowledge. In the case of financial, administrative, or technical problems, they immediately call for assistance. There is a particularly opportunistic attitude toward the provision of grant aid, related to the extensive experience Connemara communities have with development projects; while extracting as many benefits from these projects as possible, people's prevailing attitude is "wait and see."

The government–sponsored Social Employment Schemes are another example of shareholders' expedient behavior regarding their political–institutional environment. While the scheme has the advantage that "it keeps the cooperative going" and "provides training facilities for our future benefit," a number of shareholders perceive that "[it] demotivated the members who were still committed since the work was going to be done anyway." The possibility of applying for a Social Employment Scheme was already mentioned in the business plan; the shareholders knew that if the work obligation was not fulfilled, they could probably rely on an Employment Scheme. The reluctance of the committed shareholders to sanction the free–riding community members lies at the heart of this calculation.

The Future of Collective Action at the Cooperative

CSFC's licenses to the bay need to be retained to secure future access to the bay. In the current national institutional context, which is discussed elsewhere (Phyne 1996; Steins 1998), the problems associated with both salmon farming and the lack of public participation in the marine planning system are not likely to be tackled. CSFC's future, however, does not look very bright. The free–rider problem has not been solved, and although the most obvious solution is to buy them out, the cooperative's poor financial position and the fact that the free–riders are fellow community members hinder this solution. In 1995, the Board of Management, advised by the external agencies, decided to focuses on Pacific oyster cultivation only. Its continuation depends on the successful growth of 500,000 spat, which were purchased in 1996, and an increase of the market price. Two committed shareholders have decided not to take chances and have obtained individual (private) licenses for the cultivation of this species. However, potential future success will also cause new problems, since many free–riders expect to receive their share, and do not want to be bought out of a venture that has proven to be economically viable.

The Contribution of a Social Constructivist Perspective

In collective action research– be it in a controlled, experimental situation or a real case– there is a tendency to determine the conditions under which individual actors are willing to work together. The case study suggests, however, that these conditions or design principles *alone* are not sufficient to explain or establish "successful" collective action.

In the first place, many studies about "successful" CPRM extensively describe the organization of the management system itself, but tend to consider the external ecological, socioeconomic and political–institutional environment and historical context of the CPR as a "black box." However, as this study demonstrates, the external environment forms an integral part of the stakeholders' everyday reality and significantly influences decisions to either cooperate or defect.

The problem that often surfaces, however, is that such contextual factors are barely visible. We believe that this "invisibility" is complicated by the use of design principles as an analytical starting point. Predefined distinctions between categories of "successful" (e.g., cooperation) and "unsuccessful" (e.g., free–riding) are of little help, since they hinder rather than facilitate an examination of the contingencies involved in the complex processes by which, for example, "success" is first defined and later achieved (or obstructed) (cf. Verschoor 1997). For example, the collective action problems that emerged after the initial "success" of the cooperative's establishment cannot be fully understood without a consideration of the relationship between salmon farms and local fishing communities in Northwest Connemara. As Law and Callon (1992, 22) make clear, these contingencies tend to be more readily apparent in situations of controversy surrounding failure. In view of this, we turned a situation of unwillingness of Irish fishermen to work together into a "methodological convenience," one that helped us to display the contextual factors that are more easily hidden in the case of "successful" collective action.

A second risk of using design principles is that researchers and practitioners may easily lapse into generalizations. They should acknowledge, however, that what may be a design principle in one situation is not necessarily one in another. Here we meet again with the interactive nature of the CPRM and the contextual characteristics of its environment. The external environment within which the management system is located influences the actors' priorities and, consequently, to what extent they are prepared to fulfill the demands made by the collective management system. These priorities not only vary between geographical settings and over time, but also differ between actors who are engaged in the same management system, as the case study indicated.

Moreover, individual stakeholders' priorities will be reshaped through interactions with other stakeholders, other individuals, and nonhuman entities. For example, in the case of the shellfish cooperative, it is likely that once the shellfish cooperative reaches the production and sales phase, the shareholders and other community members will give a different meaning to the cooperative. As a result, their willingness to sustain the oyster resource may increase. In this light, the notion of critical mass is important; it seems that collective action is dependent on the willingness and skills of a small group of active shareholders. Once their efforts have much reward to show, other shareholders may follow their example.

In the third place, the use of prescriptive design principles raises questions related to normativity. What is "successful," what is "a failure"? When we look at the cooperative, it becomes clear that the shareholders are facing a commons

dilemma. The facts that two–thirds of the shareholders have become free–riders and that the cooperative only survives because of the efforts of a small group of people and external support would tempt many of us to say that collective action has failed. However, if we look at the hidden objective of the CSFC, namely, securing access to the local fishing grounds, the cooperative can be considered extremely successful in realizing this aim. Does the cooperative need the universal cooperation of every oyster fisherman, or is it perhaps rational to cooperate just enough to keep the cooperative going?

To avoid the "traps" associated with the use of a priori identified categories leading to "success" and, for that matter "failure," we advocate the study of collective action processes in CPRM scenarios from a social constructivist perspective. This perspective adds an important dimension to the study of CPRs in that it examines how CPRM is constructed by the various stakeholders and how it operates over time. Adopting a social constructivist perspective will, first, help researchers and practitioners to be sensitive to both internal and contextual factors influencing the actor's motivations to adopt a certain strategy, by explaining the process resulting in certain outcomes of CPRM rather than merely describing such outcomes. For example, the presence of "good" design principles in the formation of the cooperative did not prevent free–riding behavior. A consideration of the conflict between salmon farming and the cooperative per se was indispensable in understanding why "successful" cooperation failed, drawing attention to multiple–use problems and the external environment. Thus, by narrowly focusing on the description of CPRM outcomes and prescribing design principles, the process of collective action cannot be fully understood. In this context, a second contribution of the social constructivist perspective to CPR theory is through the adoption of the principle of symmetry. The fact that collective action is "successful" does not make it exempt from in–depth analysis; that is, "success" cannot itself be offered as an explanation (for example, by "defining" design principles on the basis of successful cases), but is that which needs to be explained (cf. Verschoor 1997). The reason for adopting the symmetry principle in CPR theory is that judgments about "success" and "failure" are socially constructed, by both the CPR scholar and the CPR users. Any research that starts with the assumption that some form of collective action is "successful" while another is a "failure" "will never get to analyze how the distinction is constructed and used" (Law 1994, 10). Thus, each individual case, whether or not it is "successful," will have to be analyzed in order to assess the factors contributing to the process that leads to the specific outcome.

Does this imply that the design principles identified in CPR theory are not useful? The answer has to be "yes" if they are tacitly used as prescriptions for establishing cooperation in CPRM situations. The answer is "no" if researchers and practitioners use them as a starting point for the formulation of questions that help to explain the state of a particular CPR, and if they acknowledge the interdependent relationship between these questions. For example, conditions for "success" such as "high noticeability of cheating" and "sanctions" can be reformulated into questions such as, "to what extent is cheating noticeable?" and "do the management rules include sanctions for defectors?" The question that should then logically follow is, "do a high noticeability of cheating and the presence of sanctions explain collective action?" In the case of the shellfish cooperative, high noticeability of cheating and the presence of sanctions still resulted in collective action problems. These could only be explained when a link was made with the questions "how can the socioeconomic rewards of the cooperative be explained," "what is the nature of the social

networks within the user community," and "how can the sociotechnical networks (e.g., the experimental restocking program) be described?" In addition, we strongly recommend that analysts should not narrowly focus on interdependent relationships among internal variables, but also should seek the explanation for the occurrence or absence of collective action in the CPR's external environment.

Conclusion

The sustainable management of CPRs is an important priority on a worldwide environmental agenda. Many CPRs are in a threatened state as a result of the transition from a single–use resource into more complex, multiple–use systems, where different types of use are demanded by increasing numbers of actors on a single–resource system. The issue of how to organize their sustainable exploitation has become of increasing importance.

In this article, we challenged assumptions concerning the application of design principles to CPRM by showing, through an empirical case study, the need to consider contextual factors in CPR analysis. We argued that the formulation of a priori distinctions between factors contributing either to "success" or "failure" does not facilitate CPRM research. First, they may hinder the researcher's sensitivity to contextual factors affecting stakeholders' perceptions of the CPR and their motivations to participate in collective action. Second, prescriptive design principles do not do justice to both the uniqueness of the collective action setting and the *stakeholders*' perceptions concerning "success" of management. In a social constructivist perspective such a priori assumptions are not made. The CPR is studied as an entity within a wider physical, technological, socioeconomic, cultural, historical, and political–institutional environment, in which stakeholders are making decisions to optimize the space for their own projects. The state of affairs in a CPR setting is considered to be the outcome, product, or effect of the interaction between stakeholders, other social actors, and nonhuman entities (cf. Callon and Law 1995).

The analysis in this paper has four important implications for future research and policy regarding the management of CPRs. First, we have to let go of the prevailing idea that the formulation of design principles will result in policies that eventually lead to successful and sustainable CPRM situations. It is essential to acknowledge that *in research and policy programs such design principles should, with due caution, be used as a heuristic tool to formulate research questions rather than as prescriptive guidelines for development*.

Second, the external environment can no longer be regarded as a black box. The case study demonstrates that despite the presence of "good" design principles, cooperation was thwarted by contextual factors on the basis of which shareholders socially constructed their everyday reality. *Future research on CPRM will have to focus on the problem of how to integrate the interaction processes between the collective management system and the contextual factors embedded in its wider environment*. The adaptation of existing heuristic tools in CPR literature is vital to increase our understanding of collective action in CPRM situations.[11]

Third, CPR theory tends to build on empirical studies of single–use common property regimes in non–Western societies, and neglects complex CPRs characterized by multiple, extractive, and nonextractive uses. Even if the design principles are to be used as a heuristic tool to organize information about cooperation in multiple–use situations, they will have to be adapted for the more complex demands placed on the researcher in the study of multiple–use CPRs. More empirical studies on the

complex interaction processes between different user groups within the same CPRM system are needed to *develop heuristic tools that help us organize information about collective action processes in complex, multiple-use scenarios*.

Fourth, *the potential of a social constructivist perspective to study CPRM systems needs to be further explored*. Hitherto, this approach has mainly been used in the fields of sociology of knowledge, the sociology of science, philosophy, rural sociology, and agricultural science (Berger and Luckmann 1967; Callon and Law 1995; Guba and Lincoln 1989; Knorr-Cetina 1981; Verschoor 1997). New methods and techniques will have to be developed that can deal with the analysis of the contingencies involved in the complex processes underlying an individual's decision to adopt certain collective action strategies, and, in particular, the way stakeholders socially construct the arena in which they have to take these decisions. In this process, CPR scholars and policymakers may benefit from developments in the field of agricultural extension, where methodologies based on the social constructivist perspective have been developed to support collective actions for sustainable natural resource management and policy decisions (Pretty 1995; Röling and Wagemakers 1998).

The social construction of the natural, social, and technical environment and the various unique management regimes for natural resources should be a core aspect in any research project or policy program regarding natural resource management. This is especially important in situations where some form of collective action is required. A comparison of the perspectives of resource users, other direct stakeholders, researchers, and policymakers on resource management, will help the various actors involved to understand each other's agenda, and will facilitate negotiations on the organization of resource management.

Notes

1. When the idea of design principles was introduced in the late 1980s, CPR scholars were reluctant to identify them as requirements for "success." For example, in a footnote to the *original* list of variables associated with organized coordination of CPRM, Ostrom (1992) emphasizes that none of them were a required and sufficient condition either for or against the emergence and continuation of CPRM organizations. Elsewhere she emphasized that she "is not willing to argue that these design principles are necessary conditions for achieving institutional robustness in CPR settings," but she "is willing to speculate ... that after further scholarly work is completed, it will be possible to identify a set of necessary design principles and that such a set will contain the core of what has been identified here" (Ostrom 1990, 90).

2. The role of contextual factors was further explored by the authors at a Panel on Contextual Factors at the 7th Conference of the International Association for the Study of Common Property, held in Vancouver, 10–14 June 1998. We refer to Edwards and Steins (1998b) for a detailed discussion on contextual factors.

3. In CPR theory, rational individuals who extract resource units from a CPR are generally referred to as "appropriators" (Ostrom 1990, 30). The notion of "social actor" will do more justice to the complexities and uncertainties resource users face when making decisions on the level of contribution to the collective.

4. This approach builds heavily on actor–network theory, which was developed in Europe in the context of the sociology of science. Inherent in actor–network theory is that reality cannot be defined in terms of a single social order; rather sociologists have to be concerned with multiple and incomplete processes of social *ordering* (Law 1994). In this social world, agents are building "disorderly networks composed of social, economic, political and technical elements" (Verschoor 1997, 26). Actor–network scholars explore the tactics through

which the materially heterogeneous agents attempt to constitute themselves as social actors, the tactics of "translation" (Law 1994, 101).

5. The symmetry principle was developed by sociologists of science, who opposed the conventional belief that only false scientific knowledge needed sociological explanation. This belief stems from the assumption that if scientific knowledge is false, this is caused at the end of the trajectory, when something went wrong. The very nature of true scientific knowledge thus made it exempt for sociological analysis. The opponents of this belief argued against this asymmetric explanation (Law 1994).

6. To protect the identity of those concerned, the names in this article are fictitious.

7. The free–riders represent full– and part–time fishermen of all age categories. The majority of the committed members are (1) former fishermen, (2) self–employed, or (3) unemployed.

8. The same observation is made by Taylor (1987), who was told by Irish salmon fishermen that "the river would run red with blood" if they had to punish the defectors themselves.

9. Compare Wade's Indian villages, which are not characterized by democratic decision–making structures, but where the authority to execute the rules is ensured by the existing local elite (1988).

10. The dependence on support from external agencies has an important disadvantage: It often ruins cooperation (Lehmann 1990; Ostrom 1995).

11. We refer to Edwards and Steins (1998a) for an adapted version of the Oakerson framework for the analysis of single use CPRs (Oakerson 1992), to facilitate the analysis of multiple–use commons and contextual factors.

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