Re-'designing' the principles: An interactive perspective to CPR theory

Paper for the 8th Conference of the International Association for the Study of Common Property, Bloomington, Indiana, USA, 1-4 June 2000

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Abstract

The concepts and frameworks developed in common-pool resource (CPR) theory are increasingly being applied to problems associated with the management of complex CPRs at local and global level. Furthermore, existing frameworks are increasingly being adopted by organisations such as the World Bank as tools for crafting sustainable CPR use through collective action. The paper argues that CPR theory is not sufficiently developed to justify these practices and proposes an alternative perspective.

Based on a critical examination of CPR theory and empirical examples from British, Irish and Dutch coastal waters, the paper argues that the definition of the rational, atomised actor underlying CPR theory is too limited to explain collective action processes. Instead, actors should be regarded as 'nested collectifs', whose strategies in the collective action arena are constantly reshaped. Second, the use of a static strategic model of rationality is insufficient to appreciate the shaping of collective action (or free-riding). Nested collectifs use different social and material means to achieve their objectives. In trying to enrol other collectifs in collective actions aimed at realising their projects, different forms of strategic and communicative rationality emerge. Third, the use of pre-defined categories and design principles diverts attention from (i) the stakeholders' constructions of collective resource management, and (ii) the influence of contextual factors, and therefore limits the explanatory power of CPR theory. Furthermore, a danger inherent in the design principles is that they are picked up as blueprints for the development of policies and intervention programmes for 'successful' CPR management

If CPR theory is to be used as a foundation for the analysis of complex CPR management, or as a conceptual framework in pursuing the idea that collective action is a powerful alternative to deal with complex resource management problems, a radical reconstruction of its ontological foundation is needed. The paper proposes an interactive approach to the study and facilitation of complex CPR management. In this new approach, attention is shifted to the way actors (or nested collectifs) construct collective resource management and the analysis of internal and contextual factors that shape the action strategies they adopt. In this analytical process, co-operation, free-riding and rationality are outcomes of the interplay and trials of strength amongst the different collectifs with a stake in the CPR, and their mobilisation of social and material resources. In view of the increasing reliance on collective action to solve complex resource management problems, the paper recommends that a praxeology (a theory that informs practice) for CPR theory needs urgent development. In this context, user platforms have much to offer to negotiate collective CPR use and management.

1. Introduction

After 30 years of political debate, our global natural resource base is still in crisis. Inherent in this problem is its status as a common-pool resource (CPR); that is, its joint use involves subtractability and exclusion of demands is associated with high transaction costs. For a long time, conventional ideas about the management of CPRs were nurtured by Hardin's Tragedy of the Commons thesis (1968), predicting overexploitation and the eventual ruin of common resources due to the users' rational incentive to maximise utility. Privatisation and external control were seen as the only ways to solve this so-called 'commons dilemma'. However, privatisation and state regulation have not in all cases lived up to the expectations; sometimes even causing or accelerating degradation of the CPR (e.g., Langstraat, 1999; Van Ginkel, 1988).

The debate about CPR management has been blurred by a conceptual misunderstanding about the nature of such resources, caused by Hardin's unfortunate use of the term 'the commons' to describe an 'open access' regime. Resources used in common are variously referred to as 'open access', 'common-pool', 'common property' and 'the commons'. However, Hardin's 'common', a pasture open to all, is essentially an 'open access' resource, where decision-making arrangements governing access to, allocation of and control over the resource are absent. Empirical research has shown that individuals with an interest in a CPR are not by definition locked in a position that leads to Tragedy, but that individuals can work together in crafting rules regulating the benefits produced by a CPR; in other words; decision-making arrangements, or institutions, provide a mechanism to transcend the commons' dilemma and may prevent the resource from degrading (e.g., Bromley, 1992; Ostrom, 1990; Wade, 1988).

Demographic changes, technological developments, changes in life style patterns and changing markets are but some of the factors causing increasing pressures on local and global CPRs. Worldwide CPRs are rapidly changing into complex systems with a multitude of management regimes governing their exploitation (Box 1). The presence of a multitude of management regimes to co-ordinate multiple uses has, however, not prevented externalities, such as environmental impacts and conflicts amongst different user groups, from occurring. For example, increasing pressure on coastal waters by fishermen, tourism and industries in combination with impacts from land-based uses, is posing a threat to coastal habitats. This has become a growing concern not only for conservationists, but also for user groups, scientists and governments. Consequently, marine protected areas have been established within national programmes or designated in accordance with European habitat directives. Sardinia, for instance, has witnessed the establishment of marine parks, where 'zoning' has been the strategy to co-ordinate tourism and fishing activities in the protected area. As habitual patterns of fishing and usufruct have largely been ignored by the governing authorities, and fishermen perceive that the parks benefit the tourism sector only, while taking their livelihood from them, the establishment of the parks has brought about "a polarisation of interests rather than a dialogue between the interested parties […], creating instances of tension and conflict" (Mondardini Morelli 1998: 188).

All over the world, stakeholders at various levels of decision-making have been breaking new ground in attempting to find solutions to such externalities. Integrated and community-based resource management approaches are gaining popularity as participatory, multi-stakeholder approaches to deal with the complexities and interconnectedness of management problems, balance the interests of multiple parties and achieve sustainable resource use. There is increasing awareness that a collective action approach, which considers management issues from a broader perspective and where stakeholders work collectively towards problem solving, is a strong alternative. In this context, 'CPR theory'[1] is gaining popularity. Its conceptual frameworks are, for

[1] We use the term 'CPR theory' as a general banner to refer to the work of a collection of scholars from various disciplines that deals with the analysis of collective action in 'real life' CPR management scenarios.

example, being adopted by organisations such as the World Bank and the Food & Agricultural Organisation (FAO) as tools for crafting sustainable CPR use through collective action. In our view, CPR theory in its present form provides a too limited scope for the analysis of complex CPR management (or lack thereof) and the facilitation of collective action initiatives aimed at sustainable management. Its concepts are problematic, since they are based on (i) a simplistic assumption of single use, (ii) a static rationality model, and (iii) the assumption that collective management outcomes are determined by predefined principles, thereby diverting attention from the stakeholders' constructions of collective resource management and the influence of contextual factors. If CPR theory is to be used as a foundation for the analysis of complex CPRs or as a conceptual framework in pursuing the idea that collective action is a powerful alternative to deal with complex resource management problems, a radical reconstruction of its ontological foundation is needed. We propose an interactive approach to the study and facilitation of complex CPR management.

In the next section, we briefly discuss the problems of contemporary CPR theory. We then introduce some theoretical notions from actor-oriented sociological approaches and actor-network theory. In the fourth section, we discuss how these insights will assist the further development of CPR theory as an analytical and action-oriented perspective. Finally, we conclude with a number of recommendations for future research.

Box 1:
Multiple uses, multiple management regimes in the Dutch Wadden Sea

The Dutch Wadden Sea used to be the access route for the merchant and naval fleet to the North Sea, and, until the beginning of the century, was primarily exploited by fishermen. The state adopted a *laissez-faire* policy towards the fishery in its waters; only in the oyster and eelgrass industry, common property regimes (limited entry schemes) and privatisation of plots (through leases) were introduced in 1840 and 1880 respectively. In 1932, the role of the Wadden Sea for coastal defence was articulated with the completion of the Enclosure Dike, cutting the Zuyder Sea from the Wadden Sea, which contributed to the loss of the eelgrass industry and herring fishery in both areas (Van Ginkel, 1995). In the 1950s, the mussel industry in the south-west of the country was hit by disease problems and obtained permission to lease cultivation parcels (private property) in the Wadden Sea. In the 1960s, the modern cockle fishery was developed. All fisheries, except mussel cultivation, were at the time managed under virtual open access conditions (except for the licence requirements set by the state). At the same time, sailing and nature-based tourism witnessed increasing development, with no restrictions on access. In 1959, the presence of gas was detected and a number of trial drillings were made. Commercial drilling for gas started in 1988. The seabed in the mining area is owned by the state; the ownership of the gas has been transferred to the mining company through a concession. Between 1988 and 1994, a moratorium on gas drilling, which was a voluntary measure by the mining companies, was in place for all but one mining area (Verbeeten, 1999). The Wadden Sea is also an important shipping route and a military training area. From the 1980s onwards, nature conservation gained a profound role, particularly through the implementation of international wetland and habitat designations. Pressures on the natural environment caused by the combination of these uses have resulted in the introduction of new management regimes. Areas have been closed or are subject to limited entry under statutory regulations. For example, the shellfish fisheries are now governed under a common property regime in collaboration with the state, quota have been set for the number of tourists allowed to go for the popular walks on the tidal mud flats and only six trial drillings for gas are permitted in the period 1995-2000. The multiple uses in the Wadden Sea are thus managed under a mixture of property regimes within state ownership.

2. The problems of contemporary CPR theory

In a CPR scenario, collective action typically occurs if resource users seek to overcome the problems associated with The Tragedy of Open Access and agree on decision-making

arrangement governing access to, allocation of and control over the benefits produced by the resource system. Thus, their problem is that of organising (Ostrom, 1990). Based on extensive empirical research, CPR scholars have developed a large body of literature on the organisation of collective action in resource management. They can be credited for demythologising The Tragedy thesis and developing, *inter alia*, a common vocabulary and analytical frameworks for CPR management. However, a critical examination of contemporary CPR theory reveals a number of shortcomings, which we briefly discuss below[2].

Most of the studies that form the foundation for CPR theory were carried out in non-western societies and involved the analysis of management regimes for a single resource unit in the resource system (e.g. grazing land, fisheries management). The assumption of single use poses a methodological problem. A resource system generally produces a multitude of products. It is not realistic to assume that a user will use a resource for only purpose, for example cutting timber, if that same resource can be used for grazing cattle (Selsky & Creahan, 1996; Edwards & Steins, 1998). Equally, multiple user groups may use the same resource system for different purposes (see Box 1) affecting each other's activities. Furthermore, as Meinzen-Dick & Bakker (1999) point out, even if the management regime evolves around one resource unit only, for example water in a irrigation system, there may be conflicting claims over this resource unit by different social groups and potentially different uses of this water (e.g. drinking water, domestic water), turning this single use into a very complex multiple-use.

A second problem is the static rationality model that underlies CPR theory. CPR theory has 'discarded' the neoclassical assumption of economic calculated rationality and, instead, assumes a situation of bounded rationality[3] as the driving force behind individual behaviour. In CPR theory, individual choice of action strategies is affected by four internal variables: (i) expected benefits, (ii) expected costs, (iii) internal norms, and (iv) discount rates (Ostrom, 1990). While this model of a broad conception of rationality may be useful as a heuristic tool to study individual behaviour, the difficulty is that it 'individualises' human action through the explicit assumption that only *shared norms* of behaviour in a community/society affect individual choices.

This assumption is problematic for two reasons. First, it marginalises the role of the social world to an entity that prescribes a normative context for action; that is, social interaction is aimed at setting norms for action. Second, it regards the actor-world relation as a subject-object model, where the actor is a 'lonely subject' who has to survive in an objective world, which he tries to manipulate, and where co-operation takes only place to the degree that it fits with his egocentric calculus of utility (Habermas, 1997; cf. Wilson & Jentoft, 1999)[4].

The divide between the individual and the social is evident in the view that collective action is essentially seen as an institutionalised set of procedures to guide or regulate human action (cf. Long & Van der Ploeg, 1995). The individual himself does not seem to matter, except for his role in the appropriation of resource units. Central in CPR theory is "the institutional capacity to make the 'machinery' of [collective action] run smoothly and effectively" (*ibid.:* 74). The focus on institutionalised sets of procedures for collective action moves collective action away from the arena of everyday struggle in which resource users find themselves (cf. Young, 1995). For example, our research into the common property oyster fishery in the British harbour of Cowes, showed how despite the presence of the basic set of design principles for robust common property

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[2] We refer to Steins (1999) for a detailed discussion.

[3] This implies, amongst others, that individual behaviour is studied in the context of complex and uncertain situations that affect the actor's decisions and the value he attributes to certain courses of action.

[4] The English language does not make provisions for personal pronouns that refer to both female and male actors. Accordingly, throughout this paper we refer to 'his' and to 'him' to refer to all actors and their activities in a general sense. In doing so, we hope that we do not cause offence.

regimes (Ostrom, 1990), the fishermen decided not to continue this regime. Navigational claims over the fairway in which the fishery was located, combined with nature conservation claims affected the continuation of this regime and resulted in a concerted effort aimed at privatisation (Steins, 1999).

A third problem of contemporary CPR theory we have been able to identify is related to the well-known 'design principles'[5]. These principles entered CPR theory in 1986 when Elinor Ostrom introduced 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 (e.g. Hanna et al., 1995; Libecap, 1995; Wade, 1988). Increasingly, the principles are considered to be *requirements* for successful governing institutions. 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 ... to learn more from one another about how successes have been achieved or how to avoid some kinds of failures", thereby granting them a prescriptive status.

From our own extensive field experiences (Edwards, 1996; Edwards & Steins, 1998, 1999; Steins, 1999), we have been able to identify three difficulties related to these principles. First, by describing cases of 'success' and pinning it down to the internal characteristics of the management regime, CPR theory has largely neglected the role of contextual factors in shaping collective action at various institutional levels. Variables linking collective action and the external world are remarkably absent from the design principles. The bulk of CPR literature regards the wider environment in which the CPR is embedded as 'given' or as a 'black box'. In writings that do address external changes, such contextual factors tend to be used as an *excuse* for resource degradation. While contextual factors are often recognised as determining factors in the downfall of a common property regime, researchers do not venture beyond the internal world of the resource regime to provide a fuller explanation of the significance of context (Edwards & Steins, 1999).

The apparent lack of contextual analysis in CPR theory is interesting in view of its heavy reliance on the concept of bounded rationality in explaining collective action. In analysing individual choice of action strategies, CPR theory only considers *internal* variables to be part of this bounded rationality. This is peculiar considering the interdependence between the CPR system and its external environment: the former supplies the stakeholders involved in CPR use and management with resources and must also absorb the products or benefits from the CPR. Furthermore, stakeholders will base their actions not only on the expected social and economic costs and benefits generated by the CPR itself, but will also outweigh alternative options embedded in the external world. For example, as part of their share in their common property oyster beds, members of an Irish shellfish co-operative had to contribute a number of labour days to the management of the beds. The conditions for successful management (Ostrom, 1990) were abundant, yet two third of the shareholders became free-riders within a year of setting up the management regime. Analysis revealed, *inter alia*, that the period of the required work coincided with the tourist season, which

[5] The formulation of design principles is strongly associated with the tendency to look at outcomes of collective resource management in terms of 'measurable' criteria. For example, Oakerson (1992) suggests economic efficiency (i.e., achieving Pareto optimality[5]) and social equity (i.e., distribution of benefits is equal in comparison to distribution of input costs), as performance criteria for collectively managed CPRs. The assessment of outcomes directly 'feeds' into the formulation of conditions for successful collective action; that is, under what circumstances are users capable of maximising economic efficiency and social equity? As Edwards & Steins (1998) argue, the use of such criteria poses a number of practical problems, in particular in multiple-use settings. First, it is difficult to implement Pareto optimal efficiency measures in practice. Particularly, in multiple-use scenarios a precise measurement of the efficient level of each type of use is generally not feasible, especially since achieving Pareto optimality for one type of use may subtract Pareto optimality from other uses. Second, when using equity as a performance criterion, it is imperative to examine distributional and redistributional gains and losses both *within* each user group and *amongst* all user groups.

resulted in direct rewards. The presence of tourism and its part in contributing to an opportunity cost is an example of how contextual factors influence collective action (Steins & Edwards, 1999).

Indeed, contextual factors tend to be more readily apparent in situations of controversy surrounding 'failure', than in situations where co-operation is the dominant strategy. Yet, in both cases, the interactions between internal and contextual factors as well as the stakeholders' perceptions of these dynamic forces, have contributed to the management outcome, and therefore must be included in CPR analysis. Explaining 'success' (e.g. robust self-governance) on the basis of internal factors only, does not do justice to the dynamics and uniqueness of CPR management scenarios. Part of the explanation for the lack of contextual analysis in CPR theory lies in its eagerness to rebut The Tragedy thesis; that is, bringing forward as much empirical evidence as possible to show that resource users *are* able to organize CPR management through institutional design. The consequent development of design principles has added to a vicious circle of describing 'institutional success' rather than examining the contingencies involved in the process whereby this is achieved. As a result, the further development of CPR theory is in stasis. This is interesting since one would expect CPR scholars to respond to the repeated criticism that CPR theory is incapable of (i) explaining why regimes change over time and (ii) of drawing up a programme that goes beyond mere description of what occurs, and instead includes analysis of interventions to facilitate collective action (e.g., Buck, 1999; Edwards & Steins, 1998; Knudsen, 1995; Röling & Maarleveld, 1999).

A second difficulty of focussing on design principles is the risk of using them as generalized blue prints for 'successful CPR management'. However, what may be a design principle in one situation is not necessarily one in another. Furthermore, categories that one analyst constructs may be interpreted and constructed differently by other analysts as well as the stakeholders in the CPR (who may not even know the analyst's categories). Finally, by using *a priori* categories, analysts may attribute the same weight to each principle on the list and, as was outlined above, may overlook factors that are not on the list but may be crucial in the collective action process.

Finally, the study of collective action in terms of 'successes' and 'failures' raises questions related to normativity: what is 'success', what is a 'failure'? And, more importantly, is the analyst's definition of 'success' the same as those of the other stakeholders in the CPR? Although we acknowledge that any form of evaluation is necessarily value-laden, the development of prescriptive principles inevitably results in the establishment of normative criteria for measuring outcomes, diverting attention from the stakeholders' constructions of CPR management and the process through which collective action evolves.

The problem can be illustrated by the aforementioned Irish shellfish co-operative. After spending several months in the community and building up a relationship of trust, we discovered that the co-operative was established under the *guise* of improving income opportunities for local fishermen. Its hidden objective was to create property rights to parts of the local bay to prevent a salmon farm from expanding in the fishing grounds. Once the co-operative was initiated and the shareholders had to contribute to resource management, two thirds became free-riders. Many would be tempted to say that collective action in this case has failed and that the logic of rationality had driven the free-riders to opt for a collectively irrational outcome. However, if we look at the hidden objective, namely securing access to fishing grounds, the co-operative is very successful.

We conclude that by following the conventional scientific belief that reality can be divided into categories, and that its shaping mainly operates through cause-effect relations, the process of collective action cannot be fully appreciated and is limited to the development of even more categories. Instead a focus on the *context* that shapes the collective action trajectory is needed to understand the complexities involved in collective action efforts. Our proposal is to adopt an interactive perspective to the study and facilitation of CPR management, using the insights

developed in actor-oriented approaches and in actor-network theory. Before elaborating on this proposal, let us introduce a number of theoretical concepts that lie at the heart of these theories.

3. Rational actors *versus* nested *collectifs*

In the previous section, we identified a number of problems related to the narrow definition of rationality in CPR theory. These problems can partly be addressed by introducing the notion of the 'social actor' as introduced in actor-oriented sociology (Long, 1992). A social actor is a capable, knowledgeable and creative agent who has (i) the ability to make decisions about alternative courses of actions based on social experiences and (ii) the capacity to manipulate social relations and to enrol others into his projects through his organising skills, in order to cope with life and realise (at least part of) his projects. The concept of social actor does not refer to individual human beings only, but also embodies different types of organisations. Organisations too make decisions and have organising capacity to enrol others in actions that make a difference in pre-existing states of affairs, which is when actor-oriented approaches recognise effective agency (*ibid.*).

The introduction of the notion of social actor does not mean that the concept of rationality is discarded, for "*every* [...] theory of society encounters the problem of employing a concept of rationality" (Habermas, 1997: xxlii). In theories that build on the concept of rational-choice, such as CPR theory, and to a lesser extent actor-oriented approaches, the model of strategic action serves as the (given) prime mover for individual behaviour. We depart from the position that rationality can take a number of forms. At this point, it is useful to introduce Habermas' distinction between 'purposive' and 'communicative rationality'.

Purposive rationality is "a point of view from which actions can be more or less rationally planned and carried out, or can be judged by a third person to be more or less rational" (Habermas, 1997: 86). Two types of action belong to this category: (i) cognitive-instrumental action, and (ii) strategic action. The former refers to nomological (non-social) actions that achieve set goals through the effective organisation of certain means, or standard techniques. Instrumental action follows an 'if…then' logic; for example, if one wants to bake a pie, then one has to follow a certain procedure (in this case, the recipe). In *strategic* action, the actor makes a decision between alternative courses of action to achieve the realisation of an end. The actor's calculation of the most successful decision is guided by goal maximisation and by the prediction or anticipation of the decisions made by at least one additional goal-directed actor. The well-known Prisoner's Dilemma is an example of strategic action.

The second form of rationality distinguished by Habermas (1997) is *communicative rationality*. Communicative action presupposes language as a medium of uncurtailed information whereby social actors, outside the context of their pre-interpreted world, "pursue their individual goals under the condition that they harmonise their plan of action on the basis of a common situation definition" (*ibid.*: 286). Each participant engages in communicative action on the basis of: (i) a rational agreement rather than force, (ii) complete mutual understanding, and (iii) an acceptance that each participant has the right to communicate openly (Rojek, 1985). An example of a communicative action is the development of a mutually agreed upon fisheries management plan by the shellfish fishermen in the Dutch Wadden Sea. The plan was made in collaboration with the government, scientists and nature conservation groups in order to limit negative impacts on important habitats and secure food availability for birds.

Thus, in order to realise their projects, social actors draw upon both purposive rationality, which is oriented at successful maximisation of their own utility, and communicative rationality, which is oriented at reaching understanding, to co-ordinate their activities. This puts them in a social dilemma

position, since what actually happens depends on the actions of a whole range of other actors and contextual factors. Bijker & Law (1992: 10) use the analogy of chess: “the strategies developed by the players are shaped by the rules of the game - the pieces, their relationships, and the possibilities they embody”. However, unlike chess, “where the rules of the game are fixed before the game starts”, in real life those rules are not fixed; the same actors who are shaped by the context in which they act, also help shape this context. This implies that the strategies social actors employ as well as the consequences of those strategies should be treated as emergent phenomena (*ibid.*).

This recognition has implications for the notion of social actors we introduced earlier. Following actor-network theory (ANT), it means that the material and social means that form part of actors’ strategies and networks should be included in sociological analysis. As Law (1994) points out, we do not consider human beings as mere organisms but as people (or social actors), because they have material properties (e.g., a fishing vessel, nets, oilskins, navigation equipment) and a history of social relations (e.g., family, friendships, feuds, competition, authority relations), which they may have some control over, but on which they equally depend. For instance, without his vessel, nets, the oilskin, navigation equipment, fishing licences, crew, competing colleagues, and buyers of his catch, the fisherman would not be a fisher. Equally, managers in common property regimes, the economy, technology, etcetera, are considered to be ordered networks of heterogeneous materials that are constantly being reshaped as new human and non-human entities enter the arena (*ibid.*). From an ANT perspective, both the ‘free-rider’ and the ‘abider’ in collective action strategies are an outcome or effect of the interactions between actor and environment. In ANT, such ordered networks of heterogeneous materials are referred to as ‘*collectifs’.* Since each *collectif* is interlocked in a larger one, we propose the term ‘nested *collectif*’. ANT uses the term ‘translation’ to refer to the generation of these ordering effects, in order words, the process in which actors attempt to constitute themselves as *collectifs*.

An example of such a translation process is presented in Callon & Law’s article on the development of scallop (*Pecten maximus*) farming in the French Bay of St. Brieuc (1989). The authors show how the demand for scallops by the French consumer is linked up with the aim of three scientists who wish to increase their knowledge about scallop habitats in order to develop farming techniques. The connection between the consumers and the scientists is forged through the following translation process: the scientists claimed that in order to satisfy consumer demands, it is first necessary to study the behaviour of scallops and then organise their domestication through the development of farming methods. In this way a link between economy and science was created. However, as Callon & Law (*ibid.*) point out, it is more than a link. In order to achieve their objective (development of scallop farming), the scientists had to convert themselves into *spokespersons* for (i) local fishermen (who had overfished the native scallops and would benefit from the development of farming techniques), (ii) consumers (who would like to have scallops on their plates) and (iii) local government (interested in economic benefits for the area), and then had to *mobilise* and *link* these groups together through an *intermediary*: the scallops.

The task ANT scholars have set themselves is to explore the tactics of translation. In doing so, they employ two basic principles. The first principle, that of ‘generalised agnosticism’, tells the researcher to abolish the conventional sociological (and other social scientifical) practice of studying phenomena in terms of pre-defined categories (Callon & Law, 1989). The second principle of ‘symmetry’ tells the researcher that everything deserves explanation and that each phenomenon he seeks to explain should be approached in the same way (Law, 1994). The reason for adopting this principle is that judgements about truth and falsity, or success and failure for that matter, are socially constructed. Any research that starts with the assumption that, for example, some form of collective action is successful while another is a failure, will “never get to analyse how the distinction is used and constructed” (*ibid.*: 12).

For the researcher, following these principles has a number of methodological implications. First, it demands engagement rather than detachment, or methodological intersubjectivity rather than neutrality. Second, it requires some form of methodological relativism, giving maximum control over the information obtained to the subjects under study in order to give voice to that about which a story, or ethnography, is told. Third, methodological interactionism is needed in order to guarantee that the story, or ethnography, remains interested in the practice of its subjects (Knorr-Cetina, 1981). According to Latour (1987) the researcher's task is to unravel the nested *collectif* under study, focussing on the linkages with material resources and less visible actors. The researcher leaves the boundaries open and closes them only when the people he follows close them; in other words, the researcher has to be as undecided as the actors he follows.

Having introduced the notions of nested *collectif* and the basic research principles of actor-network theory, we now discuss why believe this conceptual framework has so much to offer to CPR theory.

4. Redesigning the principles

In the second section we argued that, rather than providing an innovative framework for CPR analysis, CPR scholars have made it their enterprise to bring forward as much empirical evidence as possible to show that resource users are not by definition locked in The Tragedy, but are able to organise CPR use by crafting institutions. As a consequence, the development of CPR theory is in stasis, yet its concepts are increasingly being applied to analyse situations that are far more complex than those for which they were originally developed . In addition, much of the empirical work by CPR scholars focuses on 'snap shots' of management regimes at one specific point in time, while attention for its historical and future evolution is remarkably absent. Only a few CPR scholars have carried out longitudinal research into the evolution of management regimes and with a specific focus on the question of why stakeholders develop adaptive strategies for CPR use and management (e.g., Edwards, 1996; Jentoft & Kristoffersen, 1989; McKean, 1986; Van Ginkel, 1995, 1999). An explicit focus on changing management regimes is of particular importance in the context of globalisation, which places new demands on CPRs and its management and which creates both opportunities and externalities for traditional and new stakeholders in CPRs. In view of changing socio-economic, material and ecological conditions, the analysis of the complex processes that guide either adaptation of management regimes or their demise, is a necessary step.

Thus, a reconstruction of CPR theory and its concepts is key if we want to use it as (i) a foundation for the analysis of complex CPR management, and (ii) as a conceptual framework in pursuing the idea that collective action is a powerful alternative to deal with complex, interdependent problems in a meaningful way. We believe that this reshaping of CPR theory is centred around three concepts: (i) rationality, (ii) categories of collective action, and (iii) contextual factors, and the adoption of a new ontology and praxeology (a theory that informs practice).

4.1 Rationality, categories and context

Earlier, we concluded that the assumption that rationality is a property of individuals and is essentially driven strategic action, severely hinders our understanding of the complex processes inherent in collective action efforts. Therefore, a radical change in perspective is required. Stakeholders in CPR management scenarios should not be regarded as rational, atomised individuals, but, following ANT, must be considered as nested *collectifs* from whose attempts in shaping the social, acting upon a certain form of rationality is one of the emergent effects. Furthermore, collective action is not merely a human process; it also involves a common good or

problem, a certain resource unit or resource system, a certain technology, paperwork, institutions, and so on. Decisions for a certain course of action, such as the size of the contribution to a common property regime, will be influenced by: (i) networks of social and technical relations, (ii) the meaning that is attributed to the management system, (iii) perceptions of the external environment, and (iv) social experience. Over time, these networks, meanings, perceptions and social experience will be reshaped through the process of collective action itself, but can never be thoroughly understood without considering the non-human entities that are part of the collective action process.

Thus, stakeholders are relational networks of interactions amongst people and things, in other words: they are nested *collectifs*. Crucial to this notion is that we have to abandon the conventional sociological assumption that agency is a given property of human beings; rather, agency is an emergent property from the translation process through which *collectifs* constitute themselves (cf. Callon & Law, 1995; Latour, 1994). If agency cannot be regarded as a given property of humans or things, then rationality must be treated in an equal fashion. This means that in the course of a translation process, different forms of rationality emerge as "necessary points of passage" (Callon, 1986: 27). For example, in the aforementioned case of oyster fishery management in the harbour of Cowes, the fishermen initiated a process to privatise the hitherto informal common property fishery. The fisherman who assumed the leadership in the translation process that was aimed at securing access to the fishery, emphasised that in order to pursue their individual goals (fishing the oyster beds), the fishermen would have to agree upon a joint plan of action on the basis of a collective assessment of the problem. This resulted in the idea of applying for private property rights; thus, communicative rationality emerged as the best strategy. To increase the chances of success, the fishermen decided that they would have to get the other relevant stakeholders on their side before they submitted the application; here strategic rationality proved to be the best strategy. In their discussion with the harbour master, who had a crucial vote in the final decision on privatisation, communicative rationality emerged again, when they agreed on a compromise on the basis of a joint assessment of the problem that would benefit all parties (Steins, 1999).

Another problem of CPR theory we identified is related to its tendency to analyse CPR management in terms of pre-defined categories of 'success' and 'failure', of 'abiding' and 'free-riding', of 'rational' and 'irrational'. The outcomes of collective action processes are linked to the presence of favourable conditions or design principles. However, the development and use of prescriptive design principles inevitably results in the establishment of normative criteria for measuring outcomes. This draws attention away from the users' construction and perception of CPR management and the process through which collective action evolves, and should therefore be reconsidered.

The examples of the Irish shellfish co-operative and the common property oyster fishery in Cowes Harbour showed that despite the presence of the design principles, free-riding behaviour prevailed in the former case and privatisation was deemed necessary in the later case. Thus, what may be a 'condition' for successful collective action in one scenario does not necessarily have to be one in another. There is no 'blue-print approach' for crafting successful CPR management. Furthermore, the presence of design principles does not automatically guarantee 'successful' collective CPR management, as the case of the Irish co-operative shows. The setting within which the management system is located, influences priorities and, consequently, to what extent nested *collectifs* are prepared to fulfil the demands made by the CPR. These priorities do not only vary between geographical settings and over time, but also differ amongst nested *collectifs* who are engaged in the same management system. Moreover, the stakeholders' priorities will be reshaped in time and space through interactions with other *collectifs*. For example, a decade ago a similar privatisation attempt by the same oyster fishermen in Cowes Harbour was abandoned; however, the threat of closure due to navigational considerations and, potentially, nature conservation interests, combined with the

preparation of the estuary management plan, acted as catalysts for fishermen to join forces and breathe new life into the privatisation project.

Another problem related to the design principles we discussed in section two is that judgements and perceptions about 'success', 'failure' and 'rational behaviour' are socially constructed, not only by the stakeholders involved, but also by researchers, policy-makers and bystanders. Again, the Irish co-operative is a good example: despite the fact that two thirds of the shareholders showed free-riding behaviour and outsiders considered the co-operative to be a failure, the shareholders considered collective action to be very successful. By focusing on pre-defined categories, CPR analysts will never be able to fully appreciate how the distinction between success and failure, and indeed the notions of 'success' and 'failure' themselves, are constructed and used (cf. Law, 1994). Furthermore, 'categorisation' does not do justice to both the uniqueness of the management setting and imposes categories upon local and cultural contexts that may be completely alien to the resource managers concerned and, consequently, may lead to erroneous judgements. The recognition that *a priori* categorisation hinders CPR analysis has far-reaching methodological implications as it implies that CPR scholars should use the categories constructed by the stakeholders under study rather than their own categories (section 4.2).

Thus, by following the conventional scientific belief that reality can be divided into categories and that its shaping mainly operates through cause-effect relations, the process of collective action cannot be fully appreciated and is limited to the development of even more categories. Stakeholders in collective action, i.e., nested *collectifs*, are social constructs rather than abstract entities. Therefore, explanatory and prescriptive models of decision-making or collective action are not sufficient (Crozier & Friedberg, 1980). Rather, a focus on the sociotechnical and structural characteristics of the *context* that shapes the translation trajectory is needed to understand the complexities involved in collective action efforts. In this light, we draw attention the need for contextual analysis in CPR theory.

Without the threat of closure and the preparation of the estuary management plan, it is unlikely that the fishermen in Cowes would have started the translation of the informal common property regime into a private property regime. The narrow focus on design principles has impeded the analysis of contextual factors: by describing cases of 'success' and pinning it down to the internal characteristics of the management regime, CPR scholars have largely neglected the role of contextual factors. What is more, 'success' itself remains unexplained; but is reduced to an abstract status that can be achieved by getting the mix of institutional ingredients right. In this 'recipe for success', the external world is a 'black box'. Thus, by focussing on pre-defined design principles for success, attention is diverted from the internal and external complexities involved in the emergence and evolution of collective action processes and hinders the understanding of the dynamic and interactive nature of the translation trajectory it involves.

In a Special Issue of the Journal of Environmental Policy & Planning (1999), CPR scholars demonstrated the importance of contextual factors in CPR management and the need to include them in analysis. Using case study material, they showed that there is a large variety of contextual factors affecting the collective action trajectory (or free-riding). What is more, contextual factors will differ from case to case and, in each case, will evolve in time and space. However, as Van Ginkel (1999) rightly argues, this is no reason to exclude them from the research agenda.

Lack of knowledge of contextual factors can lead CPR analysts to make simplified judgements about collective action or free-riding. Thus, the question of how to analyse contextual factors is critical. Clearly, there is a limited extent to which researchers can study the entire external world of the CPR and its single or multiple management regime(s). Starting with one outcome, or point of passage, in a collective action trajectory, for instance the establishment of a co-management platform, and then 'backsolving' (Feeny, 1994) or tracing back the 'tactics' (Law, 1994) by focusing

on critical incidents, is one way of making visible contextual factors[6] (cf. Oakerson, 1992; Edwards & Steins, 1999). From an analytical point of view, it is useful to distinguish between 'local' and 'remote' contextual factors in this process of backsolving (Edwards & Steins, 1999). Local contextual factors affect both the demand and supply of products, benefits and services from the CPR and, therefore, have a direct effect on CPR use and its management. Generally, stakeholders will be able to influence local contextual factors. For example, the status of the Dutch Wadden Sea as an important breeding and staging ground for birds is one of the local contextual factors that eventually resulted in a co-management plan for the shellfish fisheries made by fishermen, the government, scientists and nature conservation groups in an attempt to deal with changing nature conservation demands and attitudes towards shellfish fishing in the area. Remote contextual factors usually have an indirect effect on the CPR and tend to be outside the control of the stakeholders. For example, a number of consecutive cold winters in combination with storms affected the shellfish stocks in the Wadden Sea and, even if the shellfish fisheries would not have taken place, resulted in a food shortage for birds; this was one of the factors that resulted in the division of shellfish between birds and fishermen under the co-management regime.

From a methodological point of view, distinguishing between local and remote contextual factors and making them visible through backsolving and comparative analysis are the only two grounded guidelines for the analysis of contextual factors in CPR management. While contextual factors are broadly embedded in a number of spheres, such as the ecological, economic, demographic, social, cultural, political, legal, technological and infrastructural environment, their presence and their direct and indirect impact on CPR management will vary from situation to situation. From an analytical perspective, it might be tempting to define categories of contextual factors on the basis of a comparison of case studies, as has been the case for the design principles, for instance. However, from an ontological perspective, the use of pre-defined categories cannot be advocated. As we pointed out earlier, categories that one researcher proposes may be interpreted and constructed differently by other researchers as well as the stakeholders in the CPR (who may not even know the researcher's categories). Furthermore, the inherent risk in categorising the dynamic, external forces impacting on CPR use and management is that they are used as blueprints. As we showed earlier, the presence and impact of contextual factors will vary from case to case. By using *a priori* categories, researchers may easily lapse into generalisations by attributing the same weight to each contextual factor in the translation process and may run the risk of overlooking contextual factors that are not 'on the list', but may have been crucial in the translation process.

We conclude that 'successful CPR management', i.e., collective action as the dominant strategy, cannot taken for granted; that is, cannot be used as an excuse not to analyse the contextual factors that formed part in achieving this situation. The management regimes for CPRs are subject to dynamic internal and external changes; some have been present for centuries and may evolve around one or multiple resource units, others have more recently witnessed the arrival of new stakes and have been slightly adapted or completely transformed in response to meet the new demands placed upon the resource system. While some stakeholders have been able to adapt their CPR management regime to external changes and, in this respect may be considered 'successful' (e.g., Edwards, 1996; Netting, 1981), others have proven incapable of adaptation (e.g., McKean, 1986). In both cases, the interactions amongst internal and contextual factors as well as the stakeholders' perceptions of these dynamic forces and the CPR itself, have contributed to the realisation (or decay) of adaptive management, and therefore cannot be taken for granted but

[6] Backsolving is the essence of Oakerson's well-known analytical framework for common-pool resources: working backwards through the relationships by studying interaction patterns amongst resource users will provide initial answers regarding the reasons for specific outcomes; the analyst must then ascertain how the variables in the framework: (i) physical and technological properties of the resource, together with (ii) institutional arrangements, affect the interaction patterns (Oakerson, 1992).

deserve explanation. A key question in the analysis is therefore: through what *mediating mechanisms* do these contextual factors affect and modify (and in what sense) the tactics of translation amongst nested *collectifs* (cf. Crozier & Friedberg, 1980).

4.2 A new ontology

From our discussion, it is apparent that CPR theory needs to be reshaped. Its post-positivist conception of reality, its narrow assumption of fixed, purposive rationality, the focus on internal variables and the prescriptive categorisation of collective action provide too limited a scope to deal with the analysis of complex CPRs. The traps associated with its current ontology, i.e., its beliefs about the nature of reality, and epistemology can, however, be avoided. We believe that the actor-network (ANT) perspective adds an important dimension to the study of CPRs in that it examines how the various stakeholders construct CPR management and how it evolves over time. It helps analysts to be sensitive to both internal and contextual factors influencing the actors' motivations to adopt a certain strategy, by *analysing* the process rather than merely describing outcomes.

First, ANT's principle of generalised agnosticism is crucial for the appreciation of collective action processes. The principle of generalised agnosticism tells us to abandon *a priori* categories and design principles for collective action as they thwart the analysis of the stakeholders' constructions of CPR management and the way these constructions are used. The focus of analysis should be on the tactics of translation, i.e., following the nested *collectifs* in the way they mobilise social and material means to enrol others in their projects.

Does this imply that the design principles in CPR theory are useless? The answer has to be 'yes' if they are tacitly used as prescriptions for establishing co-operation in CPR management situations. The answer is 'no' if analysts use them as a starting point for the formulation of research questions that help to identify how stakeholders define, *inter alia*, 'success', 'free-riding', 'cheating', 'sanctioning', in other words, construct CPR management. This strategy will assist the examination of the collective action or free-riding. In this process, the analyst should acknowledge the interdependent relationship between these questions and the dynamic forces from the external world that impinge upon CPR management.

In view of the principle of generalised agnosticism, the abolition of the 'human' category in favour of the 'actor-network' or *collectif* is another ontological benefit of ANT for CPR theory. Collective action strategies can only be appreciated by taking into account the very non-human entities that (i) constitute the various stakeholder-*collectifs* and, in multiple-use scenarios where different resource uses are characterised by a certain level of interdependency, (ii) are the pivot of the trials of strength that take place amongst the different *collectifs* throughout the process of translating resource management, of which co-operation and free-riding are equally likely effects.

Second, ANT's symmetry principle benefits the understanding of collective action processes. The principle of symmetry tells us that everything in a collective action situation needs explaining in the same terms. This means that 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 what needs to be explained. Thus, the presence of collective action should be analysed in the same way as its absence.

The adoption of the principles of generalised agnosticism and symmetry is the first basic requirement for the further development of CPR theory from a descriptive (and consequently prescriptive) approach to an explanatory, multi-dimensional perspective. From an epistemological point of view, this new ontological foundation means that the position of the CPR scholar in relation to the CPR and

the nested *collectifs* that have a stake in it, drastically changes. Guba & Lincoln (1989: 84) describe this new relationship as follows: “an inquirer and the inquired-into are interlocked in such a way that the findings of an investigation are the *literal creation* of the inquiry process”.

For the study of CPR management, this means that, at the outset of the investigation, only broad phenomena can qualify for analysis. The ‘inquired-into’ should determine how the analysis of this broad phenomena is filled in, i.e., they are the ones that set the research agenda. The researcher’s role is to follow the actors (Latour, 1987). ‘Co-operation’ or ‘collective organisation’ are examples of such phenomena. If a CPR scholar wants to carry out research into ‘co-operation as a mechanism to achieve sustainable fisheries management’ and the inquired-into have never heard of the concept of sustainability, it does not make much sense to carry this research through. The idea for this research may have arisen because the particular researcher misinterpreted or romanticised the existing collective organisation of fisheries exploitation as an institution aimed at sustainable management, whereas for those involved, it is nothing more but a distributional arrangement. In this example ‘co-operation’ itself is that what needs an examination.

While the recognition of the ontological principles of symmetry and generalised agnosticism and the related concept of the nested *collectif* are of crucial importance to CPR theory as a whole, these principles are of particular interest for the study of complex, multiple-use CPRs. In such scenarios, there are divergent claims on, stakes in and constructions of the resource system. What is more, the different nested *collectifs* are interdependent in that each particular type of use will, in nearly all cases, have some effect other uses. In addition, the range of local and remote contextual factors that affect the evolution of adaptive management (or lack thereof) increases; while some *collectifs* may experience a significant influence from certain contextual factors, others may feel little or no effect of the same factors (Buck, 1999. Finally, collective action processes are not limited to one particular type of use, but also take place (or don’t) amongst different uses. These characteristics make the study of collective action processes in complex, multiple-use scenarios a complex undertaking.

The adoption of the principles of generalised agnosticism and symmetry will facilitate our understanding of the contingencies involved in the shaping and reshaping of collective action processes by focusing on the socio-material construction of CPR management and the internal and contextual factors that influence the emerging action strategies by nested *collectifs*. In this analytical process, co-operation and free-riding are both outcomes or effects of the interplay and consequent trials of strength amongst the different *collectifs* with a stake the CPR and their mobilisation of social and material resources external to the CPR.

By accepting the offer of translation, instead of regarding collective action and free-riding as predominantly static phenomena, the practice of taking ‘snap shots’ and describing CPR management (or lack thereof) can no longer be defended. Changes in CPR management regimes through, for instance, adaptation, transformation, disappearance and materialisation, and the processes involved in those changes, as well as the examination of durability and mobility of CPR management regimes, will become the enterprise of CPR scholars. In this way, it becomes possible to truly develop theory instead of (i) accumulating evidence rebutting Hardin’s Tragedy, (ii) categorising CPR management and, ultimately, (iii) (consciously or unconsciously) dogmatising these categories.

Essential for this proposed paradigm shift in CPR theory is that the adoption of the principles of generalised agnosticism and symmetry is complete; that is, does not discriminate between some aspects of CPR theory. The most radical ontological shift will not be the notion that stakeholders have their own constructions of the CPR and their role in its management nor the idea that non-human entities should became part of the analysis, it will be the new status of the concept of

rationality. As was outlined at various points in this study, the rational choice approach and particularly the concept of bounded rationality have formed the foundation for the analysis of what CPR scholars refer to as 'appropriator behaviour'; boundedness in this case referring to internal variables of common property regimes. Strategic rationality is the force that drives the appropriator and, as a consequence, divides him from the social. The concept of agency is not made explicit and, unlike actor-oriented approaches that extended the agency concept to include the social world, only seems to refer to interactions of atomised individuals (cf. Wilson & Jentoft, 1999). By adopting ANT's basic principles, CPR scholars may find themselves in a conceptual crisis: from having a limited "undersocialised conception" of the appropriator (Granovetter, 1992, in *ibid.*: 63), they have to go right to the other side of the continuum in conceptualising 'appropriators' as nested '*collectifs*', whose agency and rationality are not given properties, but are the emergent outcomes of interactions of human and non-human entities. Nevertheless, this radical change in the assumptions underlying collective action processes is a basic requirement: by clinging to the concept of purposive rationality and considering it to be a fixed property, CPR scholars will never be able to analyse how collective action is constructed, how the emergence of strategic or communicative action are effects of trials of strength at a certain stage in the translation trajectory and how they are points of passage in the ongoing shaping of translation.

In the introductory section, we discussed how collective action approaches are gaining increased popularity in solving complex, interconnected resource management problems, and achieve a balanced mix of uses. In this context, the concepts developed in CPR theory are increasingly being adopted by the World Bank, FAO and NGOs. Our discussion so far focussed on the ontological and epistemological changes that are needed if CPR theory wants to provide a framework for the *analysis* of complex CPR management. Unfortunately, the development of methodologies and heuristic tools for the *facilitation* of collective action has not been on the agenda of CPR scholars, and has only recently begun to be explored (e.g., Agriculture & Human Values, Special Issue on Platforms for CPR use negotiation, 1999). A praxeology, i.e., a theory that informs practice, is urgently needed if CPR theory wants to benefit the facilitation of collective action strategies in CPR management. Below, we briefly discuss the notion of nested platforms for resource use negotiation, which we believe has a lot to offer for the development of a praxeology for CPR theory.

4.3 Towards a praxeology

The concept of 'platforms for resource use negotiation' has been developed by the Communication and Innovation Studies Group at Wageningen University, The Netherlands (Röling, 1992; Röling & Wagemakers, 1998). In such platforms, resource management issues are considered from a multiple-use perspective and stakeholders (or *collectifs*) exercise collective agency in working in concert towards adaptive resource management through (i) fostering understanding about the resource base, (ii) minimisation of social dilemmas associated with collective resource use, and (iii) implementation and fine-tuning of action strategies with respect to perceived problems.

The potential of nested platforms lies in their action-oriented commitment, i.e., they call attention to the need for creating capacity for decision-making and action at the ecosystem level at which 'solution' to resource use problems can be developed by, *inter alia*: (i) making visible existing or potential issues of contest, (ii) encouraging understanding of the physical, ecological, socio-economic and cultural characteristics of the CPR, (iii) letting the nested *collectifs* with a stake in the resource system set management objectives for the CPR (instead of prescribing them), (iv) working collectively to balance the different demands on the resource system, and (v) providing a participatory basis for the development of evaluative criteria to assess whether or not the objectives have been achieved. The latter is of importance in light of the current practice of measuring outcomes of CPR management on the basis of evaluative criteria such as economic

and social efficiency, equity and sustainability. The use of such criteria is problematic. First, the use of multiple criteria means that trade-offs have to be made as no management system can simultaneously maximise each criterion used (Oakerson & Walker, 1997). Second, developing and using evaluative criteria becomes increasingly difficult in complex CPRs as different uses are interdependent and, consequently, achieving an optimum for one type of use may result in a suboptimal outcome for another. Third, evaluative criteria are necessarily value-laden: (i) what is a desirable outcome, (ii) for whom is it desirable, and (iii) whose criteria should be used in the first place? Platforms can help assessors in constructing evaluative criteria by using the constructions of those concerned and in assisting the actual assessment process.

The effective use of platforms as a heuristic tool for the negotiation, co-ordination and facilitation of complex, multiple-use CPR management, is, however, associated with a number of critical factors. First of all, when stakeholder analysis has to be translated into stakeholder representation, social structures and prevailing beliefs about and prejudices against some groups may form barriers for participation. The sheer size a nested platform can take when all stakeholder groups are represented is another constraint. In addition, there is the question whether or not representatives are really representatives. This question must also be seen in light of the dynamic nature of priorities, stakes and the resource system itself (Steins & Edwards, 1999). Second, although platform processes heavily rely on the emergence of communicative rationality, true communicative action will be the exception rather than the rule. This is because some *collectifs* will let themselves *become* enrolled in the platform if this at that specific moment is strategically the best course of action. In this light, the collective actions that are agreed upon will always be the result of comprise and, from the stakeholders' perspective, are likely to be suboptimal. Thus, platforms are not a panacea to solve all the perceived problems, they are merely a way of mediating these problems. Third, different perceptions of and discourses about the issue at stake as well as 'stereotyping' other participants can frustrate collective decision-making and concerted action (Van Woerkum & Aarts, 1998). Fourth, we want to add that third party involvement, notwithstanding the associated problems such as stakeholder bias, is crucial for facilitation; not only can a third party (i) make the constructions of different stakeholders visible and (ii) help to make sense of them, but also it can (iii) ensure continuity, (iv) function as a 'gatekeeper' at the interface of the nested platform and its environment (Crozier & Friedberg, 1980), and (v) reduce or absorb the transaction costs of forming a platform.

As the facilitation of complex CPR management has not been on the agenda of CPR theory and as the concept of platforms as a heuristic tool for negotiating common-pool resource management has only recently been introduced, many questions remain. From a discussion in the panel on platforms for collective action in complex CPR management at the 7th Common Property Conference in 1998, which was organised by two of the authors, a number of issues that should be taken into consideration emerged. First, it is important that nested platforms correspond with the resource system level that is at stake - in ecological, economic and social terms - and that they are stakeholder-based, rather than user-based. Second, 'back up' by small-scale local platforms can facilitate decision-making and effective representation in larger-scale nested platforms for collective CPR management. Third, the empowerment of platform participants to express their views is important to challenge inequalities (in terms of gender, ethnic, education and skills) and dominant power relations, and to create a situation in which communication is as open (and voluntary) as possible. Fourth, stakeholders' priorities, as well as the resource system, are dynamic and are constantly being reshaped. Consequently, nested platforms are subject to the same dynamics. Fifth, in collective CPR management, social learning about the resource system, the different stakes, views and actions, is vital to agree on action strategies and to redefine existing power structures that may hinder collective actions. Sixth, platforms for resource use negotiation are always nested within other decision-making structures. The latter influence the role of the nested platform and create the context within which new platforms for solving certain resource

management problem are necessary or redundant. Seventh, a too strong reliance on the formation of nested platforms as the solution to complex CPR management problem may overshoot the mark; sometimes it can be more effective to let platforms evolve from smaller-scale initiatives to tackle the perceived problem. Finally, the presence of a third party is beneficial to the performance of nested platforms (we refer to a Special Issue of Agriculture & Human Values, 1999, for a detailed discussion).

We want to emphasise that these factors are not meant to be prescriptive design principles for 'successful' nested platforms for complex CPR management. If nested platforms are formed to facilitate collective resource negotiation and concerted actions, the recognition that each specific CPR management scenario represents a unique and dynamic setting with its own demands is vital. Prescriptions about platform constitution and facilitation are risky, since this involves the risk that locality-specific social and cultural factors are overlooked or generalised. The above factors have emerged from a first exchange of experiences and must be seen as heuristic tools that help researchers and facilitators to prompt questions about platform management. In this context, only the principles of generalised agnosticism, symmetry and following the actors may be granted the status of design principles for CPR management research and facilitation.

5. Recommendations for further development of CPR theory

By proposing an interactive perspective for CPR theory based on actor-network theory and an action-oriented commitment, we have become 'translators in the making'. However, for this paper to become a point of passage in the development of a theory for complex, multiple-use CPR management, its readers, and CPR scholars in particular, have to be encouraged to take up this challenge. Therefore, we want to conclude this study by giving some directions for future social constructivist research and policy into complex CPR management.

The first, and evident, implication of our proposal is that the potential of an interactive approach needs to be further explored. Our proposal relies heavily on the ontology and epistemology of ANT, which was developed in the context of the sociology of science. This means that not all of its principles and methodological rules are applicable to following common-pool resource stakeholders. Using the principles of generalised agnosticism and symmetry and the method of following the actors as starting points, new methods and techniques will have to be developed that can deal with the analysis of the contingencies involved in the tactics of translating CPR management.

Second, in the development of new heuristic tools for the study of CPR management from a social constructivist perspective, particular attention will have to be paid to methodologies that help to reveal the contextual factors that influence CPR management; the focus should not only be on explaining why some contextual factors form an incentive for change, but also why some factors do not. Furthermore, the development of heuristic tools should focus on the question of how to make the constructions of the various stakeholders involved, visible.

Third, we argued that by focussing on translation processes, CPR scholars will be able to explain change (or adaptation) of management regimes (or lack thereof). In its present form, outcomes of CPR management are described by a process of backsolving interactions of a number of categories. In an adapted form (that is, without using pre-defined categories), the process of backsolving may also benefit the analysis of translation processes. In addition, a comparative analysis of the action strategies and the 'structural characteristics' of the nested *collectifs* is a method to make the tactics of translation and consequent changes visible. However, other methods of following the actors are also conceivable; for example, not following past translation

attempts of the nested *collectifs*, but following present and future tactics of translation. This concept and other methodologies should be explored and developed further.

Fourth, the facilitation of collective action has only recently emerged on the agenda of CPR scholars. In this light, heuristic tools that facilitate concerted actions amongst multiple nested *collectifs* are lacking. We drew attention to the concept of platforms for resource use negotiation, which may be one such potential tool, and identified several emerging issues that can assist CPR scholars in prompting questions about platform management. In this light, some issues need further exploration: (i) the role of social learning in CPR management, (ii) the role of leadership in nested platforms, (iii) methodologies for stakeholder analysis, empowerment and the facilitation of collective action, (iv) adaptive management by adapting nested platforms, and (v) the role of third parties in the facilitating platforms. We want to emphasise that, besides their potential role in facilitating collective action, platforms also have an important part to play in the analysis of the outcomes of CPR management. Presently, there is a tendency to measure such outcomes on the basis of evaluative criteria defined by the analyst. Platforms can assist the development of such criteria based on stakeholders' constructions, as well as the actual assessment of outcomes. Further research into the development of heuristic tools for the facilitation of concerted actions amongst multiple nested *collectifs* should be carried out.

Fifth, the idea that collective action is an alternative to deal with complex, interdependent natural resource management problems has only recently emerged on the political agenda. Initiatives that rely on collective action amongst multiple stakeholders, such as integrated coastal zone management programmes, are still in their infancy and still have the associated teething problems. Yet, many of these initiatives have shown their potential in balancing different claims and interests over CPRs. However, by advocating that collective action is an alternative strategy for policy development and action towards problem resolution and sustainable management only, it is easy to fall in the same 'revisionist trap' as current CPR theory. Instead, research programmes into the study and facilitation of collective action to co-ordinate multiple stakes in complex CPR management are urgently needed.

Finally, an analysis of the social constructions of the natural and material environment and the various unique management regimes for complex CPRs and the way these constructions affect collective resource management, should be a core aspect of any research project or policy programme concerning natural resource management.

In this paper, we have proposed an agenda for the reshaping of CPR theory that goes beyond analysing social dilemma situations on the basis of a narrow conception of the actors involved and a divide between the actor and the social, and, instead, focuses on (i) the tactics that nested *collectifs* employ in shaping CPR management and (ii) the facilitation of collective action amongst multiple stakeholders. This proposal may seem radical to CPR scholars and modest (and perhaps inappropriate) to actor-network theorists; yet we hope that that we do not remain a 'translator in the making', since the adoption of a social constructivist ontology to CPR theory is crucial if we want to go beyond descriptive frameworks that lead to prescriptive models and, instead, make visible the contingencies involved in complex CPR management. As John Law (1992: 390) emphasises:

> "organisation is an achievement, a process, a consequence, a set of resistances overcome, a precarious effect. Its components – the hierarchies, organisational arrangements, power relations, and flows of information – are the uncertain consequences of the ordering of heterogeneous materials. […] Our task is to study [this process], to understand how [*collectifs*] realise themselves, and to note that it could and often should be otherwise".

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