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Title: The Role of Contextual Factors in Common Pool Resource Analysis

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Abstract:

It is recognised that well-established rules are a necessary, but not sufficient condition of successful collective action (see Barrett, 1991; Eyborsson, 1995; Steins, 1995). Successful co-operation depends largely on the response of individual actors, influenced by incentives derived from both inside and outside the management regime. Contextual factors are one set of such factors and include dynamic forces based *locally* and *remote* from the resource management regime: they are constituted in the user groups' social, cultural, economic, political, technological and institutional environment and can have an important part to play in establishing the choice sets from which common property users can select strategies (Edwards & Steins, 1996; Steins, 1997). In this respect, they are important in determining the evolution of decision-making arrangements for managing common pool resources (CPRs).

Contextual factors define (i) what is physically, legally, economically and socially *feasible* in terms of the supply of products and services from a resource and (ii) what is economically, socially and culturally *desirable*, by establishing the demand factor. As a result, the choice sets related to *use* of the resource system are expanded in terms of (i) the number and types of users; and (ii) the type and extent of use. In addition, contextual factors often redefine choice sets related to revision of the *decision-making arrangements* governing the resource (see Feeny, 1988; Edwards, 1996; Barrett, 1991). Lack of knowledge of contextual factors can lead analysts to make simplified judgements about the state of management of the resource. The paper advises researchers to focus on the choice sets available to individual users of the resource, in terms of (i) products and services demanded of the resource, (ii) the different decision-making arrangements possible and (iii) different action strategies, and tracing back the derivation of these choice sets to contextual factors. This is particular relevance in multiple-use CPRs, where there is more than one type of user group and analysis must address expected differentials in the adoption of individual strategies according to use of the CPR.

1.0 INTRODUCTION: THE IMPORTANCE OF CONTEXT

The objective of this paper is to establish the relative importance of context in Common Pool Resource (CPR)¹ research and to suggest ways in which meaningful contextual analysis might be incorporated in future CPR fieldwork. Whilst there is a plethora of empirical work on CPRs, encompassing a variety of field settings in terms of geographical location, nature of the resource and period of study (see, for example, the collections: McCay & Acheson, 1987; Berkes, 1989; Bromley et al., 1992), most case studies fail to address the significance of the specific context of the research in a way that might contribute to theoretical advancements. In such cases, the contextual background to each study makes two major contributions. First, contextual analysis adds interest to the growing literature on CPRs, by providing information on differing nations and localities, cultures, political regimes and periods. While authors do not always acknowledge contextual analysis as essential to the plot of their CPR story, it adds variety to such empirical collections by providing the colour and texture one associates with a richly woven cloth. Second, contextual analysis in specific situations often acknowledges that context *per se* has had an effect on the outcome of the CPR use and management. In both respects, we see contextual analysis as a feature of CPR authorship that should be maintained and enhanced. Our concern, therefore, is not with any apparent lack of contextual analysis taking place within CPR research, but rather with extent to which it is hidden within empirical research.

Traditionally, contextual factors have lacked definition, explicit identification and measurement in CPR research. Whilst many researchers acknowledge the presence of contextual factors, few summarise their significance in either specific field settings or in overall CPR research. Authors constructing theory concerning the success of appropriators to manage resources collectively over time have acknowledged the role context in determining the survival of, for example, Appropriator Organisations (AO):-

“An AO is more likely to survive over time if it is fortunate enough not to have to cope with many, simultaneous changes in key exogenous variables as population, technology, number of appropriators, external demands, and relationship to central authorities.” (Ostrom, 1992:308).

Similarly, Singh (1994:21) acknowledges the role of national and international policies on the conservation, use and development of CPRs:-

“There are many instances where national export promotion policies and international transfer of technology have significantly boosted the rate of

¹ While property rights classifications of commons can be helpful, they can also be misleading in that they suggest that each resource system will fall neatly into a single category. In ‘pure’ common property situations, the rights to the resource will be shared co-equally and are exclusive to a well-defined set of people (Singh, 1994). However, resources may be used variously in common, without comprising pure common property. For this reason, we refer to common *pool* resources in this paper. There are three other basic classifications of property rights for common pool resources other than common property: (i) open access, where no use rights are attached to a specific group, resulting in a general ‘free for all’; (ii) public property, where access rights for the public are held in trust by the Crown or state; and (iii) private property, where tradable rights are owned by an individual, household or company, who may allocate various rights of use to groups of individuals to use the resource in common. In reality, many resources can be classified under more than one definition of property rights. By using the term common *pool*, it is our intention to include resources to which common property rights are attached, but to which public and/or private property rights may also exist and, indeed, open access may be assumed by some users. This is the essence of the ‘complex’ commons we refer to and, in reality, common pool resources subject to multiple-use are likely to comprise this mixture of rights.

utilisation of natural resources, most often beyond the limits set by local conventions and traditions.”

However, there has been a tendency for such contextual changes to be used in a way that provides an *excuse* for resource degradation or depletion, without providing a full *explanation*. In most writing, exogenous change is taken as a ‘given’ and, although it is often recognised as a determining factor in the downfall of a common property regime, researchers do not venture beyond the internal world of the regime to provide a fuller explanation of the significance of context. By tracing the actions of individuals and their patterns of interaction back to some specific change in the contextual background of the CPR, the researcher *should* be able to diagnose specific outcomes and may even be able to predict the likelihood of future outcomes, given stated changes in the context in which the resource system and its use is embedded.²

Only through explicit analysis of the exact nature of the contextual changes and, more importantly, their specific effect on the action of individuals in using and managing the resource, can we begin to build a more complete picture of CPR management. This is of particular importance to research on complex, multiple-use CPRs, over extended periods. Clearly, in such cases, external changes are inevitable. Where such changes have affected the management of the CPR to the extent that the resource system has become degraded or depleted *or* the property rights regime has changed (for example, where a common property resource has been privatised or has become a *de facto* open access resource), explicit analysis is needed to explain how changes in the contextual background to the resource were translated into revised action strategies and outcomes. Equally, there is empirical evidence to suggest that some CPRs are capable of adapting to external changes to the extent that the resource system and the original property rights and management regime survives, albeit with modifications and renovations (see, for example Netting, 1981; Edwards, 1996), while others prove incapable of adaptation (see, for example, McKean 1982, 1986). Explicit analysis of contextual factors should provide information that is able to identify the extent to which (i) the nature of the contextual change, (ii) the nature of the endogenous attributes of the specific situation (for example, the use community), and/or (iii) the nature of the interaction of the above lead to the survival or downfall of the CPR and its property rights and management regime.

This paper seeks to make contextual analysis explicit in four ways. First, in advocating that context is researched and analysed explicitly, we acknowledge the need to isolate ‘contextual factors’ in a field setting. Second, we provide a generic definition of ‘contextual factors’ that might assist in them being included as a component in accepted analytical frameworks for CPR research, such as those put forward by Oakerson (1986, 1992), Ostrom (1990), Ostrom & Walker (1995), Selsky & Memon (1995) and Oakerson & Walker (1997). Third, we confirm the importance of contextual analysis in situations concerning complex, multiple-use CPRs, where external change is axiomatic to research over extended periods. Finally, we suggest ways in which researchers in the field might include meaningful contextual analysis in

² We stop short here of claiming that analysis of contextual factors will help a researcher to *predict* future outcomes. The very nature of contextual factors means that they constitute all the possible forces impacting on the user groups and the resource system. Change in the contextual factors may be sudden and may directly or indirectly influence the resource regime, making prediction very difficult. However, it is possible that retrospective analysis of contextual change and their influence on eventual outcomes might facilitate the researcher in identifying *possible* future changes in context and, therefore, identifying a range of *potential* outcomes.

their studies of specific CPRs. It is hoped that through advocating such explicit analysis of context in future CPR research that we will encourage the construction of some rudimentary theory concerning the significance of context in specific CPR cases and the effect of different types of contextual change on the likelihood of the CPR to survive.

The paper will form the basis for discussion on the role of contextual factors in CPR research during a panel session at the seventh conference of the International Association for the Study of Common Property (IASCP) in Vancouver, June 1998. Selected case study research will respond to the ideas set out in this paper and evaluate the extent to which the conclusions of the paper can be validated by the empirical work of the other panellists.

2.0 CONTEXTUAL FACTORS

2.1 Definitions

The word 'context' is derived from the Latin *contextus*, which in turn was derived from the Latin *texture*, meaning *to weave*. The contextual background to a CPR situation is a richly woven cloth of different coloured threads and of deep texture. However, while CPR research has tended to treat context as 'given', a colourful backdrop, it is essential that it is integrated as part of the analysis of specific CPR situations. In essence, it is important for the researcher to identify how each different coloured thread in the contextual 'cloth' is woven into the resource situation and how each brings about different outcomes of resource use and management. However, in order to facilitate such explicit analysis, contextual factors must become a readily identified component of CPR research. As such, they need both definition and a place in the analytical frameworks employed in empirical work.

Comparative research has shown that successful co-operation in long enduring CPRs depends largely on the response of individual actors. Whilst well-established rules are a necessary condition of successful collective action, they are not sufficient (see Barrett, 1991; Eyborson, 1995; Steins, 1995). Resource users find themselves in complex and uncertain situations. Based on their social experience, they have to choose between different courses of action and believe that they can judge the appropriateness of these (Long, 1989). The action strategies that individuals adopt are the result of weighing the costs and benefits of contributing to and conforming with the existing resource management regime against those resulting from an array of different strategies.³ The action strategies of individuals are then combined in patterns of interaction, which in turn produce physical outcomes of the CPR's use (Oakerson, 1992).

Contextual factors create dynamic forces that influence individual strategies by affecting the way in which an individual perceives the benefits and costs of different strategies. Such forces can be derived from contextual factors both based *locally* and *remote* from the resource

³ Decisions will be influenced by: (a) networks of social relations, for example a community characterised by multi-stranded relationships may perceive difficulties in acting collectively (Steins, 1995); (b) interaction between resource users and non-human entities in the environment (Callon and Law, 1995); (c) the meaning the stakeholders attribute to the resource management system; (d) their perceptions of the wider environment in which resource management is embedded; and (e) observations and expectations of how *others* behave will affect the strategies of individuals (Runge, 1981). In the evaluation of others' behaviour, CPR users will use social experience gained from their involvement in the common, as well as experience from everyday life.

management regime: by the internal and external contextual factors (Edwards & Steins, 1996; Steins, 1997a). *Local* contextual factors have a *direct* influence on the situational variables of the CPR, including the user community, and can largely be affected by the user community. *Remote* contextual factors have an *indirect* influence on the situational variables of the CPR and are usually outside the control of the user community.

2.2 Local and Remote Contextual Factors

Contextual factors are constituted in the user groups' social, cultural, economic, political, technological and institutional environment and can have an important part to play in establishing the choice sets from which CPR users can select strategies. Contextual factors *local* to the CPR affect use and management of the resource by directly influencing individuals' strategies. For example, the offer of cheaper, more convenient grazing on a nearby common may cause graziers to reduce the amount of input they are prepared to contribute to an existing common. Despite being local, such contextual factors may not be any more visible to the researcher than those that are remote from the resource regime. Often local contextual factors are so embedded in the CPR regime, that they become the most difficult to identify as a significant force (see section 4).

Local contextual factors affect both the demand for and supply of goods and services derived from the resource system. For example, our research on the New Forest has shown how residential development of privately owned land around the periphery of the New Forest has resulted in a reduction of available 'back-up' grazing land for commoners to lease. The back-up land is needed to move stock from the common grazing land when forage is in short supply. The reduction in land available is beginning to affect the ability of commoners to maintain and/or increase stock numbers. This is a local contextual factor that has affected the supply side of common grazing, although it has not affected the resource system (the common) itself (Edwards, 1996).

Remote contextual factors comprise dynamic forces derived external to the resource management regime. Although they too are constituted in the social, cultural, economic, political, technological and institutional environment in which the common is embedded, such contextual factors are usually beyond the control of the user community (such as global warming and international regulations). Nevertheless, remote contextual factors affect the CPR's use by *influencing the market for the products and services derived from the resource system*.

On the demand side, use of the New Forest commons for military purposes during both World Wars led to damage to the common (including the digging of open trenches), which was tolerated in a manner that was inconceivable before the War. The national and international political imperative defined new limits of acceptability, as common graziers were forced to acknowledge greater priorities for the resource system and to redefine their expectations of supply from the land. The remote contextual factors of the time revised parameters for strategic choices, both for individual graziers and for collective-choice organisations (Edwards, 1996). Similarly, in last two decades, contextual changes that have affected the demand for different products and services in the New Forest, include:

(a) changing demographics (in particular, population growth in southern England);

- (b) national trends in sport and recreation (including an increasing demand for recreational use of the countryside);
- (c) transport technology and transport patterns (in particular, increased accessibility to the New Forest through increased car ownership and improved road networks);
- (d) increased personal disposable income (in particular, the increase in availability of leisure expenditure);
- (e) sports technology (including both the development of off-road cycles and the subsequent decrease in their price) (LMRU, 1996).

Such contextual changes have increased the demand for use of the New Forest commons as a backdrop to informal recreational pursuits and so both augmented and diversified use of the resource system. In short, changing contextual factors have redefined the market, in terms of the products and services of resource; whether they be the type and quantity of resource units that might be extracted from the resource, or services rendered by the entire resource system.

Thus, contextual factors define (i) what is physically, legally, economically and socially *feasible* in terms of the supply of products and services and (ii) what is economically, socially and culturally *desirable*, by establishing the demand factor. As a result, the choice sets for use of the resource system are expanded in terms of (i) the number and types of users; and (ii) the type and extent of use.

Expansion of the choice sets related to *use* of the resource are matched, however, by contextual factors which have redefined the choice sets related to revision of the decision-making arrangements. For example, in the New Forest, new settlers to the area have successfully hijacked existing collective-choice decision-making arenas and created new ones, thereby holding greater influence over the design of new operational rules affecting both the new recreational uses and the traditional uses, such as grazing on the common (Edwards, 1996). Barrett (1991) reports on a similar case in the fishing industry in Bermuda.

3.0 COMPLEX, MULTIPLE-USE CPRs

3.1 Complex Common Pool Resources

Much of the original work conducted on the analysis of common pool resources has focused on resources that are subject to a single, extractive resource use. Ostrom (1990:30) distinguishes the 'resource system' from the flow of 'resource units' it provides and, in doing so, clarifies the difference between, for example, the common itself and the grass it produces. A single resource system is capable of producing a wide variety of resource units (Selsky and Creahan, 1996). For example, an open woodland area can produce grass for grazing stock, wood for fuel and timber, nuts and berries for human or animal use (such as acorns and mast for pigs) and even water for collection and distribution for future use. In addition, the woodland resource system may provide a useful non-extractive stream of benefits. Such 'non-extractive users' derive benefit from their use of the resource system itself and might include recreational users, nature conservationists, or any such other people who enjoy some benefit from the commons' existence. Furthermore, it is possible to divide further the non-extractive benefits associated with resource systems into 'use' benefits, which refer to benefits derived

from people having access to and directly using the site, and 'non-use' benefits, which, by their very nature, do not require the beneficiary to enter onto or use the natural area in any direct manner (Krutilla and Fisher, 1975; Conrad, 1980; Newman and Schreiber, 1984; McNeely, 1988).

Increasingly, authors are acknowledging that a key resource management issue is balancing the interests of *multiple* uses and users (Feeny *et al.*, 1990; Feeny *et al.*, 1996; Barrett, 1991; Van Ginkel, 1996). More recent research (for example, Selsky & Memon, 1995; Edwards, 1996; Meinen-Dick & Jackson, 1996; Selsky and Creahan, 1996; Steins, 1996) has focused on such multiple-use CPRs, where non-extractive use of the resource system as a whole has gained at least as much, if not more, importance than extraction of use units. This is of particular relevance to contextual analysis. Demographic changes, technological developments and the integration of the resource in the market affect the demands placed on a resource and the extent and type of use that might be made of it (Edwards, 1996; Selsky and Creahan, 1996; Steins, 1996). Hence, the very presence of contextual factors, creating dynamic forces on the choice sets faced by individuals using the resource system, will mean that it increasingly becomes subject to multiple uses. Selsky and Memon (1996:263) define a complex common *property* (sic.) system:-

“a bounded system of subtractable natural resources; the complexity and volatility in uses of the system produce emergent patterns in its use and management, and the system is at least regulated by local users.”

In earlier work (Edwards & Steins, *in print*), we define multiple-use commons as CPRs that support multiple *types* of use, but also acknowledge that they are likely to have multiple ownership and management structures.

Most of our research in the UK has shown how remote contextual factors have resulted in extractive-use CPRs, such as grazing commons, evolving into multiple-use CPRs, which combine extraction of use units and non-extractive use of the entire resource system through changes in demand (Steins, 1995, 1996 & 1997; Edwards, 1996; Edwards & Steins, *in print*). Similarly, Singh (1994:23) refers to CPRs that have been degraded and depleted through a change in the demand for the resource system. He refers to, for example, contextual changes in the economy of India that resulted in the promotion of the production of chemicals (such as disulphonic acid and its derivatives) for export in order to secure foreign exchange. The effluents discharged by the companies manufacturing such chemicals have polluted rivers, airsheds and common property land. In this case, remote contextual factors have redefined demand for the resource system, without referring to the CPR local community.

As traditional commons in developing countries evolve, research that explains the persistence of regimes with multiple ownership, use and management structures will become increasingly relevant as a foundation for the theory of complex multiple-use CPRs. In such cases, analysis must acknowledge the presence of contextual factors and attempt to measure the significance of their presence in the development of both use and management of the resource system.

4.0 ANALYSING CONTEXTUAL FACTORS

4.1 A Framework for Research

Lack of knowledge of contextual factors can lead CPR analysts to make simplified judgements about the state of management of the resource. However, identifying the influencing contextual factors is not necessarily easy. We advocate the use of an analytical framework, designed by Oakerson (1986, 1992) and adapted thereafter, with contributions by, amongst others, Ostrom (1990, 1992 & 1994), Feeny (1994) and Tang (1992).⁴ Our work on complex, multiple-use commons has led us to extend the framework for application in such situations¹. We believe that the revised framework is capable of facilitating analysis of resource systems which support multiple *types* of uses by multiple *types* of communities/groups.

The multiple-use framework is presented in Figure 1 and a full explanation of its development is presented in Edwards & Steins (1996 and *in print*). Lines between the variables indicate the relationship between the different component parts (lines a-f). The fact that physical and technological characteristics can have a *direct* effect on outcomes is indicated by a strong black line (line a). In addition, physical and technological characteristics can have an *indirect* effect on outcomes by (i) influencing the type of the decision-making rules which are adopted (line b), and (ii) defining the choices of action strategies that individuals can select (line c). The social characteristics of the user community have no direct effect on outcomes, but can only affect outcomes through (i) their influence on the decision-making arrangements (line d), and (ii) the effect that they have on action strategies of individuals (line e), and, therefore, patterns of interaction (line f).

The influence of the contextual factors on the internal variables of the framework - physical and technical attributes, decision-making arrangements, social characteristics of the user community and action strategies - is presented by a figure-embracing line. In fact, the contextual factors can influence each of the internal variables as well as interaction processes between them. As such, the contextual factors should be represented by a 'rain of arrows' leading to internal variables boxes *and* interaction lines. For reasons of clarity, we have drawn only an embracing line.

Like Oakerson's basic framework, the adapted framework does not attempt to be a fully-specified model, but merely a conceptual tool for organising and analysing information about different commons supporting multiple uses and types of users. It does not set out to provide answers, rather to prompt a series of questions that distinguish different characteristics of the commons and the relationships between the different characteristics. The relationships between the situational characteristics identified can be specified in ways which will allow diagnosis and understanding of problems of a particular multiple-use common pool resources.

Clearly, there is a limited extent to which the researcher of a specific resource system can analyse the entire 'external world' of the common in terms of contextual factors. As a starting

⁴ The framework was adopted by the Panel on Common Property Resource Management at the US National Research Council and was used to organise the analysis and presentation of twenty case studies at the Conference of Common Property Resource Management (National Research Council, 1986). The framework was developed with the benefit of earlier work by V.Ostrom (1974) and Oakerson's own work. A major part of the appeal of the framework was its simplicity and generality, so that it might be used in a variety of empirical case studies. Oakerson agreed that the framework in the form given could and should be elaborated in order to analyse specific common pool resource situations. The framework has since been extended and elaborated by Oakerson, albeit not specifically in relation to common pool resources. Oakerson's latest presentation of the framework is contained in Oakerson & Walker (1997).

point, researchers might examine the *outcomes* of individual strategies and their patterns of interaction. This is the very essence of the original Oakerson framework, where the analyst is encouraged to identify the elements in a situation that might be associated with a specific outcome; Feeny (1994) refers to this as ‘backsolving’ from the outcomes to the underlying characteristics and Ostrom (1990) provides plenty of examples of this type of analysis. Outcomes might comprise physical changes to the CPR itself, such as degradation of the resource system through general over-use or the introduction of one particular use.

Having identified a change in outcome to the CPR, the researcher can attempt to trace it back to a local or remote contextual factor by focusing on the choice sets available to individual users of the resource. Thus, the change in the action strategies of individuals that brought about the change in physical outcome on the common might be traced back to a change in terms of (i) the products and services demanded of the resource, (ii) the different decision-making arrangements possible and (iii) the composition and characteristics of the user community. In turn, the derivation of these choice sets might be traced back to specific contextual factors. In this way, information collected on contextual factors and different situations can be used to understand individual behaviour. Clearly, this is of particular relevance in multiple-use common pool situations, where there is more than one type of user. Analysis of multiple-use commons must address expected differentials in the adoption of individual strategies according to use of the common. Such differentials can be observed through the analysis of the different worlds of different types of users and how such influences will affect the incentive structure for each individual.

Local contextual factors affect people’s behaviour, such as their decision to comply with and contribute to the CPR regime, *and* influence the CPR by determining the demand and supply of goods and services from the resource system. For example, in periods of the New Forest’s history, stock grazing on the common have suffered from poor health. In one such period, stock numbers had not increased and it was identified that this was due to consumption of too much ragwort (genus *Senecio*) and poor stockmanship. Tracing such outcomes back to patterns of interaction and, in turn, individual strategies, it was identified that the graziers on the common had begun to neglect their agreed ‘input’ duties on the common, such as weed clearance and stock surveillance. Analysis of the user community identified that this was the result of a change from the practice of commoning being a full-time occupation and source of livelihood, to a part-time activity. As a result, most of the common graziers now work in full-time, paid occupations and are away from the common during the day. This has put additional pressure on the commoners to perform input duties during the evenings and weekends. Although the contextual change that has taken place has had a direct effect on the management of the CPR, it is possible for the user community to alter the outcome on the common by revising the institutional arrangement governing the CPR management. For example, they might devise new ‘input’ rules that enable weed clearance to be executed by a contractor, with each commoner contributing towards the cost.

In contrast, remote contextual factors are generally beyond the control of the user community, but indirectly affect the demand for and supply of goods and services from the CPR system. Remote contextual factors are more likely to be found when tracing outcomes concerning complex, multiple-use commons. For example, in many islands of the Caribbean, fisheries are experiencing a reduction in catch, caused by a reduction in the reproductive capacity of the fish. It is believed that not all such fisheries have been over-fished, but that the reduction in reproductive capacity has been caused by increase disturbance of fish stock. This can be

traced back to a change in the demand for the resource system. The region has become an important tourist destination and many fishing bays have attracted an influx of aqua sport ventures, such as water skiing and scuba diving. This particular contextual factor can be traced back to a change in several governments' economic policies, which have identified the need to diversify the region's economy away from fruit production, as a means of earning foreign exchange. In such a case, changes in the operational rules of the *original* user community will have no effect on the disturbance problem. Equally, it is unlikely that the community of fishermen will be able to persuade the government to revise its economic policy, even if it wanted to⁵. The fishermen can, however, lobby for changes in the overall operation of the resource system and the introduction of new operational rules that ensure that the scuba diving activity is internalised within the common property regime and not left, as it is at present, as a *de facto* open-access user. It is likely that such new operational rules will only come about after the establishment of appropriate collective-choice arenas.

In terms of the distinction of local and remote contextual factors, it is important to appreciate that one may lead the researcher to the other and, concurrently, one may be derived from the other. In the multiple-use common situation described above, the overlap is explicit, as the researcher traces back the fish stock disturbance to an influx of tourists and, in turn, a government policy to encourage and augment tourism initiatives. In cases that appear to involve local contextual factors, the researcher must continue to trace the cause of the change backwards, in order to prevent the analysis stopping short of identifying the true origin of the change in choice sets.

In our above case of the New Forest graziers having to cope with less time to manage their common, it is possible to trace the change in profile of the commoners back to various contextual changes outside the control of the commoners. For example, a whole package of reforms on agricultural policy (including fluctuating subsidies on livestock; central regulation of milk production; health and safety laws) have rendered the common grazing valuable only to 'hobby' farmers and encouraged commoners to seek alternative sources of income. Such remote contextual factors are outside the control of the user community, and yet have had an indirect impact on the CPR.

4.2 Revealing Invisible Contextual Factors

The problem that often surfaces is that contextual factors are often barely visible. This is especially the case for local contextual factors, which, by being embedded in the practices of every day life, are more easily hidden (or even neglected by the researcher). Our experience in the field showed us that contextual factors influencing collective resource management tend to be more readily apparent in situations of controversy surrounding 'failure' (e.g. free-riding behaviour). In this respect, problems to manage the CPR through collective action can be, as Law and Callon (1992: 22) call it, a "methodological convenience", helping the researcher to display the contextual factors that are more easily hidden in the case of 'successful' collective action. However, in revealing contextual factors it is crucial that 'success' is not taken for granted, but should be explained in the same way as CPR scenarios surrounding failure.

⁵ Of course, it must be noted that the new economic policy to increase tourists to the region may assist the fishermen's wellbeing in the long term, if they can reap the benefit of the tourist activity. They may do this by, for example chartering their boats to scuba-diving companies, or opening service providing enterprises, such as bars, cafes and guest houses.

The analysis of contextual factors demands a great deal of sensitivity from the researcher to what is happening in users' every day life. The analysis of local contextual factors is closely inter-related with the analysis of the social characteristics of the user community, for example the constitution of networks of social relations, socio-cultural norms and values, characteristics of income-generating activities. These may explain partly the reasons why people decide to free-ride (e.g. the presence of opportunity costs) or to contribute (e.g. a community characterised by single-stranded relationship may find it easier to respond to the influence of contextual factors that may present threads or opportunities to the resource system).

Our experience in the field shows that the building of a relationship of trust is essential to make hidden contextual factors more visible. Many contextual factors are easily visible. Research of the management of a common property oyster fishery in the west of Ireland revealed that free-riding behaviour by members of the co-operative responsible for the fishery could be explained by a combination of local contextual factors and the social characteristics of the user community. Members had to contribute voluntary work (e.g. contributing to the restocking of the oyster beds) as part of their share in the co-operative. The work at the co-operative ran parallel to the tourist season, which in peripheral areas in west Ireland is an important source of additional income. It would take four years before the members would receive their first reward from the work at the oyster sites (a dredging permit), whereas their involvement in the tourism industry (such as operating guest houses and sea angling trips) would generate a direct reward. Opportunity costs were, therefore, a local contextual factor adversely influencing the management of the common property fishery. Although the co-operative's rules stipulated that those people who did not complete their work obligation (or paid it off) were not entitled to a dredging permit, this rule never became operational. In this remote community, people felt very dependent on each other and punishing a free-riding friend, neighbour or family member was considered to be unacceptable (Steins, 1995).

In the above case, contextual factors such as opportunity costs were identified after only a few interviews with local stakeholders. However, from these interviews it became apparent that there was something else which people were not willing to tell. In this remote community, many people were part of a 'black market' of alternative enterprises, devised to supplement their social security allowance. The people, and in particular small coastal fishermen, were very suspicious about researchers, always suspecting that 'the taxman was behind them'. The strategy that was followed to gain their trust was to become part of these people's lives, and to partake in activities such as attending church, visiting the local public house, going fishing and contributing to the work at the co-operative; using anthropological methods rather than sociological methods. After three months, in the final week of the research, the fishermen decided that 'the girl was to be trusted' and revealed the real reason behind the establishment of the co-operative.

The government's policy was to encourage aquaculture development in peripheral coastal areas, which had resulted in the establishment of a large number of salmon farms. As already had become apparent during the research, the salmon farms were controversial for a number of reasons related to competition over fishing marine pollution, collapse of the wild sea-trout stocks and affecting the unspoilt, undeveloped image Ireland has for tourists. The fact that consultation about salmon farming sites was minor, aggravated local feelings against salmon farming. When the salmon farm that was located in the bay containing the derelict oyster beds applied for a new site over locally important fishing grounds, the fishermen decided that

they had to do something. They used the government's aquaculture development policy (and all the financial and technical assistance that was supplied with it) to start a shellfish co-operative, thereby creating property rights to large areas of the bay in an attempt to prevent the further expansion of the salmon farm. Of course, this hidden objective was never to be mentioned to neither the government or the development agents operating in the area. Once the co-operative was successfully established, a large majority of the members decided to call it a day, relying on those who were still interested in achieving the 'official' objective of the co-operative, the restocking of the oyster beds, and on the development agents to keep the co-operative going. This greatly de-motivated the members who were still committed and, together with more visible contextual factors such as opportunity costs, resulted in further free-riding behaviour (Steins, 1995, 1997b).

Researchers may find themselves in a situation where time or unfamiliarity with anthropological or ethnographic research form constraints for the analysis of contextual factors. In these situations, research methods used in Rapid Rural Appraisals might be useful. In particular, a combination of the 'time line' and 'critical incidents' techniques offers a good tool to analyse contextual factors. This is a technique where the researcher shows various interviewees a time line (for example covering a period of 10 years) and asks them to point out points on the line at which an incident happened that, to the opinion of the interviewee, was critical to the management of the CPR and to explain why. A comparison of the different critical incidents identified by the interviewees can serve to develop more focused questions on how these incidents were important. Although this technique is useful to identify contextual factors, it must be emphasised that it is very likely that the interviewees will only point out incidents that are not considered to be sensitive issues, the more visible contextual factors.

5.0 CONCLUSION

This paper argues that context must be addressed and analysed explicitly by CPR research and that ‘contextual factors’ need to be isolated in a field setting. The second section of the paper provides a generic definition of ‘contextual factors’ to facilitate the inclusion of contextual factors as a component in accepted analytical frameworks for CPR research. In addressing the issue of contextual factors in CPR research, the paper acknowledges the specific importance of such analysis in situations concerning complex, multiple-use CPRs, where external change is axiomatic to research over extended periods. Analysis of complex, multiple-use commons will help to contribute to our understanding of how to balance the interests of multiple uses and multiple users. Within such analysis, the definition, identification and evaluation of contextual factors will enable researchers to acknowledge the significance of societal contexts. Finally, the paper suggests ways in which researchers in the field might include meaningful contextual analysis in their studies of specific CPRs. We hope that the ‘tools’ offered to researchers in the paper will, through its inclusion within an accepted framework, allow contextual analysis to be incorporated as an integral part of CPR research.

When researching contextual factors, it should be born in mind that situations of failure and controversy are much more visible than success stories. CPR literature, particularly that advocating the use of the Oakeron framework, tends to advise researchers to work backwards from unfavourable outcomes. Similarly, the examples given in this paper illustrate how a researcher might identify contextual factors that have brought about unwanted physical change to the CPR. The challenge, however, must be to be capable of identifying when contextual change either (i) fails to initiate an undesirable outcome on the common; or (ii) initiates a *desirable* outcome. In such cases, identifying *why* the contextual factor has had no effect, or a favourable effect, will contribute to the construction of a rudimentary theory of contextual change on CPRs. In such cases, other authors have already identified that the speed of change and the extent to which the user community can act quickly to somehow internalise the contextual change (through various rule changes, as above), will prove to be one determining factor (for example, Ostrom, 1990, 1992, 1994; Feeny, 1994). However, research is needed to identify the exact nature of the contextual factors, rather than just the speed with which they impact on the CPR and the resultant reactions of the CPR community.

It is hoped that by advocating explicit analysis of context in future CPR research, we will encourage the construction of some rudimentary theory concerning the significance of context in specific CPR cases. In particular, future empirical research might address the categorisation of different *types* of contextual factors and extent to which such different types of contextual change can determine the likelihood of the CPR to survive.

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¹ It should be noted that the framework has since been extended and elaborated by Oakerson, albeit not specifically in relation to common pool resources. Oakerson’s latest presentation of the framework is contained in Oakerson and Walker (1997).