

CHAPTER 15

BEYOND STATE-COMMUNITY POLARISATIONS AND BOGUS “JOINT”NESS: CRAFTING INSTITUTIONAL SOLUTIONS FOR RESOURCE MANAGEMENT¹

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The question is no longer whether decentralized collective action can be effective, but under what circumstances it is appropriate, and how positive synergy between the state, market and civil organisations can most efficiently and fairly supply public goods (Uphoff 1993).

1. INTRODUCTION

Decentralised collective action is no longer on trial in the current academic debate on natural resources management.² What still needs to be worked out are the conditions for its success and its optimal nesting in or relationship with other institutions. A vast body of research has addressed the question of under what (external) conditions decentralised collective action will succeed (for a recent review, see Agarwal 2001, specifically in the context of forests, see Ostrom 1998). But there seems much less debate, let alone agreement, on the question of relationships between local-level collective action institutions and other institutions at different levels. From the perspective of those interested in proving that community-level institutions of resource management can and do work, often the only role the state can (and should) play is “non-interference” or at most “legitimation”.³ If the need for “nested enterprises” has been recognised, it is only in the case of common-pool resources that are part of a larger system (Ostrom 1990: 90). Even here, the precise meaning and form of “nestedness” are yet to be elaborated.⁴ The focus has remained on the conditions of success for local-level collective action in which the state implicitly has a minimal role.

Others have recognised that the neat separation of state, community and private property regimes is only a theoretical one, and that in fact resource rights or tenure regimes are better characterised as variations in the manner in which different strands

of the property rights “bundle” are distributed between the state, local communities, individuals and other actors (Ciriacy-Wantrup 1963, McKean 1998).⁵ The concepts of “co-management” and “joint management”⁶ that emerged in the 1990s occupy the vast (and fuzzy) middle ground between pure state control and pure community control. While there has been a virtual flood of research on the “performance” of these joint or co-management arrangements as implemented in various parts of the globe, there has been little discussion of the conceptual basis for joint management (see Lélé 1998b). Authors have identified variants of co-management that differ in the extent of devolution of state power to the community (Pomeroy and Berkes 1997). But the discussion appears confined to the distribution of power between the “state” and the “local community” without much interrogation of these concepts. Alternative forms of defining and organising the so-called local community are hardly ever mentioned.⁷ The current structure of the state is taken as given, and other institutions appear to have no place in the conceptual framework.⁸

This chapter goes beyond the analytically loose (and practically often troublesome) concepts of joint management and co-management, to contribute to the debate on why and how multi-layered systems of resource governance should be designed. Section 2 defines “institutions” and points out how the “appropriateness” of institutions depends upon one’s normative concerns. This is followed by a discussion of the broad normative concerns that should underpin institutional interventions in society, the actual variation in normative underpinnings of the current body of research on institutions for natural resources management and the need for a common, broad-based approach. Section 3 enumerates the ecosystem and social system characteristics that necessitate institutional intervention, given the broad normative concerns identified in section 2 and the kinds of institutions that might be required. This leads to the case for multi-layered structures for environmental governance. Section 4 outlines a process of designing these structures and identifies some design principles. The process is illustrated using the example of forests. The conclusion summarises the main points of this “institutionalist” exercise, and points out that institutional redesign is necessary, but not sufficient, to stem environmental degradation.

2. INSTITUTIONS FOR NATURAL RESOURCES MANAGEMENT: DEFINITIONS AND MORAL IMPERATIVES

If our goal is to craft appropriate institutions for environmental governance, then we must first define what we mean by “institutions” and then what “appropriate” means.⁹ I begin by defining institutions in broad terms, indicating the scope of this definition and some useful distinctions within it. I then discuss the different values that shape people’s concern about environmental or resource degradation, and show that this normative basis varies across different literatures, resulting in different institutional forms being privileged.

2.1 *Defining Institutions*

Institutions are generally defined as rules, regulations and conventions imposing constraints on human behaviour. They can be ‘both enabling (in providing ways through which people negotiate their ways through the world) and constraining (in providing rules for action)’ (Mehta et al. 1999: 13). From this broad definition, it follows that institutions include more than just self-organised collective-action groups operating at a local scale. Individual households at one extreme and the nation-state and international regulatory authorities such as the World Trade Organization (WTO) at the other are also institutions in that they enable and constrain individual human actions. This is also true of different forms of for-profit organisations (e.g. partnerships, cooperative societies and joint stock companies). Thus, there is no *a priori* reason to focus only on self-organised collective-action groups in this discussion.

This is not to say that all these institutions are identical in the role they play or their internal structure (and hence their performance). While a detailed taxonomy is beyond the scope of this chapter, it is useful to categorise institutions in a limited way. One obvious distinction is between *voluntary* associations of individuals (whether cooperative or corporate) and *involuntary* ones (e.g. nation-states).¹⁰ Perhaps a more important distinction is between those that play a *productive role* and those that play a *regulatory role*. There is some correspondence between these two classifications: voluntary associations (cooperative or corporate) generally play a productive role, while the main role of the state is seen today as regulatory, *except* in the production of pure public goods.¹¹

Furthermore, within each category, several institutional forms are possible. Voluntary institutions may be corporate, cooperative or non-profit trusts. Involuntary institutions also take many forms. For instance, after a phase of highly centralised and monolithic governments, it is now accepted that separation of productive and regulatory roles within the state and separation of the provision of common-pool resources from that of public goods might be necessary. Hence, regulation may be done either by state bureaucracies or by specialised regulatory bodies to which coercive power is delegated and which are accountable directly to the public (such as the utility commissions in the United States). Similarly, public goods may be produced by generalised state bureaucracies or specialised agencies or institutions jointly supported by state and civil society. Finally, one need not take the nation-state as a vertical monolith. Different levels of the state (national, provincial, local) with varying degrees of devolution are possible.

2.2 *The Normative Underpinnings of Institutions*

What then is a legitimate normative goal or moral purpose for which voluntary institutions are formed or for which nation-states may intervene in our lives?¹² While enumerating all possible purposes would be a daunting task, the umbrella terms *efficiency*, *sustainability* and *equity* seem to cover most of the concerns that drive public policy discussions and interventions.¹³ In the context of natural resources management, these terms may be defined as follows:

- *Efficiency* is concerned with maximising current well-being derived from the natural world at minimum cost, whether measured in physical or monetary terms.
- *Sustainability* is concerned about the continuation of well-being into the future, either one's own or that of several generations to come. *Ecological* sustainability as a normative concern further assumes that there is some 'immutable biophysical basis to human well-being' that needs to be preserved (Lélé 1991).
- *Equity* is concerned with the *intra-generational distribution* of human well-being, across barriers such as class, ethnicity and gender,¹⁴ including concerns about fairness of outcomes as well as processes. It is relevant in the context of sharing both the fruits of resource use and the externalities generated by resource extraction, processing and consumption.

I take the normative position that "environmentally sound development" must encompass these three categories of concerns.¹⁵ Thus all institutional arrangements proposed for natural resources management must incorporate and be judged against all three concerns.

2.3 *The Normative Underpinnings of Institutions for Natural Resources Management*

Admittedly, many voluntary institutions (for resource management or otherwise) are formed with only efficiency gains in mind. One would expect, however, that debates on *public* policy regarding institutions for natural resources management would keep in mind all three concerns. But that is not always the case. In Hardin's famous essay itself, overgrazing is "bad" because it results in everybody getting less than they could out of the pasture. In other words, he, and the bulk of the common-pool resource literature that emerged in response to his essay, is primarily concerned about *under-production*¹⁶ or *inefficiency* in resource use. The future *sustainability* of the resource seems to be an issue only insofar as this year's mismanagement affects next year's production, which is a rather short-term notion of sustainability. The question of *distribution* of benefits has also been given lower priority. While it is quite likely that the original response to Hardin was motivated by concern about the iniquitous effects of resource privatisation that Hardin was recommending, it is often simply assumed that collective-action institutions are equitable. But in Hardin's own example, graziers who own more sheep naturally stand to gain more in absolute terms, whatever the regime of pasture management. Even those who have demonstrated how collective-action institutions can and do avert Hardin's tragedy admit that these institutions are welfare-enhancing only in the sense of being "Pareto improving" (Menon 1999).¹⁷

Others, possibly forming a much larger section of the environmental community, are concerned about resource degradation because it compromises the ability of future generations to meet their own needs (*a la* the Brundtland Commission). For them, "degradation" means decline over time, leading to lower availability (in a quantitative or qualitative sense) of resources and environmental services for future generations. These sustainability scientists focus on changing current resource use practices to

avoid excessive costs in the future (Pearce 1988, Costanza 1991). Certainly most conservationists, too, would like to forsake current resource use (at least by others!) in order to save some “pristine environments” for posterity. Thus, the institutional arrangements proposed by the sustainability- and conservation-oriented literature focus on striking a balance between sustainability and efficiency, or even give sustainability overriding priority, as in the case of protected areas.¹⁸

Equity concerns have been the ideological driving force behind state interventions in many sectors, but are perhaps least foregrounded in debates on common-pool resources (see Menon 1999 for a detailed exposition of this problem). This is unfortunate, because one of the fundamental concerns in natural resources management in developing countries should be equitable access to natural resources (Agarwal 1985). It must also be recognised that local resource use often leads to externalities in space and time. Underpinning the concept of “externality” is a normative concern for the *unfair* allocation of costs and benefits of the resource use process. Perhaps we are conditioned to think of environmental externalities only in the context of pollution or “brown” issues, and not in the context of common-pool resource management or “green” issues. But there is an urgent need to integrate these debates. The institutions that can address such concerns would usually be regulatory, quasi-state institutions rather than voluntary collective-action institutions (although some role for collective-action institutions cannot be ruled out). A variety of institutional forms needs to be brought onto the institutional “menu” for natural resources management.

In short, part of the current disagreement over what constitutes “appropriate” institutional arrangements for resource management may actually be a consequence of differences in normative concerns rather than in theoretical or empirical claims about the relative ability of these arrangements to meet similar social goals. It is therefore necessary to separate these two debates, to agree *ab initio* about the desired forms and combination of efficiency, sustainability and equity and then proceed to choose institutional arrangements from the array of possibilities. Of course, working out such a consensual definition of these norms is easier said than done. Nevertheless, in what follows, I assume that the reader shares with me a certain minimum concern for efficiency, sustainability and equity, including interest in equity and justice *for their own sake* and not just because they might further sustainability or efficiency.

3. THE NEED FOR INSTITUTIONS IN THE CASE OF NATURAL RESOURCES/ECOSYSTEM MANAGEMENT

Having made our normative position clear, we need to ask whether unregulated individualistic behaviour can ensure efficiency, sustainability and equity of resource use and environmental management. The answer is obviously in the negative. The common-pool resource literature has focused largely on characteristics of resources that make them common-pool and hence prone to “under-production”, which is essentially an efficiency problem. But there are several other characteristics of ecosystem processes and also characteristics of social systems that require the coordination between and regulation of the actions of many actors.

3.1 Ecosystem Characteristics

3.1.1 (Non-)excludability and Subtractability

In thinking about ecosystem characteristics that require rule formation, the conventional focus has been on excludability and subtractability, resulting in the 2x2 classification of goods into privatisable, common-pool, toll and purely public goods. Many ecosystems – rangelands, fisheries, forests and groundwater – suffer from an inherent excludability problem (as in the case of groundwater) or have high exclusion costs (as in the case of rangelands). Given that their tangible products (water or grass) are subtractable, these ecosystems (or at least these products) can be classified as “common-pool goods”.

Note, however, that some other “benefits” or valued features of these ecosystems seem to call for them to be classified as public goods or toll goods. For instance, the existence value of wildlife is non-subtractable, making wildlife more akin to a public good. On the other hand, to the extent that it is possible to exclude someone from enjoying the aesthetic value of wildlife (by controlling access to wildlife-rich habitats), these ecosystems are toll goods. Similarly, if biodiversity is valued for the genetic information it contains, then it is more of a toll good.

3.1.2 Scale

Excludability problems are a result of ecological connections between different parts of the resource or ecosystem. However, these connections do not extend indefinitely – each ecosystem process or component has its own “typical” boundaries. For instance, groundwater moves within an aquifer, fish or land animals within some typical range, and even air pollutants might be confined to some valley, whereas carbon dioxide entering the atmosphere essentially circulates all over the globe. As long as the scale or boundary is small enough for one actor to control access to the resource (i.e. for the actor to patrol the boundary), one would not need any institutional arrangements, at least to ensure efficient use. But many ecosystem processes do not operate at such convenient scales. Hence, it becomes necessary to set up collective-action institutions to coordinate human actions at that scale.

3.1.3 Regeneration Rate

If one is concerned about the sustainability of benefits obtained from natural resources, one has to worry about their regeneration rates. These range from none in the case of non-renewables such as minerals and slow regeneration as in the case of forests to relatively fast regeneration as for grasslands. When juxtaposed against time horizons typically employed by human beings in their decision-making, different resources require different approaches to ensure long-term sustainability.

3.1.4 Tradeoffs Between Uses and Users

Most discussions of common-pool resource management focus on situations where there is a single use of a resource: grasslands for grazing, forests for wood, or groundwater for irrigation. In fact, most resources have multiple uses within and

across user communities. This interconnectedness between uses is increasing as human ability to manipulate resources expands. Grasslands in the Himalayas are important as tourist attractions; forests produce timber and non-timber products as well as provide watersheds; and irrigation water is diverted to meet urban needs. These situations differ from simple common-pool situations, because the issue is not one of coordinating actions to ensure efficient use but rather of equitable allocation across uses and users.¹⁹ Note also that the different users or beneficiaries of a resource may be located at different distances from the resource, making simple, face-to-face collective action impossible anyway.

3.1.5 Unidirectional Externality Across Stakeholders

Perhaps the least recognised ecosystem characteristic in the debate on “fit” between ecosystems and institutions is that many ecosystem processes are unidirectional in nature, generating *asymmetrical externalities* between individuals or communities.²⁰ For instance, water flows in a river basin is unidirectional, hence upstream actions influence the well-being of actors living downstream but not vice-versa.²¹ Similarly, while the atmosphere may appear to be a well-mixed ecosystem and hence akin to a conventional common-pool resource, in other cases air pollution may have strong directionality: only populations or countries downwind may be affected.

Unidirectionality of ecosystems does not create problems of efficiency, but affects equity. With downstream communities unable to “retaliate” through the biophysical process, there is no incentive for upstream communities to modify their use patterns. When combined with the fact that some externalities may operate over large scales (such as river basins) and hence introduce monitoring problems, this characteristic poses a major challenge to institutional design.

3.1.6 Complexity and Spatial Heterogeneity

It has been pointed out that ecosystems vary tremendously in their structure, species composition and hence functioning and response to human intervention. This introduces tradeoffs between the degree of centralisation in resource management and the sustainability or efficiency of management. The highly localised traditional ecological knowledge developed by communities over centuries of experimentation gives them a strong comparative advantage over centralised bureaucracies in resource management.²² In certain situations, the repository of specialised knowledge may even be the individual or the household, rather than the community, making it the most suitable unit for day-to-day management decisions. In other cases, local (informal) knowledge may have to be judiciously supplemented with knowledge produced more rigorously by scientific institutions.

3.2 Social System Characteristics

3.2.1 Missing Public Goods

Even private property rights regimes must be enforced and protected. While individual protection of their own property might be possible to a limited extent, there are

significant efficiency and equity gains if enforcement is seen as a public good to be provided by the state. The same holds true for conflict resolution mechanisms such as judicial systems. High-quality information about new technology, the condition of a resource (such as groundwater, see Ostrom 1995) or about the flows of pollutants or resources across a large spatial scale is another public good that will be under-produced unless some institutional arrangements are made for their provision.

3.2.2 Varying Concern for the Future

A substantial literature shows that discount rates used by individuals are higher than the rates they themselves expect the state to use in discounting socially productive investments (Dasgupta et al. 1972). In other words, if sustainability is a concern, individuals may expect society to take care of it rather than act individually to provide for it. In any case, it is certainly true that, in democratic societies, states are responsible for imposing social concern about long-term sustainability on individual actors who might simply not share this concern.

3.2.3 Initial Allocation of Resource Access

Even where it might be possible to manage resources at an individual level, some larger-than-individual institution needs to decide what the initial allocation of resources will be. Extending this argument, one can see that even if, say, forests are to be treated as common-pool resources at the scale of a village, the inter-village allocation of forests remains to be determined. Options include letting the villages work out the allocation on their own or asking some higher level authority to do it. The latter need not be the state; it could be a federation of village-level associations.

3.2.4 Other Market Failures

Communities that depend upon natural resources for income generation may be affected by market failures such as difficulties in obtaining credit (due to the lack of individual titles on the resource) and poor information on prices or thin markets (particularly in the case of perishables such as fish or thinly distributed resources such as timber and non-timber forest products). Societal interventions to correct such market failures can increase gains and reduce inequitable distribution of resource rents between harvesters and traders.

3.2.5 Pervasive Social Divisions

Societies are often fractured on lines such as class, ethnicity and gender. These divisions are of two kinds: “horizontal differences” where barriers to cooperation may exist but there is no hierarchy of power and “vertical differentiation” where in addition to social distance there is unequal distribution of power. The former may lead to efficiency losses, as groups may refuse to cooperate even in win-win situations. The latter may or may not result in lack of collective action, but it clearly results in less-than-equitable outcomes. Designing institutions that overcome these barriers and inequalities is a major challenge.

In sum, a variety of ecosystem and social system characteristics necessitate coordination *and* regulation of individual actions through rules (and institutions that make the rules) *if* efficiency, sustainability and equity in resource use are to be enhanced. This should not, however, be misunderstood to mean that there is no role for individual decision-making. Indeed, there are a variety of *other* socio-ecological characteristics, such as physical proximity to the resource, knowledge about the resource and maximum interest (direct dependence upon the resource) that favour giving maximum control to individuals or households living in close proximity to the resource.²³ Nonetheless, if we recognise that human beings are socially and ecologically interconnected, individual decision-making has to be circumscribed by ecological and social norms. In today's complex world, this cannot be achieved by informal, culturally internalised behavioural norms alone. It also requires formal institutional arrangements.

4. THE DESIGN OF MULTI-LEVEL INSTITUTIONS FOR NATURAL RESOURCE GOVERNANCE

Clearly, the different characteristics enumerated above demand different institutional arrangements. Common-pool resources bounded at the scale of a village can be addressed by village-level collective-action institutions (such as a village forest committee or water users' association), whereas unidirectional externalities in a river basin require a basin-scale regulatory institution (such as a watershed board or river basin authority) that would essentially protect the rights of the downstream stakeholders. Public goods such as knowledge and market information may be produced through collective action (such as fishers doing their own research) or by the state in a quasi-market situation where resource managers pay fees for the information. In all cases, institutions require at least some legitimisation by the state.

More important, these institutional requirements are not mutually exclusive but rather overlapping. Given the fact that virtually all resource use situations are characterised by multiple uses and users across local and regional scales, that most resource user communities are characterised by social divisions, and that market failures of credit and information are pervasive, purely self-organised collective-action institutions are unlikely to produce efficiency, sustainability and equity gains. Even the two-layered approach of most "co-management" or "joint management" arrangements would be insufficient. More than two institutions are clearly required (if for no other reason than to adjudicate over conflicts between the state and the local community!). There will also have to be some degree of "nesting", because functions such as conflict resolution or external policing support must be provided by institutions at one or more levels higher²⁴ than the level of the day-to-day management units.

The case for multi-layered institutions for natural resources is thus easily made. Assuming that one is concerned about efficiency, sustainability *and* equity to some extent, such a multi-layered governance structure would naturally have to contain productive and regulatory, voluntary and involuntary, specialist as well as generalist institutions. It could involve individual as well as community-level organisations,

professional non-governmental organisations and different levels of the state. In designing such a multi-institutional structure, one has to specify not only the *internal design* of each institution, but also the *inter-institutional linkages* (i.e. the distribution of authority and responsibility across institutions).²⁵

4.1 General Process and Some Design Principles

The challenge therefore is to develop a more systematic framework for structuring multi-layered governance under different situations. Generally speaking, this would involve five steps:

- identifying the ecosystem and social system characteristics peculiar to the particular resource that requires institutional intervention and the function to be performed by the intervention;
- identifying the possible institutional forms that might serve each of the functional requirements identified, and their efficacy in doing so;
- choosing the best fit between function and institutional form and specifying the inter-institutional linkages based on one's normative standpoint;
- fine tuning the arrangements to the specific socio-ecological context;
- designing the internal structures of each institution that is part of the governance structure.

Although much of the design process would necessarily be resource-specific, it is possible to identify some generic principles for multi-layered resource governance. A number of principles can serve as a starting point. The first is a *tight linkage between authority, responsibility and incentive*. In the context of institutions playing a productive role directly connected with the resource, this means that the day-to-day users (who have an incentive to be involved in resource management) must be given the responsibility of management and the authority to do so. Regulatory institutions or productive institutions not directly linked with the resource (such as those producing public goods) are seldom directly affected by the success of their efforts. Hence, for producers of public goods (such as monitoring, technical support or external policing), the linkage has to be a fiscal one, through partial support from user fees that are linked to performance. For regulators, separation from the state and direct electoral linkages with the multiple stakeholders is required to ensure accountability. In all cases, responsibility must be matched by authority.

The second principle is *jurisdictional parsimony*. In terms of scale, jurisdictions should be no larger than necessary. In other words, 'never globalise a problem when it can be dealt with locally' (Murphree 2000). Here, "can" is understood in both an ecological sense and a social sense. When common-pool problems (symmetrically) extend beyond the local scale (such as mobile wildlife populations in a forest), or in cases where public goods are to be provided at a higher scale (such as conflict resolution, information or policing), lower-level units should negotiate to determine which functions to delegate upwards and how to provide for them (*ibid.*). Higher level nation-states must not unilaterally usurp control simply because a particular resource transcends the jurisdiction of a local community, or because certain functions must be

performed at a higher scale.²⁶ Regulation must be semi-participatory, quasi-stable, transparent and use a mix of standards and incentives. Although regulators must be accountable to those they represent and also involve those they regulate, they should be insulated from direct pressures from both quarters so as to remain relatively stable and fair. Mixing standards and incentives means that the regulators should attempt to set some basic standards that ensure minimal fairness, but then allow some room for negotiations in market-like situations.

A third design principle is *tight fiscal linkages*. Resource management institutions must be financially self-sufficient insofar as possible, working with funds raised largely from below rather than doles from above. When external funds are provided, they should be linked to the provision of specific public or off-site environmental benefits, and this linkage monitored in a neutral and transparent manner. It may or may not be possible to set up formal markets to enable such provisioning, but the principle of provisioning in proportion to performance must be maintained. *Maximum transparency* is an aspect of this principle. To build confidence in the governance structure, maximum transparency at all levels is paramount. Institutions can achieve this by being small in size to ensure face-to-face contact wherever possible. They must enshrine a right to information within their structure and make maximum use of information technology to realise this right.

I shall now illustrate the process of designing multi-layered resource governance systems by applying the process to the case of tropical forests.

4.2 *The Ecological and Social Characteristics of Tropical Forests*

Forests are a particularly interesting case because they embody many of the ecosystem and social system characteristics mentioned above. Forests generate multiple products, services and benefits: timber, firewood or fodder, soil erosion control, hydrological regulation, wildlife conservation and carbon sequestration. These benefits are not only distributed across different beneficiaries and scales, but their boundaries and directionality also vary (Lélé 1998b). For instance, plant products from forests, if harvested at low levels, have limited common-pool characteristics. Higher extraction can often be compensated by more intensive management efforts. But exclusion of people or livestock from one's use area may be difficult. Wild animal populations, when managed as game, are certainly common-pool resources at a multi-village scale. On the other hand, watershed services are positive externalities that accrue in a unidirectional manner to downstream populations (often living far away from the forest). The aesthetic value of wildlife can be said to be a toll good. The existence value of wilderness is virtually a purely public good. Because forests (particularly natural forests) are slow-growing resources, decisions taken today may take many years or decades to bear fruit. Tropical forests are also highly complex and spatially heterogeneous ecosystems that render modern, centralised knowledge systems highly inefficient, if not ineffective.

The social context of tropical forests is also one that requires institutional interventions. Although communities dwelling in and around forests are often highly dependent upon forests for their livelihoods and indirect benefits, they often lack

well-defined or exclusive rights over forest products. Yet while local communities (or certain groups within them) often have the best knowledge about a particular forest ecosystem and its response to human use, this knowledge may be inadequate in the context of changing and intensifying use patterns. Protecting the boundary of a dense forest, even when done by local communities, is not an easy task, particularly when marauders are well-armed outsiders intent on poaching high-value, mobile and spatially heterogeneous resources such as ivory or sandalwood. The markets for many forest products are thin and non-competitive. Further, forest-dwelling communities are not always forest-dependent; thus, their interest in managing the resource may vary both within and across communities. This points to the fact that forest-dwelling communities are also not always homogeneous in terms of the distribution of social and economic power. Finally, current technologies and their costs bring significant economies of scale in collective protection, planting and harvest of forests, especially in densely populated regions of the tropics.

4.3 Match Between Functional Requirements and Institutional Forms

Having identified the functions that we want the institutional interventions to perform, we can identify alternative institutional forms for each function. For instance, day-to-day forest management may be carried out by individual households, user groups that are input-based or membership-based,²⁷ local governments,²⁸ or even corporate or semi-corporate²⁹ bodies. It could also be carried out by a specialised agency (such as a wildlife service) or a more all-in-one bureaucracy (such as the existing forest departments in many tropical countries). Initial allotment of access rights may be done by the user group, local government, a user group federation or a higher level government. Watershed communities can be ensured fair benefits by a generic state bureaucracy (as is the case in India today, at least on paper³⁰) or by a separate watershed regulatory authority or similar institution.

Thus, one can create a matrix in which institutional function and form are the two dimensions, and try to map the “fit” between them. Table 1 provides such a mapping for the case of tropical forest management. Due to constraints of space, this discussion uses a subset of the possible institutional arrangements. (For instance, an NGO that performs important functions of public education, advocacy and demonstration would have some role in forest governance.)

Of course, the rankings in the table are only indicative. Apart from needing to know the specific context, we must acknowledge that our knowledge of these “fits” is limited. Moreover, since many functions embody more than one concern, such as equity and sustainability, and since there is always an interest in institutional efficiency (minimum transaction costs), we would ideally want to know the variation in “fitness” of an institutional form with respect to each of these concerns. This is not done due to constraints of space. In effect, I have given some implicit weights to the different concerns in coming up with the overall fitness rankings. Nevertheless, this provisional and partial mapping provides a more rigorous and comprehensive way of designing institutional arrangements than the current approach of tinkering with existing institutions or asking NGOs to perform unrealistic roles.

Table 1. *The Relative Appropriateness of Different Institutional Forms for Different Functions in the Context of Tropical Forest Management*

Function	Organisational Forms									
	Individual Household	Hamlet/Village Committee	Cooperative or Self-help Group	Local Self-Government	Federation of Village-level Bodies	Tribunal	Forest Protection Squad	Watershed Regulatory Board	Wildlife Regulatory Board	Forest Conservation Agency
Day-to-day resource management	+++	+++	+++	++						+
Intra-group allocation & enforcement		+++	++	++ ⁶			+			+
Intra-group dispute resolution		++	++	+++		+				+
External protection		++	++	+	+		+++			++
Inter-agency dispute resolution					+++	+++				
Enforcing "environmental" norms				+	++	++		+++ ³	+++	+++ ⁴
Enforcing "social" norms	+	++	+	+++ ⁵	+++ ⁵					
Marketing of products	++ ¹	+	+++ ²	- ⁷	+++					+
Overcoming credit problems	+	++	+++		+++		+	+		+

Notes: 1. When the product is a high-volume high-value one. 2. When the product is high-value but low-volume, or when it is a perishable. 3. When the upstream forests are proximate to and being used by villagers. 4. When the specialised forest management agency operates under the control of the state in areas that are remote from human habitation. 5. With support and pressure from higher levels of democratic governance, like the state government. 6. For inter-hamlet allocation of resources. 7. Mixing self-government roles with profit-making activities is likely to lead to corruption; hence the negative sign.

4.4 Tuning Institutional Arrangements to the Socio-Ecological Context

Our understanding of the finer effects of specific socio-ecological conditions on institutional performance in the wider sense is limited. Table 2 presents some propositions in this regard, more as speculation than as established fact. For convenience, these are posed as pairs of contrasting conditions without implying that real-world conditions can be so neatly pigeon-holed.

Now, using the design principles enumerated in section 4.1, it should be possible to design a multi-layered system of forest governance for a particular socio-ecological context. If my normative position, which involves a strong concern for equity and sustainability, and my understanding of conditions prevailing in the central Indian forest belt were adopted, the design might look like the following (see Table 3):

- Hamlet-level user groups would have secure rights of access, exclusion, management and sale of all products within sustainability norms wherever such

Table 2. Fine Tuning Forest Governance System to Specific Socio-Ecological Contexts

<i>Socio-Ecological Context</i>	<i>Recommended Institutional Form</i>
Dispersed settlements ¹	More individual rights, ¹ representative democracy in user groups
Clustered settlements	Community rights, participatory democracy
Degraded lands	More investment required, more harvesting rights should be given to local communities
Dense forests	Timber and non-timber product marketing rights and organisation may be sufficient
Subsistence interest	User group may coincide with local village council
Commercial interest	User group (voluntary) should be separate from village council; latter should not be involved in economic transactions
Spatially and temporally heterogeneous resource	Community management of harvesting
Relatively homogeneous resource	Individual assignments of usufruct possible
High-value high-volume products	Individual marketing possible
High-value low-volume products	Cooperative marketing through village- and multi-village scale cooperatives

Note: 1. In the Western Ghats of India, where the rolling terrain leads to dispersed settlements or homesteads, we have documented the emergence and efficient, sustainable performance of individualised tenure regimes rather than community management regimes (Srinidhi and Lélé 2001).

groups come forward; remote areas would be managed by a forest conservation service.

- The initial allotment of forest patches would be carried out by district-level government in tandem with civil society organisations and local user groups.
- Marketing would be carried out by federations of user groups.
- Inter-village conflict resolution would be carried out by federations of user groups.
- Policing would be provided on demand by a specialised forest policing agency (separate from the forest conservation service) in return for some user charges that cover part of the agency's costs.
- Technical and monitoring support would be provided by independent research agencies, funded partly from user fees and partly by state and civil society.

Sustainability norms would be set partly by a watershed regulatory authority and partly by a wildlife regulatory authority. The former, at the river basin level, would also be responsible for regulating water use and would have representatives of all users in the river basin. The latter would be district level and include representatives from different walks of life, with links to higher level wildlife boards through fiscal transfers. Intra-user group equity would be ensured through norms laid down by district-level governments in consultation with user groups and be monitored by them jointly.

Table 3. *Socio-Ecological Characteristics of Forests, Underlying Concerns and Function to be Served by Corresponding Institutional Intervention*

<i>Key Ecosystem Characteristic</i>	<i>Underlying Concern</i>	<i>Function of Institutional Intervention</i>
Significant separability in plant product management	Efficiency of resource use	Individual or small group should have day-to-day control in plant product management
Spatial heterogeneity in resource distribution	Equity	A way of allotting initial access fairly and redistributing it from time to time
Fire management is non-excludable; NTFP availability highly variable in time	Efficiency of resource use	A way of coordinating fire protection and non-timber forest product harvest activities amongst the direct beneficiaries of such control
Unidirectional externalities of watershed benefits	Equity and sustainability	An efficient way of ensuring that the interests of downstream communities receive fair weightage in the decisions of upstream forest managers
Existence value of wildlife is a global public good	Equity and sustainability	A reasonably efficient way of ensuring that local, regional and global concerns for wildlife existence in the short and long-term get fair weightage in the decisions of forest managers
Slow regeneration rate	Sustainability	A way of formulating long-term sustainability norms that are fair
Local communities or households are generally highly dependent on forests, but not uniformly	Equity between uses/users, including within local community	Ensuring that local needs are met first before non-local demands (e.g. for timber) or that benefits from supplying non-local demands go to local, most needy groups
Economies of scale in local-level forest management	Efficiency	Ensuring that local communities have the opportunity to form collective-action groups to capture economies of scale
Markets are thin	Efficiency, equity	Ensuring that local forest product harvesters have opportunity to form marketing cooperatives
Protection is not easy	Efficiency, equity	Local groups must be involved in protection, outside protection support must also be available

Note: In the case of all institutional interventions, efficiency of the intervention itself in terms of transaction costs it creates will also be a secondary concern.

5. CONCLUSION: THE LIMITS OF INSTITUTIONS

In this chapter I have attempted to further the debate on multi-layered governance for natural resources management. I began by pointing out that, in the natural resources management context, we often seem to get stuck with very limited notions of “institutions” in relation to local-level collective-action institutions with an enabling

state in the background. Even joint management is thought of as involving only these two entities. This leads to both continued polarisation (because the conceptual basis for the involvement of the other is unclear) and practical failure (because of faulty design). Some of this polarisation or confusion is also due to differences in underlying concerns. Whereas those who focus on efficiency in resource use would see local-level collective action as “sufficient” and the role of the state as minimal, those who are most concerned about “sustainability” of certain long-term benefits argue for state intervention as the only solution.

Our discussion sketched a consistent rationale for the presence and role of a variety of institutions that would be required for successful governance of natural resources and environmental problems. These include voluntary and involuntary institutions, productive and regulatory institutions, specialised and generalised institutions, single units and federations, state, quasi-state and civil society institutions, and institutions operating at various scales. Governance of natural resources involves identifying which institutions are required, what their linkages (or distribution of authority and responsibility across them) should be, and how they should be structured internally.

The case of forest resources was used to indicate how such a multi-layered governance structure could be crafted and what uncertainties remain. Of course, the structure that emerged is at great variance with that presently in use in most tropical countries. Arguments might therefore be made that it is better to promote some simple, practically feasible, changes in policy at the cost of conceptual rigour and detail. But the current experience with “joint” resource management arrangements in different sectors in many tropical countries suggests otherwise. First, the present level of oversimplification or vagueness leads only to co-optation (Lélé 2000, Sundar 2001). In fact, a clear case for multi-layered governance could win support from those who have taken extreme positions because they are currently reacting to a limited set of options. For instance, the conservationists may support the status quo of centralised bureaucratic management only because they see the need for significant non-local regulation. The communitarians may similarly oppose outside regulation because they see how oppressive the current regulatory apparatus (centralised state bureaucracies) is.

The proposed shift is really no more drastic than what has actually taken place in several other sectors in developing countries (e.g. the liberalisation and privatisation of the hitherto “nationalised” power and telecommunication sectors in India). “Unbundling” state control in other sectors has led to separation of policymaking, productive and regulatory roles, and private sector participation in productive activities. Of course, the direction of unbundling recommended here is different, being in favour of local communities and the poor rather than large corporations. Opposition to this re-crafting should therefore be seen as driven by normative concerns different from ours rather than by different perceptions on the performance of institutions.

The focus in this chapter was the re-crafting of institutions for natural resources management in the pursuit of environmentally sound development. Obviously, the underlying assumption is that modifying structures or rules that govern individual behaviour will substantially modify individual behaviour: that is, that institutions “matter” and they “work”. It is important, however, to not get carried away by this faith in institutions to the point where we seem to be saying that *only* institutions matter!

The causes of environmentally unsound development are many. Institutional failure is one of them, but by no means the only one. Often, institutional failure is only a symptom of larger problems. At the very least, if *desirable* “rules of the game” are to emerge through a reasonably democratic and open process, then sufficient people must *desire* those rules – whether they relate to reducing fossil-fuel emissions or ensuring greater fiscal discipline. As Mahatma Gandhi said, ‘there cannot be a system so good that the individual need not be good’. The best-crafted institutions can collapse if the values of the people within them are incompatible with institutional goals.

The environmental crisis is a product of a complex and inter-related set of factors (Lélé 1991). Technological change has given human beings the ability to dramatically and often unknowingly modify ecosystem processes. It has also increased the available array of consumption possibilities. This change is partly driven by a highly reductionist science and strongly fuelled by capitalist systems of production that thrive on and hence promote unbridled consumption. Unequal distribution of political and economic power within and across villages, cities, regions and nations enables the powerful to appropriate resources and externalise environmental consequences of unbridled consumption onto the relatively powerless. These powerful actors, who range from multinational corporations to entrenched national bureaucracies down to male heads of household, can resist attempts at regulation by the state or civil society. Traditional cultural sanctions against profligate consumption are breaking down and cultural mechanisms of redistribution are disappearing as the new culture of unlimited technological possibilism creates the morally bankrupt ideal of a “free” individualist consumer.

Determining the key elements of such a holistic approach to reducing environmental degradation would be very difficult and, in any case, is far beyond the scope of this chapter. It seems clear, however, that society will need to regulate not only the physical aspects of resource use, but also the rate of accumulation and movement of the capital that is used in converting natural resources into consumable products. Fair distribution of resource access and environmental impacts will require asking awkward questions about why resources are being used: survival, decent living or mindless luxury. In other words, the process of re-crafting institutions must be embedded in a larger movement for structural, epistemological and cultural changes. This movement will have to address local inequities as much as global ones, demand personal changes as much as institutional ones and seek spiritual value as much as economic efficiency.

NOTES

1. This paper draws upon two earlier efforts to deconstruct and reconstruct the concept of joint management in the context of forests (Lélé 1998b, Lélé 1999). I am grateful to Ajit Menon for comments. The Ford Foundation provided financial support for this research.
2. There is less consensus about this in the practitioner community. At least in the Indian forestry sector, it appears that the majority of forest officers continue to believe in the need for strong hands-on state control. Similarly, a sizable proportion of activists continue to believe in the need for complete community control (e.g. Rahul 1997). The concept of “joint forest management” emerged after 1990 and has been officially adopted by 23 states, but the gap between official rhetoric and reality is enormous (Saxena et al. 1997, Sundar 2001). “Joint management” is thus a pragmatic compromise, or a

way of state and donor co-optation of the idea of decentralised resource management, not a conceptually sound innovation that can stand the test of time.

3. This is not surprising. The common-pool resource research community was virtually born out of the need to demonstrate that Hardin's tragedy of the commons does not necessarily arise, that local communities can and do devise institutions for averting this tragedy. With the focus being on demonstrating the existence and successful operation of autonomous community-level resource management institutions, and given the antagonism of most governments towards such institutions, for a long time the only external "design condition" that was identified was the minimal requirement that 'the [local] users' right to devise their own institutions is not challenged [by the state]' (Ostrom 1990: 90).
4. In a later paper, Ostrom (1995) offered one or two general principles for what kind of support higher level institutions should provide – for example, public goods such as high-quality information on resource condition and cheap conflict resolution mechanisms – and should not provide – such as pumping large quantities of external funds into local institutions.
5. Srinidhi and Lélé (2001) developed this framework further and used it to characterise forest tenure regimes in the Western Ghats of India.
6. The two terms appear to have emerged almost simultaneously in two different parts of the globe and in different sectors: "co-management" in North America in the context of fisheries (Pinkerton 1989, Berkes et al. 1991) and "joint management" in South Asia in the context of forests (see Khare 1992, Poffenberger 1996). They are not exactly identical in practice: co-management 'involves the recognition and legitimization of traditional local-level management systems' (Pomeroy and Berkes 1997), whereas joint forest management or participatory irrigation management are based upon the creation of new institutions for joint control, often suppressing pre-existing forms of more autonomous, self-organised local-level systems (Sarin 2001, Patnaik 2002).
7. Townsend and Pooley (1995) were probably the first to systematically compare self-organised institutions, communal governance, cooperatives and their variants, including corporate (share-based) governance. But they too take the 'state' as a given and ignore the role of other institutions.
8. In practitioner circles, at least in the case of forests, debates on the role of *Panchayati Raj* (local self-governance) institutions, NGOs, academics and donor agencies abound (see, e.g. Anonymous 1999). But they all take the current (highly flawed) concept of joint management as a given (see Lélé 2001a for a succinct critique of this concept).
9. This aspect tends to receive inadequate attention. For instance, Pritchard Jr. and colleagues (1998) talk of the "fit" between ecosystems and institutions, but they do not provide any external measure of identifying a good fit. Similarly, Agrawal (2001), in reviewing the literature on common property institutions and sustainable governance, defined institutional success simply in terms of the survival of the institution, rather than in terms of its ability to meet any socially desired objectives (cf. Menon and Lélé 2003).
10. Even in democratic societies, while citizens may have the ability to shape the manner and extent to which the state intervenes in their lives, the situation is an involuntary one in the sense that no one can opt out of being part of some nation-state and its governance structures. Of course, there may be other involuntary institutions that are culturally imposed that are also difficult to "flout" or "opt out of". So the exact dividing line between voluntary and involuntary institutions is somewhat hazy.
11. Note also that "voluntary/productive" corresponds to the "enabling" role and "involuntary/regulatory" to the "constraining" role of institutions mentioned above. Voluntary associations can play a productive role by exploiting win-win situations. Regulatory institutions attempt to strike a balance between winners and losers and hence are unlikely to be voluntary. Voluntary associations generally cannot play a regulatory role, as they lack the coercive power and mandate. Occasionally they may evolve or appropriate some of this power (as when professional bodies have monopoly control over the license to practice that profession).
12. I use the word "legitimate" to distance the discussion from voluntary or involuntary associations formed for, say, theft, such as mafias or dictatorships, respectively.
13. See Lélé (1993) for a detailed exposition of these umbrella concepts.

14. It could even be said to subsume the deep ecology position, since depriving other organisms the right to live is essentially an unfair or unjust proposition.
15. The concept of “environmental soundness” encompasses both ecological sustainability and equity (see Lélé 1994, Lélé 1998a).
16. Common-pool resources, by being non-excludable and also subtractable, are particularly liable to under-production and hence need policy intervention (McKean 1998).
17. “Heterogeneity” has recently emerged as a concern, but only insofar as it may affect the possibility of collective action. Here too, recent developments in common-pool resource research that demonstrate the possibility of initiating and sustaining collective action in “asymmetric” situations have ‘put a damper on equity’ (Menon 1999).
18. This includes the literature on joint or collaborative protected area management (e.g. Pimbert and Pretty 1995), where it is taken for granted that certain areas should be preserved for posterity, and the focus is on how best to achieve this.
19. What Lee (1993) calls a “sectoral” externality.
20. I emphasise asymmetry to distinguish the situation from that of common-pool resources, where symmetric externalities are inherent. For example, the extraction of groundwater by one person creates an externality that affects other users of that aquifer. However, this is a symmetric externality, because others can impose similar externalities on the first person. It has been suggested to me that ‘symmetric common-pool resources’ and ‘asymmetric common-pool resources’ might be a better taxonomy than limiting the notion of common-pool resources to the case of symmetric externalities alone. However, as Farrell and Keating pointed out, common-pool is a useful concept only in symmetrical situations (Farrell and Keating 2000).
21. Some researchers have discussed the asymmetries created within a community resource management system by unidirectional flows, as in the case of canal irrigation systems (Ostrom and Gardner 1993). But the focus there has been on identifying conditions under which win-win situations can still emerge and lead to Pareto-improving collaboration between downstream and upstream communities. There is no discussion of the inherent *unfairness* of outcomes and institutional arrangements to avoid them.
22. Note, however, that this situation is not a static one. New technologies such as remote sensing and geographical information systems may enable monitoring-at-a-distance, with its consequences contingent upon the social context in which they are developed and applied (Lélé 2001b).
23. Which is different from indiscriminate privatisation that could include individuals or corporations distant from the resource.
24. That is, fully contain more than one local-level institution.
25. What Townsend and Poole (1995) called ‘internal’ and ‘external’ governance structures.
26. Agarwal (1998) made a similar suggestion to strengthen community forestry institutions in the face of state efforts to increase its own control.
27. That is, where returns are proportional to contributions or returns are distributed equally across members regardless of contribution.
28. Local governments are different from user groups because membership is involuntary, the institution is backed by the coercive power of the state, and the institution performs multiple developmental as well as allocative functions.
29. Joint stock companies whose shares can be purchased only by members of a certain community and/or only up to a certain number.
30. In India at least, although the forest departments are charged with implementing the national forest policy, which gives highest priority to maintaining watershed and other environmental benefits of forests, the forest departments know very little about the watershed effects of different land use practices, carry out no monitoring of watershed effects, and have no clear guidelines for ensuring these alleged benefits of forests.

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