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SPECIAL SECTION: The Commons: A Revisit

The Economics of Common Pool Resources: A Review

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Abstract: The paper analyses open access and common property resource systems drawing insights from new institutional economics, especially property rights theory and policy analysis. This analysis of common pool resources (CPRs) under common property regimes indicates that local communities devise formal and informal institutions in managing the local commons. The paper further discusses how N. S. Jodha's empirical work on the economics of CPRs has enhanced our understanding of the role of CPRs in the livelihood strategies of the poor in the developing world. Devolution of authority to local resource users is emphasized as an institutional imperative in designing appropriate forms of governance structures for CPR management.

Keywords: Common Pool Resources; Institutions; Collective Action; Resource Users; Economics.

1. INTRODUCTION

In the late 1980s, there was a strong push to protect common pool resources (CPRs) in developing countries because of their impact on local livelihoods, local-level economic development, and biodiversity conservation. Transferring resource management authority to local communities was a major policy thrust in CPR management in areas such as water resource management (especially irrigation), forests, rangelands, fisheries, and other village commons (Meinzen-Dick and Knox 1999). These changes aligned with the shift from centralized economic planning toward a reduction in governmental intervention and control of the economy accompanied by increased democratization (Agrawal and Gibson

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1999). Many governments, international agencies, and non-governmental organizations have increasingly accepted the institutional imperative of devolving greater power to village communities in managing the local commons (Agarwal 2001).

Establishing well-defined property rights over these resources is considered a cornerstone in generating incentives for internalizing externalities in the management of CPRs. Scholars have highlighted several underlying factors for environmental degradation: market failures (externalities), government failures (environment adverse policies), population growth, and property rights failures (Gordon 1954; Scott 1955; Hardon 1968; Ostrom 1990; Pearce and Turner 1990; Ostrom 1999). Market failure broadly refers to conditions under which the free market does not produce optimal welfare. Important examples of such failures include external effects (externalities), public goods and CPR problems, poorly defined property rights, non-competitive markets, and imperfect (or asymmetric) information, to name a few. Policy failure occurs either when the state fails to take action to correct market failures or when policies further distort prices and act as disincentives for sustainable natural resource management (Davies and Richards 1999). Common examples include forest nationalization without an adequate institutional arrangement, insufficient knowledge and recognition of traditional management institutions, undervaluation of the price of ecological services, adverse land tenure policies, and perverse incentives that lead to the over-exploitation of CPRs. Commons scholars, therefore, advocate for an appropriate property rights structure as CPRs are characterized by a range of pervasive market and policy failures. In the absence of well-defined property rights or in conditions of open access, individual rational behaviours often result in collective irrational behaviours (Ostrom 1999).

Three different schools of thought have been proposed as potential solutions for managing the commons and avoiding the "tragedy of the commons" situation. In the first solution, the property rights school argues that only creating and enforcing private property rights can help prevent the over-exploitation of the commons. The main thesis is that private property is the most efficient way to internalize the externalities associated with resource use and consumption. An open access, unregulated common pool regime does not give individuals the proper incentives to act in a socially efficient way (Baland and Platteau 1996). Thus, the property rights school contends that private property rights will immediately increase economic efficiency (Demsetz 1967). The second option involves the allocation of full authority to an external agency to regulate the CPRs. Since the main goal of managing natural resources is maximizing long-term economic rent, until

recently, many scholars believed that community-based management generated little or no rent. Therefore, scholars have long questioned the efficiency of CPRs under common property arrangements (Gordon 1954; Scott 1955); solutions such as state control and management (Hardin 1968) and privatization of the commons (Demsetz 1964) have been proposed.

The third possibility is that local communities manage CPRs. Communities not only understand the problems well, but they also create solutions to them since their livelihoods depend on these resources. They will have greater incentives to manage these resources sustainably over time. Historical and contemporary evidence shows that resource users often create institutional arrangements and management regimes that help them allocate benefits equitably over a long period and with only limited efficiency losses (McKean 1992; Ostrom 1992). Privatizing CPRs may cause distributional problems or ecological concerns that lead to the reoccurrence of negative externalities because of imperfect or absent markets. Moreover, in some ecological settings, the transaction costs associated with assigning private property rights are greater than the potential benefits to be derived due to the spatial scale involved. An increasing number of scholars, therefore, advocate for decentralized collective management of CPRs by their users (Ostrom 1990; Berkes 1989; Wade 1988; Jodha 1986; Baland and Platteau 1996). In recent years, resource management under a common property regime has emerged a major policy agenda in land reform; land titling; conservation of forest, grazing, and wildlife resources; fisheries management; water management, and so on. According to a report by the Food and Agriculture Organization (FAO), in the 62 countries assessed across the world, 732 million hectares (about 28% of forests) are currently managed under a community forestry system or common property regime (FAO 2016).

2. CONCEPTUAL FOUNDATION FOR CPRs UNDER COMMON PROPERTY REGIMES

In an economic sense, it is difficult to manage CPRs at the individual or household level because of their spatial scale as well as the externalities involved. Externalities occur as a result of both consumption and production activities; they cause market failures, which in turn lead to sub-optimal resource allocation. Open access CPRs will eventually cease to be sustainable or optimal because of the temptation to free ride (Ostrom 1999). Free riding and other mechanisms that lead to the undersupply of public goods may also cause the overuse of CPRs unless institutions are strong enough to limit access to their users. Under these conditions, it is

difficult to assign rewards and punishments that provide individuals with incentives that ensure their contribution towards the management of environmental resources.

The assurance problem in CPR management suggests that interdependent choice creates incentives to establish and maintain institutions that coordinate expectations based on rules of fair-mindedness (Runge 1984). Common property institutions are generally able to tackle the assurance problem and make resource users confident that their efforts will be reciprocated by other users and therefore will be privately optimal in the long run. CPRs are like public goods in the sense that it is difficult to exclude anyone from their use and they are subtractable. However, it is possible to create defined user groups for the utilization of CPRs to avoid free riding. In fact, evidence suggests that such options are even better than state or private property solutions, as compliance with these institutional arrangements is higher as they are devised by community members.

Many early scholars have also emphasized the effectiveness of local management institutions as basic units from which one can build efficient CPR management systems. Gibbs and Bromley (1989) demonstrated that

> a well-functioning common property regime will probably be distinguished by i) a shared perception of fairness among the members with respect to inputs and outcomes, i.e., the regime will be equitable; ii) a minimum (or absence) of disputes and limited effort necessary to maintain compliance, i.e., the regime will be efficient; iii) a capacity to cope with progressive changes through adaptation, such as the arrival of new production techniques, i.e., the regime will be stable; and iii) a capacity to accommodate surprise or sudden shocks, i.e., the regime will be resilient. (1989, 22–32)

Combining these economic, social, and ecological dimensions of CPRs is, therefore, critical for the performance of a resource under common property arrangements. Economic measures focus on the extent to which the best economic outcome is produced through a combination of inputs at the lowest cost (Hanna, Folke, and Maler 1995). A broader economic measure of performance would also consider an economic outcome that accounts for the depleting and damaging effects of resource use (Daly and Cobb 1989). Social measures of performance focus on the equity properties of the regime and reflect social definitions of fairness in the distribution of benefits and costs across beneficiaries (Hanna *et al.* 1995). Ecological performance deals with the context in which stocks of natural capital are maintained over time (Costanza 2003).

The failure of CPR institutions to incorporate the diverse interests and values of stakeholders is often reported to be one of the main constraints

for equity and efficiency in a common property regime (Hanna *et al.* 1995). Effective management of CPRs requires the compliance of resource users. A good resource management process must represent the range of user group interests and have a clear purpose and transparent operations to be equitable. The extent to which participants' expectations are homogenous, with respect to the process and its objectives, influences perceptions of fairness and, consequently, the equity and efficiency of management regimes (Hanna *et al.* 1995). Hence, there is a need to understand CPR management from a structural perspective to maximize the equity and efficiency of collective action arrangements.

Ostrom (1990) formulated eight design principles for CPR management that she considered prerequisites for the success of local institutions. These principles include clearly defined boundaries; congruence between appropriation and provision rules and local conditions; collective choice arrangements; monitoring; graduated sanctions; conflict-resolving mechanisms; minimal recognition of rights to organize; and nested enterprises. Clear boundaries and the exclusion of outsiders is one of the most important preconditions for any kind of community-based resource management (Condition 1). There is also is a need to recognize that resource exploiting rules that are appropriate in one setting may be inappropriate in another (Condition 2). Resource users should be able to participate in modifying the operational rules of the common property regime (Condition 3). The remaining design principles concern the internal "sociology" of decision-making and focus on democracy, legitimacy, and institutional effectiveness.

Ostrom later elaborated on the attributes of resources and resource-using communities for self-governing associations to be formed. Resource attributes include the possibility of feasible improvement of the resource, availability of reliable and valid indicators of the condition of the resource system, predictability, and sufficiently small spatial extent for the appropriators to have knowledge of external boundaries. Attributes of user groups include an awareness of the salience of the resource, common understanding, low discount rate, trust and reciprocity, autonomy, and prior organizational experience and leadership. Researchers later proposed two additional variables: the cost–benefit aspect of resource management and historical inequalities within households, which may create incentives or disincentives for the management of commons at the local level (Sekher 2001). Design principles focus primarily on internal and external variables, such as the key attributes of the resource and community, but not on household socio-economic characteristics in a dynamic context, giving less attention to the distributional inequality inherent in property rights

transformation (Adhikari 2005; 2008). Cox *et al.* (2010) examined the validity of the design principles and assessed if they are inherently part of a blueprint approach to CPR management. They concluded that the design principles, although not complete, are empirically well supported. The general conclusions from these studies show that local user groups are instrumental in determining the rules for the allocation of resources between different users in a way that the users themselves deem equitable (Meinzen-Dick and Knox 1999).

3. EQUITY AND DISTRIBUTIONAL IMPLICATIONS OF COMMON PROPERTY REGIMES: SOME LESSONS

Participatory approaches to natural resource management have received much attention following the Rio Earth Summit, which established that resource users have the greatest stake in the sustainability of resources and institutions (World Bank 1996; Dearden, Carter, Kowalski, and Surridge 1999; Agrawal 2001). Governments in more than 50 countries have already ceded some control over resources to local users (Agrawal 2000). The FAO actively supports community forestry (CF) in several countries through its Forests, Trees and People Program. In Nepal, community forestry started in the late 1970s, when national forests were handed over to the local community. This programme was certainly one of the most important attempts to convert open access forests to common property by devolving ownership and control of forests to their historic users. Forest user groups (FUGs) were granted usufruct rights to forests. Similarly, joint forest management (JFM) was initiated in India in the late 1990s to involve local people in forest management. JFM, in which communities have access to non-timber forest products (NTFPs) as well as a share of timber products, is being increasingly applied in many states of India. Chopra and Dasgupta (2002) explored the CPR–poverty relationship in India and found that CPRs play an important role as a safety net for the poor. The devolution of CPR management enhances environmental outcomes and empowers community members in India in the context of forestry, irrigation, and wildlife management (Shyamsundar 2008). In Southeast Asia (e.g., Cambodia, Philippines, Thailand, and Vietnam), partnerships between local communities and the government are instrumental in protecting and regenerating degraded forests while meeting people's needs in a sustainable manner.

Despite these successes, research shows that the socio-economic and livelihood implications of common property regimes are mixed (Soussan *et al.* 1998; Malla 2000; Branney and Yadav 1998; Richards, Kanel, Maharjan,

and Davies 1999), particularly the distributional aspects of common property regimes within communities (Adhikari, Di Falco, and Lovett 2004; Adhikari 2005). Some empirical studies found that formalized systems of property rights have led to the gradual but systematic exclusion of the poor from CPRs (Beck and Nesmith 2001). The structured form of common property arrangements is not always inclusive and equitable compared to traditional institutions (Hobley and Wollenberg 1996). For example, Cooke (2000) found that the imposition of common property management institutions in villages in Nepal resulted in a reduction in the consumption of key products from forests and questioned whether significant welfare gains were generated after the institutional change.

Common property research has so far largely focused on the institutional arrangements by which communities act collectively (Saxena 2000); the decisions and actions of individuals have been given less attention. In the context of participatory forest management in South Asia, there is a tendency to assess impact in terms of biophysical and institutional changes rather than the effect on villagers' livelihoods (Das 2000). For example, Adhikari (2005) found that the CF programme in Nepal was primarily motivated by the timber and intermediate forest products oriented management regime that can be utilized by households with large land and livestock holdings, consequently marginalizing poorer households whose livelihoods depend on NTFPs. While this does not suggest that the benefits generated by intermediate forest products do not support the poor, the assumption is that NTFPs and cash-oriented management regimes prompt poorer people to participate in and benefit from collective action. Other studies suggest that well-off group members, such as with larger land and cattle ownership, are often likely to gain a larger share of benefits from a resource than those who are worse off (Agrawal 2001). Davies and Richards (1999) conducted an extensive review of economic analyses of community-based forest management to understand stakeholders' incentives for participatory forest management. They concluded that most of these studies tend to be biased towards i) reviewing valuation studies as opposed to providing clear methodological guidance; ii) non-market valuation for global and national stakeholders as opposed to adding marketable value for local stakeholders; iii) benefits in general as opposed to ones such as transaction costs; iv) ex ante studies for project preparation as opposed to ex post monitoring and impact analyses; v) treating forestry as a separate enterprise as opposed to adopting a more holistic livelihood focus; vi) efficiency and profitability as opposed to equity, gender, and institutional issues; and vii) returns to land and capital as opposed to returns to labour. The major concerns revolved around the real costs and benefits of

participation and how they are distributed among various actors (Hobley and Wollenberg 1996).

A large body of literature has demonstrated the success of common property regimes in conserving local resources (Wade 1988; Berkes 1989; Ostrom 1990; Berkes and Folke 1998). Early research efforts, however, mainly focused on the rules, mechanisms, and institutions that rural communities adopted in managing CPRs, without examining the distributional implications of these institutions. It is commonly assumed that, under common property armaments, local communities are capable of collectively managing resources and ensuring egalitarian access and distribution of benefits among their co-owners (Appasamy and Menon 2000). Many of these studies focus on communities as opposed to households, and the stated objectives of inter-household equity were often not met (Meinzen-Dick and Knox 1999). Meinzen-Dick and Knox (1999) argue that common property resources have not always been used efficiently, nor have the benefits been equitably distributed. In many cases, common property regimes have failed to recognize that resources often have multiple uses and that there tend to be sub-groups of users with different use patterns.

Several past studies explored the institutional arrangements for managing the commons at the local level (Nugent 1993; Uphoff 1993). Significant studies have identified key variables that support the self-organization of user groups for participatory resource management, such as the physical and technical attributes of the resource, characteristics of user groups, and attributes of institutional arrangements (Wade, 1988; Bromley and Cernea 1989; Ostrom 1990; Oakerson 1992; Tang 1992; Bardhan 1993; Nugent 1993). Some efforts have also been made to empirically examine the conditions under which user groups organize and the impact of such local organizational presence on the management of CPRs (Pender and Scherr 1999; Meinzen-Dick, Raju, and Gulati 2000). Another recent area of research focus is the contested role of group heterogeneity and the performance of collective action. This body of literature has initiated a discussion on whether socio-economic inequalities among resource users hinder or enhance the performance of collective action (Bardhan and Dayton-Johnson 2000; Baland and Platteau 1996;1999; Varughese and Ostrom 2001). One group of studies argue that cooperative solutions for the management of CPRs may be difficult to implement in an economy with highly heterogeneous agents. Asset inequality within a community makes the implementation of collective action more difficult since higher income and asset endowments make some sections of the community more productive in terms of resource utilization as well as influential in the

sphere of public decision-making; this may undermine the equity property of CPR institutions. For example, Chopra, Kadekodi, and Murthy (1990) found that endowments of cultivable land, cattle, and machines and harvesting tools determined household use of CFs and grazing lands in India. The very notion of a single, identifiable "community" for "community-based resource management" may be a fallacy when users are from diverse social backgrounds and while varied socio-economic positions often result in diversified interests in resource management. Much of the rhetorical weight of community comes from papering over differences that usually prevail within existing communities; such homogeneity help enhance cooperative efforts, reduce hierarchical and conflictual interactions, and promote better resource management (Agrawal and Gibson 1999). Nonetheless, quite a few studies that explore CPR management at the local level recognize that there are different subgroups, and within these subgroups, there are individuals with varying preferences for resource use and management (Kant 2000).

A high degree of heterogeneity within communities may hinder collective action due to the presence of different interests in resource management, which substantially increase the transaction costs of coordination. Moreover, in heterogeneous societies, members often have a lower level of trust in each other, giving rise to higher transaction costs. Zak and Knack (2001) posit that heterogeneous societies, especially those with weak formal and informal institutions, have lower trust levels and slower economic performance that less heterogeneous societies with higher trust levels. The transaction costs of resource management reduce with an increase in the level of trust levels between actors and institutions that provide incentives for lasting cooperation. Transaction costs may be significantly higher in communities with a high level of socio-economic differentiation. In such communities, a failure to address complex social factors such as institutional and political realities, gender issues, caste differences, and economic disparities may lead to inequitable access to the resource base and result in social conflicts. Inequality in power, for example, may mean that equal division would be unacceptable to the powerful, while any other distribution may be subject to conflict. As Somanathan, Prabhakar, and Mehta (2002, 2) point out, "heterogeneity removes a natural focal point for agreements, and, simultaneously makes one subgroup uncertain about other group's preferences, thus making agreement less likely as each group tries to drive a hard bargain, one that may be unacceptable to the other groups". Runge (1986) shows that greater heterogeneity in a community makes cooperation more difficult because it increases the costs of working together. Ghate (2008) also highlighted how social stratification and ethnic

heterogeneity in Indian villages matter with reference to JFM. Mukhopadhyay (2008) explored the impact of heterogeneity on asset ownership and cooperation in the context of agrarian transitions in Goa, India, and offers several insights to ensure the sustainability of village commons.

Olson (1965) suggests that in a heterogeneous group, a dominant member who enjoys a large part of the benefits from collective action is likely to ensure its provision even if they have to pay all of the costs themselves, with the smaller players free riding on the former's contribution. Thus, Olson holds that inequality may favour collective action. In a similar vein, Ostrom (1992) claims that heterogeneity in asset structure can favour collective action, especially where there is a need for leadership and entrepreneurship. However, despite impressive advances in our understanding of the impact of institutional form on the performance of commons-using communities, the role of socio-economic heterogeneity and its impact on collective action and equity of resource distribution are still under-researched. Dasgupta (2008) offers several underlying theoretical insights on the management of CPRs under common property regimes and warns us by presenting both the pros and cons of collective relationships.

Despite common property regimes having some weaknesses, evidence of successful self-governance of natural resources by users has engendered considerable optimism that turning responsibility over to organized user groups will improve the efficiency, equity, and sustainability of the resource base. The devolution of power engenders a deep sense of ownership over natural resources and creates incentives for investment in management. There have been significant advancements in commons research over the past two decades. Policy interventions in many countries are geared towards crafting mechanisms and procedures to represent disadvantaged groups in decision-making and to support local livelihoods through more scientific methods in the management of CPRs.

4. CONCLUDING REMARKS

This review demonstrates that the absence of well-defined property rights results in open access to the resource system that is unregulated and free to everyone interested in resource appropriation and exploitation. Rent completely dissipates under an open access equilibrium. There is an overuse of resources that results from resource users ignoring the effects of their consumption on the costs that other users bear. Similarly, there is also overuse resulting from users ignoring the effect that their consumption in the present year will have on the costs they will face in the following years.

On the supply side, open access CPRs are like public goods. Individuals cannot enjoy the benefits of their investments in these resources, and as a result, investments are inefficiently low, resources are misallocated, and there is under-investment in information to resource users (Wallace 1981). Since individual interests are unlikely to lead to the sustainable management of CPRs in an open access condition, institutional arrangements for resource management must be designed in such a way that they ensure long-term incentives for the individual resource user.

The review has highlighted that economic gains from the community-based system of resource management are among the most important factors contributing to the success of collective action. Scholars unequivocally emphasize that these gains (institutional change) should be distributed among all user groups in a manner that benefits everyone. The economics of CPRs have advanced quite a bit since the late nineties. Dr Jodha's contribution to this line of scholarly enquiry is commendable as he was one of the pioneers of CPR research in relation to rural poverty and the management of village commons in South Asia. Jodha's (1986) study of 80 villages in 21 districts in India demonstrates the importance of CPRs for rural livelihoods (e.g., 15–25% of the total income of poorer households comes from collection and gathering activities). His work also offers ample evidence of extensive use of CPRs by rural households for key economic activities such as consumption, production, and asset formation. His work emphasizes the need for the provision of equal opportunities in all aspects of CPR management and decision-making processes as well as in sharing costs and benefits. As a strong researcher and practitioner, he advocated for the right policy intervention in managing local commons by creating a set of synergies such that different sections of the community can benefit from common property resources management.

The relationship between resource degradation and CPRs is another dimension of Jodha's work (Jodha 1985a; 1986; 1990; 1995). Some early studies on the poverty–environment nexus demonstrate the empirical linkages between population growth and resource degradation (Jain 1988; Mabogunje 2001). Another stream of literature explores the dependency of both poorer and better off households on local commons, and some of these studies report a higher degree of reliance among poor community members on CPRs (Chambers 1994). These studies establish that poverty is among the principal sources of environmental damage across countries (Masron and Subramaniam 2019). Jodha (1995; 1985b) demonstrates that although poorer households are relatively more dependent on these resources (if there are fewer restraints imposed by local management institutions), the better-off sections of society appropriate more benefits

from the commons. Further, he convincingly shows that these communities can limit the overuse of resources for subsistence and use CPRs as an insurance mechanism. A few years prior to Elinor Ostrom's famous book *Governing the Commons* (1990), Jodha had already made the case that decentralized collective management by local users could be an appropriate system for addressing the over-exploitation of CPRs (Jodha 1986). Jodha (1997) demonstrates how changes in institutional arrangements, such as the legal status of CPRs, contributed to the decline of CPRs in India.

Consistent with the theoretical insights presented earlier, Jodha's work reminds us that the management of CPRs is influenced by a the local socio-economic, legal, political, cultural, and ecological variables of the community within which it operates. Because of the enormous variability in the resource base, socio-economic conditions, and history of cooperation, no single blueprint is appropriate for all situations. To this end, Jodha's (1992) work describes the key role of donors in sensitizing national agencies to the importance of CPRs and supporting policies that enforce local institutional arrangements. Policy insights emanating from Jodha's work help inform forest policy–related legislations in South Asia and elsewhere. Many of these policy changes have stipulated a strategy to hand over the authority to conserve and use forest resources to local people; this engenders a deep sense of ownership over forests and creates incentives for investment in forest management. Jodha's work rightfully emphasizes the importance of capacity building among various stakeholders involved in common property management, such as forest officials, NGOs, and the local community, which would facilitate a forward-looking and anticipatory approach to forest management (Jodha 2000). Jodha (2008) offers several useful policy insights for managing CPRs in South Asia, especially in situations where there has been a rapid disintegration of the community's collective stake in the village commons. In a nutshell, Jodha's work has contributed immensely to the economics-related and institutional aspects of CPR management and poverty alleviation in South Asia.

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