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Fifty Years of Debate on Hardin's Tragedy of the Commons – A Reflection

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Abstract

This paper critically reviews Garrett Hardin's "The Tragedy of the Commons". Hardin's thesis about impossibility of collective action for achieving mutually beneficial outcomes in a group setting has divided scholarly community ever since its publication in 1968, while its most perennial object being the communal management of resources, which was banned on account of being inherently inefficient. This paper argues that much of the criticism against common property regimes stems from an incorrect modeling of a common property situation, and misunderstandings about the terms and their wrong usage. Specifically, models of collective action - in particular Hardin's tragedy of the Commons, but also Olson's Logic of Collective Action, and the Prisoner's Dilemma - that are used as critique against common property regimes are not based on an accurate depiction of reality and many of their assumptions are untrue. The purpose is to drive home the point that common property regimes are *not* inherently inferior types of regimes, and causes of success, and of failures, of these regimes lie elsewhere. Secondly, both public [and also private] management of natural resources has not had universal success. It is time to think out of the usual 'either public or private' dichotomy. Combining elements of both public and communal management in a pragmatic way is necessary. It is time to give co-management a serious thought.

Key Words: Natural Resource Management, Property Institutions, Co-management of Resources

JEL Classification: Q20, P14.

I. Introduction

Hardin's seminal work "The Tragedy of the Commons" has been a cornerstone of debates about common property regimes since the time it was first published fifty years ago [Hardin (1968)]. Though he presented his case on population problem as one involving no technical solution, his arguments have been widely used by others to condemn communal management of resources.

The mainstay of Hardin's thesis is the impossibility of cooperation by rational individuals to achieve a common good. For the management of natural resources it basically meant that any situation that requires cooperation among individuals to adopt a stint rule is improbable, because

it is in the interest of each individual to cheat and take more than his allotted quota. The implications for common property regimes were clear. Since common property regimes are a group property and resources held under such an arrangement are used by individuals but are not individually owned, rules that are developed for the use of a particular resource must have the consensus of the group and each individual must abide by the rule. Meaning, management of resources under common property system requires collective action in the formulation of rules of restrained use and in its observance. As Hardin was not optimistic about the prospects of success of such collective effort, common property regimes were banned. So, for decades, this form of management was relegated to a secondary position on account of being inferior to public or private management, owing to “Tragedy of the Commons”. However, disillusionment with the latter types has sparked a revival of interest in common property regimes (CPRs), and a vast literature has emerged in defense of the commons, spearheaded in particular by Elinor Ostrom, who was awarded a Nobel Prize for her work on the commons.

This paper reviews this research endeavor, which has been multifaceted. On one hand, it has focused on practical issues of compiling empirical evidence in favor of common property regimes and identifying conditions for their success, as well as challenges faced by them [Bromley (1992), Berkes (ed.) (1989), McCay and Acheson (1987)]. On the other, it seeks to tackle conceptual issues haunting this debate, which in its own sense is important because much of the criticism against common property regimes stems from (1) an incorrect modeling of a common property situation, and (2) misunderstandings about the terms and their wrong usage [Knudsen (1995), Ostrom (1999), (1990), Wade (1987)]. In terms of policy making, much ground has been covered for the ‘inclusive’ concept of development, where state and citizens work in unison. For the sake of common property regimes, it meant they could now be co-opted in the ‘co-management’ in solving particular resource management problems where state management had not proved to be effective. Yet, it seems governments in developing countries have not embraced the idea whole heartedly and the concept of including ‘people’ in resource management has remained elusive, marked more by rarity than by its preeminence. Phrases like ‘anti-tree’ attitudes, and antipathy [rather animosity]¹ of people toward natural resources still dot the policy documents, and in many cases only lip service is paid to ‘co-management’, which is seen more as donor-driven policy agenda². Below, we first discuss the critique against the CPRs. Next, we appraise regimes that are envisaged as alternatives of the commons. Lastly, we review

¹ For example, reflecting on the relationship between the Forest Department and forest communities in the case of Pakistan, Dove (1994) notes that “the Forest Department has an attitude of mistrust towards local population and attributes overexploitation of tree products and deforestation of forested area to the ‘anti-tree’ attitudes of the rural people.

² Even a casual screening of the Government of Pakistan’s Forestry Sector Master Plan (1992) reveals that government considers local people as the primary cause behind high deforestation rates in Pakistan and recommends strengthening government’s control over forests. [Hasan (2001)].

arguments that are put forward against Hardin's Tragedy, and for rationalising CPRs as viable options.

II. CPRs and Impossibility of Collective Action

Before we discuss the critique against the CPRs, a few definitions are in order. These are important because much of the criticism against CPRs stems from misunderstandings and misinterpretations of terms, and their incorrect usage in the debate. These include: 1) confusing common property regimes with common pool resources; 2) misrepresenting common property regimes as open access situations. We will elaborate on these concepts below.

Common pool resources are defined as “natural or man made resources where exclusion is difficult and yield is subtractable” [Ostrom and Gardner (1993: 93)].³ These two attributes collectively make common pool resources vulnerable to extinction, which warrants the need to regulate the behaviour of its users through property regime.⁴ Common pool resources can be managed under different regimes, i.e. public, private or common property (or any mix of these regimes).⁵ Whereas, common property regime refers to a property arrangement that has a well-defined and recognized group of users, a well-defined resource that the group manages and uses, and a set of institutional arrangements regulating its use⁶. This is in contrast to an open-access regime where no such arrangement exists, and resource belongs to the person who captures it first.

The resources held under common property arrangement are used by individuals but are not individually owned. They are a group property. This means that rules, which are developed for the use of a particular resource, must have the consensus of the group and each individual must abide

³ “As such they share their first attribute with pure public goods and the second attribute with pure private good. The first attribute, difficulty of exclusion, results from factors such as cost of parcelling or fencing the resource and the cost of designing and enforcing property rights to exclude access to the resource. It is this attribute of common pool resource that makes them prone to free riding by others. The second attribute of subtractability means that resource unit that one person appropriates from the common-pool resource is not available to others” [Ostrom and Gardner (1993: 93)].

⁴ Typically, a property regime refers to a structure of rights and duties characterising the relationship of individuals to one another with respect to that particular resource [Bromley and Cernea (1989:5)]. We can envisage four types of regimes for to resource management. These differ in their ability to exclude non-right holders. These are: (1) Public Property Regimes - ownership (and control) over the resource belongs to the state, (2) Private Property Regimes - individuals (and private entities) maintain ownership and control over the resources, (3) Common Property Regimes - a group property where a well-defined set of user has access and control rights over the resource, and (4) Non-Property Regimes (open access) - resource under this regime belongs to the party that captures it first.

⁵ For example, forestlands are managed by state institutions in Pakistan (and also elsewhere) [see Hasan (2001)]. Village commons have been privatized in India [Jodha (1994)].

⁶ It is important to note the difference between a resource, which is an object of want [Reeve (1986)], and a regime, which refers to structure of rights and duties characterising the relationship of individuals with respect to that resource [Bromley and Cernea (1989:5)].

by the rule. Thus, management of resources under common property system requires *collective action* in the *formulation of rules* of restrained use and in its *observance*⁷.

A certain degree of pessimism prevails among analysts regarding the viability of common property regimes. Much of this stems from their lack of faith in the ability of resource users to act collectively in the sense described above. Their skepticism is based on several theories of collective action. These are (1) the Prisoner's Dilemma⁸, (2) the Hardin's Tragedy of the Commons⁹, and (3) the Theory of Collective Action¹⁰. These theories highlight the problems associated with collective action. If a group of user is required to act collectively, i.e., adopt a stint rule in the use of a resource, and this action is mutually beneficial to all of them, they will not do so unless an external agency imposes this rule on them. These theories contend that a "rational" individual will find it to his own benefit to ignore the rule and over exploit the resource, fearing that if he does not do so others will capture the benefits.¹¹ The common theme running among all three of these models is the free rider problem.¹²

This has implication for the management of resources. This school of thought believes that common property management is bound to fail. They base their judgement on the following

⁷Collective action is action by more than one person to achieve some common goal or to satisfy some common interest; a goal or an interest that can not be achieved by a person acting alone (Wade 1987, p 97).

⁸ The Prisoner's Dilemma is visualized as a non-cooperative game in which communication among players is forbidden. Each player has complete information about the full structure of the game tree and the payoffs attached to outcomes. Each player has a dominant strategy, meaning that the player is always better off choosing that strategy.

⁹ Hardin envisions a grazing ground which is "open to all". He then examines the situation from the point of view a "rational" herdsman. Each herdsman has a utility function, where he derives positive utility from selling his animal and negative utility from overgrazing of the pasture. His objective is to maximize his own utility. In this scenario, each herdsman is motivated to add more and more to his herd because he reaps the full, and direct, benefit from his animals but bears only a part of the cost resulting from overgrazing. He then concludes and I quote "each man is locked into a system that compels him to increase his herd without limit - in a world that is limited. *Ruin is the destination* towards which all men rush, each pursuing his own best interest *in a society that believes in the freedom of the commons*" [Hardin (1968): 1244, emphasis added]. He believes that the only solution to this problem is coercion by an *external authority*.

¹⁰ Olson questioned the accepted view that individuals with common interest will act together to further those interests, and that possibility of a collective benefit to a group is sufficient to generate collective action. Rather, he suggests and I quote what has come to be the most quoted phrase from his work that "unless the number of individuals is quite small, or unless there is coercion or some other special device to make individuals act in their common interest, *rational, self interested individuals will not act to achieve their common or group interests*" [Olson (1965): 2]. The argument is that a person who cannot be excluded from the benefits of a collective good once the good is provided will have little incentive to contribute in the provision of that good, unless some kind of coercion is exercised.

¹¹See Ostrom (1990), Van de Laar (1990) and Wade (1987) for a description of these models.

¹² The free rider problem results when an individual shirks responsibility to the group. When a person cannot be excluded from the benefits of a joint action he will have a motivation not to contribute in the efforts. If each individual decides to free ride then the action will not take place at all. It points to the impossibility of having a collective action.

arguments. (1) each rational individual has a motive to shirk its duty to the group¹³, (2) it is a dominant strategy in the sense that he is always better off choosing this strategy, (3) even if an agreement is struck regarding resource use the strict dominance of the individual strategy makes such co-operation unstable because each individual prefers that the other stints while he overexploits (Runge 1992, p 26). Therefore, the enforcement of the rule must come from outside, hence the appropriate property systems are exogenous [public or private property].

III. The Alternatives of the Commons

The tragedy of the commons provides a rationale for state control with major coercive power [Ophuls cited from Ostrom (1990): 8]. The state control essentially means control by the central government.¹⁴ Needless to say that they are assumed to be able governments who possess *complete and accurate information* about the resource and its use, who are able to *device appropriate policies* and above that have the ability to *implement them*, that they have *monitoring capabilities, sanctioning reliabilities* and *zero cost of administration* [Ostrom (1990): 8-10]. Breakdown of any of these assumptions means a less than optimal utilization of the resource. Experience has shown that nationalization of resources has generally resulted in their degradation.¹⁵ The de facto management regime is one of open access [Bromley (1992), Ostrom (1990)].

Further, it assumes a neutral state. Insights from the 'Public Interest' theory, however, suggest that political decision makers and bureaucrats are not neutral in their decisions and they seek to further their self-interests [Buchanan and Tullock (1963)].¹⁶ Lack of political will, lack of interest on part of bureaucrats, and incapable administrators are also important in causing resource degradation under state-management.¹⁷ Further, decision makers are usually far removed from the site, and have little knowledge of the local ecology, their time horizon are often short, and they are in many instances under the influence of interests groups far removed from the resource. There is little case for centralized control [Dasgupta and Mäler (1994)].

¹³ i.e. not contribute in the effort of managing the resource and thereby over exploit it

¹⁴ That is, the central government makes decision about who can use the resource, how and when can he use it.

¹⁵ See Azhar (1993), Arnold and Campbell (1986), Commander (1986), Hasan (2001, 2007) and Messerschmidt (1986), for failures of state management.

¹⁶ They are seen as rational utility maximising individuals. So if this concept of economic rationality of an individual was used to advance the notion that communal management is bound to fail, and if it is equally applicable to the decision makers in the state, the implications are very clear - the state management may also fail. The process of deforestation in the South-East Asia and the role that large logging concessions have played in that is a case in point.

¹⁷ See Blaikie (1985) for this point.

Privatization of resources is not without problems either.¹⁸ In fact, in many cases it has contributed to a faster destruction of resources.¹⁹ Moreover, it has to be judged if the process is *cost effective* or not. Privatization of a resource involves parcelling out resources and handing them over to individual owners. There are costs involved in such an action; cost of assigning, defining and enforcing these rights. The fair enforcement of formalized private rights and duties may be prohibitively costly compared with customary arrangements and too high for a village economy to bear [Runge 1992: 20]. Further, privatization has serious *distributional implications*. The question here is who decides about the assignment of ownership rights.²⁰

IV. Rationalising the Commons

The models of collective action that were used as critique against CPRs have come under severe criticism. Taking the case of prisoner's dilemma, outcomes under this game are based on two key assumptions: (1) players have no communication,²¹ (2) no repeated interaction,²² and (3) no information about the environment in which they operate. The first two assumptions imply that the players cannot negotiate among themselves to change the rules of the game and adjust their behaviour accordingly. While these assumptions are suitable for the 'prisoner's dilemma' in which suspects had no previous ties, no code of honour, and no expectation of future interaction, each person knows that he will not have another opportunity to confess; they will be less suitable if the situation is an enduring and recurrent one. If the prisoners know that the game will be played repeatedly the chances that they will cooperate in the hope that others will then do so are

¹⁸ Private ownership internalizes costs and benefits associated with the resource; this creates incentive for the owner to utilize resources more efficiently [Demsetz (1967), Tisdell (1993)]. Where it is difficult to create private property rights (in the case of mobile resources, e.g.), management must choose from various types of imperfect approximations of property rights [Townsend and Wilson 1987: 318].

¹⁹ In India, privatization of land not just had a negative repercussion on the rural poor by their disentanglement from the CPR, but also caused a faster destruction of native vegetation [Jodha 1992, 1994]. In Brazil, the conversion of forestland to pastures for cattle ranching activities accounted for approximately seventy two percent of land use alterations up till the late 1980s. Almost 30% is accounted by a few hundred large-scale, heavily subsidized ranches, which was given a boost by the government fiscal incentives to the livestock sector [Browder (1988)].

²⁰ Jodha's research on India indicates that between 49-86 percent of the privatized land ended up under the control of the better segments of the society [Jodha 1986]. The increased privatization of land marginalizes people and forces them to use the commons more intensively and hence contributes to the shrinking potential of the commons themselves [Blaikie 1985: 130].

²¹ That is, they make their choice in ignorance of other's choice.

²² Essentially, each player chooses only once and cannot revert his decision afterwards i.e. upon finding what other player has chosen.

much higher [Wade (1987)].²³ Runge argues that village level decision-making is more akin to the “assurance problem” - where there are no dominant strategies, and decisions are interdependent - than to a prisoner’s dilemma game.²⁴ It is precisely the role of village level conventions, including common property institutions, to reinforce expectations of collective behavior [Runge (1992)].

Hardin’s analysis, in particular, is based on ‘no information’ assumption.²⁵ This brings out the issue of information people have about the larger system and environment in which they operate [Kimber (1983) cited in Wade (1987)]. While his parable may hold for very large resource systems (open sea fishing), it is less likely to be a situation of a common property held by a village where the level of interaction and flow of information among the residents is high, making the monitoring of the condition of commons an easier task.²⁶ Another problem with Hardin's analysis is that he misconstrued an open access situation with a common property situation. While former prescribes no property rights and duties to a person (or a group), the latter are structured property arrangements.

Experience with management of forests in South Asia has shown that *dejure* state forest have become *defacto* open access due to negligence and corruption of state institutions [Arnold and Cambell (1986), Azhar (1993), Hasan (2007, 2001), Knudsen (1996)]. Any property regime, when left unmanaged, can fall into an open access situation, and is not peculiar to CPRs.

²³ Reality is more complex than this simplified game; here considerations of morality, power and loyalty put checks on free riding. People choose not to free ride when others are cooperating because to do so would run against their moral standards [*ibid*]. Short-term benefits resulting from shirking may be more than offset by cost arising within the group from breaking the institutional rule. In cases where shirking is not a dominant strategy, cost of reputation loss is very high [Runge (1981)].

²⁴ In an assurance problem a variety of outcome is possible. What is needed in this situation is a cooperation of a critical mass, and not necessarily every individual, to convince a villager to cooperate and hence benefit from the stinting. Interdependence in decision making implies expected decisions of others enter one’s decision function

²⁵ It implies that each herdsman is not aware of the action of the others, of the overall condition of the common, and that it is heading toward total ‘ruin’. Each herdsman makes a rational decision of adding one more to his herd just before the time of resource breakdown, and hence hastens the destruction.

²⁶ Kimber further point out that Hardin does not distinguish between the situations where resource is vital for the survival of users and where it is not. In situations where it is vital, a rational user will stop at some point well before complete plunder of the resource. Criticism on Hardin’s allegory is replete with one more, and probably the most important, point- his failure to distinguish an open access regime from a common property regime. While his story could easily fit a situation of open access, it is less befitting for a common property regime where a group ownership exists and access is open only to the members of the group. Monitoring the activities of the group and ensuring compliance with the rule stands greater chance under these conditions [Wade (1987)]. When CPRs are wrongly identified as open access regimes, chances for human co-operation and collective action are dismissed [Bromley and Cernea (1989)].

Common property regime may be the only viable choice under certain (village life) conditions such as: relative poverty²⁷, resource dependence²⁸, uncertainty²⁹, high cost of transaction for alternative institutions. All this creates a structure of incentives that makes collective management a rational strategy. Free riding, which lies at the core of the attack against common property regime, need not be a universal phenomenon. In fact, in the villages of the developing countries social pressure is enough to keep people from free riding. Further, given a high level of interaction, monitoring is not an enormously difficult task in these villages [Runge (1992)].³⁰

Critics of common property regime question the viability of such a regime, and suggest replacing these with either state or market solution. They, however, tend to ignore institutional problems associated with either of the situations. They assume an *institution free environment* for their analysis, but “neither state nor market is unproblematic in composition, dynamics or effect” [Sinha and Herring (1993: 1431)]. Institutional rigidities are very important in explaining the failures of these management regimes.³¹ Institutions of public or private property are expensive to make effective. Already overstretched states in the developing countries may not be able to provide the necessary resources to make the work in the myriad of microenvironments. A malfunctioning approximation to a formalized system of state control or private system may prove to be inferior form of management when seen in contrast to a local management of resources [Wade (1987)].³² All this is not meant to say that common property regime are the panacea for commons. Common property regime can and do break down under internal or external pressures. Population pressures,

²⁷ This makes the transaction cost of well-defined system of property rights much higher than that under traditional system and too great for them to bear. The more things for which rights are defined the greater the social investment in assignment, definition, and adjudication will be.

²⁸ Villagers rely on natural resources for most part of their livelihood and given these resources vary considerably in terms of their productivity over time and space a joint ownership is preferred with a view to avoid unequal distribution of resources.

²⁹ This element of uncertainty about future emphasizes inclusion of other as a guard against risks. The expectation is that when one is in need help will come from others.

³⁰ See Wade (1987) for this point.

³¹ Bromley writes, “If the right conditions exist – divisibility, mobility, full ownership of all valuable resources, full information, and well-functioning markets – then the allocation of all factors of production will be efficient. As a definition this is fine; as a policy prescription in a world where not all valuable resources are fully divisible and capable of individual ownership, where all resources are not fully mobile, where information is imperfect, where many markets are not present, where the future is unrepresented, then our standard advice [of privatization] is suspect” [Bromley (1989): 875].

³² Privatization of commons, which is offered as a solution to the ‘tragedy of commons’ cannot work unless enforced (and supported) by state institutions [Bromley and Cernea (1989)]. If CPRs are extended the same level of support from the government agencies, these regimes have a fair chance of success. Common Property Regimes are not inherently inferior types of regimes. In fact, these can be a superior form of regimes under conditions where both state and private property regimes are costly to establish.

diversification of the village economy, breaking of cultural ties can put common property regime to a test situation, and it may not come out as triumphant. Similarly, the overall environment in which a common property regime has to survive is crucial in determining the chances of its success. The infusion of modern techniques, government policies, and its attitude in terms of giving priority to common property regime are vital. In most instances common property regimes are not looked at with same degree of importance as private regime and as such do not enjoy an equal level of government support. Privatization of commons, which is offered as a solution to the ‘tragedy of commons’ cannot work unless enforced (and supported) by state institutions³³. If CPRs are extended the same level of support from the government agencies, these regimes have a fair chance of success. Common Property Regimes are not inherently inferior types of regimes. In fact, these can be a superior form of regimes under conditions where both state and private property regimes are costly to establish.

Further, since both public and private management of natural resources have not had universal success, it is time to think out of the usual ‘either public or private’ dichotomy. Combining elements of both public and communal management – collective management - in a pragmatic way is necessary. Experience with forest management in Pakistan has shown that local people can complement government institutions remarkably well in halting forest degradation³⁴.

.As opposed to widely held conception, common property regimes are not free for all. They are structured ownership arrangements in which management rules are developed, group size is known and enforced, incentives exist for co-owners to the rules and sanctions are at work to ensure compliance [Bromley and Cernea (1989)]. Communities have relied on this particular form of property institution to manage resources with reasonable degree of success over long

³³ Bromley and Cernea (1989) write, “Private property would be nothing without the requisite authority system that makes certain the rights and duties are adhered to” [Bromley and Cernea (1989): 17].

³⁴ One of the success stories relates to the case of Chaprote forest, which is situated in the Nagar Valley of the Gilgit district in the Northern Areas of Pakistan, where a village committee, in recognition of their traditional rights, was first merely involved in the management of forest and later on given complete charge of the forest. Mumtaz and Nayab (1992) report the committee was successful in putting a check on the deforestation process [Mumtaz and Nayab (1992)]. The second experience comes from the Kalam Integrated Development Project (KIDP). The KIDP improvised the concept of petty (local) contractors, as against big contractors who were notorious for their alleged collusion with the forest department and over-cutting, and also supported involvement of the village community in the making of working plan [Khan and Zurflueh (1994)]. Also See Poffenberger (1995) for a successful experience with forest protection committees formed of local tribal population, in the Jungle Mahals of West Bengal. He writes that the emergence of these committees is grounded in tribal resistance movements against state control.

period of time³⁵. It is true that success with this kind of property institution has not been an across the board phenomenon, but neither has it been the other way round. The causes of its success are many so are the reasons for its failure³⁶.

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³⁵For successful cases of common property regime see Arnold and Campbell (1986), Bromley and Cernea (1989), Bromley (1992), Berkes (ed.) (1989), McCay and Acheson (1987), Mumtaz and Durr-e-Nayab (1992, 1991), and Ostrom and Gardner (1993), Wade (1992).

³⁶See Ostrom (1990) for commonalities among successful common property regimes, especially pp. 88-102.

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