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Managing Environment: A Critique of 'The Tragedy of Commons'

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INTRODUCTION

To be precise, the term commons denotes common resources of a collective of a locality. Long back, Garrett Hardin (1968) wrote in Science an article entitled *'The Tragedy of the Commons'*, with a sub-title *'The population problem has no technical solution; it requires a fundamental extension in morality'* (1968; 1243, italics mine). This essay begins with a quotation from J. B. Wiesner and H. F. York "Both sides in arms race... confronted by the dilemma of steadily increasing military power and steadily decreasing national security. *It is our considered professional judgment that this dilemma has no technical solution."* (cited in Hardin, 1968; 1243, italics added). Hardin, adopting that conclusion, says that there is a class of human problems that are "no technical solution problems" and he cites "population problem" as one of these. Then, he supports Malthusian thesis of population growing "geometrically" - now "exponentially" - and remarks, *"A finite world can support only a finite population; therefore, population growth must eventually equal zero"* (ibid; 1243). For this he gives two reasons: first, it is not mathematically possible to maximize two or more variables at the same time; secondly, biologically, any organism must have a source of energy for maintenance and work and, therefore, he argues, *"maximizing population does not maximize goods"* (ibid; 1244).

Taking a pessimistic view, he imagines a 'finite' common pasture 'open to all' and assumes every herder to be a rational utility-maximizer who gets a positive utility by adding more animals even when the aggregate of all herder' activities far exceeds the sustainable yield of the said pasture. Then occurs the 'tragedy': *"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 toward which all men rush, each pursuing his own best interest in a society that believes in freedom of the commons. Freedom in a commons brings ruin to all"* (ibid; 1244).

Then, his second argument is that, particularly in a welfare state, 'freedom to breed is intolerable' and he openly denies the validity of UN's Universal Declaration of Humans Rights 'that any choice and decision with regard to the size of the family must irrevocably rest with the family itself, and cannot be made by anybody else' (ibid; 1246). His argument is that an appeal to conscience to desist from exploiting a commons, or for responsible parenthood, has 'pathogenic effects' (ibid; 1246-7).

Third, he gives an example of bank robbing where a robber acts 'as if the bank were a commons'; the right method to prevent it is not a verbal appeal or propaganda but social arrangements to 'infringe on the freedom of the would-be robbers'. Therefore, he recommends *"mutual coercion, mutually agreed upon by the majority of the people affected"* (ibid; 1247). So his alternative solution to commons' problem is 'the institution of private property coupled with legal inheritance'- though he admits that 'legal system of private property plus inheritance is unjust', yet asserts: *"Injustice is preferable to total ruin"* (ibid; 1247).

Thus, his conclusion is: *"the commons, if justifiable at all, is justifiable only under conditions of low-population density. As the human population has increased, the commons has had to be abandoned in one aspect or another"* (ibid; 1248). He cites three examples of the 'recognition of necessity': first, commons was abandoned in food gathering, enclosing farm land, restricting pastures, hunting and fishing areas but this restriction is still not complete throughout the world; second, commons as a place of waste disposal would have to be abandoned; third, evils of commons in matters of pleasure-restricting sound waves in the public medium. He remarks: *"When men mutually agreed to pass laws against*

robbing, mankind became more free, not less so. Individual locked into the logic of the commons are free only to bring on universal ruin; once they see the necessity of mutual coercion, they become free to pursue other goals... The most important aspect of necessity that we must now recognize, is the necessity of abandoning the commons in breeding. No technical solution can rescue us from the misery of over-population. Freedom to breed will bring ruin to all" (ibid; 1248).

Assumptions of the 'Tragedy of Commons' Thesis

Before Hardin, even Aristotle had observed such a kind of tragedy when he remarked: *"What is common to the greatest number, has the least care bestowed upon this. Everyone thinks chiefly of his own, hardly at all of the common interests"* (cited in Ostrom: 1990;2). However, it was Hardin who theorised it wherein Hobbes' parable of man in a state of nature- 'nasty, brutish and short'- is a prototype of the tragedy of the commons. Hardin had several assumptions that are noteworthy (O'Riordan, 1976; Runge, 1992; Wade, 1988; Eckersley, 1992; Lane and Moorehead, 1995).

(a) that every individual is selfish and rationally utility-maximizer at the cost of the commons since animals are held individually while the range is owned by 'everyone' or 'no one';
(b) that common resources are finite and scarce, and 'carrying capacity' of any piece of range is fixed;
(c) that the consumption pattern puts in far less than removes;
(d) that grazing commons is used as a metaphor for the general problem of over-population;
(e) that there is a mutual distrust that others will capture the benefits of the common resources;
(f) that there is a dominance of free-rider defecting strategy;
(g) that all rural produces in a community practise the same livelihood, have the same interest in a resource and can act fully independently of their fellow producers;
(h) that there is a need for coercive enforcement, i.e., 'to legislate temperance';
(i) that, in the ultimate analysis, solution lies in the privatization of common property resources because only private property internalizes the 'externalities' of non-exclusive resource exploitation.

The application of the concept of 'tragedy of commons' was not limited to the grazing land or fisheries but extended to describe Sahelian famine of 1970's (Picardi and Seifert: 1977), firewood crises in developing countries (Normal, 1984; Thomson, 1977), urban crime (Neher, 1978), communal conflict in Cyprus (Lumsden, 1973); inability of US Congress to limit its capacity to overspend (Shepsle and Weingast, 1984), problem of acid rain (Wilson, 1985), public-private sector relationships (Scharpf, 1985) and the problems of international cooperation (Snidel, 1985).

A Critique of the Tragedy of Commons Thesis

The 'tragedy of commons' thesis has been criticized by several social scientists and environmentalists on various theoretical and empirical counts. For instance, Hardin's diagnosis of over-population as the cause of degradation has been declared as unrealistic since population growth is more closely associated with poverty, illiteracy, malnutrition, lack of social security in old age, absence of health and sanitation, and cultural practices than with individual reproductive behaviour (Simon, 1979; World Bank, 1984). Hence, the observation of 'no technical solution' and seeking answers in moral reason is not sound.

Further, 'hard line' solutions to environmental problems (depletion taxes, residual taxes etc.) are economically and socially regressive and will only be effective if accompanied by a genuine attempt to ensure fair and equitable distribution (O'Riordan, 1976). But unfortunately, Hardin is against such equitable distribution of wealth and, in his view, in the absence of a world government controlling reproduction, 'the ethics of a lifeboat' must govern since somebody has to be sacrificed in the interest of 'humanity'! For Hardin, humanity means the rich and elite minority.

In addition, the 'tragedy of commons' thesis is historically not supported. As Juergensmeyer and Wadley (1974) rightly point out, the looking-after of common resources needs community efforts and reciprocity of all members; the

use of grazing and woodland of original English common lands predates feudalism to the period of Germanic laws when the concept of private property hardly existed - actually the communal rights and obligations governed the use of land.

Hardin is also to be criticized for his Darwinian view that man must imitate natural selection wherein the criterion is 'survival of the fittest'. This elitist view is against the masses' interest who are poor for exogenous factors (adverse terms of trade, unequitable land tenure etc.) for which they are not responsible.

His thesis wrongly over-emphasises on the absence of a sense of community, and the dominance of the individual defective strategy. As Schelling correctly points out, the divergence of individual concern and collective interest is more a result of inappropriate social organization than perverse human nature; we have not devised appropriate institutions to deal with an abundance of bads in the way we have successfully created mechanisms to cope with a scarcity of goods: *"Medicines are proprietary, but germs are free. I own the tobacco I plant in my field, but you may have the smoke free of charge"* (1971: 78). Lane and Moorehead also perceptively remark: "However, by reiterating the primacy of the motivation for individual maximization, he is adopting an economic model to explain behaviour, and failing to acknowledge the existence of the benefits (mutual support, security) that come to individuals from collective behaviour in the public interest, as is displayed by traditional pastoral societies" (1995: 199).

Further, in response to the massive criticisms, Hardin later on conceded in 1988 that his theory only applies to 'open access' commons and, therefore, the tragedy is confined to the unmanaged commons. But Lane and Moorehead (1995) criticise that pastoral commons are not included in the three categories of commons Hardin describes - 'privatism', 'commonism' and 'socialism'; secondly, while talking of 'open access' systems, he does not refer to the property systems.

Regarding management of commons' resources, much water has flown since Hzardin's observation. There are several theories; among these, the theory of property rights, assurance problem theory and theory of environmental entitlements are quite important. Since these theories' perceptions, presumptions and conclusions differ from those of the 'tragedy of commons' in fundamental ways, it becomes imperative to briefly mention about these theories.

1. Theory of Property Rights

Demsetz (1967) and Behenke (1991) relate individual rights to land and mechanisms to use such rights to the levels of resource productivity, effects of population pressure and application of rural technologies. Due to population pressure, land use is intensified - a shift from 'opportunistic grazing' (where pastures are exploited in periods of maximum production and then left to recover) to more continuous resource utilisation. According to Demsetz, common property regimes exist in those societies where natural resources have low value and the cost to control over their use is relatively high. As a resource acquires greater value or scarcity, the prevalence of individual maximizing behaviour provides an incentive to over-exploit it and only then the institutional innovations take place to conserve it - from non-exclusive to more exclusive forms of access. According to this theory, shifts to private property right only occur where the transaction costs or costs of 'policing', to use Demsetz's term, are exceeded by the benefits accruing from the control of a resource. He cites an example of persistence of Native American communal hunting grounds on North American Great Plains due to the fact that the costs of containing roaming herds of bison were too high; the enclosure of the plains by cattlemen occurred when relatively low-cost barbed wire became freely available. Thus, main tenets of this theory are as follows (Lane and Moorehead, 1995).

(a) as resources become increasingly scarce, they will become progressively more controlled;
(b) increased population pressure will convert opportunistic grazing strategies to continuous use;
(c) cost of policing resources become less than benefits;
(d) herders can develop management institutions of their own.

According to this theory, common property regimes only work where resources are not scarce and it does not matter than utility-maximizing persons act as 'free-riders'. Thus this

theory partly accepts the 'tragedy of commons' thesis with the caveat of cost of 'policing' being less than benefits, due to new and cheap technology. But this theory does not explain as to why certain scarce and highly productive resources, like Swiss Alpine meadows, have been continuously existing as commons for thousands of years.

2. Theory of Assurance Problem

Refuting the basis of the tragedy of commons, Runge (1984) argues that if expectations, assurance and actions are coordinated to predict behaviour, there is less necessity for herd owners to pursue 'free-rider' strategies' - i.e. the cooperative behaviour can be encouraged for utility maximization. Runge (1984), and Bromley and Cernea (1989) point out following main tenets of this theory:

(a) where communities have low and uncertain incomes and are critically dependent on natural resources (especially rainfall), communal property systems are more efficient and cost-effective since they allow access to other areas and thus function as a hedge against environmental risk;
(b) institutions, customs and conventions coordinate decisions in a community to promote voluntary support since production decisions by individuals are based on the expected decisions of others;
(c) mobility is enhanced through reciprocity;
(d) relative poverty puts a tough budget constraint on rural communities in terms of transaction costs (of policing, registering and adjudicating titles), thus private property regime becomes too costly for a subsistence economy;
(e) the more homogenous a community, the more likely optimal outcomes are; the more heterogeneous, the more difficult cooperation becomes;
(f) over-grazing does not necessarily arise from the strict dominance of a free-rider strategy, but from the inability of interdependent individuals to coordinate and enforce actions in situations of strategic interdependence. For instance, in Africa customary institutions have been undermined by the inability of rural producers to coordinate their activities - this inability is due to unsuitable land tenure laws and pastoral policies by the donors as well as post-colonial state (Lane and Moorehead, 1995).

3. Theory of Environmental Entitlements

Leach, Mearns and Scoones (1997) have developed this theory by improving upon Amartya Sen's theory of entitlements. While Sen's theory confined to command over resources through market channels, backed by formal-legal property rights, they extend entitlement framework to the whole range of socially sanctioned as well as formal-legal institutional mechanisms for gaining resource access and control. Secondly, instead of assuming that endowments are given, they focus on how both endowments and entitlements arise; they also include institutional skills that enable people to access official decision-making structures and other public goods.

They have cited three examples from India, Ghana and South Africa. In southern Ghana, the women commonly collect the leaves of Marantaceae plants. The leaves become endowments depending on whether these lie inside the government forest or outside:

(a) off-reserve, the leaves are common property of a village, with an actor's endowment depending on village membership;
(b) if on farmland, collection rights are acquired through membership of, or negotiation with, the appropriate landholding family;
(c) on reserve land, endowment mapping depends on the forest department's permit system.

Women find lead-collection in *"groups more effective, so collection depends on membership of a regular group or on impromptu arrangements among kins and friends. There is frequently competition between groups for the best sites, as well as competition for leaves among members. When disputes arise, whether between individual women, collection groups, or with forestry officials, 'a queen mother of leaf-gatherers' - appointed by each village or neighbourhood's women gatherers - helps to mediate them"* (ibid; 22).

Similarly, they cite the case of seven hamlets in Rajasthan (India) which experienced soil

degradation and deforestation due to new market opportunities, state policies of land reforms and population growth. People grazed their livestock there under unregulated open-access system that in tun led to over-grazing and encroachment of hills for cultivation. But, later on, Nayakheda watershed project, supported by Udaipur-based NGO, Seva Mandir, has promoted soil and water conservation and a system of enclosures to regulate the use of commons through a community-level committee. This resulted into not only common environmental good but also promoted social cohesion and political action. Two facts are notable here: first, people are differentiated in terms of seven castes and tribes, residence in three villages, occupations and resource priorities but there is a dynamic interaction between them; secondly, at first; Seva Mandir, worked on adult literacy, maternal and child health care, leadership training, and 'institutional strengthening' for eight years and only thereafter attempted for natural resource management. Thus these activities were aimed at building up of capabilities - social capital.

Therefore, for proper understanding of the use of commons, Leach et al. call for *"insights into institutions influencing settlement patterns, labour organisation, fire and gazing management, tree product marketing and so on, and into the ecological legacies left by actions under each set of institutional arrangements for people's subsequent resource use and management"* (ibid; 29).

Empirical Evidence: Case Studies from the Third World

Lane and Moorehead (1995) have observed that in Africa a dogma prevailed among the policy-makers that the pastoralists would degrade the commons if left to themselves since they own animals individually but use the range as an 'open access'. Hence, there are three major processes under way in Africa affecting pastoral system: nationalization of their resources, sedentarisation of herders themselves, and privatization. Now, we need to briefly discuss these processes as they have affected commons.

(a) Nationalisation: Case of Mali:

This is the first method of the 'tragedy of commons' approach. The classic 'tragedy of commons' argument has legitimized the takeover of pastoral resources by the government in many countries of Africa. But the result is different. For instance, in Mali, pastoral resources, of inland delta of river Niger, were nationalized. Earlier under customary practice dryland flood pastures were divided into thirty territories allocated to sub-clans of Fulani pastoralists and outsiders could access only with the payment of a fee. The resource managers for each territory set the dates on which crossings into pastures took place. But nationalization brought an inflexible, untracked policy according to which animals moved on to flood pastures when they were dry - thus preventing the regeneration of pasture resource itself. This case study by Moorehead (1991) shows that the 'tragedy of commons' thesis is not tenable because after nationalization the pastoralists could not check outsiders' access to commons as they did in earlier system of commonly-owned resource.

Similarly, in the case of forests, that were managed by the villagers for generations with considerable restraint over rate and pattern of the use of forest products, nationalization in many countries failed because of two reasons: first, there were no sufficient forest employees to enforce regulations; second, they were poorly paid and hence bribe became a means to supplement their income. Consequently, *"nationalization created open-access resources where limited-access common property resources had previously existed"* (Ostrom, 1990: 23). The similar disastrous effects of nationalization of former communal forests occurred in Thailand (Feeny, 1988), Niger (Thomson, 1997), Nepal (Arnold and Campbell, 1986), and India (Gadgil and Iyer, 1989). The same also happened in case of inshore fisheries.

(B) Sedentarisation and Land Titling: Case of Tanzania:

Sedentarisation is the second method of the 'tragedy of commons' perspective of believing the incompetence of herders. Actually, many governments in Africa have often seen the herders as escaping their administration - going beyond national boundaries - or as potential threats to security or as evaders of fiscal dues. Therefore, settlement of pastoralists is pursued as

either an overt policy objective (e.g. villagization in Tanzania) or as product of administrative action (e.g. famine response in Sahel) or as the inevitable consequence of land tenure reform and the push of privatisation sponsored by the western aid donors. In Tanzania, more than 1,00000 acres of prime grazing land were acquired by the government for a parastatal wheat scheme which undermined Barabaig grazing system, adversely affected the environment and Barabaig welfare (Lane and Moorehead, 1995).

Similarly, it was believed by policy-makers in many African countries that only through more formal registered title will protect from grabbing and/or rural land-users be encouraged to investment or induce lenders to finance through credit. But in a study of some villages in Hanang district of Tanzania, Kjarby (1979) found that those Barabaig, who settled in villages in semi-arid plains, were compelled to compromise by limiting their migration to the distance their animals could travel to and from their homestead in one day. But, unfortunately, the concentration of herds within the village had negative ecological effect, encouraged a tendency towards agro-pastoralism and resulted in decrease in the levels of production (Lane and Moorehead, 1995). Thus both sedentarisation and land titling methods failed. As Place and Hazell found in household survey in Ghana, Kenya and Rwanda, with a few exceptions, *"land rights are not found to be a significant factor in determining levels of investments in land improvements, use of input access, or the productivity of land"* (1993: 10).

(C) Privatization: Case of Botswana:

The extreme policy under 'tragedy of commons' thesis is privatization. White (1992) found in Botswana that the introduction of borehole drilling technology and emergence of a rigid social order led to the monopoly of new water resources by rich land owners who have got more share of national herd and controlled best grazing areas. Lane and Mooreland observe: *"The Tribal Grazing Land Policy ranches that were set up in the late 1970's to improve the productivity of range lands, dramatically failed either to reduce numbers of livestock to a national 'carrying capacity' or improve rates of return to investment. In fact, they were actually less efficient than cattle posts in communal areas"* (1995: 126). Thus privatization method of the 'tragedy of commons' thesis also did not give expected results. That is why Ostrom correctly observes: *"Privatizing the ownership of CPRs need not have the same positive results as privatizing the ownership of an airline. Further, privatizing may not mean "dividing up" at all. Privatization can also mean assigning the exclusive right to harvest from a resource system to a single individual or firm"* (1990: 22).

Regarding privatization of commons, Lane and Moorehead's (1995) three observations are noteworthy:

(a) it neither provides equity nor efficiency for pastoralists in uncertain environments, either in terms of livelihoods or the sustainable management of resources;
(b) there is a need to shift from technical solutions to social and economic issues - from improving productivity on private ranges to improving the manner in which 'reciprocal tenure agreements can build management consensus between resource users as stakeholders in the ranges on which they depend';
(c) more attention be given to 'the physical characteristics of resources and their relationship to tenure systems, and on the relationship between tenure systems and institution building'.

(D) Case Study of Kottapalle, South India:

Robert Wade (1988), in a case study of Kottapalle village in South India, found that it had all four features of 'open-field' agricultural system in Great European Plains during Middle Ages:

(a) land of each village was unfenced;
(b) holdings of each farmer were scattered;
(c) fallow and stubble was grazed in common;
(d) an assembly of villagers regulated the cropping, grazing etc.

But whereas by-laws commonly emphasised on the regulation of the cropping, South Indian villages emphasize regulation of livestock - the institution of village field guards. Secondly, there is a system of common property rights in canal water - practice of 'first come, first served'. To quote him: *"In villages where the potential*

externalities of water and grazing are high, there has been no move to privatize these resources - this option is largely ruled out on cost ground; nor does the state lay down rules of resources use - it would in any case be too weak to enforce them. Rather, the villagers themselves have constituted an authority to impose rules of restrained access" (1988: 18). Thus the villagers have successfully created water rules, grazing rules, harvesting rules, road maintenance, well repairs etc. Wade found that, unlike Hardin's assumption that individual herder has no information about the aggregate state of the commons and its nearness to the point of collapse, *"monitoring the condition of the commons, and of cheating, is relatively easy"* (1988: 205). Secondly, Hardin did not distinguish between commons where the resource is vital for individual's survival, and those where it is not; but, as Kimber (1983) points out, Hardin's logic is more likely to operate where the resource is not vital than where it is. Wade found: *"Where survival is at stake, the rational individual will exercise restraint at some point. In our villages water and grazing are both vital"* (1988: 205). Thus the 'tragedy of commons' thesis did not work in these South Indian villages.

(E) Case Study of Somalia:

M. S. Said (1994) found in Somalia that pastoralists in management of range land successfully cooperate, particularly where groups of users have no wide income disparities or where customary contract law -'xeer'- is properly developed or where customary kin and clan structures facilitate cooperation on several issues. But on the other hand, cooperation is undermined in three situations: (a) where government claims management sovereignty over the rangeland; (b) where individual rich herders or merchants introduce different management goals; (c) where donor-aided projects undermine customary decision-making and enforcement process (Swift, 1995).

(F) Case Study of Sukhomajri, North India:

In Sukhomajri, near Chandigarh, the hills, which were earlier vegetated, suffered from increase in human and animal populations resulting into over-grazing and severe erosion - in 1970's only 15% of uplands had vegetation and erosion rate was 150-220 tons/ha - and 60% of lake and filled with sediment. The people to irrigate the agricultural fields built small earthen dams and farmers were given subsidized seeds and fertilizers; consequently, yields increased. Later on, water-users society was formed - one representative from every family. Second, a coupon system was introduced and families with no land or little land could sell their water rights or use the water to sharecrop on others' land. Third, if someone's animals were found grazing on the hills, he lost his rights to water. Thus the society maintained these dams and catchments, and was responsible for water distribution and record keeping. Consequently, the villagers replaced their goats with buffaloes that are stall-fed. Then, forest department gave the villagers, instead to private contractors, the grass-cutting right; it also granted them the right to grow *Bhabbar* grass and later machines were introduced to make ropes from the grass - this provided income to the landless poor. Thus on the one hand, villagers' livelihoods grew, on the other hand the hills became vegetated and the rate of soil erosion heavily fell. Though this project started as a conventional soil conservation project, yet it became a community project through an intensive interaction between the project staff and the villagers by adopting a learning approach, a conscious decision to put 'people's priorities first', security of rights and gains for the poor, importance of self-help, and good project staff (Conway and Barbier, 1990).

Findings

There are thus three divergent schools who propose to avoid the inevitability of the 'tragedy of commons'. First is the privatization school that justifies establishment of full private property rights over commons. As Robert Smith says: *"The only way to avoid the tragedy of commons in natural resources and wildlife is to end the common property system by creating a system of private property rights"* (1984: 467). North and Thomas (1977), Johnson (1972), Picardi and Siefert (1976) also share the same view. On the other hand, there is the state ownership school. As William Ophuls argues: *"because of the tragedy of commons, environmental problems*

cannot be solved through cooperation... and the rationale for government with major coercive powers is overwhelming..." (1973: 229). Ehrenfeld (1972), Carruthers and Stoner (1981) and others also share this view.

However, a third school, like assurance problem theory and theory of environmental entitlements, which is gaining more acceptance, emphasizes that historically in many developing countries there have been successfully functioning communal property regimes, that were neither private nor state property regimes. As Wade observes: *"That collective action is likely to be much cheaper in terms of state resources than the other two* (Runge, 1986). *Both private property regimes and state control regimes are expensive to make effective. Already over-stretched states in developing countries may not be able to provide necessary resources to make them work across myriad micro locations"* (1988: 217).

Similarly, Conway and Barbier (1990) too assert that many pastoral livestock systems have evolved highly organized controls on the use of common poverty land, with sanctions from the community against individual over-exploitation. However, they admit that due to the following rapid changes common property resources may be transformed into 'open-access' resources where communal management institutions no longer apply:

(a) introduction of technological changes like trucks to transport people and animals, or government institutions like declaring grazing land as public property;
(b) increasing competition between different ethnic groups;
(c) growing stratification of income and wealth, alongside erosion of social cohesiveness and reciprocal arrangements causing conflicts;
(d) rapid population growth and the abrogation of traditional lands which confine traditional migratory patterns during dry seasons and thus increases grazing pressure.

However, there is some evidence to show that even in communal management, the smaller groups tend to have more cooperative behaviour than larger ones, especially because costs of monitoring conditional strategies increase as the size of the group increases (Snidal, 1995). But, as Ostrom (1990, 1995) shows, numbers alone may not have strong effects per se, and small size may be less important than other factors facilitating cooperation like common understanding of interests, low discount rates and low transaction costs. Actually, as Gadgil and Iyer (1989) admit, the sustainable use of common property resources is indeed possible, yet it requires following conditions:

(a) the number of parties sharing access to the resource is small;
(b) they frequently interact with each other over a long period;
(c) they share the harvests equitably;
(d) they are linked to each other by bonds of kinship or reciprocation in contexts additional to resource use.

In this context, Wade's perception is remarkable: *"as an extreme case, we would not expect to find effective rules of restrained access organized by the users themselves when there are many users, when the boundaries of the common-pool resources are unclear, when the users live in group scattered over a large area, when undiscovered rule-breaking is easy, and so on. In these circumstances a degradation of commons can confidently be expected, and privatization or state regulation may be the only options. But an actual case deviates from this extreme, the more likely is that the people, who face the problem, will be able to organize a solution"* (1988: 215).

We are of the view that, as we have seen in some case studies cited above, not only competition but also cooperation does exist in the villages of the Third World regarding commons' management. But unfortunately government neglects people's traditional knowledge systems and bureaucratises heavily by creating several intermediary layers. Hence Keohane and Ostrom (1995) make two valid points: First, it is required to 'get the institutional incentives right', as wherever government policies have ignored the local knowledge of participants or underestimated their capability to solve the collective action problems, they have done great damage. Second, extensive common knowledge and ease of information provision facilitate cooperation, while private information and barriers to communication make it much more difficult.

Agreeing with Berkes (1989) we are of the view that the 'tragedy of commons' thesis is a *cultural bias* seen from the English commons' perspective. Unlike Britain, in developing countries many common property resources are used without such tragedy. The users usually cooperate with one another rather than compete. Even the common grazing lands in Hardin's paradigm were looked after for many centuries. Hence common property resource tragedies in the Hardin sense seem not to be the rule but the exception.

Thus, as these case studies have shown, Hardin's 'tragedy of commons' thesis does not work in most of the real situations of common property systems in the Third World, and wherever an attempt has been made to change it to privatization or nationalisation, it has generally failed. In many developing countries, commons have not been an 'open access' system of free-for-all, rather well-developed institutions and mechanisms regarding their use and control as well as care and maintenance have been in existence for quite long time.

KEY WORDS Commons. Environment and Population.

ABSTRACT Here we will first define what the concept of 'tragedy of commons' is. Secondly, we will discuss about various manifest and latent assumptions of the tragedy of commons thesis, especially its text and context. Thirdly, we will critically analyse these assumptions in the light of various theoretical perspectives and issues put forward by the various social scientists: viz. the theory of property rights, theory of assurance problem and theory of environment entitlements. Fourthly, we will test this thesis against the empirical evidence through various case studies from different parts of the third world. Finally, we will suggest some conclusive findings on the theoretical and empirical lines.

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