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CAPTURING THE COMMONS: AN INTRODUCTION

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Bonnie J. McCay and James M. Acheson

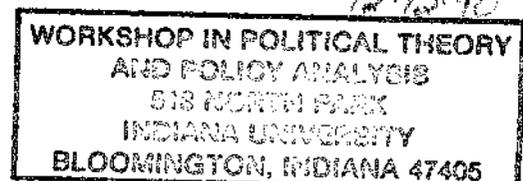
The Tragedy of the Commons

The problem is clearly rooted in the nature of property rights

-(Moloney and Pearse 1979: 860)

The "tragedy of the commons" paradigm is a behavioral and ecological theory rooted in classical microeconomics about human response to resource decline. According to the theory of common property resources, all resources held in common or in the public domain, such as water, oceans, air, rivers, and public grazing land, are inexorably doomed to overexploitation. So-called "common property resources" are owned by no one and thus are not protected by anyone. Why should those who use such resources conserve or protect them? The fish, wildlife, grasses, waters that are not exploited today will only be taken by someone else tomorrow. It is not just that they may be wasted by an uncaring public. Rather, common property users are said to be locked into a competitive system in which it is only rational that they get as much of the resource for themselves as quickly as they can. Escalating abuse ceases only when the resource is stripped bare or befouled beyond value.

The common property dilemma is an instance of contradiction between rational "micromotives" and irrational "macrobehavior" (Schelling 1976). Common property leads to market failures. Adam Smith's "invisible hand" does not work to result in economic efficiency where there is common property. It is not just that natural resources are squandered. Labor and the capital goods used to harvest them are wasted as well. Privately-owned property, by way of contrast, is ostensibly protected by the owner who stands to gain by his own conservation efforts and is subject to the efficiency-generating workings of the marketplace.



In 1968 the biologist and human ecologist Garrett Hardin vaulted the theory from textbooks, obscure 19th century tracts, and the memos of colonial officers and modern management agencies to its current position "...as the dominant framework within which social scientists portray environmental and resource issues" (Godwin and Shepard 1979: 265). With the publication of Hardin's article, "The tragedy of the commons," the idea took on a catchier, more doom-laden metaphor and a larger audience (see Baden and Hardin 1977 for an influential and representative collection of essays on the topic).

The oft-repeated parable used by Hardin to explain the theory is that of a herdsman utilizing a pasture in common with other herdsmen. Even though there are signs that the condition of the pasture will worsen with additional stocking, it is only rational for each herdsman to add more animals to his herd because he gains the full benefits of each additional animal while the costs of overgrazing ("externalities") are dispersed among all the herdsmen: The positive utility to the individual herdsman of adding an extra animal is +1; the negative utility is but a fraction of -1. When resources are limited, the rational decisions of each individual add up to an irrational dilemma for the group; freedom becomes tragic:

...the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another...but this is the conclusion reached by each and every rational herdsman sharing a commons. Therein lies 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 the freedom of the commons. Freedom in a commons brings ruin for all [Hardin 1968: 1244].

Of course there are limits. There is a point at which the individual's marginal gain from adding one more animal to his herd is no longer greater than the marginal costs. However, this point is far beyond that of 'maximum sustained yield' or sustainable productivity of the system; moreover, as resource economists have

pointed out, it is often even farther beyond the point of maximum profitability (see Townsend and Wilson this volume). So, the ruin is both environmental and economic; it is in no one's interest; it is nonetheless inevitable unless something is done to intervene in the workings of the commons or to transform common property into private property.

Hardin was primarily interested in population problems, as was the source of his parable of the herdsman and the commons and the basic idea of the problem of common property, William Lloyd (1977 [1833]), an obscure early 19th century commentator working with the ideas of Malthus and others. Their message is that freedom to breed in a commons brings tragedy to all. Hardin went beyond the population question to trace problems of erosion on national lands in the west, decline of the value of national parks, air pollution, water pollution, and overexploitation of fisheries to the fact that they are all common property resources. He concludes that we cannot expect people to voluntarily restrain their use of any "commons." "Coercion" is **necessary. Ideally it would be "mutually agreed upon," but "need not be just." As Mr. E. Smith (this volume) notes in her critique of Hardin's messages, managing the commons is logically linked to hard social choices, a question of "triage."**

The ideas embodied in the metaphor of the tragedy of the commons concern human behavior in response to resource decline on the one hand and political economy on the other. The popularity of the model may be related to its ability to generate both 'liberal' and 'conservative' political solutions. The tragedy of the commons idea (and theories related to it) became a popular and influential way to articulate the argument that government must take a stronger role in dealing with world population and environmental problems. A seemingly contradictory message—that government should leave this role to individuals and the private sector—is nonetheless also carried by the metaphor and the theories that lie behind it (see DeGregori 1974). The contradiction disappears in the essence of the theory's policy prescription: **common property situations require ^{government intervention} ~~governance~~ to overcome natural tensions between**

private interests and public goods only when it is impractical to convert them into private property situations.

'The Commons' in Western Thought and Social Science

The idea that "common property" is problematic is a very old and well entrenched part of Western culture. It is a powerful explanation for human behavior and for social and environmental problems in circumstances which are very common. Aristotle recognized this 2000 years ago: ". . . that which is common to the greatest number has the least care bestowed upon it" (cited in Cass and Edney 1978: 372).

Lying behind the commons paradigm is an intellectual tradition concerning relationships among individuals, property, society, and the environment. The literature on common property resources is really an offshoot of this tradition, which can be found in the writings of Lewis Henry Morgan (1877), Sir Henry Maine (1884), the Dutch jurist Grotius (1609)—who is credited or blamed for establishing the doctrine of the "freedom of the seas." The tension between individual rationality or interests and societal welfare inherent in the commons model is that explored by Hobbes, Locke, Adam Smith, Durkheim and others, and addressed in public choice, exchange, strategic interaction, and decision theory in the social sciences (e.g. Olson 1965; Blau 1964; Homans 1961; Thibault and Kelley 1959). The problem of the relationship between the behavior of the individual (or gene) in furthering its interests and the interests of the group, population, or species is also at the core of neo-Darwinian evolutionary biology and sociobiology.

The commons dilemma raises questions about how social institutions affect the ways that people deal with their natural resources, a question that John Bennett (1984) underlined as of particular importance for cultural ecology and that is central to this collection. It also relates to questions about tensions between private interests and the public goods and hence about social order (Bates 1983). Cast in terms of how human institutions maintain allegiance to the commons and to the common good against the self-orientation of individuals, the problem of the commons leads us

to consider how institutions of the commons convert individual interest into system interest to further human biological and cultural reproduction (Fernandez this volume). It raises other questions about the nature of the state; its role in resource management and policy; and its relationships to local communities (Anderson, Pinkerton, Durrenberger and Pålsson this volume); and about the potentials and limitations of different kinds of "community" in relation to common interests and resources (Taylor, Bauer). In short, the dilemma and phenomenon of the commons involves some of the most important questions at issue in the social sciences.

The theory of the commons has played a strong role in age-old debates over the enclosure of the Old World commons (Fernandez, Godoy this volume), rationales for the imposition of new forms of land tenure in the colonized world (Peters this volume), and recent attempts to explain disasters like rapid soil erosion and deforestation and the Sahelian famine of the early 1970s (Picardi and Seifert 1977; see Franke and Chasin 1980 for a critical response). Garrett Hardin's source for the idea (Lloyd 1977 [1833]) was part of early 19th century debate on population, labor, and Poor Laws. The concept and theory behind it are general enough to have been applied even to the African slave trade (Thomas and Bean 1974), urban mugger-muggee relationships (Neher 1978), and rice harvesting institutions in Java (Sturgess and Wijaya 1983). It has been the subject of numerous experiments by psychologists (Dawes 1980). It is now fundamental to scientific resource management in fisheries, forestry, soil conservation, rangelands, and other fields and plays a quiet but strong role in social policy. In this context, it is essentially an economic theory about the role of institutions in natural resource management.

The Economics of Common Property Resources

Hardin is best known for the idea of "the tragedy of the commons." However, economists interested in fisheries and other natural resources (e.g. Gordon 1954; Scott 1955) honed the fine points of the notion that common property resources are patently in trouble because of their tendency to engender the most self-seeking and short-term interests of people using them. The models used incorporate both biological and economic variables (see Townsend and Wilson this volume). Their work is part of a larger interest in property rights in economics. The interest of economists in property rights is perhaps only to be expected. They are primarily interested in market exchanges, and exchange involves a transfer of ownership rights. One economist goes so far as to say "...economics is the study of property rights over scarce resources" (Alchain 1967: 237). He goes on to say, "The question of economics, or of how prices should be determined, is the question of how property rights should be defined and exchanged, and on what terms" (Ibid).

The most direct linkage of the economic property rights perspective to the common property question is its interest in how variations in ownership (bundles of property rights) affect decisions concerning the use of resources and how those resources are allocated (Furubotn and Pejovich 1972: 1139). The single most important conclusion of the neo-classical version of this body of theory is that (private) property results in more efficient use and conservation of resources and greater increases in wealth than do less exclusive forms of property (Johnson 1972: 259). The theory holds that this is because private property internalizes what was externalized.

In the economic literature the concept of property rights is inextricably bound up with the concept of externalities. The essence of "externality" is fairly simple (but see Cheung 1970). Owners of firms incur both costs and benefits. To produce anything the owners of a firm must pay such costs as labor, interest, insurance.

These are costs internal to the firm, and the profits that result from the firm's activities are internal benefits and are the owner's reward. He is not only aware of the costs but must take them into account in making decisions. Firms produce external benefits and costs as well. The owner of a bee hive generates external benefits for the owner of a nearby apple orchard, whose trees are pollinated by the bee-hive owner's bees. A firm that pollutes rivers and the air is also creating externalities, passing off some of its costs of production onto downstream municipalities and the larger society. By definition, firms cannot capture external benefits they produce nor must they pay for the external costs that result from their operations. Such benefits and costs are those of people or units external to the firm. Common property increases the extent to which both costs and benefits are externalities.

Among numerous alleged advantages of private property over common property is that private property reduces "transaction costs" or the expense a person has to incur to make an exchange with another. If property rights are established and clear cut, there is little difficulty in finding out who can lay claim to the income produced by a property and who must be compensated if that resource or asset is damaged. Property rights make it relatively easy to enter into contracts. This in turn makes it possible to remove many externalities through private exchanges. If the Penobscot River is polluted, private property rights make it possible to locate all owners of the lands on the river, including the polluter, at relatively low cost. The polluter can then buy up the property of people who are damaged or compensate them for their loss and use the river as an open sewer. Conversely, the land owners can get together to buy out the polluter. In either case, private ownership allows exchanges to be made at low transaction costs. Common property often makes such exchange prohibitively costly.

In addition, private ownership means that resources are used more efficiently because the owner can be counted on to seize on those options which will grant him

greatest wealth and reject less productive uses. The owner of land, for example, can contract to lease it, rent it, give it to sharecroppers or use it himself for a variety of purposes. Efficiency comes from the freedom to enter into contracts of various sorts in which the market is free to operate.

The efficiency of private property also stems from the fact that the owner of a resource must pay all of the costs of using that resource. He must pay the so-called "rent" on the land or resources he uses and take this into account in his decision-making calculus. If he squanders the resources he owns, he is degrading his own assets and is the one who will experience the repercussions.

Furthermore, private property is said to result in the best use of resources for society as a whole: there is no problem in the relationships between the individual and society. The owner is paying all of the costs and gets all of the benefits. He thus has no incentive to waste the property. The broadest claim is that private property results in a convergence of individual ends and social ends to the benefit of both:

Each individual's wealth is made to depend solely upon the net value created by the resources under his control. The greater the net value created, the greater in pari passu is his wealth. When benefits and costs are thus internalized, the social cost and social value of an activity will equal the private cost and private value respectively [Johnson 1972: 265].

In summary, privatization internalizes costs and benefits that were "externalities" and thereby increases individual responsibility for the environment and rational use of its resources. One particularly elegant and forceful use of this argument is Libecap's analysis (1981) of the problems of the Western rangelands of the United States, which are owned by the federal government but used intensively by private ranchers in a system of grazing permits. The grazing permit system, he claims, promotes inefficiency and little interest in rangeland management largely because of insecurity of tenure (see also Johnson and Libecap 1980 who develop a similar argument for overstocking on Southwestern American Indian reservations). As

part of his argument for alienation of the federal range lands to private holdings of ranchers, Libecap summarizes the advantages of private property:

Private property rights are essential for long-term decision making regarding investment in improvements, stocking practices, and land allocation. Those profit-maximizing decisions of ranchers also maximize the net social value of rangeland and its contribution to production. There appear to be no significant external effects from private range use and, hence, ranchers (unlike bureaucrats) incur the full social costs and benefits from their efforts [Libecap 1981: 101].

If private property confers benefits, "common property" is said to confer nothing but problems. At root the problem is one of externalities. Users of publicly owned resources pass off some or all of the costs of their economic activities on other groups or on society as a whole. The users of the resources gain; someone else picks up the downstream effects of the activity. The literature on the problem is enormous, even within fisheries (see Towns end and Wilson this volume).

Since common property is, by one definition (see below) not owned, no one can make contracts regarding its assets. Anyone trying to rent, lease, or engage in any exchange regarding such resources would incur very high transaction costs. How do you make a bargain to use water or air? Some users of common property resources have expropriated them, but this entails risks. Manufacturers who have expropriated the air and polluted it are, increasingly, subject to fines and other costs. ~~and~~ ^{They} reduce their transaction costs by financing lobbyists in Washington, D.C. rather than deal directly with all of the people affected by their externalities but this too is expensive. Conflicts and decisions concerning alternative uses of common property resources cannot quickly be resolved through the market, i.e. by buying and selling property rights.

Perhaps most important, users of common property resources do not pay for them. The "rents" are not being collected. This, in combination with the difficulty of entering into contracts, is said to result in great inefficiency since "commoners"

have no incentive to use the "free" resources at maximum efficiency.

Overcapitalization is the rule in industries exploiting common property resources. Entry into an industry will occur as long as there are "profits" to be made; and where common property is concerned abnormally high profits are the rule because the full costs of production are not paid. Timber companies using unowned forests in the Amazon Basin do not pay the costs of growing the trees; fishermen do not pay the costs of growing the fish. Consequently, there are typically far more firms and capital equipment employed in the exploitation of common property resources than are needed to harvest them efficiently. In the Maine lobster industry, for example, it has been estimated that the entire annual catch could be harvested by 1000 well equipped boats (Hugh and Hasey 1973); yet there are approximately 2500 boats employed full-time and another 6,000 on a part-time basis involved. These overcapitalized industries are capable of harvesting resources at a very rapid rate. Given the competition among them, they usually do just that--in the open access, commercial system we are describing.

Finally, open-access market-oriented common property systems are characterized by an otherwise anomalous supply curve: the "backward bending supply curve." As the resource becomes scarcer its selling price often rises sharply, along with profits. Thus, as a resource dwindles firms are stimulated to enter, rather than leave, the industry and to redouble their exploitative efforts. What is unusual is that as the price climbs, the quantity produced declines. Usually the relationship between price and quantity produced is exactly the opposite, since, in privately owned industries, a rise in price will stimulate a firm to produce more of the good.

In conclusion, common property is less efficient than private property in terms of mal-distribution, overcapitalization, and high transaction costs. Common property also results in escalating abuse of resources. According to the property rights theorists, the solution to resource problems is simple: establish more exclusive

property rights. In fisheries virtually all of the policy options proposed involve either giving some degree of exclusive rights over resources or stimulating the capture of "rents" from them through such strategies as taxation, licensing, quotas, rental, stock certificates, etc. The users are thereby forced to pay the costs of using the resources, leading to lower exploitation rates and higher efficiency.

Privatization thus lets the market do the job of regulation. Technically, the biggest problem with "common property" is that with it the market fails to do its job; privatization restores the working of the "invisible hand" of the marketplace.

Critical Perspectives on the Economic Model of the Commons

The essays written for this book contribute to the understanding of conservation, common property "resource regimes" (Young 1982) and common property dynamics. They also contribute to a relatively new but vigorous critical perspective on the micro-economic paradigm of common property and its assumptions (e.g. Ciriacy-Wantrup and Bishop 1975; Bromley 1982). The debate, which heretofore was mostly in economics and political science, bears more than a superficial resemblance to the "formalist-substantivist" controversy within economic anthropology.

"Substantivists" in anthropology (see Gudeman 1978: 349-350) as well as some Marxist anthropologists would object to use of the property rights paradigm, as well as its congener, public choice theory, to account for non-Western, non-market, and non-"economic" situations (Bates 1983: 140). Fine, but most of the world today has lost those negative prefixes and the rest are arguably irrelevant to the immense environmental problems we face. However, within economics there is also concern about what anthropologists have called the "formal" approach and what economists sometimes call "neo-classical economics." Virtually every criticism that has been thrown at neo-classical economics (see Madden 1984) has also struck at property rights theory, as is appropriate given the grounding of the latter in the former.

Institutional Economics and Critiques of the Commons Paradigm

Private rights
in fisheries
Market for
the price

The economists most vociferous in their criticisms of the application of property rights theory to natural resource management and social policy are known as institutional economists (for early and influential works and overviews see Veblen 1919, Myrdal 1978, Klein 1978, Madden 1984). They would agree with the position of many anthropologists, that economics and decision-making are embedded in social structure and cultural values. The "institutions" of interest are "collective conventions and rules that establish acceptable standards of individual and group behavior," particularly those of property rights or "entitlements" (Calabresi and Melamed 1971; Bromley 1978; cf. Sen 198) involving rights, duties, privileges, and exposures. These together with the productive base of society are part of the infrastructure, and are legitimized and transformed in part through the superstructure, of society (Bromley 1982: 839, following Harris 1979). The agenda in institutional economics is that of the collective choice approach to political economy: "...the examination of ways in which preferences of individuals aggregate into choices for society in different institutional environments" (Ibid: 136). The key term and the one that connects critics of the "commons" paradigm, public or collective choice theorists, and Marxist anthropologists is "different institutional environments."

One criticism this school of economists levels at neo-classical economics in general and property rights theory in particular concerns the dangers of methodological (and normative) individualism (see Peters, McCay this volume). They also are concerned about the purported "value-free" nature of neo-classical economics and the very question of what determines value. What, for example, does the herdsman take into account when he is deciding whether to put more animals on the common pasture? In the classical model, his only criterion is cost. "Exclusion of other criteria (ecological impact, equity considerations, etc.) is a de facto value presumption that these non-market criteria are irrelevant" (Madden 1984: 9). In addition, in neo-

classical models the "cost" is expressed in terms of market prices which are assumed to be otherwise value-free. We are led to ask, "where do these prices come from, and what social sanction do they possess to play such a critical role in the economic organization of a society" (Bromley 1982: 834). The answer is that they come from the interplay of (1) demand, which is determined by the tastes and wealth of people; supply, determined by technical and environmental conditions; and especially (2) property rights (Ibid).

Property rights or entitlements "...bestow control over all inputs, goods, and services. That is, property rights establish the ability to withhold valuable items from the market--at least until the price is acceptable" (Ibid: 835). One implication of this perspective is that the workings of a market, and hence the use of the market to assess what is efficient, good, bad, wasteful, are dependent on social institutions and the distribution of rights, privileges, and wealth within them rather than vice versa. Techniques of economic analysis, especially the "Pareto optimum", are used to compare one policy against another (including one form of property rights against another). Their outcomes are avowedly independent of questions of equity and distribution. However, because the values involved are determined by a market, which is in turn contingent on property rights and other social institutions, the use of the Pareto optimum "...gives preference to the existing institutions, distribution of property rights, and income" (Madden 1984: 15). Thus, while many economists claim that income distribution is something for politicians and sociologists or philosophers to worry about (~~see Crutchfield 1979: 746~~), they have implicitly favored the current one in their analyses.

~~While~~ ^{Yet} The above discussion may seem far afield of the topic of common property and resource management, ^{yet} any social scientist who has participated in or done research on the management policy process will recognize its importance. Efficiency (with or without explicit use of the Pareto optimum) is the criterion for policy

choice used by economists, who nonetheless are frustrated by competing criteria used by biologists, industry members, bureaucrats, and politicians involved in the process (see Durrenberger and Pålsson this volume). In arguing for policies that favor efficiency, e.g. "limited entry" or privatization of rights to erstwhile common property resources, economists meet objections concerning the "distribution costs" of these policies, i.e. the social effects of reduced participation and reallocation and concentration of income (Bromley and Bishop 1977). One of the ways they counter this is to claim that whether a policy that, for example, "will surely funnel licenses into the hands of better qualified, more professional entrepreneurs whose major occupation is fishing....is good, bad, or indifferent involves social and philosophical questions that are not at issue here" (Crutchfield 1979: 746). Institutional economists--like anthropologists involved in the policy process--often disagree by arguing that even in economics the question is at issue, as it more surely is in the politics of common property resource management that often results in a defeat of the economists' proposals.

Efficiency is an important social question, and we return to the central one: whether resource-use systems that involve private property or other more exclusive bundles of property rights are more efficient than those that involve one or another bundle that includes common property rights. The position taken by some institutional economists is that this question cannot be answered, that one cannot choose among different property rights regimes using the criterion of economic efficiency (or Pareto optimum). The reason is that property rights determine what is efficient. They do this by their effects on prices, e.g. via the distributions of rights and abilities to withhold goods from the market. They define markets in that they determine "what is a cost and who must pay to achieve certain outcomes" (Bromley 1982: 836).

Consider two legal (institutional) structures, one in which a farmer may spray

pesticides with no fear of having to compensate neighboring apiarists, and one in which the apiarist can claim compensation for the damage spraying does to his bees. According to Pareto logic, continued spraying would be the efficient outcome in the first case and no spraying would be efficient in the second. "[E]fficiency is thus seen to be a fickle master..." (Ibid). It is contingent on the nature of property rights and thus cannot really be used to compare two bundles of rights:

The institutional structure—of which property rights are prominent in natural resource policy—determines which costs will be reckoned by which decision makers, and hence, property arrangements over natural resources determine which outcomes appear to be efficient [Bromley 1982: 836].

Accordingly, one cannot (or rather, one should not, for the debate is very much one about the proper nature of society) use the test of efficiency to compare one property rights institutional arrangement over another. Moreover, it is faulty to presume that property rights will automatically change or evolve when the costs of "externalities" generated by activities under one property rights regime reach the point at which the potential gains from making the change are high enough to outweigh the "transaction costs" of social action to change things (e.g. Demsetz 1967 and others on the evolution of property rights in prehistory and history; see also Dyson-Hudson and Smith [1978] who use a similar logic, from biology, to account for the presence or absence of territoriality). This presumption, at the core of neo-classical property rights theory, leads to the unacceptable conclusion that what exists is economically optimal, otherwise it would change (Bromley 1978: 45).

What exists may or may not be socially optimal, the result of communal and political decisions about social and hence ecological welfare. A logically prior question to that concerning the most efficient property rights or allocation scheme is that of "collective choice over the desired scope of bargained exchange in society" (Bromley 1982: 842). In other words, people have collectively determined, or been forced to accept definitions of, what things will and will not be "commodi-

ties" subject to "bargained exchange" and hence tests of efficiency and allocation through the marketplace:

I remind you that not all things which are scarce and valuable are bought and sold. And, of course, what is to be bought and sold changes through time; people were commoditized long before land, though in recent times humans have become less alienable, while land as a commodity is now quite well accepted [Bromley 1982: 842]

Commoditization has played important roles in the genesis of tragedies of the commons (see-below). Bromley's point is related but other, and leads us to consideration of the social meaning of common property resources and "the commons." The meaning and value of common property tenure and rights--or of any other institution of property--play a strong role in influencing individual decision-making and economics, ~~but~~ **They are derived** from social and political choices about the nature and distribution of property rights and about which things created by nature and by man are alienable (i.e. private) and which things are inalienable (i.e. common).

How We Try to Capture the Commons

Fortunately there are signs of resolution, attempts to reconcile the use of a formal model rooted in classical microeconomics with the embeddedness of decision-making and economizing in society, culture, and history (Peters this volume; Bates 1983). It is at this point in the intellectual history of our subject that this collection surfaces: aware of the explanatory power of the paradigm but concerned to specify its embeddedness in and the inapplicability of many of its assumptions to the real and diverse world.

The economic and bio-economic models on which the thesis of the "tragedy of the commons" is based are of necessity loaded with simplifying assumptions. One task for an anthropology of natural resource management and "the commons" is to see what happens when assumptions are modified to more closely reflect "the real world," situated in time, place, history, and culture. Another is to examine the premises and explicit and implicit assumptions of the models as manifestations of the culture of those who developed them and believe in them. A third is to examine the implications of policy actions based on the models for the socio-economics, culture, and behavior of human communities.

Most authors in the book have something to say about the assumptions or implications of the thesis of the commons, and the overviews of Smith, McCay, and Townsend and Wilson in the first section of the book review them and their implications in some detail. In this part of the introduction to the book we will note only a few of them as they relate to the themes of the book.

One questionable assumption is that problems of environmental decay and economic loss can be reduced to the nature of property rights. The model assumes that that if there are such tragedies, they are due to common property. It is arguable that the common-property status of resources is neither necessary nor sufficient to explain cases of resource depletion and economic impoverishment (see Emmerson 1980;

Clark 1973; Chasin and Franke 1980) and that (2) resource conservation is not ensured by the private-property status of resources. Gilles and Jamtgaard (1982) review literature on conditions in which private ownership of rangelands may facilitate overgrazing (cf. Bennett 1979). Carrier in this volume provides an ethnographic account of why this might be so in a Papua New Guinea fishing community. The recent development of "sodbusting" legislation at federal and local levels in the U.S. (Ebenreck 1984) is but another ^{recurrence} ~~response~~ among many ^{of} ~~to~~ the fact that private landholders are not always more socially and ecologically responsible than are common property users of natural resources. Moreover, as Townsend and Wilson show (this volume) there can be non-property solutions to resource management problems that work better in attaining conservation objectives than do "property-mimicking" solutions; in fisheries in the U.S. market forces and switching among fisheries may help to conserve heavily exploited ~~stocks~~ ^{fisheries}.

Credit and blame tend to be misplaced, located in tenure systems and the behavior of certain commoners or private owners, when successes and tragedies may in fact be linked to other factors, processes, and actors (Wisner, Pinkerton, Peters, Anderson this volume; see Clark 1973 and Emmerson 1980 for ^{3.1} important and very different discussions of these points). Depletion of valuable resources, such as inshore fish stocks, may be blamed on local fishermen but due to the polluting activities of others and the limitations of governments' abilities to deal with that commons problem ^(cf.) Anderson this volume; see Valliant 1985 on the "tragedy of the Chesapeake Bay commons").

System boundaries may be erroneously drawn. In his ecological history of the colonial encounter among Indians, settlers, and natural resources in New England, Cronon (1983) made many points paralleling arguments in this book, among which is that the colonists' "mere exclusive sense of property and their involvement in a capitalist economy" (p.viii) contributed mightily to the transformation of the land-

scape by themselves and the Indians. The anthropological custom of drawing boundaries according to the area within which people conduct their subsistence activities, including their conception of their territory, is inadequate because the development of a world capitalist system had brought more and more people into trade and market relations which lie well beyond these local ecosystem boundaries. The "erasure" of local boundaries may be the most important issue (Ibid: 14).

For example, -in their study of development problems and ecological change in the Sahel, Franke and Chasin suggest that the 1968-1974 Sahelian drought and famine, analyzed by Picardi and Seifert (1977) and others as a classic tragedy of the commons, "could be more accurately titled the "tragedy of unbridled personal accumulation":"

It was not simply herders and their lust for greater numbers of animals, but the pressures of the profit system that led to the overgrazing and well construction that so ravished the pastures of the Sahel [Franke and Chasin 1980: 122].

When natural resources become "commodities" whose value is determined by markets with little sensitivity to local man/environment systems; when, as is common in many frontier and colonizing situations (Margolis 1977), labor and capital are scarce relative to "land" and the endowments of nature itself are seen as capital (Cronon 1983; Worster 1979: 6), the important change is from resources that were "objects of use for which the need was slight..." to "commodity of exchange for which the need was great" (Cronon 1983: 105, in reference to the plight of the beaver in colonial New England). Stocks, Carrier, and Berkes in this volume ~~most explicitly~~ address this theme in their concern for the fragility of the management systems they depict in the context of increased commercialization. Vondal's paper on multiple uses and conflicts of the village swamplands of southeastern Kalimantan, Borneo, focuses on the effects of increased commercialization and economic development in triggering an incipient tragedy of the swampland commons. Wisner's analysis of the environmental and economic problems of Lesotho, a tiny kingdom ensconced ^{within} next to South Africa,

addresses this topic in another way, looking at the effects of migratory labor-- another form of commoditization--and South African economic policies on the ability of the people of Lesotho to manage their relationships with their natural environment. Land tenure reform seems beside the point in Lesotho.

Another questionable assumption of the tragedy of the commons thesis is that the people using and reliant upon common property resources are incapable of doing what they must to protect these resources. It is assumed that "commoners" are individualistic, competitive, and predatory; that they are "independent individuals" (Runge 1981, see Peters this volume); and hence cannot agree amongst themselves about corrective measures. It is, however, evident that there are "common property institutions" with greater and lesser efficacy in achieving social goals and that there may be, under a wide range of historical, cultural, and economic conditions, strong sentiments and public goods associated with "the commons" as with "enclosure" (Ciriacy-Wantrup and Bishop 1975).

The studies by Pinkerton (British Columbia), Anderson (Malaysia), and Taylor (Ireland) depict cases where management has in fact been taken over by the government. But under other conditions, groups in local communities have been able to erect institutions to conserve and manage natural resources. Vondal shows the workings of highly informal and customary rules about the use of common swamplands and their relationships with dry-lands according to the seasons. Taylor describes the salmon fishing rotational system of Irish fishermen as a communal management institution. In neither of these cases is management in the sense of resource conservation evident, but in others it may be. Brightman, Berkes, Hames, and Stocks discuss various wild animal and fish management tactics and issues among Indians of the Canadian North and the Amazon.

As Hames points out, there has been remarkably little empirical evidence brought to bear on claims that human behaviors and customs promote resource conservation. Several articles in this volume, especially those of Hames, Berkes, and Acheson, seek

to redress the problem. For example, Acheson's quantitative analysis shows that communal "ownership" of lobster fishing territories in Maine results in a larger breeding stock as well as larger catches and incomes for fishermen. Greater recognition and understanding of "indigenous" and informal local community management systems may lead to improvements in government's attempts to manage the commons as well, by building on those that seem to work and by respecting and seeking to preserve their integrity instead of destroying it (Berkes), as is possible even by imposing management regulations inspired by the tragedy of the commons paradigm.

Once it is accepted that local communities can and sometimes do devise ways to manage their relationships with common property resources—including restricting property rights through territoriality and other means--the question is what the conditions are that account for this. Given the problems of overexploitation and depletion of natural resources facing many societies, the question assumes particular urgency.

Ideas proposed by Jochim (1981), Nelson (1982), Dyson-Hudson and Smith (1979), Gilles and Jamtgaard (1982) and others suggest some formal ecological conditions for what Hames (this volume) calls a "theory of conservation." First, there of course needs to be some perception that action is needed to protect a resource, and this is a function of its apparent scarcity. ~~It~~^{is the} also implies ability to monitor the condition of the resource, which in turn may be a function of the population dynamics and behavior of the resource, whether it is localized or migratory, whether its location and fluctuations in its abundance are predictable or unpredictable, the relative simplicity or complexity of the local ecosystem, etc. It seems logical to presume that there must ~~also~~ be apparent feedback or positive reinforcement from management efforts, which can reflect resource characteristics too. There has been relatively little development of these ideas so far, but this is a promising area for inquiry, and Berkes and Hames (this volume) contribute to it.

It is self-evident that none of the above is relevant in the abstract without looking at the characteristics of the human groups involved. As Hames (this volume) points out, some degree of territoriality or ability to exclude others from the benefits of conservation (as predicted by the economic theory of property rights) as well as to keep away those not subject to a community's sanctions is required. Dyson-Hudson and Smith (1979) addressed themselves to the question of the ecological determinants of territoriality, focusing in particular on resource density and predictability. Group boundary dynamics, including permeability and defendability, are significant variables (Edney 1981: 28), as shown in Acheson's study (this volume) of lobster territories in Maine.

Stimulated by Acheson's original study (1975) the psychologists Cass and Edney (1978) found that by manipulating resource visibility and territorial division of resources, an experimental "commons dilemma" game turned out to have much more variable outcomes than predicted by the economic theory and the prisoners' dilemma theory of the commons. Psychologists have also found that dimensions of the social organization and size of the group made a difference: smaller size groups in which communication among members is widespread, and each member has a good chance of knowing what others are doing or thinking increased the sense of group identity, decreased the likelihood of "free-rider" behavior (a disincentive to conservation), and reduced alienation (Edney 1981: 27-28). These variables relate of course to the critical question of whether a person's or group's rules can be enforced, whether sanctions and authority are effective, and how visible cheating is (see Hames this volume).

Also required is some way of thinking about and understanding the resource that includes appreciation of the role of human behavior in affecting it. As Carrier and Brightman show in this volume, cultural variation in what we will call "ethnoecology" must be appreciated if we are to be accurate in our analyses of tenure and management systems in the past and present, and their potential for the future. Finally, the

social organization and structure of the community, particular the locus of authority and contractual relationships (i.e. whether inside or outside the local community or its common-property activities) may be a significant variable in how it deals with common-property resources---and "calls to the commons" (Taylor, Fernandez this volume). This last is a topic that has been barely scratched yet is perhaps most critical in understanding the genesis and workings of common-property institutions.

Asking about the conditions under which transformations in property rights takes place leads to a more general question about ways in which individual decisions and strategies relate to institutional changes. Barth (1966) and Bennett (1976) are among the anthropologists who have dealt with this topic in a manner similar to the approach taken by property rights and public choice theorists. They all stress that **norms and institutions change when ^{this} changes allow ^s the people ^{to} ~~involve~~ achieve better outcomes than they otherwise would.** But the possibility that norms and institutions reduce costs, add predictability to relationships, and produce favorable outcomes does not automatically mean that any group which can benefit from new institutions will automatically evolve them. This point has been made most forcefully by Mancur Olson (1965), who in so doing takes us squarely back to the commons dilemma: the rationality of individual actions does not necessarily lead to aggregate rationality in "common pool" or "public good" situations.

Property rights economists argue that people will work together to change institutional arrangements when the benefits exceed the transaction costs involved in establishing a new regime. They suggest that if private property is more efficient, it will replace common property in time. This argument was developed by Demsetz (1967) utilizing anthropological materials on the behavior of "primitive" groups in relation to their environments and used by Anderson and Hill (1977) to account for changing institutional arrangements concerning land, water, and cattle in the American West. Papers in this volume do not explicitly utilize such a cost-benefit

framework for analyzing changes in institutional arrangements, but it seems evident that some economizing and questions of social "transaction costs" are involved, as for example in changing management practices and customs in the subarctic (Brightman, Berkes), the "intentional conservation" form of resource management in the Amazon (Stocks), the switch back and forth between communal and exclusive property in Ethiopian villages (Bauer), breakdown in the boundaries of fishing territories in Maine (Acheson), and the ability of local communities to organize to force changes in government management measures (Pinkerton). The ecological approaches discussed above would also seem to apply, but this is not surprising, since the economic and ecological styles of analysis both emphasize aggregate behavior as emergent from the strategic decision-making of individuals.

The tragedy of the commons thesis offers two solutions to commons problems, converting common property to private property and government intervention because of failure of markets to work. The former is presented as if it is the only rational course of action. The latter is a second-best alternative (how, for example, do you create property rights in having children, as proposed by Lloyd [1977 (1833)] ?").

From another perspective, government intervention is preferable, ^{in order to make} making common property more common by exercising its "public trust" status to manage the resource for maximum production potential and other social goals distinct from maximal economic yield (C. J. Gatewood, personal communication 4/2/84).

In any case, "government" is presented as aloof from commons problems, looking over and when necessarily wisely regulating the commons against the woeful predilections of citizens to abuse it. One problem with this perspective is that it thus rules out the possibility that government actions cause or exacerbate tragedies of the commons, a possibility substantiated by Pinkerton and Anderson in this volume. Governmental control is implicitly foreign, onerous to people in local communities, and completely beyond their own control. The degree to which this is true is as variable as anything else social and human. A number of authors in this volume

depict situations in which "the locals" and "the government" mutually influence each other., ~~problems of the commons and local communities.~~ In Iceland, fishermen strongly influence government resource management policy (Durrenberger and Palsson); in British Columbia native salmon fishing communities were able, in a remarkable event, to cajole the government into changing its management measures in order to protect a critical and threatened salmon run (Pinkerton); in Ireland the government and Gael-Linn have their functions for the local community (Taylor). Carrier points out that the government of Papua New Guinea would like to take advantage of local customs and institutions in its resource development and management policies.

Anthropologists are often accused of being romantics who present the peoples they study, particularly those not yet perverted by "the culture of consumption," capitalism, and Western habits, as living in idyllic harmony with nature. The authors in this volume take a more analytic perspective. Orbach goes so far to suggest that "self-determination" in re resource management is a moot question in most of the world, particularly for communities well integrated into nation-states. This is generally true where governments have taken on "public trust" ownership or stewardship of public or common resources and where they, being states, monopolize police power. Management institutions like the lobster territoriality described by Acheson must be considered informal or extralegal, and vulnerable to challenge. It is particularly true where a community is almost hopelessly embedded in and dependent upon a system such as that described by Orbach, where most of the life support system of the Pribilof Islands Aleuts comes from the federal government and where relationships between Aleuts and fur seals are framed not only by federal government priorities but also by international relations and the activities of world-wide preservationist (anti-sealing) organizations.

But it is not so true that we should thus ignore the attempts of groups of individuals and organizations to influence government policy, as is so evident in Iceland (Durrenberger and Passon) to claim and realize the property right to make decisions that the government's agents are then committed to support (Pinkerton). In Canada, Alaska, and elsewhere the term "co-management" is now used to signify the importance of involvement of local communities, with their greater knowledge, experience, and levels of concern about common property resources, in the management process (see also Berkes).

These and other points about the anthropology of natural resource management and the commons are developed in the rest of the book, most often as part of an ethnographic or ethnohistorical case study. Theoretical and thematic concerns interweave between and among the papers. After the theoretical and overview papers of Smith, ^{and} McCay, ~~and Townsend and Wilson~~, we organize the papers in terms of the agrarian commons, the foraging commons, and the commercial fishing commons. The following discussion of the major themes addressed in each section of the book will also serve as a conclusion to this introduction.

The Agrarian "Commons"

The "commons" is ~~an old and contentious topic in Western thought.~~ It is often romanticized as a symbol of the "lost village community" and a more cooperative past or condemned for being an uneconomic and wasteful way to manage and allocate rights to land and its products. Similarly, in the developing countries of the Third World the notion of "communal" ownership, use, and management of farming and grazing lands, water, and other natural resources evokes images of the pre-colonial past or of obstacles to a modernized future.

The "commons" has a long history in Western societies, particularly in the form of communal systems of mixed agriculture. The most frequently cited example of how

the "tragedy of the commons" works is Hardin's instance of a village with a grazing commons, which is likely to have been a case of turning village cattle out onto field stubble. We offer three articles on communities based on or with a history of common field agricultural systems in Europe, the Andes, and Ethiopia (Godoy, Fernandez, and Bauer). They investigate ecological, economic, and cultural aspects of communally owned and managed agricultural systems. Among their contributions to the theory of common property resources and to anthropological understandings of both "the commons" and natural resource management are: (1) recognition of the dynamism of the sets of economic and social relationships known as property rights; (2) depiction of the changing complexity of bundles of property rights and resource management systems; (3) ^{emphasizing the} ~~underscoring~~ the cultural nature of property claims and of the concept of "the commons" itself.

These findings are underscored and extended in the work of ~~Wisner~~ and Peters on common property and agrarian systems in southern Africa where land tenure and water rights are critical to rural development. Their articles contribute to the objective of the volume in several ways, including (1) looking at problems and issues concerning common property resources in contemporary developing Third World nations; (2) addressing the question of the boundaries, in time and space, of relevant analysis; (3) criticizing the focus on property rights per se as opposed to the larger and dynamic system of socio-political, economic, cultural, and environmental factors that interact with property rights; (4) highlighting the politics of land tenure and common property resource management; and (5) showing that concepts such as "common property" are themselves the subject of dispute and manipulation as well as articulators of social change.

The Foraging Commons

The volume brings the theory and problem of common property resources to old and new topics in the study of the cultural and behavioral adaptations of subsistence hunters, trappers, and fishermen, including territoriality, taboos, and optimal foraging strategies. **Brightman, and Berkes discuss territoriality and other wild animal and fish management tactics and issues among the Indians of the Canadian North. Stocks and Hames depict similar phenomena and topics based on their work among South American Indian groups in the Amazon. Carrier takes us around the world to the islands of Papua New Guinea and the ethnoecology of fishing there. Unifying all of these articles is the question of what conservation is and the conditions that give rise to it, especially among people who hunt, fish, and trap primarily for subsistence rather than for markets.**

These articles contribute to the theory and problem of "the commons" by (1) examining the roles of ideology and "ethnoecology" in relation to resource exploitation and conservation in very different cultures and historical moments; (2) utilizing empirical data on behavior and resources to test hypotheses derived from theories concerning conservation as well as theories concerning efficiency or "optimal foraging;" (3) presenting findings that call into question notions of "primitive man" as innate conservationist while beginning to specify the conditions of conservation-related institutions and behavioral patterns; and (4) providing **suggestive evidence that systems based on subsistence production are strikingly** different from those based on commercial production.

The Commercial Fishing Commons

Commercial fishing provides most of the classic examples of tragedies of the commons. Articles in previous sections suggest why this is so. We include Vondal's paper in this section, even though it could as well go into the "agrarian commons" section, because it depicts a classic situation primed for a tragedy of the commons. Contrastin

(moved to agrarian section)

Acheson's updated article that shows how communal ownership of lobstering areas can result in lower exploitation rates with favorable biological effects on stocks of lobsters in Maine. These and articles by Anderson (Malaysia), Langdon (Alaska), Pinkerton (British Columbia), Durrenberger and Pállson (Iceland), ^{and} Taylor (Ireland), ~~and Orbach (Pribilof Islands)~~ support the theory of common property resources while also analyzing the successes and failures of social institutions designed to prevent resource overexploitation. In several of these articles special emphasis is placed on interactions between local-level communities and centralized governmental bodies involved in resource management.

The articles on commercial fisheries and their resource management problems contribute to the goal of the volume as shown above. In addition, they provide (1) analyses of governmental decision-making, too often glossed over in discussions of common property problems; (2) arguments for more accurate delineation of the systems relevant for study; (3) support for the position that even in large nation-states and highly commercialized production activities groups of people can and do "capture the commons" in their efforts to reduce the risks and uncertainties of depending on both common property resources and distant and often ineffective governments.

The case studies written for this volume show that although resource abuse and overexploitation ^{are} ~~is~~ widespread and serious and although the model of the tragedy of the commons is a useful abstract account of human behavior, under some conditions institutions ^{develop or} ~~exist~~ which help manage resources owned in common. Some involve territoriality or private property, as predicted by the model; others do not. Some are sustained entirely at the local level; others involve larger political units. When anthropologists have dealt with issues of resource management, they have tended to limit their focus to the small scale, local, and traditional societies that are

the usual focus of the discipline. Furthermore, their work has been innocent of the theory of common property resources. Whether or not the ^{innocence} ~~innocence~~ is construed as happy is up to the reader. In any case, the innocence is now lost.