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THE "TRAGEDY OF THE COMMONS"
AND RESOURCE MANAGEMENT IN BOTSWANA

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Introduction

The subject of this paper is the "tragedy of the commons," a thesis first popularized in its modern version in Garrett Hardin's now famous Science article of 1968.¹ Since then, it has in many ways become the dominant paradigm of resource overexploitation resulting from common ownership. As an explanation, it has formed the basis of numerous public policies devoted to "privatizing" natural resources--from current policies in the United States to many efforts to end common ownership of resources in the developing world. It is directly relevant to Botswana's experience with range management. The influence which the tragedy of the commons thesis has had on policy in Botswana can be seen directly in the 1975 Tribal Grazing Land Policy White Paper, and the Chambers and Feldman consultants' report which preceded and formed the basis for it.²

Here I would like to investigate the soundness of this thesis as a basis for policy. First, I will examine its logical properties, looking carefully at its major premises and conclusions. I will argue that it is an erroneous and inaccurate description of many problems of common resource use, which leads to a limited view of policy options and a restricted sense of the institutions capable of successfully managing natural resources. Second, I will propose what I believe to be a more empirically accurate description of overuse of

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1. Garrett Hardin, "The Tragedy of the Commons," Science, 162 (1968), pp. 1243-48.

2. Government of Botswana, "National Policy on Tribal Grazing Land," Government Paper, no. 2 of 1975 (Gaborone, Botswana: 1975); R. Chambers and D. Feldman, "Report on Rural Development" (Gaborone, Botswana: 1973).

commonly held resources. This I will call the assurance problem.³ This description redefines problems of common ownership as resulting from uncertainty over the expected actions of others. Institutions of all types, notably property institutions, respond to and reduce this uncertainty by setting the "rules of the game." These rules are not always the same, and depend on the problem, the time, and the place. In many cases, common property may successfully perform this coordination function.

Third and finally, I want to suggest some of the policy implications of looking at overgrazing in Botswana as an assurance problem. Two implications are of particular relevance. The first is the importance of promoting greater certainty in the face of institutional change by not moving too quickly to eliminate or destroy existing common property institutions. This has implications for policies of enforced land allocations through the system of Land Boards and district government set up by recent policy. A related implication is the importance of local-level institutions, whose support government needs if it hopes to succeed in programs of resource management. Traditional common property institutions are not always obstacles, and can be aids, to the development of new alternatives in resource management. Not to rely on these institutions, I submit, will lead to failed policy, at great expense to the already overburdened economy of Botswana.

The Tragedy of the Commons

What is the tragedy of the commons thesis? Its major premise is that in cases of common grazing and "public goods" generally, each individual will always have a strict incentive to "free ride" at the expense of others. In cattle grazing, to free ride is to overstock, since the costs of overstocking are borne by everyone while the benefits are reaped by the free rider alone. According to the tragedy of the commons thesis, free rider behavior will inevitably occur in the absence of enforcement, regardless of what others are expected to do. Expectations of others' behavior are, strictly speaking, irrelevant. Uncertainty over others' behavior is thus not a problem. The conclusion following from this premise is that overgrazing is inevitable. Without some sort of rule imposed from above, no one will have an incentive to do anything but overgraze. Furthermore, even if an agreement is struck to reduce stocking, no one has an incentive to keep it and it will always break down, leading to the overgrazing tragedy.

The strictly individualistic incentives underlying this argument make only one institutional prescription possible. This is private individual property. The argument makes no distinction between common property, based on the

3. The problem is developed in more detail in C.F. Runge, "Common Property Externalities: Isolation, Assurance and Resource Depletion in a Tradition 1 Grazing Context," American Journal of Agricultural Economics 63 (1981): 595-606. It was originally proposed by A.K. Sen. See "Isolation, Assurance, and the Social Rate of Discount," Quarterly Journal of Economics 81 (1967): 172-224, and "A Game Theoretic Analysis of Theories of Collectivism in Allocation," in Growth and Choice, ed. Tapas Majumdar (Oxford: 1969).

individual right to be included in a resource, and open access, in which no rights to the resource are defined.⁴ Common property, it asserts, is no one's property, and therefore no different from an open access situation in which no one has an incentive to maintain and manage resources. Only private property, based on the individual right to exclude others, can prevent over-exploitation.⁵ Since there is no middle ground allowing common property rights to be recognized as legitimate, they must be overruled. Where common property is the status quo ante, as in Botswana, new regimes of private property must therefore be imposed. Top-down enforcement of new and essentially alien property institutions is a necessary condition for effective resource management.

Yet, such top-down imposition is inconsistent with individual liberty--the supposed virtue of private property. This is a major flaw in the argument of those who maintain that the tragedy of the commons thesis is consistent with libertarianism. Ironically, the tragedy of the commons leads to policies imposed from the top-down, based on the faith that private property is best. The thesis concludes that private property rights should therefore be imposed if efficient resource management is to occur. As one scholar put it, the choice is either "Leviathan or oblivion."⁶

In summary, four main features of the tragedy of the commons thesis can be identified.

1. The thesis supposes that individual incentives are always to over-graze, no matter what is expected of others, so that uncertainty about what others are likely to do is not a problem.
2. The thesis is thus that overexploitation of common grazing lands will always result from each individual's incentive to free ride.
3. As a result, it is necessary to enforce private property rights, since without them, overgrazing will inevitably result from the incentives describes in #1 and #2.
4. Private exclusive property is the only institutional alternative, since the incentive to free ride makes mutual agreement based on any form of common property institutions impossible.

4. See S.V. Civiacy-Wantrup and R.C. Bishop, "Common Property as a Concept in Natural Resource Policy," Natural Resources Journal 15 (1975): 713-27.

5. This argument was first put forward in the resource management literature by H. Scott Gordon, "The Economic Theory of a Common Property Resource: The Fishery," Journal of Political Economy 62 (1954): 124-42.

6. William Ophuls, "Leviathan or Oblivion," in Toward a Steady State Economy, ed. Herman Daly (San Francisco: W.H. Freeman, 1973). See also Michael Taylor, Anarchy and Cooperation (New York: John Wiley and Sons, 1976).

Consider point one above. Does it seem reasonable that people decide whether or not to graze more cattle regardless of what they expect of others? As an empirical matter, it seems more reasonable that individual decisions are not so easily separated. A choice to graze more cattle is based, at least in part, on what each person expects of others in the group or community to which they belong. Hence, a central problem is uncertainty about other peoples' actions. This uncertainty results from a lack of information to which agreements or rules respond. Thus, the first premise of the tragedy seems not only unreasonable but generally false. People do not formulate their judgments independently of the expected decisions of others.⁷

Consider now the second main feature of the thesis. If we observe over-grazing, is it always due to strict incentives to free ride, or are there other reasons? In an environment of mutual interdependence, in which expectations of others' behavior count, a variety of expectations-based decisions become worth examining in more detail. For example, if each person expects others to graze as many cattle as possible, he or she may also decide to "get while the getting is good." By dropping the premise of strictly individualistic decisions, we realize just how important expectations and the problem of uncertainty really are to the farmer or grazer. If individuals were assured by rule or custom that others would not free ride, they might not either.

Thus, in terms of the third main feature of the thesis, enforcement from above may be far less important than agreements developed within a village or community through a process of mutual accommodation and consent. In this setting, enforcement may arise from the "bottom-up" in the form of reputation and other pressures resulting from informal or local rules and customs.

Finally, with respect to the argument's fourth main feature, expectations of others' actions may be made with more confidence if a rule of behavior allows these actions to be accurately predicted. This prediction can be accomplished by a wide variety of institutions which provide assurance and reduce uncertainty respecting the actions of others in different biophysical and cultural environments. Private property is only one such institution. Where natural environmental factors and human traditions and customs emphasize not only the right to exclude, but also the right to be included, institutions which emphasize such inclusionary rights may provide assurance and a form of bottom-up enforcement.⁸

In fact, it is possible to identify a rather wide continuum of common property institutions operating in the real world. These institutions are composed of a mixture of rights to exclude and be included. At one end are

7. This is equivalent to stating that common property "externalities" are not separable in costs. As William J. Baumol notes, It takes two to Tango, or Sin 'Separable Externalities' Uburhaupt Moglich," Journal of Political Economy 84 (1976): 381-87.

8. This view is discussed for Botswana in Paul Devitt, "The Management of Communal Grazing in Botswana," Pastoral Network Paper, no. 14d (Overseas Development Institute, August 1982).

cases in which each individual has a full right to exclude others from everything he or she owns--pure private property. At the other end are cases of purely communal property, in which each has a right to be included in particular resources. In reality, we seldom see property rights defined over resources which do not have some blend of these exclusionary and inclusionary characteristics. How can we generalize about such complexity?

An Alternative Approach: The Assurance Problem

The "assurance problem" is an alternative description of the problems of common property resource management. Unlike the tragedy of the commons thesis, it does not predict dominant free rider behavior and inevitable overexploitation of common lands, nor does it lead solely to prescriptions of private property imposed from above. The key differences between it and the tragedy of the commons thesis are summarized in the table below.

TABLE 1.1

Comparative Predictions of and Prescriptions for Resource Overexploitation

Tragedy of the Commons Thesis	Assurance Problem Hypothesis
1. Strict individual incentive by each to overgraze no matter what is expected of others. Uncertainty is not a problem, since "free riding" dominates all other strategies.	1. Overgrazing depends on expectations. Expected overgrazing by others may lead to overgrazing; expected conservation may lead to similar behavior. No single strategy dominates.
2. In cases of common grazing, overexploitation will always result, since each has an incentive to free ride.	2. Overexploitation results from expectations which are not coordinated by the existing "rules of the game" or in which these rules promote overgrazing, leading each to "get while the getting is good."
3. Enforcement from above is necessary. Without it, all agreements and rules will break down due to the incentive to free ride.	3. Enforcement from above is sufficient, but not always necessary. Necessary solutions involve rules and agreements which are maintained in the interest of coordination.
4. The only successful institutional prescription is private property, based on the right to exclude. No other alternative is compatible with the strict individual incentive to free ride.	4. Institutional prescriptions will vary, depending on the history, traditions, and biophysical resources of the group involved. Assurance is possible under a wide variety of institutional alternatives.

To recapitulate table 1.1, note that in the assurance problem, whether or not overgrazing occurs depends on expectations. If I expect overgrazing by others, I will be inclined to overgraze too. But if I expect resource conservation, I may also have incentives to conserve. Overgrazing or free riding is not a dominant strategy for each and every individual, and expectations formed by various types of property rules matter. Hence, in cases of common grazing, overexploitation may be traced to expectations which are not coordinated by the existing rules of the game or which are coordinated by rules which lead individuals to expect overgrazing by others, leading each to "get while the getting is good." Thus, while enforcement from above may be sufficient to prevent overexploitation, it is not necessarily the most efficient or equitable approach. What is necessary is to establish a basis for mutual accommodation and consent based on a set of rules. Even where the old rules do not provide a complete basis for natural resource management due to technical change, population growth, and other factors, there may still be elements of these rules worth preserving, including many traditional rights to be included. New rules should therefore seek to incorporate and depend on the strengths of the old. Finally, institutional prescriptions will vary depending on the history, traditions, and biophysical resources of the group involved. Assurance is possible under a wide variety of institutional arrangements.

In this approach, a variety of institutional forms, among them those which depend on rights to be included, can successfully coordinate expectations. The problem of policy is to find the appropriate institution for particular times, places, and environments. Private property, which may be highly appropriate in societies in which the right to exclude is a part of history and tradition, may not be appropriate for societies which emphasize the right to be included. In these societies, a conservative attachment to precedent indicates that common property may have an important role in natural resource management. Private property institutions may provide far less assurance, or may actually foster the notion that one should "get while the getting is good," exacerbating problems of overexploitation. The tragedy of the commons may become a tragedy of privatization if this is the case.

Conclusion: Some Observations on Policy

If the alternative hypothesis provided by the assurance problem is judged a better diagnosis of observed reality than the tragedy of the commons thesis, its prescriptions have some important implications for policy. Among them:

1. If overgrazing is primarily a problem of expectations and uncertainty, an important need exists for better information yielding greater assurance regarding land tenure decisions. Especially germane is information on the technical management of range and water quality. This information is a foundation for allocative decisions concerning which lands to zone commercial and which lands to retain in communal land tenure. Technical information must be complemented by knowledge of the existing structure of local institutions and their comparative capacity to regulate grazing behavior by consent and mutual accommodation at the village level. To attempt a pure "top-down" approach is to throw away valuable information contained in local-level rules. Therefore, reliance on technical data alone is insufficient; knowledge of traditional land

tenure systems and patterns is crucial. The best sources of this information are the people themselves, with whom consultation can provide an understanding of the institutions most compatible with technically efficient resource management.

This implies a dual role for the Land Boards in Botswana. First, they must approach issues of resource management with sufficient technical expertise to assure those affected that their information is sound. Second, they must approach allocative and distributional issues with sufficient attention to local definitions of fairness so that they gain a village-based constituency. Where technical and allocation questions are interdependent, as in the determination of the threshold of cattle required to provide draft for arable lands, both technical and institutional information is crucial.⁹

2. A second policy prescription follows from the first. Both technical and especially institutional innovations require consultation not only with local people but with guidance from existing local institutions. As Dolf Noppen has recently written, successful district planning respecting Land Board allocations should depend to a much greater degree on both the kgotla and Village Development Committee, where a large amount of valuable information is stored. A supportive constituency composed of village leaders can greatly reduce the costs of administering district-level policies at a central level. It should be noted in passing that assurance conveyed by traditional rules, while involving consultation, does not necessarily imply an equal voice for all. Assurance is possible under unequal as well as equal distributions of power, again depending on history and tradition.¹⁰

3. Finally, it is very important to recognize that local institutions in Botswana and throughout the developing world continue to rely on rights to be included implicit in common property. Such institutions are arguably central to traditional rural life, in which a low level of subsistence and carry-over from season to season makes the right to exclude less important than the assurance generated by more inclusive arrangements. Where weather and natural calamity dominate the pattern of life, the assurance that misfortune will not lead to certain death is provided by social institutions which spread risks by means of the right to be included. New solutions to problems of resource management can gain both insight and strength by carefully examining the structure of these beliefs. This will be possible, however, only if the erroneous idea that common property institutions are inherently dysfunctional is discarded.

9. See Steven W. Lawry, "Land Tenure, Land Policy, and Smallholder Livestock Development in Botswana," LTC Research Paper, no. 78 (Madison: Land Tenure Center, University of Wisconsin, March 1983).

10. Dolf Noppen, "Consultation and Non-Commitment: Planning with the People in Botswana," Research Report, no. 13 (Leiden, the Netherlands: African Studies Centre, 1982). See also Louise Fortmann, "Preliminary Draft Report on Strengthening the Role of Local Institutions in Rural Development" (Gaborone, Botswana: Applied Research Unit, Ministry of Local Government and Lands, November 1982).