ABSTRACT

RISKS, RESOURCES AND POLITICS:

A STUDY Of INSTITUTIONS AND RESOURCE USE PROM INDIA

by

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propose that four kinds of operational rules are crucial for successful institutional solutions to resource use: rules for using (resource), monitoring, sanctioning, and arbitration. The study further argues that institutions, not population or market pressures, form significant explanations of resource conservation or degradation.

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INTRODUCTION

Community owned and managed resources form the basis of subsistence for millions of Indians in ecologically fragile environments.[1] In the absence of benefits from common pastures and woodlots, poor households may well starve, lose their livestock, and be forced to eat their food raw.[2] In recent years community owned and managed resources - the source of sustenance, fodder and fuelwood for millions of Indian households - have been threatened by a constellation of adverse factors: government policies, local political rivalries, increasing pressures from a larger population, encroachment of market forces, and most important, declining local institutions. In this study, I place the influence of institutions -- defined as sets of rules that guide human behavior -- at the core **of** my analysis as I examine resource use.

A large number of studies in India have documented the reliance of poor households on common resources. **They** have also speculated about the

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[1]Detailed evidence is available in Center for Science and Environment, The State of India's Environment 1982: A Citizens' Report (New Delhi: Center for Science and Environment, 1982); idem, The State of India's Environment, 1984-85: The Second Citizen's Report (New Delhi: Center for Science and Environment, 1985).

[2]See N.S. Jodha, "Common Property Resources and Rural Poor in Dry Regions in India." Economic and Political Weekly 21 (1986): 1169-81; idem, "A Note on Contribution of CPRs to PPR-based Farming Systems in Dry Tropical Regions of India," Paper presented at Common Property Resources Workshop in Sariska, Rajasthan, India, 1987; idem, "Population Growth and Common Property Resources: Micro-Level Evidence from Selected Areas." Paper presented at Expert Consultation on Population and Agricultural Development: Institutions and Policies, FAO, Rome, June 29-July 1.

importance of institutional arrangements in resource use.[3] Nor are studies on commons restricted to the Indian context. In many developing countries in Africa, S. Asia, and Latin America, large numbers of studies document that poor households rely on community owned resources for subsistence, fodder and fuelwood.[4] For all such resources, institutional arrangements are believed to play a critical role in determining patterns of resource use.

My dissertation explores the role of institutions in influencing resource use in poor societies. It does so by examining the factors behind the emergence and

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[3]Anil Agarwal and Sunita Narain, "Towards Green Villages: A Strategy for Environmentally Sound and Participatory Rural Development (New Delhi: Center for Science and Environment, 1989); Vishwa Ballabh and Katar Singh, "Van (Forest) Panchayats in Uttar Pradesh Hills: A Critical Analysis," (Anand, Gujarat, India: Institute for Rural Management, 1988), Research Note; N. S. Jodha, "Common property resources and rural poor in dry regions in India," Economic and Political Weekly 21 (1986): 1169-81; Prakash M. Shingi, ed., Studies on Social Forestry in India: Management Perspectives (Bangkok and Ahmedabad, 1990), FAO/ IIM, RAPA Publication 1990/1.

[4]See N. O. J. Abel, M. E. S. Flint, N. D. Hunter, D. Chandler and G. Maka, "Cattle-keeping, Ecological Change and Communal Management in Ngwaketse," (Addis Ababa: International Livestock Center for Africa, and Gaberone: Ministry of Agriculture, 1987), 140; Roy Behnke, (Jr.), "Open Range Management and Propery Rights in Pastoral Africa: A Case of Spontaneous Range Enclosure in South Darfur," London: Overseas Development Institute Pastoral Development Network paper 20f, 1985) 29; David L. Browman, "Andean Pastoralism and Development in Bolivia and Peru," London: Overseas Development Institute Pastoral Development Network, Paper 23d, 1987) 28; Paul Devitt, "The Management of Communal Grazing in Botswana," (Overseas Development Institute Pastoral Development Network, Paper 14d, 1982) 31; D. Guillet, "Risk Management among Andean Peasants," in Andean Peasant Economics and Pastoralism (Colombia: University of Missouri, Department of Rural Sociology, 1980) Small Ruminants CRSP Publication 1,13-44; Lloyd Mendes, "Private and Communal Land Tenure in Morocco's Western High Atlas Mountains: Complements, Not Ideological Opposites," (London: Overseas Development Institute Pastoral Development Network, Paper 26a, 1988) 16; Y. S. Rao, Marilyn Hoskins, Napoleon T. Vergara, and Charles P. Castro, Community Forestry: Lessons from Case Studies in Asia and the Pacific Region (Bangkok and Honolulu: RAPA and EPI, 1986) 248.

creation of institutions, and the manner in which institutional rules affect human behavior. With respect to the emergence and creation of institutions, I propose - and illustrate through case studies - the importance of three factors. Considerations of efficiency, environmental risks, and local political rivalries, I argue, underlie many of the processes that lead to the formation of new institutions and their maintenance. When analyzing the relationship between resource use and institutions, I adopt a property rights framework. I show that different bundles of property rights over resources, allocated among competing groups in villages, powerfully affect how resources will be used and how benefits will be distributed.

I focus in particular on the resource management systems[5] in rural communities. More specifically, the subjects of my analysis are a group of migrant shepherds; a village in semi-arid Rajasthan; and six villages in the Middle Himalayas. In each, the institutional arrangements are geared to the utilization of natural resources that resemble collective goods.[6]

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[5] **All resource management systems are a proper subset of property rights arrangements which in turn are a proper subset of institutional arrangements. In the text, I often use the phrases "property rights systems" or "institutional arrangements" or "institutions" to refer to "local resource management systems" so as to direct attention to the theoretical literature that I am drawing upon.**

[6] **Pure public goods differ in essential aspects from the community controlled resources that I studied. Public goods are non-subtractable (their supply does not decline with use) and non-excludable, i.e. open access - no one can be excluded from using them. (See Paul Samuelson, "The Pure Theory of Public Expenditure." Review of Economics and Statistics. 36 (1954): 350-356). National defence is a common example. Toll or club goods are excludable but non-subtractable. Bridges, roads and state parks are approximate examples. Private goods are both subtractable and excludable. Most goods sold in the marketplace are examples of private goods. Gold mining during the California Gold Rush can be seen as an example of an non-excludable good whose supply declined with use.**

Subtractability of goods, in combination with non-excludability raises problems of overcrowding and collective action (See Michael Laver, The Politics of Private Desires: The Guide to the Politics of Rational Choice. New York:

Several general features characterize the forests and pastures I examine. The resources[7] lie close to the village. The fodder and fuelwood that are extracted from the local resource systems are primarily used for consumption and subsistence needs. Only rarely do the resources make their way to outside markets. Village residents struggle to exclude "outsiders"[8] from using these forest and pastures; this implies that the collective legal ownership rights which villagers exercise in forests and pastures are attenuated[9] to different degrees. In some

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Penguin, 1981). Excludability and subtractability both depend on the level of technological development and on the physical characteristics of the good itself. For example, atmospheric oxygen was a public good both because it was simply there - available to all, and its supply did not decrease for other individuals because of its use by one individual for breathing. However, with the prospect of ever higher air pollution, it may, in the future be possible that cost-effective private supplies of oxygen will be made available through technological breakthroughs. Similarly, the invention of barbed wire facilitated the conversion of open prairies into private ranges. Most real life goods do not possess the characteristics of excludability or subtractability to perfection. Community resources are in general imperfectly excludable and the supply of resources from them is subtractable. However, many community resources - forests, pastures, fish stocks, irrigation waters - are renewable resources. This means that through appropriate management of the stock of the resource, a regular flow of benefits can be ensured over time (See Ostrom, Commons).

[7]As is clear, both forests and pastures are renewable resources. The problems in managing these resources would necessarily be different in character from those involved in managing non-renewable local resources. The reason for this is simple. For renewable resources, users at the local level can contribute to the rate of regeneration of the resource and also step up the rate of using the resource at the same time without degrading the resource.

[8]Outsiders may be villagers from other villages. They may also be traders from towns looking for cheap fuelwood in village commons, migrant pastoralists who are passing through the village boundaries, or even village residents who are not authorized to extract benefits from the community resource.

[9]Attenuation of property rights refers to an inability to exercise the right to the fullest extent (See Eirik J. Furubotn and Svetozar Pejovich, eds., The Economics of Property Rights (Cambridge, Mass.: Ballinger Publishing Company, 1974) 4-6). All property rights are attenuated to some extent - especially when the

cases, the forests and pastures are "owned"[10] by the village community; in others, the villagers only have the legal rights to use the benefits (fodder and fuelwood) from the resource, and in yet others their rights are not legal, but de facto.[11] Generally, villagers invest little labor or capital in local resource systems[12] although they sometimes do contribute to the maintenance of the resource.[13]

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exercise of the right conflicts with the welfare or rights of other individuals or of the community. Thus, ownership rights over some piece of land may be attenuated through a specification that the owner cannot build a factory over that land (zoning laws are examples). Similarly rights to ownership of a music system may be attenuated if owners cannot listen to music at loud volumes in a quiet neighborhood (See Yoram Barzel, Economic Analysis of Property Rights (Cambridge: Cambridge University Press, 1989).

[10]Full ownership rights over a resource are in fact a collection of analytically discrete rights. The full set of these analytically discrete rights can be divided into five categories: the right to access a resource, to use a resource and the benefits from it, to manage the resource in accordance with principles that the owner deems fit, to exclude others from accessing, using or managing the resource, and finally the right to transfer the resource. See section II, chapter one.

[11]The disjunction between de jure rights created and enjoyed by the government, and the de facto property rights enjoyed by the villagers, often owes its existence to the high costs of enforcement of the impractical government de jure rights. For a more detailed analysis of different ownership rights over local resources see chapter six.

[12]Exceptions to this pattern are frequently observed in the case of common irrigation institutions. In some instances villagers contribute their labor and use locally available materials to create commonly owned and controlled resources. See Shui Yan Tang, "Institutions and Collective Action in Irrigation Systems" (Ph.D. Dissertation, Indiana University, 1989).

[13]The maintenance of the resource system may require either physical improvements in the resource system or mechanisms to prevent its overuse. Both can be brought about by labor contributions. To illustrate, labor contributions geared towards physical improvements could involve weeding, or removing undergrowth (in forests); or cleaning and repairing the system (in irrigation systems). Similarly, monitoring and guarding the use of resources and sanctioning rule breakers are also a form of maintaining the resource system.

Finally, since both pastures and forests are renewable resources, their continued existence is a function of the relationship between the rate of regeneration of trees and grasses and the rate of their consumption.[14]

The analysis in this work is shaped by the nature of the resources and communities it examines. Since the communities are imperfectly integrated into the market, they often employ other mechanisms that contribute towards efficient resource use. Collective ownership of resources forces attention on how communities exclude outsiders and on the systems of rules they create to restrain member users. Institutional arrangements, often taken for granted in economic analyses, thus become the explicit focus of analysis.

Research in the field of new institutionalism,[15] property rights,[16] and

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[14]A more comprehensive description of the different features of local resources that are managed by village communities is available in Christine Picht and Arun Agrawal, "Corporations and Communities," Paper presented at the Mini-Conference, Workshop in Political Theory and Analysis, Indiana University, Bloomington, Indiana, April 1989. There is a large number of case studies that provide details on the subject. Some of the better known collections and works are Robert McC. Netting, Balancing on an Alp (Cambridge: Cambridge University Press, 1981), and the collections of case studies by the National Research Council, Proceedings of the Conference on Common Property Resource Management, (Washington D.C.: National Academy Press, 1986) and Bonnie J. McCay, and J. M. Acheson, The Question of the Commons: The Culture and Ecology of Communal Resources, (Tucson: University of Arizona Press, 1987).

[15]See Robert H. Bates, "Contra Contractarianism: Some Reflections on the New Institutionalism." Politics and Society 16 (1988): 387-401; Ronald H. Coase, "The New Institutional Economics," Journal of Theoretical and Institutional Economics 140 (January 1984): 229-31; Douglas C. North, "The New Institutional Economics," Journal of Institutional and Theoretical Eocnomics. 142 (January 1986): 230-37.

[16]See Armen Alchian and Harold Demsetz "The Property Rights Paradigm," Journal of Economic History 33 (1973): 16-27.1973; Yoram Barzel, Economic Analysis of Property Rights (Cambridge: Cambridge University Press, 1989); Ronald H. Coase, The Firm, the Market and the Law (Chicago: University of Chicago Press, 1988); Louis de Alessi, "The Economics of Property Rights: A Review of the Evidence," Research in Law and Economics 2 (1980): 1-47; Harold

transactions costs[17] provides insights that I use in this work. The existing literature attempts to generalize an economic approach to the study of social institutions. Scholars pursuing research on institutions in these areas retain the basic elements of economic analysis - rational behavior, optimization under constraints[18] and study of equilibria - while relaxing others. In particular they relax assumptions pertaining to property rights and transactions costs.[19] They hold that property rights matter and that the differences in property rights across different situations are not just a function of the physical nature of the good itself; they can be of a socio-legal nature, or result from technological differences. Changes in technology, in government policies, in local politics, and in the balance of market forces will lead to changes in the manner in which goods and services are utilized. Second, and relatedly, they argue that enforcement and transfers of rights to property cannot be accomplished without incurring costs. The costs that are incurred during enforcement and transfers of rights to goods and services are termed transactions costs. Different institutional forms lead to different sets of costs and benefits for individuals and groups subject to the institutional arrangement.

Demsetz, "Towards a Theory of Property Rights," American Economic Review 62 (1967): 347-59; Douglas C. North, Institutions. Institutional Change and Economic Performance (Cambridge: Cambridge University Press, 1990).

[17]Armen Alchian and Harold Demsetz, "Production, Information Costs and Economic Organization," American Economic Review 62 (1972): 777-95; Ronald H. Coase "The Problem of Social Cost," The Journal of Law and Economics 3 (October 1960): 1-44; and Oliver E. Williamson, The Economic Institutions of Capitalism (New York: The Free Press, 1985).

[18]As pointed out in John R. Umbeck, A Theory of Property Rights: With Application to the California Gold Rush (Ames: The Iowa State University Press, 1981), satisficing can be seen as optimization under constraints.

[19]See Louis de Alessi, "Property Rights, Transactions Costs, and X-efficiency: An Essay in Economic Theory," American Economic Review 73 (January 1983): 64-81.

between resource degradation and factors like overpopulation or market pressures. The major part of the chapter, however, is devoted to an analysis of the specific institutional rules in six study villages and the manner in which rules influence resource use and allocation. I am especially concerned here with issues of equity and sustainability.

The conclusion to this study weaves together the themes I introduce in chapter one and discuss and elaborate in the empirically oriented chapters two to five. My major aim in the dissertation is to contribute to the study of institutions by pointing to forces that shape them, and by presenting a framework for understanding the effects that they produce on human behavior, especially in the context of resource use. The effect of environmental risks and politics on institutions has not been adequately explored in the literature. Similarly, there are only a few studies that systematically examine the effect of different institutional rules on resource use. By prospecting these themes this dissertation attempts to render a more comprehensive understanding of institutions.

CHAPTER 1

THE THEORETICAL FRAMEWORK: ORIGINS AND EFFECTS OF INSTITUTIONS REGULATING RESOURCE USE

Where do They Come From?

This section focuses on the factors that can be regarded as responsible for the emergence of institutions that guide resource utilization in ecologically fragile regions. I discuss three factors: the imperatives of efficiency, environmental risk, and distribution. The discussion combines a positive political economic approach[1] with a form of functionalist explanation.[2] Works belonging to the former tradition claim that origins of institutions are related to their effects. If individuals can anticipate the outcomes of certain kinds of institutions, even if only with uncertainty, then the anticipated effects of institutions may be a source of institutional change. Individuals will assess different institutional rules in terms of the benefits that the rules may provide them, and lobby to create those

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[1]James E. Alt and Kenneth A. Shepsle, eds., Perspectives on Positive Political Economy (Cambridge: Cambridge University Press, 1990): 2

[2]See Jon Elster, Explaining Technical Change: A Case Study in the Philosophy of Science (Cambridge: Cambridge University Press, 1983) and George Tsebelis, Nested Games: Rational Choice in Comparative Politics (Berkeley: University of California Press, 1990) for a critique of functionalist explanations in social sciences. A reasoned defence of functionalism can be found in R. P. Dore, "Function and Cause," American Sociological Review 26 (1961), Reprinted in A. Ryan, ed., The Philosophy of Social Explanation (Oxford: Oxford University Press, 1973); and Deepak Lal, The Hindu Equilibrium: Cultural Stability and Economic Stagnation, Vol.1 (Oxford: Clarendon Press, 1988): 7.

institutions that will benefit them the most. Explanations for origins of institutional change, therefore, must also address how institutions affect outcomes.[3] In my arguments I stress the role of human motivations in analyzing the emergence of new institutional forms.

Institutions as the Efficient Response to Changing Environmental Conditions

Neo-institutionalists furnish one of the most influential explanations of institution formation.[4] They explain the creation of new institutional arrangements in terms of efficiency. Their account of institution formation is primarily evolutionary: existing institutions undergo mutation (but the process of mutation is a black box); some of the new mutated institutions survive (because they are more efficient); and the world becomes populated by ever more efficient institutions. In addition, the agents of institutional change, they argue, are macro-forces in the economy rather than individual actors.[5] Second, they focus on organizational and institutional forms of capitalist and socialist economies rather

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[3]This distinctiveness of the positive political economic approach is in fact a similarity that it shares with functionalist explanations - in so far as both of them explain social phenomena by referring to the effects of the phenomena. The major difference between the two approaches is of course that functionalists explain phenomena in terms of the beneficial (but unanticipated) consequences that the phenomena may have for the system, while in the positive political economic approach, individual anticipations regarding outcomes are used to harness consequences as explanands. Methodologically and epistemologicalty, the difference is crucial.

[4]I use neo-institutionalism and new institutionalism as equivalent terms. For a distinction between the two terms see Thrainn Eggerttsson, Economic Behavior and Institutions (Cambridge: Cambridge University Press, 1990)

[5]See Douglas North, Structure and Change in Economic History. New York: Norton, 1981); Richard Nelson and Sidney Winter, An Evolutionary Theory of Economic Change (Cambridge, Mass.: Cambridge University Press, 1982); and Douglas North and Robert Thomas, The Rise of the Western World: A New Economic History (Cambridge: Cambridge University Press, 1973).

than on non-industrial settings.[6] Finally, they see the choice for institutional forms as lying primarily between three categories: open access to all resources, government control over resources, and "free" market arrangements.[7]

I seek here to advance three criticisms of the neo-institutional arguments, which I will develop at greater length in the course of this chapter. Greater efficiency may create an environment that promotes institutional change but it is neither a necessary nor a sufficient condition. A certain modification of institutional arrangements may be Pareto Superior, but unless it benefits the group that is capable of bringing about change, the institution is likely to remain unaltered. Second, since institutions serve to allocate benefits among competing groups, explanations of institutional change are deficient as long as they ignore

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[6]In the past decade, however, some of the work done on institutions is beginning to consider other institutional arrangements. Two of the most popular subjects for institutionalists are the open field system in England, the logic behind it, and why enclosures took place and slavery in the US. Carl Dahlman, The Open Field System and Beyond: A Property Rights Analysis of an Economic Institution (Cambridge: Cambridge University Press 1980) and Donald McCloskey, "The Open Fields of England: Rent, Risk and the Rate of Interest," in David W. Galenson, ed., Markets in History: Economic Studies of the Past (Cambridge: Cambridge University Press, 1990): 5-51 have produced two of the most authoritative works on the open field system. For slavery in the US, Yoram Barzel, "An Economic Analysis of Slavery," Journal of Law and Economics 20 (1977): 87-110 and idem, Economic Analysis of Property Rights (Cambridge: Cambridge University Press, 1989) render interesting neo-institutional accounts. For work on institutional arrangements in developing countries or in pre-industrial settings see Robert H. Bates. Markets and States in Tropical Africa: The Political Basis of Agricultural Policies (Berkeley: University of California Press, 1981); Margaret McKean, "The Japanese Experience with Scarcity: Management of Traditional Common Lands." Environmental Review. 6 (1982): 63-88; and Elinor Ostrom, Governing the Commons: The Evolution of Institutions for Collective Action (Cambridge: Cambridge University Press, 1990). Anthropologists have traditionally examined pre-industrial societies, though not always from an institutional perspective; seldom from a neo-institutional perspective.

[7]For a discussion, see Ostrom, Commons.

political struggles. Explanations that ignore political struggles fail to take into consideration the preferences and capacities of individuals who influence and are influenced by the change. Finally, the range of institutional alternatives for resource use is broad - much broader than the three-way typology of open access, government control or free market. Rules that comprise institutions often combine in subtle ways, so that small adjustments may greatly alter an institution and the effects it has on resource use.

According to Alchian, incomplete information and transactions costs render profit maximization a weak guide to action.[8] But even if the activities undertaken by firms and households were based on randomly chosen criteria, some economic units, by laws of statistics, would perform more profitably than others. Over time, the less efficient units, i.e. the ones that earned lower profits would simply be eliminated in a competitive environment. Accepting the existence of purposive and foresighted action, the process of elimination would occur even faster: the more efficient units (whether they became efficient because of random or rational choices) would be imitated by others; and there would be learning and some innovation. Alchian's argument is attractive precisely because it requires no

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[8]See Armen Alchian, "Uncertainty, Evolution and Economic Theory," Journal of Political Economy 58 (Fall 1950): 211-21. Early work by scholars such as Ronald H. Coase, "The Nature of the Firm," Economica. n.s., 4 (1937): 386-405; John R. Commons, Institutional Economics (Madison: University of Wisconsin Press, 1934); and Frank H. Knight, Risk. Uncertainty and Profit (Boston: Houghton Mifflin, 1921) laid the foundation of later neo-institutional research. Friedrich A. Hayek, "Economics and Knowledge." Economica (February 1937); 33-54; and George J. Stigler, "The Economics of Information," Journal of Political Economy 69 (June 1961): 213-225 fuelled interest in the economics of information. For the origins of new property rights, a well developed rationale that works on the principles of biological evolution is available in the works of Alchian, Uncertainty; Steven Cheung, "The Structure of a Contract and the Theory of a Non-Exclusive Resource," Journal of Law and Economics 13 (April 1970):.49-70; and Harold Demsetz, "Towards a Theory of Property Rights." American Economic Review 62 (1967): 347-59.

model of individual choice,[9] thus making it compatible with rational choice models as well as with models of satisficing behavior.

Neo-institutionalists can easily extend this reasoning to economic institutions in a dynamic world where not only the economic units change, but also the environmental conditions that exert selective pressures. Alterations in the environmental conditions lead to changes in knowledge. Changes in knowledge capital lead to changes in production functions, market values, tastes, and so forth.[10] The impetus of these changes propels some previously efficient units towards obsolescence. But this just paves the way for the replacement of the inefficient units by new, more efficient institutional forms. Efficient institutions, this suggests, result from adaptation by economic units to environmental change.

The exact mechanisms underlying evolutionary adaptation remain vague and unpredictable. There is little certainty as to which new institutional forms will emerge as a result of specific changes in environmental conditions. This explanatory failure of the evolutionary model is obvious in both the context of biology and economy. While the theory predicts that "some" new, more efficient institutional form will evolve, its specific form and the process whereby it will come into being, remain unclear. In defence, it may be argued that institutional

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[9]There is no necessary correspondence between rational choice and individual action. Organizations and institutions can "make" rational choices (if we define rationality as a relationship between ends and means, rather than as the choice over different ends), and individuals can make "irrational" choices.

[10]Different property rights theorists identify more or less the same set of factors as being responsible for and characterizing changing economic conditions which lead to changes in institutional arrangements. Eirik J. Furubotn and Svetozar Pejovich, eds., The Economics of Property Rights (Cambridge, Mass.: Ballinger Publishing Company, 1974): 8 cite conditions such as technical progress, new markets, new products, and changes in the relative endowments of parties involved in exchange. Cheung, Structure of a Contract. *66* and North, Structure and Change consider changes in supply and demand and technological innovations as important. North and Thomas, Western World made changes in relative prices the determining source of institutional change.

innovation is akin to creativity - defying the formalism of rules and theories.[11] This is true whether we take the induced innovation approaches of agricultural economists such as Hayami and Ruttan and Boserup,[12] or the accounts of institution formation proffered by the neo-institutionalists. Tsebelis criticizes evolutionary theories of institution formation because they sacrifice the assumption of individual rationality.[13] While this assumption is indeed absent from evolutionary accounts, to evolutionists its absence does not represent a loss, but rather the gain of an eliminated redundancy, greater parsimony. The evolutionary account does not require individuals to be rational. Even in the absence of perfect individual rationality, rational i.e. efficient behavior on the part of individuals and economic units will triumph.

The evolutionary argument applies both to institutions that resemble self-enforcing agreements and to those that resemble agreements requiring enforcement mechanisms. Self-enforcing agreements involve a coordination problem. The choice of driving on a particular side of the road is an example: it does not matter whether we drive on the left or the right side, as long as everyone else also does the same. In such situations, institutions specifying individual behavior do not need to be enforced by outsiders. However, in many other situations individuals have an incentive not to cooperate with others - as in the case where resources are owned by a group of people. In these situations a viable institution must ensure that rules for using the resources are followed. For this, an enforcement mechanism is essential. It is also possible for institutions with enforcement mechanisms to evolve as long as selective pressures in the

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[11]See Tsebelis, Nested Games. 95-96.

[12]Esther Boserup, The Conditions of Agricultural Growth: The Economics of Agrarian Change Under Population Pressure (New York: Aldine, 1965); and Yujiro Hayami, and Vernon W. Ruttan, Agricultural Development: A Global Perspective, rev. ed. (Baltimore: Johns Hopkins University Press, 1985)

[13]Tsebelis, Nested Games. 100-3.

environment privilege them because they successfully manage resources in comparison to institutions without enforcement mechanisms.[14] Conscious rational design is unnecessary to evolutionary theories. Indeed, in the case of institutions with enforcement mechanisms, rationality is an impediment to their creation (although not to their evolution once they have been created).

Let me now summarize the argument of neo-institutionalists. More efficient institutional forms are needed to take advantage of new efficiency gains made possible by changing economic conditions. More efficient property rights arrangements can come about through rational choice, trial and error, or learning and imitation. The selection mechanism for rewarding more efficient units is the "filter of competition" which impels less efficient organizations towards extinction.

The account of the new-institutionalists can be complemented and enriched by the introduction of a second literature - that on externalities and property rights. Existing institutions that allocate rights to property become inefficient once, "shocked" by technological change or new economic conditions, they fail to exclude some users from a resource.[15] Some individuals can then use the resource and extract benefits from it without having to pay for the costs. This divergence between the costs and benefits attributable to the user constitutes an externality. The concept of externalities can be illustrated with the example of forests that are open to all users. Short term benefits from overfelling trees in these forests are available to all users. However, the reduced availability of timber in the future owing to overfelling in the present is a cost that is unaccounted for when users over-exploit forests. Similarly, excessive soil erosion, excessive amounts of carbon dioxide in the air and diminished scenic beauty constitute other costs of overfelling. Hence the commonly advocated solution by

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[14]See Tsebelis, Nested Games for the contrary view.

[15]Cheung, "Structure of a Contract"; and Demsetz, "Theory of Property Rights.

economists and many property rights theorists for externality problems: greater privatization of the rights to resources.[16]

Demsetz's paper, "Toward a Theory of Property Rights" provides a good example of the privatization argument. After the development of commercial fur trade around Quebec in the beginning of 18th century, private property rights arrangements began to develop among the Algonkians and the Iroquois in the region.[17] Demsetz uses this and other evidence[18] to argue that as fur trapping became more valuable because of its commercial worth, "the property rights system began to change, and it changed specifically in the direction ... (of the) most complete development of the private hunting territory". Notice that actors are absent from this specification of the emergence of property rights. Nor does Demsetz concede any space to politics where the emergence of private property rights is concerned.[19] Further, Demsetz considers only two forms of property rights: communal property (which he thinks is open access) and private property. In his formulation, therefore, greater efficiency parallels greater privatization of property.

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[16]See for example, W. Clark, "Restricted Access to Common-Property Fishery Resources: A Game Theoretic Analysis," ed. P.T. Liu, Dynamic Optimization and Mathematical Economics (New York: Plenum Press, 1980): 117-32; H. S. Gordon, "The Economic Theory of a Common Property Resource: The Fishery." Journal of Political Economy 62 (1954): 124-42; and A. D. Scott, "The Fishery: The Objectives of Sole Ownership," Journal of Political Economy. 63 (1955): 116-24.

[17]Eleanor Leacock, The Montagnes 'Hunting Territory' and the Fur Trade," American Anthropologist 56 pt.2 quoted in Demsetz, Property Rights.

[18]The other major work Demsetz uses is Speck's study of the Native Americans in the Labrador Peninsula. See Frank Speck, "The basis of American Indian ownership of land," Old Penn Weekly Review (January 16, 1915): 491-95.

[19]Strangely enough, Demsetz does talk of negotiating costs when he discusses communal rights (p.354). They want consideration only when he speaks of private property rights.

Demsetz accurately perceives that with a complete assignment of property rights economic decision-makers take into account all potential effects of their decisions and see themselves as liable for the effects of their decisions.[20] It is not clear however, that privatization is necessarily the most efficient solution. Private property rights are only a proxy for more precise property rights and other control mechanisms that could exclude non-owners and create efficiency gains.[21] Depending on technological developments, prevailing social norms and institutions, and physical characteristics of goods, combinations of property rights arrangements other than privatization may be more successful in aligning costs and benefits.[22] A different solution advanced by many economists when confronted with market failure is direct government intervention in resource management. To analyze this, we need to examine more closely the externalities associated with creation and enforcement of property rights over productive resources.

Externalities arise because of the existence of search and information costs and transactions costs[23] associated with defining, exchanging, monitoring and

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[20]It goes **without saying that, without exception, a complete assignment of rights to property is inordinately costly.**

[21]**DanieI Bromley and Devendra P. Chapagain, "The Village Against the Center: Resource Depletion in S. Asia," American Journal of Agricultural Economics *66* (Dec. 1984); and Margaret McKean, "Success on the Commons: A Comparative Examination of Institutions for Common Property Resource Management," Journal of Theoretical Politics, (Forthcoming) argue that common property is private property once the rights to property are assigned securely and precisely. What the privatization advocates really mean to advance, they argue, is "propertyization", not privatization, and that "propertyization" does not necessarily mean single owners -- witness corporations and cooperatives.**

[22]**See section II of this chapter on effects of different institutional arrangements on resource use.**

[23]**Williamson's work on transactions costs is paradigmatic. See Oliver E. Williamson, The Economic Institutions of Capitalism (New York: The Free Press,**

enforcing property rights and exchanges of property rights. If no costs were incurred in defining, exchanging, monitoring, and enforcing property rights, no externalities would arise.[24] Although externalities are ubiquitous in an economy the mere existence of externalities, as Coase argues, is not sufficient reason to advocate government intervention in the form **of** taxes or subsidies to remove them. Whether government intervention is desirable depends on the transactions costs associated with the policy regulation being contemplated relative to the costs that will be incurred in the absence of the regulation.[25] There are then, no globally efficient arrangements of rights to property.

In this thesis, I borrow from neo-institutionalists and property rights theorists the insight that alterations in environmental conditions create pressures that can change existing institutional structures - often towards a more efficient utilization of resources. I also tailor in several ways the stylized account of the formation of property rights provided above. Individuals and choices they make play an important role in the emergence of new property rights. Second, there is no "filter of competition" that would "weed out" the less efficient institutional forms in the village communities I examined.[26] It is necessary therefore, to pinpoint another selection mechanism through which inefficiencies can be reduced through choices made by individuals. The following sub-section of the chapter on environmental risks does precisely that.

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[24]**As I discuss later in section I, the absence of externalities and transactions costs does not guarantee that resources will be used in an optimal fashion. Competing interests of parties affected by institutional rules for using resources, and problems of strategic behavior in preference revelation mean that resources may be used inefficiently even when no transactions costs are present.**

[25] **Ibid., 23-28.**

[26]**There is only a relatively small number of politically active agents in rural contexts. Further, which actor will triumph often depends on an ability to use political connections, threats, and bribes not on the actor's efficiency. See discussion, chapter 4.**

Property Rights and Risk

Institutions are not just mechanisms for promoting efficient or optimal utilization of resources. They also allow individuals and communities to counter risks.[27] There are two types of risks that institutions of different kinds help to counter. The first are the risks associated with interactions between individuals possessing incomplete information, both about each other and the context in which they interact. Institutions serve to reduce the consequent uncertainties as to the outcomes of social interactions. The second are risks that arise from environmental and ecological uncertainties. By structuring behavior and interactions, all institutions serve to reduce risks of the first kind. They provide stability to expectations of actors and facilitate calculations regarding outcomes.[28] The particular institutions we analyze in this study are interesting because they specialize in the management of the second type of risks: the risks associated with environmental uncertainties.

Specific forms of risks influence individuals' choices of strategies.[29] The crucial variations relate to the frequency, timing, severity and predictability of

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[27]In the literature a distinction is often made between risk and uncertainty. See Knight, Risk, Uncertainty and Profit. If probabilities can be assigned to the various future states, the decision-maker is confronted with risk. If no probability assignments are possible, decision-makers are faced with uncertainty. It is possible to make problems involving uncertainty more tractable by using subjective probabilities used by decision-makers. See Elizabeth Cashdan, ed., Risk and Uncertainty in Tribal and Peasant Economies (Boulder, San Francisco: Westview Press, 1990): 2-3.

[28]See Tsebelis, Nested Games, 92-118 and Douglas North, Institutions, Institutional Change and Economic Performance (Cambridge: Cambridge University Press, 1990) for a discussion on this aspect of institutions.

[29]The following discussion on risks and their characteristics borrows heavily from Paul Halstead and John O'Shea, eds., Bad Year Economics: Cultural Responses to Risk and Uncertainty (Cambridge: Cambridge University Press, 1989), 3-4.

subsistence crises. Timing of the crisis refers to the period over which a given risk operates and the duration of the scarcity. Risks can also be analyzed spatially - the extent of the area affected by the scarcity crisis and whether the crisis has a homogenous effect over the entire area. Finally, analysis must take into account the level and variability of the severity of the crisis in examining how environmental risks affect cooperative behavior.

In ecologically marginal regions, the primary selection mechanism is the ability to survive risk.[30] The empirical studies examined in this dissertation have all been carried out in ecologically risky regions. Variations in rainfall, temperature and sunshine in the hilly areas and in rainfall in the dry areas produce profound uncertainties. To mitigate the effects of scarcities in agricultural and pastoral production during unfavorable years people seek to integrate surpluses and deficits in output across time, space and economic units.

Work by archaeologists and anthropologists on risk management recognizes a wide variety of cultural responses to ecological risks, collectively referred to as "buffering mechanisms". These responses exhibit many forms, but in this thesis I focus on four: mobility, diversification, physical storage, and exchange.[31] These are primarily analytical categories and most of the real life strategies that people actually employ combine one or more. Through one or a combination of these strategies, it is possible to integrate production surpluses across time, space, and economic activities and units.[32]

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[30]Thus, the institutions I examine are often inefficient. But they help their members counter risks effectively.

[31]Ibid., 3-5.

[32]See the appendix at the end of the chapter for a statistical explanation of how integration of surpluses across time, space, or economic units helps in reducing variances associated with production strategies.

I suggest that individual ability to employ strategies from each of these basic categories is enhanced by coordination with other individuals.[33] In high risk ecological settings, such coordination among community members may become crucial for the very survival of the community, especially in times of crises. Thus pastoralists could not possibly migrate with their livestock unless they did so collectively.[34] In situations of extreme scarcity, community members may also be forced to change the institutional arrangements through which they counter environmental variations.[35] Thus new institutions come about not through competition, and extinction of existing institutions, but through modifications of existing institutions as individuals struggle to cope with risk. In the ensuing discussion of the four different responses to risks - storage, mobility, diversification and exchange - I will illustrate how cooperation and coordination among group members can enhance the effectiveness of each of these strategies.

Storage allows producers to use surpluses produced in periods of abundance in later periods of scarcity. It is one of the simplest risk countering strategies used by individuals in fragile environments. In its most basic form, it

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[33]**Common field agriculture in England prior to the agricultural revolution is a case in point. See Dahlman, The Open Field System. Similar agricultural systems are currently practiced in many parts of the Himalayas.**

[34]**See chapter two.**

[35]See **P. Garnsey and I. Morris, "Risk and the Polis: The Evolution of Institutionalized Responses to Food Supply Problems in the Ancient Greek State," in Bad Year Economics: Cultural Responses to Risk and Uncertainty, eds., Paul Halstead and John O'Shea, (Cambridge: Cambridge University Press, 1989); Paul Halstead, "The Economy has a Normal Surplus: Economic Stability and Social Change among Early Farming Communities of Thessaly, Greece." in ibid.; P. Rowley-Conwy and M. Zvelebil, "Saving it for Later: Storage by Prehistoric Hunter-Gatherers in Europe." in ibid. These works submit empirical evidence on how communities deal with environmental risks and may change institutional arrangements when faced with risks. See also Purnendu S. Kavoori, Pastoral Transhumance in Western Rajasthan (Jaipur, India: Institute of Development Studies, 1990).**

requires no coordination or cooperation with other individuals or households. The problems of spoilage of stored articles can also be solved at the individual level. However, in subsistence-oriented economies, two problems make storage, especially individual level storage, unviable. Individuals can only store limited amounts - which may not be sufficient for dealing with scarcities. Although collective or community level storage can help resolve this problem, spoilage make storage difficult. Storage of consumption goods beyond two or three years radically increases spoilage losses. And as good years and bad years need not follow each other, a community that relies only on storage is certain to starve following three consecutive poor harvests. Combining storage with exchange or diversification can eliminate both these problems, but requires coordination and cooperation among individuals. It is also possible to get around the problem of spoilage by storing consumables live - as cattle or sheep. However, this strategy must be combined with mobility to counter spatial and temporal fluctuations.

Mobility allows individuals to counter risks inherent in production in any one location. Thus the primary function mobility serves is integration of production surpluses across space. The most common agricultural occupation that relies on mobility is pastoralism. Pastoralists who integrate crop agriculture with animal husbandry often manage to rear their animals without periodic movement cycles. However, most pure pastoralists, (except those who own large ranches) rely on mobility to escape unpredictable variations in rainfall and fodder availability in a particular area. Opportunistic movements by pastoralists in search of fodder have often been interpreted by officials and analysts as random. However, the randomness of the movements usually reflects the randomness associated with climatic factors. In response to more predictable seasonal variations in rainfall, nomadic pastoralist movements exhibit seasonal

regularities.[36] In this behavior, what is important however is that mobility cannot take place without coordination and cooperation among individuals residing in different places. Take nomadic pastoralism as an example. If animals of a certain group of people are to move over a large territory and consume fodder and water in the areas through which they move, members **of** that group must have rights to access and use water and fodder in the areas *grazed* by their animals.[37] Under conditions of resource scarcity, such access and **use** rights cannot exist without either some form of ownership of the land, or some form of exchange in return for fodder and water. Different nomadic groups engage in both these types of institutional arrangements; the groups I examined combine and coordinate mobility with exchange for producing a viable production strategy.

Producers also deal with risk by diversifying their portfolio of production activities. The basic principle is simple. The output from different production activities would have different variances attached to them; variances attached to the different economic activities may well be uncorrelated; therefore the total variance of the portfolio would be lower than that of a single production activity (See appendix 1 for the statistical explanation). The role community plays in diversification strategies is again related to the imperfect development of capital markets. Each economic activity undertaken by an individual or family is defined by a production function. The characteristics of the production function that

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[36]See Douglas Johnson, The Nature of Nomadism: A Comparative Study of Pastoral Migrations in Southwestern Asia and Northern Africa. Research Paper No. 118 (Department of Geography, University of Chicago, Illinois) 1969 for a detailed analysis and classification of nomadic movements in Southwest Asia and North Africa. The regional focus of the study does not detract from its applicability to nomadic movements in other parts of the world such as South Asia.

[37]Mobility of human beings also requires definitions of property rights in ways that can facilitate such mobility - possibly at a price. The point is that definitions of property rights can be facilitated through coordination between the parties involved.

defines a particular economic activity may well preclude its undertaking by a family which already devotes part of its resource base to other economic activities. In many Indian villages, households collectively assign grazing of their livestock to a cowherd selected jointly by the villagers.

Diversification takes a number of different forms in practice. Designation of reserved or emergency foods, creation of sacred groves, scattering of fields, subsistence through a mix of different activities such as agriculture, animal husbandry, foraging, hunting are all examples of diversification. Essentially, it integrates and smoothes production surpluses and scarcities within and across time periods by combining different economic activities.

Of all the different methods of dealing with environmental risks, exchange is the most complicated and varied. Ranging in form from the pooling and sharing in hunting-gathering societies to raiding, theft and appropriation to market exchange processes in contemporary societies, exchange is universal. Certainly not all exchange transactions and processes are aimed at reducing risks. Yet, risks can be countered through all of the different exchange processes mentioned above. The basic process by which exchange transactions help counter risks is through transforming current surpluses into obligations for times of future scarcity. This is true of market transactions as well where tokens imbued with value signify the extent of future obligations that are due to an individual.[38] Thus exchange balances production scarcities by integrating production surpluses over time and

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[38]That coercion can play a role in exchange processes goes without saying. Raiding, theft and appropriation are characterized almost entirely by coercion. Market exchanges are coercive or voluntaristic depending on the ideological camp one belongs to - Marxism or Neo-Classical Economics. The same can be said for exchanges through pooling and sharing and of gift exchanges (For the last see Raymond Hames, "Sharing among the Yanomamo," in Risk and Uncertainty in Tribal and Peasant Economies, ed., Elizabeth Cashdan (Boulder, San Francisco: Westview Press, 1990), 103).

economic units. As such coordination and cooperation among the parties to exchange is essential.[39]

In the previous section we examined how different property rights institutions may help individuals secure greater efficiency gains. In this section I presented a brief discussion of the strategies which can help reduce production risks. Individual strategies win greater effectiveness if individuals coordinate their activities. Collective coordination of strategies can create institutions that help individuals survive and counter risks. In this sense, struggles to counter environmental risks work in the same fashion as attempts to increase efficiency. But with environmental risk, survival, not competition, functions as a selection mechanism for institutions. The selection mechanism works by prompting individuals to modify existing institutions and create new ones as they attempt to survive risks, not by eliminating existing institutions. In fragile environments, after ensuring survival institutional arrangements may also serve to bring about more rather than less efficient outcomes. Chapters two and three will illustrate how collective institutions help individuals and communities to tackle risks through a combination of diversification, mobility and exchange. Indeed, we will show that the institutions facilitating decision-making among Raikas - migrant shepherds of Rajasthan - can be explained adequately only if we view institutions as mechanisms that help tackle environmental risk as well as promote efficiency.

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[39]If individuals have access to capital markets, and were risk neutral, they would not need to employ strategies to reduce risks. In the long run, using a strategy of maximizing expected utility, they will each be better off than if they used risk reducing strategies. Each of the risk management strategies that I have discussed in this section gains its importance from the fact that most individuals are not in fact risk neutral (see Amos Tversky and D. Kahneman, "Rational Choice and the Framing of Decisions," Journal of Business *59* (1986). At the same time, the actors who use strategies of mobility or diversification or *storage do* not have access to capital markets (or capital markets are absent or ill-organized).

Until now, most of the discussion has focused on the welfare enhancing effects of institutions as the factor that leads to the creation of new institutional arrangements. However, the existence of possible gains through new institutional arrangements - either in the form of greater efficiency or in the form of an enhanced ability to tackle risks - is neither a necessary nor a sufficient condition for institutional change. Considerations of welfare gains become a necessary condition for institutional change only when all parties affected by the institutional change can influence the course of the change. The next section discusses the importance of distributional struggles and power plays in the creation of institutions.

Political Rivalries and Institution Formation

Political scientists have long recognized that institutions serve to allocate goods and services among competing individuals, user groups and loci of power. Philosophers such as Locke and Hobbes addressed the origins of property rights long before the issue gained currency in Economics. Political scientists and game theorists today draw upon the work of these normative philosophers for presenting a positive account of rights formation.[40] These positive theorists attempt to provide accounts of rights formation that incorporate the political interests of different groups.

If a certain institutional change affects more than one party, and all the parties have the capacity to influence or block the change; then it is essential that

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[40]**See Andrew Schotter, The Economic Theory of Social Institutions (Cambridge: Cambridge University Press, 1981); Itai Sened, "A Political** Theory **of the Evolution of Rights: A Game with Asymmetric Information," The** Center **in Political Economy, Washington University, St. Louis, 1990; Robert Sugden, The Economics of Rights. Cooperation and Welfare (Oxford: Basil Blackwell, 1986); Michael Taylor, The Possibility of Cooperation (Cambridge: Cambridge University Press, 1987); John R. Umbeck, A Theory of Property Rights: With Application to the California Gold Rush (Ames: The Iowa State University Press, 1981).**

all the parties expect to be at least as well off after the change as they were before, (and one of them be strictly better off). Failing this, the party which the institutional change makes worse off will attempt to block the change. If the proposed change is to be Pareto Superior, the aggregate output must increase as a result. Where the aggregate output increases, even if some of the parties become worse off as a result of the change, "in principle it is possible to construct a side payment scheme that would compensate those who otherwise would oppose the desirable change in property rights."[41] But as Libecap, for one, points out, distribution conflicts render the construction of such a scheme of side payments difficult in practice.

The severity of distributional conflicts (even when the change will produce a Pareto Superior outcome) depends on a number of factors. Libecap[42] mentions the size of aggregate expected gains from the institutional change, information problems,[43] the number and heterogeneity of the bargaining parties, and the skewness of current and proposed share distribution. Ostrom adds two others - the discount rate used by individuals when they consider future returns from a proposed institutional change, and the presence of participants with leadership or other assets. Ostrom also proposes two additional factors as important in explaining institutional change - the incremental and self-transforming nature of institutional change and the importance of external political regimes in which local institutions guiding resource utilization in villages

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[41]Gary Libecap, Contracting for Property Rights (Cambridge: Cambridge University Press, 1989), 6.

[42]Ibid., 21.

[43]See appendix 1.2 for a discussion on the relevance of information problems and of the size of gains.

are set.[44] Before I discuss any of these factors, it is necessary to make a crucial point.

There exist situations in which not all of the parties affected by changes in property rights have the power to influence the change. In such situations, there is no reason to believe either that new institutions come into being primarily to promote gains for the various parties affected by institutional change or even that existing institutions solely serve to increase welfare. It is, therefore, not the aggregate gains (or losses) for all the individuals who will be affected by the institutional change that are significant, but rather the gains (or losses) to individuals with the power to block institutional change. In such situations the construction of a successful side payments scheme is irrelevant. The group powerful enough to bring about institutional changes which will increase its share of output will do so, even if other parties are harmed by it. As a result, pace economic theorists, new institutions may prove to be more inefficient that their erstwhile counterparts.[45]

Distributional struggles among parties take place, whatever the institutional form. Such struggles take place both before rules have been framed for using and distributing resources, and after they have been created. In the remainder of this section I will focus mainly on the factors which influence the intensity of struggles for creating rules to use and distribute resources.

According to Libecap, when bargaining parties propose or anticipate institutional changes, they compare their anticipated income streams under the new arrangement to their expected income streams under status quo. Their expectations determine the contracts that will define new property rights. I modify Libecap's hypothesis. Bargaining parties do not just compare their personal income streams under status quo and the proposed property rights arrangement;

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[44]**Ostrom, Governing the Commons, 188-91.**

[45]**See also North, Institutions, 6-9.**

they also compare their expected income streams and share of benefits with the income streams and share of other parties that will be influenced by the proposed institutional change. The propensity of a particular party to support institutional changes will be determined by the relationship that the party has with other parties that benefit or lose from new institutional arrangements.[46] As will be seen in the later studies, such competitive behavior is true also for institutions that govern the use of commons. Competing factions which receive benefits from common resources may, therefore, even be willing to take cuts in their share of the benefits from the commons if at the same time they can ensure proportionately much larger reductions in the share of rival factions.[47]

In general, the larger the number of parties involved in the bargaining process for creating new institutional arrangements,[48] the lower the likelihood that a new arrangement will emerge.[49] But the heterogeneity of the different parties involved is an equally, possibly more, crucial factor. Hardin argues that one can expect "better prospects for successful collective action in the asymmetric than in the symmetric group".[50] On the other hand, Ostrom and Libecap suggest

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[46]See Joseph M. Grieco, "International Anarchy and the Embedded Rationality of States: Realist and Neoliberal Institutional Theories and the Problem of Regional Economic Cooperation," paper delivered at the Annual Meeting of the American Political Science Association, Atlanta, Georgia, August 31-September 3, 1989.

[47]It should be evident that such a change in the property rights arrangement can only come about when not all of the groups using the resource and influenced by the proposed rule changes have a say in changing institutional rules.

[48]Institutional supply essentially hinges on the possibility of collective action. See Ostrom, Governing the Commons.

[49]Russell Hardin, Collective Action (Baltimore: Johns Hopkins University Press, 1982); Libecap, Contracting, 21.

[50]In a group of n members with symmetric costs and benefits and a ratio r of benefits to costs of supplying itself a collective good, the minimal efficacious

that homogeneity among group members, especially in their interests, will make it more likely that an efficient institutional change will occur.[51] These two divergent views can be reconciled if we distinguish between the maintenance and creation of institutions.

Maintenance of institutions is facilitated when all the users have similar interests and endowments. Large differences in the interests and endowments of users will mean either that such differences be accommodated in the rules that govern distribution of benefits or that the larger users will attempt to break rules to suit their interests and that other users will find it difficult to sanction them. Of course, users will attempt to break rules even when they are roughly equal and have similar interests; however, they will not differ very much in their capacity to break rules. Hence, users who do not break rules will find it easier to sanction rule breakers.

Creation of institutions, on the other hand, may be facilitated by the existence of some level of asymmetries among parties interested in changing institutions. Whether it will be depends on a distinction made earlier in this section. If the interests of all the parties which will be influenced by the institutional change must be taken into account, then institutional change will indeed be more difficult[52]. However, if the concerns of some of the less influential group members can be ignored, then greater heterogeneity of interests

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subgroup (an efficacious subgroup defined as one which can supply the necessary collective action) is of the size k_s where $(n/r) < k_s <= (n/r) + 1$. In an asymmetric n-member group where the average member's valuation of costs and benefits is the same as in the symmetric group but in which come members have much higher evaluations of the benefit of the group's collective good, the minimal efficacious subgroup will be of size k_a which will be smaller than k_s (Hardin, Collective Action, 68). Obviously, collective action is a certainty in only those asymmetric groups where the size of the minimal efficacious sub-group equals 1.

[51]Ostrom, Governing the Commons, 188; Libecap, Contracting, 22.

[52]Ibid., 22.

and capacities in a group will actually facilitate the formation of new institutional arrangements. The "stronger" parties or group members will create institutional rules favoring their interests, reducing the diversity of interests in the group.

Further, it is also not the case that only persons affected directly by the institutional change can influence the process of change itself. Governments create over-arching rules which influence the creation of formal and informal local institutions profoundly. Governments have their own interests in mind when creating the kinds of institutional arrangements they do. However, the rules they frame influence the manner in which local users utilize resources. The successful and unsuccessful attempts of different groups in villages to promote, ignore, circumvent and violate government rules which influence resource use creates a dynamic of resource use which would be very different were governments not to intervene at all; even if the results that actually occur after government interventions are substantially different from what governments intend when framing rules.

Government policies thus act as external variables that facilitate or discourage the formation of local institutional arrangements which can accelerate or ration resource use. The same role is played by existing local institutions that promote or hinder collective action at the local level in areas other than use of community resources. The "institutional capital," as Ostrom terms it,[53] present in the form of the other institutions in the village aids the processes involved in the supply of institutions.

However, it must be kept in mind that community institutions in villages that guide the use of common resources are not static. The rules comprising them undergo constant change. Such change results from the attempts of different villagers to gain greater benefits for themselves through infringing rules that were framed to guide resource use, and from changing capacities of different villagers

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[53]Ostrom, Governing the Commons, 190.

to break rules. Villagers' ability to break rules and push for creation of new formal or informal rules is critically influenced by arrangements for monitoring and sanctioning rule violations. This is the subject of discussion in the next section.

Institutional Rules and Their Effect on Resource Use

Many of the hypothesized causes of resource degradation - overpopulation, market forces and lack of education - operate within an institutional context. Therefore, it is essential to examine how specific institutions exacerbate or mitigate the impact of these factors. The commonly proposed institutional solutions to the problem of resource degradation - privatization or greater government intervention[54] - fail, however, to consider how institutions influence resource use.[55] I argue that every institutional solution to resource degradation and depletion must overcome collective action problems at four distinct levels: creation of rules for resource use, monitoring of users; sanctioning of rule breakers; and arbitration of disputes among parties subject to the rules.

Institutions for managing local village resources, often called common property institutions, exist in all Indian villages.[56] These institutions prescribe the

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[54]Some works that forcefully advocate state intervention are Garrett Hardin, "Political Requirements for Preserving our Common Heritage" in Wildlife and America, ed., H. P. Bokaw, (Washington DC: Council on Environmental Quality, 1978), 310-17; R. L. Heilbroner, An Inquiry into the Human Prospect (New York: Norton, 1974); and W. Ophuls, "Leviathan or Oblivion," in Toward a Steady State Economy, ed., H. E. Daly, (San Francisco: Freeman, 1973), 215-30. Louis de Alessi, "The Economics of Property Rights: A Review of the Evidence," Research in Law and Economics 2 (1980): 1-47 provides a review of some of the literature advancing privatization as a superior alternative to government action.

[55]See first section. See also Ostrom's Governing the Commons.

[56]It is formally correct to say that all villages have resource management institutions. However, the manner in which institutions function and the strictness with which institutional rules are adhered to by villagers differ across

manner in which members of village communities can use benefits from local resource systems. They are set within a broader framework of governmental and economic institutions - indeed it is difficult to establish clear and precise analytical boundaries between communal, private and government institutions regulating resource use. However, not all village institutions allow efficient, sustainable, or equitable use of resources. In the villages I studied, fodder and fuelwood resources were sometimes over-exploited or degraded, and in some cases, benefits from the resource system were cornered by a small group of villagers. A number of theorists have ascribed resource degradation and depletion to over-population, to market forces and to the poverty and ignorance of rural populations.[57] However, in my case studies, overpopulation and market pressures do not covary in any systematic fashion with resource depletion or degradation.[58]

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villages.

[57] **See for example, Asian Development Bank, "Population Pressure and Natural Resource Management:** Key **Issues and Possible Action. Manila: ADB, Environment Paper No. 6,1991); P. R. Ehrlich, A. H. Ehrlich, and J. P. Holdren, Ecoscience: Population. Resources, Environment (San Francisco, California: W. H. Freeman, 1973); Garrett Hardin, "The Tragedy of the Commons,"Science 162 (1968): 1243-1248; Garrett Hardin and J. Baden, eds., Managing the Commons (San Francisco, California: W.H. Freeman, 1977); N. S. Jodha, "Population Growth and the Decline of Common Property Resources in Rajasthan, India," Population and Development Review 11 (1985): 247-263; idem., "Population Growth and Common Property Resources: Micro-Level Evidence from Selected Areas," Paper presented at Expert Consultation on Population and Agricultural Development: Institutions and Policies, (Rome: FAO, June 29-July 1 1988), idem., "Management of Common Property Resources in Selected Areas of India," in Local Institutions and Resource Management eds., Anis Dani and J. G. Campbell, (Kathmandu, Nepal: ICIMOD, 1989).**

[58]**See chapter 5. I do not, however, test my data for the effect of poverty or education on resource conservation.**

There is little reason to believe that rural populations are ignorant about the resource systems upon which they depend.[59] Nor is it necessary to believe that their large numbers will inexorably lead them into a "tragedy of the commons". The correlation of overpopulation or market forces to resource degradation is a case of spurious correlation.[60] Institutions mediate between resource use and the operation of forces such as market pressures and large numbers of users. Specific institutional rules fundamentally shape resource use in village contexts.[61] The institutional rules that we must analyze in particular relate to monitoring and to the enforcement of rules for resource use. Since actual rules-in-use and norms may diverge widely from formally created procedures we must also analyze informal institutional arrangements.

Before we proceed, two related points must be made. To compare the efficacy of different institutional arrangements for a particular objective, it must first be ascertained whether supposedly diverse institutional arrangements such as private property, community ownership and government ownership over resources

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[59]Indeed, if anything, quite the reverse is argued by researchers on local knowledge and institutions. See, for example, David Brokensha, D. M. Warren, and Oswald Werner, Indigenous Knowledge Systems and Development, (Washington D. C: University Press of America, 1980); R. A. Cramb and I. R. Willis, "The Role of Traditional Institutions in Rural Development: Community Based Land Tenure and Government Land Policy in Sarawak, Malaysia." World Development. 18 (1990): 347-60; A. Faniran, O. Areola, "The Concept of Resources and Resource Utilization among Local Communities in Western State, Nigeria," African Development 2 (1976); G. Feder and R. Noronha, "Land Rights System and Agricultural Development in Sub-Saharan Africa," World Bank Research Observer. 2 (1987): 143-69; and Miryam Niamir, Herders' Decision-making in Natural Resource Management in Arid and Semi-Arid Africa (Rome: FAO,FAO Forestry Papers, 1990).

[60]See Elster, Explaining Technical Change, 2634.

[61]Of course, institutions also affect resource use at supra-local, regional or national levels. This study does not directly investigate institutional impact on resource use at these levels.

are at all comparable. Second, we must have a set of criteria along which these different institutional forms can be usefully compared.

I hypothesize that it is indeed possible to analyze different types of ownership and institutional arrangements in **a** property rights framework. Depending on the authority in which the property rights of access, use, management, exclusion and transfer **of** resources[62] are vested, we can make useful categorizations to represent private, common, government and other categories of property rights. In suitable combinations, rights to access, use, manage, exclude, and transfer resources can approximate different types of property rights arrangements.

Of these different types of rights, the right to transfer a resource is the most crucial for determining ownership of a resource[63]. Depending on who possesses this right, the resource will be owned by the government, by private individuals (or firms), or by a community. While the right to exclude others from accessing, using and managing the resource has been hypothesized as a necessary part of the bundle of rights that comprise ownership[64] further consideration reveals that the right to exclude others from a resource is insufficient to grant ownership status. Nor is the possession of this right necessary to confer

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[62]See Lawrence Becker, Property Rights: Philosophic Foundations (London: Routledge and Kegan Paul, 1977); Edella Schlager, "Model Specification and Policy Analysis: The Governance of Coastal Fisheries," (PhD Diss., Political Science, Indiana University, 1990); and Edella Schlager and Elinor Ostrom, "Common Property, Communal Property and Natural Resources: Some Conceptual Clarifications," (Bloomington: Workshop in Political Theory and Policy Analysis, Indiana University, 1987) photocopied, for a discussion of the different kinds of rights that a full set of property rights can be divided into.

[63]That is to say, it is a necessary (though not sufficient) right for ownership. Further, it is the only necessary right for ownership.

[64]See Armen Alchian and Harold Demsetz, "The Property Rights Paradigm," Journal of Economic History 33 (1973): 16-27; de Alessi "Economics of Property Rights"; and Schlager and Ostrom, "Common Property".

ownership. If we examine modern, publicly held corporations, most of them are owned by shareholders who exercise little or no exclusionary rights over the assets they own. At the same time, the managers who do exercise rights to exclude outsiders do not own the corporation - at least, and this is crucial for my point - they do not exercise the right to exclude others by virtue of their ownership stakes in the corporation. Clearly, it is not the right to exclude others that is necessary for ownership. Rather, it is the right to transfer.

In the villages I studied, the right to transfer the resource system (forest or pasture areas in villages) is not completely entrusted to the respective communities. In fact, transferring resources to any other body or individual has been made into an exceptionally arduous process, so that existing ownership patterns for community managed resources are extremely hard to change.[65]

Theoretically, inefficiencies may result if the right to transfer a resource is not available to an individual or community since without this right it would be very difficult for "owners" to capture future benefits of current investments through transfer prices. But while it is true that few communities have the right to transfer or sell the forest and pasture plots that they control, few of them would want to transfer their resources. The forests and pastures are crucial for the survival of the community and its animals. The possibility of capturing future benefits of current investments into a resource through transfer prices is more a concern for people who do not depend on the resource for their daily survival.[66]

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[65]Village councils can pass resolutions to convert common lands for public purposes: school construction, medical dispensaries, or playgrounds for the village. Such conversions require the approval of revenue authorities at the district level. A more common way in which the legal status of commons changes is when long standing private encroachments on commons are regularized. See Rita Brara, Shifting Sands: A Study of Rights in Common Pastures (Jaipur, India: Institute of Development Studies, 1987).

[66]Obvious examples are stock-brokers, futures traders and speculators.

From an efficiency perspective, however, the right to transfer the resource is less important than the right to exclude others from the resource. As long as owners cannot exclude outsiders from their resources, they cannot reliably capture investment benefits. They then do have incentives to overexploit resources. Alchian and Demsetz use the relationship between non-excludability and over-exploitation to argue that communal property will be overexploited. According to them, in communal ownership individuals do not possess rights to exclude, nor the right to transfer resources; only the right to access, withdraw and manage the resource belong to them.[67] There are no theoretical or empirical grounds, however, to accept that communities by definition cannot exercise rights to exclude outsiders. Even if an individual in a community can not exclude outsiders, villagers can create formal and informal centers of authority, and vest in them decision-making powers so that only community members access, use and manage the community forest resources.[68] Therefore, if communities can exercise rights

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[67]idem., "The Property Rights Paradigm".

[68]See chapter five. A large literature supports the possibility of community control over resources. See H. Alverson, "The Wisdom of Tradition in Dryland Farming: Botswana." Human Organization 43 (1984): 1-8; A. B. Anderson, D. A. Posey, "Management of a Tropical Scrub Savanna by the Gorotire Kayapo of Brazil," in Resource Management in Amazonia: Indigenous and Folk Strategies eds., D. A. Posey and W. Balee, Advances in Economic Botany 7 (Bronx: The New York Botanical Garden, 1989): 159-73; W. Balee, "The Culture of Amazonian Forests," in Resource Management, eds., Anderson and Balee; Fikret Berkes, ed., Common Property Resources: Ecology and Community-based Sustainable Development (London, UK: Belhaven, 1989); David Brokensha and B. Riley, "Forests, Foraging, Fuel and Fences in a Marginal Area of Kenya," Paper prepared for USAID Africa Bureau Firewood Workshop, Washington D.C. (June 12-14, 1978); J. M. Chernela, "Indigenous Forest and Fish Management in the Uapes Basin of Brazil," Cultural Survival Quarterly 6 (1982): 17-18; W. C. Clarke, "The Structure of Permanence: The Relevance of Self-subsistence Communities for World Ecosystem Management," in Subsistence and Survival: Rural Ecology in the Pacific eds., T. Bayliss-Smith and R. Feachem, (London: Academic Press, 1977): 363-84; R. Cooper, Resource Scarcity and the Hmong Response Singapore: Singapore University Press, 1984); D. A. Posey, "Indigenous

to access, use, manage and to exclude others from the resource, it is at least theoretically possible for communal resources to be managed without external interventions or privatization. Whether in fact, the resource will be managed in a desired fashion will depend on the actual rules of management and on how well these rules are translated into practice.

We see from the preceding discussion that it is indeed possible to compare different forms of property rights through a property rights framework.[69] The second task is to find a set of criteria along which different property rights arrangements can be compared in terms of their effects on resource utilization - the manner in which a resource is consumed. To keep the rate of consumption lower or equal to the rate of regeneration,[70] all institutions must ensure that

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Management of Tropical Forest Ecosystems: The Case of the Kayapo Indians of the Brazilian Amazon," Agroforestry Systems 3 (1985): 139-58; and E. Yandji, "Traditional Agroforestry Systems in the Central African Republic," in Agroforestry in the African humid tropics ed., L. MacDonald, (Tokyo: United Nations University, 1982) 52-55.

A large number of similar studies also exist for India. For a review see J. E. M. Arnold and William Stewart, "Common Property Resource Management in India." (Oxford Forestry Institute, University of Oxford, Tropical Forestry Papers No. 24, 1991) 51. See also Robert Chambers, N. C. Saxena, and Tushar Shah, To the Hands of the Poor: Water and Trees (New Delhi, India: Oxford and IBH, 1989); Kanchan Chopra, G. Kadekodi, and M. Murthy, Participatory Development: An Approach to the Management of Common Property Resources (New Delhi, India: Sage, 1990); Madhav Gadgil, and Ramchandra Guha, "Greening the Commons", Mainstream (January 21, 1989); and Anil Gupta, "The Socio-ecology of Grazing Land Management," in Rangelands: A Resource Under Siege by CSIRO. (Australia: CSIRO, 1985).

[69]The studies in chapter five do not actually compare private property rights with community or government control over resources. Rather, I examine different community institutions.

[70]As is clear, both fodder and fuelwood are renewable resources. The problems in managing these resources would necessarily be different in character from those involved in managing non-renewable local resources. The reason for this is simple. For renewable resources, users at the local level can contribute to the rate of regeneration of the resource and also step up the rate Of using the

individuals adhere to a certain set of rules. To gain a better understanding of the problem, we must disaggregate the different functions involved in resource management.

Successful institutional solutions to the problem of overuse and resource degradation must ensure that rules be enforced at four distinct operational levels of management: rules that prescribe how local resources must be used, rules for monitoring resource use to guard against violations, rules for sanctioning deviance to prevent further violations, and rules to arbitrate disputes over the meaning of rules and to create new rules.[71] If users flout rules at any of these levels, institutional arrangements can unravel and eventually fail to ensure sustainable resource use.

The first step in the formation of viable institutions at the local level is the creation of rules to use a resource system. In general, use rules must be formed in accordance with higher level rules that are specified by the state. Use rules have two aspects: some of them specify how benefits from a resource system can be appropriated; others describe how users must contribute to protect, maintain, or enhance the resource. Following Ostrom I will call these appropriation rules and provision rules.[72]

Appropriation rules can vary in their content widely. The rights to use local resources can be distributed equally among individuals in the village; they may favor individuals with larger families, with larger asset ownership or with higher social or caste status; they may distribute benefits in accordance to the effort contributed by different village households; or, they may be empty - in the sense that no restrictions for withdrawing benefits exist. The same holds for contributions that village households must make to the resource system. For the

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resource at the same time without degrading the resource.

[71]See also Furubotn and Pejovich, The Economics of Property Rights.

[72]Ostrom, Governing the Commons.

withdrawal of benefits to remain below the renewal, user behavior must be monitored.[73] Resource users in the village are likely to follow interactive strategies, and alter their withdrawal and contributions depending on what others do. It is important therefore to know what other community members are doing. The behavior of different individuals must be monitored.

Ideally, monitoring should provide accurate information on all rule related behavior - violations and conformance. Such accurate monitoring would provide the necessary information to users and managers of the common resources to sanction violators. In practice, such perfection can be achieved only at a substantial cost. But in the absence of any information on the user behavior creating rules for using the resource becomes meaningless. Institutional solutions to the monitoring problem, therefore, must balance the cost of detecting rule violations against the cost of the violations of rules. Users can mutually monitor each other's behavior, they can select individual(s) to monitor rule infractions, an external agent can appoint monitors — the range of solutions is large, each though, is beset with its own problems.[74] In essence, the questions is, "Who will monitor the monitor?" How do we ensure that monitors will actually monitor? As we shall see, several of the local institutions that I studied have devised simple solutions to this problem.

Monitoring provides information on rule violations. Once obtained, this information needs to be translated into effective punishment of violators if monitoring or rule-making is to have any meaning. Again, different agencies can impose punishments - the monitor himself or herself, another agent selected by the users or the resource, an agent provided by the state and so forth. Not only is it important to choose an appropriate body for imposing sanctions, the level and

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[73]Else rational users will withdraw in access of what is prescribed by rules.

[74]See Jon Elster, <u>The Cement of Society: A Study of Social Order</u> (Cambridge: Cambridge University Press, 1989).

promptness of sanctions will also bear upon their success. Sanctions imposed months or years after a rule violation occurred will be less effective than if they were called up immediately. Similarly, the severity **of** punishment must be appropriate to the nature of rule infraction.

Finally, there must be arenas where it is possible to discuss and resolve disagreements that among users, managers, monitors, rule violators and those imposing sanctions. If a large body of users considers the rules for using resources to be grossly unfair, enforcing the rules may be impossible. Similarly, if users disagree over interpreting some rules, if there are disputes over reported infractions of rules, or if there are questions about sanctions on rule breakers, then there must be some rules or a mechanism through which disputes can be satisfactorily resolved. If disputes are consistently resolved in the favor of a particular group or individual, and seen by a majority of the users as biased, the entire institutional structure for utilizing resources (from the level of rule creation to sanctions) may prove to be quite ineffective.

The supplying of enforceable rules at each level is a collective action problem that individuals must solve to create institutional regimes that can guide resource use successfully. External intervention by governments -- either through more secure private property rights, or by bringing resource systems under greater government control - or local innovation, can lead to successful institutional solutions. In none of the cases is it necessary that the solutions will be optimally or globally successful. The level of success enjoyed by different solutions will depend on the ingenuity of rule makers, and the particular situation.

Creation of institutions has been treated as a collective action problem that resembles the famous Prisoners' Dilemma game in structure.[75] It is important

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[75]**For a discussion of the famous Dilemma, see D. R. Luce and Howard Raiffa, Games and Decisions; Introduction and Critical Survey (New York: Wiley, 1957). David M. Kreps, "Corporate Culture and Economic Theory." in Perspectives on Positive Political Economy eds., James E. Alt and Kenneth A. Shepsle**

to note however that creation of successful institutions to manage resources is in effect a game that has at least four stages - creation of rules for the use of the resource, monitoring of the users' behavior, sanctioning the violators of users, and arbitration of disputes. The structure of the resultant action situation cannot be described by any simple single shot game. The investigation of resource management arrangements through game theoretic analysis becomes especially difficult because the different games representing the four stages need not resemble the structure of any simple game.

Further, the different rules for managing resources cannot be analyzed in isolation of each other. As Ragin and Ostrom point out, the specific impact of a particular rule on human behavior is often determined not by the rule itself, operating alone, but by the configuration in which it exists with other rules.[76] For the analysis of the impact of institutional arrangements on behavior, this characteristic of the nature of rules has a profound impact. It means that we cannot simply pick up rules for monitoring resource use or sanctioning violators and attempt to predict what the effect on user behavior will be if the particular rule is changed. We must at the same time also keep in mind the other rules and examine effects of rule changes in other dimensions. In the analysis of rules in

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(Cambridge: Cambridge University Press, 1990) 90-143 provides an excellent discussion of the similarities between successful solutions to the Dilemma and the provision of institutions. For a discussion of differences between the underlying structure of many problems of institutional supply and the Prisoners' Dilemma, see Robert H. Bates "Contra Contractarianism: Some Reflections on the New Institutionalism," Politics and Society 16 (1988): 387-401; Ostrom, Governing the Commons: and Carlisle Ford Runge, "Common Property Externalities: Isolation, Assurance and Resource Depletion in a Traditional Grazing Context," American Journal of Agricultural Economics 63 (1981): 595-606; and idem., "Institutions and the Free Rider: The Assurance Problem in Collective Action," Journal of Politics 46 (1984): 154-81.

[76]Charles Ragin, The Comparative Method (Berkeley: California University Press, 1987: Ostrom. Governing the Commons.

chapter five, therefore, I will look at rules for using resources, for monitoring resource use, for sanctioning behavior and for arbitrating disagreements together.

A second important point to be kept in mind is that while rules to guide resource use can be introduced by any agency - private owners, governments, local community officials and organizations - whether users will actually follow rules depends on how well rule following behavior is monitored, deviance is sanctioned and disputes are adjudicated. In the absence of effective execution of the latter three steps in the creation of institutions, it is very possible that existing behavior patterns of users will not be altered. The informal rules that users employ in resource utilization may not be influenced. In examining resource use, and the effect that rules have on resource use, it is important to look at informal rules that exist, why the informal rules are different from formally created rules, and to what extent this disjunction is responsible for resource degradation or conservation.

Conclusion

This chapter presented the theoretical framework that informs the empirical cases in the following chapters. In the first section of the chapter, I indicated three possible directions to answer the puzzle of the emergence of institutions. Institutions, I suggested, may come into being to allow greater efficiency in the utilization of resources. They may emerge as a response to exigencies of risk management. Or they may result from political maneuverings aimed at increasing the relative shares of different groups in the population. The second section of the chapter developed a framework to examine the effects of institutional rules on resource use.

The four empirical chapters that follow will explore the ideas already introduced. Each of the studies I present - of the Raikas in chapters two and three, of village Patawal in chapter four, and of Almora district in chapter five - illustrates a distinct theme from this chapter. The study of the Raikas - nomadic shepherds - discusses primarily the impact of environmental risks on institutional

arrangements. In village Patawal, I show how distributional considerations influenced the creation of new institutions for using local common resources. By studying six arrangements for using community forests in Almora district in chapter five, I illustrate the importance of institutional rules at different levels for creating patterns of resource use.

APPENDIX 1.1

Variation in production levels of economic units over time, across space, and for different activities makes strategies such as storage, mobility, diversification, and exchange important. The following formula, from the theory of portfolio management, expresses succinctly the statistical principle behind different strategies of risk management:

$$= s \left[\frac{1+(N-1)}{N}\right]^{.5}$$

Where:

= coefficient of variation after a particular risk management strategy has been employed;

s = coefficient of variation of a single economic unit over time; for multiple economic units during a single time period; or for many different economic activities adopted by a given economic unit during a single time period.

N = Number of economic units; time periods; economic activities.

= Correlation in the production level of different units.

Where there is a perfect positive correlation in the production levels of all units (= 1), = s. If the variation in the production levels of all economic units occurs together, no strategy can help reduce risks. With no correlation between the production levels of different units (= 0), = s/ N. For all values of 1 > > 0, as the number of units, different activities or time periods over which production levels are integrated increases, risks reduce, but at a decreasing rate, reaching their limit at = s . If = -1, to eliminate variation, the production of only two units need be integrated.

APPENDIX 1.2

To illustrate the importance of information problems and the size of expected gains as factors relevant in negotiations, I will select a simple example - in fact the same example as used by Coase in his classic article on the problem of social cost.[1] For a cattle raiser and a farmer, Coase states the relationship between the number of cattle in the herd of the cattle owner and the crop loss for the farmer as follows:

Size of Herd (no. of steers)	Annual crop loss (tons)	Crop loss per additional steer (tons)
1	1	1
2	3	2
3	6	3
4	10	4

The price of the crop is $ 1.00 per ton and a fence can be built between the farmer's and the cattle-raiser's lands for $9.00. Coase proposes that if the cattle raiser is liable for the damage caused, then the cattle raiser will include the costs of damages paid to the farmer in his cost calculations and raise the size of his herd till the point where the gain from an additional steer are higher than the crop loss caused by the additional steer. On the other hand, if the cattle raiser was not liable for damages, then the farmer will be willing to pay the cattle raiser

[1]**Ronald H. Coase, "The Problem of Social Cost," The Journal of Law and Economics 3 (October 1960): 1-44.**

up to four dollars if the cattle raiser reduced his herd size to three steers from four steers (assuming that four steers is the size of the herd the cattle raiser wished to maintain if crop damage was irrelevant); seven dollars if the cattle raiser reduced his herd size from four steers to two and so forth. Through this example Coase develops his basic insight: although property rights may affect the distribution of benefits from economic activities, they do not affect the total output (in the absence of transactions costs).

However, in the presence of information asymmetries and uncertainties and political struggles, Coase's insight requires qualifications. Let me elaborate. Coase is correct about the dollar amounts that the farmer will be willing to pay the cattle raiser to prevent him from adding an additional steer to the herd. But to find out the amounts that the cattle raiser will be willing to pay when he is liable for damages, we must examine the returns that the cattle-raiser gets from adding an additional steer to his herd. These, however, are not provided by Coase. If the additional amounts that the cattle raiser gets from increasing his herd size are higher than the losses to the farmer, then the farmer will attempt to extract the entire profit that the cattle raiser makes from adding another steer to his herd. Depending upon the specification of property rights and the negotiating skills of the cattle raiser and the farmer, the cattle raiser may be forced to pay as damages all his profits. This will be true as long as the information on the exact profits and losses of the farmer and the cattle raiser is unavailable. Thus the stakes involved in the bargaining between the cattle raiser and the farmer are the higher of the amounts that either one of them gets.

The problem is not one of transactions costs. In a more general situation where the externality imposed on a party "X" through the actions of another party "Y" result in lowering the utility of X, the problem arises because of strategic misrepresentation of preferences. Such preference misrepresentation not only increases the amounts at stake in negotiations, it may also alter the aggregate output under different property rights arrangements, even in the absence of

transactions costs. Consider the following table where the losses and gains of the two affected parties under different property rights arrangements are unknown.

Marginal Gain/Loss to Y	Production Level Chosen by Y	Marginal Gain/Loss to X
Y(1)	1	X(1)
Y(2)	2	X(2)
Y(3)	3	X(3)
Y(4)	4	X(4)

The table represents a situation where Y can undertake a range of actions 1 to 4 each of which involves an unknown loss as a result of externalities to X, increasing from X(l) to X(4) and corresponding to the actions undertaken by Y. Each of these actions also provides to Y an unknown gain of Y(l) to Y(4). Assume also that Y is liable for damages and that Y(i) > X(i). If, to achieve a better bargaining position, X inflates his losses and Y deflates her gains,[2] such that neither of them know the other party's real position, no prediction can be made regarding the level at which production will be in equilibrium. It will depend on the amount that Y must pay to X as damages in consequence of the production level chosen by her and the profits accruing to her at that production level. In the long run, in the absence of knowledge about the exact amounts of liability, both parties will attempt with even greater intensity of effort to create property rights institutions such that they are not liable for damages. In this example it does not matter much whether the actual gains and losses are known to the parties involved in the transactions. If they themselves also do not know the precise amounts, such lack of knowledge will encourage their natural tendency to claim greater losses (for X) or lower gains (for Y), further decreasing the possibility of arrival at a mutually agreeable outcome and the likelihood of being at the Pareto frontier. However, even if they knew the extent of their losses and gains, they have

[2]**X will inflate losses and Y deflate gains since Y is liable for damages.**

incentives to misrepresent them as higher since such misrepresentation will aid their bargaining position. Incentives for misrepresenting preferences are especially severe where negotiations among parties are for provisioning of public or common goods.[3]

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[3]Since it is costly to exclude individuals in a group from using the benefits available from public and even common goods, and there are costs to the provisioning of public and common goods, it is in the interest of individuals to consistently misrepresent their interest in the provision of the good. At the same time different individuals will have a different interest in the provisioning of the good. Whenever the divergent interests of a number of parties must be accommodated in the negotiations over the selection of a particular institution, the problem of preference revelation becomes especially acute, making it possible that all collective-choice processes will be manipulable by individuals who choose strategically. See Allan Gibbard, "Manipulation of Voting Schemes," Econometrica 41 (1973): 587-601; Mark Satterthwaite, "Strategy-proofness and Arrow's Conditions: Existence and Correspondence Theorems for Voting Procedures and Social Welfare Functions." Journal of Economic Theory (1975): 187-217; and Thomas Schwartz, "No Minimally Reasonable Collective-choice Process can be Strategy-proof," Mathematical Social Sciences 3 (1982): 57-72.

Chapter 2:

THE GRASS IS GREENER ON THE OTHER SIDE !

This chapter examines the subsistence and survival system of a group of nomadic shepherds from India - the Raikas.[1] It illustrates the role environmental risks play in influencing and determining various activities of the Raikas on their migration cycle. It argues that the strategies adopted by Raikas change in response to their dynamic context. Taken as a whole, their strategy set constitutes a survival system that is well adapted to their risky environment. The pastoralists' strategies possess a clear rationale and are explicable in terms of efficient utilization of available resources and of environmental risks. Contrary to popular and official misconceptions, therefore, the movements and activities of the Raikas can not be viewed as random behavior; neither can they be ascribed to ignorance or lack of intelligence.

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[1]Questions about whether pastoral production systems are profitable, or whether it is even possible for such systems to survive in the long run, trouble the most sanguine analysts. See for example, David L. Browman, "Agrarian Reform: Impact on Llama and Alpaca Pastoralism in the Andes," in Contemporary Nomadic and Pastoral Peoples: Africa and Latin America ed., Philip Carl Salzman, Studies in Third World Societies, Publication Number 17, (1978): 151-152; and Theodore Monod, "Introduction," in Pastoralism in Tropical Africa ed., Theodore Monod (London: Oxford University Press, 1975) 183; For a contrary view see Neville Dyson-Hudson, "The Study of Nomads," in Perspectives on Nomadism eds., William Irons and Neville Dyson-Hudson, (Leiden: E. J. Brill, 1972) 9.

I begin this chapter by describing the social and occupational structure of the Raikas.[2] I then examine their migration patterns, discuss the Raika migratory camps, and analyses their flock economics. My major purpose in this chapter is to provide answers to two basic questions. Why do the Raikas migrate? And, why do they migrate in groups?[3] Answers to these questions will show the role that considerations of efficiency and environmental risks play in the institutions of the Raikas.

Who Are The Raikas

The Raikas are the largest sheep-herding community in India. Today, they are divided into several exogamous clans[4] (gotra). Most of the clans[5] possess

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[2]Raikas are also known as Rebari or Dewasi. Most of the Raikas in Rajasthan belong to the Maru group of Raikas.

[3] For the benefit of the reader, I will recapitulate some of the relevant discussion on risks from chapter one. Human adaptations to environmental risk, distributed temporally or spatially, are collectively termed "buffering mechanisms". However, the exact form a buffering mechanism exhibits is a function of both social structure and the nature of variability. Thus, it will be hasty to assume that nomadism is simply an environmentally induced reflex. See O. Lattimore, Inner Asian Frontiers of China (New York: American Geog. Society, 1940) 331-34. Both politics and ecology play a role in determining the specific nature of the nomadic response that a society will produce. Societal responses can be conveniently analyzed as one or a combination of the following four basic categories: mobility, diversification, storage, and exchange. See Halstead and O'Shea, Bad Year Economics, 3-5. The Raikas use all of these, but especially mobility and different forms of exchange, in their repertoire of survival mechanisms.

[4]The information given on clans divisions among Raikas is based on interviews with Raika shepherds and on a survey of the Raikas carried out in 1980 by FAIR (Foundation to Aid Industrial Recovery), New Delhi. See Foundation to Aid Industrial Recovery, A Study of Migrant Shepherds (New Delhi: All India Handicrafts Board, Ministry of Commerce, 1980).

[5]A list of these clans is provided in Table 2.1.

subclans. The social life of the Raikas is substantially influenced by caste panchayats known as Nyaats. Nyaats are assembled at festive occasions, as well as on births, marriages, and deaths. A nyaat can also be called to settle a dispute between two feuding parties.[6] Such disputes may originate over land, over the breaking of a marriage or engagement contracts, or over individual conduct that offends members of the caste or the community. Usually the numerical strength of the assembled nyaat depends on the gravity of the occasion, the status of the host for the nyaat, and the impact that the host wishes to create. The nyaat is presided over by an elder Raika, (called a Panch) who decides how a dispute must be settled. His decisions are final on pain of social ostracism if the disputants do not adhere to the decisions handed down to them.[7]

The Raikas are the most important nomadic pastoralists in Rajasthan. Prevailing environmental conditions (aridity and poor soils), especially in Rajasthan's Western districts make it particularly well-suited to a combination of agriculture and livestock rearing; the existing fodder resources, however, cannot support the large number of animals in these districts. While part of the fodder deficit is met by importing fodder from neighboring Punjab and Haryana, it is even more significantly relieved by the migration of animals, particularly sheep,

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[6] **When nyaats assemble, they are usually hosted by the individual in whose house the birth or death has taken place. In case of marriages, the groom's side hosts the nyaat. In case of nyaats called to settle disputes, the expenses of hosting the nyaat are borne by the parties involved in the disputes. The expenses are incurred on feeding the kinsmen and villagers who have assembled for the occasion.**

[7] **The Nyaat is usually called only while the Raikas are stationary. Since the assemblage is based on village households, calling a nyaat while the Raikas are migrating will be well nigh impossible. However, it is entirely conceivable that after the annual migration is over, a nyaat may be assembled for offenses committed by a Raika while he was migrating. As such the possibility of punishments meted out by the elders in the nyaat is a powerful disincentive for individual raikas to break caste rules.**

to Punjab, Uttar Pradesh, Haryana, and Madhya Pradesh.[8] Estimates on the proportion of the flocks that migrate annually from Rajasthan to other states vary from as low as 20% to as high as 90%. The data collected during this survey reveals that while the proportion of sheep owners who migrate is low (35%); the proportion of sheep that migrate is far higher - closer to 90%.[9] There are no official figures on the proportion of Raikas among the migrants, but my respondents estimated that Raikas probably form 50% of all migrating shepherds.

Raikas are the largest of the pastoral nomadic groups in Rajasthan, but most Raika households combine dry season pastoralism with rainy season agriculture.[10] However, the Raikas do not own much land.[11] Given low per capita ownership of land, individuals, in general, can increase their overall income either by buying more land or by investing in animals. Ownership of animals, in contrast to land ownership, provides the advantage of diversifying risks. In periods

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[8]See Center for Science and Environment, The State of India's Environment, 1984-85: The Second Citizen's Report (New Delhi: Center for Science and Environment, 1985). Currently a large proportion of migration of sheep is to Haryana and Uttar Pradesh. Historically, however, a large number of animals also went to Gujarat and Sind. See Purnendu S. Kavoori, Pastoral Transhumance in Western Rajasthan (Jaipur, India: Institute of Development Studies, 1990).

[9]This is in agreement with Kavoori's findings as well as with the informal estimates of the Sheep and Wool Department of Rajasthan (quoted by Kavoori, Pastoral Transhumance). Migration, this implies, is a survival strategy that is more important for the larger flock-owners than for small shepherds.

[10]Of course, there are some Raika pastoralists who do not migrate with their animals. Typically, these are Raikas who own fewer than twenty-five sheep and goats. A small percentage of Raikas are also on the move for the entire year. But many members of even such "permanent migratory groups" own land and engage in agriculture.

[11] Although caste-wise land holding data are not available for all of Rajasthan, the Raikas in the villages that I surveyed had among the lowest per capita land ownership. See chapter 4.

of low rainfall, productive assets (animals) can be removed to areas with higher rainfall - something that is impossible to do with land or standing crops. The Raikas use precisely this strategy. Every year, after the monsoon months, they embark on a six to nine month migration cycle that spans up to two thousand kilometers. They thus counter environmental uncertainty by diversifying their investment into assets which are mobile and whose output is determined by a production function quite different from that which determines output from land.

All of the above explains why the Raikas must migrate. The very survival of their sheep and the viability of their household economy depend on their regular migration into regions with greater forage.[12] Grazing areas within and around their villages simply do not produce sufficient fodder to provide adequate nourishment for their sheep. And purchase of feed for the sheep from the market would be prohibitively expensive.

Given that the Raikas must migrate, the obvious question is whether they would find it more advantageous to migrate individually or in groups. Collective migration offers the Raikas two basic advantages over individual mobility: economies of scale and through larger numbers, greater security in interactions with outsiders. In much of the rest of this chapter, I illustrate these points by examining the concrete steps that Raikas undertake to ensure for themselves the advantages of collective migration.[13]

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[12]See last section of this chapter for a quantification of the annual returns that the Raikas gain from migration. They vary from as low as Rs. 1.5 per sheep for the small flocks to Rs. 35.00 per sheep for the larger flocks. (Rs. 26.00 = $ 1.00)

[13]Collective migration however, also suffers from disadvantages, primarily because it raises the costs of decision-making. To counter coordination and decision-making problems, the Raikas have devised a sophisticated system that structures decision-making in the group. For a description and analysis of this system see chapter three.

Migration Patterns

While Raikas are distributed throughout Rajasthan, most of them are concentrated in the districts in Western Rajasthan, especially in Pali, Jodhpur, Nagaur, Sikar, Ajmer and Banner. Typically, they migrate east from these districts in mobile herding camps that are known as **dangs.**[14] The leader of a dang is the **nambardar.**[15] Dangs comprise anywhere between eight and twenty herding units. Each herding unit headed by a **mukhiya** is called an **ewar.**[16] The migration of the dangs can be categorized along several dimensions: the period over which migration lasts, the distance travelled during migrations, the frequency with which migration is undertaken, and the direction of travel.

Of these, the duration and frequency of migration and the distance travelled during migration are very closely related. Each depends on the size of the shepherds' flock[17] and the vegetation around a village. On the other hand, the direction in which a dang migrates depends for the most part on the contacts that a nambardar has developed with settled groups along the migration route.

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[14]Dang is pronounced with a soft "d". The "a" is short as the "u" in "but".

[15]Nambardar literally means the "holder of a number". The word dates back to the British period when migrating shepherd leaders were assigned a number by the state administration.

[16] Words such as nyaat, dang, nambardar, mukhiya, and ewar, have no convenient translations into English. In the text, I have usually translated dang as camp. But for the most part I have used the other non-English terms directly, in preference to using a non-exact or clumsy translation.

[17]Shepherds own sheep flocks which greatly vary in size - from 50 sheep to 1,200 sheep. An ewar flock is rarely larger than 600 sheep. An ewar flock may comprise more than one flock - each owned by different individuals. In the chapter I have usually used the word 'flock' to signify a group of sheep as in, "the shepherd's 'flock' ". In section III, where I discuss economic returns to flock owners, I have also used "flock" to signify the sheep, the camels, and the owner of the flock himself as in, "the returns to 'flock' 3 are low".

Duration, Frequency and Distance of Migration

The Raika migration cycle begins at the end of the monsoons. Depending on the fodder-animal balance in their village and in the areas close to the village, the period of migration can vary from as little as three months to as much as the entire year.[18] (See table 2.2).

The shepherds travel for three to five months before they reach their destinations in Haryana, Uttar Pradesh or madhya Pradesh. After spending between a month and two in these states and with the approach of the monsoons, they begin their journey back home. The return journey, which lasts no more than two months, is often completed by a different route and is much faster than the outward journey. Generally, the total length of migration is between six and nine months, but it seems that the average duration of migration has increased over the past few years. This is true for the shepherds whom I interviewed in the dangs, as well as for the nambardars (see Table 2.2).

Although four years is too short a period of time to establish a pattern and conclude that the length of shepherd migration is increasing, the figures in table 2.2 confirm findings by other researchers.[19] For the nambardars, the average length of migration has increased by a month. For the ordinary herders, the

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[18]This statement assumes significance in the context of the following facts. In most of the drier areas of Rajasthan - certainly in the districts mentioned earlier - there is little irrigation. Therefore, cropping intensity for almost all land (the number of crops grown in a year) is less than one - reflecting a fallow period. Customarily, animal owners graze their animals in almost all fallow land. Thus for the purpose of grazing, fallow land is public property - animal owners from any village can graze their animals in the fallow of any other village. The exact duration of the fallow period varies from village to village depending on the time at which the first showers are expected and received, but typically, the months between November and May constitute the open grazing period. This also implies that any landowner who wishes to use irrigation must fence his land to keep animals out.

[19]Kavoori, Pastoral Transhumance.

duration of migration has in precipitously from about six months in earlier years to eigh nt year. However, the figures for the ordinary herders need tnewhat cautiously.

Almost all the nambarc 0 to 400 sheep. Flocks of this size form "viable herding units nomic pressure, therefore, on the nambardar to combine his shepherd. Quite a few of the shepherds, however, own floe less sheep. These shepherds combine their flocks to produce an economically viable flock. But the smaller flock owners can often find sufficient forage around their village, and therefore they do not have to migrate for six to nine months every year. It is possible that in some of the years, the smaller shepherds will not find a suitable partner with whom they wish to migrate. Since several small flock owners whom I interviewed do not migrate every year, the average duration of migration for shepherds as a whole is low. This will be clearer if we look at the distribution of the migration periods for the shepherds and the nambardars. We see from Table 2.3 that some shepherds migrate for three months or less - these are shepherds who own small flocks. At the same time, often the period of migration lies between 6 and 9 months. The shepherds with larger flocks migrate for longer periods.

The data in tables 2.2 to 2.4, and the accompanying discussion, suggest the following three inferences: first, the duration of migration is directly proportional to the size of a shepherd's flock. If a shepherd owns a small flock, he needs to leave the village for a shorter period of time. Second, flock size is directly related to the distance travelled by shepherds during migration. In years when the shortfall in vegetation around the village of a small flock owner is not extreme, (owing to relatively good rainfall), he will herd his sheep in the pastures around his village. Even if he leaves his village, he will not go far - preferring to herd the

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[20]**To understand why a hundred sheep do not make up a viable herding unit for the purposes of long distance migration, see section III on flock economics.**

sheep close to the village and travelling between his home and the flock every week. Third, if a shepherd has a large flock that numbers 200 or more sheep, he is likely to migrate every year, because even in years of average or better than average rainfall, the village pastures will not produce sufficient fodder for his entire flock. Duration, distance and frequency of migration, this shows, are all closely related and interdependent. The correlation between flock size, and duration, distance and frequency of migration is shown in table 2.4.

Direction of migration

While the duration, distance and frequency of migration are strongly influenced by economic factors - in the sense that they are linked to resource availability and flock size[21] - the direction of movement depends more on socio-political factors. Given that a Raika dang can cover as much as two thousand kilometers during a migration cycle, the shepherds are highly likely to travel across national and state boundaries. This means that we must consider questions of national security and differences in state policies.

Prior to Indian independence, a large number of pastoralists from Western Rajasthan went to Sind after the monsoons. However, when most of Sind became Pakistan in 1947, the option of migrating in this direction was formally closed to Indian shepherds.[22] Current policies of different Indian provinces also drastically affect the direction shepherds choose for migration. In 1979 the state government

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[21]This, of course, is not to say that government policies do not influence the duration, distance, and frequency of migration. It should be sufficient to point out here that government policies regarding agriculture, irrigation, fodder and pasture development, species-specific livestock health, credit, law and order, and famine - to name a but few - will significantly affect different aspects of migration.

[22]Ibid., 11.

of Madhya Pradesh increased the taxes on livestock[23] immigrating from out of the state by as much as a factor of ten. As a result, now most migrants either avoid Madhya Pradesh or are forced to make side payments to petty forest officials to procure access to state owned grazing areas.[24]

While migration is feasible in several major directions (towards Uttar Pradesh, Haryana, Delhi, or southern Rajasthan), the actual choice of direction depends on the nambardar's familiarity with the farmers and other villagers on a given route. The purely economic advantage[25] of going to a particular state - to Uttar Pradesh or Haryana or Delhi - does not seem to be prominent in any of the cases. (See maps in Appendix 2.3 for migration routes of shepherds).

The routes described in appendix 2.3 and shown in maps I and II confirm that there is no overwhelming advantage to going in a particular direction. Dangs from the same region go in different directions. We must then, seek the explanation for the choice of directions in the manner in which nambardars are created and in the relationships that they develop.

Each year, shepherds select nambardars prior to the beginning of a fresh migration cycle. A number of shepherds approach a person who they feel is influential within the local community, has good contacts among the settled population along some migration route, and is capable of interacting with government bureaucracy - in short, a person with leadership qualities. If someone has acted as nambardar for a few years, his selection may become routine. Often

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[23]CSE, India's Environment.

[24]The grazing tax for goats and sheep increased from Rs. 1.00 per animal per year to Rs. 10.00; for camels from Rs. 10.00 to Rs. 50.00; and for cattle from Rs. 0.75 to Rs. 2.00 per animal. (Written communication, 1990, Bhopalaram Dewasi, President, Rajasthan Livestock Breeders Federation,).

[25]I refer here chiefly to the availability of fodder for sheep and to geographical obstacles to migration.

a relative, perhaps the father, of the new nambardar may also hold (or have held) that office. The choice of a good nambardar is crucial to the success of **a** migration cycle[26].

Once chosen, the nambardar becomes responsible for the choice of the migration route. His decision depends on how familiar he is with a given route and the people and villagers on that route. Knowledge about the route, is important because shepherds often get into fights and conflicts with settled populations along their migration route. Indeed, the incidence of the often unavoidable conflicts between settled populations and passing shepherds has increased over the years. If a fight occurs, local acquaintances can prove to be invaluable. Local acquaintances can also offer shelter and help when sheep are sheared, and folding space for the sheep during migration.

The choice of the direction of migration thus depends on socio-political as well as economic factors. State policies, presence of acquaintances, familiarity with the route - these determine the possibilities of subsistence while moving and therefore the attractiveness of a migration route.

The Moving Village

Dang Characteristics

Raikas migrate in "dangs" - the corporate social unit of migration. The dang is a closely knit group of shepherds, cooks, sheep, camels, goats, dogs and sometimes donkeys, organized by "households". On the average a dang consists of twelve "households", each known as an "ewar" (see Table 2.5). The ewar consists of five to seven persons (men, women and children) who need not necessarily be from a single household, but are usually affinally or agnatically

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[26]See appendix 2.2 for the entire range of decisions that a nambardar is entrusted with.

related (see appendix 2.1). In no dang for which I possess data were all ewars from the same village (see table 2.6). To avoid confusion, therefore, dangs are known by the name of the nambardar or by the name of the nambardar's village.

The membership of a given dang remains relatively consistent from one year to another. New members are chosen when previous members do not join the new cycle: either because they have found other alternatives or because they are dissatisfied with their current migration experience. Dissatisfied shepherds can easily join another dang on the basis of kin relationship with any member of the new dang or on the basis of friendship with another shepherd in that dang. There is no formal criterion that a new member has to fulfil to join a dang. There are of course informal criteria, primary among them being that the shepherd should not have the reputation of being a trouble maker.

To set camp, Raikas require two things - fuelwood and water. These are collected from the fields in which camp is struck. The fields may be private, government-owned or owned by a village community (see table 2.7). The Raikas themselves prefer setting their camps in private fields that have irrigation - especially when there is tube well irrigation since water from the tube well can also be used for the sheep and for their own needs of drinking, cooking, washing and so forth. Farmers also have a clear preference that the shepherds fold sheep in fields with irrigation possibilities because fertilization by sheep manure in irrigated fields provides better crops.

Apart from the above, there is yet another reason why the Raikas prefer to fold their sheep in irrigated fields. In general, irrigated fields belong to the wealthier and more influential persons in the village. By folding their sheep in the fields of the richer individuals, the shepherds reduce their chances of being harassed. A more powerful local acquaintance will deter theft and mischief-makers from entangling with the shepherds. The shepherds I interviewed related instances where farmers in whose fields they folded their sheep would sometimes help them look for culprits if any sheep were stolen.

Spatial Organization of the Dang

At the first glance, a camped dang resembles nothing as much as a mobile village (see Table 2.8). The belongings of different ewars are laid out in a circle, there are little camp fires[27] for cooking (each ewar cooks its food separately), and by nightfall the animals return from grazing. After the sheep have come back for the night, they are folded inside the circle of the camp-fires, while the camels remain outside.

The Raikas do not use tents but sleep in the open. Sleeping in the open entails problems regarding security of assets. Raikas tackle such problems in two ways. For one, they set camps for the night in fairly precise patterns, somewhat resembling concentric rings. When women and children are present, Raikas put their belongings (known as **dera)** in the center of the innermost circle. The women and children sleep in this circle. The sheep are in the second, the camels in the third, and the guards in the outermost circle.[28] After the women have left for home, the sheep are placed in the innermost ring, then come the camels, and finally the men with their belongings (see diagrams 1 and 2 for a schematic representation of the arrangement).

To guard their belongings and sheep, the Raikas maintain a careful watch during the night[29] During the watch, the guards talk to each other, sing, and walk to prevent themselves from falling asleep. In areas known for criminal activity or hostility to shepherds, guards walk from their position to the position of the next guard, who then walks to the position of the next guard and so on, until the circle is complete. To ensure that nobody falls asleep, they often carry

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[27]**Camp fires are almost religiously put out in the night to prevent detection by thieves and trouble-makers.**

[28]**All men act as guards.**

[29]**Depending on the strength of the ewar, the members will have to stay awake for a longer or shorter duration in the night.**

a stick with them which is rotated as the watchers move along the circumference of the circle. If any of the guards falls asleep, the stick remains with him, and he can't pass it on to the next person. In the morning, this unmindful person will be discovered by the location of the stick, and appropriately fined.

Ewar Characteristics

An ewar is the constituent unit of dangs. It is also the unit along which production and consumption are organized in the dang. Individuals in an ewar are related to each other but often belong to different households from different villages (see tables 2.9 and 2.10). On the average, an ewar possesses five or six members.[30] There are no formal restrictions that the corporate group places on ewar membership. In practice, however, much greater store is placed on kin relationships than on mere friendships. As shown in Appendix 2.1, just four out of the 160 persons in thirty ewars were friends of the head of the ewar rather than relatives.

Ewar members graze the sheep and camels, take care of the young sheep, cook and perform other household tasks, and communicate between the ewar and the village. The head of the ewar - the mukhiya - assigns different tasks to the individual ewar members. This is the case even if the ewar members belong to different households and villages. Indeed, it is in situations where there is greater possibility of disagreement (as is often the case when ewar members belong to different families) that the task of distributing responsibilities is more important. Usually, tasks are assigned according to age and sex.[31] The dynamics of the

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[30]Of the 30 ewars I interviewed, 22 had either five or six members - see table 2.11.

[31]At the same time, when the ewar is formed, members are also chosen with an eye to the daily different tasks that normally must be carried out during migration.

assignment process will become clearer in the following paragraph where I project an idealized picture of responsibility distribution.

Two males can graze an average ewar flock of three to five hundred sheep (see table 2.11). Of these, usually one is an adult, and the other a child around ten years of age. An adult female and in some cases a younger female child cook and perform other household-related tasks such as milking the animals[32], setting camp, unpacking, and breaking camp. An adult male maintains contacts between the migrating ewar and the household in the village by travelling back and forth between the two. This person also carries out other tasks that are related to the migration and to herding since the shepherds who graze the sheep have no spare time. Thus he gathers information about rainfall, about fodder availability, about selling sheep and wool, and purchases medicines and supplies. He also grazes camels when assigned this task by the nambardar and sometimes helps the women in packing belongings and breaking camp. A teenager takes care of the new-born sheep.

Of course, none of the task assignments according to age and gender are inviolate. The opportunistic flexibility that characterizes migratory grazing is also evident in the division of labor. When women leave the dang towards the end of the migration cycle,[33] male members of the ewar double as graziers and cooks. Depending on the availability of labor in the family, the mukhiya can employ a shepherd - called gwala - for grazing sheep. The relationship with the gwala is usually purely economic: the gwala grazes the sheep and often carries out other

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[32]However, camels are milked exclusively by males and camel milk is drunk fresh. There are religious taboos on the sale of all milk, (but especially the milk of camels), on the heating of camel milk and on its use for making tea.

[33]A male member in the dang escorts the women home.

tasks in exchange for food, some clothes and cash.[34] Of the ewars I interviewed, forty percent employed gwalas.

Daily life in the ewar is fairly harsh. The shepherds rise before day break and take their sheep to graze - usually within 3 to 5 kilometers from the camp. They return after 3 to 4 hours and breakfast. Before their return, the persons in charge of grazing the camels leave with the camels. After breakfast/lunch, the shepherds again leave for grazing the sheep. The camels return after the shepherds' departure and are loaded with the household goods so that they can move to the next camping location. Raikas move camp almost every day, and seldom stay in any location for more than two days.

The dang reaches its new campsite in two to seven hours. During the move, men and women walk, as they lead the camels. Younger children, infants, and new-born lambs travel on camel-backs. Once the dang has reached the new camping site, the camels are unloaded, camp is struck and the camels are again taken away for grazing. The shepherds return to the camp with the sheep a little after sunset. When women are in the camp or if someone is specifically in charge of cooking, the dinner for the shepherds is cooked by this person before the shepherds return from grazing. If there is no one in charge of cooking the meals, then the shepherds cook for themselves after returning from grazing the sheep.

With women present in the camp, sheep are milked regularly every morning and evening. The milk is used for drinking, and making yogurt, tea, butter, buttermilk and ghee (clarified butter). Women carry out all of these tasks. Women are also expected to fetch firewood and water, and wash and mend clothes. In addition, they are responsible for spinning sheep's wool.

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[34] See the section on "Economics of Sheep Herding" for the economics of and for details on contracts between the gwalas and the mukhiya of the ewar.

Nomad-Farmer Relationships

As pastoralists, the Raikas must interact with settled farmers during the period of their migration.[35] They depend on settled populations for food, campsites, water, and fuelwood;[36] equally importantly, most of the available grazing for sheep falls inside village boundaries, very often on lands owned privately. On the other hand, farmers depend on the Raikas (although not crucially) for fertilization of their fields. (Sheep droppings are perceived to be better manure for the fields than either chemical fertilizers or cattle dung).

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[35] The distinction between sedentary and nomadic populations has been questioned by many researchers; particularly when it is depicted as the distance between two polar extremes See Neville Dyson-Hudson, "The Study of Nomads," in Perspectives on Nomadism eds., William Irons and Neville Dyson-Hudson, (Leiden: E. J. Brill, 1972): 18. Daniel G. Bates, "Differential Access to Pasture in a Nomadic Society: The Yöruk of Southeastern Turkey," in Perspectives on Nomadism eds., William Irons and Neville Dyson-Hudson, (Leiden: E. J. Brill, 1972); Michael M. Horowitz, "Ethnic Boundary Maintenance among Pastoralists and Farmers in the Western Sudan (Niger)," in Perspectives on Nomadism eds., William Irons and Neville Dyson-Hudson, (Leiden: E. J. Brill, 1972); and William Irons, "Variation in Economic Organization: A Comparison of the Pastoral Yomut and the Basseri," in Perspectives on Nomadism eds., William Irons and Neville Dyson-Hudson, (Leiden: E. J. Brill, 1972) call such facile category creation into question and provide a thoughtful analysis of the relationship between nomads and farmers. The dual nature of the Raikas, who are both settled farmers and migrant pastoralists, demonstrates the failure of rigid categories to describe empirical verities.

However, the analytical distinction between sedentary farmers and mobile shepherds still helps us to understand Raika nomadism. Purged of rigid dichotomous overtones, the terms "sedentary farmer" and mobile pastoralist" can serve as useful analytical tools.

[36] The shepherds can buy needed food-grains in shops in towns. However, it is often easier to buy grains in village shops because then they do not have to carry grains for long periods of time, nor do they have to make detours from their migration route just for getting food from the town. But for water, fuelwood, and for campsites, they must depend on villagers for the most part. Carrying these is out of the question.

It should be noted that there exists a growing 'asymmetry' in the relationship between migrant shepherds and sedentary farmers. Farmers no longer depend on sheep manure as they used to. Inorganic fertilizers are widely available and many farmers consider them as good as sheep manure. Second, with greater availability of irrigation, farmers increasingly enclose their fields and/or raise two crops every year.[37] Large areas have also been enclosed by the government to develop and protect vegetation. Third, the pressure on village common lands is increasing and the area of common lands is decreasing owing to encroachments and the distribution of common lands among the landless.[38] Common lands are also declining because village panchayats (councils) take advantage of government programs that encourage tree planting to enclose village commons.[39] At the same time, the absolute number of village animals grazing on the common lands has increased. These developments imply that less fodder is available for sheep belonging to migrant shepherds. In contrast to these developments among settled populations, Raikas continue to depend heavily on migration. The number of animals migrating out of Rajasthan each year and the period of migration have both increased.[40] Water and fuelwood, always scarce in semi-arid environments, are no longer as easily available even over the wetter

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[37]Increase in irrigation has also resulted in the creation of new grazing possibilities for the shepherds in the state of Haryana. Canal irrigation in Haryana has created a "new adaptive niche" for the pastoralist in the form of crop stubble in a previously barren region. See Kavoori, Pastoral Transhumance.

[38]See Rita Brara's Shifting Sands: A Study of Rights in Common Pastures (Jaipur, India: Institute of Development Studies, 1989) which contains an excellent study of this issue.

[39]See chapter four.

[40]The data in table 2.2 support the latter statement. For estimates on the increasing trend in the number of migrating animals. See Center for Science and Environment, The State of India's Environment, 4-11.

parts of the Raika migration routes; often village residents themselves have to walk long distances to collect sufficient fuelwood for cooking.[41]

As some strands dissolve in the web of mutual dependence between shepherds and farmers, conflicts between the settled populations and the Raikas are becoming more frequent. Despite this trend, it remains remarkable, that "out of the thousands of independent interactions that take place between shepherd and cultivator in the course of a cycle of migration, only a handful at the most lead to minor altercations".[42] According to shepherds, most 'altercations' take place in specific villages which have a history of hostile responses to shepherd presence.[43] Problematic issues have been water, grazing, theft of animals, and in exceptional cases, collection of fuelwood. Table 2.12 lists the reasons behind 25 shepherd-farmer disputes in 1989-90.

These disputes were reported by 16 of the 30 dangs that I interviewed. Clearly, not all the dangs get involved in significant conflicts. Of the 25 incidents, 16 were related to grazing and sheep theft. Sheep theft attacks the very basis of

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[41] **Ibid. It should be kept in mind, however, that the asymmetry in the shepherd-farmer relationship is to some extent mitigated because the shepherds have customarily and without challenge collected firewood, obtained water, camped on village lands, and grazed their animals on the fallow. Their migration imposes little cost on villagers as long as their animals do not browse on standing crops - something the shepherds exercise great care to prevent. See Center for Science and Environment, The State of India's Environment, 1984-85. 11 for reports containing a different view. Indeed, sheep droppings provide valuable fertilization for farmers. Even today, many farmers along the migration route compete with each other to have shepherds fold sheep in their fields. Before chemical fertilizers became available, such additions to the fertility of the land were invaluable.**

[42] **Kavoori, Pastoral Transhumance.**

[43] **Many of these villages are difficult to avoid as they are conveniently located along the most frequented routes of migration.**

Raika livelihood and is immediately visible.[44] It is not surprising therefore, that it produces the most serious conflicts; in such conflicts, it is very likely that disputants will get injured and the incident will be reported to the police and pursued in courts. Of the 7 reported cases of conflicts over sheep theft, 5 resulted in someone getting hurt. (The corresponding figure for disputes for other reasons is 6 injuries for 18 conflicts).

"Blackmail" is a source of dispute that is usually related to a nambardar's lack of familiarity with a particular geographical area. The three incidents of blackmail listed in table 2.12 occurred in dangs that initiated migration in a new direction. Once the shepherds are camped they may be approached by a group of people who will attempt to extort money in exchange for security. After assessing the seriousness of the threat, the shepherds may pay their "patrons" some money or give up a couple of sheep. Some of the factors that shepherds consider in threat assessment are the size of the group that demands money, whether its members carry firearms, and whether the local villagers know anything about threatening group.

The Raikas invoke the help of the government only as a last resort. Historically, their interactions with government officials have seldom promoted trust. The administration is generally ill-equipped to deal with the needs of a mobile population, a fact that has repeatedly been impressed upon the Raikas

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[44]Raikas and their sheep display a very high degree of familiarity with each other. Raikas can recognize all their sheep without any markings, as the sheep recognize their shepherds. The shepherds in the ewar have a name for each sheep in the flock - whether the flock be of fifty sheep or of a thousand. The sheep too can distinguish the calls from their masters from calls by other persons (as can be vividly demonstrated by a shepherd - by calling out a sheep's name leading to a sheep come running to its master). It is often said that if the shepherd orders his sheep to sit down, the sheep will die before it moves from the spot in which it was told to sit down. Usually shepherds discover thefts in the morning when they are separating their sheep from sheep of other ewars in the dang. At this time, if any sheep is missing, the shepherd will know of it without needing to count the sheep.

through negative experiences with the police, the judicial system, and other administrative institutions such as the forest department, government veterinary hospitals, and the revenue department. Even government services that ostensibly exist to support shepherds[45] often prove indifferent to their requirements and fail when needed most, i.e. when sheep are sick or dying.

The structure of government departments and the experiences of their personnel are better oriented to satisfying the needs of settled rather than mobile populations. The police, the judiciary, veterinary doctors, and forest officials expect their clients to come to them rather than the other way around. The public distribution system similarly provides subsidized commodities only to settled villages; not to persons moving every day to a different location. So far the state has done little to dispel the developing distrust between settled populations and migrating groups - at best it has been indifferent.

Economics of Migration

Income from Sheep Rearing

Raikas have three sources of income - wool, animal sales and sale of manure. Of these the first two are the more significant. Revenues from wool and animal sales are received directly by the heads of the ewars, the mukhiyas. The income from folding sheep goes to a general fund used to defray collective migration expenses. The fund is managed by the nambardar.

Wool Sale

Sale of wool takes place each time sheep are sheared - usually twice a year. The first shearing occurs in the Raika village homes in October; the second when

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[45]**Such as government veterinary hospitals, or the Sheep and Wool Development Board.**

the shepherds are on the migration cycle - during the return journey.[46] Professional shearers - 'lavas" - usually shear the sheep.[47]

In the Raika villages, raw wool is stored in sacks and kept in **a** hut. Usually, there is little pressure to sell the sheared wool to wool merchants, or their agents. During migration however, there is greater need to coordinate the sale with shearing so that the sheared wool does not become a burden for the moving dang. The nambardar coordinates and carries out the various tasks associated with the sale of the wool during migration.

The first shearing task is to establish contact with the shearers. It is rendered somewhat easier because a large number of shearers is located in just two or three cities in Rajasthan. Thus in Pipar city there are 60 parties of shearers.[48] The second task is to negotiate a price for the wool. The nambardar may contact wool merchants and negotiate a tentative price for the wool even

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[46]According to the Raikas, in recent year this pattern is undergoing some change as shepherds are forced to shear sheep even three times a year owing to financial pressures and need for quick cash.

[47]Many Raikas also shear their own sheep, especially when the shearing is done at home. This is more likely for poorer shepherds. When shepherds shear the sheep themselves, the task is undertaken either by the immediate family of the shepherd, or with the help of some neighbors. Today however, more and more Raikas get their sheep sheared by lavas - professional shearers - even when they are at their home bases. This implies a higher level of organization and coordination than earlier when individual shepherds could undertake to shear their own sheep.

[48]Parties of shearers and the way they are organized would itself make a fascinating study in cooperation and mobility. Shearing parties share their earnings from shearing equally - in fact, they do not even keep count of the number of sheep that each individual shears. They have their own trade union (formed in 1989), and travel thousands of miles each year to shear the sheep of migrant shepherds. Over the last few decades their migration patterns have changed together with those of the shepherds. While they spent a lot of time in Gujarat earlier, today they spend more time in Uttar Pradesh and Madhya Pradesh.

before shearers are contacted. The wool may be sold on the sheep. In such contracts, the wool merchants arrange for the shearing. But most nambardars prefer to arrange and supervise the shearing themselves because with a merchant in charge, the shearers may nick or cut a larger number of sheep. It is also more profitable for the nambardar to arrange the shearing.

The third task that must be completed before shearing, is the selection of a shearing site. To shear up to 5,000 sheep a party of 20 shearers requires a week. Therefore, a farmer who provides the shearing site to the Raikas must also be willing to accommodate the dang and provide dang members fuelwood, fodder and water for a week. Water is needed as drinking water for humans and sheep, but also to wash the sheep because the cleanliness of the sheared wool determines the returns to the shepherd.[49] Nambardars prefer a spot close to a motorable road since such a spot will make the transportation of the wool easier. A covered space should also be available to store the sheared wool in case it rains. Finally, the sheared sheep are corralled in a fenced space which must be constructed before the shearing can begin.[50] Seldom do shepherds pay farmers in cash for the shearing site. Sheep droppings in the farmer's fields during the night are usually his main return.

The trader with whom the nambardar negotiated a tentative wool price arrives at the site of the shearing while shearing is still in progress. After his arrival, the nambardar contracts for a final price for the dang's wool. Whatever this price, other shepherds in the dang abide by it. Sometimes, the nambardar and the trader may not be able to reach an agreement. Such incidents happen only when the price of wool which is subject to volatile fluctuations, changes

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[49]Mr. Zabar Singh Udawat, Marketing Assistant, Wool Development Board, Jodhpur, quoted by Kavoori, Pastoral Transhumance, 63.

[50]The sheep that are sheared are enclosed in the fenced corral like space and let out after they have been counted. This prevents double counting of the sheared sheep as also missing counting any sheep that have been sheared.

drastically between the period when the price was first negotiated tentatively and the final settlement.[51]

Animal Sales

Animal sales are the shepherds' major source of income. One can distinguish two types of sheep sales. Sale of mature stock, or regular sales, that take place in annual cycles[52] between January and April; and sales of animals to meet short term cash needs. Sales to meet short term needs are often of unfit animals. However, if the shepherd does not need money urgently, he will attempt to nurse the sick sheep back to health through medicine and by carrying it on the back of a camel.

The sheep are sold to traders and their agents who specialize in buying sheep from migrant shepherds. The market works quite effectively in this regard. Sheep buyers visit dangs at regular intervals, thus there is no need for any of the ewar leaders to make trips to the market.

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[51]Usually, shepherds find it difficult to negotiate prices with different traders. Traditionally, most shepherds need ready cash. The trading pattern that has emerged in response to this need greatly disadvantages the shepherds (See FAIR, Migrant Shepherds). At the village level, most wool traders have an agent known as a "khatik". The khatik buys the wool from the shepherds in advance by paying Re. 1.00 per sheep. After making the down payment he marks the sheep whose wool is sold to him. Another agent who controls the trade in 20 to 30 villages, pays another Rs. 5.00 after six months. This entitles him to half the price of the wool from the sheep every six months. The other half is shared between the shepherd and the village khatik in the ration of 3:1. The shepherd is thus deprived of 62.5% of the income from the sale of wool simply in exchange for Rs. 6.00 per animal.

[52]For the smallest flocks there may be no discernible cycle in the selling of mature sheep. Medium sized flocks may sell mature stock every three or even every two years. In flocks of 350 to 400 sheep an annual cycle of mature animal sales can be discerned.

Animals sales are governed by several factors: ideal herd size, rate of lambing, labor availability, and male to female proportions in the herd. Raikas consider 350 to 500 sheep the ideal size of a flock.[53] Given the limited labor availability in the ewar - two shepherds - the mukhiya[54] attempts to maintain the flock at about that size. If in some year, lambings in the flock are low, and the size of the flock is small to begin with, the shepherd will reduce the sale of animals. Conversely, sales will be higher if there are **a** large number of successful lambings.

As table 2.14 shows, shepherds attempt to maintain an optimal proportion of adult males and females for a given flock size by selling excess male animals. In larger flocks, (350 or more sheep) the proportion of males is rather low (Between 10% to 20%) and tends to vary only in a small range.[55] However, the number of males tends to be high just before culling (see table 2.15 for proportions between males and females if rams sold during the year are added to the total male adults figure).

In medium sized flocks the ratio of males to females tends to be the same as in the larger flocks, but fluctuates more between cullings (between 15% and 35%). For the smallest flocks, the proportion of males to females is highest as is

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[53]The average flock size of an ewar is 452 (see table 2.8). However, the average flock size of the household units constituting an ewar is only 190. (For distribution of flock sizes of flocks constituting an ewar see table 2.13)

[54]In each ewar, the mukhiya makes the decisions regarding which animals are to be sold, the number of animals to be sold, and the time at which the animals should be sold. This is also true for ewars in which more than one household has come together to make up the ewar.

[55]In the tables on the ratio of rams to ewes only one of the flocks - no. 10 - has a high ram to ewe ratio (28% to 72%). The flock owner explained this with his inability to sell any of his sheep in the year.

the variation in ration between cullings (between 25% and 45%).[56] These distinctions between different flock sizes can be explained by the need of all shepherds to maintain a minimum number of males in their flocks for crossing with the females. Once this minimum is satisfied, shepherds try to increase the number of females to the maximum in order to increase the size of their flock at the fastest possible rate. In the larger flocks this imperative can be played out fully because the shepherd can make ends meet from the sale of wool, without having to sell any animals. Smaller shepherds however, must sell sheep regularly in order to survive. So although the number of males smaller flocks need is somewhat lower than what the larger flocks require, the proportion of males to females is still high in small flocks.[57]

The proportion of male and female lambs is more or less even. This is may be expected since there is no reason for there to be a higher proportion of males or females in the flock (see table 2.16). While the sex proportions of lambs are more or less equal at birth, independent of flock size, the shepherds manipulate the ratio between male and female lambs through sales and gifts to increase the proportion of ewes in the flock. In addition to manipulating the age and sex composition of the flock against the size of the flock, Raikas also attempt to use animal sales to respond to adverse climatic and natural variations. Of course, the most important strategic response to climatic variations and resultant

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[56]**In all cases, the highest proportion of males to females is seen just before the flock is culled. Naturally, the lowest proportion is seen just after culling. In the tables above, only one flock in the small flock size group has a low male to female proportion -18% to 82%. The main reason is that the flock owner was able to sell a proportionately higher number of sheep this year than general. Usually someone owning a hundred sheep sells 6-8 sheep. This year, owner of flock no. 2 sold 12 sheep.**

[57]**Sale of adult females does not make economic sense. Nor is it an acceptable practice among the raikas because of religious taboos on sale of adult female sheep. A consideration of whether this religious taboo exists because of economic imperatives is beyond the scope of this chapter.**

variations in fodder availability is mobility. But severe adverse conditions also prompt the shepherd to increase animal sales. Animal sales of this kind are better known as distress sales. However, in the conditions under which these sales take place, if the shepherd did not sell large parts of his flock, many of his animals would die - representing a total loss.[58] It is interesting in this context to note that even in highly adverse years, most flock owners are able to prevent their flock size from falling below a certain minimum.[59] At these times, the reduced flock comprises basically prize rams and adult females.

Sheep Folding

Income received from folding sheep in farmers' fields forms an important, but generally unrecognized part of the total income of the Raikas. Part of the reason is that this income goes into a general fund and several joint expenses[60] for the dang are met from this fund. At the end of the migration cycle, whatever balance remains in the fund (positive or negative) is shared equally by the different ewars.

Not all farmers pay the shepherds for folding the sheep in their fields. On the average, the nambardar in a dang is able to negotiate some returns from farmers for 20% to 35% of the days that the Raikas are on the move. The amounts the farmers pay depends on the number of dangs in the area, proximity of the sowing season, irrigation availability, number of sheep in the dang, and the

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[58]Clearly, this argument in no way attempts to minimize the severity of the loss to the shepherd resulting from distress sales of animals.

[59]According to Kavoori Pastoral Transhumance, 22 this minimum is a flock size ranging between 50 and 100 sheep. The range to some extent also depends on the breed of sheep - for the hardier Marwari sheep the range is somewhat higher. (As reported by my respondents - fieldwork conducted between March and June, 1990).

[60]For a description, see the following sub-section on expenses.

number of farmers that want sheep folded in their fields. The amount dangs actually receive ranges between Rs. 30.00 to Rs. 200.00 per night.[61] In many cases, the Raikas receive grains (wheat or millet) instead of cash. The average amount of grain they get varies between 20 and 40 kilos of wheat or 25 and 50 kilos of millet.[62] Table 2.17 provides the figures for income from sheep folding (as well as income from other sources).

Most ewars earn between Rs. 600 and 900 each through the sale of sheep manure to farmers (when divided among flocks, the amount is smaller; see table 2.17). Such sums scarcely rival the returns from either wool or animal sales. Sale of sheep manure rather constitutes a supplementary income. Yet families that earn less than Rs. 5,000.00 in an average year, can by no means scoff at Rs. 600.00; in some cases, it may constitute as much as 25% of the final surplus.

Expenses incurred on Sheep Rearing

In order to assess the viability of migrant sheep-herding, the income from wool, animal, and sheep manure sale must be balanced against the expenses incurred by shepherds. I divide into two categories the expenses incurred by the ewar: expenses incurred individually by each ewar, and collectively incurred expenses. Of the total expenditure, the greater proportion is incurred individually. Each ewar individually meets expenses on sheep (feed and supplements, grazing, medicines, transportation,[63] shearing),[64] and labor (salary for the gwala,

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[61]At current rates of exchange, $1.00 equal approximately Rs. 26.00.

[62]The price of wheat and millet is approximately Rs. 2.00 and Rs. 1.75 per kg.

[63]Transportation of the flock by trucks is still a very rare phenomenon and occurs only in circumstances where the survival of the flock without using transportation will be impossible owing to the non-availability of grazing within walking distance for the flock. (See Kavoori. Pastoral Transhumance). However, none of the shepherds I interviewed had transported their sheep and I do not discuss it as an item of expenditure in this note.

consumption expenditure on ewar members, transportation, entertainment). Expenses that are necessary for gathering information (usually this task is performed by the nambardar), entertaining guests, paying fines, and bribing officials, are met by the dang collectively.

Feed and Grazing

For the most part sheep browse and nibble on grass in fallow fields, on government land and on village community land. Raikas do not pay fees for any of these. However, fodder is not uniformly available during the migration months in the winter Raikas supplement natural fodder with different kinds of feed purchased from the market. Such supplementary feed is also bought for the pregnant sheep.

Shepherds pay cash for grazing sheep in two situations. Permanently migrating dangs pay grazing fees in forest areas during the monsoon months. At this time all private fields are under crops and the fodder available in community lands is hardly sufficient for the village animals. On the average grazing fees are around Rs. 0.50 per sheep in Rajasthan forests. In Madhya Pradesh forests shepherds formerly paid Re. 1.00 per sheep. At present, however, grazing fees have been raised to Rs. 10.00 per sheep. The second situation in which shepherds pay for grazing their flocks provides them access to harvested fields of green grams (a kind of lentil) in Haryana and Uttar Pradesh. They rent fields for about a month and pay approximately Rs. 50.00 for a hundred sheep.

Medicines

Shepherds use both indigenous and western medicines to treat the sheep. Western medicines are purchased when indigenous substances fail to have any

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[64]**Expenses incurred on shearing have already discussed in the previous section and I will not deal with them in this section.**

effect. Vaccines, injections, tonics, anti-biotics, and anti-diarrhoeal and deworming medicines are the most important. Most medicines are purchased in the open market from private traders but some are also procured from the government.

Gwala[65]

Not all ewars employ gwalas and not all the employed gwalas receive salaries.[66] In cases where gwalas are paid salaries, it forms a major part of the flock's expenditure. Whether and how much a gwala is paid depend on his kin relationship with the ewar mukhiya and on the number of sheep he brings into the ewar. If the gwala does not bring any sheep, he is paid between Rs. 2,200.00 to Rs. 3,500.00 depending on his age and skill. Ewar mukhiyas prefer younger gwalas because they can be paid less. In addition to the salary, all gwalas receive food and a set of clothes. Gwalas who bring less than fifty sheep receive between Rs. 1000.00 and 2000.00 in addition to food and clothes while those bringing between 50 and 100 sheep are paid less than rupees thousand. If a gwala adds a hundred or more sheep to the ewar, he is not paid any cash but still provided with food and clothes. The exact amount a gwala receives finally depends on idiographic variables related to kinship and the negotiating skills of the gwala and the ewar mukhiya.

Consumption Expenditure

Much of the consumption expenditure is incurred on food. Meals consist of unleavened bread made out of coarse grains (millet), onions, and red or green

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[65]**Gwalas are individuals hired by the shepherds to help graze sheep.**

[66]**Seven of the thirteen flocks on which I have information employed gwalas. However, only three of the flocks hiring gwalas were the same size as the ewar. So four of the flocks would only need to pay part of the salary of the gwala. (In total I came in contact with 69 flocks. Of these eight flocks were the same size as the ewar. Four of these eight also hired gwalas.)**

chilies. In the evenings either a lentil soup or some vegetable are added to the meal. Tea is made several times using sheep milk; milk from sheep forms an important part of the Raika diet - used for making butter, buttermilk, yoghurt, and clarified butter. Camel milk is drunk fresh, without being heated.

While the diet is similar for most Raika households during migration, irrespective of wealth and status, tobacco and opium are consumed mostly by the richer Raikas, Tobacco and opium consumption can have a significant impact on the household economy; richer Raikas can spend up to Rs. 100.00 on opium every month. Apart from food, tea, tobacco and opium, medicines are the only other item of regular consumption expenditure. Raikas treat most common ailments with western medicines available over the counter. Not much money is spent on medicines however.

Transportation

Raika ewars maintain regular contact with their village households and make trips back and forth between the dang and the village as often as once every two months. Anyone who wishes to go back to the village must obtain permission from the nambardar so that his movements can be coordinated with those of the dang. The nambardar tells the shepherd where he must return and on what date. Only the nambardar has a rough idea of the distance and direction that the dang will travel during the period the shepherd is away from the dang. On the day the shepherd is supposed to return from his journey home, the nambardar sends another member of the dang to the prearranged meeting point. Usually the meeting place is a train or a bus station since it is easy to locate.

Joint Expenses

The nambardar of the dang undertakes reconnaissance missions to gather information regarding precipitation and vegetation availability. Such journeys are of two types. Journeys over short distances and lasting approximately two to three

hours, and longer journeys which take up to three or four days and may involve travelling over hundreds of miles. Nambardars undertake shorter journeys on horse or camel back almost every day in the morning. They travel five to twenty miles ahead of the dang and gather information on the state of vegetation over the proposed route. They look at the state of water availability at the usual water-points and find out if the farmers whom they are acquainted with are present in their villages. They talk with the farmers and see if the farmers will be willing to let them camp for the day in their fields. Since Raika dangs move almost every day, such reconnaissance missions are invaluable in getting advance information which will help the movement of the dang.

Nambardars undertake the longer journeys using public transport. In these journeys the nambardar attempts to learn more about the rainfall and presence of vegetation than about farmers or watering points. Several nambardars may join each other before undertaking these journeys. Information gathered on these journeys aids decision-making regarding the general direction of the movement of the dang. Expenses incurred on the longer journeys are shared by the dang members collectively. Similarly, the dang collectively bears expenses on journeys that dang members make to purchase medicines for the sheep from the city.

Food is cooked collectively on all festive occasions - such as for Holi, Diwali, Akha Teej, Prasaadi, Raakhee, Shivratri, Gangaur[67] and so forth. For all the festivals, shepherds buy stores using cash from the joint fund of the dang. To buy the stores, the nambardar sends three or four members of the dang, ensuring that different people are sent for different festivals. Thus food is cooked jointly for the entire dang on five to eight occasions during a year. The expenses on these joint celebrations can run quite high, up to Rs. 200.00 each time for the entire dang. These expenses are also shared equally among all the ewars.

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[67]Each of these is celebrated by Hindus all over India.

Welcoming and taking care of guests visiting the dang is also the collective responsibility of the dang. And finally, all expenses incurred on payment of fines and on bribes are shared equally by the members of the dang (see table **2.18).** Fines may be required for trespassing, for paying off irate villagers in whose fields sheep may have grazed, or to government officials. Often fights with farmers on different issues may be settled through the payment of a fine. While fines are only an irregular source of expenditure, payment of bribes to government officials are a pervasive element of cash drain on the economy of the mobile Raika dang. Bribes are necessary to procure subsidized medicines, to secure permission to graze in forest areas,[68] or to cross state borders. In all these cases, the negotiations are left to the nambardar who pays the bribe out of the general fund. In cases involving high amounts a number of elders in the dang may be involved in the deliberations.[69]

As is obvious from table 2.18, fines and bribes are the largest item of expenditure in joint expenses. Most of the smaller flocks have fairly low levels of collectively incurred expenses because in the dang, the total amount spent collectively is divided equally among the different ewars, and within the ewar, the mukhiya of the ewar distributes expenses equally among the flocks that constitute the ewar. The flocks that constitute an ewar all by themselves incur the highest amounts as collective expenditure. These are ewar 9, 10, 11, and 13. The average joint expenditure for these flocks is Rs. 629; The same figure for the flocks that are only a part of another ewar is Rs. 280.

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[68]Few Raikas can afford to pay the grazing fees levied by the government before passes for grazing are issued. They attempt instead to bribe forest officials and graze their animals in exchange. Often however, they have to pay bribes to several officers before the period of grazing in the forests ends.

[69]Such instances may occur when the police is called in to settle fights with farmers.

Flock Economics

This sub-section considers the actual returns and expenses that each flock I interviewed incurred during its migration.

Returns

Table 2.17 shows the total income of each flock from sheep folding, and wool and animal sales. The highest proportion of returns is from stock sales - 56% of the total returns during migration. This is nearly half as much again as returns from wool sales. However, there are large variations across flocks in the returns from stock sales - from Rs. 420.00 to Rs. 21,020. Returns from sales of wool, even while they are lower than those from stock sales, fluctuate less strongly across flocks. Their range is from Rs. 1,705.00 to Rs. 11,880.00.

Expenses

Table 2.19 provides estimates on expenses over feed and grazing, medicines for sheep, and shearing cost. Table 2.20 gives the figures for transportation and consumption expenses and the salary paid to the gwala in case a gwala is hired by the flock. The figures in this table are expenses incurred by different flocks on labor. Consumption expenses are primarily a function of the length of time for which the dang is migrating and the number of people in the flock. The salary of the gwalas is split evenly by the flocks in an ewar if the number of flocks in an ewar is more than one. All expenses are consolidated together and presented in table 2.21. Table 2.22 shows the income and expenditure statements for all the flocks as well as the average surplus that a shepherd has been able to procure.

For most flocks, animal sales are essential for staying out of the red. The only two flocks which do not have a surplus of income over expenditure were those unable to sell mature animals (flocks 3 and 10). All the flocks that could sell some mature animals were out of the red. Indeed, for four of the larger flocks (5, 9, 11 and 13) income from animal sales alone is sufficient to meet all

their expenses. In none of the cases is the income from wool sales sufficient to meet all expenses.

Advantages of Larger Flock Size and Collective Migration

We began this chapter with two questions: Why do the Raikas migrate? And, why do they migrate in groups. Migration itself was motivated by exigencies of environmental risks. The discussion on the "Economics of Migration" aims to show that collective migration is preferred to individual migration because it increases the efficiency of herding and at the same time helps reduce security risks. There are two kinds of economies that collective migration produces: those that Raikas achieve through a larger flock size, and those that are reaped by migrating in a group of flocks. Migration in a group of flocks also reduces security risks.

There are many variations in the surplus generated by flocks of different sizes. However, the trend is clear. As flock size increases, surplus per sheep registers an upward trend.[70] As table 2.23 shows, surplus per sheep and per person increases significantly from one flock-size category to next. The larger flocks procure a surplus of almost Rs. 30.00 per sheep and Rs. 3,000.00 per person while the smaller flocks earn less than Rs. 2.00 per sheep and Rs. 100.00 per person.[71] It seems however, that once flock size increases beyond 600, shepherds either divide their flocks into two, or sell off enough sheep to bring the flock back to a smaller size. They tend to split two flocks if there is sufficient labor available within the household and if they do not need cash urgently.

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[70]Part of the reason why there are variations and the trends are not clear is that flocks 3, and 10 were unable to sell any sheep during the migration period. Had they sold some sheep, the difference in surplus per sheep or per person in the different categories would smaller; especially for the first two categories.

[71]See also figure 2.1

There are several sources of scale economies: from needing fewer shepherds per sheep; and from better rates on purchases of medicines, feed, and grazing and sales of wool. At the same time, the larger flocks need to maintain a smaller proportion of males to females in the flock. Since flocks sell primarily male sheep, larger flocks have an advantage over smaller flocks in this respect also.

A number of advantages accrue from migrating collectively: one, income from folding sheep in the fields of farmers; two, benefits from collective grazing of camels, collective purchases of medicines and feed, and collective preparation of food for guests and during festivals; three, lower payments of bribes and fines to officials and settled populations; and four, greater security against theft and other crimes. Income from manure sales, collective grazing and collective purchases improves migration efficiency: each ewar saves nearly Rs. 1,500.00 by migrating together with other ewars. Lower bribes and fines, and better security improves the shepherds' abilities to counter risks.

Manure from a few hundred sheep in an individual flock is too little for a farmer to go to the trouble of offering flock-owners cash or grains.[72] But when farmers can persuade a dang of four to five thousand sheep to spend the night in their fields, they are willing to pay a price to the shepherds. If the flocks were to migrate individually, they would lose approximately Rs. 500.00 (see table 2.17) in lost manure sales.

In chapter three I will show that each ewar saves about Rs. 900.00 by grazing all the camels in a dang collectively. Shepherds also indicated that because they purchase medicines and feed for the sheep in bulk for the entire dang, they get discounts of up to ten percent from traders on the purchases of

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[72]**The shepherds estimated that the price of a large basket of manure - which is what a flock of 300 sheep would produce during a night - is possibly around Rs. 5.00. For a dang of 5,000 sheep - the average for my sample - the value of the manure would be approximately Rs. 83.00.**

these items. Each flock spends Rs. 1,000.00 on medicines (see table 2.19). Therefore, if the flocks were to migrate individually and purchase their own feed and medicines, they would probably spend an extra Rs. 100.00. Similarly, if each flock cooked for its guests and on festivals, it would be forced to spend a larger proportion of its time on these activities than it does when such tasks are divided among ten to twelve flocks in each dang.

At present shepherds spend less than Rs. 200 per flock on bribes which the nambardar pays on behalf of the flocks; and on fines that result from fights that dang members may get involved in. In cases of theft of sheep, because there are a large number of shepherds travelling together and willing to help each other, they are often able to recover stolen sheep. The very fact that there are so many of them travelling together and keeping a watch over their sheep during the night deters many would-be thieves from stealing. Individual flocks would find it extremely difficult to negotiate bribe amounts with government officials; demonstrate adequate bargaining strength to belligerent villagers; exercise sufficient caution and safety in the night to protect sheep; or recover stolen sheep. Collective migration avoid all such problems.

Conclusion

There are two primary conclusion that this chapter helps us to make. Raikas are able to tackle environmental risks and improve their net household incomes by migrating annually. Second, collective migration is substantially superior to individual level migration. These conclusions answer the two questions that motivate the discussion in this chapter: why do the Raikas migrate? And, why do they migrate collectively?

All flocks, if they can sell mature sheep during the year, are able to procure for themselves a surplus beyond simple subsistence. From table 2.22 we see that collectively the interviewed flocks made a net profit of more than Rs. 64,000. This is an average of Rs. 5,000.00 for every flock or Rs. 1,500 per person. Thus the

Raikas will have to forego a sizeable income were they to stay at home each year instead of migrating. At home the lack of fodder will force them to maintain smaller flocks, substantially reducing incomes. Migration costs for the shepherds are little higher than their costs of subsistence at home.

We also see that it is the collective migration of sheep that makes the migration strategy efficient. Each flock saves Rs. 1,500.00 by migrating with other flocks. If flocks migrated singly, it is almost certain that any advantages that the Raikas derive out of migration would be lost to theft and in encounters and fights with settled populations. Nor would the flocks be able to enjoy economies of scale that are currently available to them because of migrating in collectives.

Collective migration also requires coordination and creation of institutional hierarchies to facilitate decision-making. The next chapter undertakes an analysis of the decision-making arrangements among the Raikas. The discussion in the next chapter will also show how institutions emerge in response to environmental risks so that costs of coordination and decision-making can be minimized.

TABLE 2.1

List of Raika Clans

No.	Name	No.	Name
1.	Aal	2.	Aandu
3.	Ajjana	4.	Bar
5.	Basant	6.	Bharka
7.	Bhim	8.	Bhukkia
9.	Bhuku	10.	Chelana
11.	Dhugal	12.	Dhula
13.	Gair	14.	Gaangal
15.	Hoon	16.	Janj
17.	Jhuan	18.	Kalar
19.	Kalotra	20.	Kargatta
21.	Khamla	22.	Khatana
23.	Kheka	24.	Kirmata
25.	Kola	26.	Makwana
27.	Mandawat	28.	Nangu
29.	Parihar	30.	Piswala
31.	Samar	32.	Shabdara
33.	Shekhawat	34.	Tira

T A B L E 2.2

Average Months of Migration During the Year

Year -->	1989-90	1988-89	1987-88	1986-87
Duration				
Nambardar (30)	8.23	8.12	7.9	7.2
Shepherds (29)	8.08	6.08	6.12	6.17

T A B L E 2.3

Distribution of Migration Periods: Nambardars and Shepherds

Year -->	1989-90	1988-89	1987-88	1986-87
Nambardars				
Duration of period of grazing				
3 months or less	None	None	2	2
3.1 to 6 months	3	2	2	3
6.1 to 9 months	23	24	21	23
more than 9 months	4	4	5	3
Shepherds				
3 months or less	None	8	9	7
3.1 to 6 months	3	1	2	3
6.1 to 9 months	23	18	16	18
more than 9 months	3	2	2	1

T A B L E 2.4

Correlation between Flock Size and Duration, Distance, and Frequency of Migration

	Duration	Distance	Frequency
Flock Size	.76	.81	.78

T A B L E 2.5

Number of Ewars in a Dang

Category (n=30)	No. of Dangs falling in that category
less than 5 ewars	0
6 to 10 ewars	10
11 to 15 ewars	16
more than 15 ewars	4

Average no. of ewars in a dang is 12.

T A B L E 2.6

Distribution of Dangs by No. of Villages

Category (n=29)	No. of dangs in that category
Ewars from	
2 villages	3
3 - 4 villages	9
5 - 6 villages	10
7 - 8 villages	3
More than 8 villages	4

T A B L E 2.7

Ownership of Fields in Which Raikas Camp

Category (n=14)	Proportion of Campsites
Govt. owned land	16%
Village owned lands	15.3%
Pvt. land (irrigated)	21.4%
Pvt. land (unirrigated)	47.1%

T A B L E 2.8

Size of a Dang in Terms of Animals

No.	Ewars	Sheep	Goats	Camels	Donkeys
1	13	5,500	250	35	
2	12	5,900	110	63	
3	14	5,600	100	61	
4	12	5,100	300	64	
5	11	7,200	130	40	
6	12	4,300	130	45	
7	11	5,700	150	42	
8	6	3,500	65	16	
9	17	7,400	330	56	
10	6	2,300	55	21	
11	14	6,700	160	54	30
12	17	7,300	140	4	40
13	10	4,400	125	33	
14	11	6,300	525	65	3
15	9	4,900	150	4	40
16	10	5,300	120	45	3
17	11	4,200		15	6
18	9	3,500	35	62	
19	16	6,100	200	75	
20	14	6,500	410	100	
21	17	5,300	125	51	
22	13	6,400	325	57	
Average per Dang	12	5,427	187	46	20
Average per Ewar		452	16	4	-

T A B L E 2.9

Family Composition of Ewars by Villages

Category (n=30)	No. of Ewars
Ewar members are from 1 village	13
Ewar members are from 2 villages	13
Ewar members are from 3 villages	4

T A B L E 2.10

Family Composition of Ewar: by Households

Category (n=30)	No. of Ewars
Ewar members are from 1 household	7
Ewar members are from 2 households	9
Ewar members are from 3 households	12
Ewar members are from 4 households	2

T A B L E 2.11

Ewar Size according to Membership and Animal Ownership

No.	Persons	Units	Sheep	Camels	Dogs	Goats
1.	6	3	470	3	1	9
2.	5	1	330	2	-	6
3.	5	3	665	9	-	5
4.	5	2	620	3	1	40
5.	7	4	310	2	-	3
6.	6	3	325	3	1	11
7.	6	3	410	4	1	15
8.	5	2	425	6	-	5
9.	3	1	350		1	3
10.	5	2	335	6	-	-
11.	5	3	460	3	-	10
12.	4	3	410	2	-	7
13.	6	1	350	4	-	14
14.	5	3	560	2	-	18
15.	6	2	340	3	-	5
16.	5	2	570	4	1	17
17.	7	2	530	2	1	10
18.	5	3	380	3	1	20
19.	5	3	340	2	1	5
20.	5	1	315	2	-	5
21.	5	3	510	3	-	6
22.	6	1	380	4	-	8
23.	8	4	625	2	-	-
24.	4	2	305	1	1	12
25.	6	1	615	3	-	4
26.	3	1	525	4	1	6
27.	4	1	490	30	1	20
28.	6	2	530	3	1	-
29.	4	1	375	2	-	22
30.	5	2	455	2	1	-
Avg.	5.2	2.2	443	4	.5	9 . 5

T A B L E 2.12

Reasons for Disputes between Shepherds and Farmers

Category (n=25)	No. of Incidents	Where People were Injured	And Matters Reached Law
1. Grazing	9	3	1
2. Passage through village	1	1	-
3. Sheep theft	7	5	2
4. Water	4	1	-
5. Blackmail	3	1	1
6. Fuelwood	1	-	-
Total	25	11	4

T A B L E 2.13

Distribution of Flocks by Size

Size Category	No. of Flocks
Less than 100 sheep	5
101 to 150 sheep	23
151 to 250 sheep	21
251 to 350 sheep	7
351 to 450 sheep	7
More than 450 sheep	6
Total	69

T A B L E 2.14

Proportion of Male to Female Sheep in the Flock

No.	Flock Size	Total Adults	Male Adult	Female Adult	Male %	Female %
1.	95	64	21	43	33	67
2.	107	67	12	55	18	82
3.	110	72	17	55	24	76
4.	148	103	28	75	27	73
5.	212	114	18	96	16	84
6.	228	149	38	111	26	74
7.	255	197	46	151	23	77
8.	330	267	50	217	19	81
9.	350	295	58	237	20	80
10.	380	295	83	212	28	72
11.	425	312	54	258	17	83
12.	430	320	60	260	19	81
13.	490	387	51	336	13	87
Total	3560	2642	536	2106	Avg. for total 20	80

T A B L E 2.15

Proportion Between Males and Females Including Culled Animals

No.	Adult	Adult+ Culled	Males+ Culled	Female	Male %	Female %
1.	64	68	25	43	37	63
2.	67	79	24	55	30	70
3.	72	72	17	55	24	76
4.	103	111	36	75	32	68
5.	114	148	52	96	35	65
6.	149	169	58	111	34	66
7.	197	209	58	151	28	72
8.	267	291	74	217	25	75
9.	295	323	86	237	27	73
10.	295	295	83	212	28	72
11.	312	357	99	258	28	72
12.	320	345	85	260	25	75
13.	387	432	96	336	22	78
Total	2642	2899	793	2106	Avg. For Total 27	73

T A B L E 2.16

Proportion Between Male and Female Lambs

No.	Flock Size	Total Lambs	Male Lambs	Female Lambs	Male %	Female %
1.	95	31	12	19	39	61
2.	107	40	16	24	40	60
3.	110	38	22	16	58	42
4.	148	45	25	20	55	45
5.	212	98	39	59	40	60
6.	228	79	44	35	56	44
7.	255	58	31	27	53	47
8.	330	63	38	25	60	40
9.	350	55	24	31	44	56
10.	380	85	38	47	45	55
11.	425	113	54	59	48	52
12.	430	110	53	57	48	52
13.	490	103	57	46	55	45
					Avg. For Total	
Total	3560	918	453	465	49	51

T A B L E 2.17

Total Returns for Each Flock

No.	Flock Size	Folding	Wool Sales	Animal Sale	Total
1.	95	264	1,705	1,520	3,489
2.	107	335	2,100	4,745	7,180
3.	110	227	2,295	420	2,942
4.	148	396	3,640	2,800	6,836
5.	212	396	3,920	10,220	14,536
6.	228	335	5,075	7,465	12,875
7.	255	396	5,940	6,220	12,556
8.	330	396	7,020	9,580	16,996
9.	350	791	7,200	12,040	20,031
10.	380	791	7,830	1,740	10,361
11.	425	791	9,920	21,020	31,731
12.	430	396	9,660	10,900	20,956
13.	490	791	11,880	17,630	30,301
Avg.		485	6,014	8,177	14,676
Proportion		3.3%	40.9%	55.7%	100%

T A B L E 2.18

Joint Expenses Incurred by Different Flocks

No.	Flock Size	Guests	Transport	Fines/Bribes	Festivals	Total
1.	95	6	20	107	38	171
2.	107	33	92	134	67	326
3.	110	10	25	100	38	173
4.	148	22	30	150	62	264
5.	212	22	30	150	62	264
6.	228	33	92	134	67	326
7.	255	48	42	154	81	425
8.	330	33	53	160	73	314
9.	350	75	88	300	112	575
10.	380	89	144	300	178	711
11.	425	50	68	382	100	600
12.	430	9	29	161	57	256
13.	490	79	86	350	114	629
Avg.		39	61	199	81	387

T A B L E 2.19

Expenses Incurred Directly on Sheep

No.	Flock Size	Feed/grazing	Medicines	Shearing	Total
1.	95	1,425	475	95	1,995
2.	107	1,498	642	107	2,247
3.	110	1,760	605	138	2,503
4.	148	1,998	814	163	2,975
5.	212	2,544	1,081	233	3,858
6.	228	2,508	958	228	3,694
7.	255	2,805	1,020	268	3,734
8.	330	3,465	1,320	396	5,181
9.	350	3,500	1,330	333	5,163
10.	380	3,724	1,330	437	5,491
11.	425	2,975	1,785	510	5,270
12.	430	2,580	1,290	559	4,429
13.	490	3,430	1,225	588	5,243
Avg.		2,631	1,067	312	4,010
Proportion		66%	27%	8%	

T A B L E 2.20

Expenses Incurred on Labor

No.	Flock Size	Men in Flock	Gwala	Consumption	Transport	Total
1.	95	1	-	1,040	250	1,290
2.	107	2	900	1,800	350	3,050
3.	110	1	800	1,760	400	2,960
4.	148	2	-	1,600	350	1,950
5.	212	3	-	3,120	600	3,720
6.	228	3	1,200	3,360	750	5,310
7.	255	3	-	3,600	900	4,500
8.	330	3	1,200	7,680	1,300	7,920
9.	350	3	1,500	2,240	600	4,340
10.	380	6	1,050	4,620	800	6,470
11.	425	5	3,500	6,480	1,500	10,480
12.	430	4	1,700	5,400	1,200	8,300
13.	490	4	-	7,440	1,600	9,040
Avg.			911	3,857	815	5,583
Proportion			16%	69%	15%	

T A B L E 2.21

Total Expenses Incurred by Each Flock

No.	Flock Size	Joint	Sheep	Labor	Total
1.	95	171	1,995	1,290	3,456
2.	107	326	2,247	3,050	5,623
3.	110	173	2,503	2,960	5,636
4.	148	264	2,975	1,950	5,189
5.	212	264	3,858	3,720	7,842
6.	228	326	3,694	5,310	9,330
7.	255	425	3,734	4,500	8,659
8.	330	314	5,181	7,920	13,415
9.	350	575	5,163	4,340	10,078
10.	380	711	5,491	6,470	12,672
11.	425	600	5,270	10,480	16,350
12.	430	256	4,429	8,300	12,985
13.	490	629	5,243	9,040	14,912
Avg.		387	3,983	5,333	9,703
Proportion		4%	41%	55%	

T A B L E 2.22

Income and Expenditure Statement for the Flocks

No.	Flock Size	Expenses	Income	Surplus (Deficit)	Surplus/ Sheep	Surplus/ Person
1.	95	3,456	3,489	33	0.3	33
2.	107	5,623	7,180	1,557	14.5	778
3.	110	5,636	2,942	(2,694)	(24.5)	(2,694)
4.	148	5,189	6,836	1,647	11.1	824
5.	212	7,842	14,536	6,694	31.6	2,231
6.	228	9,330	12,875	3,545	15.5	1,182
7.	255	8,659	12,256	3,597	14.1	1,199
8.	330	13,415	16,996	3,581	10.8	1,194
9.	350	10,078	20,031	9,953	28.4	3,318
10.	380	12,672	10,361	(2,311)	(6.1)	(385)
11.	425	16,350	31,731	15,381	36.2	3,076
12.	430	12,985	20,956	7,941	18.5	1,985
13.	490	14,912	30,301	15,389	31.4	3,847
			Average surplus per flock			4,947
			Average surplus per person			1,569

T A B L E 2.23

Surplus earned in Different Flock-Size Categories

Size Category (Sheep)	n	Surplus Earned (in Rs.) (Per Sheep)	(Per Person)
0-199	4	1.18	92.00
200-399	6	14.34	1,193.00
400 and above	3	28.78	2,977.00

APPENDIX 2.1

Kin Relationships in Raika ewars

No.	Total Members	Composition
1.	6	Head, son, 2 nephews, f-in-l, b-in-l.
2.	5	Head, 2 sons, wife of elder son, gwala.
3.	5	Head, wife of head, brother, b-in-l, cousin.
4.	5	Head, son, 3 nephews.
5.	7	Head, wife, nephew, 2 friends, wife of one friend.
6.	6	Head, 4 brothers-in-law, f-in-l.
7.	6	Head, 3 sons, d-in-l, nephew.
8.	5	Head, 2 brothers, wife of brother, gwala.
9.	3	Head, younger brother, gwala.
10.	5	Head, brother, wife, son, gwala.
11.	5	Head, 2 sons, b-in-l, grandson.
12.	4	Head, brother, 2 friends.
13.	6	Head, 3 sons, wife, d-in-l.
14.	5	Head, brother, 2 brothrs-in-law, nephew.
15.	6	Head, brother, wives of both, brother of b-in-l, son.
16.	8	Head, wife, 3 brothers-in-law, son, 2 grandsons.
17.	6	Head, wife, son, daughter, brother, nephew.
18.	5	Head, brother, brother's wife, brother's b-in-law, aunt's grandson.
19.	5	Head, 2 sons, cousin, gwala.
20.	5	Head, brother, son, wife, gwala.
21.	5	Head, son, d-in-l, niece's f-in-law, gwala.
22.	6	Head, 2 sons, d-in-l, grand-daughter, gwala.
23.	8	Head, son, wife, s-in-l, 3 cousins, gwala.
24.	4	Head, 2 brothers, gwala.
25.	6	Head, wife, daughter, 3 gwalas.
26.	4	Head, 2 brothers, gwala

27.	4	Head, wife, 2 brothers.
28.	6	Head, 2 daughters, son, s-in-l, gwala
29.	4	Head, son, d-in-l, gwala
30.	5	Head, wife, 3 brothers-in-law.

f-in-l = Father in Law; b-in-l = Brother in Law;
s-in-l = Son in Law; d-in-l = Daughter in Law;

APPENDIX 2.2
Consolidated list of decision issues

Decision Areas/issues	Not know	Mukhiya	Nambardar	Council
1. Dang Formation and Dissolution				
-Selection of nambardar		2	21	7-
-Leaving the dang (Dissolution)		-	28	2-
2. Migration				
Direction:				
-General direction/ route		-	-	264
-Which state		-	-	246
-Scouting: short term		-	-	291
-Scouting: longer term		-	-	273
Timing:				
-When to begin migration		-	-	30-
-When to start return journey		-	1	227
Distance:				
-How far to travel each day		-	-	30-
-Whether to become permanent migrants	16	-	2	12
Camp Setting:				
-Which village to camp in each day		-	-	30-
-Where camp should be set		-	-	291
-Whether to stop for mid-day		-	-	264
3. Ewar Management				
Household decisions:				
-Cooking		-	30	--
-Gathering water/fuelwood		-	30	--
-Buying supplies for cooking		1	29	--
-Breaking camp		-	28	2-
-Setting camp		-	27	3-
Flock Management:				
-Separation of sheep in morning		-	30	--
-Grazing and watering sheep		-	30	--
-Grazing and watering camels		-	6	24-
-Milking sheep and camels		-	30	--

-Taking care of young sheep	-	28	2-
-Maintaining ewar accounts	1	28	2-
-Order in which ewar members will keep night watch	2	5	23-
-Gwala's salary	9	21	--

4. **Dang Management**

<u>People Management</u>:			
-Permission for people wanting to visit village household	-	3	243
-Appoint people for leaving dang to do dang related tasks	-	-	291
-Arrange for receiving those returning to dang	1	2	27-
-Arbitrate disputes	-	-	228
<u>Collective Tasks</u>:			
-Supplies for collective feasts	-	-	282
-cooking for feasts	-	2	262
-cooking for guests	-	2	271
-Accommodation for guests	1	2	27-
-Talking with visitors	-	6	24-
-Purchase medicines	-	5	25-
-Accounts for common fund	-	-	264
-Using the common fund	-	-	282
-Whether to join another dang	-	-	246
<u>Security</u>:			
-Prescribe order for setting camp	-	4	233
-Fine guards for carelessness -	-	14	16

5. **Market Interactions**

-When to call sheep merchants	-	-	10	20
-When to call wool shearers	-	-	12	18
-When to call wool merchants	-	-	17	13
-Who to sell wool to	-	2	26	2
-Who to sell sheep to	-	14	16	-
-Rate for wool sale	-	-	27	3
-Rate for sheep sale	-	28	2	-
-Rate of sheep shearing	-	-	28	2
-How much wool to sell	-	-	30	-
-How many sheep to sell	-	27	3	-

6. **External Relations**

<u>Government Officials</u>:				
-Getting passes for grazing animals in forest	-	3	24	3
-Bribing forest officials	4	5	21	-
-Making reports to police	-	-	27	3
-Bribing police	-	-	28	2
<u>Settled Population</u>:				
-Handle disputes with villagers	-	-	17	13
-Where to fold sheep	-	-	30	-
-Develop acquaintances with locals	-	-	25	5
-Payment of fines	-	-	3	27
-Go for recovering stolen sheep	A	L	G	O
<u>Legal System</u>:				
-Selecting a lawyer for a lawsuit	)			
-Collect money for lawsuit	)	ALL DANG MEMBERS ARE		
-Go to court for hearings	)	INVOLVED		

APPENDIX 2.3

Migration Routes

There are a large number of different migration routes that shepherds follow. Most shepherds follow different routes for going from and returning to their villages in their migration cycle. One reason for following different routes is to not wear their welcome thin in an area by being there too often. In this appendix I will list some of the major routes. I describe the routes under two classifications. Routes followed by shepehrds engaging in permanent migration and routes used by shepherds for six to nine month migrations.

Permanent Migration

In general shepherds from Jaisalmer and Banner do not stay out of their villages on a permanent basis. They go out during the winter and the summer and return home in the rainy season. It is more the shepherds from Jodhpur, Jalore, Pali and Nagaur districts that are on permanent migration. There is lesser variability in the routes followed by shepherds on permanent migration. Divided by season, these migration routes can be broadly classified as follows:

Monsoons

Most of the monsoon months are spent in forest ranges in the area of Karoli, Sawai Madhopur, Dholpur, Kota, Bundi, Jhalawar, and Chittorgarh in Rajasthan.

Summer

The summer months are spent for the most part in districts in Uttar Pradesh. These districts will be Bulandshahar, Mathura, Agra, Etawah, Etah, Mainpuri, Shikokabad and Hathras.

Winter

There are two options followed by shepherds during the winter months. They can spend them in either agricultural fields in districts bordering between Rajasthan and Uttar Pradesh - such as Dholpur, Bharatpur, Jagner, Gangapur and Hindaun. However, not many dangs follow this option. Most dangs graze their flocks in forest areas in Madhya Pradesh in the winter months in the districts of Gwalior, Guna, Rajgarh, Ashoknagar and Chanderi. Two major migratory patterns can be thus distinguished. One is an oscillatory pattern in which the different dangs move up and down spending winter and monsoon in forest areas in the districts bordering Rajasthan and Madhya Pradesh and the summers in Uttar Pradesh. During winter and monsoons, the dangs move from place to place within the forest areas depending on the availability of fodder. The movement from day to day is over short distances, seldom more than two to three miles. As summer approaches, the fodder available in the forests declines and the dangs start moving to the agricultural districts in Uttar Pradesh here stubble in the fields from winter crops can be found for the sheep. At this time, their is greater direction to their movement and they move up to ten miles every day. But once they reach districts in Uttar Pradesh, their movement is again slower. Dangs following this pattern are shown in dotted lines on Map I.

The other is a more of a circular pattern in which the dangs move from forest areas of Rajasthan in the monsoons to agricultural districts in Uttar

Pradesh in summer to forest areas in Madhya Pradesh in the winter. This route is shown in solid lines on the same map.

Migration for six to nine months:

Most of the migration taking place for six to nine months relies on harvested fields in single cropped fields for the earlier part of the migration (between late November and late February) and on the stubble of the winter crop for the latter part of the migration (March to June) during spring and early summer. This means that they there are constraints imposed on the distance and direction of migration by agricultural cycles in the areas where the shepherds are migrating to. Shepherds tend to stay in Rajasthan until the winter crops have been harvested in the canal irrigated fields in Haryana and Uttar Pradesh. Oilseeds and pulses are harvested earlier than wheat and many shepherds enter into contracts for paying farmers for grazing sheep in harvested fields of pulses.

There are four major routes followed by the shepherds that I interviewed. (These routes are shown on Map II. Return routes are shown in dotted lines and routes for going into Madhya Pradesh, Uttar Pradesh, and Haryana are shown in solid lines. Where return routes are substantially the same as outgoing routes, no dotted lines are marked).

1. One group of shepherds follows a circular pattern.Most of the shepherds in this group are from the districts of Ajmer and Nagaur. Two routes in the circular pattern can be distinguished - based on distance travelled. Shepherds travelling the shorter distance remain in Rajasthan - moving from Ajmer, Beawar, and Nagaur to Tonk, Gangapur, Karoli, and Dausa area in the winter, to Bharatpur and Alwar during the spring and early summer and beginning the return towards their villages in mid-summer. This is the route marked la on Map II.

The other group of shepherds follows a larger circular path. In winter they move from their villages near Sojat, Nagaur, Beawar, Ajmer and Bilara

towards Boondi, Kota, Jhalawar and Aklera where they spend the winter. They move into Madhya Pradesh in late winter to Rajgarh, Guna, Ashoknagar, Shivpuri, and start moving north towards Agra, and Bharatpur. In spring and early summer they are on the bordering districts between Rajasthan and Uttar Pradesh. These groups also start returning to their villages by mid summer and are home by the time monsoons arrive. This group is shown by the route marked lb on Map II.

2. Shepherds in this group move from their villages in Pali, Jodhpur, Ajmer and Nagaur, towards Uttar Pradesh. They spend most of their winter in Rajasthan moving slowly and spending the winter months in Dudu, Sanganer, Dausa, Bharatpur and Alwar. By late winter they start moving into Uttar Pradesh and spend spring and early summer in the districts of Agra, Mathura, Aligarh, Mainpuri, Etah, Ettawah, Shikokabad, Perozepur, and Firozpur. They start moving back to their villages by late summer and reach back just around the time monsoons are breaking. They do not cross the Yamuna river to enter Rajasthan until they have heard that rains have arrived since by the time they are ready to return to their villages, there is little vegetation on the ground. The first showers allow some germination and growth of grass which is what their sheep survive on in the march home. They move very fast on their return, often making the journey back home within twenty days, travelling up to 25 and 30 kms. every day. Shepherds from this group are marked on routes numbered 2 in Map II.

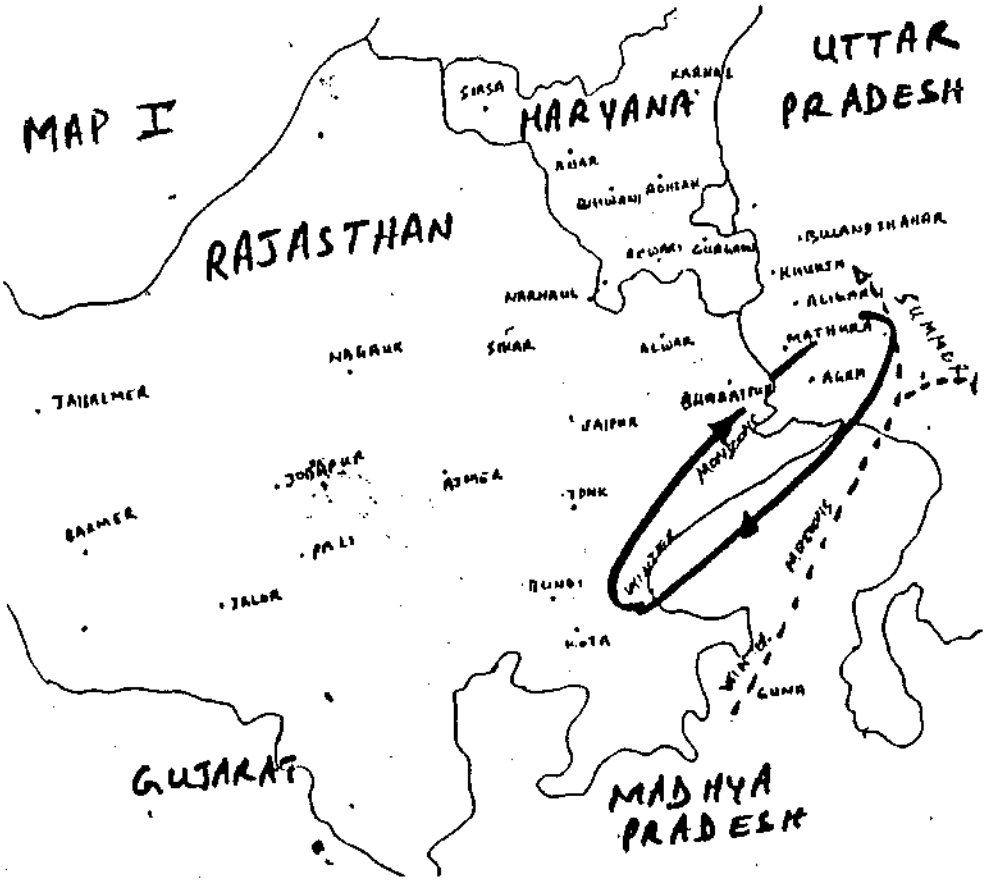
3. Shepherds in this group are also primarily from villages in the districts of Nagaur, Pali, Jodhpur and Ajmer. Some of them are also from Barmer and Jaisalmer. During the winter their migration routes are more or less the same as those of shepherds in group 2. However, by late winter they start moving into Haryana. They move to Rohtak, Panipat, Sonipat, Gurgaon, Rewari, Mahendragarh, Hissar, Bhiwani, Palwal and Faridabad. Many of them come

back along routes close to the ones they used while moving into Haryana. But approximately half come back using more westerly routes along Jhunjhunu, Narnaul, Sikar and Churu. They also return in mid summer, at a very fast pace, just by the time monsoons start. This route is marked 3 on the map.

For both groups 2 and 3, shepherds on the routes also join in the migration cycle. However, few villagers who join the migration from districts lying midway on the migration routes (such as Alwar, Bharatpur, Jaipur) go towards Uttar Pradesh. Most of them move into Haryana.

4. Shepherds in this group move between the more southern districts of Western Rajasthan and the eastern districts of Madhya Pradesh. These shepherds are from districts such as Sirohi, Jalore, and Southern Pali. They move to Chittorgarh, Banswara, Partapgarh on their way to Mandsaur, Dhar, Ujjain, Rajgarh, and Indore in Madhya Pradesh. They spend most of their late winter and summer in Madhya Pradesh and return to their villages by the time monsoons break. This route is marked 4 on Map II.

I have not talked about a substantial number of shepherds who migrate from Rajasthan into Gujarat. Most of these shepherds are from districts of Jaisalmer and Barmer as well as from the southern districts of Western Rajasthan - Jalore, Sirohi. Some of the shepherds in Jaisalmer and Bikaner also move north towards the canal irrigated districts of Rajasthan - Ganganagar and Churu. I have also not mentioned these in this appendix. None of the shepherds I interviewed used these migration routes.


MAP I
UTTAR PRADESH
HARYANA
RAJASTHAN
GUJARAT
MADHYA PRADESH
SIRSA
KARNAL
HISAR
ROHTAK
BULANDSHAHAR
ALIGARH
MATHURA
AGRA
NARNAUL
NAGAUR
SIKAR
ALWAR
JAISALMER
JAIPUR
BHARATPUR
JODHPUR
AJMER
TONK
BARMER
PALI
JALOR
BUNDI
KOTA
GUNA

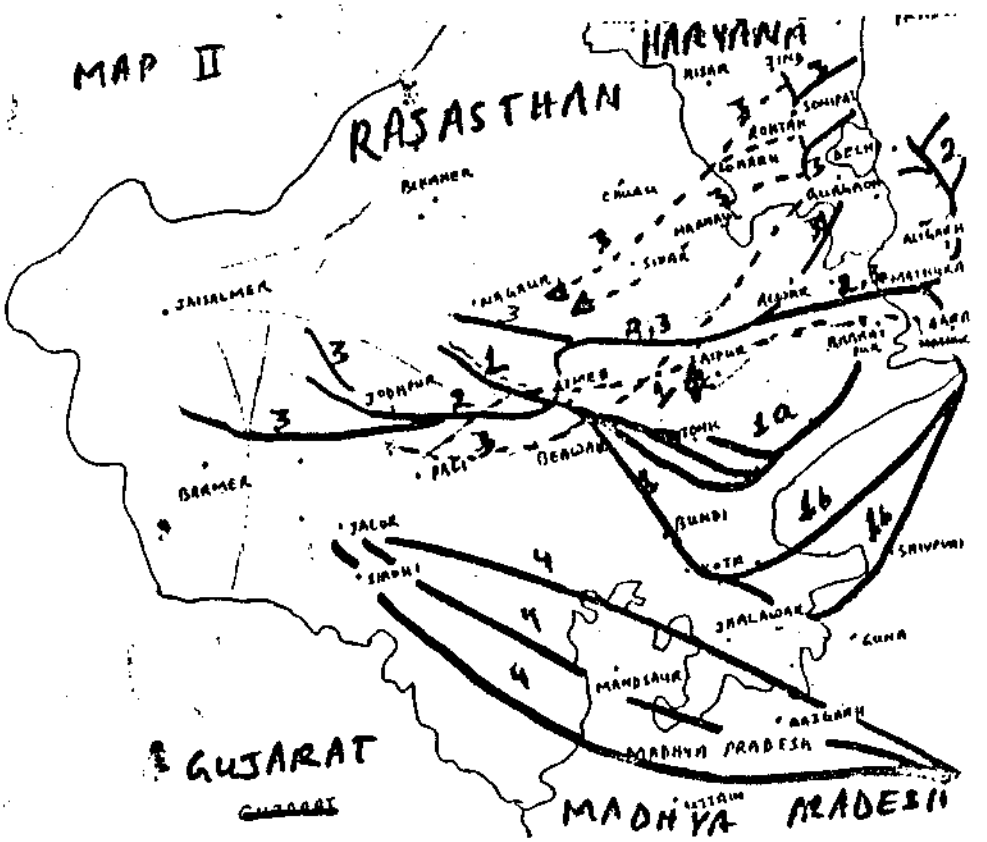
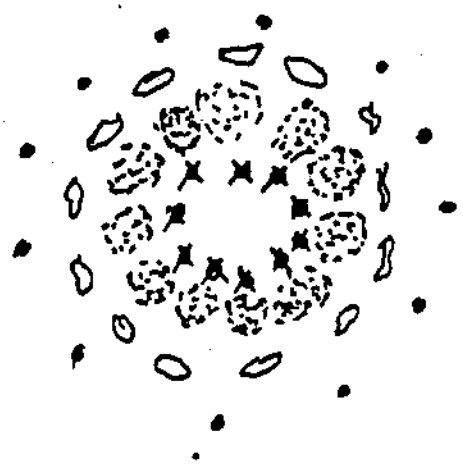

MAP II
HARYANA
RAJASTHAN
GUJARAT
MADHYA PRADESH
HISAR
JIND
SONIPAT
ROHTAK
GURGAON
DELHI
CHURU
NARNAUL
SIKAR
ALIGARH
MATHURA
AGRA
NAGAUR
ALWAR
JAISALMER
JAIPUR
BHARATPUR
JODHPUR
AJMER
TONK
BARMER
PALI
DEOGARH
BUNDI
JALOR
KOTA
SIROHI
SHIVPURI
JHALAWAR
GUNA
MANDSAUR
RAJGARH

Diagram I : WHEN WOMEN ARE PRESENT IN DANG



X : Dera (women, children, belongings

: Sheep

: Camels

: Guards

Diagram II : WHEN NO WOMEN ARE PRESENT IN the DANG

: Sheep

: Camels

X : Dera + guards (belongings) + guards

SPATIAL ORGANIGATION OF RAIKA DANGS AT NIGHT

Fig. 2.1a:
Economies of Scale: Per Sheep

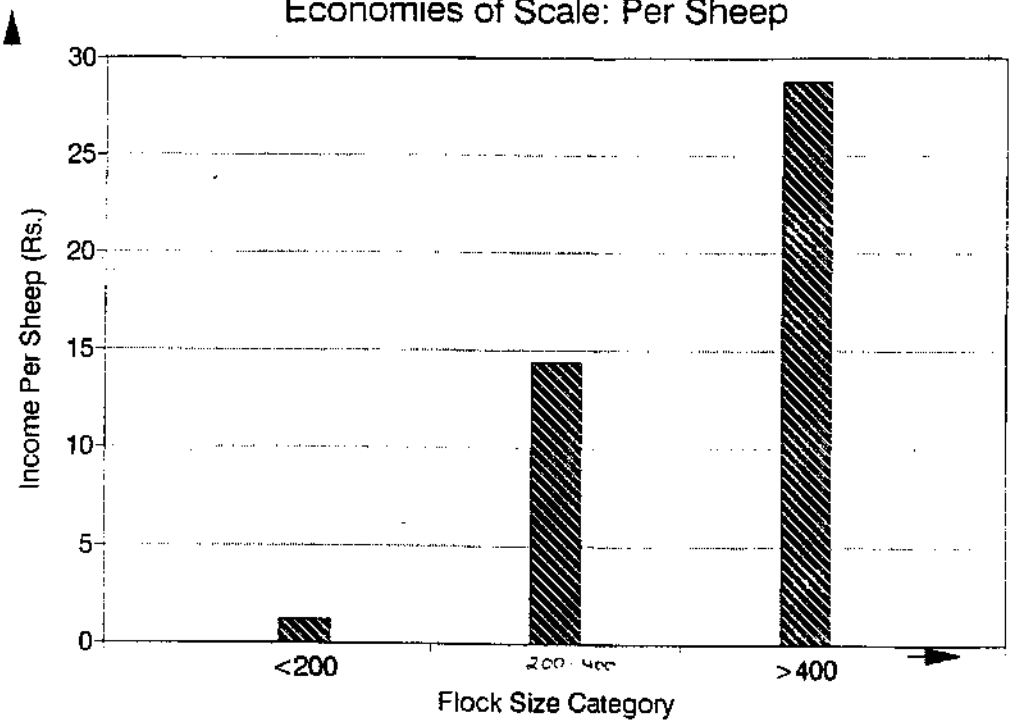
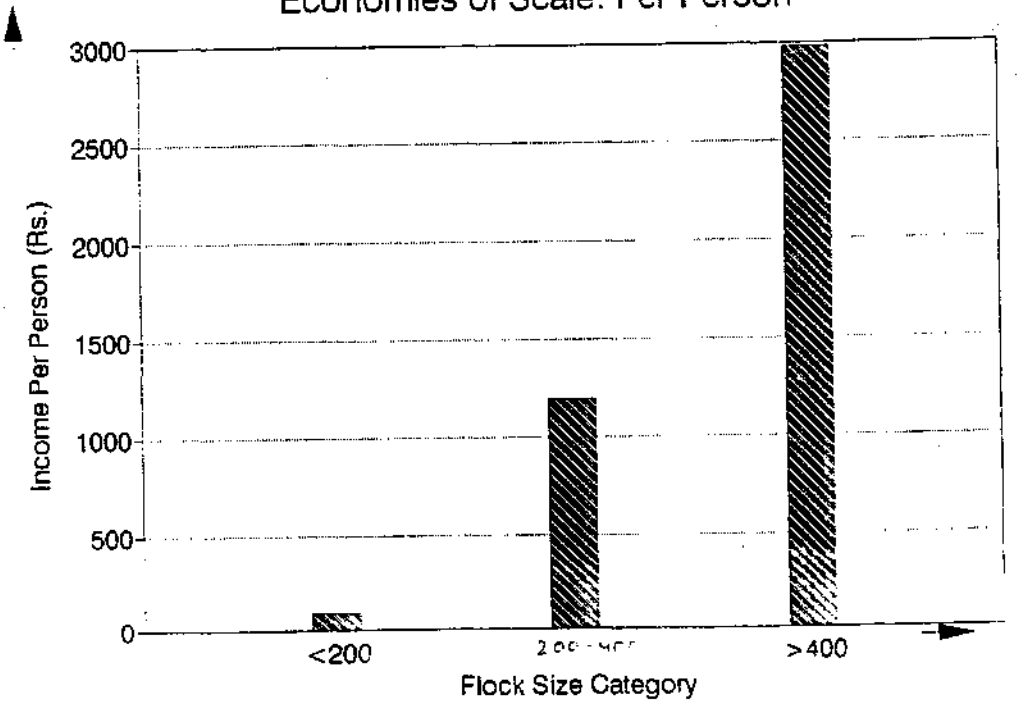


Fig. 2.1b:
Economies of Scale: Per Person



Chapter 3

THE STRUCTURE OF DECISION-MAKING AMONG RAIKAS: THE CREATION OF COMMUNITY INSTITUTIONS

In the previous chapter, we examined some of the basic features of Raika migrant life to understand how

tackle environmental risks. I portrayed a life-style centered around diversification of asset-holdings, mobility, and exchange, and depicted how risk buffering mechanisms influence the economic activities carried out by the Raikas. An especially important characteristic of Raika mobility that I mentioned, but did not discuss in any detail, was how Raikas coordinate their activities and structure decision-making during their collective migration. This discussion is necessary to show the institutional responses that environmental risks have generated among the Raikas.

The daily movement of dangs[1] - groups of fifty to a hundred human beings and thousands of animals - necessitates the making of critical collective decisions. This chapter examines who makes these decisions, the principles behind the selection of decision makers, and how decisions are carried out and enforced. Insofar as shepherds in other parts of the world[2] migrate over long distances and

[1]In this chapter I will continue to use the local terms that were introduced in the previous chapter. For the benefit of the reader, the dang is the mobile camp of the Raikas; the nambardar is the leader of the mobile camp; the ewar is the "household" which is the constituent unit of the dang; and the mukhiya is the head of the ewar.

[2]Anthropologists have produced several significant studies on decision-making and organization of nomads. See N. O. J. Abel and Piers Blaikie, "Land Degradation, Stocking Rates and Conservation Policies in the Communal

confront problems similar to those faced by the Raikas, the analysis in this chapter holds general relevance.

My thesis can be stated simply: the Raikas allocate decision-making tasks in the dang in a sophisticated fashion to avail of scale economies and to reduce costs of coordination, to minimize risks of wrong decisions by taking into account all available information, and to control decision-makers in the dang.[3]

Loci of Decision-Making

Three major centers of decision-making exist in shepherd dangs. Of these, the nambardar is the most important. He is an influential shepherd, has wide ranging contacts among other shepherds, farmers, wool and sheep merchants, and on occasion government officials. He possesses familiarity with a large variety of issues relating to migration routes and patterns, movements of other dangs, dealings with outsiders such as government officials and farmers, purchase of supplies, and sale of pastoral products. The nambardar spends a large amount of his time (nearly two to three hours each morning) gathering information. He undertakes scouting trips before sunrise on camel or horse back; for longer term decisions, nambardars make reconnaissance trips at longer intervals. Previous experience and freshly gathered information ensures that their decisions will be based on reasonably good information. The second-in-command of the nambardar is called "kamdar". The kamdar assumes the duties of the nambardar when he is sick or away from the dang. Since the duties of the kamdar are the

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Rangelands of Botswana and Zimbabwe," (London: Overseas Development Institute Pastoral Development Network, paper 29a, 1990) 23; Fredrik Barth Nomads of South Persia (Oslo: Oslo University Press, 1961) 159; and Wolfgang Weissleder, ed., The Nomadic Alternative (The Hague: Mouton Publishers, 1978) 423.

[3]These factors correspond to the theoretical points I made in the first chapter regarding formation of institutions - considerations of greater efficiency; of an enhanced ability to tackle environmental risks; and of political leverage.

same as those of the nambardar, I will not treat him as a different locus of decision-making, especially because his office is only infrequently called into play. Usually he plays a role as a member of the council of elders in the dang. The council usually comprises five or six of the older and more experienced persons in the dang. The members to the council represent the spectrum of different interest groups in the dang. Collectively, they possess information and experience that none of the other decision-makers in the dang can match. Finally, there is the mukhiya of the ewar who is intimately familiar with matters related to the functioning of the ewar. He is the leader of an ewar.

Choice of particular individuals for any of these leadership roles depends on several factors. Age and experience are instrumental in the selection of leaders, especially for the selection of the mukhiya of an ewar. Indeed, age often serves as a proxy for experience. But the most important factor governing a leader's selection is that elusive quality - status. Status depends on age and experience, but also upon the number of sheep owned, wealth of other forms, previous leadership experience, experience in migration, and kin relationships with other well-known Raikas.[4]

Major types of decisions

Members of different dangs identified at 60 issues[5] as important for the continued efficient functioning of the dang. I divide them into six major issue areas: dang formation and dissolution, migration, ewar management, dang management, interactions in the market, and interactions with the government and settled populations.

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[4]The gender of the individual seems to play an negatively determinant role in leadership tasks. None of the thirty dangs that I surveyed had a woman as the nambardar. Nor was a woman the mukhiya in any of the ewars in these dangs.

[5]See Appendix 2.2 for a consolidated list of decision issues as identified by the shepherds.

Dang formation and dissolution

This category contains two major decisions - selection of the nambardar before the beginning of the migration and the breakup of the dang at the end of the migration cycle. To select a new individual as nambardar, a few mukhiyas approach an individual in whom they have faith to be the nambardar for a particular migration cycle.[6] Often, of course, a particular dang continues with the same nambardar and has the same composition of ewars that it had in a previous year. In these cases, the nambardar may initiate the process of dang formation by sending messages to the different ewar heads to assemble in a mutually convenient location. But when a group of mukhiyas wants to choose a new nambardar, or if some mukhiyas are dissatisfied with their existing nambardar, they approach an experienced person, often an existing mukhiya who has migrated several times, to accept the responsibility. New members to the dang can also be introduced by any existing member of the dang. Usually, only male members introduce new persons.

In the normal course of events, the breakup of the dang occurs after the migration cycle is complete. Different ewars leave the dang on the return journey at the point that they joined up with the dang. However, ewars can also leave the dang earlier. If there has been adequate rainfall in the village of a particular ewar member, he may leave the dang sooner than other members and return home. Another possibility, relatively rare, is for a dissatisfied member in the dang to leave before the cycle is over. Nambardars take special care to ensure that no dang members get so dissatisfied that they leave the dang in mid-migration on this account. Such departures would adversely affect the nambardar's reputation and the possibility of his continued selection.

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[6]To select dang members, ewar mukhiyas have set procedures but no formal mechanisms. Often, once three or four mukhiyas have decided to migrate, they decide on a nambardar. Then, in consultation with him, they may look for other partners for the migration cycle.

Migration

The direction of travel, the timing of migration, the daily distance to be covered, and the setting of the camp are the central migration issues. The Raikas are constantly on the move and camp in a new location almost every day. Therefore many decisions related to camp setting and distance to be travelled each day must be made every day. For these decisions, the required information is not always easily available. Familiarity with the migration route and information about the villagers on the route are needed before making decisions about where and when to set camp. Only the more experienced shepherds have such information. However, decisions on this subject are of a routine nature. That is, they need to be made very often, and the risks associated with a wrong decision are low. A wrong decision is unlikely to impose huge costs on the shepherds. Farmers are usually not hostile and welcome the manure that sheep deposit in their fields in the course of the night. If a dang camps in the fields of an average farmer "X" instead of farmer "Y", it is unlikely to encounter major difficulties. Finally, all of these decisions affect a large number of people; in fact, they affect every individual in the dang.

It is important therefore that the responsibility for making these decisions be assigned to some individual; who bears the responsibility is not vitally important. Once responsibility is delegated, other shepherds in the dang are free to concentrate on the everyday management of the sheep flock.

Ewar Management

Two sub-classes of decision-making can be distinguished in this group: household decisions (about cooking, loading and unloading camels, etc.), and decisions about managing the flock (grazing, watering, accounting and so forth). Women perform most of the housekeeping work. Most of the tasks of ewar management require little direction or guidance from the decision-makers. All the

v have to do is to ask that the evening meal be cooked, or that r wake the shepherds to take the sheep for grazing. Decision- n intimate familiarity with the affairs of the ewar and an ability s in the ewar.

Dang Management

of issues affect dang management: the management of people; security. By management of people, I refer to issues such as allocating collective tasks, and keeping track of shepherds who lective tasks include cooking on festive occasions, taking care eracting with them, purchasing medicines, and supervising common fund. The decision-making unit which undertakes ossess leadership qualities. To make arrangements for better sure that these arrangements will be followed, the decision- ve contacts among the settled population and familiarity with . If the decision-maker does not know the specifics of the will not be able to admonish the shepherds to be especially keeping watch those shepherds who are more alert and strong.

Market Interactions

ecisions in this area concern sheep shearing and sale of sheep kes hinge on such decisions as the rate at which sheep should sions are more routine - to whom should wool be sold? Some high level of asset-specific knowledge -such as when sheep are d or when animals can be sold. Most decisions on market ne entire dang. Decisions also necessitate possession of the out market prices for sheep and wool. The decision-maker to persuade farmers to provide space to shepherds for a week being sheared.

At the same time, since the interactions with the merchants involve the determination of the rate for sales of pastoralists' products, the shepherds should also be able to determine whether the decision-maker is defrauding them in collusion with the merchants.

External Relations

This last issue area poses the greatest level of uncertainty. Decisions involve interactions with government, with the legal system, and with settled populations. Together with low information availability on issues falling in this area, shepherds also face an additional complication: the stakes are very high. Although shepherds make their decisions only irregularly and infrequently wrong decisions can lead the entire dang into grave trouble, lose large amounts of money, or face major fights. Right decisions on the other hand promise no benefits except that the status quo will continue. Thus decisions involve high stakes and asymmetries in returns and losses. The high stakes mean that the shepherds do not easily want to delegate the responsibility for these decisions. The asymmetry between returns and costs implies that the decision-maker will receive no special praise for making the right decision and all the blame if the decision is incorrect.

Decision-Making Among Raika Pangs

Table 3.1 presents the data collected on decision-making from thirty Raika dangs. To interpret the table, begin with row one.[7] The "2" in brackets after the first issue area implies that there are two decision-issues that fall under the general category of "Dang Formation and Dissolution". Respondents in each dang were asked who made the decisions on each of these issues. There were sixty responses, but two were invalid (or the respondents did not provide an answer);

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[7]**This table is a condensed version of Appendix 2.2.**

hence the figure 58 in the last column. Of these 58 responses, the mukhiyas of the ewars were mentioned 49 times as the decision-making units, and the nambardar mentioned as decision-maker in nine instances. Of the total of 1,800 responses for 60 decision-issues from 30 respondents, 37 were either invalid or unavailable;[8] and thus the number 1763 as the total number of responses.

The mukhiyas make most of the decisions (85% of them) for dang formation and ewar management. The nambardars have extensive powers to make decisions in all other areas. They make 74% of the decisions in the other general categories of decision-making. They share their authority with the council of elders and ewar mukhiyas in one major category of decision-making. With the council of elders they share authority in the area of external relations - where interactions with outsiders such as farmers and government officials are involved. With the ewar mukhiyas they share authority for decisions related to market interactions. Even in these two areas they make 65% of the decisions. On the other hand, the council of elders makes 22% of the decisions involving external relations, and the ewar mukhiyas make 24% of the decisions related to market interactions.

What accounts for this distribution of decision-making authority? In the rest of this chapter I will suggest that the observed distribution of decision-making responsibilities is shaped by three factors: economies of scale, actors' knowledge of decision-issue; and the need to control decision-makers.

Analysis of Decisions

Under each category, there is a particular decision-making unit that is chiefly responsible for the decisions. For dang formation and dissolution it is primarily the ewar mukhiyas who make the decisions. They select the nambardar

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[8]**The general categories in table 3.1 are constructed from the individual issues in appendix 2.2 where more detailed responses from shepherds are presented.**

and decide the time at which they will leave the dang. The logic behind the allocation of these decisions to the ewar mukhiyas can be understood if we recall how a new dang is formed. The ewar mukhiyas approach an individual whom they trust to guide them through the migration. In choosing a nambardar, they abdicate responsibilities for making a large number of important decisions. By allowing the nambardar to make many decisions, they save significant levels of time and energy. However, they must be able to exercise some control over the nambardar, or else he could easily exploit them. Although they give up the power to make many decisions, they therefore retain the right to choose a new nambardar and the right to leave the dang if they are dissatisfied with the current nambardar. Unless they have the power to select the nambardar for the dang, they will be left with little control over the decision-making authority of the nambardar, which is extensive. This is the reason - prevention of arbitrary decision-making by the nambardar and control over him - that the responsibility to form and dissolve dangs lies with the ewar mukhiyas.[9]

For decisions related to ewar management, it is again the ewar mukhiyas who are responsible. They make 85% of the decisions. For most of their decisions, the number of affected persons is small and there are seldom any economies of scale that can be harvested.[10] At the same time, the mukhiyas have more knowledge about their ewar than anyone else in the dang. A mukhiya can gain no advantage by allowing another decision-maker the right to manage his ewar.

The nambardar makes the vast majority of the decisions on migration and dang management. Significant economies of scale facilitate delegation of decision-

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[9]However, see the section, "What About Politics" for a discussion of some other ways in which the nambardar is controlled by mukhiyas.

[10]There is an important exception to this statement which I will discuss later when analyzing decisions related to ewar management.

making to one individual (particularly for performing collective tasks). At the same time, information on dang management is easily available. For most of the decisions in dang management, the shepherds can therefore assess the quality of the decisions made by the nambardar. For decisions relating to migration, information is not easily available but the nambardar is better informed than other dang members. At the same time, it is easy to maintain informal checks on the nambardar to ensure that none of the dang members are defrauded by the nambardar (see last section). Most issues in the areas of dang management and migration require routine decisions (decisions need to be made often and not much is at stake), even if the information needed to make the optimal decision is not easily available. Again, the nambardar can make the decisions on these issues because not much is risked if the decisions are not of high quality. For instance, even if the nambardar decides that the dang should travel five kms. instead of six kms., the shepherds do not lose much. As one of the shepherds put it, "Who needs the headaches of making all these decisions. If the nambardar wants prestige, he can have it".[11]

For decisions related to market interactions and external relations, however, the nambardar shares decision-making responsibilities with the council of elders. For many of the issues in these two categories, neither the nambardar nor any other shepherd in the dang possess precise information; a large number of individuals in the dang are affected by the decision, and the possibility of an adverse impact on the shepherds because of the decision is high. The shepherds and the nambardars, therefore, wish that the nambardar involve other elders in decision-making. Involvement of the council of elders serves two purposes: it serves the interests of the nambardar since it prevents the responsibility for wrong decisions from being laid at the doors of any one individual. It serves the interests

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[11]**Although the nambardar does not receive any explicit remuneration for all the responsibilities he carries out, he is able to get commissions from traders when arranging wool sales (see section five).**

of the council of elders because their involvement ensures that the nambardar can not manipulate uncertain situations to his personal advantage. At the same time, collective decision-making utilizes all available information.

Looking at the individual issues in a class of decisions (see Appendix 2.2), we immediately notice some anomalies. The decision making unit for any given category of decisions makes most decisions in that area but there are exceptions that require explanation. For instance, the nambardar is supposed to make migration decisions. But the start of the return journey is decided by the nambardar and the council with approximately equal probability. Similarly, the council of elders decides in most cases whether the dang should become a permanently migrating dang.

For both these exceptions, the explanation is simple. The decision regarding initiation of the return journey is made only once during the migration cycle. Thus it is not a routine decision.[12] Second, the information necessary for the decision is not exclusively available to any single individual, including the nambardar. For this decision it is necessary to know the amount of fodder available in different villages; when the shepherds return to their villages there must be sufficient vegetation for their animals. Further, given the generally low availability of fodder in villages, many shepherds will prefer the rains to have begun by the time they reach their villages. There is yet another reason why the shepherds would wish their preferences to be explicitly considered. Different shepherds cultivate differing amounts of land. Some of them will not like to miss the first monsoon showers as it will affect their income from agriculture. Thus information regarding needs of different shepherds to return home must be taken into account. A delicate balance, therefore, needs be struck between an early and

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[12]**Routine decisions are made often and risks associated with** a **wrong choice are low.**

a late return. The council represents a broader interest group that just the nambardar and also has more information than him.

The explanation for the council of elders deciding on permanent migration parallels the previous explanation. It is a decision taken very infrequently. It affects all ewars highly significantly. And the information necessary to make the decision is not available to the nambardar. At the same time, the nambardar can not enforce his decision on any ewar. Consultation with the elders is therefore necessary, and finally, it is their views that prevail.

If we examine the list of issues in ewar management, we find that the mukhiya in the ewar makes all the household decisions. Under flock management, however, there are two issues over which the nambardar rather than the mukhiya makes decisions (See table 3.2). The first is how many people from a given ewar will graze and water camels and the second is the order in which ewar members will keep watch during the night. This interference in the right of the mukhiya to make decisions about ewar related matters can be explained by examining the two issues in depth.

We first analyze the issue of camel grazing. Since camels and sheep differ in their grazing habits, it makes sense for camels to be grazed separately from sheep. The average number of camels in an ewar is four.[13] However, two herders can graze between 30 and 50 camels. This means that real economies of scale can be obtained by collectively grazing all the camels from the different ewars in a dang. Instead of each mukhiya in an ewar assigning the task of grazing camels to one individual from the ewar, the nambardar can select ewars by rotation and ask them to contribute a smaller level of labor for grazing the camels than they would need to if each ewar had to contribute the labor of one person every day for grazing camels. Through the nambardar coordinating the selection of camel herders, the dang can benefit from scale economies. If we use averages,

[13]See chapter 2.

there are 12 ewars and 46 camels in a dang. If the mukhiya assigns a person to graze camels every day from the ewar 12 people will be needed. But if the nambardar does the same task, at most 3 people will be needed each day. If we take the average consumption expenditure on a person to be Rs. 1200.00 for a migration cycle, the dang saves a total of approximately Rs. 10,800.00 or Rs. 900.00 per ewar. However, the identity of the person who can be spared for grazing the camels (from any given ewar on any particular day) is a decision that is taken by the mukhiya of the ewar.[14]

The reason why the nambardar decides on the order in which ewar members will keep watch during the night is because the decision is routine (in the sense that it has to be taken every day) and the nambardar possesses greater familiarity with the route selected for migration; hence more information than anyone else about the area through which the dang moves. If the migration is through a region where thieves may be encountered, he can change the order in which ewar members keep watch so that the more alert and reliable members keep watch when there is a greater possibility of theft. So it is he who advises the dang members on how careful they must be in different areas. Therefore, although the decision about which ewar members should keep watch in which order is related to ewar management, the nambardar decides on this issue.

A similar analysis of other major issue areas can be undertaken by looking at the individual issues which diverge from the norm for decision-making in the issue area. I have already talked about the exceptions in the case of dang management. I will look at one more set of issues - market interactions, as presented in table 3.3. I choose this set of issues because in market interactions, the factors influencing the suitability of decision-making units compete with each other. The nambardar shares decision-making responsibilities with the ewar mukhiya and the council of elders.

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[14]See Appendix 2.2

Decisions regarding the shearing of wool and sale of wool are made by the nambardar. The major reason is that he is the one person in the dang who is capable of coordinating the various tasks and operations which must all be carried out more or less simultaneously or in quick succession before sheep can be sheared and their wool sold.[15] Not only must the decision-making for wool shearing and sale be coordinated, there are large economies of scale if all sheep in the dang are sheared at the same time rather than if each ewar mukhiya gets his sheep sheared separately, only going by his own convenience.

The sale of sheep, however, does not have to be coordinated for the entire dang. Indeed, shepherds often sell one sheep at a time. Sheep merchants come to the dang to buy sheep. So the ordinary shepherd does not have to rely on the nambardar either for calling the sheep merchants or for coordinating the sale of the sheep. Further, the returns to the shepherds are much higher on the average from the sheep sale than from wool sale. Since giving up the responsibility of sheep sale to the nambardar confers no extra benefits in terms of scale economies; since each flock owner can sell sheep on his own; and since the amounts involved are high, it makes sense that the decisions for sheep sale (regarding the rate as well as the number) be taken by the ewar mukhiya. Also there is a greater possibility of loss if all the information about the differences between the sheep being sold is not taken into account at the time of the sale. Wool on the other hand is more homogenous as a commodity, especially because the Raikas seldom clean or grade the wool before selling. Since the nambardar will not have as detailed information about the qualities of the sheep in each ewar as the ewar mukhiya himself, it also implies that the nambardar is disadvantaged in comparison to the mukhiyas regarding the information he possesses about sheep.

The nambardar shares the responsibilities for making decisions regarding the timing of calling merchants with the council because the council represents a

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[15]**See Chapter 2 for a discussion of the reasons.**

greater diversity of interests in the dang and has more information about when sheep will be ready for shearing, or for sales, and when wool can be sold. If the nambardar rejects council decisions about when to call the merchants, the ewar mukhiyas can refuse to sell their commodities. For the three decisions about the timing of calling merchants, the information that the nambardar has on the location and identity of different merchants can be combined with the information that the council members have on the condition of sheep, to allow the best decisions to be made.

Some Statistical Tests

To test the inferences in this chapter, I use two simple procedures: the well known chi square test, and a proportional-reduction-in-error measure which tests for the strength of association between two variables.[16]

I calculate the chi square for the entire table of decisions as presented in Appendix 2.2.[17] Through the chi square measure, I test two null hypotheses. The first hypothesis tests for statistical independence between the two variables in appendix 2.2 - the identity of the decision-making unit and the nature of the decision issue.

H_{01} Identity of the decision-maker is statistically independent of the nature of decision.

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[16]**See David K. Hildebrand, James D. Laing, and Howard Rosenthal, Analysis of Ordinal Data (Beverley Hills, California: Sage, 1977); and K. T. Reynolds, Analysis of Nominal Data (Beverley Hills, California: Sage, 1984).**

[17]**Several cells in the table do not contain any numbers. Since this will inflate the chi square, I compute the chi square by adding five to each cell where the number of observations is less than five (this should reduce the computed value of the measure - something that will prevent the rejection of H_{01}).**

The second hypothesis tests whether the observed number and type of decisions made by a decision-making unit differ significantly from the decisions we would expect that unit to make were the analysis in section four correct.

> H_{02}: Observed decision-making patterns do not differ significantly from the patterns that will be observed were the analysis in section four correct.[18]

The test for the first null hypothesis quickly becomes absurd. The chi square value is easily greater than 10,000, indicating that the null hypothesis of statistical independence can be summarily rejected. On the other hand, the value of chi square for the second hypothesis is 30.05 when degrees of freedom = 118. Even at the .25 level of significance, the critical chi square value is far higher than the observed value of 30.05 (d.f. = 118).[19] We can not therefore say that the observed pattern of decision-making is significantly different from what one would expect if the logic of decision-making presented in this chapter is correct. Our conclusion is especially significant because for large samples, the chi-square measure almost always leads to rejection. Although the chi square measure corroborates the analysis in the previous four sections, it does not provide information about the strength of the association between variables. All the chi square tells us is that some relationship exists between the decision-making unit and the kind of decisions the unit makes. To estimate the strength of the relationship, I employ a proportional-reduction-in-error (PRE) measure of association. The PRE

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[18]**The chi square test for this hypothesis compares the observed distribution of decisions with a hypothetical distribution in which all decisions of a particular type are made by the decision-maker who is best suited to make those decisions** (as **determined by the discussion in section four).**

[19]**Few chi square tables contain critical values of the chi square when the degrees of freedom go beyond 100. When d.f. = 100, the critical value of chi square at the .25 level of significance is 109. The value of 30.05 for the decision tables is far lower than the critical value. The null hypothesis therefore cannot be rejected.**

measure varies between 1 and -1. To help explain the measure I first describe how the measure is calculated.

For any two dimensional table, we treat one of the variables in the table as the dependent variable and the other as independent.[20] In tables 3.1 to 3.3, we can treat "types of decisions" as the independent variable and the "identity of the decision maker" as the dependent variable. Each decision issue then, is characterized by its type and who makes it.

To calculate the value of the PRE we proceed in the following manner: we draw elements from a population and guess the category of the dependent variable to which each element belongs. We guess the category in two ways: first without using any information about the element and second, using information its value on the independent variable. In our tables, we first pick up a decision issue at random and try to guess who makes the decision without using any information about what kind of decision it is. We then try again to guess the identity of the decision-making unit knowing whether the decision is about cooking for feasts, or about fining guards, or grazing camels, or selling wool.

Both ways of guessing will result in some errors. But if there is a relationship between the independent and dependent variables, the second rule should reduce the probability of error. If the argument in section four is valid, then knowledge that a decision concerns camel grazing should help us classify more accurately that the decision is made by the nambardar. The PRE measure provides a numerical estimate on how much more accurately we can classify elements from a population with knowledge of the "independent" variable. When the value of the measure is one, it signifies that if we use information about the independent variable, the probability of classifying an element incorrectly is zero. If there is no relationship between the type of decision made and the identity of

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[20]Although one of the variables is classified as dependent and the other as independent, the classification says nothing about a causal arrow, or even if a causal relationship exists.

the decision-maker, then the value of the *measure* will be zero. Intermediate values have a clear interpretation as the proportional-reduction-in-error in creating classes of the dependent variable.

For the three tables in this chapter, the value of the PRE measure works out to .571 for table 3.1; .802 for table 3.2; and .887 for table 3.3. These values show that knowledge of the "independent" variable (nature of the decision) helps in guessing who will make decisions considerably. For the latter two tables, the improvement is especially significant. The relationship between who makes decisions and the nature of the decision, therefore, is quite strong.

What About Politics?

As is evident, the rationale I have provided for the allocation of decision-making responsibilities relies mostly on considerations of risk mitigation and economies of scale. According to the argument I have made, the shepherds delegate the responsibility to make decisions on a large number of issues to the nambardar. This enables a smoother functioning of the dang, an enhanced ability to counter environmental risks and greater economies of scale. In the process of presenting this view I have ignored a vital issue, however. How dang members ensure that the nambardar will make decisions that benefit the dang? Or, how do they prevent the nambardar from misusing for personal benefit his powers to make decisions?[21]

Even a cursory look at the range of decisions entrusted to the nambardar will reveal that he can abuse his powers. He can strike deals for side-payments with the shearers, with the wool and sheep buyers, and with farmers. What prevents him from doing any of these? There are two aspects to this question. First, what internal mechanisms are present in the dang through which the

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[21]In terms of the principal-agent literature, "How does a principal ensure that the agent will not allow personal agendas to influence tasks entrusted to the agent?"

ordinary dang member can get to know if and how the nambardar may be misusing his authority for personal gain? Second, even if the ordinary dang members know that the nambardar is misusing his authority, how can they sanction the nambardar? Are they powerful enough to stop the nambardar from carrying out a certain course of action? The remainder of this chapter addresses these questions.

In general, the nambardar can benefit personally from the decisions he makes, primarily in those situations where interactions with outsiders such as merchants, farmers, or government officials are involved; and particularly in those interactions where sums of money change hands. The nambardar can misrepresent the true costs of some actions (such as bribes paid to officials, amounts spent on medicines or purchases made to celebrate feasts) and the benefits received from others (such as money received from farmers for setting camp in their fields; rates fixed with merchants for sale of pastoral products and so forth). In each of these situations, to prevent discovery, it is necessary for the nambardar to conceal information from the dang members, and to ensure that they do not find out true costs and benefits from other sources.

The dang members, on the other hand, are faced with the problem of balancing two kinds of costs. They must minimize the costs of the nambardar acting in a manner which prejudices their interests. As the first step in this they must seek information on the nambardar's actions, on the rates at which he sells products and buys goods. But any mechanism that is used for collecting information on the nambardar will itself be costly. Keeping these points in mind, the dang members must decide whether to delegate responsibilities; and once responsibility is delegated, whether to use some system of information collection to find out what the nambardar is doing. In the language of the principal-agent literature, they are faced with the problem of monitoring their agent - the nambardar.

To see how the shepherds deal with the problem of monitoring, we will discuss four situations: the selection of camping sites; the purchase of medicines and supplies for feasts; the calling of merchants and fixing rates with them; and finally, bribing of police, forest and other government officials. In each of the situations there is a possibility that the nambardar can make personal gains by concealing information from the shepherds. There are three different ways in which shepherds can respond. They can ex ante preclude the possibility of the nambardar defrauding them; they can check on what the nambardar does; or they can ignore possible deviations of the nambardar's actions from their interests because attempts to prevent such deviations are too costly in relation to the benefits of delegation.

Selection of Camp Sites

Raika dangs mostly camp on private fields. The amounts they receive for folding sheep are sizeable - on the average each ewar gets around Rs. 800.00 from folding sheep. In most dangs the nambardar decides the location of the fields in which the dang will camp. There is a simple mechanism that the shepherds use to ensure that the nambardar does not conceal information or siphon off returns from folding: the negotiations between the farmer and the nambardar usually take place in the open and are settled on the spot. Further, in many cases, farmers pay the Raikas grains - usually between fifty and a hundred pounds. Because of the bulk of grains, it is quite impossible for the nambardar to misrepresent the amount that the farmer paid.

Purchase of Medicines and Supplies

The nambardar can purchase medicines from vendors known to him personally and skim a commission directly off the price, or he can misreport the price that he paid for buying the medicines. The shepherds prevent the latter occurrence by accompanying the nambardar. Whenever the nambardar goes to

buy medicines, one or two other members of the dang go with him. Generally, on different occasions, different individuals go with the nambardar. If the nambardar is successfully and systematically to report higher prices for the medicines he buys, he will have to collude with all the persons who go with him to buy the medicines. There is another factor that hinders the nambardar from defrauding shepherds. The shepherds primarily use only a few major kinds of western veterinary medicines. Therefore, they can easily remember the price they paid to the nambardar for the medicines at earlier times.

It is also difficult for a nambardar to skim commissions by colluding with medicine vendors because of the presence of other shepherds with him. Even if the nambardar has a favorite medicine store, the other shepherds can easily compare the price they are paying with the prices in other stores. By patronizing a particular store and buying the medicine requirements of the entire dang from it in bulk, the nambardar can still make some gains; but only as long as the prices are not higher than in other stores. For the shepherds it still makes sense to delegate the responsibility of buying medicines to someone else because if each of them were to go to town to buy needed medicines, they would each have to spend time, money, and effort over a task that can easily be accomplished by a single individual.

Misreporting of prices of supplies for collective feasts is prevented through a similar mechanism. For purchasing these supplies, the nambardar does not travel himself but appoints three or four shepherds. During the migration cycle several feasts are held and different individuals are appointed by the nambardar to buy the supplies. Thus, in principle, most of the households in the dang have an opportunities or two to take advantage of their fellow dang members. In practice, no single shepherd can exploit the others.

Because a number of shepherds are usually present with the nambardar, he is also apprehensive about misrepresenting prices he paid for goods. There is

always a danger that he may be discovered and then he risks losing face and reputation.

Sale of Pastoral Products

There are three sets of individuals external to the dang that are involved in the sale of pastoral products. The shearers, the wool merchants and the sheep buyers. Misrepresenting the rates at which sheep shearing has been agreed upon would be a very difficult proposition for the nambardar for two reasons. First, he is not the only person involved in calling the shearers. He makes this decision together with the council of elders. Since the nambardar does not have the discretion over calling shearers known to him personally, it is difficult for him to engage in any kind of price-fixing with them. Second, the party of shearers which comes to shear the wool stays with the Raikas for a week or more. The interactions of the Raikas with the shearers over such a long period increase the chances of discovery by an ordinary member of the dang if there is collusion between the shearers and the nambardar over the rate to be charged without the dang members being informed.

Ewar mukhiyas decide the rates for sheep sale. This reflects the possibility of large potential losses to the ewar if the nambardar colludes with the sheep buyers. There are wide variations in the quality of sheep owned by different ewars and few ewar mukhiyas and members would trust any individual outside the ewar to get the best price of the sheep that are sold. If the flock-owners do not get a good price for their sheep even for one or two major sales, it may mean a large loss for them. Since in this case the costs to the principals (the shepherds in the dang) are very high if their agent (the nambardar) misrepresents their interests, they have chosen not to delegate the responsibility for this task to the nambardar. The costs of not delegating the responsibility to the nambardar are

low since many sheep buyers visit the dangs regularly in the hope of buying sheep from cash poor flock-owners.[22]

It is in the case of wool sales that the nambardar has the greatest possibility of making personal gains. The nambardar decides on which merchants the wool should be sold to, how much of the wool should be sold, and the price at which the wool should be sold. The time for which the wool merchants or their agents stay in the dang is very small, seldom exceeding a few hours at a time. The prices of wool fluctuate fairly rapidly in the urban markets. This means that the ordinary shepherds would find it difficult to ascertain what the best price for their wool is at the time the wool is being sold. Therefore misrepresenting the price at which the deal for wool sale was negotiated is a relatively simple matter. However, in this case shepherds seem to exercise some control over the extent to which the nambardar can strike deals for personal side-payments with the wool merchants through ex post information collection. They constantly seek information from other dangs about the rate at which their nambardars sold wool. It is also the case that sometimes wool merchants who have not established links with any nambardars visit the dangs in search of developing regular sellers. Shepherds get some information about what the current prices of wool are from them also. In spite of this kind of vigilance, it is still the case that the nambardars make some commission on wool sales. However, most shepherds believe that this is not a large amount and many of them felt that this is something that the nambardar deserves for all the tasks that he performs for the dang.[23]

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[22]See discussion in chapter 2 on sheep sales.

[23]It is relevant to remember that the shepherds do not pay the nambardar any explicit remuneration for the tasks he performs as the leader of the dang.

Bribes to Government Officials

Few members of the dang have much expertise in how to bribe officials. The "rules of etiquette" on how to talk with government officials in a rural context where government officials consider themselves superior and gifted beings, are beyond the ken of most shepherds. Even the nambardar possesses only to a small degree the necessary skills required to negotiate and pay bribes. Therefore the nambardar enjoys almost monopoly powers in this area of decision-making. However, an examination of the figures in table 2.19 will reveal that the nambardar probably can not make much capital out of it.

The figures in table 2.19 reveal that on the average flock-owners pay Rs. 200.00 on bribes and fines during the entire migration cycle.[24] As a percentage of the total income, bribes and fines are no more than three percent for any of the flocks in the sample. Even if the nambardar makes some money for himself in the payment of bribes it can be only a small amount. Further, this is something that the shepherds cannot do anything about. They necessarily have to interact with the government and there must be someone who can manage side-payments to government officials.

We find that for most of the situations in which the nambardar can make some money on the side there are institutionalized practices in the Raika dangs that either preclude or minimize the possibility that the nambardar will exploit the ordinary dang members. In many of the other cases where the nambardar enjoys some discretion in fixing prices and rates, the advantages that accrue to him are

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[24]Usually the money paid as fines to villagers in disputes that may develop between the shepherds and the farmers are negotiated openly. Thus all dang members know how much has been paid as fine. The negotiations for bribes are carried out more covertly and usually no one other than the nambardar is involved in them. In some cases it is possible that an elder member of the dang who has some experience in interacting with government officials is also involved in these negotiations. More often than not, it is only the nambardar who decides on the amount that should be paid as the bribe.

relatively low. They are tolerated by the dang members because eliminating all discretion from the nambardar will be excessively costly. But the question still remains about what the dang members can do to sanction an unscrupulous nambardar.

None of the shepherds I interviewed mentioned as a possibility the removal of the nambardar during the migration cycle. Thus the shepherds seem to have no coercive powers over the nambardar to make him perform his tasks according to their will. However, the individual herders do have another recourse against unscrupulous nambardars. In the normal course of events they have at least two options open to them if they are not satisfied by the decisions taken by the nambardar. They can choose to leave dangs headed by particular nambardars; and, for a new migration they can choose a different nambardar than the one they had in the current year. Few shepherds choose to leave a dang in the middle of the migration cycle. But while such acts may be rare, the fact that dang members have the choice to do so acts as a healthy restraint on hasty, thoughtless, or arbitrary decisions by the nambardar which will affect all ewars in the dang. The extent to which the nambardar can impose his will on the shepherds is thus limited by the shepherds' freedom to express their preferences through exit and voice.[25]

In a rare conversation shepherds remembered an instance where a mukhiya, disgusted with his nambardar,[26] left the dang in mid-migration. His

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[25]The shepherds use "voice" not in complaining to the nambardar or protesting directly to him. Instead, they use "voice" to talk with other shepherds and thus affect the reputation of a nambardar and the possibility of his continued selection as nambardar. See also Albert O. Hirschman, Exit, Voice and Loyalty: Responses to Declines in Firms, Organizations and States (Cambridge: Harvard University Press, 1970) for a detailed discussion of the strategies of exit, voice and loyalty.

[26]Shepherds were unwilling to divulge the exact nature of the nambardar's impropriety. According to some, he misreported the selling price of wool. Another shepherd privately told me that the shepherd's defection had to do with

nambardar was universally condemned by other nambardars and shepherds as having behaved in a capricious and wilful fashion. "It is like a father deserting his son in the wilderness", was a common expression used by shepherds to describe the errant nambardar's behavior. When the shepherd left the dang the nambardar lost status and respect.

Since very few shepherds ever leave dangs, it seems that an equilibrium prevails where nambardars do not abuse their decision-making powers, and shepherds do not need to exercise the potent threat of deserting the dang. If a nambardar begins to deviate from the equilibrium strategy, the use of desertion by mukhiyas effectively checks not just him, but also other nambardars.

The decision to choose a nambardar, it may be pointed out, is one issue area in which decision-making has clearly political rather than economic imperatives. However, the political choice has an economic rationale. If the mukhiyas do not have the freedom to choose a nambardar or leave one dang and join another, and are thereby saddled with a leader for all future migrations, then there is no reason that the nambardar will act in a fashion that will promote the interests of different dang members. If all ewars have to perforce follow his directions, he has little incentive to act in their interests. At best he will be simply careless. At worst, exploitative.

Conclusion

In chapter two I showed that the grazing strategies of the Raikas represent innovative and successful adaptations to changing environmental conditions (increasing areas under irrigation, enclosures of land for providing sanctuaries to wildlife and so forth). Raikas are successful managers because they use a mix of strategies - diversification, mobility and exchange.[27] They improve the

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an extra-marital affair between the nambardar and the shepherd's wife.

[27]**They also use storage - using sheep to store wealth.**

effectiveness of their strategies by collective action and coordination. Diversification into animal asset-holding allows the shepherds to counter environmental risks associated with a semi-arid ecology. By devising a life-style based around mobility, shepherds convert a risky handicap (irregular and low rainfall) into a factor that ensures their survival although their land-holdings are low. Finally, exchange during migration[28] makes it possible for shepherds to gather a surplus from their animal products which supplements their household budgets.

It is evident that in the absence of the fodder which the Raikas find for their sheep over their migration route, they would not be able to maintain large sheep flocks. At the same time, the manner in which fodder is available over their migration cycle makes any strategy other than mobility non-viable. They find fodder in harvested fields, in lands owned by the forest and the revenue departments, by the roadside and in commonly owned village lands. Seldom is fodder for the sheep available in any one place over a period of time - typically Raikas move their camps every day. The strategy mix they employ creates livelihoods and surpluses for thousands of households - by gleaning from a resource that would otherwise be wasted - since it cannot be utilized for any other purpose.

The decision-strategies discussed in this chapter show that distribution of decision-making responsibilities in the dang is along easily understandable lines. In addition to distributing responsibilities for decision-making to suitable units, the Raikas use sophisticated methods to restrain their agents from defrauding them. Their institutional arrangements conform to logic of efficiency, risk management, and political control over agents. Each of their activities — the grazing strategies they adopt, the decision strategies they use to allocate responsibilities, and the way

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[28] **Raikas employ two forms of exchange: barter - when folding sheep in the fields of farmers, and market exchange - when disposing wool and mature stock.**

they exercise control over their leaders - demonstrate their ability to create institutional arrangements that help them deal effectively with environmental risks and to efficiently utilize pastoral resources.

T A B L E 3.1

Aggregate Decision-Making Data by Issue Area

Issue Area	No. of Decns.	Decision-making Unit			
		Mukhiyas	Nambardar	Council	Total
Dang Formation/ Dissolution	(2)	49	9	-	58
Migration	(11)	1	265	48	314
Ewar Management	(13)	322	55	-	377
Dang Management	(16)	53	377	48	478
Market Interactions	(10)	71	171	58	300
External Relations	(8)	8	175	53	236
Total	(60)	504	1052	207	1763

T A B L E 3.2

List of Decision Issues: Ewar Management

Decision Areas/issues	Mukhiya	Nambardar	Council
Ewar Management			
Household decisions:			
-Cooking	30	-	-
-Gathering water/fuelwood	30	-	-
-Buying supplies for cooking	29	-	-
-Breaking camp	28	2	-
-Setting camp	27	3	-
Flock Management:			
-Separation of sheep in morning	30	-	-
-Grazing and watering sheep	30	-	-
-Grazing and watering camels	6	24	-
-Milking sheep and camels	30	-	-
-Taking care of young sheep	28	2	-
-Maintaining ewar accounts	28	2	-
-Order in which ewar members will keep night watch	5	23	-
-Gwala's salary	21	-	-
Total	322	55	-

T A B L E 3.3

List of Decision Issues: Market Interactions

Decision Areas/issues	Mukhiya	Nambardar	Council	Total
Market Interactions				
-When to call sheep merchants	-	10	20	30
-When to call wool shearers	-	12	18	30
-When to call wool merchants	-	17	13	30
-Who to sell wool to	2	26	2	30
-Who to sell sheep to	14	16	-	30
-Rate for wool sale	-	27	3	30
-Rate for sheep sale	28	2	-	30
-Rate of sheep shearing	-	28	2	30
-How much wool to sell	-	30	-	30
-How many sheep to sell	27	3	-	30
Total	71	171	58	300

Chapter 4

I DON'T NEED IT, BUT YOU CANT HAVE IT: POLITICAL RIVALRIES AND COMMUNITY INSTITUTIONS

In chapters two and three I examined the role ecological risks play in institution formation. Risks structure the context in which migrant shepherds create institutional arrangements that help them subsist and eke out a surplus from an inhospitable environment. While the setting for the study in this chapter remains the same as in the previous two - semi-arid Rajasthan - the actors now are different: settled farmers and their caste factions. I examine farmers and factions belonging to village Patawal,[1] situated in Jodhpur district[2] in Rajasthan.

The major objective of this chapter is to show how political rivalries and distributional struggles between factions lead to new institutional arrangements. I analyze the process of institution formation in a single village - Patawal, with respect to the struggles among local factions over distribution of fodder and fuel

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[1]The real name of the village has been disguised.

[2]A district is an administrative division in India. Each district comprises approximately one thousand villages and has an average population of two million. Jodhpur district has an area of approximately 23,000 sq. kms. (9,000 sq. miles); 710 villages and a population of 1.7 millions. Source: Directorate of Economics and Statistics, Rajasthan Annual Statistics (Jaipur: DES, 1987).

wood from the village common - the "Oran".[3] The argument in this chapter proceeds through the following steps. First, I introduce the village and its two major factions - the landholders and the animal owners.[4] I then examine the extent to which political activity in Patawal is influenced by state policies. Finally, using the information on the village and the relative autonomy of local politics, I discuss how distributional struggles contribute to institutional change in Patawal. I show that different factions in the village, when they compete for benefits from the same resource, attempt to change institutions but not necessarily in order to increase their benefits. Rather, a particular faction may be willing to change institutional arrangements so as to increase its share relative to other factions - even if the new institutions were to reduce the absolute amount available to the faction that initiated the change.

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[3]The word oran (also auran) derives from the Sanskrit word "Aranya" which literally means forest or wilderness. Orans are sacred groves of trees, often set aside during the feudal period in Rajasthan for religious purposes (see next section). Villagers still regard trees on the Oran with some religious significance. However, for the most part, in Patawal and many other villages, Oran simply denotes common land with trees and some grass cover on it. In administrative usage there are several other forms in which village common lands can exist: Gauchar, Nadi, Agor, Pahar. Gauchar signifies common lands meant for grazing. Gauchar seldom has trees. Nadi resembles a water hole that usually gets filled with water during the uncertain monsoon months, and which holds water from three to ten months in the year. Agor is the catchment area for a Nadi. Pahar is hilly common land. All the different common lands listed here are controlled by the Village Council (the Gram Panchayat).

[4]A division of the village between landholders and cattle owners is the most appropriate for the account of politics presented in this chapter - an account that is primarily concerned with political processes around the village commons. The political struggles around the use of benefits from the village commons is, of course, also influenced by local and supra-local electoral political processes in which caste and economic class determine political factions. The relationship between electoral politics and the politics over the commons will become clearer in the course of the chapter.

Village Patawal

Patawal is located close to the district administrative headquarter, the city of Jodhpur. Several villagers work in Jodhpur, including the sarpanch (headman) of the village. Thus many villagers have easy access to markets and to government officials. Conversely, market forces and the government bureaucracy exert a strong influence on what happens in the village.

Situated in the drier, flatter part of the district, the landscape of Patawal is disturbed only by "nadis", tanks dug in the oran to conserve rainwater for drinking during the dry season. Water from the nadis and from an old well are crucial to the villagers. Especially during the dry season when the government pipeline carrying drinking water is often broken by migrating shepherds. Low and irregular rainfall also makes agriculture a risky business. According to villagers, only in 20% of the years is there sufficient rainfall for a good crop. Almost all villagers, therefore, have diversified their asset portfolios, usually by acquiring some animals.

For the villagers and their animals, the oran and its vegetation represent sources of important benefits. In area, the oran extends 225 hectares, approximately a quarter of the cultivated area of Patawal. The major part of the oran is located close to the main settlement of the village. Its small trees provide villagers fuelwood and fodder;[5] its grasses, fodder for cattle and sheep. Many lower caste villagers also use some grasses for making ropes, bedding and cushions for their furniture.

Patawal contains 212 upper and lower caste families (see Table 4.1). Between 1981 and 1988, the number of village households increased by almost 25% (verbal communication from the village patwari). The two more numerous

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[5]Trees such as Ber and Khejri provide fodder for animals, and some firewood. Kair provides fuel for household wood stoves. The tree density on the oran is approximately 15 trees per hectare. Of these nearly 50% are fodder trees; the rest provide shade and fuelwood.

castes, Raikas and Meghwals (both of whom are scheduled castes),[6] make up nearly half of the village population. Brahmins, Rajputs and Charans, who are the upper castes, form just 10% of the population. The Patels are primarily an agricultural caste. They count themselves among the upper castes and are numerically the strongest of the higher castes. Over the last thirty years they have assumed an important position in local politics. The factional struggles that I describe and analyze in this chapter took place between the Patels, Rajputs, Charans and Brahmins on the one hand and the Raikas on the other.

The Raikas are chiefly animal owners. This, apart from their lower caste status, separates them from the Patels, Charans, Rajputs and the Brahmins. As tables 4.2 and 4.3 show, there is a large difference in the animal and land holding patterns between the Raikas and the higher caste groups. Let us first consider table 4.2. This table reveals divisions between Raikas and other castes in the species of animals owned. We see that Raikas own almost 90% of the sheep and more than 90% of the camels in the village. Yet, they form only 27% of the population. Cattle holding in the village is more evenly spread out among the different castes. The four higher castes (Charans, Brahmins, Patels and Rajputs) together own just about 50% of the cattle in the village. They form 23% of the village population.

The landholding pattern is highly skewed in favor of the four higher castes (see Table 4.3). The Charans and the Patels have the highest per household landholding figure in the village: 10.2 ha. per family.[7] The rest of the village

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[6]Scheduled castes are so called because they are mentioned in the Indian Constitution as oppressed and disadvantaged castes and the state has undertaken to target specific programs at them to improve their socio-economic status. Affirmative action, job reservations and setting aside some of the parliamentary constituencies in favor of the scheduled castes are some of the ways in which the state has attempted to achieve this objective.

[7]I use household and family interchangeably in this work.

households own 3.3 hectares of land on the average. The Raikas possess just 2.1 hectares of land per household.

Of the various castes in the village, the Sargaras, the Bhils and the Meghwals occupy the lower position in the caste hierarchy. Their social status is also congruent with their economic status. They hold a little more land on the average than the Raikas. On the other hand, they possess very few animals. While the Meghwals are still somewhat better off, the Sargaras and the Bhils occupy the very bottom of the social and economic ladder in the village.

Caste inequalities in land and animal holdings between castes are further accentuated by the fact that just a few families in each caste hold most of the land and animals of that caste. For example, just twenty percent of the Raika families own more than 50% of the camels and sheep in the village. Similarly, less than ten percent of the upper caste households own more than 50% of the land and cattle held by the upper caste families.[8]

The inequalities between the upper caste families and the Raikas in terms of their land and animal holdings have an important effect in polarizing the interests of the two groups, especially when it comes to harvesting benefits from the commons. To understand how the unequal division of land and animals affects the interests of village caste groups in the common resource - the oran - we need to look at the economic activities of the villagers.

Most families in the village rely on agriculture. Almost all households possess and cultivate some land, even if they have to supplement their income from crop agriculture from other sources. Two of the most important other sources of income for village households are livestock and off-farm employment in the cities and on construction sites outside the village.

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[8]The same pattern of inequalities in landholding exist for the entire village. The bottom fifty percent of the households own less than 15% of the cultivated land in the village. But the top 10% of the households own 34% and the top 20% own 56% of the cultivated land in the village.

The major crops in Patawal - millets, fodder crops, legumes, and some oilseeds - are cultivated during the summer monsoon, also called the "Kharif season. The first ploughing occurs at the end of June or the beginning of July depending on the onset of the monsoons. To take advantage of every bit of available moisture after the first showers have fallen, farmers use tractors instead of bullock drawn ploughs since tractors are much faster. Once crops are sown, they mature quickly, within eighty to ninety days. They are harvested in October/ November. For the rest of the year, all fields in Patawal lie fallow.

None of the fields in the village are enclosed. Boundaries between fields owned by different individuals exist, but they can be easily crossed by animals and human beings. The reason for the absence of enclosures is quite simple: although cultivated fields are private property, they are treated as common property for the purposes of grazing during the fallow period. The treatment of private fallow as common property is not a phenomenon particular to Patawal. Most villages in this region lack irrigation and have only one cropping season. Therefore it makes sense to treat private fallow as common in the post monsoon period when no crops are standing on the fields.[9] The fields are then available to animals owned by individuals from other households in the village, and even from other villages.[10]

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[9]See Carl Dahlman, The Open Field System and Beyond; A Property Rights Analysis of an Economic Institution (Cambridge: Cambridge University Press, 1980); and Donald McCloskey, "The Open Fields of England: Rent, Risk and the Rate of Interest," in Markets in History: Economic Studies of the Past, ed., David W. Galenson (Cambridge: Cambridge University Press, 1990) 5-51 for a discussion of common pasture and private crop agriculture in eighteenth century England.

[10]Of course, owners of the plots can enclose their land and grow crops on it. However, there is no irrigation in the village. And enclosing the land so that animals owned by the farmer can graze on the enclosed fallow is far too expensive an option to encourage any farmers to take this step.

Because of open access private fallow becomes an important source of fodder for both the upper and lower castes. It does not seem that the lower castes benefit more from the private fallow than do the upper castes.[11] The lower castes (Meghwals, Darjees, Raikas, Sargaras and the Bhils) own 39% of the private cultivated land and 36% of the cattle in the village (see tables 4.2 and 4.3). The four upper castes (Rajputs, Brahimns, Charans and Patels) own 47% of the privately owned land and 58% of the cattle. We see that almost all caste groups in the village maintain cattle. Further, the cattle owned by different caste groups roughly match the proportion of land owned by that group. Inequalities in cattle ownership parallel landholding inequalities. None of the castes, therefore, gains over other castes by cattle ownership. The grazing patterns for the cattle and other village animals demonstrate that open access to the private fallow for grazing confers no extra benefits on any caste group in the village. A high proportion of the benefits from the oran, however, are extracted by the Raikas.

Most villagers graze their animals on the open private fallow from November to May. In this period, most of the animals in the village are cattle since the Raikas, who own almost all the sheep and camels in the village, leave for their annual migration cycle. Very few sheep are then left behind in the village. Of the sheep that are left behind in the village, many browse on the vegetation on the oran rather than on the crop stubble in the fields. Cattle, on the other hand, seldom graze on the oran after the monsoons because the vegetation on the oran quickly deteriorates to an extent that makes it unsuitable for cattle.

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[11]For a different view see N. S. Jodha, "A Note on Contribution of CPRs to PPR-Based Farming Systems in Dry Tropical Regions of India," Paper presented at Common Property Resources Workshop in Sariska, India, 1987; and idem., "Population Growth and Common Property Resources: Micro-Level Evidence from Selected Areas," Paper presented at Expert Consultation on Population and Agricultural Development: Institutions and Policies, (Rome: FAO, June 29-July 1, 1988).

As the fodder available to the cattle from the crop stubble in the fields declines with the approach of summer, more and more cattle are fed from private fodder stocks. Families that do not have sufficient stocks from the monsoon months often purchase fodder from neighbors and neighboring villages.

With the onset of the monsoons, the private fields are sown with crops and closed to grazing. Now some of the cattle begin to graze in the oran.[12] Some of the farmers keep part of their land for pasturage, but only a few have surplus land to set aside for pasture. Therefore a large proportion of the households rely on the vegetation in the oran during the monsoon months to feed cattle. While both higher and lower castes rely on the oran, upper caste families also feed their animals from private fodder stocks and crop residues. The Raikas and other lower caste households can avail this option only to a limited extent.

The Raikas return from their migration just around the beginning of the monsoons. At this time the sheep population of the village increases enormously. The same situation is replicated in other villages around Patawal since the Raikas of these villages also return from their migration cycle at the same time. Almost all their sheep browse on the commons. As a villager described it, in the monsoon months, the oran is so filled with sheep that it resembles the back of a flea-ridden dog.

We see here a distinct difference in the extent to which the Raikas and the higher caste groups rely on the oran and on private fallow for fodder. The upper castes own cattle which graze on the oran only for a short period during the year. For most of the time, the cattle are either fed from private sources, or on the private fallow which turns into common property after the harvest. The Raikas on the other hand are sheep owners. They are absent from the village for the main part of the year, but return for approximately four months. In this period,

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[12]Pregnant and lactating cows are always stall-fed. In addition to the usual hay, they are also fed green fodder, some enriched cattle feed, and traditional medicines to improve milk yield.

the vegetation on the oran is crucial to the survival of their sheep and their household because they possess little land that could be spared.

Where benefits from the oran are concerned, unequal land and animal holdings between castes polarize caste interests. The Raikas would like the oran to be as large as possible so that their sheep can graze on the common during the monsoons. Any reduction in the size of the oran directly reduces the fodder availability for their sheep. Other groups in **the** village, especially the richer landowners, are unlikely to be strongly affected by reductions in the size of the oran. At the same time, as we shall see, inequalities of wealth and assets within a caste facilitate joint political action to improve the benefits for the entire caste. The discussion in section three of this chapter shows that the events that led to institutional change were precipitated by the more powerful and influential members within the Raika and the landowning castes.

Different factions in the village gain fodder from the commons (the private fallow and the oran) in proportionately different amounts. But fuelwood from the common lands is harvested by village households equally. A large proportion - nearly 70% - of the fuel needed for cooking is gleaned from private fallow once crops have been harvested.[13] Almost all village households use twigs, branches and crop residues rather than wood logs. The women and female children of the household gather them from the oran and the private fallow. But these are collected more often from the private fallow than from the oran. In the next section we will see the kind of restrictions that have been placed on gathering, using or selling woody bio-mass from the oran.

Political Processes

Historically, Patawal was a part of the feudal state of Marwar. Erstwhile patterns of administration and land use profoundly influence the present day

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[13]**The source for this data is the household survey I carried out.**

dynamics in the village. Local institutions, especially the informal village panchayats and the caste panchayats, function on principles that date back three to four hundred years. The village panchayats introduced in independent India by government fiat still recognize the authority of the informal panchayats in local resource management. To appreciate the autonomy of local institutions today, it is necessary to investigate their historical roots. This is especially important as the history of institutions of resource use trapped in the collective memory of the villagers inspires many of the rules that villagers use currently to conserve resources.[14]

Three historical factors prove to be important in analyzing how community resources are utilized in the village today: that Patawal was part of the Khalsa lands in Marwar state;[15] that local community institutions vigorously enforced social and economic decisions at the grassroots level; and that traditional rules guided resource use on the commons.

Prior to Indian independence, the princely state of Marwar was administered feudally with the king at the top and a congeries of nobles called

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[14]One of the most intriguing rules used by villagers, for instance, requires rule breaking individuals to feed birds. To punish individuals who cut wood or grasses on the oran, the informal village panchayats require them to stand in the village square and feed seeds to birds. Although the rule has historical roots, many village panchayats still follow it. In the current context the rule makes sense only as an act of altruism. Three facts, juxtaposed together, provide the rule with an economic rationale. One, birds often deposit undigested seeds in their droppings - thus birds are efficient seeders. Two, the orans date back to the feudal period when even petty lords controlled large areas, and many orans lay within their domain. Three, the lords would be concerned to protect and enhance vegetation all over their fief. An obvious inference from these three facts is that the rule for feeding birds was created by feudal lords to improve vegetation on the orans. Today, when orans are small, villagers do not necessarily gain the benefit of seeding their orans by feeding birds.

[15]Villages directly controlled by the center were known as Khalsa villages. Villages granted to the jagirdars were called jagir villages.

jagirdars - fiefholders - below him.[16] In principle, the jagirdars held their fiefs at the pleasure of the king, and had to fulfill several conditions to continue as jagirdars.[17] In practice, however, the jagirdars ruled as mini kings, administering their fiefdoms without much hindrance by the center. They appointed their own officers to collect revenues, to police the villages, and to dispense justice in the jagir lands. Usually the king had sufficient other troubles to not interfere in the day to day administration of the jagirs by the jagirdars. But throughout the nineteenth century, the crown sporadically attempted to reduce the local influence of the jagirdars. It tried to do so especially by favoring local administrative bodies and village communities in their disputes with the petty feudal lords.[18] The efforts of the crown to reduce the influence of local lords were rewarded with particular success when the jagirdar was both locally unpopular and when the actions of the jagirdar were contrary to traditionally held values.[19]

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[16]See Nirmala Upadhayaya. The Administration of .Jodhpur State: 1800-1947 (Jodhpur: International Publishers, 1973) 256.

[17]See G. D. Sharma, Rajput Polity: A Study of Politics and Administration of the State of Marwar. 1638-1749 (New Delhi, India: Manohar Publications, 1977; and Padmaja Sharma. Maharaja Man Singh of Jodhpur and His Times (1803 - 1843 A.D.) (Agra, India: Shiv Lai Agarwala, 1972) 216-218.

[18]In 1915 the jagirdar of Kurki was jailed for two years and his jagir was taken over by the state for five years because he had assaulted and beaten a village brahmin; the Bangwas thakur (feudal lord) was deprived of his judicial functions (as were several more thakurs for similar offenses) when he was found to abuse these rights; the thakur of Bhikamkor was tried as an ordinary criminal for attacking a guard with a sword: his estate was put under the supervision of the court of wards. See Upadhyaya, Jodhpur State, 180.

[19]See Hilton Root, Peasant and King in Burgundy: Agrarian Foundations of French Absolutism (Berkeley: University of California Press, 1987) 277; for a discussion of similar strategies adopted by the French monarch in the 18th century, prior to the French Revolution.

It is an open question whether the crown succeeded in actually curbing the power of petty lords through adjudicating against them in their disputes with ordinary villagers and village level authorities. It does, however, seem reasonable to assume that decisions by the crown against jagirdars could not have failed to provide a boost to the influence of local administrative bodies.

A large number of institutions at the village level influenced social and economic life. Village level panchayats and caste panchayats were two of the most important institutions that prescribed rules for social behavior and guided the behavior of villagers on resource use. Caste panchayats acted as arbitrating bodies for members of a particular caste. By settling disputes among members caste panchayats helped them avoid formal state institutions.[20] In Patawal, village residents even today respect the decisions made by caste panchayats in the affairs of their members.[21]

Village panchayats were judicial and administrative bodies for the entire village and on occasion also settled intra-village disputes.[22] The village

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[20]Not much precise data is available on the powers and activities of the caste panchayats. Some indication of their authority can be gathered from the following incidents. In 1817, the caste panchayat of the Meghwals (shoemakers) in Falodi (located in the northern part of Jodhpur district) refused to allow caste members to engage in removing the bodies of dead animals from the streets of the town. When Kumhaar (potter) Fusia of Jodhpur refused to marry the woman betrothed to him, his caste panchayat imposed on him a fine of Rs. 21.00. Vyas Sukhlal of Mandore (a town located near the present day city of Jodhpur) was fined Rs. 51.00 for conducting an extra-marital affair with a woman belonging to a caste lower than his - the sweeper caste. The Mandore caste panchayat of the Shrimalis threw out Shrimali Raghunath from the caste for having raped a teenage girl.

[21]See chapter 2 for a discussion of the caste panchayats of the Raikas.

[22]Two examples of such incidents are provided below. In 1821, the Bishnois (a caste group) of Mundwa and the Shrimalis were involved in a dispute with the Raibaris of Pokaran. The Raibaris set the hayricks of the Bishnois on fire and grazed their animals in the fields of the Shrimalis. The Mundwa Panchayat levied a fine on the offenders and imposed corporal punishment on some of them

panchayat of the earlier feudal period still persists in a somewhat attenuated form. The Patawal panchayat is an informal body comprised by ten elders and respected residents of the village. This panchayat settles minor disputes among villagers and presides over any significant village event.[23] It meets whenever the need is felt by the villagers. Meetings of the Panchayat are arranged through consultation, and information about them is spread in the village either by word of mouth or by the village **Baambhi** - a sort of unofficial position whose holder is supposed to inform all village households about upcoming village events.

The panchayat also manages local common resources, something that again has historical roots. In most villages in Jodhpur state, some land, called "charnota" was reserved for communal grazing by village animals.[24] All charnota land was controlled by the village panchayats. The panchayats also possessed other resources that were included in the village boundaries but were not owned privately. Some of these resources were naturally given (pastures, forests), some provided by the feudal lords (orans, nadis), and for others such as drinking water wells, the panchayat could undertake construction activities. The panchayat made rules about the utilization of the community resources such as pastures, forests, drinking water tanks, and village wells.[25]

(Arzi Bahi, No. 2, F. 58., quoted by Sharma Maharaja Mansingh, 207). In 1827, the Jaswantpura Panchayat punished the Bawaris of the village by socially ostracizing them and asking them to leave the village when they stole the fuel and vegetables of the Godras in the village (Khabar from Jaswantpura, 4th day of the dark half of Falgun, quoted by ibid., 208).

[23]. The informal panchayat, as we shall see, also enforces rules for the use of the community resources and sanctions those who violate rules.

[24]See Shubhu Patwa, Paryavaran Ki Sanskriti (Bikaner, India, 1989) 112-4).

[25]See Anant Sadashiv Altekar, State and Government in Ancient India, from Earliest Times to c. 1200 A.D. (Chowk Banaras, India: Motilal Banarsidass, 1958) 236.

Jodha[26] details some of the rules that regulated grazing access to the community grazing lands. According to him, scattering of watering points evenly in the grazing areas, deliberate rotation of grazing, periodic restriction grazing by some types of animals in the common, use of watchmen to prevent villagers from breaking rules, auction of rights to dung collection, top feed lopping, and restrictions over cutting wood in the common were some of the more prominent ways in which villagers protected and conserved commons. Often the panchayats also levied user fees from villagers and outsiders for the use of common resources. The revenues gathered through user fees and taxes that the panchayat levied went to a village fund and were used for public purposes.[27]

Patawal was part of the Khalsa lands in the kingdom of Marwar. The oran in the village was dedicated to a local deity which was supposed to protect the villagers and their animals. A number of rules regulated access to the oran. Rules also prescribed how benefits could be withdrawn from the oran. Over time, as the influence of the feudal state declined and it lost its authority, many of the rules that guided resource use lost their force. This is the substance of a number of studies carried out by Brara, Anantram and Jodha.[28] They argue that after Indian independence in 1947, existing rules lost their force to preserve the

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[26]**N. S. Jodha, "Rural Common Property Resources: Contributions and Crisis," Foundation day lecture, May 16, 1990, New Delhi, India: Society for the Promotion of Wasteland Development, 1990): 26, photocopied.**

[27]**Altekar, State and Government, 236.**

[28]**Rita Brara, Shifting Sands: A Study of Rights in Common Pastures (Jaipur, India: Institute of Development Studies, 1987); K. Anantram, "Economic Analysis of Harnessing Common Property Resources for Livestock Development in Arid Zones of Western Rajasthan," Ph.D. Diss., (Jodhpur, India: Department of Economics, University of Jodhpur, 1988) 183; and N. S. Jodha, "Population Growth and the Decline of Common Property Resources in Rajasthan, India," Population and Development Review 11 (1985): 247-263.**

commons especially quickly. Jodha[29] studies two villages in Western Rajasthan and concludes that out of nineteen rules that villagers had for managing commons in the past, only two survive today. Anantram also contends that local panchayats have become less effective in implementing rules for conserving common resources.[30] This study, however, shows that at least for Patawal the erosion of community institutions has not proceeded apace. In the last fifteen years, the formal village panchayat has attempted to resurrect the rules for utilizing the commons. Its efforts have been crowned with some success.

The formal village panchayat[31] - or the village council - is quite different from the informal panchayat discussed earlier in this chapter. It is one of the most obvious forms in which the state government intervenes in local political processes. Funded by the state, the formal panchayat is an elected body that carries out developmental tasks in the village. It is a multi-village panchayat and is responsible for welfare activities in Patawal and four other villages. Through more than 500 unanimous resolutions in the past twelve years, the thirteen panchayat members have voted for constructing and maintaining local schools, lobbied the government for providing drinking water to the villagers, and undertaken relief works during droughts.

The head of the panchayat is called the Sarpanch. The twelve other members of the panchayat, each called a Ward Panch, are drawn for the most part from the higher castes (Patel, Rajput, Bishnoi, and Charan). Of these twelve members, ten are elected to office. Two are nominated and most be from disadvantaged groups. All the elected Ward Panches are from higher castes. The

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[29]**Ibid.,255.**

[30]**Idem., "Economic Analysis".**

[31]**From this point I will refer to the informal village panchayat comprised by village elders as the informal panchayat. The formal, legal, elected body of villagers, on the other hand, will be the formal panchayat.**

two ward panches who perforce must be nominated from among disadvantaged groups are a woman and a Meghwal. Although there are two Ward Panches who are from disadvantaged groups, the fact that the 500 resolutions that were supported by the panchayat in the past twelve years were all unanimous, indicates the absence of serious conflict within the panchayat.

Only a few of the 512 unanimous resolutions that the panchayat has passed concern the oran: fourteen to be precise. Six resolutions aimed at converting part of the oran into land for settlement. Two of the resolutions petitioned the government to remove encroachments from the oran. Out of the remaining six resolutions three detailed sanctions for individuals who cut wood on the oran and three aimed at improving grass and tree cover on the oran. The last six resolutions occupied the center stage in the political struggle which led to changes in the institutional arrangements guiding use of fodder and fuelwood from the oran.

Change in the Institutional Arrangement

The vegetation cover on the oran in Patawal is superior to that for the orans in most neighboring villages. The trees on the orans of most villages close to Patawal, are severely lopped. In addition there are many more trees on the oran in Patawal in comparison to the orans located within a ten mile radius of Patawal. When asked the reason, villagers stated that trees are sacred objects, especially the Khejri tree. They should therefore be preserved, not cut. But they also admitted that prior to the concrete steps taken by the formal and informal panchayats in Patawal the vegetation on the oran was declining.

Clearly, to make people translate their feelings of respect towards trees into protective behavior towards trees, reinforcement is necessary. Reinforcement can adopt several forms: new protective rules, economic incentives, or strengthened norms. The formal panchayat in Patawal undertook to protect vegetation by creating new, enforceable, rules.

Beginning from 1979, the formal panchayat in Patawal initiated resolutions that restricted the access of different villagers to the oran. Although the new rules restricted the access of different caste groups equally, they more adversely affected those caste groups which depended on the oran to a greater extent. These were the Raikas. We saw in the first section that since they own sheep, and since sheep browse chiefly on the oran, any restrictions on access to the oran would affect the Raikas more adversely than any other group. The political process whereby the formal panchayat accomplished its objective of restricting access of the villagers to the oran is interesting and instructive. The upper caste, land-owning castes combined with the Meghwals; forced the Meghwals to vote against the Raikas in the local panchayat elections; and used their control over the panchayat to reduce benefits from the oran to the Raikas.

In 1979 the formal panchayat passed a resolution which banned villagers from cutting green wood from tree species such as ber and Khejri. This was not a unique incident. Prior to this resolution, the formal panchayat had passed similar resolutions on a number of occasions. However, there was one difference this time. Coupled with the passage of the resolution to restrict villagers from cutting wood, panchayat members debated about fencing part of the common and preventing animals from entering it so that its vegetation could improve.[32] The debates in the panchayat assumed a new meaning in 1979 because of certain developments that took place in the civil and revenue courts of the state, and because around this time the state government began to consider a new forest bill. The sequence of these developments can be briefly described.[33]

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[32]The ownership rights on the fenced part of the oran would not change. It would continue to be controlled by the formal panchayat. By closing off some of the oran, the panchayat primarily wished to defer gratification.

[33]See Brara, Shifting Sands for further details.

The Rajasthan Tenancy Act (1955) and the Allotment of Land for Agricultural Purposes Rules, (1970), specify that certain village lands cannot be converted into agricultural land: pasture lands, lands covered by water, lands reserved for village forests and lands earmarked for purposes of public utility fall under the provisions of these two statutes. These statutes safeguarded the interests of animal owners in Rajasthan by ensuring that grazing lands for their sheep will not be privatized into agricultural land. A series of court decisions between 1961 and 1977 further strengthened the principle that certain categories of land in the Western dry districts of Rajasthan could not be used for agricultural purposes. In the case of Nanu Ram V. State of Rajasthan (1961), the Board of Revenue decided that "grazing lands which were recorded as such ... were to be frozen as charagah[34] lands. In Ram Singh V. Parmoli (1971), the courts reversed the decision that grazing lands could not be diverted for agricultural purposes. But this reversal of the earlier decision did not apply to grazing lands in the semi-arid Western districts of Rajasthan. Therefore shepherds in districts such as Jodhpur, Banner, Bikaner, Jaisalmer, and other Western Districts were still safe. In Durga Prasad V. Pannalal (1977), it was reiterated yet again that all lands in the villages that were unassessable for revenue were exempt from conversion into agricultural land. The oran in Patawal, recorded as community grazing land in land settlements prior to independence, was exempt from conversion into private cultivated land. Safe were the interests of the Raikas.

However, around 1978 a new forestry bill began to be considered by the government. This bill contained a provision through which common lands in a village could be enclosed so that the vegetation cover on them could improve. According to the provisions of this bill, once a formal panchayat in a village passed a resolution to enclose a part or whole of the village common, government forest departments or some other government agencies could begin the fencing of

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[34]**Charagah literally means an "area for grazing".**

the common land and actual planting on the enclosed land. In addition to fencing and planting the common land, the forest department would also provide the formal panchayat with funds to hire a guard to protect from grazing the sablings planted on the enclosed common. This provision in the bill aimed at increasing the vegetation in villages, especially in dry and hilly areas where the government perceived the vegetation on the common lands to be most degraded.

The Raikas in Patawal were (and are) completely against any enclosure of the oran. In the elections for selecting ward panches for the formal panchayat in 1982, they put up two candidates. One of these candidates was from the family of the largest sheep owner in the village. The other was also persuaded to stand for election by the Raikas who owned large sheep flocks. It were their interests which would be affected the most by the enclosure. The Raikas believed that once their candidates were elected, they could attempt to persuade the rest of the members of the panchayat to desist from enclosing the common lands. Even if they did not succeed in preventing the other ward panches from passing resolutions to enclose the commons, their dissenting votes in the panchayat meetings would create some dissonance in the hitherto unanimous voting patterns of the formal panchayat.

They had reason to entertain some hopes of success in the elections. Numerically, they are by far the largest caste group in Patawal village. Although Patawal is a multi-village panchayat, they expected to get some support from the other lower caste groups in the village so as to get at least one of their candidates elected to the formal panchayat as a ward panch. These were the first elections in the village in which a lower caste group had threatened the unchallenged domination of the panchayat by the upper caste groups.

The first effect that the Raika candidates had on the upper castes was that it united the Patels, Charans and Rajputs against the Raikas. Once united, the upper caste, landowning faction in the village, reacted predictably. It tried each

of the four strategies prescribed by Chanakya:[35] Saama (cajoling or persuasion); Daama (bribes); Danda (threats) and Bheda (dividing the enemy), to prevent the Raikas from putting up a candidate. None worked.

Then the upper caste faction used a carrot and stick policy with the other major lower caste group - Meghwals - in the village. If the Meghwals voted for the Raika candidates, the upper caste group threatened, they (the Meghwals) would never again receive employment on the farms of the Patels and the Brahmins. They also worked on the resentments of Meghwals against the Raikas.[36] Finally, when the election returns came in, only one of the two Raika candidates had been elected.

Although the Raikas had got their way, their attempt to enter the formal panchayat polarized the landowning caste groups against them. Over the course of the next five years, the formal panchayat passed five resolutions that effectively restricted the access of villagers to the oran and enclosed 30% of the oran.[37] The newly elected set of officials passed a resolution in 1982 through which villagers were disallowed from cutting trees on oran without obtaining permission from the panchayat. Between 1982 and 1987, the panchayat passed three resolutions through which it enclosed 70 hectares of the oran land. Trees have been planted on the enclosed land with the help of the forest department and the Center for Arid Zone Research Institute in Jodhpur. The area is enclosed by

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[35]Chanakya was prime minister to the first Indian Emperor - Chandra Gupta Maurya who ruled from 323 to 300 B.C. As his advisor, Chanakya gained the reputation of being the greatest diplomat in Indian history. His reputation has not yet faded.

[36]While both Meghwals and Raikas belong to the scheduled castes, the Raikas consider themselves superior to the Meghwals.

[37]The Raika representative in the panchayat duly voted against these five resolutions. Apart from indicating a voice of dissent, his vote did not have any other effect.

barbed wire and none of the village residents are allowed to graze their animals in this part of the oran.

Finally, in the beginning of 1987, the panchayat passed a comprehensive resolution that fixed precise fines for offenses involving removal of wood from the oran. Two categories of punishments were defined. In the first category were those offenses where the wood cut from the oran was recovered from the offenders.

> a) Individuals found cutting an entire khejri tree would be fined Rs. 500.00.
> b) Anyone found cutting branches of the Khejri tree would be fined Rs. 250.00. The same amount would be imposed on persons cutting Ruhira, Ber or Videshi Babul trees.[38]
> c) The amount of fine was fixed at Rs. 100.00 for those who cut Kair bushes.

In case wood could not be recovered from the offenders, the matter was to be reported to the police. To enforce the rules the panchayat appointed a five member committee consisting of one Ward Panch and four prominent villagers. Members of this committee were not paid, nor were they supposed to act as guards. Their primary task, rather, was to arbitrate disputes among villagers over the use of the oran. In the same meeting the panchayat also specified that money collected through fines would be used for collective welfare within the villages. Further, the amount of fines could be reduced at the discretion of the panchayat in a given case.

Although the formal panchayat created the rules for conserving and protecting the vegetation on the oran, the informal panchayat plays an important role in enforcing the rules created by the formal panchayat. The informal panchayat comprises one representative from each of the major castes in the village and two representatives from the Patels and the Charans. While the rules

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[38]**The botanical name of these trees are respectively Tecomella Undulata; Zizyphus Mauritania and Prosopis Chilense or Prosopis Juliflora.**

passed by the formal village panchayat seem to be very precise and stringent, it is the informal panchayat that bears the real responsibility for protecting the trees within the village boundary. This is also the implicit understanding between the two panchayats.

The relationship between the five village formal panchayat and the informal panchayat in Patawal is difficult to pinpoint exactly because there are no defined areas of authority and influence for the Patawal Panchayat. It has no legal standing, but within the village its word carries considerable influence and weight. Since it is composed of the elders residents in the village, it is difficult for most villagers to defy its decisions unless they want to cut themselves off from the village community life.

The informal panchayat meets regularly. The meetings serve two purposes. The panchayat reaffirms rules about cutting of trees in the oran and on private fields.[39] At the same time, it usually also selects one or two guards for the village (or confirms the existing guards in their position). The guard is entrusted with the dual function of preventing outsiders and villagers from cutting wood in the oran and in private fields. The guard is paid a salary by the village families collectively. While the formal five village Panchayat is officially responsible for auctioning dry trees from the oran, in practice it is the informal Patawal Panchayat that oversees this task. It also retains the revenue from the sale of dry trees and uses the money for public purposes in the village.

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[39]There are a number of differences in the manner in which villagers exercise their rights over trees on the Oran and trees on their private fields. They can restrict others from cutting tree branches from their fields while in the case of the oran, they can simply report the matter to the panchayat which will then take appropriate action. In practice, the panchayat takes a more lenient view of villagers cutting trees on their fields. After harvesting crops, villagers have no restrictions on cutting new saplings of ber trees on their fields (between .25 and .5 meter high); they are not allowed to cut any saplings on the Oran.

The effect on different village groups, of the rules that prevent them from cutting wood is substantially similar. There are few differences between different caste groups in their fuelwood consumption patterns.[40] The richer as well as the poorer and the upper caste as well as the lower caste households collect fuelwood from the oran and private fallow between November and May. During the monsoons, most families rely on fuelwood stocked in the earlier part of the year. Some households buy fuelwood from the market.

However, because the Raikas and the landowning castes in the village differ substantially in the animals they possess, the rules restricting fodder use from the oran have adversely affected the Raikas. Indeed, 30% of the oran was fenced precisely because the landowning groups dominating the formal panchayat knew that the new rules would affect the Raikas unfavorably. The new institutional arrangement was created to show the Raikas who was the boss in the village. The new arrangement, as one Raika put it, also hit the shepherds where it would hurt the most - in their stomachs.

When 70 hectares of the oran land were fenced, the benefits to the upper landowning castes also declined because during the monsoons, some of their cattle graze on the oran. However, the reduction of benefits to the Raikas was comparatively much greater. During the monsoon months, the Raikas' sheep must subsist on the vegetation in the oran. They cannot leave the village and migrate with the sheep for the entire year because they have to cultivate their agricultural fields. They also cannot migrate with the sheep during the rains because most of the fields are under crops during the monsoons. The fencing of a large part of the oran has reduced substantially the benefits available to them from the commons in the village.

Fencing of the common has reduced present benefits to all groups in the village. It has also not increased future streams of benefits from the oran to the

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[40]**Household survey, 1989-90.**

villagers. The forest department planted most of the trees on the oran. Survival rates for trees are as low as 20%. After five years, survival rates of less than 5% are common[41] in other parts of the district where the forest department undertook plantation programs. The fenced part of the oran is distinguishable from the rest of the oran only because of the broken fencing that surrounds it; not because it has a higher vegetation cover.

Conclusion

This chapter set out to show that for competing factions in a "community" it is not the absolute level of benefits that is important in bringing about institutional change. Rather, rival groups compare each other's relative share of the benefits and react to bring about changes when their existing shares are threatened. The changes they effect may actually reduce benefits to all factions. The story of the Raikas and the upper caste land owning groups in Patawal illustrates and confirms this statement. This chapter therefore, demonstrates the role of politics in bringing about institutional change. In the next chapter we will examine how rules influence resource utilization patterns.

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[41]Indeed, in many parts of Rajasthan the forest department has stopped recording survival rates of trees because of its abysmal performance in protecting planted seedlings. The department only records the number of trees it planted as its performance indicator.

T A B L E 4.1

Distribution of Village Households by Caste

Caste	Number of Families	Percentage
Raika (Dewasi)	57	27
Meghwal	38	18
Patel	27	13
Bhil	24	11
Suthar	24	11
Charan	14	7
Sargara	12	6
Darjee	7	3
Brahman	4	2
Rajput	3	1
Sad	2	1
Total	212	100

Source: Patwari Records, 1988.

TABLE 4.2

Livestock Ownerhip in Patawal according to Caste Groups

Caste	Cattle	Sheep/Goats	Camels
Charan	42(3.0)	97(7)	1-
Rajputs	8(2.7)	-	-
Brahmin	9(2.3)	3(.7)	-
Patels	49(1.8)	18(.7)	-
Raikas	22(0.4)	2870(50)	66(1.2)
Suthar	29(1.2)	10(.4)	-
Darjee	8(1.1)	10(1.4)	-
Sad	2(1.0)	2(1.0)	-
Meghwal	24(0.6)	55(1.5)	-
Sargara	5(0.4)	21(1.8)	-
Bhil	8(0.3)	152(6.3)	4(.2)

(Figures in brackets are the per family holding of the particular animals species for the caste.)

Source: Patwari Records, 1987.

TABLE 4.3

Land Distribution according to Caste Groups in Patawal

Caste	Area Owned (ha)	Households No.	Per Family Holding (ha)
Charan	155	14	11.1
Patel	264	27	9.8
Brahmin	34	4	8.5
Sad	16	2	8.0
Sutar	118	33	4.9
Darjee	33	7	4.7
Meghwal	170	38	4.5
Rajput	10	3	3.3
Raikas	120	57	2.1
Sargara	23	12	1.9
Bhil	40	24	1.7
Outsiders	73	12	6.1
Total	1056	212	

Source: Patwari Records, 1987.

Chapter 5:
RULES, RULE MAKING AND RULE BREAKING: EXAMINING THE FIT BETWEEN RULE SYSTEMS AND RESOURCE USE

The previous three chapters examined two factors that contribute to institution formation - environmental risks and politics. This chapter shifts the analytical focus. It investigates the effects of institutional rules on resource use. I show that to understand patterns of resource use it is crucial to examine institutional rules - especially rules that help enforce utilization of resources - rather than such factors as overpopulation or market pressures. The setting for the analysis changes from the semi-arid plains of Rajasthan to the mighty Himalayas. Six cases of fodder and fuel use from community forests[1] in Almora district in the Middle Himalayas provide the empirical grist for the analysis.

Of the various causes posited as responsible for resource deterioration, we will first examine overpopulation and market forces.[2] Both, I argue, provide untenable explanations of resource degradation. Increasing population increases the number of individuals who depend on a given resource system. Increasing pressure on resources, researchers claim, leads individuals to overexploit resources. The implicit assumption is that villagers suffer from a basic inability to reduce consumption to match supply. Market forces on the other hand, operate in a distinctly different fashion to change resource use patterns. Profit motivations,

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[1]The community forests I study are called panchayat forests. They are managed through local institutions called forest panchayats. See section II for a brief discussion on the origins of forest panchayats.

[2]For citations, see chapter 1, section II, fn. 57. Also fn. 18 in this chapter.

researchers believe, prompt societies facing market pressures to shift economic activities from a logic of subsistence to a logic of surplus. The logic of surplus "naturally" leads to overexploitation of resources. The implicit assumption in this case is often that villagers are incapable of foregoing the temptation to make a quick buck if markets present them with an opportunity to sell benefits such as fodder/ fuelwood.[3]

Claims that market pressures and overpopulation lead to resource degradation do not make sense, however, if they ignore institutional arrangements. Institutions exist in all villages and mediate the effects of factors such as overpopulation and market forces, which may contribute to resource degradation. Successfully functioning[4] institutions can regulate resource use even in the face of population pressure and regular market interactions. Indeed, the obvious characteristic of institutions is that they constrain human behavior. In several cases discussed in this chapter, locally designed institutions did restrain villagers as they harvested benefits from the common forests. If villagers can design institutions to constrain themselves, then they possess the ability to reduce consumption and to forego profitable opportunities. What explains resource degradation then, I hypothesize, is either the absence of well designed and regularly enforced institutional rules in villages, or strong policy interventions by

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[3]To examine the role of market forces and overpopulation in resource degradation, I will supplement my data with the case data collected by Vishwa Ballabh and Katar Singh, "Van (Forest) Panchayats in Uttar Pradesh Hills: A Critical Analysis Research Note, Anand, India: Institute for Rural Management, 1988) and Sonali Bisht (n.d.). Together, they present data from five additional cases they studied in Almora and similar ecological settings.

[4]Functioning institutions refers to institutions which have rules that prescribe stinting behavior on the part of resource users, in which the observance of the rules is monitored, where rule breakers are sanctioned and where mechanisms are available to users for resolving disputes.

the government to change local patterns of resource use,[5] rather than the inability of villagers to stint.[6]

Overpopulation and Market Pressure --> Resource Degradation ?

Overpopulation

This section relates population and livestock pressure to local forest resources. We have two measures of the dependent variable - the condition of the resource. The first is based on the researcher's own observations and the second on the opinions of villagers. Both measure are ordinal, classified into five categories ranging from excellent to degraded.[7] The two measures do not differ

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[5] **Of course, it is possible for villagers to force central governments to change policies that attempt to restrict villager access to resources and which attempt to alter local resource use patterns. Organized and spontaneous protest by villagers led the British government to introduce the Van Panchayat Act in 1931 for the hill districts. Villagers can also evade formal rules (whatever the source for the rules) through low key, but sustained, rule violations.**

[6] **Under extreme deprivation, as in famine conditions, individuals may over-exploit available resources, in spite of all institutional safeguards. Such situations are not, however, the subject of study in this chapter.**

[7] **To compare the data from different sources, I proceed in the following fashion. For the five cases studied by Ballabh and Singh, "Van (Forest Panchayats," and Bisht (n.d.), I use their statements on the state of the resource to classify the resource into different categories. They have provided their personal assessment of the resource condition as well as opinions of the villagers. For my studies, I have categorized the forests depending on the vegetation on a given unit of land: the age and number of the trees and the grass cover on the ground. To gather opinions of the villagers on the state of the resource, I conducted a ten percent sample survey of the village households. The five categories that I employ to characterize the resource are: excellent, good, fair, poor and degraded. In some cases, I have also characterized the resource as lying between two categories - such as good/excellent, or fair/poor and so forth.**

from each other in any substantial fashion.[8] For the ensuing analysis, therefore, I will use my classification of the resource condition.

There are quantitative measures of the independent variable - pressure on resource. The first two measure how much panchayat forest land is available per household and per livestock unit[9] in a village. The other indicators show how much total forest and pasture land is available near the village for each household and livestock unit (see table 5.1). The data in the table is presented visually in Figures 5.1 to 5.4. In all the four figures, the data points scatter almost randomly. The implication is that none of the four measures of "pressure on resource" are successful in explaining resource condition. There are a number of villages where a large amount of forest land is available for each household but the forest cover is poor. Conversely, in a number of villages where the condition of forest is good or excellent, there is relatively high pressure on the resource. A simple OLS regression line shows that none of the variance is explained by the different measures of the independent variable - pressure on resources.[10] Neither are the beta coefficients significant for any of the regressions.[11] It is obvious that the figures show no clear relationship between resource degradation and population

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[8]The coefficient of correlation between the two measures is 0.73. Spearman's and Kendall's correlations compute to 0.75. and 0.94, respectively.

[9]Following standard practice, one cow or bull equals one livestock unit, one buffalo equals 1.5 livestock units, and one sheep or goat is equivalent to .2 livestock units. See Ballabh and Singh, "Van (Forest) Panchayats".

[10]Since the dependent variable is categorical, OLS is not the most appropriate technique. However, the observed values of the dependent variable are distributed over the range of the different categories. Further, we possess information on only eleven observations. Finally, the purpose of OLS is not to prove that pressure on resources is not related to resource condition; rather, the aim is to simply provide a rough numerical estimate of the possible relationship. The data, even observed visually, is clear enough in its implications.

[11]The R^2 for the four regressions (one for each measure of the independent variable) are close to zero. The t-statistic for the Beta coefficients in each case are less than 0.5.

or livestock pressure on the resource. As argued in the introduction to this chapter, we must therefore invoke other explanatory factors.

Market Forces

Market pressure constitutes another factor which may explain resource degradation. My analysis uses distance from a major town or roadhead, where resources such as fodder and fuelwood can be sold, as a proxy for the strength of market forces.[12] Using this proxy, we investigate the suggested relationship between the condition of the resource and the strength with which market pressures influence its use. Table 5.2 provides data from eleven villages in the hills. The figures in the table suggest that there is no systematic relationship between market pressures and resource condition. Degraded village panchayat forests are located as far as 11 kms. from the village. On the other hand, village forests in an excellent to good condition are located just one to 2.5 kms. away from the market. Figure 5.5 presents the data from table 5.2 visually. The OLS line in this case shows that distance from the market explains some of the variance observed for the dependent variable, but it is very small.[13]

The empirical evidence thus calls into question arguments that relate market forces and pressure on resources to resource degradation, or that posit that market or population pressures drive villagers to overexploit resources. Indeed,

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[12]Few of the villagers sell fodder or fuelwood from the commons in the market. Although fodder and fuelwood can be purchased, market prices are high enough and markets distant enough to prevent most villagers from buying fodder and fuelwood. Because markets are far away, villagers are also seldom able to sell firewood or fodder. The firewood that is sold in the markets is taken there by individuals who own some means of transport - usually a truck or tractor. However, if there were no enforcement mechanisms preventing tree felling, there will possibly be an increase in the amount of firewood and fodder that makes its way to the market.

[13]The Beta coefficient in this case is approximately 1. The R^2 is approximately 0.3.

if the market forces/ overpopulation hypotheses were correct, none of the hill villages should have forests that are in **a** good condition. In the sample above, all the villages possess less than 0.5 hectare of forest and pasture land available per livestock unit. But, according to Ashish[14] each livestock unit in the hills needs four to eight hectares of mixed pasture and fodder forest. Clearly, other factors play a role. I will argue that it is local institutional arrangements that prevent villagers from overexploiting forests and pastures.[15] The next section investigates how institutional rules may help to conserve resources.

Institutional Arrangements and Resource Use

The inductive exercise undertaken in the previous section raises doubts, but does not conclusively demonstrate anything. We observe that there are villages where high population and market pressures have not led to resource degradation. But there are also villages where they have. We saw that in some villages forests were in a degraded condition despite low population pressures. In some villages, however, the converse held. Similar contradictory evidence and conflicting conclusions characterize the mass of other empirical studies on the subject. Cool[16] believes that increasing population levels and the resultant pressures on resources lie "at the heart of our current dilemma (about deforestation)".

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[14]Sri Madhav Ashish, Personal Communication, March, 1990. His estimates are corroborated by similar figures presented by forest department officials in the district.

[15]Or, permit villagers to overexploit forests and pastures.

[16]John C. Cool, "Factors Affecting Pressure on Mountain Resource Systems," in Mountain Development: Challenges and Opportunities Proceedings of the First International Symposium and Inauguration (Kathmandu, Nepal: ICIMOD, December, 1983) 26.

Campbell[17] notes that such pressures lead villagers to engage in a number of ecologically unsound practices - they over-collect fuel and fodder, over-graze animals, practice shifting agriculture, and burn grasses[18]. Many specific case studies further support the beliefs that market forces and population pressures on resources lead to resource degradation.[19]

Pessimistic conclusions about the role of villagers in deforestation are hotly disputed by a large number of studies. Many researchers hold that villagers can play a positive role in of fodder and fuel management, even in the face of a changing environment and different kinds of pressures from market forces and

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[17] **J. Gabriel Campbell, "Community Involvement in Conservation," (Resource Conservation and Utilization Project) Prepared by the APROSOC for the USAID, Vol. 5, Annex, Mb., Kathmandu, Nepal: Agricultural Projects Services Center, 1979): 11.**

[18] **Whether all the practices that Campbell believes are ecologically unsound are actually so is in fact an open question into which I do not go. Interested readers are referred to Guha The Unquiet Woods, and Jack D. Ives, and Bruno Messerli, The Himalayan Dilemma: Reconciling Development and Conservation (London: Routledge, United Nations University, 1989).**

[19] **Sudarshan Iyengar, Common Property Land Resources in Gujarat: Some Findings About Their Size, Status and Use (Ahmedabad, India: Gujarat Institute of Area Planning, 1989); N. S. Jodha, "Common Property Resources and Rural Poor in Dry Regions in India." Economic and Political Weekly 21 (1986): 1169-81; idem., "A Note on Contribution of CPRs to PPR-Based Farming Systems in Dry Tropical Regions of India," Paper presented at Common Property Resources Workshop in Sariska, India, (1987), photocopied; idem., "Population Growth and Common Property Resources: Micro-Level Evidence from Selected Areas," Paper presented at Expert Consultation on Population and Agricultural Development: Institutions and Policies. (Rome: FAO, June 29-July 1,1988; and J. T. Thomson, "Ecological Deterioration: Local Level Rule Making and Enforcement Problems in Niger," in Desertification: Environmental Degradation in and Around Arid Lands, ed., M. H. Glantz, (Boulder, Colorado: Westview Press, 1977) 57-79.**

growing populations. To buttress their arguments, they cite numerous instances of successful collective resource management practices by villagers.[20]

Conflict among researchers is evidently the case even in studies of forest panchayats in Uttar Pradesh - the empirical context of this chapter. Bisht (n.d.) has examined two panchayats where the forests are in a degraded state and she has concluded that, in general, the institutional arrangements in forest panchayats are unlikely to promote forest conservation. But, Ballabh and Singh and Somnathan[21] have looked at cases where many of the forest panchayats have successfully protected their forests. They arrive at conclusions diametrically opposed to those of Bisht.

The problem therefore is to find a theoretical basis for reconciling the conflicting conclusions of different empirical studies. Empirical evidence cannot be ignored. Yet, it is equally clear that nothing can be settled by finding yet more

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[20]See D. W. Anderson, and W. Huber, The Hour of the Fox: Tropical Forests, The World Bank and Indigenous People in Central India (New Delhi, India: Vistaar Publications, (Sage), 1988; J. E. M. Arnold, and William Stewart, Common Property Resource Management in India London: Oxford Forestry Institute, University of Oxford, Tropical Forestry Papers, No. 24, 1991, 51; Thrainn Eggerttsson, "Analyzing Institutional Successes and Failures: A Millennium of Common Mountain Pastures in Iceland," Paper presented at the 8th Annual Conference of the European Association of Law and Economics, Copenhagen, Denmark. August 29-31, 1991; Anil K, Gupta, "Building upon People's Ecological Knowledge: Framework for Studying Culturally Embedded CPR Institutions," Paper presented at Second meeting of the International Association for the Study of Common Property, University of Manitoba, Winnipeg, September 26-29, 1991; and Robert Wade, Village Republics: Economic Conditions for Collective Action in South India (Cambridge: Cambridge University Press, 1988).

[21]Ballabh and Singh, "Van (Forest) Panchayats". E. Somanathan, "Public Forests and Private Interests: Deforestation and Forest Policy in the Central Himalaya," New Delhi, India: Indian Statistical Institute, 1990: *66* provides a theoretical basis for his argument that community management of forests will be superior to forest management through the forest department or by the government. However, he neglects problems and potential problems that exist in community managed forests.

instances where villagers have collectively over-exploited resources or carefully husbanded and managed them in the face of individual incentives to squander them.

This section examines specific rules for fodder and fuelwood use in the panchayat forests in Almora district. Successful institutional solutions to resource management problems must create and enforce rules on at least four operational levels: resource utilization,[22] resource monitoring, sanctioning, and arbitration. The creation and enforcement of rules at each of these levels constitutes a problem of collective action which if solved successfully creates institutional arrangements that support the sustainable use of resources.[23] If the collective action problem remains unsolved at any one of these levels, it can lead to the unravelling of the entire institutional arrangement. For example, failure to sanction rule violators (or mistakenly sanction those who never violated rules) will encourage further rule violations or promote resentment among users against existing institutions. Or, incorrect prescription of use rules may lead to excessive withdrawal of benefits from the resource system or to a supply of too little benefits - the latter leading users to extract greater benefits in violation of prescribed rules. The analysis of different rule arrangements in the studied villages shows that it is invariably the failure to create or enforce rules at some operational level that leads to institutional failure.

The institutional rules in the forest panchayats in Almora (an other hill districts) are powerfully influenced by the Van Panchayat Act of 1931. This statute frames the rules that villagers create to manage forests. The British

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[22]Rules for utilizing the resource refers to five sets of property rights - rights to access, use the benefits from, manage, exclude others from, and finally, transfer, the resource.

[23]The exact aim of resource management can vary. Thus the word "sustainably" can be replaced by "efficiently", or "equitably" or for that matter, "unequitably".

government passed the Act after prolonged resistance offered by the hill villagers in Kumaon and Garhwal.[24]

The villagers had begun to protest the efforts of the British state to bring large areas of hill forests under government control. From the 1850s the British government asserted its absolute rights over all land and forests in Kumaon and Garhwal and brought more than 60% of the land in Kumaon under its control between 1840 and 1910. The primary motivation was economic. In the 1830s, forest revenues were low, less than Rs. 4,000.00 a year. Over the next 30 years they grew enormously, surpassing agricultural revenues (see table 5.3). The state could extend its rights over forests only by limiting villager access and use rights in the resource. The Imperial Forest Department protected state forests from trespassing, unauthorized tree felling, grazing and firing.[25] Against encroachments by the state on their traditional rights in the forests, villagers protested incessantly. They employed what Scott has called "everyday forms of resistance", as well as more active resistance. Guha describes and traces in detail the more active and militant forms of protest by the peasantry in Kumaon. Faced with the prospect of unceasing and unmanageable peasant protest, the government was forced to look into the demands of the peasants.[26]

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[24]Kumaon and Garhwal are the names of the two ancient hill kingdoms in Uttar Pradesh province. The names today refer to administrative and geographical divisions. Almora is one of the three districts in Kumaon Division. The other two are Nainital and Pithoragarh.

[25]Villagers fired the grasses and undergrowth before monsoons to get a good grass crop. Such fires prevented forests from growing and regenerating.

[26]Scott, James C, Weapons of the Weak: Everyday Forms of Peasant Resistance (New Haven: Yale University Press, 1985) 389; idem, Everyday Forms of Peasant Resistance," The Journal of Peasant Studies 13 (January 1986) 5-35; idem., Domination and the Arts of Resistance: Hidden Transcripts (New Haven: Yale University Press, 1990) 251; Ramchandra Guha, The Unquiet Woods: Ecological Change and Peasant Resistance in The Himalaya (Berkeley, Los Angeles: University of California Press, 1989); and Govind Ballabh Pant, The Forest Problem in Kumaon (Nainital, India: Gyanodaya Prakashan, 1922).

On the recommendations of the Forest Grievances Committee, set up in 1921, the government reclassified forests into Class I and Class II forests. Class I forests were transferred to the Revenue Department and the Class II forests retained by the Forest Department. Villagers could create community managed forests from the forests controlled by the Revenue Department under the provisions of the Van Panchayat Act. The rules facilitated collective action by villagers. Any two villagers could apply to the deputy commissioner of the district to create the panchayat forest[27] out of revenue department forests falling in the village boundaries.

The Van Panchayat Act prescribes how panchayats can be formed and imposes duties on village panchayats. Villagers must protect forests from illegal tree felling, fires, encroachments and cultivation. They must demarcate the boundaries of the panchayat forest. In addition, 20% of the area of the forest must be closed to grazing every year. Villagers feel that through the Act, the bureaucracy exercises excessive control over forest panchayats. Bureaucrats on the other hand believe that in the absence of central control villagers would clear-fell the entire forest.

The day-to-day management of panchayat forests in the six study villages[28] is chiefly governed by rules that villagers have crafted.[29] As table 5.4 shows, in the first three villages the forest is in an excellent, or excellent to good condition. In the other three, the resource condition is poor to fair.[30]

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[27]Currently, at least a third of the village residents must apply to form the village panchayat (Van Panchayat Niyamawali 1976).

[28]Table 5.4 presents some basic statistics on the six study villages.

[29]The six study villages in Table 5.3 are village nos. 1, 2, 3, 6, 7, and 9 from tables 5.1 and 5.2.

[30]We can quickly verify that market forces and population pressures do not explain the different levels of resource degradation in this smaller sample. The first three villages are located 3.1 kms. away from the market on the average. The latter three are 2.8 kms. distant. In the first three villages, there is .57 hectares

Since the six study villages are all situated in Almora district, their resource management institutions have been subject to similar administrative and bureaucratic rules. Government regulations, we can therefore infer, do not create variations among the study villages. The variance in the resource condition of the two sets of villages can be explained best by examining rules for using the resource, for monitoring the use, for sanctioning violations and for arbitrating disputes.[31] *

Use Rules

The first set of operational rules to be considered are rules for taking fodder from the community forests. These rules specify who can withdraw benefits from the forest, how much fodder can be extracted, the manner in which fodder can be extracted, and the obligations users must fulfill to remain beneficiaries. In all the cases (but one), users must be residents of the village where the forest is located. In the exception, the family of an individual who aided the creation of the panchayat forest is allotted rights to harvest benefits from the resource.

In most of the villages, rules specify how fodder can be extracted from the resource system. These rules differ in the rights that they confer on the users. In

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of panchayat forest land per household; .14 hectares per livestock unit. In the other three villages, the corresponding figures are .41 hectares and .14 hectares. We can also see how much of all forest and pasture land is available to households and livestock in the six villages. For the first three villages there are .86 hectares of all forest and pasture available per household and .22 hectares per livestock unit. For the remaining three villages, the same figures are 1.0 hectares and .36 hectares.

[31] Appendix 5.1 presents economic data on each of the six cases (The analysis in the chapter is complete in itself. Only the interested reader need refer the appendix). These facts are culled from records of the forest panchayat meetings (which in some instances go back more than sixty years; and records kept by the village revenue officials (the patwari).

some of the villages, users have equal rights - without reference to their contributions in maintaining the resource (although they can buy and sell rights among themselves).[32] In others, their rights to the resource are a function of the effort they have invested in the maintenance of the resource (by paying the salary of the guard or by helping in planting trees); in yet others, their rights are a function of their ability to make high bids in auctions where benefits from the forest are sold to the highest bidder.

In some cases, institutional rules not only specify who has the rights and how these rights can be used, they also state how much fodder can be withdrawn from the resource. Fodder from forests constitutes a renewable resource. To ensure regular annual supplies and the continued health of the forest, it is therefore essential to match extraction levels to regeneration. Villagers who designed rules have attempted to match supply and withdrawal by assessing fodder growth during the year,[33] fixing extraction levels below the annual regeneration, and metering fodder extraction using simple measures.[34] In village one, two and three, users can cut grass from the forest only for a specified number of days in the year. The panchayat officials carefully meter the amount of grass extracted. Passes entitle holders to cut a specified number of fodder bundles from the forest. All users are provided with a rope that they must use to make a bundle out of the grass they have cut. All villagers, therefore, can extract only specified levels and equal amounts of fodder.

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[32]Users mainly buy or sell rights to bundles of fodder rather than rights to use the forest for the entire year.

[33]To assess regeneration, panchayat officials visit forest compartments prior to opening them to the villagers. The officials make an eye estimate of the total amount of fodder bundles available. They open the forest for limited grazing or grass harvesting - the total number of animals that can graze or bundles of grass that can be extracted depends on the initial estimates made by the panchayat officials. The forest guard monitors and enforces the panchayat's decision.

[34]Bundles of grass are measured with uniform lengths of rope using which the bundles are tied.

There are also villages where panchayats have not designed rules that match growth with withdrawal. In villages four and five, there are no rules that facilitate the metering of withdrawal from the resource. The right to cut grass in these village forests is sold primarily through auctions after which the purchaser is free to cut grass from that section of the community forest he has successfully bid for. This means that the winning bidder has little incentive to stint in his behavior when cutting the grass.[35] He may cut too close to the ground, damaging roots and harming the growth for the next year. In auctions involving leaf fodder, he may harvest too many leaves, damaging the capacity of the tree to produce fodder. In village six, withdrawal by users is metered to some extent. Users are allocated spaces on the common where they must harvest grass. Although this prevents disputes among the users, they still attempt to harvest as much as they can from the area allocated to them.

Two reasons may account for auctions of grass in some villages. Auctions reduce the management effort that the panchayat must expend in extracting and distributing benefits from the resource. Once the auction has been held, the panchayat officials need no longer worry about regulating or supervising the removal of fodder from the forest.[36] To create institutional mechanisms that would distribute benefits among a large number of small users would probably improve equity, but at the cost of greater management and supervision effort on part of the owners or managers.

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[35]**Although there are just two or three families which consistently win the right to cut grass, the winning bidder still has no assurance that he will win again in the subsequent year.**

[36]**A similar procedure for distributing resources is followed by the Uttar Pradesh government which auctions grass in the Himalayan foothills. In the foothills, the rights to harvest grass from large areas (up to a hundred square miles) is sold to the highest bidder. The government interacts with just a few persons who then create their own systems for harvesting the grass.**

A second, possibly more important factor prompting auctions is that auctions effectively concentrate the fodder harvested from the forest in the hands of just a few users. In villages that used auctions, panchayat records document that the same three or four individuals repeatedly make successful bids for the rights to harvest fodder from panchayat forests. In village four and five the upper and lower castes (Brahmins and Harijans) have a history of simmering hostility. The Brahmins who are also the richer individuals in the village, were instrumental in the creation of the forest panchayats. They designed the rales that guide fodder extraction from the panchayat forests. Although the panchayat elects officials every five years, the numerical superiority of the Brahmins in the two villages has guaranteed them effective control over the panchayat.

We can draw the following conclusions. At the local level, there are cases of successful rule design to use resources sustainably and equitably. But such cases are not ubiquitous. Even if forests management is delegated to the local level, the local managers[37] may not (be able to) use resources efficiently, sustainably, or equitably. Local users and managers have many advantages over centralized governments and bureaucracies in creating use rules that can match supply with demand. They have greater information about themselves, about their needs, and about the resource.[38] Nevertheless, they may choose not to use their capacity to create rules that promote sustainability and equity.

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[37]**In my** cases, **panchayats, in others the relevant community organizations.**

[38]**A large number of authors have extolled the virtues of local management. I do not survey this literature. See Elinor Ostrom, Larry Schroeder and Susan Wynn, Institutional Incentives and Rural Infrastructure Sustainability (Burlington, Vermont: Associates in Rural Development, 1990) 181, photocopied, for a thoughtful discussion and for relevant literature citations.**

Monitoring

The problem of ensuring compliance to rules for using resources is acute. In all the villages where I carried out my studies, violations of use rules occurred routinely, even if they were not always reported. In the two villages which maintained detailed records on rule violations (village three and six), minor violations occurred almost every day (see table 5.5 and 5.6). Villagers illegally entered the panchayat forests, cut grass and leaf fodder from trees, grazed their animals, collected twigs and branches, and in some instances even felled trees. Their activities occurred in violation of rules, and in spite of the presence of guards who could discover and report them to the panchayat, which would then try to force them to pay fines. The records, while documenting high levels of abuse, underestimate the extent of illegal grazing and cutting. The guards are often absent from the forest and even when at their posts, they can not monitor all compartments of the panchayat forest simultaneously. The community forest is too large and dispersed.

Clearly, not all rule violations can be detected. A resource system need not deteriorate, however, if the infractions are minor and a significant proportion of rule breakers are discovered and sanctioned. It is only when rules are not enforced or monitored, and violations not sanctioned that institutions become meaningless as guides to behavior.

In the first three cases of sustainable resource use, the panchayats took great pains over monitoring. Panchayat officials recognized that unless resource use is effectively monitored, rules serve no purpose. Not only did they understand that monitoring is necessary, they also recognized and solved the problem of monitoring the monitor.[39] They employed two methods. First, they linked the

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[39]**Jon Elster, The Cement of Society; A Study of Social Order (Cambridge: Cambridge University Press, 1989) 40-1.**

monitor's performance to the rewards he received. Second, they untangled the Gordian Knot of monitoring the monitor by closing the loop between monitors and users. Let me explain.

In the first three cases, the guards appointed by the village forest panchayats were monitored by the panches. Guards were assigned different compartments of the forest to watch over. It was easier then to monitor the guards than to monitor the villagers. If there was evidence of freshly cut grass or tree branches in the forest, it meant that the guard had not been "guarding". Further, the panchayat could easily sanction the guard since the panchayat determined how much the guard would be paid. In a number of cases, the panchayat paid the guard a lower salary when high levels of rule violations occurred. In other instances panchayats dismissed guards and refused to pay them a salary if they found rule violation levels to be very high. Panchayat officials would resume the guard's salary and reinstate him only when he promised to improve his performance. Thus officials created institutional incentives for the guards to assiduously monitor users.

The panchayat in village three solved the problem of who would monitor the monitor by involving all villagers in monitoring. The panchayat officials monitored the guard who monitored the users who monitored the officials. At each level incentives were created for reporting violations in panchayat meetings. When a panch[40] or his family members were discovered in the forest, illegally grazing cattle or cutting fodder, an open meeting of the whole village could be summoned where the panch would confess his crime and pay a fine. The confession was as potent a deterrent as the fine. By creating a closed loop, and providing monitoring incentives to all the "links" in the loop, the problem of who would monitor the monitor was successfully solved by the panchayat.

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[40]A panch is an elected official of the panchayat. Five panches make up the panchayat.

In none of the cases did villagers use "trigger strategies" to force individuals to reduce their levels of rule violations. When the panchayat or the villagers discovered that rule infractions had increased (as in village three), their response was not to step up their own level of infringements in order to make infractors reduce rule breaking. Instead, the panchayat and the users took other steps to ensure that the level of rule violations would be reduced. They attempted to improve the efficiency of monitoring, increased the man hours spent on monitoring, and tried to innovatively impose graded sanctions (see next sub-section). The behavior of the panchayat officials in village three exposes a problem in suggesting trigger strategies to solve collective action problems. Trigger strategies can work only as long as none of the individuals in a group actually defect. As soon as an individual defects, all other individuals in the group will also defect.

Ostrom's attempt to salvage the trigger strategy solution as a real life solution for collective action problems can work only when combined with effective monitoring and sanctioning mechanisms.[41] An individual following a contingent strategy[42] can only increase her rule deviance when confronted with rule deviance by others. But her contingent strategy will fail to induce rule following behavior among other individuals. By increasing her rule deviance she will increase the total level of rule deviance in the system, inducing others not to stop breaking rules, but to break them more often. The only way to improve rule following behavior is through monitoring and sanctioning rule-breakers. Trigger strategies by themselves can create cooperation only as threats, not after an individual has initiated defection. Understanding the futility of trigger strategies,

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[41]Ostrom, Commons, 186.

[42]A contingent strategy is any strategy that depends on how other individuals behave. For any individual 'i', a contingent strategy may be to follow rules if all others follow rules; to break rules if any other individual breaks a rule. Another contingent strategy may be to follow rules as long as rule violations do not exceed a critical limit; to break rules when the critical threshold is exceeded.

panchayat officials used other mechanisms to ensure rule compliance. These mechanisms, once in place, helped villagers follow rules.

In contrast to the successful institutions in villages one, two and three, panchayat officials in the latter three villages did not emphasize monitoring. In village four, the panchayat did not employ a guard for most of the year. In village five, panchayat records mentioned few instances of rule violations. Most recorded instances were connected with inter-caste disputes in the village between the upper and lower castes. It seemed that the panchayat, dominated **by** Brahmins, used its control over the panchayat forest as a way of dominating the Harijans. Instances of rule breaking by Harijans were mentioned in panchayat records with regularity. But from the records, it appeared as if Brahmins never broke rules. Such prejudiced reporting and enforcement could only increase rule deviance and resource degradation. The Brahmin residents in the village, if never reported and sanctioned, would get a license to break rules; the resentment against the Brahmins would goad Harijans to break rules as often as possible. In village six, the community forest was highly dispersed. The panchayat considered monitoring important, but was unable to devise a system of salary payments to guards which could allow it to employ two guards for the dispersed panchayat forest compartments. In contrast to villages four, five and six, the successful panchayats not only realized the importance of monitoring user behavior, they also successfully devised mechanisms to ensure compliance by users.

Finally, rule violations occur in successful as well as unsuccessful village institutions. As table 5.5 and 5.6 show, in just two panchayats (in villages three and six) the detected number of rule violations is 1,279. If villagers are to be believed the actual incidence of rule deviance may be three to four times higher.[43] Casual walks with panchayat officials in community forests revealed

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[43]I interviewed more than forty individuals who had been sanctioned by the Panchayat officials for rule breaking. With remarkable regularity, these villagers asserted that the panchayat had been too hard on them, was not even aware of offenses by their neighbors and friends, and was too lax in controlling fuel and

villagers illegally collecting fodder and fuelwood almost each time we took a walk. Just for two villages,[44] we have a figure of possibly a thousand rule violations every year in the panchayat forests. Almora which has more than 3,000 inhabited villages probably has 3 million rule violations occurring every year. Given such high levels of rule violations, it seems safe to infer that in unsuccessful village panchayats, there is a very large gap in actual rule breaking and reported incidents of it; the lack of reported incidents of rule breaking reflects not that villagers do not break rules, rather it reveals that monitoring arrangements are lax or non-existent.

Although village panchayats are often unable to detect rule violations, government bureaucracy seems even less capable. Guha reports that for the entire Kumaon region, between 1926 to 1933 (for 7 years)[45] the forest department detected a total 16,805 violations[46] - i.e., less than 3,000 violations per year; a thousand times less than what may actually be occurring. Although these are figures from the past, they indicate a general failing of central authorities to enforce rules. Even if the forest department increased the number

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fodder theft by "other" villagers. Villagers who had not recently been sanctioned by the panchayat also pointed the finger at numerous village families whose rule breaking behavior often went undetected. According to them, the panchayat discovered no more than 20 to 30 percent of rule violations.

[44]The nature of rule violations is similar in both villages. In both village three and six, guards detected villagers in the act of cutting grass and leaf fodder, collecting twigs and branches, and grazing animals.

[45]Guha, The Unquiet Woods. Kumaon circle at this time included most of the present day Nainital district, Almora district and Pithoragarh district. So the population in Kumaon circle in the 1930s and in Almora today is probably roughly similar, making the figures on rule violations in Kumaon Circle then, somewhat representative of rule violations in Almora district today.

[46]Violations detected by forest department officials are for the most part quite similar to those that guards employed by panchayats detect. They include illegal grazing, tree felling, fodder and fuelwood collection, and firing.

of guards (at present it employs a guard for fifteen to twenty villages), they will not be able to monitor a significant proportion of rule violations.

Sanctioning

In all the village institutions, the villagers have created rules for sanctioning those rule breakers whose activities were brought to the attention of the panchayat. The panchayats employ a variety of mechanisms to increase the effectiveness of the sanctions they imposed. They ask offenders to render written or public apologies, confiscate cutting implements such as scythes, strip villagers of use rights, impose fines, report villagers to government officials, and sometimes, seek redress in courts. The sanctions they impose depend on a number of factors: the severity and nature of the offence, the economic status of the offender, whether the person is known to be a trouble-maker, the attitude that the rule-breaker displays towards the panchayat and its authority and so forth. The purpose of the sanctions is as much to punish somebody for a crime that was committed as to uphold the authority of the panchayat in issues of resource use.

The latter is very important in the context of the forest panchayats because they have no formal or legal powers to automatically impose sanctions on rule breakers. If the users openly flout their authority by breaking use rules and disregarding panchayat directives to pay fines, the panchayats will be hard put to create any kind of management system for the panchayat forests. Thus the panchayats often excuse even repeat violators from paying fines imposed on them, if the offender is willing to render a written or public apology.[47] Such an apology reinforces the authority of the panchayat to manage the forest and to punish other individuals who commit infractions of rules.

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[47]Of course, if a person is found to continue infringing rules even after rendering a written apology, the panchayat is more strict in imposing sanctions on the individual.

Given the fact that the panchayat have no legal authority to impose sanctions on villagers who break use rules framed by the panchayats, it may seem puzzling that many of the villagers pay the fines that the panchayat imposes on them.[48] If we examine the income and expenditure statements of the different panchayats in appendix 6.1, income from fines is significant for all the sucessful panchayats (except for the panchayat in village three - where the total income is very high), and quite low for all the unsuccessful panchayats. It follows that effective sanctions are necessary for successful institutions. Why some of the panchayats were able to make their sanctions effective, and others not, is something that I discuss in the section on arbitration.

Arbitration

All the panchayats also act as arbiters of disagreements that arise over the imposition of sanctions on rule breakers, and for interpretations of rules and disputes over the creation of rules. In this capacity they often reduce or excuse fines, allow villagers to influence the dates when the different forest compartments may be opened for grazing by animals or for removal of fodder and so forth.

The puzzle of their continued authority, in spite of the lack of formal powers, lies in the relative power position of different actors if the panchayat chooses to take to court any of the users who break rules. Even if the panchayat does not have formal legal power to extract fines from rule breakers, in courts of law its word carries greater weight than that of an ordinary villager. Since it has been created by a statute of law, its mere existence has the support of law. Further, in major disputes with users, there are a number of villagers who will support the interpretation of events presented by the panchayat - - the guard who is appointed and paid by the panchayat, and the panches who are official members

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[48]Especially so in view of the fact that none of the panchayats invoked social boycotts or ostracism of offenders as punishment.

of the panchayat. The rule breaker on the other hand is unlikely to have any witnesses who will attest to his innocence. Finally, the panchayat is likely to have more funds available to fight law suits in comparison to an ordinary user.

The above factors imply that unless the user who violated rules is influential and wealthy, he will find it worthwhile to settle the small fine that the panchayat imposed on him rather than go to court. It is this ultimate loading of the dice in the favor of the panchayat that drives the outcomes in intermediate stages in its favor - so that we find that many of the users pay the fines imposed on them by the panchayat, that many of the users render apologies and promise not to break rules in future.

Still, not all panchayats are equally willing to take matters to court, or to apply rules equally strongly. We find that for panchayats in villages one, two and three, there is strong evidence that the panchayats expend effort and funds in monitoring, and enforcing their rules. The income and expenditure statements of the panchayats[49] indicate that in village one, the panchayat spends 90% of its expenses on monitoring; in village two, 76% of the panchayat expenditure is on monitoring and legal expenses; and in village three, 74% of the panchayat expenses are monitoring and legal expenses. In contrast, villages four five and six spend a much smaller proportion of their expenses on these tasks. In village four, just 9% of the expenses are spent on legal expenses, nothing on monitoring; in village five, a total of 29% of expenses are incurred on these heads; and in village six, again, only 28% of the expenses are towards monitoring and enforcement.[50] These figures tell their own story about the importance of ensuring monitoring and sanctions for creating effective institutions (see figures 5.6 to 5.9).

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[49]**The major proportion of benefits that panchayats provided villagers were extracted from the forests. Villagers used fodder and fuelwood from panchayat forests either without paying, or at rates substantially lower than market prices.**

[50]**Tables one to six in the appendix show further details.**

As a contrast to the regressions conducted earlier with the eleven village sample, we can examine the importance of expenditures by panchayats on monitoring, sanctioning and arbitration.[51] Using proportions of panchayat expenditures on monitoring, sanctioning and arbitration as the independent variable, we find that a significant relationship exists with resource condition. The Beta coefficient is statistically significant at the .001 level (t-statistic is 4.1); and the adjusted R^2 equals .76. It is particularly heartening that of all the regressions, this is the only case in which the beta coefficient or the R^2 are at all significant. The statistical tests would thus, seem to bear out our proposition that all the successful institutions commit a large part of their resources to monitor and sanction rule breakers. Conversely, unsuccessful institutions pay little attention to either monitoring or sanctioning. Further that the correlation of the condition of resource with population pressure or market forces is not evidenced by the data collected and exhibited in this chapter.

Conclusion

In this chapter I have argued that overpopulation and market forces - factors often advanced as explanations for resource degradation in villages - are at best only partial explanations. To successfully explain resource degradation and conservation, we must examine the institutional design that guides resource use. Successful institutional design must solve problems of collective action at four distinct levels: creation of rules for using resources, effective monitoring of use rules, sanctioning of violators who break rules, and arbitration of disputes among monitors, users, and managers. Use rules determine whether communities can restrict resource use to levels below the sustainable yield from the renewable resource. Villages five and six used rules that rewarded different caste groups

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[51]The regression in this case needs to be taken with even greater caution since we have only six data points.

unequally. Monitoring rules provide information that is necessary to punish rule breakers. We find that while the first three villages attempted successfully to monitor the monitor, in village four, five and six, there were not even institutionalized mechanisms through which adequate information on rule breaking could be collected. In fact, in villages four and five, monitoring seemed to be prompted by a desire to persecute the Harijans. In the absence of accurate information about rule breaking, sanctions could not be imposed in the latter three villages, nor could they assert their authority as arbiters. Thus monitoring and sanctioning which the first three villages emphasized (see data on incomes and expenses of panchayats) were almost ignored by the three unsuccessful village institutions. Similarly, arbitration, which is important to back sanctions, was ineffective in the latter three villages.

Thus villagers in village four, five and six did not successfully create institutional arrangements that could prevent users from overexploiting and degrading resources. The failure of panchayats to create adequate institutions explains resource degradation in these villages more comprehensively than do factors like overpopulation or market pressures.

T A B L E 5.1

Condition of the Resource and Pressure on Local Forests

	Condition of VP Forest		Pressure on Resource			
	A Village	B	1	2	3	4
			(Has./household or livestock unit)			
1.	Ex	Ex/G	.38	.06	1.86	.31
2.	Ex/G	Good	1.23	.31	1.92	.48
3.	Ex/G	Good	.56	.17	1.26	.37
4.	Good	G/F	2.30	.36	2.60	.41
5.	Good	Good	.41	.13	.96	.31
6.	Fair	Fair	.26	.05	1.29	.25
7.	F/P	Poor	1.00	.30	3.12	.95
8.	Poor	Good	.41	.05	.70	.10
9.	Poor	Fair	.25	.13	.86	.45
10.	Degraded	Fair	1.17	.28	1.60	.39
11.	Degraded	Poor	1.04	.23	2.21	.49

Notes for the Table:

1. Condition of the Van Panchayat forest is denoted by A and B. A stands for the condition of the forest as observed by the researcher. B stands for the condition of the forest as assessed by villagers.

2. There are four measures for "pressure on the resource". One stands for the area (in hectares) of van panchayat forest in the village per household. Two denotes the area of Van Panchayat forest in the village per livestock unit. Three signifies the availability per household of the area of the Van Panchayat and other forests which the villagers can use (other forests are primarily forest area controlled by the revenue department). Four shows the figure for the same forests for each livestock unit in the village.

3. Ex. stands for excellent; G for good, P for poor, and F for fair.

4. The figures in the table are the area of forest land available per household or livestock unit. The lower the figure, the higher the pressure on the resource.

TABLE 5.2

Condition of the Resource and Distance from Markets

Village	Condition of Resource A	Condition of Resource B	Distance From Market (Kms.)
1.	Excellent	Ex/Good	6
2.	Ex/Good	Good	3.5
3.	Ex/Good	Good	1
4.	Good	Good/Fair	2.5
5.	Good	Good	3.5
6.	Fair	Fair	2
7.	Fair/Poor	Poor	4
8.	Poor	Good	11
9.	Poor	Fair	0.5
10.	Degraded	Fair	11
11.	Degraded	Poor	8

Notes for Table 5.2

1. "A" and "B" under "Condition of Resource" signify the same as in Table 5.1.

2. One mile is equal to 1.6 Kms.

T A B L E 5.3

Agricultural and Forest Revenue in Kumaon in Rs.

Year	Agriculture	Forest
1872-3	164,000	267,000
1873-4	161,500	365,500
1874-5	162,000	276,500
1875-6	194,000	297,500
1876-7	232,000	218,000
1877-8	229,500	179,500
1878-9	222,000	171,000
1879-80	219,500	165,500

TABLE 5.4

Basic Statistics on the Six Studied Villages

Village	Resource Condition	Households	Livestock	Panchayat Forest (Area in Ha.)	Other Pastures (Area in Ha.)
1.	Excellent	37	220	14	55
2.	Excell/Good	13	52	16	9
3.	Excell/Good	124	424	70	86
4.	Fair	38	194	10	39
5.	Fair/Poor	79	228	39	83
6.	Poor	108	305	27	66

T A B L E 5.5

Rule Violations in Panchayat Forest: Village 3

Year	Number of violations
1978-79	40
1980-81	354
1982-83	389
1984-85	114
1986-87	87
1988-89	40

T A B L E 5.6

Rule Violations in Panchayat Forests: Village 6

Year	Number of Violations
1977	138
1979	91
1980	2
1982	26
1983	95
1988	30

APPENDIX 5.1

This appendix presents the income and expenditure accounts of the panchayats in study villages. Each table shows the total incomes and expenses and the proportions for different categories.

T A B L E 1: Appendix 5.1

Income/Expenditures of Van Panchayat in Village One

Income	Proportion	Expenditure	Proportion
Fines/collections	29%	Stationery	2%
Tree sale	55%	Guard Salary	90%
Fodder sale	7%	Miscellenous	8%
Minor Forest Produce sale	8%		

Total Income for the Panchayat was Rs. 3,722.00
Total Expenditure for the Panchayat was Rs. 2,777.00.

T A B L E 2: Appendix 5.1

Income/Expenditures of Van Panchayat in Village Two

Income	Proportion	Expenditure	Proportion
Fines	39%	Stationery	14%
Fodder sale	11%	Guard	33%
Wood sale	51%	Legal Expenses	43%
		Donations	9%

The total income for the period was Rs. 1,188.00
The total expenses for the period were Rs. 2,335.00.
The excess of expenses over income was met through withdrawals from the accrued income of the panchayat maintained as a deposit in the bank.

T A B L E 3: Appendix 6.1

Income/Expenditure of Van Panchayat in Village Three

Income	Proportion	Expenditure	Proportion
Resin sales	48%	Guard's salary	72%
Fodder sale	49%	Stationery	1%
Fines	3%	Legal Expenses	2%
		Public donations	25%

The total income for the period to which there figures relate was Rs. 20,443.00
The total expenses for the same period were Rs. 21671.00
The excess of expenses over income was met through accrued income in other years.

T A B L E 4: Appendix 5.1

Income and Expenditure for the Van Panchayat in Village Four

Income	Proportion	Expenditure	Proportion
Tree sale (Contractor)	70%	Tree Planting	48%
Tree Sale (Villagers)	5%	Fertilizers	40%
Grass Sale	24%	Stationery	2%
Fines	1%	Legal Costs	9%

Total Income for the period was Rs. 5636.00
Total Expenditure for the period was Rs. 5337.00

T A B L E 5: Appendix 5.1

Income and Expenditure for Van Panchayat in Village Five

Income	Proportion	Expenditure	Proportion
Resin Royalties	23%	Stationery	2%
Grass Sale	22%	Tree Planting/ Fencing	68%
Grass Auction	53%	Guard Salary	15%
Tree Sale	2%	Legal Expenses	14%

In additin to the above, the panchayat has deposited a large sum earned from resin sales, with the district magistrate. Rs. 16,000 of this amoun have been used to lay a water pipeline for the village.

The total income for the panchayat was Rs. 4,425.00
The total expenses were Rs. 8,181.00.

T A B L E 6: Appendix 5.1

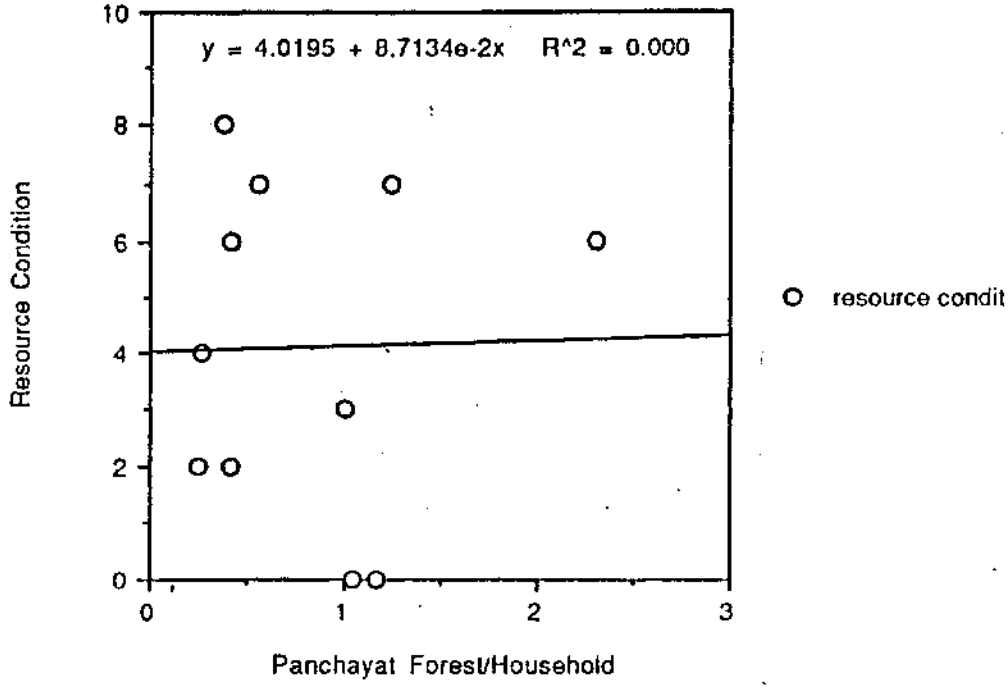
Income and Expenditure of the Van Panchayat in Village Six

Income	Proportion	Expenditure	Proportion
Tree Sale	44%	Stationery	9%
Grass Sale	19%	Guard Salary	19%
Fines	32%	Legal Expenses	9%
Miscellenous	5%	Public Donations	43%
		Tree Planting	21%

The Legal expenses were incurred in a law suit with villagers from a neighboring village.

The total income is Rs. 3,779.00
The total expenses are Rs. 4,974.00.

Fig 5.1: Population Pressure and Resource Condition, A



Notes: (For figs 5.1 to 5.9)

- Condition of Resource ranges from Degraded to Excellent; "0" stands for degraded and 8 stands for excellent.

- The OLS line uses the numerical value of each category.

- Area of forests is in hectares; distance in kms.

Fig 5.2: Resource Condition and Population Pressure B

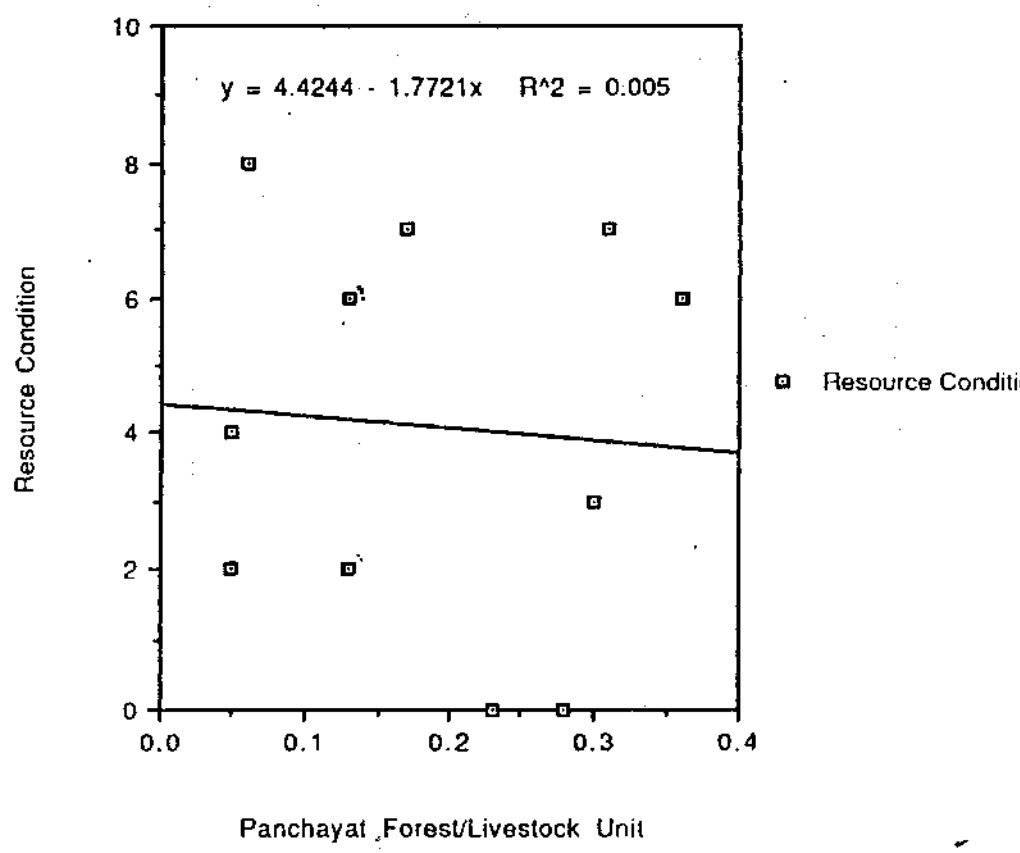


Fig 5.3: Resource Condition and Population Pressure c

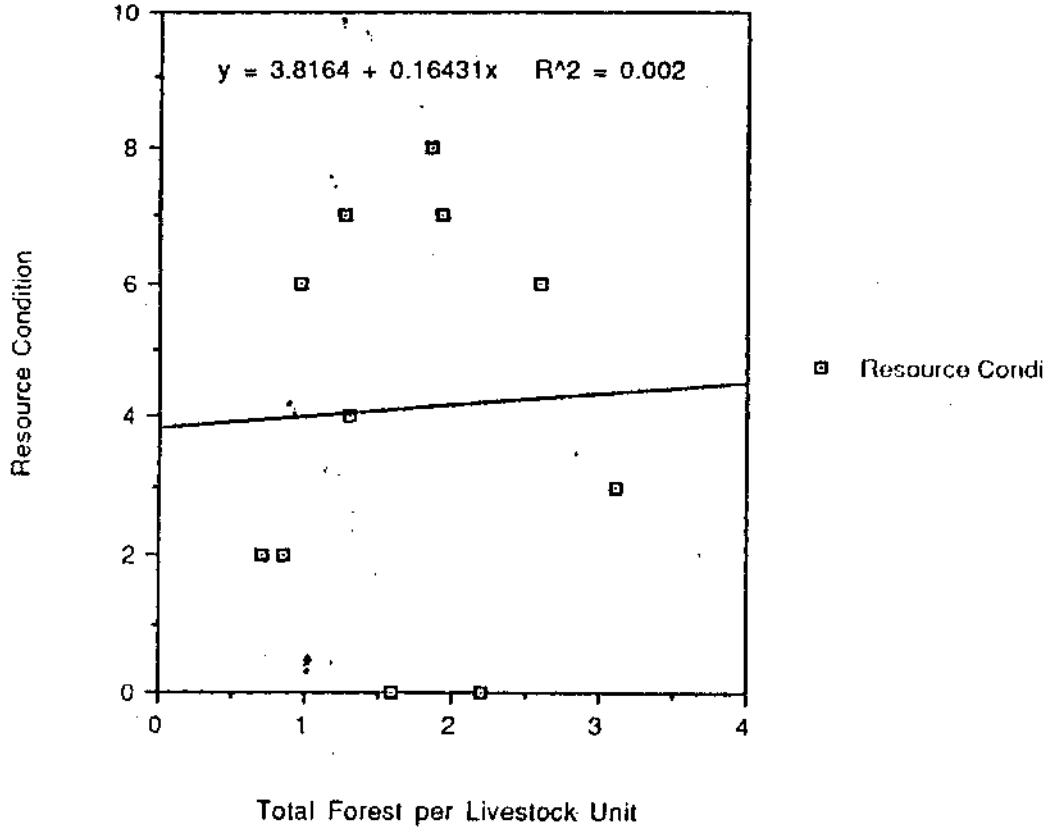


Fig 5.4: Population Pressure and Resource Condition, D

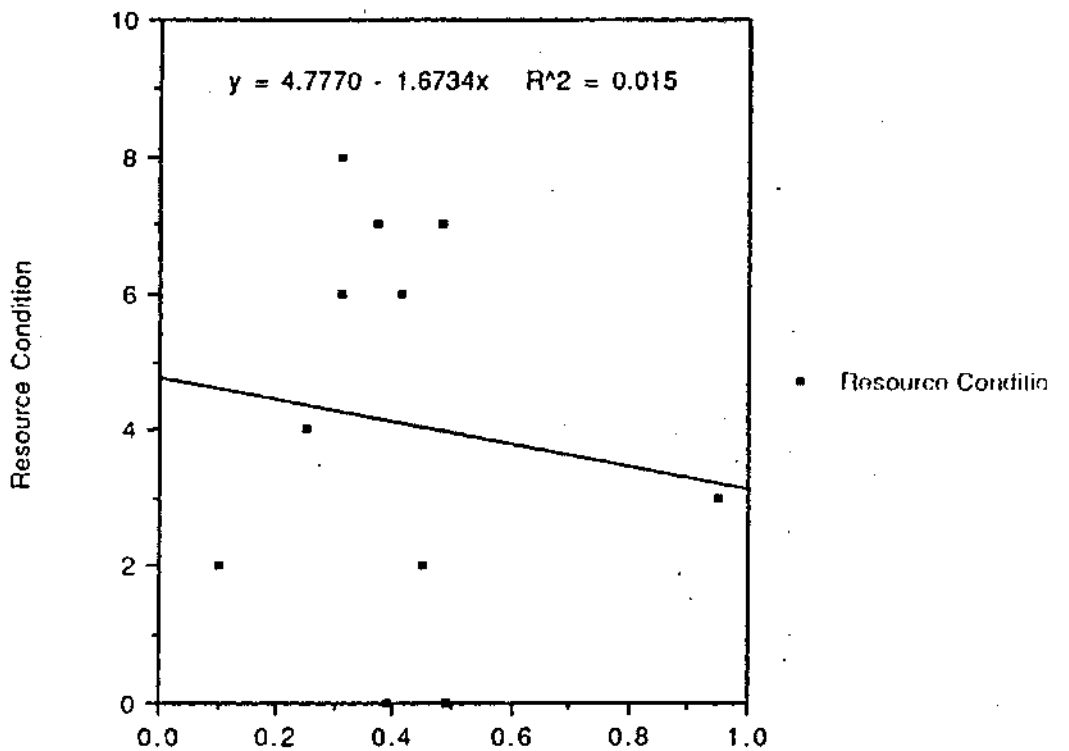


Fig 5.4: Total Forest per Livestock Unit

Fig 5.5: Market Pressure and Resource Condition

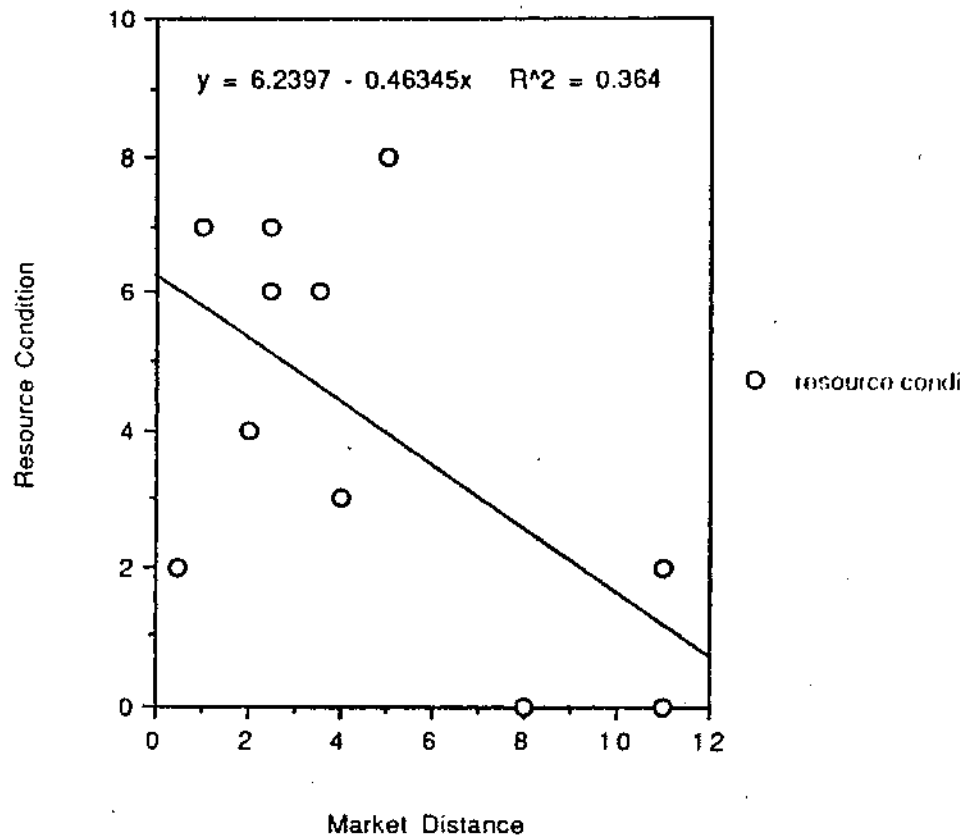


Fig 5.6: Resource Condition and Market Distance: Six Villages

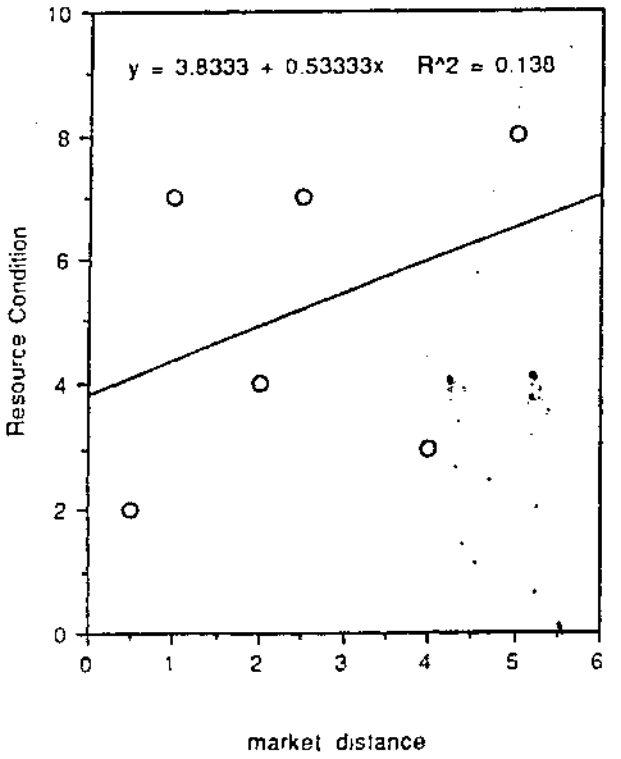


Fig 5.7: Resource Condition and Population Pressure: A, Six Villages

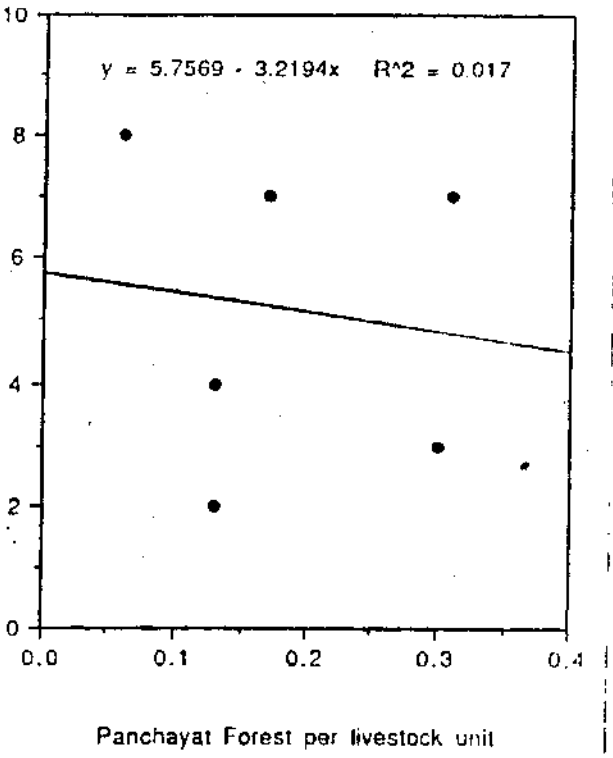


Fig 5.8: Resource Condition and Population Pressure: B Six Villages

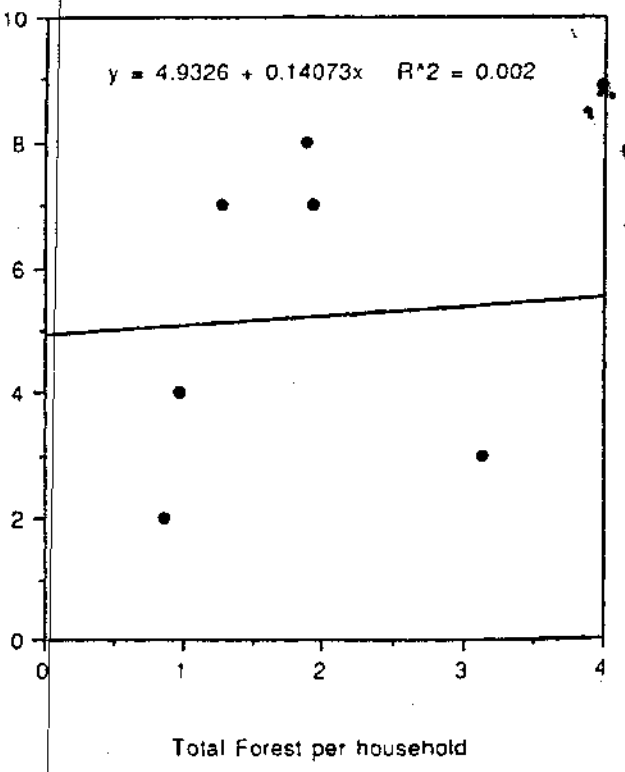
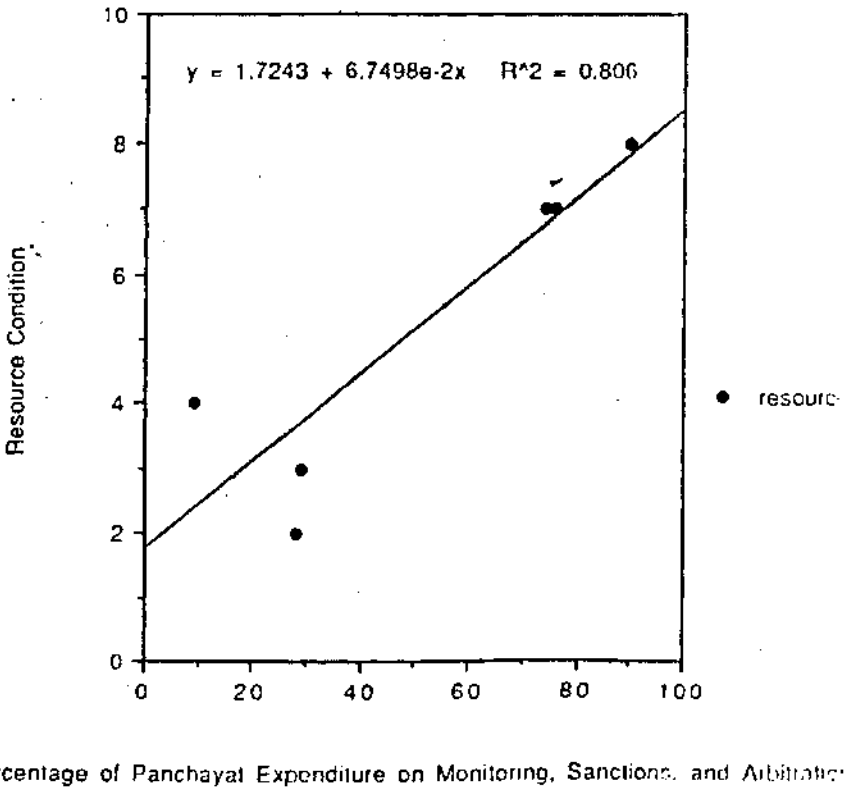


Fig 5.9: Resource Condition and Attention to Monitoring, Sanctions, Arbitration: Six Villages



CONCLUSION

In the preceding pages I described and analyzed the institutional arrangements of three groups from ecologically fragile regions in India: of nomadic Raikas in Rajasthan, of settled farmers and pastoralist factions in Patawal, and of villages with community woodlots in Almora. The question that motivated the discussion was, how best to understand collective institutions that influence the lives of millions of poor households. To look at this question I drew from several literatures - from positive political economy, from neo-institutionalism, and from peasant and nomadic studies.

To understand institutions, the study adopted a two-pronged approach. Its first two case studies examined the factors that influence the creation of institutions, and the third study investigated how institutional rules affect resource use. In the first case I argued that environmental risks frame and influence the production strategies and institutional arrangements of nomadic shepherds. The study of Patawal village depicted the political struggles between rival factions in the village and showed how such political tussles lead to new institutional arrangements. Pace most neo-institutionalists, I suggested that efficiency, while an important consideration, alone can not explain institution formation. We must incorporate politics in our explanations; and in marginal environments, environmental risks as well. The third case explained resource use patterns by looking at four types of institutional rules. These four categories of rules were rules for using (resources), monitoring, sanctioning and arbitration.

The study of the Raikas, "The Grass is Greener on the Other Side!" draws from anthropological literature on nomadic pastoralism and risk management. My

analysis, however, paid little attention to questions about nomadic imperviousness to change -- a question that concerns many anthropological studies.[1] Indeed, the question, I submit, has little more than rhetorical value. The pastoral: I look at are evidently not traditional, nor impervious to change and development. Rather, it is planned development that is impervious to the needs of the shepherds.[2]

In fact, the picture of the Raikas that emerges in chapters two and three shows them to be ingenious herders, efficient migrants, and sophisticated decision-makers. Like poor shepherds the world over, the Raikas migrate, interact with farmers and government officials, attempt to increase their flock size, and try to generate surplus. To achieve these ends, they exploit strategies that are fundamentally similar to those of other shepherds: diversification, migration, exchange and storage. In an environment characterized by dryness, large variations in production possibilities, and sparse vegetation, the Raika strategies help the shepherds to stabilize their production levels. In detailing the manner in which the Raikas implement these strategies, this study contributes to the descriptive literature on nomadic shepherds. The description breaks new ground especially where I discuss decision-making in Raika dangs. As Niamir (1989) points out, there exist few detailed studies of decision-making among migrant pastoralists. As we examine decision-making among the Raikas two points become amply clear: one, that in their mobile camps the Raikas use hierarchy to

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[1]See for example, the volume edited by John G. Galaty and Philip C. Salzman, eds., Change and Development in Nomadic and Pastoral Societies (Leiden: E. J. Brill, 1981); and Wolfgang Weissleder, ed., The Nomadic Alternative: Modes and Models of Interaction in the African-Asian Deserts and Steppes (The Hague: Mouton, 1978).

[2]See Philip Carl Salzman, "Introduction," in Contemporary Nomadic and Pastoral Peoples: Africa and Latin America ed. Philip Carl Salzman, Studies in Third World Societies, Publication No. 17, (September 1981): vii-xviii.

facilitate decision-making, and two, that the ordinary shepherds in the mobile camps have designed effective methods to control decision-makers.

This study, however, went beyond a mere empirical indexing of the types of Raika decision-making. It suggested that collective strategies that the shepherds collude in, create institutions that help them counter environmental risks. The institutional strategies followed by the Raikas are substantially superior to individual level strategies. The first part of the Raika study showed how collective mobility contributes to risk management. In a situation where the Raikas find it difficult to gain access to institutionalized capital markets or to the state bureaucracy,[3] collective mobility confers on them several advantages that would otherwise be impossible to acquire. Collective mobility provides the Raikas with greater security against criminals and in quarrels with settled populations. If shepherds were to migrate with their flocks individually, they would be easy prey to theft and intimidation.

In addition to better protection, the Raikas also gain other advantages by cooperation. They gain scale economies in purchases of supplies, in marketing their products, in grazing camels, and in information collection. They also improve their bargaining strength in everyday interactions with settled populations and with government officials. Thus it is not just that the shepherds apply a certain set of strategies for survival. It is at least equally significant that they mobilize collective strategies.

The institutions that prevail among the Raikas facilitate the task of mobilizing migration and the collective strategies they wield during migration. Set procedures lead to the selection of the same nambardar from year to year unless the nambardar is discovered to be grossly incapable or corrupt. Similarly, during migration, the existing reputation of the Raikas that they support each other in

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[3]Illiteracy and high levels of seasonal migration are the major causes of the poor access of the Raikas to capital markets and bureaucracy. At a more general level, illiteracy and migration are also the effects of poor access.

fights with outsiders, reduces the probability of such fights and while it also compels the Raikas to act together because of the fear of losing face within their community.

Collective migration is however also beset with some problems. Two major problems that Raikas confront are problems with coordinating the movement of a large group, and making decisions for the collective. To both problems the Raikas have formulated an institutional solution. An informal hierarchy aids decision-making regarding migration. The nambardar and the council of elders also decide for the entire dang on many issues where individual decision-making may be problematic. Their decisions become possible only because individual flock leaders abdicate authority over a large number of issues. And yet, the shepherds regulate the nambardar's behavior by ingenious mechanisms.

The techniques of control that the shepherds have created and adopted, turn out to be remarkably similar in principle to those employed in "modern", "developed" institutions such as the US Congress or industrial corporations. The shepherds often act to reduce the level of "hidden information"[4] that the nambardar is privy to and which he can use to his personal benefit - by collecting, for instance information on wool prices. They also act to reduce the problem of "hidden action"[5] - by accompanying the nambardar on his trips to purchase supplies and medicines. Such monitoring proves so effective that the shepherds seldom have to activate their ultimate threat - which is to leave the camp in mid-migration. Politically, the institutional arrangements for the migration process

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[4]See William A. Niskanen, Bureaucracy and Representative Government (Chicago: Aldine-Atherton, 1971) for a discussion on how bureaucrats use hidden information.

[5]See D. Roderick Kiewiet and Mathew D. McCubbins, The Logic of Delegation: Congressional Parties and the Appropriations Process (Chicago: University of Chicago Press, 1991) 25-27 for a discussion of the problem of hidden action.

seem to be in a state of equilibrium in which the shepherds select the same nambardars and councils of elders from year to year and their decision-makers perform decision tasks skillfully enough to ensure continued selection. If politics do not seem to play a prominent role in the everyday activities of the Raikas, it is because the Raikas have apparently successfully solved potential political problems by their organization of decision-making in the camp. A consideration of their internal political structure, however, is essential to a clearer understanding of the camp.

The discussion in the second case, "I Don't Need it But You Can't Have it", is propelled by politics; more precisely, I attempted to explicitly introduce political reasoning in neo-institutional explanations of institution formation. While a number of neo-institutional scholars acknowledge that politics is significant[6] most institutional studies of politics concern themselves with the effect of politics on outcomes. Few discuss how political battles unfold to produce new institutions. On the other hand, the second study in this work - of village Patawal, its factions and its community institutions - is specifically concerned to demonstrate how factional struggles create new institutions to guide resource use. The political battle between the Raikas and the land-owning castes in Patawal surfaced over the use of the commons; it was rooted, however, in the fundamental interests of the groups in the village. The interests of the groups revolved around the kinds of assets they owned - land or animals. The groups followed strategies that were constrained by their power and existing village institutions, but their strategies still led to new institutions for using the commons.

To protect and further their interests and relative primacy in village affairs, the dominant landowning groups in the village were willing to give up some of their benefits if at the same time they could substantially reduce benefits to their

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[6]See Gary Libecap, Contracting for Property Rights (Cambridge: Cambridge University Press, 1989); and Douglas C. North, Institutions, Institutional Change and Economic Performance (Cambridge: Cambridge University Press, 1990)

competitors. To accomplish their aim, they first ensured a victory in the local elections by manipulating the Meghwals over whom they wielded economic influence. They then used the village panchayat to create new institutions that helped alter the existing use patterns for the common pasture.

The new institutions in Patawal were thrust upon one group by its rivals. This observation helps us expose a deficiency in most neo-institutionalist accounts of institution formation. Such accounts often proceed on the assumption that institutional change requires the consent of the affected parties. Different parties would agree on change only if they were all to benefit, or at least not be made worse off. New institutions, therefore, must extend the Pareto Frontier. We witnessed, however, that processes to create new institutions can be impelled purely by considerations of relative gains. In Patawal, the total benefits to the community declined when the upper-caste-dominated-Panchayat created new rules to use the common pasture. While the upper castes in Patawal also lost some of their benefits from the common, the new rules drastically diminished the benefits to the shepherds.

The study of factional struggles in Patawal can also be seen as a village study. As such it provides a useful glimpse into the character of rural social interactions. Not only does it indicate the presence of a significant public political realm in Indian villages, it also shows us how different groups in villages struggle to secure economic and political gains. Thus it calls into question anthropological work that interprets village societies as expressions of "communitarian values", or sees them as solidary collectives.[7] On the other hand it also challenges much of the literature that portrays Indian villages as lacking in collective arrangements or

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[7]See Yujiro Hayami, "Economic Approach to Village Community and Institutions," Journal of Rural Development 3 (April 1980): 27-49; Robert Redfield, Tepoztlan, A Mexican Village: A Study of Folk Life (Chicago: University of Chicago Press, 1930); James C. Scott, The Moral Economy of the Peasant (New Haven: Yale University Press, 1976); S. Srinivas, The Remembered Village (Delhi: Oxford University Press, 1955).

depicts declining village governments.[8] All of this suggests that although village governments exist in Indian villages, they are not expressions of solidary community values. Nor, in fact, do institutions that regulate the use of common pastures necessarily indicate the existence of unqualified cooperation among villagers. Rather, the existing community institutions are most appropriately viewed as arenas where rivalries between different groups in the village are played out **as** the groups jockey for advantage.

The third study in this work, "Rules, Rule Making and Rule Breaking", explored how institutions influence resource use. I used data from six village institutions from the Middle Himalayas to argue that for sustainable patterns of resource use, villagers must monitor and sanction rule breaking and resolve disputes. This last study also showed that if we wish to explain different patterns of resource use, it is to institutional arrangements that we need to turn; not factors such as population or market pressures.

Overpopulation and market pressures have long constituted an important set of factors cited as responsible for resource degradation. Small rural communities, many analysts believe, are incapable of using communally owned resources sustainably in the face of pressures to consume and sell. To protect resources it is therefore necessary either to privatize communal resources or to impose government control. Yet there are also other analyses that portray small

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[8]See Bernard S. Cohn, "The Changing Status of a Depressed Caste," in Village India: Studies in the Little Community ed., McKim Marriott, (Chicago: University of Chicago Press, Midway rpt., 1955); Louis Dumont, Homo Hierarchicus: The Caste System and its Implications (London: Paladin, 1966, rpt. 1972); V. R. Gaikwad, "Community Development in India," in Community Development: Comparative Case Studies in India, the Republic of Korea. Mexico and Tanzania, eds., R. Dore and Z. Mars, (London: Croom Helm, 1981); Kathleen Gough, "The Social Structure of a Tanjore Village," in Village India: Studies in the Little Community (Chicago: University of Chicago Press, Midway rpt., 1955); and International Studies of Values in Politics (ISVIP), Values and Active Community: A Cross-National Study of the Influence of Local Leadership (New York: The Free Press, 1971).

communities as quite capable of taking care of their resource base. The analysis in the last chapter of this dissertation shows that claims of sustainability on behalf of the market, the state or the "little" community may all be overstated. We saw that village communities in the mountains proved capable of protecting local resources and using them sustainably in some instances. In others, they over-consumed and degraded their community forests. What distinguished the unsuccessful from the successful cases were fractious internal village politics and the lack of attention to enforcement rules. Overpopulation and market pressures on the other hand, failed to explain adequately the condition of the forest resources in the studied villages.

The last study also confirmed that we must investigate political struggles to understand the shapes institutions will assume. In the several villages, inter-caste dissensions proved pivotal in the choice of use rules for forest resources. Where caste differences loomed large, the dominant groups in the villages chose and dictated institutional arrangements that ensured a greater share to the dominant groups. Although the institutions that were created formally conformed to state policies, there was sufficient latitude for villagers to craft rules that would benefit their own factions.

This dissertation studied institutions. More specifically, it investigated the politics of institutional design and the economics of institutional impact. In investigating the origins of institutions, it concludes that environmental risks and local politics are significant determinants of institutional contours. Indeed, they can be seen as causal factors that have not been sufficiently explored in the literature. In assessing the influence of institutions on resource use, it proposes that population and market pressures are less significant explanations of resource use patterns than are institutional arrangements.

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