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Mobility and Cooperation Among Nomadic Shepherds: The Case of the Raikas

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This paper describes and then analyzes the decision-making arrangements that prevail among the Raikas—nomadic shepherds from Western India. The paper suggests, using a simple analytical framework, that the existing distribution of decision-making during migration helps the Raikas to utilize available economies of scale, represent the different interest groups in their collectives, and control their decision-makers. At the same time, the ordinary shepherds in the camp are able to extract a comfortable subsistence from a complex and harsh environment by delegating much of their decision-making responsibilities to the leaders in the camp. To the extent shepherds in other parts of the world migrate over long distances and must confront similar issues of delegation of responsibilities and control over decision-makers, the analysis holds general relevance.

KEY WORDS: decision-making; Raikas; pastoralism; nomadic shepherds; Rajasthan.

INTRODUCTION

As institutional and popular faith in top down development policies erodes, studies valorizing local knowledge and institutions are gaining ground. Such studies are especially significant in the rural areas of the third world. An impressive body of research stresses local knowledge and institutions and the role they play in the strategies adopted by households in their quest for survival. The goal of securing an improved life for the poor will be better served, these studies argue, if we first appreciate their desires, knowledge, and institutions (Chambers et al., 1989; Croll and Parkin, 1992; Oldfield and Alcorn, 1991; Posey and Balee, 1989; Schmink and Wood, 1984).

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In consequence of these emerging trends in "development science," new studies on local knowledge and institutions have become increasingly available. Although anthropologists had researched indigenous cultures for a long time before the current interest in such studies, their work differed in motive and nature. The studies today are more explicitly concerned with policy and with the relationship between development initiatives, local institutions, and indigenous systems of knowledge (Ascher and Healy, 1990; Brokensha et al., 1980; McKean, 1992; Ostrom, 1991).

Much of this rich literature, however, focuses on the knowledge that cultivators and farmers generate on the farm.² Institutions and knowledge of nomadic pastoralists³ exact a lower level of interest from those researching local institutions and development.⁴ It appears that as the nomadic way of life becomes increasingly arduous in the face of adverse state policies and disappearing grazing lands, research on pastoralists is also ceasing ground to other, more "pressing" concerns. Nomadic pastoralism, however, constitutes a dramatically different mode of production in comparison to settled agriculture. It continues to provide basic subsistence to millions of households that dwell in the semi-arid regions of Asia and Africa. According to some, the number of individuals that depend on pastoralism may well have increased in recent years (Sandford, 1983, pp. 1-3). Knowledge and institutions of the pastoralists, therefore, retain pertinence for the practically as well as the theoretically inclined.

Most nomadic pastoralists today subsist in ecologically fragile regions. To successfully survive, they employ a combination of strategies that help unravel problems stemming from environmental risks. Among the strategies they employ are diversification, storage (on the hoof), exchange, and mobility (Halstead and O'Shea, 1989, pp. 1-3). Of these, mobility is perhaps the foremost. Indeed, collective mobility in the face of environmental risks undergirds the survival of most nomadic pastoralists.

While collective migration confers economies of scale and provides greater security to pastoralists and their animals, it is beset by problems of

²Listings even a small fraction of the studies now available on traditional knowledge of farmers and the institutions they employ goes beyond the scope of this paper. Some of the more interesting and better known works, however, are Brokensha et al. (1980), Chambers, (1983), Jackson et al. (1984), Martin (1986), Netting, (1974), Richards (1985), and Warren (1991).
³Nomadic pastoralists are defined as groups who "are economically reliant on their herds and who wander seasonally in search of pastures." This definition as well as a summary of the debate concerning the origins of pastoralism is available in Sadr (1991, pp. 1-11). The interested reader is also referred to Khazanov (1984, pp. 15-84).

⁴Some exceptions are present in the works of Galay et al. (1981), McCabe (1990), Rigby (1985), and Sandford. (1983). Unlike studies on farmers and agriculturists, however, the cited works do not explicitly focus on the relationship between development and the indigenous knowledge or institutions of pastoralists. Nonetheless, they often critique many of the policies that governments follow to "develop" pastoralists.

coordination and control. The strategies pastoralists use to order their activities during migration and to make decisions over a host of crucial issues are the subjects of analysis in this paper. Information on decision-making among shepherds and cattle herders, as Niamir points out in her comprehensive review of the African literature, especially lacks serious students (Niamir, 1990). Even more sobering is the relative absence of systematic analyses of decision-making arrangements followed by nomadic pastoralists.⁵

The paper seeks to contribute a descriptive and analytical study of the decision-making arrangements among migrant shepherds. More specifically, it examines the *Raika* shepherds—nomadic pastoralists in Western India—to uncover the factors underlying their decision-making. The arrangements that exist are best conceptualized as informal institutions. They are informal because they are neither codified nor incumbent upon different groups. They are institutions because they structure and constrain interactions and behavior (North, 1990). Using the example of the *Raikas*, I will focus on the logic of the mobile response to risky environmental imperatives.

Daily movements of the *Raikas* in groups of 50 to a hundred human beings and thousands of animals demand critical collective decisions. In the ensuing analysis I will explore who makes decisions in *Raika* mobile camps and the principles behind the selection of decision-makers. My thesis can be stated simply: the *Raikas* allocate decision-making tasks during migration to reduce costs of coordination and avail of scale economies, to minimize risks of wrong decisions by considering all available information, and to control decision-makers. To the extent shepherds in other parts of the world migrate over long distances and confront problems similar to those faced by the Indian shepherds, the analysis holds general relevance.

The discussion is divided into five parts. The first part provides a brief description of the *Raikas*. The second section focuses on the three groups of decision-makers among the *Raikas*. In the next section, I summarize the major types of decisions that require attention during migration. Using the descriptive evidence in the first three sections, the next two parts present an analysis of the distribution of decision-making. I discuss the organization of decision-making in the fourth section and move on in the fifth to the reasons behind the arrangements that prevail. The conclusion to the paper discusses the implications of the evidence presented.

⁵Exceptions, again, are available in the works of anthropologists who have produced several studies on decision-making and organization among nomads and hunter-gatherers. See, for example, Abel and Blaikie (1990), Barth, (1961), De Boer and Prins (1989), Mithen (1989), and Weissleder (1978). The vast literature on decision-making by game theorists and management scientists suggests possible future directions for research, but few current applications. See, for example, Bell et al. (1990) and March (1988).

THE RAIKAS

The *Raikas* are the largest group of nomadic pastoralists in India.⁶ They reside, for the most part, in permanent dwellings in the Western Indian states of Rajasthan and Gujarat but migrate with their sheep for more than two-thirds of the year. Women and children often accompany the men on the migration cycles, contributing equally to the success of the enterprise. Most *Raikas* combine dry season nomadic pastoralism with agriculture during the rainy season. The areas they inhabit receive infrequent and variable rainfall. Migration with sheep seems an attempt, therefore, to manage environmental risks by diversifying investments into mobile assets whose output is determined by a production function independent from that which controls farm production (Kroeber, 1948; Sadr, 1991).

Each year after the rains,⁷ hundreds of thousands of shepherds migrate from Rajasthan into regions of greater forage (see Fig. 1). Their migration lasts 7–10 months on the average and spans distances between 500 and a 1000 miles.⁸ The shepherds often return home by buses and trains during the migration to attend to the needs of the household they left behind. As a rule, the shepherds migrate collectively and move to a new camp location almost every day. A *dang*—mobile camp—embraces up to 18 flocks. Since a flock often comprises 400–500 sheep, their total number may run as high as 7000. The camp, which may consist of a 100 men, women, and children, a similar number of camels, and 7000–8000 sheep, resembles nothing as much as an entire village on the move.

LOCI OF DECISION-MAKING

Three major centers of decision-making exist in shepherd camps. Of these, the *nambardar*⁹—the leader of the camp—is the most important. He is an influential shepherd, boasts wide ranging contacts among other shep-

⁶General descriptions of the *Raikas* are available in Agrawal (1992), Kohler-Rollefson (1992), and Srivastava (1990).

⁷In India rains occur chiefly during the monsoon months of June to September. Most *Raikas* embark on migration routes around October or November.

⁸The inset map of India in Fig. 1 shows the distribution of annual rainfall in the country. The enlarged part of the map shows the migration routes of the *Raikas* from Rajasthan into the bordering states. It is obvious that their migrations are toward regions of higher rainfall and consequently into areas where more fodder is available.

⁹*Nambardar*, literally means "the holder of a number." The term dates back to the times of British when the camp leaders were assigned individual numbers for ease in recording their movements.

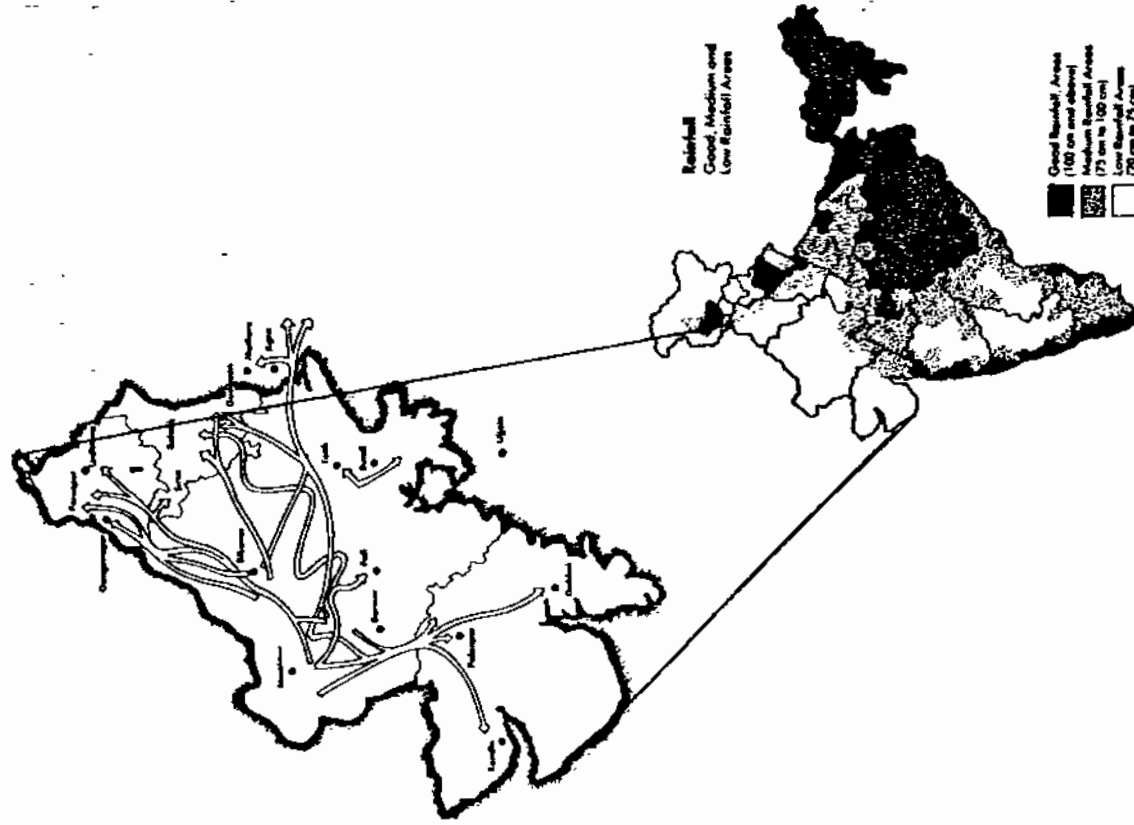


Fig. 1. Migration by *Raikas* and its relationship to rainfall: (a) migration routes adopted by the *Raikas*, (b) rainfall pattern in India. Adapted from CSE (1985).

herds, farmers, wool and sheep merchants, and on occasion, even government officials. He is familiar with a large variety of issues relating to mi-

gration routes, movements of other shepherd camps, dealings with outsiders such as government officials and farmers, purchase of supplies, and sale of pastoral products. Each morning, he spends notable amounts of time gathering information in scouting trips undertaken before sunrise; for longer-term decisions, *nambardars* make reconnaissance trips at longer intervals. Previous experience and freshly gathered information ensure that decisions will not suffer from lack of information. The second-in-command in the camp is called a *kamdār*. He assumes the duties of the camp leader when the *nambardār* is sick or away from the camp. Since both perform the same duties I will not treat them as different loci of decision-making. Usually the second-in-command also plays a role as a member of the *council of elders* in the camp. The council comprises five of the older and more experienced persons in the camp. The members to the council represent the spectrum of different interest groups in the camp. Collectively, they possess information and experience that none of the other decision-makers in the camp can match. Finally, there is the *mukhiya*, the leader of the individual flocks that comprise the mobile camp. He is intimately familiar with matters related to the functioning of his flock.

Choice of particular individuals for any of these leadership roles depends on several factors. Age and experience strongly influence the selection of leaders, especially the flock leader. Indeed, age often serves as a proxy for experience. But the most important factor governing the camp leader's—the *nambardār's*—selection is that elusive quality, status. It 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*.¹⁰

MAJOR TYPES OF DECISIONS

Members of different camps identified 60 issues as important for the functioning of the camp (see Table I in the next section). I divide them into six classes: camp formation and dissolution, migration, flock management, camp management, market interactions, and interactions with the government and settled populations. The characteristics associated with each class of decisions are presented below.

¹⁰The gender of the individual seems to play a negatively determinant role in leadership tasks. None of the 30 *dangs* that I surveyed had a woman as the leader of the camp. Nor was a woman the flock leader.

Camp Formation and Dissolution

This category contains two major decisions: selection of the camp leader before the beginning of the migration and the breakup of the camp at the end. To select a new leader for the camp, a few flock owners—the *mukhiyas*—approach an individual they can trust as a leader. Once the leader is selected, he tends to continue with the same camp and flocks for a long time. After selection, the leader usually initiates camp formation by sending messages to the different *mukhiyas* to assemble in a mutually convenient location. When flock leaders want to choose a new camp leader or if they become dissatisfied with their existing leader, they can then approach an experienced *mukhiya* to accept the responsibility. New members to the camp can be introduced by any existing member of the camp. Usually, only male members introduce new persons.

In the normal course of events, the breakup of the camp occurs after the migration cycle is complete. On the return journey, flocks leave the camp at points closest to their villages. Flocks sometimes also leave the camp earlier, especially if adequate rains have fallen in their villages. Another possibility, relatively rare, is for a dissatisfied member in the camp to leave before the cycle is over. A *nambardār* takes special care to ensure that members do not get so dissatisfied that they are forced to leave in mid-migration. Such departures adversely affect his reputation and the possibility of his continued tenure.

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.¹¹ The *Raikas* are constantly on the move and camp in a new location almost every day. Decisions related to setting the camp and the distance to be traveled each day must, therefore, be made repeatedly. For these decisions, the necessary information is not easily available to all shepherds. Familiarity with the migration route and information about the villagers form a prerequisite to decisions about where and when to set camp. Only the more experienced shepherds have such information.

At the same time, decisions on this subject can be considered routine because they are made often and the risks associated with a wrong decision are low. Thus a wrong decision is unlikely to impose huge costs on the shepherds because farmers are rarely hostile and welcome the manure that

¹¹These issues have been considered so central by some researchers that pastoralists have been classified into different categories on the basis of these variables (Johnson, 1969).

sheep deposit in their fields during the night.¹² If the camp settles in the fields of an average farmer "X" instead of farmer "Y," it is unlikely to encounter major difficulties. Finally, decisions about migration affect every individual in the camp. It is important, therefore, that the responsibility for making these decisions be assigned to some experienced individual; precisely who bears the responsibility is not vitally important. Once responsibility is delegated, other shepherds are free to concentrate on the everyday management of the flock.

Flock Management

Two subclasses of decisions can be distinguished: household decisions (about cooking, loading, and unloading camels, etc.), and decisions about managing the sheep (grazing, watering, accounting, and so forth). Women perform most of the housekeeping work; men carry out the sheep management tasks. Decision-making depends on intimate familiarity with the affairs of the flock and an ability to direct individuals in the flock. Few of the tasks, however, require much direction from the decision-maker. All the decision-maker may need to do is to ask that the evening meal be cooked, or that camp be broken, or wake the shepherds to take the sheep for grazing.

Camp Management

Three issues affect the management of the camp: the management of people; allocation of collective tasks; and the security of the camp. By management of people, I refer to issues such as arbitrating disputes, dividing responsibilities related to the camp, and keeping track of shepherds that leave the camp.¹³ Collective tasks include cooking on festive occasions, taking care of visitors and interacting with them, purchasing medicines, and supervising expenses from the common fund. The decision-making unit which undertakes these tasks must be able to command. To make arrangements for better security and to ensure that these arrangements will be followed, the decision-maker must also have contacts among the settled population and familiarity with the migration route. If the decision-maker

¹²Much has been made of the hostility between the settled populations and the migrating shepherds. For the *Raikas*, at least, such conflicts are the exception, mutual accommodation the rule.

¹³Shepherds often leave the camp for short periods of time to return home, to purchase supplies, to buy medicines, to meet merchants, to collect information and other related tasks.

does not know the specifics of the migration route, he cannot admonish the shepherds to be especially vigilant or choose for keeping watch those shepherds who are more alert and strong.

Market Interactions

Shearing and sale of sheep, and wool sales lead to the major decisions needed to interact with markets. Most decisions on market interactions affect the entire camp. High stakes hinge on such decisions as the rate at which sheep should be sold. Other decisions are more routine—to whom should wool be sold? Some decisions demand substantial asset-specific knowledge—when are the sheep ready for shearing or sale? Decisions also entail possession of the latest knowledge about market prices for sheep and wool. Finally, since shearing takes place over a week, the decision-maker should be able to persuade farmers to furnish space during this time.

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. In addition to low information availability on these issues, shepherds face an additional complication: the stakes are very high. While shepherds make their decisions only irregularly and infrequently, wrong choices can lead to losses of significant sums of money, expedite grave trouble, and precipitate major fights with farmers. Right decisions, on the other hand, promise no benefits except that the daily business of the camp can continue as usual. Thus decisions involve high stakes and asymmetries between 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 THE *RAIKAS*

Table I presents the data collected on decision-making in 30 *Raika* camps. To interpret the table, begin with row one. The "2" in brackets after the first issue area implies that there are two decision-issues that fall under the general category of "Camp Formation and Dissolution." Respon-

Table 1. Aggregate Data on Decision-Making, Classified by Issue Area

Issue area	Number of Decisions	Decision-making unit			Total
		Mukhiyas	Nambardar	Council	
Camp formation/ dissolution	(2)	49	1	9	58
Migration	(11)	1	265	48	314
Flock management	(13)	322	55	—	377
Camp 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

dents in each camp were asked who made the decisions on each of these issues. There were 60 responses, but two were invalid (or the respondents did not provide an answer); hence the figure 58 in the last column. Of these 58 responses, the leaders of the flocks, the *mukhiyas*, were mentioned 49 times as the decision-making units, and the camp leader, the *nambardar*, mentioned as the decision-maker in nine instances. Of the 1800 responses for 60 decision-issues from 30 respondents, 37 (2%) were either invalid or unavailable; and thus the number 1763 as the total number of responses.

The flock leaders make most (85%) of the decisions about camp formation and flock 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 flock leaders for two types of decisions. 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 flock leaders they share authority for decisions related to market interactions. Even in these two areas they make 65% of all the decisions. On the other hand, the council of elders makes 22% of the decisions involving external relations, and the flock leaders make 24% of the decisions related to market interactions.

The figures above reveal that the responsibility for decisions is not distributed randomly in the shepherd camps. A simple statistical test provides support for this belief.¹⁴ If we calculate the χ^2 to test the null hypothesis that the responsibilities are distributed without regard to the suitability of different decision-makers, the χ^2 value equals 933.3—statisti-

¹⁴The χ^2 test seems most suitable since both the variables in the table are categorical. An added attraction is that the test makes no assumptions about the underlying probability distribution.

cally significant at the .001 level. We can safely reject the hypothesis that there is no logic behind the manner in which the shepherds make decisions. But the analytical problem remains. What explains the observed distribution of decision-making authority?

ANALYSIS OF DECISIONS

Under each category a particular decision-making unit seems chiefly responsible (see Table 1). For camp formation and dissolution the flock leaders are the primary decision-makers. They select the camp leader and decide the time at which they will leave the camp. To understand the logic behind the allocation of these decisions recall how a new camp is formed. The flock leaders approach an individual whom they trust to guide them through the migration. In choosing their leader they abdicate responsibilities for making a large number of important decisions. By selecting a leader to make decisions on their behalf, they save a significant measure of time and energy. They must, however, be able to exercise some control over their leader, else he could easily exploit them. So although they give up the power to make many decisions, they retain the right to choose a new leader and the right to leave the camp if dissatisfied. Unless they preserve these two rights, they will be left with little control over the *nambardar's* authority.¹⁵

For decisions related to flock management, it is again the flock leaders, the *mukhiyas*, who are responsible. They make 85% of the decisions. Their decisions affect only a small number of persons, and there are seldom any economies of scale that can be harvested. At the same time, the *mukhiyas* possess more knowledge about their flock than anyone else in the camp. A *mukhiya* can gain no advantage by allowing another decision-maker the right to manage his flock.

The *nambardar* makes the vast majority of the decisions about migration and how to manage the entire camp. Significant economies of scale facilitate delegation of decision-making to one individual (particularly for performing collective tasks). At the same time, feedback about the manner in which the leader manages the camp is a matter of direct experience for the flock leaders. For most of the decisions regarding the management of the camp the shepherds can effortlessly assess the quality of the decisions made by their *nambardar*. For decisions relating to migration, information is not easily available but the *nambardar* is better informed than other camp

¹⁵An insightful discussion of the pros and cons of delegating authority to decision-makers is available in D. Roderick Kiewiet and Matthew McCubbins (1991, pp. 22-38).

members. At the same time, it is easy to maintain informal checks on the *nambardar* to ensure that he is unable to defraud any of the ordinary shepherds. Most issues in the areas of camp 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 available to all. Again, the shepherds permit the *nambardar* to make the decisions on these issues because their risks are low unless the decisions are absolutely inappropriate. For instance, even if the *nambardar* decides that the camp should travel five km. instead of six or eight km. 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."

For decisions related to market interactions and external relations, however, the camp leader shares decision-making responsibilities with the council of elders. For many of the issues in these two categories, neither the leader nor any other shepherd in the camp possess precise information. At the same time, a large number of individuals in the camp are affected by the decision and the possibility of an adverse impact on the shepherds owing to a wrong decision is high. The shepherds and their leader, therefore, would both prefer that the other elders are involved in making decisions. Involvement of the council of elders serves two purposes: it serves the interests of the *nambardar* because it prevents the responsibility for wrong decisions from being laid at his feet. It also serves the interests of the council of elders because their involvement ensures that the *nambardar* cannot manipulate uncertain situations to his personal advantage. At the same time, collective decision-making utilizes all available information.

The foregoing analysis underscores the thesis offered at the beginning of this paper: the shepherds allocate decision-making responsibilities to reduce costs of coordination and avail of scale economies, to minimize risks of wrong decisions by taking into account all available information and to control decision-makers. However, if we look at Table I more closely, it is evident that significant deviations exist in each class of decisions. It is true that within a given set of decision issues, most of the decisions are made by the "appropriate" decision-making unit. Exceptions, however, remain. For instance, the camp leader is supposed to make decisions regarding migration. But within that class, interviewees mentioned the council of elders as the decision-maker 48 times out of 314. Similar irregularities mark decisions related to flock management, camp management, or market interactions. A satisfactory explanation dictates a closer look into the types of decisions that comprise each class of decisions.

Table II lists the issues that form the set of migration decisions.¹⁶ It is immediately evident that the timing of the return journey and whether

Table II. List of Decision Issues: Migration

Decision issue	Mukhiya	Nambardar	Council
Direction of migration			
Choice of direction	—	26	4
Choice of destination	—	30	—
Gathering information (short-term decisions)	—	29	1
Gathering information (longer-term decisions)	—	27	3
Timing of migration			
When to begin migration	—	30	—
When to begin the return journey	1	16	13
Whether to migrate for the entire year	—	2	12
Distance to be traveled			
Distance to be traveled each day	—	30	—
Setting camp			
Choice of the village for camping	—	30	—
Choice of fields for camping	—	29	1
Total	1	275	38

the camp should migrate for the entire year are issues which the camp leader does not fully control. For these exceptions, the explanation is simple. The decision on when to return home is made only once during the migration cycle. Thus it is not a routine decision.¹⁶ Second, to make an appropriate decision for the entire camp, information on the fodder availability in all the shepherds' villages is necessary. No single individual in the camp possesses this information. Finally, in many of the camps, the interests of the shepherds diverge as regards an early or a late return. Most shepherds also possess land back in their villages which they wish to cultivate when rains begin. Shepherds with larger landholdings prefer to get home with the first monsoon showers because if they do not plough in time, their agricultural incomes may fall. On the other hand, those owning

¹⁶Table II can be interpreted in a similar manner to the previous table. Begin with row 1. Of the 30 respondents that were asked, "who makes the decisions related to the direction in which the camp should travel?" 26 mentioned the *nambardar*, and 4 said it was the council of elders.

¹⁷Routine decisions are made often and the risks associated with a wrong choice are low.

Table III. List of Decision Issues: Flock Management

Decision issue	Mukhiya	Nambardar	Council
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 the 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 accounts	28	2	—
Order in which members will keep night watch	5	23	—
Helper's salary	21	—	—
Total	322	55	—

large flocks prefer to get home a few weeks after rains have begun so that the sheep can browse on the common lands in the village. The different interests of the shepherds imply that a delicate balance must be struck between an early and a late return. The council of elders, representing a broader interest group in the camp, also possesses more detailed information about individual shepherds than does the camp leader. It, therefore, makes decisions on this issue fairly often.

A parallel account explains why the council of elders decides whether the camp should migrate for the entire 12 months. It is an issue that needs to be considered only infrequently, for example, when the rains fail almost entirely making cultivation an unattractive proposition. Again the information about the amount of rainfall in different villages is not available to the camp leader or to any single individual. Naturally, the council with its broader representation of interests in the camp, forms a more appropriate unit to make decisions on this issue.

By looking at the individual issues that comprise a set and analyzing the exigencies that drive the decision-making for that issue, we can explain other observed exceptions. Thus the flock leaders make most of the decisions pertaining to flock management. But as shown in Table III, the *nambardar* interferes twice in the right of the flock leaders to assign responsibilities to the shepherds in their flock. He decides how many peo-

Table IV. List of Decision Issues: Market Interactions

Decision issues	Mukhiya	Nambardar	Council
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 for shearing sheep	—	28	2
How much wool to sell	—	30	—
How many sheep to sell	27	3	—
Total	71	171	58

ple will graze and water camels; he also decides the order in which individuals from different flocks will keep the watch during the night. What explains this interference?

We first analyze the issue of camel grazing. Camels and sheep differ in their grazing habits. It makes sense, therefore, for camels to be grazed separately from the sheep. The average number of camels in a flock is between four and five. But two herders can graze up to 50 camels. This means that significant economies of scale can be captured by collectively grazing the camels. The leader of the camp can select individuals in rotation from the entire camp, rather than an individual from each flock being asked to graze the camels belonging to his flock. On the average, there are 12 flocks and 46 camels in each camp. If the flock leaders assign individuals to graze camels, 12 herders will be needed to graze the camels. If the task is delegated to the camp leader, he can substantially reduce labor requirements by rotating the task among different flocks. Only two to three herders will then be necessary. Nine fewer individuals are thus needed to carry out the same task by this arrangement of decision-making responsibilities.

Two reasons explain why the camp leader decides on the order in which shepherds from different flocks will maintain a watch. First, this is a routine decision (in the sense that it needs to be taken each day) and therefore the council of elders need not be involved. Second, the camp leader possesses greater familiarity than any other individual with the migration route and hence more information about the area through which the camp moves. If the migration is through a region where thieves or thugs may be encountered, he can change the order of the watch so that the more alert and reliable members in the camp keep watch when there is a greater possibility of theft.

Several factors influence the suitability of the decision-maker for issues comprising the set of decisions about market interactions (see Table IV). The camp-leader makes decisions about the shearing of the sheep and the sale of the wool. Wool is a homogenous commodity, especially because the *Raikas* rarely clean or grade it before sale. The camp leader can negotiate a price for the wool of the entire camp without unduly upsetting individual shepherds. Further, the camp leader is the only person in the camp capable of coordinating the operations which must be carried out in quick succession to complete the shearing and wool sale. These tasks include contacting the shearers, negotiating the prices for the shearing and the sale of the wool, selecting a farmer who will host the shepherds during the shearing, finding space for the shearing and water for washing the sheep, and finding transport for the wool. The range of tasks and the complexity of coordination imply large economies of scale if all the sheep in the camp are sheared at the same time in comparison to each flock leader getting his sheep sheared separately. It is easy to understand why the task is delegated to the camp-leader.

The sale of sheep, however, need not be coordinated for the entire camp. Shepherds often sell their sheep one at a time to merchants who visit the camps to buy sheep. Several factors make this a rational course of action. The price of a sheep, in comparison to its wool, is much higher and the higher stakes make it profitable for the sheep merchants to occasionally come to the shepherds.¹⁸ The ordinary shepherd, therefore, need not rely on the camp leader to either contact the merchants (as in the case of wool), or to coordinate the sale of animals. No scale economies accrue to the shepherds from delegating the responsibility to the camp leader. On the other hand, the camp leader does not possess accurate information on all the sheep in the flock. Since differences among the animals can significantly alter their prices he will be unable to negotiate the best prices for the shepherds. If he does negotiate a low price for the shepherds, they will find it hard to determine if the negotiation was made in good faith or if the camp leader received side payments from the merchants. It is clear the shepherds would not gain much from delegating the responsibility for this task to their leader; they could stand to lose large sums.

The camp leader and the council of elders share the responsibility for decisions related to the timing of calling the shearers and the merchants. For the three types of decisions about the timing of calling the shearers and the merchants, the camp leader's information about the location and identity of merchants can be combined with the information of

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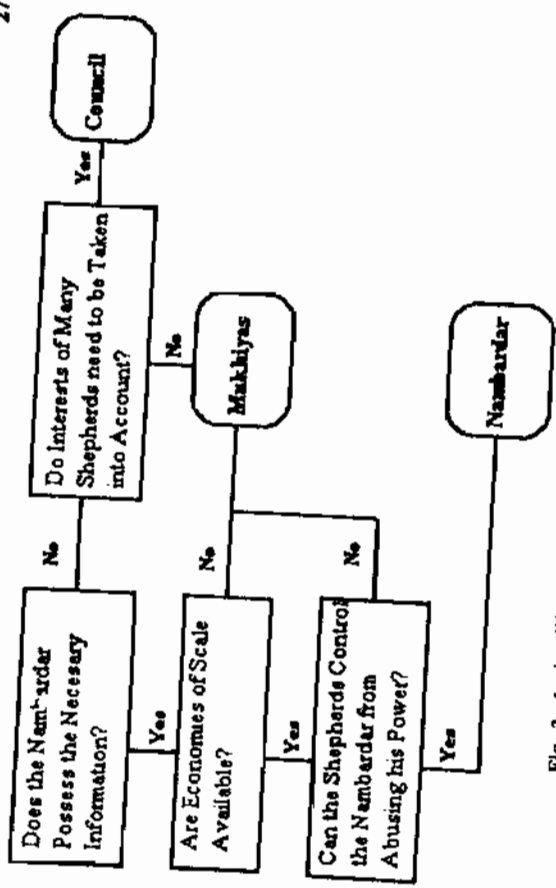


Fig. 2. A simplified model of decision-making among the *Raikas*.

the council members on the condition of the sheep to allow the best decisions to be made. The council as discussed earlier, represents a broad diversity of interests in the camp and possesses more information about the condition of the sheep and their wool than does the camp leader.

The foregoing discussion on the allocation of decision responsibilities is presented in a summary form in Fig. 2. As can be seen, the *nambaradar* is permitted the power over particular decisions only after careful consideration by the shepherds. Only when the camp leader possesses information that other shepherds do not, when he can create economies of scale, and when the shepherds can prevent him from abusing his power to make decisions, does the responsibility for a class of decisions devolve upon the *nambaradar*. In other instances, the shepherds either retain the right to make decisions or the council makes the necessary decisions.

CONCLUSION

This paper documents decision-making among the *Raika* shepherds in Western India. In so doing, it contributes to the growing literature on indigenous knowledge and institutions and seeks to fill a gap in our reconstructions of such knowledge among pastoralists. The paper also presents an analytical scheme which can be employed to understand the rationale behind the distribution of decision-making responsibilities among the *Rai-*

¹⁸The wool on a sheep is worth no more than Rs. 20.00, often less. The price of a sheep, however, is approximately Rs. 400.00. (One US\$ = Rs. 31.00).

ks. The reasons that motivate the institutional arrangements among the shepherds, I argue, point to their ability to order complex realities using a small set of easily understandable criteria. Their patterns of decision-making utilize available information, promote economies of scale, take into account the interests of different groups members and at the same time control decision-makers from abusing delegated powers. It would seem, therefore, that in their migrations over the past centuries the *Raikas* have evolved informal institutional arrangements for ordering their lives that balance subsistence needs with the capacities of a hostile environment.

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