The Social Dimensions of Rangeland Management[1]

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INTRODUCTION

A social scientist's contribution to this workshop should highlight the socioeconomic context of rangeland management problems and emphasize that the improvement of the human condition is a crucial part of rangeland development programs. Being an interdisciplinary gathering, including cattle developers, wildlife assessors, and rangeland managers, you hold an interdisciplinary perspective, as is evident in your invitation for us to speak here today. Also, given the binational experience of the group, it seems unnecessary to repeat the general differences and similarities between the United States and Mexico. Instead, we shall emphasize a handful of social and economic facts concerning the northern Mexico and southwestern United States rangeland situations which must be considered if either management or technological solutions to rangeland management problems are to be transferred across the border in either direction.

In his classic introduction to the topic, Heady (1975) stresses that:

> "Rangeland management is a land management discipline that skillfully applies an organized body of knowledge known as 'range science' to renewable natural resource systems for two purposes: (1) protection, improvement, and continued welfare of the basic range resource, which may include soils, vegetation, and animals; and (2) optimum production of goods and services in combinations needed by mankind."

After presenting a basically ecological model for achieving these objectives, Heady realistically assesses the practical difficulties facing an "on the ground" manager.

> "Rangeland professionals provide...knowledge to the actual managers and administrators of rnageland. The exchange of information between the providers and the users has been slow. Many scientists have neither the interest nor the time to sell their products. Range managers, as a group, often are more concerned with what can be done biologically than with what the land managers choose or can afford to do. The traditions of rangeland use change slowly for these and many other causes. One might ask the question: If these practices are so good, why haven't they found wider application?"

Heady answers that each recommended practice must be considered within its larger context, that is, within its biological, social, political, and economic context. Without considering the larger context, Heady, you, and we know that reasonable, ecologically sound management and technological solutions may never be implemented.

THE SOCIAL GROUPS IN A RANGELAND SITUATION

An analysis of the larger context begins by realizing that a discussion of rangeland management concerns the interaction of three populations: (1) the rangeland users (government agencies, private ranchers, ejidatarios, or otherwise); (2) professional rangeland managers; and (3) nonranchland oriented populations whose actions influence the actions of the preceeding groups. We assume that Heady's reference to the "larger context" refers to the latter population, including the institutions, regulations, history, and economic systems in which rangeland managers and rangeland users are enmeshed. Each of these populations has certain knowledge and beliefs concerning rangeland management, which, right or wrong, must be considered in any realistic management problem. An objective of rangeland science is to increase the overlap between the rangeland scientists' knowledge and the users' knowledge. This overlap, which we shall call the "area of influence," represents those ideas and management criteria known to be scientifically valid by the rangeland managers and accepted as "standard operating practice" by the rangeland users. This area of influence will be greater among some combinations of rangeland scientists and users than among others. Moreover, the "area of influence" implies a two way exchange of knowledge, for it is also the area of the rangeland managers' knowledge of the users' information and knowledge.

Concerning all three populations, there are certain socioeconomic facts that must be considered if we are to have any meaningful actions.

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FACTS CONCERNING SOCIOECONOMIC CONTEXT

Fact: Although the rangelands of the southwestern United States and northern Mexico show great ecological similarities, the socio-cultural and economic contexts of rangeland use differ.

Northern Mexican and the southwestern United States share the common characteristic of having the majority of their lands suitable for rangeland (Table 1), or as a nonrange oriented outsider might quip, "Suitable for little else but rangeland."

Despite this similarity, land tenure (the question of who controls what land) seems to vary between the two countries. On the northern side of the border, considerable landholdings are "managed" by government agencies. Grazing lands make up about 85 percent of Arizona's 72 million acres (Hillman 1972). Yet, private tenure over these lands is restricted. Less than 16 percent of the land is in private hands, while the Federal and State governments control about 60 percent of the land. Indian reservations hold the remaining 27 percent. Under such circumstances, the "management" of the public domain has become a major problem and the rangeland management discipline, itself, offers an institutional and academic solution to this problem.

In Mexico, on the other hand, if we consider ejido lands to be privately controlled, very little rangeland appears to be under federal control. Rangeland scientists in Mexico often do not have contact with the problems of maintaining the public domain in the same way that scientists from the United States do. Thus, the special relationship that exists between rangeland managers and the federal government in the United States should not be expected to occur in the Mexican situation.

Moreover, the United States range situation is strongly influenced by the presence of "interest groups" whose actions toward public and private rangeland use play an active role in the decision-making process. The governmental decision-making processes which favor public-participation and hearings are distinct from the decision-making processes in Mexico. Because of its inherent ecological basis in biology, rangeland managers are often identified with the "environmental movement," which may or may not be related to their political tendencies. Mexico also has a nascent concern for its renewable natural resources, represented institutionally in such centers as the Subsecretary of Forestry and Wildlife, the Institute of Ecology, and the Center for Ecodevelopment.

The relative capital intensity of rangeland management in the United States and Mexico also appears to vary. The high costs of labor in the United States favors more capital intensive solutions to management problems, while Mexico displays a less expensive labor profile (Table 2).

Observation reveals the United States prefers fencing (which is capital intensive) as opposed to ranch hand control of herd movement in Mexico (a more labor intensive solution to the same problem). This difference in the labor intensity of management solutions is a critical variable for consideration in proposed technical and management oriented

TABLE 1: COMPARISON OF RANGELAND USE AND LABOR FORCE IN ARIZONA, NEW MEXICO, CHIHUAHUA, NUEVO LEON AND COAHUILA

STATE	ANIMAL POPULATION Sheep	Cattle	Goats	LAND Grazing	% of total[6] land	TOTAL LABOR FORCE in Agriculture	% of labor[9] force in Agriculture
	in (1000)			(in 1000km2)			
ARIZONA	340[1]	807[2]	na	250[4]	85.3	28,000[7]	3%
NEW MEXICO	595[1]	1,316[2]	na	250[4]	79.6	26,000[7]	5%
SONORA	44[3]	1,664[3]	85[3]	135[5]	73.7	109.377[8]	39%
CHIHUAHUA	386[3]	3,110[3]	305[3]	159[5]	64.3	151,498[8]	36%
NUEVO LEON	237[3]	682[3]	601[3]	53[5]	82.3	85,149[8]	17%
COAHUILA	367[3]	839[3]	764[3]	138[5]	91.6	85,760[8]	29%

Sources:
(1) USDA Agricultural Statistics (1980) - Includes stock sheep only
(2) USDA Agricultural Statistics (1979) - Includes stock cattle only. The average number of cattle on feed for the 4 quarters of 1979 was subtracted from the total number of cattle to get the stock cattle.
(3) Anuario Estadistico de la Poblacion y Produccion Pecuaria de los Estados Unidos Mexicanos, Secretaria de Agricultura, 1977. (Dairy cows are also included in the cattle data).
(4) Data obtained from An Assessment of the Forest and Rangeland Situation in the United States, by USDA, Forest Service, 1980 (FS-345). The data includes the total forest and rangeland grazed in 1976.
(5) The grazing area in Mexico was calculated on the basis of Landsat photographs published by SARH, 1978. The categories considered in the grazing lands (grassland and shrubs) were Pastoral, Matorral, Vegetacion Halofila,Mezquital, Chaparral, Nopalera, and Izetal.
(6) The percent grazing land of the total land area was calculated from the sources indicated in (4) and (5).
(7) USDA Agricultural Statistics (1980) - Includes the annual average number of total workers on farms for 1979.
(8) Censo General de Poblacion (1970) for Sonora, Chihuahua, Nuevo Leon, and Coahuila.
(9) The percent of farm workers in the total labor force was calculated from the sources indicated in (7) and (8).

TABLE 2: INTENSITY OF HUMAN/ANIMAL USE OF RANGELANDS IN MEXICO AND U.S.

STATE	ANIMALS PER FARM WORKER[10]			ANIMALS PER SQUARE KILOMETER OF RANGELAND[11]		
	Sheep	Cattle	Goats	Sheep	Cattle	Goats
ARIZONA	12.1	28.8	na	1.4	3.2	na
NEW MEXICO	22.9	50.6	na	2.4	5.3	na
SONORA	0.4	15.2	0.8	0.1	12.3	0.6
CHIHUAHUA	2.5	20.5	2.0	1.4	19.6	1.9
NUEVO LEON	2.8	8.0	7.1	4.5	12.9	11.3
COAHUILA	4.3	9.8	8.9	2.7	6.1	5.5

Sources: (10) The animals per farm worker was calculated from the appropriate data and sources indicated for Table 1.

(11) The animals per square kilometer (247.1 acres = 1 km^2 = 100 hectares) was also calculated from the data in Table 1.

decisions. Technologies acceptable on one side of the border will prove economically untenable on the other side.

The institutional supports for rangeland management are also distinct. In the United States, rangeland managers have a professional responsibility to maintain a renewable natural resource, often with the objective of protecting the public domain.

Implications: rangeland management solutions which appear ecologically and economically defensible on one side of the border may not be on the other side. Each technological and management scheme must be filtered through a sociopolitical and economic screen before the feasibility of the solution is evaluated.

FACTS CONCERNING RANGELAND MANAGERS POPULATION

Fact: Exchanges between the two federal governments and range managers is distinct.

Rangeland management in the United States developed in a specific, task-oriented setting (the protection and management of the public domain). The rangeland users in Mexico, who control most of the rangelands have not created a strong demand for rangeland management, and many of the smaller users, who need the rangeland manager's knowledge, are not even aware of the existence of this scientific endeavor.

Implications: the sociopolitical influence of rangeland science in the United States has been and will be distinct for the rangeland scientist in Mexico and the United States.

FACTS CONCERNING RANGELAND USERS

Fact: The rangeland animals emphasized in Mexico and the United States differ.

The southwestern United States shows a predominance of cattle; northern Mexico has not only cattle, but also a high proportion of sheep and goats. Rangeland management, in many cases, is animal specific, since the grazing patterns, browse preference, herd behavior, are distinct for each species.

Implications: therefore, a sophisticated rangeland management solution will have to show sensitivity to the difference in user preference for different animals.

Fact: We have poor information as to precisely how users in either country manage their rangelands.

As we were preparing this paper, we searched for detailed descriptions of how the two countries manage their rangelands. The search was disappointing. However, we can assume that MOST RANGELANDS ON BOTH SIDES OF THE BORDER ARE NOT MANAGED BY RANGELAND MANAGERS.

How much of the rangelands of either Mexico or the United States is actually influenced by rangeland management? This question arises over and over again in discussions, such as we will be having during the next few days. We cannot answer this question any more than you can, but, there appears to be a general consensus that the overall impact of rangeland management science is less than desirable. Perhaps our modest contribution to this question might be to rephrase it. Rather than searching for an answer in acres or hectares or by different kinds of land types, we should realize that we are talking about the area of influence. Management success should not be measured by areal influence, but by the influence of human knowledge, and, we should ask instead, how effective has the penetration of scientific knowledge into the decision-making processes of those who control rangeland use been. Such a perspective changes how we determine the "score of the game", it is not to be measured in "acres managed" but rather in "heads (of people, not animals) influenced."

Rangeland management seldom operates in a vacuum. Although most rangelands are "managed" without the advantage of the organized body of knowledge and scientific principles characteristic of rangeland science. Knowledge of the existing system can only be gained through observation and face-to-face interviewing with rangeland peoples. Windshield tours are not sufficient to understand the complexities of a rangeland management system. We also have little idea of how rangeland peoples perceive their rangeland resources and the management sciences that attempt to provide additional information into their complex decision-making process.

Fact: A great deal of practical knowledge concerning rangeland conditions resides in the collective minds of ranchers.

All rangeland managers know that it would be foolish to suggest that their discipline, or even all the academic disciplines, have exclusive information on rangeland management. Much of what is known about specific rangeland conditions and rangeland management practices resides in the collective heads of hundreds of bright rangeland users (cowboys, ranch owners, operators, herders, etc.). Unfortunately, very little of this "folk" or "practical" knowledge is systematically collected and organized. Nonetheless, much of this information on local range conditions, animal behavior, and microenvironmental conditions can be recovered. Some of it will prove of minimal use to hard scientific investigations, while other information will assist in the development and testing of hypotheses. To deny the importance of this local level knowledge is to deny the value of experience itself, a denial which few of us who are nearing out middle age would dare support.

FACTS CONCERNING SOCIAL SCIENTISTS WORKING WITH RANGELAND PEOPLES

Fact: Social scientists have limited ability.

Without further research on how to predict the impacts of new rangeland management practices on human populations, however, we are beginning to understand how the above might be done. Much of human social life revolves around work related activities. Insofar as a social scientist understands the details of a new technology, he can estimate what types of social arrangements and conflicts will accompany a rangeland development plan. A few of the social scientists have extensive experience in addressing the rangeland development problems of traditional herders, cattlemen, and nomadic groups (Johnson 1979, Spooner 1973, Al-Gain n.d., etc.) Moreover, the ranks of social scientists interested in rangeland problems is increasing (Downing and Sayers 1979). Evidence which these investigators are collecting, thus far, suggests an important change in perspective on "human factors" in the rangeland production process. We are beginning to realize that sociocultural settings not only present problems, but also solutions to rangeland problems. The view that sociocultural behaviors are obstacles has to cease. Social organizations solve problems. The cutting edge of contemporary social scientific investigation is to search for technologies and management schemes that utilize the internal strengths of social systems, rather than seek creative ways to circumvent social traditions (Downing 1981).

Implications: social scientific research on rangeland problems is undergoing constant evolution and development. The current cutting edge of the social sciences consists of merging the knowledge that social sciences have of the human/animal/environmental relationships, based primarily on the modeling of traditional people, with the necessities of modern rangeland development.

RECOMMENDATIONS

Based on the above perspective, rangeland management needs the following research and cooperative work during the immediate future.

1. Collect baseline data on actual use of rangeland in both northern Mexico and the southwestern United States. These data should focus on, but not be limited to, the following information: land tenure/use; grazing patterns, especially seasonality; herd composition; market participation; labor/capital costs; production functions for different types of operations.

2. Integrate the above information into synthetic regional portraits of major rangeland and wildlife regions. The collection of additional statistics is necessary, but this alone is not sufficient for rangeland management. Some social and economic scientists are gifted with the ability to take masses of data and synthesize this information into an integrated, global overview of the rangeland situation, identifying major constraints, conflicts, and potentials of a region that seems to influence human behavior again and again. An excellent example of this ability is John Bennett's work on The Northern Plainsmen (1969), Wally Goldschmidt's (1947) early study of Californian agriculture, and Edward Spicer's (1962) description of early southwestern United States' development in Cycles of Conquest. These synthetic portraits, when properly done, not only provide us with an overview of the general conditions of natural resource utilization and human groups who compete for resources, but also allow the actors involved in management problems to gain a perspective on the motivations and objectives of other interest groups. The problem here is that few scientists are intellectually qualified to write such syntheses.

3. Review the experience of the United States with regard to the Apache and Navajo Indian Reservations. Although it is relatively easy to claim that rangeland managers and government officials in the United States have "considerable experience" working with traditional peoples on the large Indian reservations that dominate the southwestern

United States, it is much more difficult to state precisely what this "experience" is and to organize it in a manner that may help the cross-cultural transfer of science and technologies between rangeland scientists and traditional peoples on both sides of the border. The collective experience of rangeland managers over four or five decades lays dormant in government files, field reports, and the heads of participants in these developments. A relatively inexpensive project that would have considerable payoffs would be to systematically organize and collect this information in a format that could be used as guidelines for future developers.

4. Develop cooperative training ventures. The fact that the specific rangeland situations of northern Mexico and the southwestern United States differ should not be discouraging. The socioeconomic differences are large enough that we may expect that a great deal of the specific training we carry on, on either side of the border, needs more "fine tuning" to the situation on the other side. The best method for achieving this cross-cultural understanding is for close cooperation to occur between faculty, students, government officials and other professionals on both sides of the border. Very few range management schools in the United States are equiped to prepare Mexican graduate students for working with their native institutions and rangeland users. Closer contact with the Mexican situation and the Mexican faculty and government officials could assist the United States' faculty and schools in leading Mexican students in the proper direction. More directly, it would be of considerable assistance to have Mexican officials and faculty hold visiting appointments in schools in the United States so that students in the U.S. could become familiar with a more international perspective. Likewise, if rangeland scientists in the United States are to develop management tools with more cross-cultural applicability, they must become more intimately acquainted with rangeland problems outside the southwestern United States. Leaves of absence, cooperative research endeavors, and sabbaticals taken by United States' faculties and government officials in Mexico could greatly improve the management perspective of both countries. Finally, Mexican government officials or faculty would not wish to adopt a rangeland management solution that is inappropriate for the conditions in Mexico, nor would they wish to avoid certain useful solutions which might be transferred without any accompanying negative disruptions. Without close cooperation and an understanding of the important differences, as well as the similarities between the two countries, such errors cannot be avoided.

SUMMARY

As long as humans manage animals and adjust their management techniques to fit human goals and needs, rangeland management will require a social dimension, a perspective of the "larger context." At present, we are just beginning to understand how to grapple with this question of the "larger context." One simple lesson that anthropologists have learned and taught is that a comparative perspective not only increases understanding of another culture, but also of one's own. The development of a cross-cultural, comparative perspective is one of the primary reasons for this workshop.

LITERATURE CITED

Al-Gain, Abdulbar. n.d. Bedouin Nomads:Their In-Situ Development. Bureau of Ethnic Research, University of Arizona Press, Tucson, 133 p.

Bennett, John W. 1969. The Northern Plainsmen. AHM Publishing Corporation. Chicago, Illinois, 352 p.

Downing, Theodore E. 1981. Culture and Agriculture. University of Arizona Press, Tucson, (in press).

Downing, Theodore E., and Robert Sayers. 1978. Directory of Social Scientists for Rangeland Peoples. Published by Rangelands Directorate of the Man and the Biosphere Program, UNESCO, Washington, D.C., 74 p.

Goldschmidt, Walter. 1947. As You Sow. Harcourt, Brace, and Company, New York, 288 p.

Heady, Harold F. 1975. Rangeland Management. McGraw-Hill Book Company, New York, 460 p.

Hillman, Jimmye S. 1972. Farming and ranching. In Arizona:Its People and Resources, University of Arizona Press, Tucson, 411 p.

Johnson, Douglas. 1969. The Nature of Nomadism. University of Chicago Geography Research Paper Number 118, 200 p.

Spicer, Edward. 1962. Cycles of Conquest. University of Arizona Press, Tucson, 609 p.

Spooner, Brian. 1973. The Cultural Ecology of Pastoral Nomads. Addison-Wesley Module in Anthropology Number 45.