MAN-NATURE ATTITUDES OF ARIZONA WATER RESOURCE LEADERS

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INTRODUCTION

Human attitudes are an important element in natural resource management. Most studies of attitudes in a natural resource context have considered only users of natural resources (Folkman et.al.,1968; Folkman, 1965; Hendee et. al., 1968; West et. al., 1968; West and Merriam, 1969). This paper reports on a pilot study conducted in Arizona to develop a man-nature attitude scale for natural resource professionals and leaders (Kanerva, 1969).

METHODS

The study attempted to measure the frame of reference used by professionals and interested laymen in the field of water resources in a decision-making context. The study model consisted of a man-nature interaction system which was viewed as an open system representing the general interaction between man and nature (Figure 1). The area within

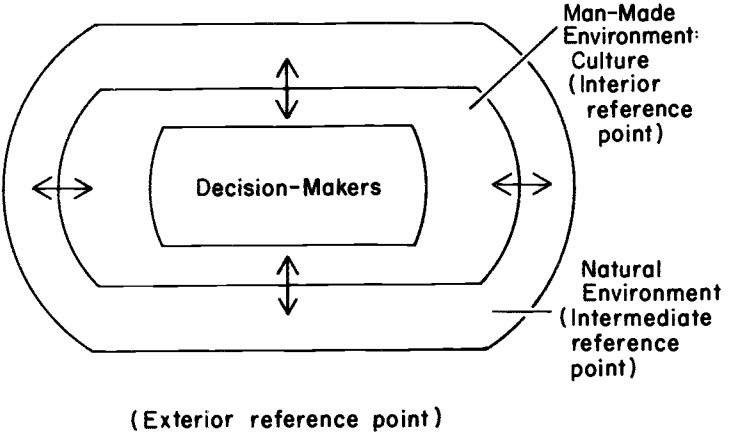

Figure 1. General system for the man-nature interaction.

The area within the largest oval represents the natural environment. The area within the middle oval represents the man-made environment, culture, the medium through which man views the natural environment. The smallest oval represents man as a part of the man-made and natural environments. The interactions, shown by the arrows, occur between man and the natural environment with cultural processes acting as a mediary (Smith, 1966).

The decision-making of man within the general man-nature system was represented by another open system shown in Figure 2 (Campbell et.al., 1960). The actual decision process is made up of three parts: the frame of reference of the decision-maker, the integration or thought process, and the input stimuli. In the study the integration process was taken as given. The frame of reference was considered the critical factor and was analyzed by comparing it to a variable set of input stimuli (questions).

In the general man-nature interaction system there are three basic frame of reference positions: the cultural or interior, the natural or intermediate, and the balanced or exterior (Figure 1). The exterior reference position is the most general; not wholly dependent on either the cultural or natural environments. When the decision-maker takes this mental step outside the whole system, he is able to view it in perspective and effect a more objective decision than from the other two reference positions.

The three reference positions are shown in Figure 3 on an interaction continuum from culture to nature. The exterior reference position is shown at the midpoint. In order to obtain a measure of an individual's position on this interaction continuum it is necessary to choose a qualitative variable and develop an attitude scale to measure it. The qualitative variable chosen was attitude towards human management.

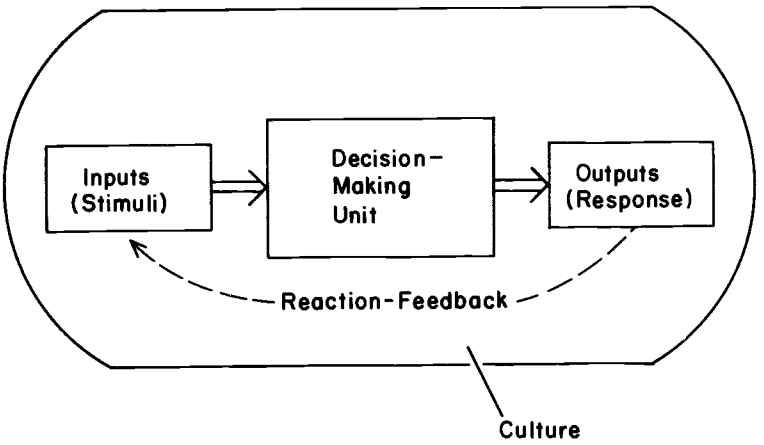

Figure 2. A decision-making model.

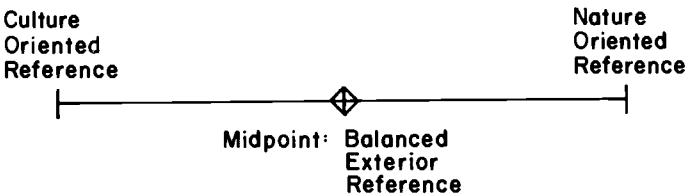

Figure 3. Frame of references interaction continuum.

The human management attitude continuum is shown in Figure 4. The continuum represents, from left to right, an increasing degree of positive attitude towards human management. The left part represents a low degree of human management attitude and a cultural reference position. The middle part of the scale represents a medium degree of the attitude and a balanced reference position. The right portion of the scale represents a high degree of the attitude and a nature oriented reference position. These portions may be described in more familiar, and perhaps controversial terms, left to right, as exploitation, conservation, and preservation attitudes.

Guttman scalogram analysis was used to develop the human management attitude scale (Stouffer et. al., 1950). The Guttman procedure was chosen because it makes possible the development of a unidimensional attitude scale along which respondents can be rank ordered. The procedure is too long to be completely detailed in this paper. A thorough explanation is provided by Anderson, Watts, and Wilcox (1966) in Legislative Roll Call Analysis. Briefly, the process includes developing a set of questions relevant to the qualitative variable. In this case, a set of 12 dichotomous questions were prepared and pretested (Oppenheim, 1966). Next, "favorable" responses to each questions must be determined based on question content. A favorable response is one that indicates a positive attitude towards the qualitative variable. The questions are then administered to a group of individuals. The remainder of the process involves the analysis of the responses. This analysis proceeds, through several steps, to determine whether questions are scalable or not through examination of question response

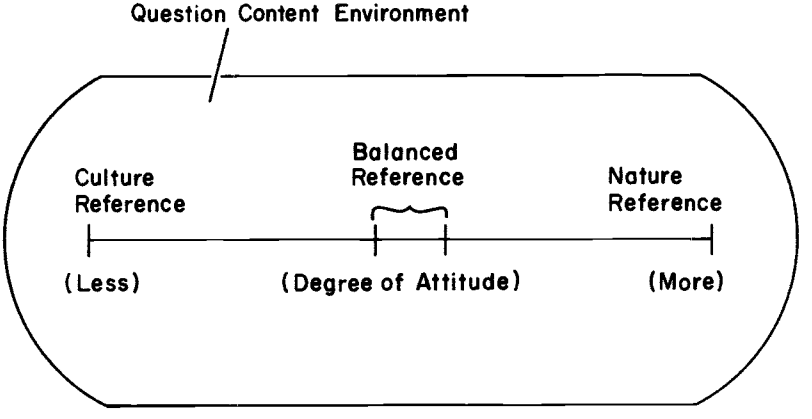

Figure 4. The human management attitude continuum.

patterns. The end result is a set of questions constituting the scale. The total number of favorable (positive) responses given by a respondent is his scale score.

Because this was a pilot study, a purposive sample was taken (Kish, 1965). The main study group of 86 persons consisted of people who had attended the 1967 Arizona Watershed Symposium and faculty members at the University of Arizona. In addition, one group of Watershed Management graduate and undergraduate students was used to pretest the questions. A second group of Watershed Management students was used to check the scale after it had been developed from the responses of the main study group.

RESULTS

The original set of 12 questions was reduced to eight by the scalogram analysis, four questions were found to be nonscalable. The eight questions forming the human management attitude scale with their positive responses indicated were:

A) As a manager planning natural resource uses, which factor would be more important in your decisions: man's physical or man's emotional needs.

___+___ 1. Man's physical needs

_____ 2. Man's emotional needs

B) In general, which do you think is more important: deciding who gets what amounts of our useable natural resources or increasing the supply of our useable natural resources?

___+___ 1. Deciding who get what

_____ 2. Increasing the supply

C) In making decisions about using natural resources, would you take into account how people behave or would you not include this factor?

___+___ 1. Take into account

_____ 2. Not include this factor

D) To protect certain areas, would you choose not developing these areas for public use or managing the public that uses these areas?

___+___ 1. Not developing these areas

_____ 2. Managing the public

E) In general, do you think the manipulation of natural resources is a harmful practice or a beneficial practice?

___+___ 1. A harmful practice

_____ 2. A beneficial practice

F) In making decisions about using natural resources, would you consider municipal and industrial demands important or consider these demands not so important?

_____ 1. Consider these demands important

___+___ 2. Consider these demands not so important

G) Which would you choose: managing to take into account the opinions of groups that use natural resources, or managing according to the opinions of the managers?

_____ 1. Take into account the opinions of groups

___+___ 2. According to the opinions of the managers

H) Do you think that the amounts of natural resources people use everyday are more than is needed or that these amounts are needed for modern living?

___+___ 1. These amounts are more than is needed

_____ 2. These amounts are needed

The scale was found to meet all of 5 criteria:

1. The coefficient of reproducibility was .91, greater than the standard of .90 (Stouffer et. al., 1950).
2. There should not be a large number of respondents who all have the same non-scale pattern of responses. Three respondents were the most that fell into any one of 28 different non-scale patterns (Torgersen, 1958).
3. The initial set of dichotomous questions should be greater than ten (Stouffer et.al., 1950). Twelve were used.
4. The error ratio was .26, less than the suggested upper limit (Riley, 1963).
5. The responses of a group of students were checked against criteria 1, 2, and 4 above with favorable results. Although the students' scale scores were more evenly distributed than the main study group, they did not differ greatly.

As mentioned previously, the scale represents an increasing degree of positive attitude towards human management. A low score indicates a culture based reference position. A high score indicates a nature based reference. A middle score indicates a balanced reference.

The distribution of scale scores for the main study group were:

Scale Score	Percent of Respondents
0	0
1	9.3
2	30.2
3	32.6
4	9.3
5	12.8
6	3.5
7	1.2
8	0

The median score was 3. This means the study group was approaching a balanced attitude towards human management and, thus, approaching a balanced and objective reference position.

Respondents were asked whether they felt man and nature are in conflict. Sixty-nine percent said yes and 16 percent said no. This is in general agreement with the groups' overall attitude.

Sixty-nine percent of the natural resource professionals in private business or self-employed had scale scores in the 0 to 2 range (Table 1). This indicates a development philosphy and a culturally oriented reference position. Government professionals approached a more balanced attitude and reference position, only 35 percent of them had scale scores in the 0 to 2 range. While 30 percent of the natural resource educators had scale scores in the 0 to 2 range, 44 percent had scores in the 4 to 8 range. Thus, educators tended to have a balanced reference position and a philosphy of conservation. These groups, however, have different modes and degrees of influence on natural resource management decisions.

Respondents were asked to list the groups, clubs, and civic organizations to which they belonged. Respondents with membership in a greater diversity of groups tended to have higher scale scores than those belonging to a less diverse set of groups (Table 2). It would be expected that a person exposed to more points of view would have a more balanced attitude.

Respondents who had lived longest most of their lives in the West or East tended to have lower scale scores than those who had lived longest in the Central region (Table 3). It might be hypothesized that the Central region has an environment that is, in some unknown way, conducive to a more balanced reference position.

Table 1 Distribution of Respondents by Scale Score and Type of Employer

Scale Score Group	Employer		
	Government	Private Business or Self-Employed	Educational Institution
0-2	33%	69%	30%
3	44%	15%	26%
4-8	22%	15%	44%

$\chi^2_4 = 10.0$ significant at .2 level

Table 2 Distribution of Respondents by Scale Score and Number of Group Types

Scale Score Group	Number of Group Types	
	1-2	3-5
0-2	45%	22%
3	28%	48%
4-8	28%	30%

$\chi^2_2 = 4.1$ significant at .2 level

Table 3 Distribution of Respondents by Scale Score and Region Lived in Longest

Scale Score Group	Region		
	West	Central	East
0-2	47%	20%	50%
3	33%	36%	33%
4-8	20%	44%	17%

$X_4^2 = 7.5$ significant at .2 level

CONCLUSIONS

The pilot study was successful in constructing a scale measuring attitude towards human management. The scale, however, should receive further testing. One approach would be to test the scale on two groups believed to have greatly different attitudes, such as the Sierra Club and the Arizona Mining Association. A more interesting test would be to compare scale scores of natural resource managers with actual management decisions.

The analysis of associations between scale scores and respondent characteristics was not completely successful because the sample size was inadequate. Another similar study, but utilizing a larger sample, should be done to determine if such associations do exist. The existence of such associations would tend to validate the scale.

It is felt that techniques and studies such as these can provide natural resource managers with effective means of objectively evaluating and improving their management decisions.

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