THE STRUCTURE OF PUBLIC ATTITUDES TOWARD SOCIAL SCIENCE RESEARCH ON FLOOD DAMAGE PREVENTION*

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ABSTRACT

As part of a larger study of water resource research needs, 1300 "concerned citizens" were asked to report their evaluations on nineteen issues in flood damage prevention in terms of their relative importance for future, social science, research. A factor analysis of the responses isolated four distinct clusters of issues; the "health" cluster was rated as most important followed by "community" and "natural" environment with "institutions" ranked as least important.

PROJECT OVERVIEW

Flooding of lakes, rivers and streams continues to destroy life and property, and scientists are continuing to conduct research to learn ways of preventing such damage. Predominant among these scientists have been biologists, geologists, economists and engineers. As a result of their work, a variety of structural and non-structural flood damage abatement methods have been developed. The human social elements of such methods, however, has received very little attention by social scientists, yet it is precisely the Human Element that is of ultimate concern to all scientists. A confounding problem is that the small number of social science studies that have been conducted are very difficult to locate.

This abridged report contains the results of one phase of a multi-methodological approach to determining the current state, and future needs, of social science research on flood damage abatement methods and their environmental settings. By "flood damage abatement methods" is meant any strategy which reduces economic, geographical, biological, psychological or, particularly, social costs of water flooding in a community. This definition includes structural as well as non-structural methods. From the outset of the project, it became increasingly clear that, in fact, very little social science research has been done on this topic. The focus of the project thus shifted from equal emphasis to a heavy emphasis on "future needs" and lighter emphasis on "current state." And, at a very general level this was the major finding of the research, namely, little has, but much needs, to be done!

In order to document past as well as future needed research a variety of methods were used, but the present report is restricted to one major data source: a selected list of 1300 persons known to have an interest in water resource development were contacted through a mail questionnaire and 40 per cent responded with information about their perceptions of the need for social science research on flood damage prevention.

That there is a general *sentiment* for further social science research in the area was documented by a review of related literature. *Less* easily documented concerns, however, are the specific direction that such research should take— this assessment was a major focus of the survey of "concerned citizens."

METHODOLOGY

Although environmental sociologists' perceptions and the literature provide some insight into needed social science research on flood damage reduction, a very important source of perceptions are those held by "concerned citizens." A concerned citizen is any adult that has a particular interest in water resources research. This interest can take a variety of forms from economic and political self-interest to religious and familial altruism. To describe such a collection of persons is, of course, much easier than actually identifying such a collectivity. For purposes of obtaining an estimate of the perceptions of this group, approximately 1,300 subscribers to *Water News,* the Virginia Water Resources Research Center Newsletter, were selected so as to represent a cross-section of the much larger and less easily identified population of "concerned citizens." The *Water News* subscription list contains names of persons who must, periodically indicate their interest in water research by renewing their complimentary subscriptions.

Specifically, the fall, 1976 subscription list for *Water News* contained 3,581 names divided into sixty occupational categories. Nineteen of these categories were selected based on their collective representativeness of a wide cross-section— from University faculty and town mayors to newspaper environmental editors

and farm bureau members. From these categories, a listing of all current subscribers was obtained. This listing contained 1,264 names; thirty-five were eliminated because of vagueness of subscriber name and sixteen others were eliminated because they were already included in other data collection phases of the research. Thus the actual sample of *Water News* subscribers—or "concerned citizens"—was 1,213. A questionnaire was sent to all 1,213 members of the concerned citizen sample with a cover letter and stamped return envelope. Essentially, the instrument asked the respondence to provide information about (1) his occupational position (2) his opinion regarding nineteen water research areas and (3) research on flood damage prevention that he had conducted or was aware of. The nineteen water research areas are shown in Table 1 and were derived from the suggestions given in the four publications listed in the Bibliography.

Of the 1,213 questionnaires, which were mailed in November, 1976, 466 (38.42%) were returned in useable form. Because the mailing was at "bulk" rate, the proportion of questionnaires that did not reach the respondents is unknown, but it suspected to be somewhat high; likewise, because of funding and time restrictions only one mailing was made. Nevertheless, the 38 per cent response rate is somewhat low in comparison with other social science mail questionnaire data collection efforts. It was assumed, however, that those responding were among the more "concerned" or interested, in one way or another, and thus, in this sense, any response bias would be in the desired direction. Although the overwhelming majority (85%) of the respondents were Virginia residents, the average responses of the non-Virginia respondents were not appreciably different and no severe bias is assumed for the Virginia responses.

FINDINGS

Table 1 presents the percentage distribution of the 466 respondents for each of nineteen areas of possible future research; the respondents were asked to select one of the four responses: "very important," "somewhat important," "not important" or "no opinion." The item that was seen as "very important" by more of the respondents than any other item was "land use policy" followed closely by "soil erosion" and "water purity" and then by "health" and "waste treatment." The item that was seen as "not important" by more of the respondents than any other item was "religious institutions" followed by the "family" and "educational institutions" and then by "architectural design" and "communication systems." The highest proportions of "no opinion" items were similar to the "not important" items in that the religious, educational and family institution were most often designated as "no opinion" along with the item of community power structure.

An item of "other" was also included in the questionnaire and used by

Table 1. Percentage Distribution of Water News Subscribers'
Responses for Each Issue in Terms of Importance for Future
Research on Flood Damage Prevention (N=466)

	Very Important	Somewhat Important	Not Important	No Opinion	Total
a. Community power structure	26	33	14	28	100
b. Land use policy	76	13	2	8	100
c. Quality of life	41	39	7	14	100
d. Transportation systems	18	52	15	16	100
e. Architectural design	17	40	23	21	100
f. Recreation	22	51	14	14	100
g. Agriculture	53	33	4	10	100
h. Family institution	13	29	31	27	100
i. Educational institution	10	34	27	28	100
j. Religious institution	3	19	46	32	100
k. Economic institution	28	37	11	23	100
l. Forestry products	23	48	15	15	100
m. Soil erosion	70	19	2	9	100
n. Wildlife	32	47	10	13	100
o. Fishing	26	46	14	14	100
p. Water purity	68	19	5	9	100
q. Waste treatment	61	26	6	8	100
r. Health	63	23	5	9	100
s. Communication systems	16	42	19	22	100

fifty-two of the 466 respondents to indicate areas that were not listed but ones which they felt merited (uniformly designated "very important") further research. Table 2 presents a listing of these "other" areas mentioned by the respondents who in a few cases mentioned more than one "other" item. Among the items, the majority seem to focus on non-structural methods, health and, in a general sense, social topics. Economic and engineering topics do not appear. One major function of providing an "other" category is to check on the relevance of the specified (Table 1) categories. For the most part, the "other" topics seem to be further elaborations of the specified categories and the assumption is hence supported that the categories were relevant. Nevertheless the items represent a rather eclectic collection of topics. In order to discern what, if any, *underlying* conceptual concerns were present among all the items, a data reduction technique commonly referred to as "exploratory factor analysis" was utilized. Specifically, the following procedures and criteria were used: (1) an item's mean response was substituted for any "no opinion" response for the item; (2) all nineteen items and 466 cases were entered into a principal components (nonspecified interactions—eight performed to reach correlation matrix determinant), varimax rotated (number of factors extracted specified at four) factor computing procedure; (3) conceptual location of each item within a factor was based on the largest rotated factor loading associated with the item—the range of such coefficients was .15 to .80 with only three

Table 2. Specific Items in "Other" Category of Future Flood
Damage Prevention Research Topics

Zoning (3 respondents)	Plant diseases
Sociologists	Prevent habitation (2 respondents)
Human life (3 respondents)	Legal institutions
Flood control works	Conservation
Channelization	Obtain grants
Saving wetlands	Rainfall-Streamflow research
Urbanization	Group attitudes
Utilities	Advance planning (5 respondents)
Sand dunes	Political institutions (2 respondents)
Natural vegetation	Flood insurance (2 respondents)
Flood forecasting (2 respondents)	Runoff control
Information dissemination	Ecological resiliency
Landscape design	Art museums
Aesthetic	Irrigation (2 respondents)
Direct Assistance	Energy systems
Solid wastes	Pesticides
Drinking water	Water supply
Mineral resources	Aquatic life
Sediment control	Poverty
Relocation	Safety (2 respondents)
Up/Downstream effects	Historical structures (2 respondents)
Public awareness (2 respondents)	Dam construction (3 respondents)

under .30 and the largest crossloading was .26 with only six above .20. The resulting four clusters of items are given in Table 3; titles of the four clusters were derived from an inspection of their prose content. The point is that within each cluster the items listed are highly correlated with one another but between clusters they are not. The four clusters, then, indicate distinctly different areas in the minds (as reflected in the responses) of "concerned citizens." Each respondent was assigned a value for each of the issue clusters based on his average response (1 = not important, 2 = somewhat important, 3 = very important) to the items within each cluster; this value is referred to in this paper as a cluster index   Table 4 presents a distribution of the indices for each cluster across three categories of index values which center around the original categories of "not," "somewhat" and "very" important for future research.

CONCLUSIONS

Clearly, for these concerned citizens, the general area of "health" is of major concern as regards a focus for future research on flood damage abatement.

Table 3. Issue Clusters Derived from Factor Analysis of
Water News Subscribers' Responses

Community Environment	Natural Environment
a. Community power structure	f. Recreation
b. Land use policy	g. Agriculture
d. Transportation systems	l. Forestry products
e. Architectural design	m. Soil erosion
s. Communication systems	n. Wildlife
	o. Fishing

Institutions	Health
h. Family institution	c. Quality of life
i. Educational institution	p. Water purity
j. Religious institution	q. Waste treatment
k. Economic institution	r. Health

That is, 76.6 per cent of the respondents' health issue indices fall into the "very important" (2.34 to 3.00) range—much greater than the corresponding percentages for the other clusters (e.g., 39.3%, 43.8%, 6.2%). The three topics of "water purity," "waste treatment" and "health" itself are seen as *quite* critical for future research. Quality of life is the fourth item in the health issue cluster and is of particular importance in the research because of its bearing on sociological variables. "Quality of life" includes economic and physiological variables also but a major component, developed in recent years, is the social aspect.

Just as clearly, the institutions are seen of little importance for future research on flood damage abatement. Only 6.2 per cent of the average responses to the four institution items fell above 2.34 ("very important") while 32.2 per cent fell into the "not important" range (less than 1.67). The largest cluster percentage in the "somewhat important" category, however, was also from this

Table 4. Frequency Distribution of Issue Cluster Index Categories

	Issue Cluster Index Categories							
	Not Important (1.00-1.66)		Somewhat Important (1.67-2.33)		Very Important (2.34-3.00)		Total	
	N	%	N	%	N	%	N	%
Community Environment	37	7.9	267	57.3	162	34.8	466	100
Natural Environment	33	7.1	250	53.6	183	39.3	466	100
Institutions	150	32.2	287	61.6	29	6.2	466	100
Health	22	4.7	87	18.7	357	76.6	466	100

institutional cluster (61.6%) and this may indicate a transitional period of interest in the topic.

The remaining two clusters—community environment and natural environment—had quite similar distributions of index values: 34.8 per cent versus 39.3 per cent "very important"; 57.3 per cent versus 53.6 per cent "somewhat important"; 7.9 per cent versus 7.1 per cent "not important." Thus, while the two "environments" are seen as *qualitatively* distinct in terms of research needs in flood damage abatement, they enjoy very similar *quantitative* priority ratings over-all. The point is that after health problems, of both engineering and social origins, have been researched, the next level of priority is "the environment" with two distinctly different focii—community and natural. As an inspection of the items within the environmental cluster will show, a variety of sociological variables need examination; the major variables among natural environmental focii would be associated with recreation; among the community environmental focii would be several types of variables, including communication, social power and influence, status and stratification and mobility.

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