

SOCIOLOGY OF WATERSHED DEVELOPMENT

by

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Introduction

The Problem

The problem of successful watershed development besides being physical and technical is also a socio-cultural one. The socio-cultural component of the problem, which, in other words, means that technical know-how and economic patterns are embedded in socio-cultural systems, can either act as barrier or stimulant to technical and economic change. Watershed development program, like any other program of planned change, involve people both as individuals and social groups. More often than not it encounters resistance for the local people whose interest it is supposed to serve. Each social system has its own cultural forms which constitute the economic and technical phases of the culture to fulfil its physical needs from which it is generally reluctant to deviate. Occasionally, water management programs, directly or indirectly, threaten these established customs and institutions of the local society where the program is initiated, and, consequently, the local people tend to be resistant to it who feel that their firm held values have been challenged by the development program. These basic human factors have often been ignored by technicians and planners, and the local society, where the program is implemented, has frequently been regarded as little more than merely an ecological arena. This has resulted in, on the part of the local residents, a complete lack of identification with the watershed development program.

In other words, it is generally observed that in watershed development planning the economic and physical factors are considered more important than the socio-cultural factors. The technicians and planners appear to depend more on technical than on human aspect of the problem. However, the importance of human element in water management has been receiving increased attention in the recent sociological studies conducted in this general area.¹

1. For example, see Wade H. Andrews, "Toward a Sociology of Natural Resources," presented at the 1966 Rural Sociology Society meeting at Miami Beach, Florida; Carl F. Kraenzal, "The Social Consequences of River Basin Development," Law and Contemporary Social Problems, Vol. 22 (Spring 1957), pp. 221-236; Kenneth P. Wilkinson, Local Action and Acceptance of Watershed Development, (Mississippi State University, Social Science Research Center Preliminary Report 12, July, 1966).

Focus of the Study

The major focus of this study is on the effects of attitudes of local residents and their participation on success of watershed development programs.² This has been done by comparing two communities, referred to hereinafter as Community A and Community B, which were at different levels both in favorable predisposition of its residents toward watershed development and its relative success as a program.

A greater proportion of residents in Community A had more knowledge and were more favorably oriented toward watershed development program than in Community B. While one-third of the respondents in Community A knew the program and could name one or more organizations involved in it, less than one-fifth in Community B could do so. Of the 56 percent of the respondents in Community B who had some knowledge of the program, 42 percent were only superficially familiar with the program and could neither name the organizations involved in it nor specify their tasks. On the other hand, of the 60 percent of the respondents in Community A who had some knowledge, 33 percent could name one or more organizations involved in it and also their tasks. Over 50 percent of the respondents in Community B (as compared to ten percent of Community A) stated that loss of valuable land would be one effect of the project.

In terms of physical accomplishments, although the program in Community B was much more large and ambitious, and problems involved were complex in nature, relatively little physical progress had been made in this community at the time of data collection. In contrast, in Community A watershed development activity was on the way to accomplishing its objectives.

Theoretical Orientation

Sociological study of watershed development involves analyses of three interrelated levels - organizational, individual and community.³

2. For a more detailed study of attitudes and local participation in successful watershed development, see Satadal Dasgupta, Attitudes of Local Residents Toward Watershed Development, (Mississippi State University, Social Science Research Center Preliminary Report 18, May, 1967), and Satadal Dasgupta and Kenneth P. Wilkinson, "Local Participation and Watershed Development: A Comparative Study of Two Communities," presented at the Third Annual American Water Resources Conference at San Francisco, California, November, 1967, respectively.

3. For a detailed theoretical discussion of how the interrelationship of these three factors can be conceptualized in a general theoretical frame of reference for sociological analyses of critical watershed problems see, Kenneth P. Wilkinson and Lucy W. Cole, Sociological Factors In Watershed Development, Water Resources Research Institute, Mississippi State University, State College, Mississippi, July, 1967.

Analyses at the organizational level basically involves the study of field relationships between water management organizations and the various community groups interested in local water resources development. Effective external relationships with local community groups is largely determined by the internal structure of the water management organization as a beaurocratic unit in terms of its relationship among sub-units at different levels, decision making process and so forth. In other words, "at a concrete level the context of water management program is provided by a variety of types of agencies in interaction with one another and with other groups, each with internal and external problems of task accomplishment and structure maintenance."⁴

At the individual level, one is mainly interested in delineating the characteristics of the landowners which make them either positively or negatively predisposed toward watershed development. In a large number of studies on diffusion of agricultural innovations, a host of factors have been found to be related to adoption of recommended farm practices at the individual level. Among others, factors like size of farm, tenure status, occupation, education, social participation and level of living have been found to be related to adoption of farming innovations.⁵ These findings may have some relevance in delineating factors related to attitude toward watershed development at the individual level. For example, Photiades reported on the empirical relationship between attitudes toward a watershed development program and a number of socio-economic factors, such as occupation, tenure status, size of farm, education and age.⁶

Basically, one is interested to know to what extent a person's residence in a particular community influences his attitude toward watershed development program. In other words, why are residents in one community favorable toward watershed development while the residents in another community are not?

One of the important water resources problems in the context of community study is the degree to which the watershed development program is initiated locally rather than by governmental agencies which operate in the locality. A watershed program or any other kind of program may be

4. Ibid., p. 9.

5. Everett M. Rogers, Diffusion of Innovations (New York: Free Press, 1962).

6. John D. Photiades, Attitudes Toward the Water Resources Development Program in Central South Dakota (Brookings: South Dakota State College of Agriculture and Mechanic Arts, Preliminary Report 1, May, 1960).

near to the center of the community field⁷ and be an integral part of the community action processes; it may be relatively removed from the center of the community field being partly organized at the local level and partly initiated by outside agencies; or it may be completely isolated from the community arena and implemented within the locality by outside agencies with little or highly restricted local participation. Essentially, a local watershed development program is a special-interest activity within the locality carried on with the guidance and cooperation of extra-local bureaucratic agencies. Typically these agencies provide the major financial and technical support. What are the consequences of disregard on the part of technical agencies of the importance of involvement of local groups and associations in the program? Does this lead to failure in recruiting local resources and gaining local support both of which are important in successful implementation of the program? These and other questions may be answered in part through careful examination of the phases of development of actual programs.

Area and Method

The two Communities, A and B, were selected for the purpose of study because watershed projects in both were developed through similar processes.

7. In contrast to ecological, institutional or social system approaches to the study of community is the notion of community as an interactional field. Community is conceived of as one of many interactional units in a local society, rather than the local society itself. The community field is distinguished from other interactional units in the locality by a complex of characteristics, including (1) the degree of comprehensiveness of interests pursued and needs met, (2) the extent to which the action can be locally identified, (3) the extent of local participation in the activity and (4) the extent to which the action affects the local society in terms of stability and change.

One important characteristic of a strong and well-integrated interactional community would be that it have actions locally oriented across a wide variety of human interests. Such specialized areas of action as health, agriculture, religion and government would be coordinated through various associations and integrated through a common ideology. With the growth of technology and diversification of groups and associations, a locality tends to become differentiated in terms of interest areas. Lack of coordination may result in too many independent actions and consequently in community disorganization. The major objective of community research from this perspective is to identify the kinds of structures and processes which will facilitate both technical growth in special interest areas and integrated action across interest lines. This refers to community development in its broadest sense--both development in and development of the community.

For a discussion of the interactional approach in community study see, Harold F. Kaufman, "Toward an Interactional Conception of Community," Social Forces, Vol. 38, pp. 8-13; and Harold F. Kaufman and Kenneth P. Wilkinson, Community Structure and Leadership: An Interactional Perspective in the Study of Community, Social Science Research Center Bulletin 13, Mississippi State University, State College, Mississippi, June 1967.

Both of these communities included a trade center of 20,000 population within a community of 40,000. The trade center of each served as the county seat, as a regional center for several state agencies, and as headquarters for rural watershed development projects.

Data on watershed development were collected at two levels. Data of qualitative nature involving depth interviews on the course of a watershed development project with selected active participants in watershed programs were collected during the summer and fall of 1965. The other level of data collection involved a survey of rural landowners whose lands were directly affected by the watershed project. The purpose of this survey was to determine the extent to which the watershed projects were recognized and accepted by rural landowners.

The survey was conducted on 84 landowners in Community A and 182 in Community B during the summer of 1965 and involved structured interviews. The respondents were selected through a combination of census and sampling procedures. In Community A a list of owners of land within the official boundaries of the watershed in each community was prepared and those who were local residents were designated as potential respondents. In Community B, where the watershed was much larger, the potential respondents included owners of ten or more acres of land which would be affected by the permanent pool, flood water pool, or site of either of the structures to be constructed as part of the project. In Community A there were 107 potential respondents; in Community B, 242. Twenty-three potential respondents in Community A and 60 in Community B could not be interviewed because they were not available during the two-month period of field work.

Data were collected on persons' and family characteristics, organizational participation, contact with agricultural and other related agencies, and land possession and use. Respondents were also interviewed regarding their knowledge and attitudes toward the watershed.

For the purpose of depth interviews, respondents were selected according to the extensiveness of their contacts with the watershed projects. The interviews were conducted through informal conversations and recorded verbatim. A series of general and specific questions was used by the interviewer to guide the course of conversation. Official documents such as watershed plans and committee lists, served as sources of supplementary information.

Attitudes Toward Watershed Development

Construction of Attitude Scale

Landowners in both the communities were asked to respond to twenty-two evaluative statements concerning the need for watershed development in the community, the scope of their participation in the program, the activities of the watershed development agency, and the extent to which it would be beneficial to the members of the community. Percent of landowners responding positively or negatively to each statement, in both the communities, have been presented in a table in the Appendix.

An attempt was made to construct an attitude scale by first summing responses from the two communities and then subjecting the responses to Guttman's scale analysis.⁸ A large number of statements had to be eliminated to meet the required criteria of this scale. Finally, a scale was obtained when the number of statements which met the required criterion (a coefficient of reproducibility of .8981) was reduced to eight. The respondents were given scale scores from zero through eight on the basis of their positive endorsement of the number of statements included in the scale. The items which were combined into the attitude scale are presented in Table 1 by percent of individuals who positively endorsed each one of them.

Table 1. Statements Included in the Attitude Scale Constructed by Combining Responses of Both the Communities

Statements	Percent Responding Positively
*Only those with dams on their property will be benefited from the program.	72
Spending money for watershed development is a good investment.	65
*The watershed program is being pushed too hard in this community.	61
*They are damming up too many creeks in this county.	50
Watershed programs in this county are likely to meet with widespread acceptance in rural areas.	46
The average landowner in this county stands to lose more than he will gain by watershed programs.	42
Everyone in this county will be benefited from the watershed program.	39
*Landowners have little opportunity to express their opinions in planning the watershed program.	20
*A response of "disagree" was a positive endorsement of this statement.	

8. For the purpose of analysis of attitudes toward watershed development at the individual level, the respondents of Community A and Community B were combined as representing a single sample. Although the methods of selecting respondents in the two communities were slightly different, watershed development projects in both were developed through similar processes.

In the light of previous findings,⁹ seven socio-economic variables, organizational involvement,¹⁰ occupational status, education, level of living,¹¹ age, tenure status and number of acres operated, were selected to examine their relationship to attitudes toward watershed development. The relationships are presented in Table 2. It may be observed that out of seven variables only four, namely organizational involvement, occupational status, education and level of living, were found to be significantly related to attitude. High organizational involvement, non-farm occupation, high education and high level of living were positively related to attitude toward watershed development. Age and farm characteristics had no relation to attitude in the present case.

IPW and Attitudes Toward Watershed Development

The above analysis thus helped to delineate factors related to attitude toward watershed at the individual level. An index of predisposition toward watershed development (IPW) was constructed for each of the two communities separately, by combining four status variables, each of which was found to be related to attitudes, to examine their additive effect upon attitudes toward watershed development. For the purpose of developing the index, weights of 0 and 1 were given to the categories of the four variables as follows, with a weight of 0 being in the direction of unfavorability and a weight of 1 in the direction of favorability:

	0	1
Organizational Involvement	Low (5 or below)	High (6 or above)
Occupational Status	Farming	Non-farming
Education	Low (11 years or below)	High (12 years or above)
Level of Living	Low (0-2)	High (3-4)

9. Photiades, op. cit.

10. The organizational involvement of an individual was measured by assigning him an organizational involvement score on the basis of his membership in a number of organizations, offices held in different organizations and monetary contributions in each of these organizations. He was assigned a point score for each membership in different organizations, for holding any office and also for regular monetary contributions. Thus, if an individual were a member of three different organizations, if he held an office in one, and if he regularly contributed money in all three, he was assigned a total organizational involvement score of $(3+1+3)=7$.

11. A level of living scale was constructed for each of the communities with the use of Guttman's scale analysis. Each of the level of living scales included five items of living. The level of living scale of Community A included telephone, vacuum cleaner, newspaper and air conditioner with a coefficient of reproducibility of .9525. The level of living scale of Community B consisted of items such as telephone, vacuum cleaner, air conditioner and weekly or monthly magazines with a coefficient of reproducibility of .9272.

Table 2. Relationship Between Selected Variables and Attitudes Toward Watershed Development (Percent)

Variables	Very Favorable	Fairly Favorable	Un-favorable	Total	Value of Chi-Square	Level of Significance*
<u>Organizational Involvement</u>						
Low (5 or below)	29	29	42	100	20.175	.001
High (6 or above)	57	22	21	100		
<u>Occupational Status</u>						
Farming	28	35	37	100	7.756	.05
Non-farming	43	21	36	100		
<u>Education</u>						
Low (11 yrs. or below)	30	28	42	100	8.815	.05
High (12 yrs. or above)	47	25	28	100		
<u>Level of Living</u>						
Low (0-2)	27	28	45	100	11.400	.01
High (3-4)	45	26	29	100		
<u>Age</u>						
44 yrs. or below	34	35	31	100	3.226	NS
45 yrs. or above	38	24	38	100		
<u>Tenure Status</u>						
Fully or partially owned	36	26	38	100	.948	NS
Fully or partially rented	41	30	29	100		
<u>No. of Acres Operated</u>						
120 acres or below	33	29	38	100	2.138	NS
121 acres or above	42	25	33	100		

*With 2 degrees of freedom.

Scores on this index thus could range from zero through four. The individual who received a weight of 1 in all the variables received a total score of 4; the persons who got a weight of 1 in three variables out of four received a total score of 3; and the respondent who got a weight of 1 in two variables out of four received a total score of 2, and so on.

For the purpose of relating IPW to attitudes, a separate attitude scale was constructed for each of the communities, because the combined attitude scale, which was constructed earlier to delineate factors at the individual level, was not discriminatory enough when applied to the communities separately.

The attitude scales constructed for Community A and Community B contained six attitude statements each. Three statements were common to both the scale, although the other three statements were different. The coefficients of reproducibility were .8969 and .9094 respectively for the attitude scales of Community A and Community B.¹²

The relationships between the IPW and attitude toward watershed in the two communities are presented in Table 3. As would be expected, the relationships were significant in both communities. This relationship was much greater than that between any of the variables taken singly. For the purpose of employing the Chi-square test of significance, the IPW categories of 0 and 1, and 3 and 4, were combined in each community because of the small number of cases in many of the cells. However, the strength of relationship between the IPW and attitudes, as indicated by the value of γ ,¹³ was low in Community A and moderate in Community B.

Knowledge, Attitudes, and IPW by Communities

A significant relationship between the IPW and knowledge was found in both the communities. The relationship between the IPW and knowledge

12. The common items were: Only those with dams on their property will benefit from the program. The average landowner stands to lose more by the program, and everyone in this community will benefit from the program. The other three items in the scale for Community A were: watershed programs in this county are likely to meet wide acceptance, the watershed commission should go to the court for easement rights, and State's power are being given up when Federal government finances watershed projects. The other three items for Community B were: a watershed lake would be good for recreation, spending money for watershed development is good investment, and they are damming up too many creeks in this county.

13. γ has a possible range of +1 to -1. For a detailed discussion on γ , see Morris Zelditch, Jr., A Basic Course in Sociological Statistics (New York: Henry Holt Co., 1959), Chapter 7.

Table 3. Relationship Between IPW and Attitudes Toward Watershed Development by Communities (Percent)

Attitudes Toward Watershed Development	Community A* IPW Scores					Community B** IPW Scores				
	0	1	2	3	4	0	1	2	3	4
Very Favorable	34	35	30	40	44	21	17	28	33	71
Fairly Favorable	0	20	52	30	44	27	34	30	36	15
Unfavorable	66	45	18	30	12	52	49	42	31	14
Total	100	100	100	100	100	100	100	100	100	100
No. of Respondents	3	20	23	27	9	33	46	51	33	14

* $\chi^2 = 8.49$; d.f. = 4; $P < .05$; $\phi = .19$

** $\chi^2 = 11.603$; d.f. = 4; $P < .02$; $\phi = .33$

by communities is presented in Table 4. The higher an individual's IPW score, the more likely he was to have some knowledge of the watershed development program. Similarly, the lower a person's IPW score, the more likely he was to have no knowledge of watershed development.

A significant relationship between knowledge of watershed¹⁴ development and attitudes toward watershed development was also found to exist in both the communities (Table 5). Persons who had some knowledge of the watershed development were more likely to be favorable toward it. Similarly, the individuals who had no knowledge of the watershed development program were more likely to be unfavorable toward it. Knowledge of watershed development could thus act as an intervening variable in the relationship between the IPW and attitudes toward watershed development in both the communities.

Table 6 presents the relationships between the IPW and attitudes toward watershed development controlling for two knowledge conditions--those

14. In regard to the relationship between knowledge and the variables comprising the IPW, it was expected that the persons who had high organizational involvement, high education and high level of living would tend more to be exposed to various information sources and thus would be more likely to have knowledge of watershed development than would those rating low on these variables. It was found in a previous study, and also in the present one, that the non-farm residents were relatively more favorable toward watershed development than the farm residents. Because non-farm residents were mainly of managerial and professional occupations and a greater proportion of them were relatively more educated, it was argued that they tended more to come in contact with various information media and thus were more likely to acquire knowledge of watershed development than were the farm residents.

Table 4. Relationship Between IPW and Knowledge of Watershed Development by Communities (Percent)

Knowledge of Watershed Development	Community A* IPW Scores					Community B** IPW Scores				
	0	1	2	3	4	0	1	2	3	4
Had Some Knowledge	60	30	65	67	89	36	47	66	79	71
Had No Knowledge	34	70	35	33	11	64	53	34	21	29
Total	100	100	100	100	100	100	100	100	100	100
No. of Respondents	3	20	23	27	9	33	46	51	33	14

$$*X^2 = 25.154; \text{ d.f.} = 2; P < .001$$

$$**X^2 = 17.065; \text{ d.f.} = 2; P < .001$$

Table 5. Relationship Between Knowledge and Attitudes Toward Watershed Development by Communities (Percent)

Attitudes Toward Watershed Development	Community A*		Community B**	
	Had Some Knowledge	Had No Knowledge	Had Some Knowledge	Had No Knowledge
Very Favorable	46	23	37	15
Fairly Favorable	36	27	31	29
Unfavorable	18	50	32	56
Total	100	100	100	100
No. of Respondents	50	34	103	79

$$*X^2 = 8.033; \text{ d.f.} = 2; P < .02$$

$$**X^2 = 12.663; \text{ d.f.} = 2; P < .01$$

who had some knowledge of watershed development and those who had no knowledge of watershed development respectively by communities. It may be observed that the relationship between IPW and attitudes completely disappeared in both the communities when knowledge of watershed development was controlled. In other words, when the variation in knowledge was eliminated, the relationship between the IPW and attitudes was also eliminated. Therefore, the findings suggested that knowledge of watershed development acted as an intervening variable in the relationship between the IPW and attitudes in both the communities.

Table 6. Relationship Between IPW and Attitudes with Knowledge of Watershed Development by Communities Controlled (Percent)

Attitudes Toward Watershed Development	Had Some Knowledge About the Program									
	Community A*					Community B**				
	0	1	2	3	4	0	1	2	3	4
Very Favorable	50	50	40	44	50	33	29	29	37	80
Fairly Favorable	0	33	47	28	50	25	29	38	33	20
Unfavorable	50	12	13	28	0	42	42	33	30	0
Total	100	100	100	100	100	100	100	100	100	100
No. of Respondents	2	6	15	18	8	12	21	34	27	10

$$*\chi^2 = 1.297; \text{d.f.} = 4; P = \text{NS}$$

$$**\chi^2 = 5.388; \text{d.f.} = 4; P = \text{NS}$$

Attitudes Toward Watershed Development	Had No Knowledge of Watershed Program									
	Community A*					Community B**				
	0	1	2	3	4	0	1	2	3	4
Very Favorable	0	28	13	33	0	14	8	24	16	50
Fairly Favorable	0	14	62	22	0	28	40	12	50	0
Unfavorable	100	58	25	45	100	58	52	64	34	50
Total	100	100	100	100	100	100	100	100	100	100
No. of Respondents	1	14	8	9	1	21	25	17	6	4

$$*\chi^2 = 5.768; \text{d.f.} = 4; P = \text{NS}$$

$$**\chi^2 = 5.685; \text{d.f.} = 4; P = \text{NS}$$

Situational Variables and Attitudes by Communities

Three situational variables, experience of land damage by previous floods, degree of technical contact, and participation in planning were also correlated with attitudes toward watershed development in both the communities. As may be observed from Table 7, a degree of technical contact and participation in planning were not significantly related to attitudes in either of the communities, although the trends of percentage distribution were in the expected direction. The number of persons who had any technical contact or who participated in planning was extremely low in both the communities. Only thirteen persons in Community A and seventeen in Community B had any sort of technical contact. Similarly, only seven persons in each of the communities participated in the planning of watershed development. Thus, the number of individuals who had

Table 7. Situational Variables and Attitudes Toward Watershed Development by Communities (Percent)

Situational Variables	Community A			Total	χ^2	P <
	Very Favorable	Fairly Favorable	Unfavorable			
<u>Land Damaged by Previous Floods</u>						
Not Damaged	29	30	41	100	10.781	.01
Damaged	57	39	4	100		
<u>Degree of Technical Contact</u>						
Had contact with 3 or less organizations	36	30	34	100	3.115	NS
Had contact with 4 or more organizations	46	46	8	100		
<u>Participation in Planning</u>						
Did Not Participate	32	34	34	100	5.880	NS
Participated	86	14	0	100		

Situational Variables	Community B			Total	χ^2	P <
	Very Favorable	Fairly Favorable	Unfavorable			
<u>Land Damaged by Previous Floods</u>						
Not Damaged	22	30	48	100	10.689	.01
Damaged	45	31	24	100		
<u>Degree of Technical Contact</u>						
Had contact with 3 or less organizations	27	24	45	100	4.481	NS
Had contact with 4 or more organizations	35	47	18	100		
<u>Participation in Planning</u>						
Did Not Participate	26	30	44	100	5.381	NS
Participated	71	29	0	100		

any technical contact or who participated in planning was too low to result in any significant relationship to attitudes. Interestingly enough, experience of land damage by previous floods was found to be significantly related to attitudes in both the communities.

Experience of land damage, however, was not related to knowledge of watershed development (Table 8) in either of the communities. Thus, it was found to be independently related to attitudes. Persons whose lands had been damaged by previous floods were more likely to be favorable toward watershed development in both the communities.

Table 8. Experience of Land Damage by Previous Floods and Knowledge of Watershed Development by Communities (Percent)

Knowledge of Watershed	Community A*		Community B**	
	Land Damaged	Land Not Damaged	Land Damaged	Land Not Damaged
Had Some Knowledge	57	65	54	64
Had No Knowledge	43	35	46	56
Total	100	100	100	100
No. of Respondents	61	23	137	45

$$*\chi^2 = 1.273; \text{d.f.} = 1; P = \text{NS}$$

$$**\chi^2 = 0.428; \text{d.f.} = 1; P = \text{NS}$$

Factors of Community Differences in Attitudes

The IPW was thus found to be related to attitudes toward watershed development. The IPW was also found to be related to knowledge of watershed development. Since knowledge of watershed development was also related to attitudes, an argument was advanced that it was primarily through the relationship between the IPW and knowledge, and the relationship between knowledge and attitudes, that the IPW bore a relationship to attitudes toward watershed development. In other words, it was argued that the persons who had high organizational participation, who followed non-farm occupations, who had high education and who had a high level of living tended more to have knowledge of watershed development and thus were more likely to be favorable toward it than did those persons without these characteristics. This argument was supported in both the communities. Furthermore, experience of land damage by previous floods was also related to attitudes in both the communities. Persons who had experience of land damage by previous floods were also more likely to be favorable toward watershed development than those persons whose lands had not been damaged.

In the light of these findings it was further postulated that a greater proportion of persons in Community A were more favorable toward watershed development than in Community B because Community A included a greater proportion of persons with high organizational involvement, with

non-farm occupations, with high education, with high level of living, and thus with high IPW scores. It was also argued that a greater proportion of persons in Community A had an experience of land damage by previous floods than in Community B.

To examine these postulates, Community A and Community B were compared in terms of the above variables. The result is presented in Table 9. Although the differences between the communities were not very great in some of the variables, Community A was consistently higher than Community B in all the variables.

Table 9. Comparison of Communities in Terms of Variables Found to Be Related to Attitudes Toward Watershed Development

Variables Related to Attitudes Toward Watershed Development	Community A	Community B
Percent Having High Organizational Involvement	46	22
Percent Following Non-Farm Occupa- tions	51	26
Percent Having 12 or More Years of Education	47	41
Percent Having High Level of Living	48	43
Mean IPW Score	2.4	1.6
Percent Having Experience of Land Damage	28	24

Local Participation in Watershed Development

Local participation in watershed development in the two communities were described and compared in terms of a number of steps or phases. For the purpose of analysis the events and activities in each program were classified in five phases: (1) initiation and spread of interest, (2) organization of sponsorship, (3) goal setting and determination of strategy, (4) recruitment of resources, and (5) implementation. The sequence of events and the nature and extent of local participation in each of the phases were determined by pooling information collected from the depth interviews and other supplementary sources. The purpose was to incorporate every minor detail into a narrative description which would serve as a base for empirical interpretation.

Activities within each phase of watershed development program were examined in terms of coordination of efforts of the technical agencies and local participants, and the nature of local participation. For example, source of initiation and spread of interest are important in

terms of locality-orientation of and extensiveness of local participation in the program. A program initiated from within potential beneficiaries is definitely different from a program initiated by technical agencies and imposed upon the potential beneficiaries, from the point of view of gaining local support and raising local interest.

The factor of felt need is crucial at this stage. There may be a long time awareness of need for solution of a problem in the minds of potential beneficiaries who might be already looking for some technical and financial help from extra-local agencies. A program for development in this situation may be initiated through the cooperation between technical agencies and local leaders and associations. Initiation of programs under such circumstances gain a local orientation and a wide base potential of popular support. In a contrasting situation popular awareness of the problem may be at a minimum and the technical agency may attempt to initiate the program with little cooperation with the local groups and associations and thus the program may lose its local identification and consequently, popular support.

An organized sponsorship with local orientation carries relatively greater potentiality in terms of mobilizing local resources and gaining extensive local participation. It may be argued that cooperation between the technical agencies and potential beneficiaries is extremely important at the stage of determining the specific objectives and means for their realization. If the extra-local technical agency attempts to make all important decisions regarding specific objectives and strategies to be adopted, it may lose sight of many of the local problems or underrate them and thus impose a program upon the local people with which they might have little identification. On the part of local leaders and associations, it is impossible for them to determine strategies without technical advice from the extra-local agencies.

The success of the last two phases of program development are largely determined by the three preceding ones. A program which grows out of the felt need of the potential beneficiaries and initiated, sponsored and planned by their leaders in cooperation with technical agencies has relatively greater chance of success in recruiting local resources and gaining widespread local participation. However, communication of knowledge and information regarding specific objectives and strategies to be adopted to the potential beneficiaries is very important at this stage which helps reduce apprehensions and unfavorable attitudes based on inaccurate information and unfounded rumors.

Comparison of the Programs

The watershed development activities in the two communities have been compared by phases of program development in Table 10. This table shows clearly that the watershed activity was more locality-oriented and local participation was more extensive in each phase of program development in Community A than in Community B.

One of the most important differences in watershed activities of the two communities was that in Community A there was a strong general awareness of need for watershed development. The farmers were eager to

Table 10. Comparison of Watershed Development Activities in the Two Communities by Phases of Program Development

Phases of Program Development	Community A	Community B
1. Initiation and spread of interest	General awareness of need existed much before the present watershed activity began. Program was initiated from within the beneficiaries. Local leaders contacted technical organizations for assistance after they knew of the passage of PL 566.	No general awareness of need. Awareness was confined among a few interested landowners. Program was initiated from the technical bureaucracy, soil conservation agents informed some local influentials about the availability of PL 566 fund and urged them to organize a committee.
2. Organization of Sponsorship	Landowners elected a three-member commission, individuals who showed interest and provided early leadership were elected. Watershed commission, Soil Conservation Service and the board of supervisors cooperated with each other and the responsibilities of each were made explicit.	A fourteen-member commission was organized. Representatives to the commission were elected from each of the fourteen drainage districts. Some maintained that the representatives were nominated by the chairman of commission. Soil Conservation Service and extension agency were co-sponsors.
3. Goal Setting	The three-member board worked with soil conservation agency as a unified group and reached decisions through mutual cooperation.	The watershed board though charged as a collectivity with responsibility, actually operated primarily through a subgroup of five people with major decisions resting with the soil conservation agency.

Table 10. - continued -

Phases of Program Development	Community A	Community B
	The soil conservation agency was responsible for making technical decisions and planning and gave considerations to the suggestions of the commissioners.	The soil conservation agency took all the major technical decisions independently.
4. Recruitment of Resources	Mass publicity was organized by the extension agency to inform the people about the purposes and benefits of the watershed program. Commissioners addressed meetings, made personal solicitations and reported to the civic clubs about the watershed activity. Most of the easements were donated. Little difficulty was felt in gaining participation and cooperation of landowners.	Little information was released to the landowners. The soil conservation agency did not allow any group to disseminate information regarding purposes and benefits of the program. The landowners were apprehensive. Obtaining easements was extremely difficult.
5. Implementation	Watershed development activity was on the way to accomplishing its objectives. Most of the landowners contributed their property. Four of the ten constructions were completed. Work on four more constructions was going on at the time of data collection. More than two-third of the work for the entire program was completed.	Several loans and gifts of money were received from local banks. Acquisition of land had not begun. No physical progress had been made at the time of data collection.

do something about it and were looking for technical and financial resources. In Community B the awareness of the problem was confined to a few interested landowners. The landowners themselves in Community A found out about the availability of resources under PL 566 and contacted the technical agencies for help and cooperation. In Community B it was the Soil Conservation Service which contacted the influential landowners and informed them of the availability of funds and urged them to form a commission. Decisions were made jointly by the sponsoring groups in Community A; all decisions were made by the technical agency in Community B. Widespread publicity was given the program in Community A; information was carefully withheld from the public in Community B. Finally, the physical accomplishments in Community A were substantial, while in Community B there was considerable public apprehension and, by the time of data collection on this study, no physical progress.

Discussion

The above findings thus suggested that the reason Community A and Community B differed in the degree of favorability of their residents toward the watershed development program was primarily that they had different proportions of landowners with the knowledge of watershed development. Community A had a greater proportion of persons than Community B who had high organizational involvement, followed non-farm occupations, had high education and a high level of living and thus were more likely to have knowledge of watershed development. Since knowledge of watershed development was highly related to attitudes, Community A had a greater proportion of individuals who were favorable toward watershed development than Community B. Extent of knowledge of watershed development was thus extremely important in determining the favorability of the individuals toward watershed development in either of the communities. The more knowledge a person had about watershed development, the more strongly he felt about the need of such a program within the community and the more he became convinced of the desirability of the program.

In terms of local participation in the watershed program, in Community A there was a strong favorable response from local residents and a high level of actual task accomplishment. The significant differences between the two communities in terms of local participation were (1) the high level of initial concern in Community A which resulted in local initiation and (2) a concerted effort by the technical planners in their community to coordinate their efforts with local groups and to inform the relevant segments of the local public of the nature, objectives and potential benefits of the program.