

5-5-47

PN-AAR-841 / 62  
LSW-34338

*Rural Sociology* 48(1), 1983, pp. 44-59  
Copyright © 1983 by the Rural Sociological Society

## Collective Adoption of Natural Resource Practices in Developing Nations<sup>1</sup>

*Patrick C. West*

*School of Natural Resources, University of Michigan,  
Ann Arbor, Michigan*

**ABSTRACT** Selected sociological barriers to achieving collective adoption of natural resource conservation and development projects in rural areas of developing nations are discussed. Collective adoption of innovations has received far less attention, yet it is an important component of rural development strategies, especially for poorer strata. The factors analyzed include: (1) the contrast among equity issues in optional and collective adoption; (2) the special importance of property rights considerations in collectively adopted resource development projects; (3) the problems that community factions present for collective adoption; (4) the role of community organizing and social learning in collective adoption; and (5) the role of indigenous leadership in collective adoption.

### *Introduction*

In this paper selected sociological barriers to achieving collective adoption of natural resource conservation and development projects in rural areas of developing nations are examined through a review of the rural development literature.<sup>2</sup> A set of middle range generalizations is developed from a synthesis of available research literature for use by practitioners and to provide a basis for further systematic research and more general theoretical synthesis in future work on collective adoption processes.

Research on the diffusion and adoption of innovations has focused primarily on adoption by individuals or what Rogers and Shoemaker (1971:269) have termed "optional decision making by individuals, rather than collective decision making within social systems." Collective adoption of innovations has received far less attention, yet it is an important component of rural development strategies (Katz, 1962; Kerr, 1970:1; Rahim, 1968:18; Rogers and Shoemaker, 1971:269). Rogers and Shoemaker (1971:270) define collective adoption as "collective decisions, made by the individuals in a social system by con-

<sup>1</sup> Funding for this research was provided in part by the United Nations through the National Science Foundation.

<sup>2</sup> The focus of this paper is restricted specifically to collective adoption of natural resource practices for the following reasons: (1) to keep the literature review within reasonable bounds; (2) to focus on middle range comparisons of projects having more similar characteristics (e.g., property rights issues are more central to natural resource projects than they might be to other types of projects); and (3) the original motivation for undertaking this research centered on natural resource conservation innovations.

**Best Available Document**

sensus."<sup>3</sup> Rahim (1968:25) defines it more specifically as the adoption of an innovation by a collectivity in which "the decision to adopt is made jointly by the system's members and the actual use of the innovation involves joint efforts by the members of the system." Within this general definition we wish to restrict our focus to small-scale rural community efforts in developing nations where community members sanction the project, participate in its development, and share in its benefits.

Some projects such as a school built by community effort cannot be optionally adopted by individuals. Most collective adoption projects, however, can be adopted either by individuals or by groups. Tube wells (Gotsch, 1972), collective agriculture (Coward, 1973:240; Lele, 1975:74), fuel woodlots (Thompson, 1977), and fishing (Apthorpe, 1970; Ghee, 1978) can all be collectively or individually pursued.

Thus we can perhaps distinguish two project subtypes: those that may be and those that must be collectively adopted. It is frequently not the nature of the innovation itself but the economies of scale and the perceived advantages of cooperative action that make collective adoption desirable, and often essential, if a given end is to be achieved. This is especially so for poorer strata. For instance, Gotsch (1972:333), Goss (1979), and Rahim (1968) note that a tube well has to be collectively adopted if the poorest farmers are to have any access at all to this technology.

Very few studies have been conducted in a rural development context under the specific label of "collective adoption" (Kerr, 1970; Rahim, 1968), although a sizeable body of research has dealt with this process under different labels (e.g., Batten, 1957; Du Sautoy, 1962). Rogers and Shoemaker (1971) discuss collective adoption explicitly, but they ignore major structural factors that are critical in the achievement of collective adoption in rural development settings. For these reasons, we have selected five key structural factors to complement Rogers and Shoemaker's (1971) analysis. It should be noted that because of journal space limitations this discussion is confined to structural factors within the local community. Thompson (1977) and Brechin and West (forthcoming), for instance, have discussed the role of extra-local factors such as national bureaucratic structure and central government—local power relations as barriers to community level

<sup>3</sup> There has been a growing body of literature on collective aspects of optional adoption, but this should be distinguished from collective adoption proper. In some cultures, especially tribal cultures, collective decision is a prerequisite to optional adoption (e.g., Barghoui, 1974; Lang, 1971). Where this occurs, the conceptual distinction between optional and collective adoption becomes blurred, and optional adoption of the innovation becomes contingent on an initial collective adoption of the idea.

collective adoption of community forestry projects. While these extra-local structural factors are important to recognize, it is beyond the scope of this paper to deal with them in detail. Nor could all possible internal structural factors be fully considered for lack of systematic comparative data. For instance, the type of local social and economic organization may be an important factor, but there is not a sufficient comparative research base on success or failure of comparable collective adoption projects across different forms of local social and economic organization. While one might speculate, for instance, that less stratified, free peasant communities, with local autonomy, may present the optimal conditions for collective adoption (other things being equal), further comparative research is needed before tentative generalizations can be advanced. Various typologies of local peasant organization could provide a starting point for this needed research (e.g., Geertz, 1971; Lehman, 1977; Paige, 1975; Stinchcombe, 1961). This in turn could provide a basis for more fundamental theoretical synthesis of the factors we discuss.

With these limits in mind, the factors analyzed here are: (1) the contrast among equity issues in optional and collective adoption; (2) the special importance of property rights considerations in collectively adopted natural resource projects and their relation to equity; (3) the problems that community factions present for collective adoption; (4) the degree of prior community organization and the role of community organizing and social learning in collective adoption; and (5) the role of indigenous leadership in collective adoption.

The first three factors can be grouped under the more general processes of structural factors in the distribution of project benefits. The last two are concerned more with internal organizational factors in the social organization of collective adoption. Central to this paper is an analysis of the role of equity in collective adoption. Our basic thesis is that unless fundamental equity is assured community members will not perceive benefits to their self-interest and hence will not sanction collective projects or participate in their implementation. The issue of equity also permeates two closely related factors—property rights and community factionalism. These structural factors strongly affect equity in the distribution of project benefits. In addition to these structural factors influencing equity there are a number of organizational factors and dynamics that are critical to the achievement of collective adoption. Collective adoption implies not just decision but also collective action and organization to forge consensus and to engage in collective implementation and long-term project management. This requires attention to the structure and dynamics of community organization (and the potentials and strategies of community organizing) and the development of indigenous leadership in this organizing process for collective adoption.

**Issues of equity***Distributive equity and collective adoption*

Collective adoption avoids the equity problems inherent in optional adoption, which are caused by different rates of adoption or different abilities to adopt. There has been a growing chorus of analysts pointing to the inequitable social consequences of optional adoption of new techniques in rural development, especially green revolution technologies that require intensive resource inputs (e.g., Gotsch, 1972; Röling *et al.*, 1976; Saint and Coward, 1977).

While avoiding many of the problems of differential optional adoption, a different set of equity problems arises in collective adoption. In particular, the danger exists that subgroups within the community may attempt to monopolize benefits from collective projects. This differential distribution of collective benefits has two important consequences: (1) it can create resistance to collective adoption leading to project failure; and (2) it leads to problems of inequity and differential social impacts on the poorest strata.

Collective projects are likely to be resisted by those who benefit least from existing distributive mechanisms (Alexander, 1975). Often official rhetoric promises equitable distribution of collective project benefits, but, in fact, benefits are monopolized by power elites in the community (Baily, 1980:22; Berreman, 1967:402; Haney and Haney, 1976; United Nations, 1971; Uphoff and Esman, 1974:64-66).

The sensitive distribution issue can block adoption of collective projects at several stages of the adoption process. The Rogers and Shoemaker (1971) model seems to stress the critical importance of the decision stage. When projects are blocked at that stage, it is often because of a failure to reach agreement over labor contributions for implementation due to a perceived inequity in the distribution of benefits.

Oyugi (1963:12) suggests the general rule that "popular participation depends upon the amount of direct benefit that the individual or family can hope to derive from the particular development project." This theme is echoed by other researchers (Almy and Mbithi, 1973:624; United Nations, 1960:41-63).

There are a number of qualifications to this general relationship, however. Bolnick (1976:144) has found that "though contributions are in part related to benefits, they are also related to the strength of direct and indirect social influences, the distribution of which may be totally unrelated to benefits." In research on collective adoption of small-scale irrigation projects in the Philippines, Kikuchi *et al.* (1978: 220-25) have found that labor contributions in relation to benefits did not need to be absolutely equal across all groups to gain voluntary

participation. But they did need to guarantee a net gain in benefits for each group.

In other situations, disparities in land ownership and power may be so great that attempts to achieve equitable community-wide collective adoption may be doomed to failure (Uphoff and Esman, 1974: 64-66). One important strategy for countering this may be to work with subgroups within the community rather than with the community as a whole. If class structures are expected to prevent equitable distribution of benefits from community-wide projects, one can sometimes work with subunits of relatively homogeneous social strata. This was successfully done, for instance, in the Camilla project (West and Light, 1978:357).

This strategy, however, may be resisted by vested interests. In the Chilalo Agricultural Development Unit in Ethiopia, efforts to stimulate cooperative reforestation and other collective adoption projects among small farmers was greatly impeded because of resistance from large farmers (Coombs and Ahmed, 1974:98). Large-scale interests may resist innovations in lower strata for a variety of reasons. They may be seeking: (1) to monopolize external project aid for themselves; (2) to block and control potential competition for markets; (3) to monopolize access to key natural resources; and/or (4) to maintain the status stratification system (i.e., wealthier high status groups often seek to block advancement of low status groups as this threatens their dominant status position). In dealing with this vested interest resistance to social change, Berreman (1967:406) emphasizes the importance of aid strategies that will benefit both upper and lower strata, thus, buying off the one group to permit assistance to the other.

#### *Property rights and distribution of benefits*

The issue of distribution of collective project benefits is frequently embedded in the structure of property rights systems. Collective projects on communal land can fail if they do not take account of distributive mechanisms in traditional collective property institutions, especially where adaptive property norms exist for the collective management of commons resources (e.g., Mitchell, 1976; Orlove, 1976; Reiger, 1977:3). For example, in a project involving range management practices in Somalia (Mahony, 1966), technical grazing experts sought to gain improved range management through demonstration areas where new well drilling would be concentrated, range herds reduced, and private property rights introduced. Prevailing customs with respect to property rights prevented collective agreement that would allow certain grazers exclusive rights. Friction that developed caused the cancellation of the project. Similar dynamics involving pastoral grazing rights occurred in the Sahel (West and Light, 1978: 355).

5

Property rights are also of concern with respect to project location on private lands. In optional adoption, each farmer innovates on his own land or the land of the landlord. But in collectively adopted projects, some collective territory must be designated, whether this is communally or individually owned. Problems become particularly sensitive for collective projects that are located on private land on either: (1) a single individual's land; or (2) distributed across numerous private holdings.

A case of collectively adopted well drilling in Peru (Holmberg, 1952) illustrates the first situation. A site was selected for the well on a geological basis only, and it happened to fall on the land of a large landowner who had previously alienated many of the members of the community. Many people suspected that the property owner alone would benefit from the well and thus refused to cooperate in its construction.

The general category of collective irrigation system innovations illustrates the second category in which a project is distributed over numerous private land holdings. The Camilla irrigation project was designed to take away as little cultivated land as possible on each holding. It was found that village landholders would support the project only if the land taken for the project was small in comparison to benefits and if the villagers were responsibly involved in all aspects of local planning so that each landholder was assured of surrendering no more than his fair share of the land for the project (Pakistan Academy for Rural Development, 1963).

As in the case of equity considerations in general, the property rights implications of collective adoption frequently alter access to land resources that threaten vested interests, which lead to resistance to planned social change. These may be class interests, but they may also represent conflict among land uses. Thus the establishment of community fuel woodlots on commons land often interferes with grazing land use, and hence grazers often resist or even sabotage community forestry efforts (Whyte and Williams, 1968:54).

The products of any collectively adopted project become collective property. Participants' belief that these collective products will be protected is important for initial project adoption. And actual successful protection of that collective property becomes a key to long-range success of the project. This has been a problem for a variety of collective resource projects including cooperative farming (Lele, 1975:74), collective irrigation (Coward, 1973:240), community fuel woodlot projects (Eckholm, 1976:103; Thompson, 1977:63), and collective grazing (Horowitz, 1977:3). In such cases, coercion is inevitably involved in voluntary collective adoption (Hardin, 1968). Not only must there be an agreed upon coercive apparatus, but this apparatus must be perceived by all participants in the collective project as a credible, effective deterrent. Reiger (1977:8) has emphasized the critical im-

portance of this perception in programs to end collective forest destruction in the middle hill lands of the Himalayas.

Brechin and West (forthcoming), however, have found an exception to this relationship between theft control and collective adoption success for community forestry projects in Niger, West Africa. Where equitable distribution of benefits is blocked, as it was in the Niger projects, limited theft may have the latent function of increasing equity and hence increasing tacit support for project adoption.

#### *Factions and power*

The prevalence of factions within peasant communities often complicates the problem of achieving effective adoption of collective practices (Niehoff, 1966:225). Comparative evaluations of the success of cooperative associations in the Camilla project, for instance, revealed that those which were relatively free of factional divisions had a much greater chance of success (Hussain, 1967; Pakistan Academy for Rural Development, 1964:38; Rahim, 1968). Factions are more problematic in the case of collective adoption than they are in optional adoption (Constantine, 1970).

Although collective adoption under conditions of community factionalism is difficult to achieve, Whyte and Albert (1976) suggest from their research in Latin America that absence of conflict may simply indicate a lethargic resignation, which also makes collective action difficult. Factional conflict may indicate a vitality that can be harnessed in constructive directions to achieve collective adoption. Schwartz (1968) has found that where factions are involved in crosscutting lines of conflict<sup>4</sup> and no faction is strong enough to dominate the decision process, coalitions for cooperative action could be formed. When these conditions are not present, it may be necessary to work again at the sub-community level to achieve collective adoption within homogeneous factions. The external conflict may actually increase in-group solidarity and communication and facilitate within-group adoption (Constantine, 1970).

In some areas, factions have formed precisely along economic lines that divide collective aspects of the economy, based in cooperatives, from noncollective sectors (Bertocci, 1970; Carras, 1972). Here, factional conflict strengthened the solidarity of the co-ops and added incentives for collectively adopting new practices as a means of economic and political advantage in the factional struggle.

In lineage-based factions on American Indian reservations, Fowler (1973) has found that hiring a neutral project manager not aligned with any given faction can be one way to achieve collective adoption

<sup>4</sup> "Crosscutting conflict" is defined here as conflict groups who are in conflict on some issues but who are in coalition on other issues.

7

across factional lines. In sum, while the existence of factions presents greater problems for collective adoption than for optional adoption, the existence of factional divisions does not necessarily preclude successful collective project adoption. However, here also, collective adoption has implications for change in the balance of power, economic resources, and prestige among factions, which can lead to resistance to adoption of the planned social change.

### ***Issues of organization***

#### ***Community organizing and collective adoption***

There is an important debate in the literature on rural development over the appropriate role of community organizing. Stavis (1976) argues that lack of local organization is one of the key barriers to effective rural development. This theme is echoed by Owens and Shaw (1974) and Rice (1971). Erasmus (1961), on the other hand, argues that community organizing is not worth the trouble and effort to gain collective group action when such action is not essential for project success. Where collective organizing has been achieved, however, it has been beneficial (Uphoff and Esman, 1974).

In the midst of this debate, the specific differences between optional and collective adoption need to be recognized. Community organizing *may* be important for optional adoption. However, collectively adopted innovations, such as small-scale community irrigation works or community fuel woodlots, virtually necessitate investment in at least some degree of community organizing (Coward, 1977a, 1977b).

Community organizing for collective adoption is especially critical, but at the same time more difficult to achieve, in communities without strong collective traditions (Banfield, 1958; Hornik, 1977). However, we must avoid the automatic assumption of unmotivated, unorganized amoral familism in peasant cultures (Whyte and Albert, 1976).

Tribal systems with traditional collective economic organization present the "ideal type" of societies based in collectivist traditions (e.g., Lang, 1971; Mitchell, 1976). However, just as we must avoid overstereotyping conditions of amoral familism, so must we avoid overstereotyping images of collectivist traditions. As Baily (1980:20) observes of rural Malay society:

Government officials and students of rural Malay society alike often hold the rather romantic notion that rural Malay communities possess an inherent cohesiveness that enables and encourages members of these communities to work together for the common good. Many government programs based on this misconception seek to mobilize supposedly preexisting local energies and resources for development projects.

8

Long and Winder (1975:85) make a similar point about reliance on systems of traditional labor exchange in Peru that no longer exist.

It is important to stress the difficulty of organizing directly for the adoption of collective projects, especially where benefits to the individual may not be immediate. It is, of course, one of the cardinal principles of community organizing to focus initially on projects of immediate interest that can be easily achieved. Then these new or strengthened social organizing capabilities that have been developed within the community can be utilized in the achievement of more complex, long-range projects. This strategy has been effectively used in community reforestation programs in Korea (Kincaid and Yum, 1976:83-90) and in Africa (Hoskins, 1980:166-67).

Coward (1973) and Dunn (1971) emphasize that where possible the development of such organizing capabilities should be internally generated rather than externally imposed. They contrast a "social learning" model with the traditional diffusion of innovations paradigm. Coward (1973:240) defines social learning as internal, experimental innovation by a group in which "the users are also the designers" of the innovation. Social learning is primarily relevant to "sociocultural innovations," and it may therefore be particularly important in developing the collective organization capabilities necessary for collective adoption. Coward (1973) cites several cases involving social learning in the development of project management systems for irrigation in the Philippines and group farming in Japan.

Community organizing for collective adoption also may affect changes in power relations that can threaten vested interests and thus lead to farther resistance to social change (e.g., Coombs and Ahmed, 1974:98). Because community organizing is inevitably involved in collective adoption, such projects are a double threat to vested interests, for they alter both the access to resources and the structure of organizational bases of power in the community. Thus there is a tendency for upper-class interests either to resist such efforts or to co-opt them to reinforce patterns of rural stratification (Gotsch, 1972: 338).

#### *Indigenous leadership and collective adoption*

The development of indigenous leadership is also more important in collective adoption than in optional adoption. In optional adoption the main function of leadership is frequently a more passive role of "opinion leadership." In collective adoption, however, leadership must not only mold opinion but must actively engage in community-organizing efforts to seek enough consensus for joint decision by mobilizing labor contributions and by developing and managing organizational systems for implementation and long-term project management. In sum, collective adoption depends much more on

actual, active leadership functions and activities that need to be sustained over the life of the project. Thus Coward (1977b) has identified the problem of identifying, developing, and maintaining adequate leadership as one of the most critical problems in collective adoption.

We noted above that collective adoption involves at least a three-stage process of initiation, legitimation, and implementation. Studies by Kerr (1970) and Rahim (1968) suggest the importance of identifying different leaders in the different stages of the collective adoption process. Kerr (1970:104) has found that introducers tended to be younger, better educated, with more extra-system contact than other leaders. Legitimaters were the oldest leaders. They had the highest social status but were not necessarily the wealthiest leaders. Implementers tended to fall between the other two types in age and were more locally oriented. While these leadership functions are important to distinguish, they may not always be represented in different individuals. In the case of the Korean reforestation program cited above (Kincaid and Yum, 1976), one leader played all these roles.

The background and orientation of leaders is related to the success of collective adoption. Rahim (1968) has found that cooperative associations in Camilla whose leaders were more highly educated and oriented towards modernity had the highest rate of collective adoption success. The social origin of leaders within the local social structure can affect the participation of different strata and the perception of equity as we noted above in the case of factions. It can also help to explain the relationship between social influence and labor participation found by Bolnick (1976:144). For instance, Kikuchi *et al.* (1978:220) have found that the labor share of tenants on a collectively adopted irrigation project was the highest among the various strata involved, although their share of benefits was not the greatest. They have found that this occurred primarily because most of the leadership for the project came from the share tenant strata. There may have been both a greater degree of social influence within that group and a greater assurance of delivery of their share of project benefits.

Coward (1977b) has found that one of the key functions of effective leadership is an ability to mobilize participation, and this ability, in turn, depends heavily on reciprocal solidarity bonds connecting members of the group. The strength of these bonds depends in part on the size of the group, which he has found should not exceed seventy to eighty members. This may put a limit on the size of the social unit for which collective projects should be designed.

In considering highly concentrated systems of power, we must be cautious about confusing coerced labor with the social influence exerted by leaders in collective adoption. Erasmus (1961:94) recounts the case of a highway project in which it appeared that a local priest was playing a constructive leadership role in mobilizing local villagers

in a voluntary, cooperative self-help project. Later it was discovered that, to further his own career interests, the priest had forced peasants to participate on pain of loss of burial, baptismal, and marriage services.

### **Discussion**

The five basic factors discussed in this paper should be viewed within an integrated framework of social change and resistance to change (Schon, 1971). In the course of collective project introduction and implementation, all of these structural factors are subject to changes that may be threatening to vested interests in the community. The reaction of these vested interests can in turn present an additional barrier to collective adoption that cuts across all of the dimensions and factors we have considered. The ability to assess and to anticipate these second order changes in the social system is a critical first step in dealing with them, but there are no easy answers or ready formulas for mitigating these potential barriers. Here, perhaps, as elsewhere, the greatest barrier to the promise of change may be the threat of change.

Our findings with respect to these five basic structural factors may also shed some light on the contradictory generalizations about power concentration, participation, and collective adoption in Rogers and Shoemaker (1971). To the extent that power concentration inhibits participation, blocks equitable distribution of project benefits, and inhibits organizing efforts that may threaten that concentrated power, our findings support Rahim's (1968) finding of an inverse relationship between power concentration and collective adoption success.

It may be possible in future work to integrate the factors and middle range generalizations presented here with broader literature and theories on collective action, collective goods, distributive justice, and relative deprivation, but this effort is beyond the scope of this paper. While such a broader synthesis may eventually lead to applied payoffs for rural development, I will leave this task for others. The questions we are exploring in further research seek to translate existing gains into applicable strategies for action through comparative replication and extension of research on collective adoption in rural natural resource development settings. We are thus exploring such research questions as: What is the interaction of internal community level factors with extra-local institutional factors in collective adoption (Thompson, 1977; Brechin and West, forthcoming)? What are the specific conditions under which the above relationships apply? For instance, how do the hypothesized dynamics of collective adoption vary by type of local social and economic organization or stages of economic development, and how can the variable types of barriers to

adoption encountered under these various structural conditions be overcome?

There may also be specific qualifications and additional interacting factors that need to be considered for different types of collective projects. For instance, the collective adoption of social forestry projects involves longer time horizons for the realization of project benefits and requires that greater land areas be taken out of production than is the case for the collective adoption of irrigation (Brechin and West, forthcoming). Further research is needed on how these additional project specific barriers can be overcome in the implementation of social forestry projects. What is needed, in sum, is more systematic comparative research on factors and strategies related to successful collective adoption under different social, economic, and project specific conditions. This inductive strategy could lead to more refined generalizations that would, in turn, contribute to more abstract theoretical work. At the same time, such a "grounded" approach would provide more specific guidance for practitioners in specific rural development settings.

### **References**

- Alexander, P.  
1975 "Innovation in a cultural vacuum: the mechanization of Sri Lanka fisheries." *Human Organization* 34 (Winter):333-44.
- Almy, S. W., and P. M. Mbithi  
1973 "Local involvement in the special rural development programme." Pp. 624-36 in *An Overall Evaluation of the Special Rural Development Programme*. Nairobi, Kenya: University of Nairobi, Institute for Development Studies, Occasional Paper No. 8.
- Apthorpe, R. (ed.)  
1970 *Rural Cooperatives and Planned Change in Africa*. New York: United Nations Research Institute for Social Development.
- Baily, C.  
1980 "Social consequences of economic organization: a comparison of three rural Malay communities." Paper presented at the annual meeting of the Rural Sociological Society, Ithaca, New York.
- Banfield, E. C.  
1958 *The Moral Basis of a Backward Society*. Chicago: Free Press.
- Barghouti, S. M.  
1974 "Integrated functional education in Machakos District." New York: Food and Agriculture Organization of the United Nations, PBFL Report No. 13.
- Batten, T. R.  
1957 *Communities and Their Development*. London: Oxford University Press.
- Berremen, G. D.  
1967 "Caste and community development." Pp. 398-407 in J. Potter, M. Diaz, and G. Foster (eds.), *Peasant Society: A Reader*. Boston: Little, Brown and Co.
- Bertocci, P.  
1970 "Patterns of social organization in rural East Pakistan." Pp. 105-37 in A. Lipski (ed.), *Bengal East and West*. East Lansing: Michigan State University, Asian Studies Center, Occasional Paper No. 13, South Asia Series.

12

adoption encountered under these various structural conditions be overcome?

There may also be specific qualifications and additional interacting factors that need to be considered for different types of collective projects. For instance, the collective adoption of social forestry projects involves longer time horizons for the realization of project benefits and requires that greater land areas be taken out of production than is the case for the collective adoption of irrigation (Brechin and West, forthcoming). Further research is needed on how these additional project specific barriers can be overcome in the implementation of social forestry projects. What is needed, in sum, is more systematic comparative research on factors and strategies related to successful collective adoption under different social, economic, and project specific conditions. This inductive strategy could lead to more refined generalizations that would, in turn, contribute to more abstract theoretical work. At the same time, such a "grounded" approach would provide more specific guidance for practitioners in specific rural development settings.

### **References**

- Alexander, P.  
1975 "Innovation in a cultural vacuum: the mechanization of Sri Lanka fisheries." *Human Organization* 34 (Winter):333-44.
- Almy, S. W., and P. M. Mbithi  
1973 "Local involvement in the special rural development programme." Pp. 624-36 in *An Overall Evaluation of the Special Rural Development Programme*. Nairobi, Kenya: University of Nairobi, Institute for Development Studies, Occasional Paper No. 8.
- Apthorpe, R. (ed.)  
1970 *Rural Cooperatives and Planned Change in Africa*. New York: United Nations Research Institute for Social Development.
- Baily, C.  
1980 "Social consequences of economic organization: a comparison of three rural Malay communities." Paper presented at the annual meeting of the Rural Sociological Society, Ithaca, New York.
- Banfield, E. C.  
1958 *The Moral Basis of a Backward Society*. Chicago: Free Press.
- Barghouti, S. M.  
1974 "Integrated functional education in Machakos District." New York: Food and Agriculture Organization of the United Nations, PBFL Report No. 13.
- Batten, T. R.  
1957 *Communities and Their Development*. London: Oxford University Press.
- Berremán, G. D.  
1967 "Caste and community development." Pp. 398-407 in J. Potter, M. Diaz, and G. Foster (eds.), *Peasant Society: A Reader*. Boston: Little, Brown and Co.
- Bertocci, P.  
1970 "Patterns of social organization in rural East Pakistan." Pp. 105-37 in A. Lipski (ed.), *Bengal East and West*. East Lansing: Michigan State University, Asian Studies Center, Occasional Paper No. 13, South Asia Series.

13

- Bolnick, B. P.  
1976 "Collective goods provision through community development." *Economic Development and Cultural Change* 25 (October):137-50.
- Brechin, S. R., and P. C. West  
forth-coming "Social barriers to implementing appropriate technology: the case of community forestry in Niger, West Africa." *Humbolt Journal of Social Relations*.
- Carras, M. C.  
1972 "The economic determinants of political factionalism: a case study of an Indian rural district." *Economic Development and Cultural Change* 21 (Spring): 118-41.
- Constantine, Y.  
1970 "Political conflict and the diffusion of innovations." *Rural Sociology* 35 (Winter):488-500.
- Coombs, P. H., and M. Ahmed  
1974 *Attacking Rural Poverty: How Nonformal Education Can Help*. Baltimore: The Johns Hopkins University Press.
- Coward, W. E., Jr.  
1973 "Sociocultural innovation and developmental change." *Phillipine Sociological Review* 21 (February):239-43.
- 1977a "Irrigation management alternatives: themes from indigenous irrigation systems." *Agricultural Administration* 4 (Winter):223-37.
- 1977b "Small groups and large projects: technology, organization, and irrigation performance." Paper presented at the Thirteenth American Water Resources Conference, Tucson, Arizona.
- Dunn, E. S.  
1971 *Economic and Social Development: A Process of Social Learning*. Baltimore: The Johns Hopkins University Press.
- Du Sautoy, P.  
1962 *The Organization of a Community Development Programme*. London: Oxford University Press.
- Eckholm, E. P.  
1976 *Losing Ground: Environmental Stress and World Food Prospects*. New York: W. W. Norton.
- Erasmus, C. J.  
1961 *Man Takes Control*. Minneapolis: University of Minnesota Press.
- Fowler, L.  
1973 "The Arapahoe ranch: an experiment in cultural change and economic development." *Economic Development and Cultural Change* 21 (Fall):446-64.
- Geertz, C.  
1971 *Agricultural Involution*. Berkeley: University of California Press.
- Ghee, L. T.  
1978 "Fishermen find a way." *International Development Review* 20 (June):45-47.
- Goss, K. F.  
1979 "Consequences of diffusion of innovations." *Rural Sociology* 44 (Winter): 754-72.
- Gotsch, C. H.  
1972 "Technological change and distribution of income in rural areas." *American Journal of Agricultural Economics* 54 (Summer):326-41.
- Haney, E. B., and W. G. Haney  
1976 "Rural modernization and community development: a Columbia case study of social and ecological incongruities." Paper presented at the fall meeting of the North Central Council of Latin Americanists, St. Cloud, Minnesota.
- Hardin, G.  
1968 "The tragedy of the commons." *Science* 162 (December):1242-48.

- Holmberg, A. R.  
1952 "The wells that failed: an attempt to establish a stable water supply in the Viru Valley, Peru." Pp. 113-26 in E. H. Spicer (ed.), *Human Problems in Technological Change*. New York: John Wiley and Sons
- Hornik, R. C.  
1977 "Mass media use and the 'revolution of rising frustrations'." *Communication Research* 4 (October):387-414.
- Horowitz, M. M.  
1977 "Sociological variables of livestock development projects in the West Africa region." Binghamton, New York: Institute for Development Anthropology Inc., for the World Bank.
- Hoskins, M.  
1980 "Community participation in African fuelwood production, transformation, and utilization." Pp. 155-88 in D. French and P. Larson (eds.), *Energy for Africa: Selected Readings*. Washington, D.C.: United States Agency for International Development.
- Hussain, Z.  
1967 "A field investigation into the management of village cooperatives in Camilla experimental area." Camilla, East Pakistan: Pakistan Academy for Rural Development.
- Katz, E.  
1962 "Notes on the unit of adoption in diffusion research." *Sociological Inquiry* 32 (Winter):3-9.
- Kerr, G. B.  
1970 "Leadership and communication in the collective adoption process of development associations in eastern Nigeria." Ph.D. Dissertation, Michigan State University.
- Kikuchi, M., G. Dozina, and Y. Hayami  
1978 "Economics of community work programs: a communal irrigation project in the Philippines." *Economic Development and Cultural Change* 26 (January): 211-26.
- Kincaid, D. L., and J. Y. Yum  
1976 "The needle and the ax: communication and development in a Korean village." Pp. 83-90 in W. Schramm, G. C. Chu, and F. Yu (eds.), *Communication and Change: The Last Ten Years and The Next*. Honolulu: University Press of Hawaii.
- Lang, G. O.  
1971 "Modernization in East Africa through cultural continuity." Pp. 337-59 in D. Z. Mario, J. M. Maher, and H. Orenstein (eds.), *Themes in Culture*. Quezon, Philippines: Kayumanga Publishers.
- Lehman, D.  
1977 "Agrarian structures and paths of transformation." *Journal of Contemporary Asia* 7 (April):346-61.
- Lele, U.  
1975 *The Design of Rural Development: Lessons from Africa*. Baltimore: The Johns Hopkins University Press, for the World Bank.
- Long, N., and D. Winder  
1975 "From peasant community to production co-operative: an analysis of recent government policy in Peru." *Journal of Development Studies* 12 (Spring): 75-94.
- Mahony, F.  
1966 "The pilot project in range management near Afmadu." Pp. 157-63 in A. H. Niehoff (ed.), *A Casebook of Social Change*. Chicago: Aldine Press.
- Mitchell, W. P.  
1976 "Social adaptation to the mountain environment of an Andean village." Paper

- presented at the International Hill Land Symposium, Morgantown, West Virginia.
- Niehoff, A. H.  
1966 *A Casebook of Social Change*. Chicago: Aldine Press.
- Orlove, B. S.  
1976 "The tragedy of the commons revisited: land use and environmental quality in high altitude Andean grasslands." Paper presented at the International Hill Land Symposium, Morgantown, West Virginia.
- Owens, E., and R. Shaw  
1974 *Development Reconsidered: Bridging the Gap Between Government and People*. Toronto: Lexington Books.
- Oyugi, O.  
1968 "Participation in development planning at the local level." Nairobi, Kenya: University of Nairobi, Institute for Development Studies, Discussion Paper No. 163.
- Paige, J. M.  
1975 *Agrarian Revolution: Social Movements and Export Agriculture in the Underdeveloped World*. New York: The Free Press.
- Pakistan Academy for Rural Development  
1963 *The Camilla Pilot Project in Irrigation and Rural Electrification*. Camilla, East Pakistan: Pakistan Academy for Rural Development.  
1964 *An Evaluation of Rural Works Program*. Camilla, East Pakistan: Pakistan Academy for Rural Development.
- Rahim, S. S.  
1968 "Collective adoption of innovations by cooperatives in Pakistan: diffusion of innovations in a development system." East Lansing: Michigan State University, Department of Communication, Technical Report.
- Reiger, H. C.  
1977 "Socio-economic aspects of environmental degradation in the Himalayas." Paper presented at the International Hill Land Symposium, Morgantown, West Virginia.
- Rice, E. G.  
1971 *Extension in the Andes*. Cambridge: The Massachusetts Institute of Technology Press.
- Rogers, E., and F. Shoemaker  
1971 *Communication of Innovations: A Cross Cultural Approach*. New York: The Free Press.
- Röling, N. G., J. Ascroft, and F. Wachege  
1976 "The diffusion of innovations and the issue of equity in rural development." *Communication Research* 3 (April):155-70.
- Saint, W. S., and W. Coward, Jr.  
1977 "Agriculture and behavioral science: emerging orientations." *Science* 197 (August):733-37.
- Schon, D. A.  
1971 *Beyond the Stable State*. New York: W. W. Norton & Co.
- Schwartz, N. B.  
1968 "Latent functions of factionalism in a northern Guatemalan town." Ph.D. Dissertation, University of Pennsylvania.
- Stavis, B.  
1976 "China's rural local institution: a comparative perspective." *Asian Survey* 16 (April):381-96.
- Stinchcombe, A. L.  
1961 "Agricultural enterprise and rural class relations." *American Journal of Sociology* 67 (September):165-76.
- Thompson, J. T.  
1977 "Ecological deterioration: local-level rule-making and enforcement problems"

- in Niger." Pp. 57-79 in M. Glantz (ed.), *Desertification: Environmental Degradation In and Around Arid Lands*. Boulder, Colorado: Westview Press.
- United Nations
- 1960 *Community Development and Economic Development*. Bangkok: United Nations.
- 1971 *Popular Participation in Development: Emerging Trends in Community Development*. New York: United Nations, ST/SOA/106.
- Uphoff, N. T., and M. J. Esman
- 1974 *Local Organization for Rural Development: An Analysis of Asian Experience*. Ithaca, New York: Rural Development Committee, Center for International Studies, Cornell University.
- West, P. C., and S. Light
- 1978 "Community level change strategies for the management of fragile environments." Pp. 323-78 in K. Shapiro (ed.), *Science and Technology for Managing Fragile Environments in Developing Nations*. Ann Arbor: University of Michigan, School of Natural Resources, Office of International Studies.
- Whyte, W. F., and G. Albert
- 1976 *Power, Politics, and Progress: Social Change in Rural Peru*. New York: Elsevier Scientific Publishing Co.
- Whyte, W. F., and L. K. Williams
- 1968 *Toward an Integrated Theory of Development: Economic and Non-Economic Variables in Rural Development*. Ithaca, New York: Cornell University, New York State School of Industrial and Labor Relations.