CD/R(79)20 Original : English

EXPERIENCES IN RURAL DEVELOPMENT

Occasional Paper N° 9

A SELF-HELP PARADIGM FOR RURAL WATER SYSTEMS

by

Duncan Miller

OECD DEVELOPMENT CENTRE
94, rue Chardon-Lagache, 75016 Paris, France
March 1978

Occasional Papers on Experiences in Rural Development (1)

The OECD Development Centre initiated this series of occasional papers due to an increasing commitment to field work and research activities in this subject and an awareness that much of the background material and lessons derived from field experiences is frequently not d cumented or accessible. These occasional papers are preliminary working documents written by the specific authors and they do not necessarily represent the views and opinions of the OECD or the Member Governments.

The present paper attempts to clarify the concepts of self-help and popular participation within the analytical framework of rural water supply systems. A review of evidence and experiences from case studies conducted by the Development Centre and from the literature is presented and a basic set of hypotheses examined. The author, Dr. Duncan R. Miller, is a Principal Administrator at the Development Centre.

(1) A series of occasional papers concerning the subject of industry and technology in developing countries is also available upon request from the OECD Development Centre.

LISTING OF OCCASIONAL PAPERS ON EXPERIENCES IN RURAL DEVELOPMENT

Occas. Paper N°	CD/R(..) N°	Author	Title	Date
1	CD/R(77)13	H. Schneider	Linkages between social and economic aspects in rural development and their implications for project design and implementation	April 1977
2	CD/R(77)22	N. Imboden	Planning and design of rural drinking water projects	Sept. 1977
3	CD/R(77)29	Peter Bachrach	Evaluating Development Programs ; A Synthesis of Recent Experience	Oct. 1977
4	CD/R(78)12	S. Fresson	Public Participation on Village Level Irrigation Perimeters in the Matam Region of Senegal	April 1978
5	CD/R(78)13	B. Slade Yaser	Replication and Scaling up criteria in project design	April 1978
6	CD/R(78)19	F.L. de la Barra Rowland	Analysis of experiences of self-help and public participation in rural water supplies : The case of Mexico	June 1978
7	CD/R(78)24	H. Schneider	Promoting Rural Development through Institution Building : A Case from the Congo	Aug. 1978
8	CD/R(79)19	T.I. Bennell	Planning and Design of Rural Drinking Water Projects : Results from Pilot Runs	March 1979
9	CD/R(79)20	D. Miller	A Self-Help Paradigm for Rural Water Systems	May 1979

TABLE OF CONTENTS

List of Tables

A SELF-HELP PARADIGM FOR RURAL WATER SYSTEMS

Duncan MILLER

Water, water everywhere
but not a drop to drink

I. Introduction

A. Policy Context

Self-help is one of the most fascinating yet frustrating aspects of development theory and practice. It is a dynamic process that transcends the narrow boundaries of any given development discipline ; the purported benefits of self-help are multifarious, they extend to virtually every aspect of development, in every country, at every point in time. Self-help is a fundamental tenet of recently expounded strategies of basic needs and self-reliance.(1) It promises to receive priority attention in the forthcoming Third Development Decade.

Why, then, is self-help so frustrating ? It is largely due to the fact that we, the social scientists and policy analysts, cannot agree on what the concept means, who should be represented/involved in the process and how the process by which they are involved should be promoted. (2) In fact, some

---

(1) As defined in this paper (Section I-B), self-help is both a means and a goal within the stragegy of basic needs. It is a means (policy instrument) with which to achieve goals of minimum requirements of private consumption (adequate food, shelter and clothing) and community services (safe drinking water, sanitation, public transport, health and education). It is also identified as a goal : people should participate in making the decisions which affect them. See, International Labour Office, Employment, Growth and Basic Needs : A One-World-Problem (Geneva, 1976), especially pp. 32-34.

For the role of self-help within the strategy of self-reliance, the following references are good : J. Galtung, "Self-reliance : Concept, Practice and Rationale", University of Oslo, 1978, and Anisur Rahman, "Research on Participation of the Poor in Development", ILO World Employment Programme, WEP 10/WP 4, 1978.

(2) The distinction between self-help target groups and self-help as a process is discussed in Beaty and Pierce. See selected references [27].

analysts would argue that self-help must be "truly" indigenous and attempts to address the questions posed above would, ipso facto, prejudice "meaningful" self-help. Paternalistic or faulty efforts to sponsor self-help are regarded as worse than no self-help at all. This, some contend, was often the case of the so-called Community Development days. (1)

Why, then, is self-help receiving such renewed interest and vigour ? Part of the answer is negative in origin. After more than two decades of meager results from the "trickle down" variety of development planning, many developmentalists are examining more participatory strategies of development to attack root causes of poverty. Inherent in the "new style" development is a commitment to focus programmes or projects on specific target groups (small farmers, landless or near landless agricultural workers, urban poor). Self-help becomes the means - and often the ultimate goal - of this new thrust on decentralised development. Some Third World scholars have called to question the conventional wisdom of programme and project funding but they too place major emphasis on expanded efforts at self-help. (2)

Part of the renewed emphasis on self-help stems from the now classical debate of growth versus development. Whereas much of the debate has been - or appeared to be - sterile (3), it has induced development thinkers to expand their horizons and investigate new modes and "models". (4) The new look has been partly toward the West (historical evolution of the guilds in Western Europe, Grange movement in the US for example), frequently toward the East (the Chinese model of self-reliance), and less often toward indigenous strategies (Ujamaa vijijini in Tanzania).

Self-help therefore appears to be on the agenda of future developmentsefforts. But, what exactly is it ? Why does it work, not work ? What are its determinants and consequences ? What evidence exists which explains how it can be promoted if

---

(1) W. Hoque, N. Mehta, A. Rahman and P. Wignaraja, "Towards a Theory of Rural Development, Development Dialogue 1977 (2).

(2) P. Wignaraja, in an address to the Development Assistance Committee, Meeting on Rural Development, 8-11 May 1978.

(3) For a concise review of the development experience between 1950 and 1975 and an elaboration on growth plus development, see the World Bank, World Development Report, 1978 (Washington D.C., 1978).

(4) A good review of recent trends may be found in "The Development of Development Thinking", OECD Development Centre, Liaison Bulletin, 1977, N° 1.

not more actively programmed ? (1) Is it really operational as part of a development strategy ? These are questions for which ready answers do not exist. One reason for this gap in knowledge is the lack of precise definitions of fundamental terms and a conceptual framework with which to analyse past experiences. The other major reason is that no careful and systematic attempt has been made to investigate scientifically past experiences over time and in different social environments. (2) Although there is a growing body of literature on this subject, much of it is still anecdotal and extremely limited in coverage.

We cannot begin to address, no less answer, all of these questions in a paper of this kind. Our objective is much more modest, namely, to clarify some of these issues in a particular policy context. The policy context chosen for analysis in that of rural water supplies. The reasons for this selection were fourfold :

- Rural water systems represent a good point of entry into the usual obstacles and problems faced in rural development.

- Water has always been high on the list of community declared "felt needs" and is an acknowledged basic need.

- The history of self-help in rural water is both long and extensive (in terms of a cross section of countries) so that the experience should be amenable to hypothesis testing.

- The World Water Conference raised the level of consciousness about the tremendous efforts that will be required to bring safe water to everyone in the world.

The OECD Development Centre become actively engaged in research on the subject of self-help in rural water systems after convening a group of experts on the general subject of water resources utilisation and management in March 1976. (3)

---

(1) One intriquing question about programming basic needs type projects is the degree to which they can be replicated or scaled-up. A first attempt to delineate important factors in this area is presented in B. Slade Yaser "Replication and Scaling-up Criteria in Project Design" OECD Development Centre, Experiences in Rural Development, Occasional Paper N° 5, April 1978.

(2) This conclusion has been stressed by numerous studies. The Ad Hoc Working Group on Rural Potable Water Supply and Sanitation (see reference /417) reported that a world-wide scale critical assessment of experiences should receive the highest priority. Unfortunately, no actions have been undertaken to implement such an assessment.

(3) Reference /207.

The topic of self-help was given a high priority by the experts assembled and the Centre was encouraged to undertake specialised and comprehensive case study investigations. The major purpose of these studies would be to experiment with different methodological approaches to the analysis of self-help experiences.

In 1977, the Centre initiated three different types of case studies : (1) an in-depth study of an experimental programme in small scale irrigation systems (the Matam region of Senegal), (2) a review of a nation-wide supply programme of rural household water (Mexico), and (3) a cross sectional process evaluation in seven African countries. The following publications in this same series of Occasional Papers reported on these case studies :

Author	Publication	Occasional Paper n°	Centre Reference N°
N. Imboden	Planning and Design of Rural Drinking Water Projects	2	CD/R(77)22
S. Fresson	Public Participation in Village Level Irrigation Perimeters in the Matam Region of Senegal	4	CD/R(78)12
F.L. de la Barra Rowland	Analysis of Experiences of Self-help and Public Participation in Rural Water Supplies : The Case of Mexico	6	CD/R(78)19
T.I. Bennell	Planning and Design of Rural Drinking Water Projects : Results from Pilot Runs	8	CD/R(79)19

As will be explained below, this paper will, amongst other things, synthesis the major findings of these case studies.

The paper is structured in the following manner. In the section which follows, an attempt is made to clarify the concepts of self-help and popular participation in the context of promoting rural development. In the second chapter, a scheme or paradigm is presented of self-help and participation within rural water supply programmes, both small scale irrigation and household uses. A series of hypothetical relationships are advanced in the third chapter ; these cover two aspects

of self-help and water systems : (1) project design and implementation, finance, and operations and maintenance, and (2) project impact. The first three chapters constitute the theoretical base for subsequent analysis.

In the fourth chapter, the major findings of the Centre's field case studies are synthesiesed and individu l hypotheses are examined. Other evidence and experiences are reviewed from available literature in light of the two sets of hypotheses. (1) The last chapter presents a synthesis and brief summary of the state of the art.

---

(1) We do not purport to have undertaken a complete state of the art review because the literature of self-help and participation in rural water is largely unorganised. Much of the experience has gone undocumentad or hidden away in classified reports (therefore lost) ; many reports are unrecorded or available only at the source (usually donor finance agencies). We would contend however that most of the readily available literature has been reviewed. A functional international documentation centre is sorely needed in this area.

B. Concepts of Participation and Self-Help

Our present scope does not allow for an extensive formal review of the literature about the concepts of participation and self-help in all of the subject fields of rural development(1). Moreover, we hope to escape the social scientist's penchant for new definitions and lengthy discussions of abstract

(1) A forthcoming Centre publication (D. Miller, Patterns of Popular Participation in Rural Development) will attempt to provide such a review. Those readers interested in a short but fairly exhaustive reading list on these concepts in general should consult the following: (1) Agence de Coopération Culturelle et Technique, Promotion Humaine et Animation Rurale, Paris, 1977; (2) A. Andreas Bodenstedt, Ed. Self-Help: Instrument or Objective in Rural Development (Saarbrücken: Research Centre for International Agrarian Development, 1976); (3) R. Charlick, Power and Participation in the Modernization of Rural Hausa Communities (Ann Arbur, Michigan: University Micro films International, 1976); (4) J.M. Cohen and N.T. Uphoff, "Concepts for Measuring Participation for Project Design, Implementation and Evaluation", Cornell University, December 1976; (5) R. Colin, L'Animation et le Devéloppement Rural en Afrique Noire Francophone (Paris: Bureau d'Etudes Cooperatives et Communautaires, 1968); (6) D. Curtis, et.al., "Participation and Basic Needs", Institute of Local Government Studies, University of Birmingham (U.K.), April 1978; (7) D. Hapgood, ed. The Role of Popular Participation in Development (Cambridge, Mass.: M.I.T. Press, 1969); (8) A. Meister, Participation, Animation et Devéloppement (Paris: Editions Anthropos, 1969); (9) S. Chee Meow, et.al. People's Participation at the Local Level (Bangkok: Stiftung, 1978); (10) U.N. Commission for Latin America, "Popular Participation in Development, "Community Development Journal Vol. 8 (2), 1973, pp. 77-92; (11) U.N. Department of Economic and Social Affairs, Popular Participation in Decision Making for Development (New York, 1975).

reasoning. The purposes of this section are: (1) to construct a hierarchy which depicts the range of possible levels of popular involvement in the development process, and (2) to describe the major characteristics attributable to participation and self-help.

Beginning at the most micro level (individual, household or community) and building upwards, the most fundamental level of involvement in the development process can be identified as self-help. To us, this is simply "people helping themselves." A subsistence farmer, for example, carves out a small irrigation ditch to distribute rain fall; an urban slum dweller surreptitiously cuts into the local electric power lines so that he (she) can have light at night. This is no different in principle than that of the historical frontier individualism of New World America. Self-help can of course take more collective forms (group rather than individual) but, in any case, it usually implies a totally voluntary action. The impetus for the action is of local origin and outside influences are few, if any.

Self-help is almost **tautologically** small scale, spasmodic, time limited and ad hoc. The aims or goals of self-help are self-determined. Self-help actions are most often undertaken in the absence of rather than in concert with higher authorities or priorities. As witnessed in 1943 Warsaw and 1965 Watts, self-help, as thus broadly construed, can be vehemently anti-establishment. It is usually not so however.

In comparison to self-help, popular participation implies a greater scale in terms of group size (therefore alternatively called mass or public), more representativeness of group interests and a larger or longer term goal being pursued. Thus, in contrast to self-help, participation can be identified as a process "to release people from being the subject of development and make them agents of modernization and change(1)." Participation entails some degree of interaction with higher order priorities and outside (usually extra-local) authorities.

As previously mentioned, the action involvement of the population can also be a salient aspect of the national development strategy, the highest level of the hierarchy employed herein. As defined by Galtung, this means "autonomy to set one's own goals and realise them as far as possible through own efforts, using one's own factors(2)."

---

(1) S. Wisardjoro, "People's Participation at the Local Level in Jakarta," in S. Chee Meow, et.al., op.cit., p.66.

(2) Galtung, op.cit., p.4.

Under this strategy of development, the aspirations of the population are to become the goals of development and they constitute the resource base for development. Desired goals and means of implementation are revealed through popular participation and representation in the national political process. Under one novel variation of this strategy, Tévoédjre(1) declares that poverty rather than plenty can become the "wealth of nations." At the global level, participation can be regarded as a basic human need and an unalienable human right(2).

The lines of demarcation between self-help and popular participation are, in reality, difficult to distinguish, especially at the local level. Consequently, in the analysis which follows, those terms are employed inter-changeably except where a distinction is required. More important are the characteristics of how these concepts can be employed in the rural development process.

There are three characteristics or components which are usually attributed to participation. Briefly put, these are(3):

1. Participation in decision-making: meant as a dynamic process of discussion, dissent and collective consent from the outset of a plan, programme, project or any other action intervention foreseen,

2. Participation in the implementation of action(s) decided upon above: meant to include action involvement in terms of, for example, self-help labour, provision of local building materials, supervision of construction, etc., and

3. Participation in the sharing of benefits to be derived from the action and the costs to undertake the actions: meant to be an equitable (not necessarily an equal or exclusive) sharing of both benefits and burdens.

Participation should therefore be an integral input into each phase of what might be called a project or programme cycle. Participation becomes even more dynamic in character when local groups are involved in project evaluation(4) and the design of

---

(1) A. Tévoédjre, Poverty, the Wealth of Mankind (Oxford: Pergamon, 1978).

(2) P. Balestteri, "Organizing for Justice: More about the Rights of the Rural Poor", Ceres Vol. 12(1), January-February, 1979, pp.39-40.

(3) D. Miller /197.

(4) W. Hoque, et.al., describes how participation can aid evaluation, op. cit. pp. 113-136.

research about alternative future rural development actions(1). Given these concepts, a paradigm of possible self-help and participatory actions in rural water supplies is developed in the following section.

The review of case studies and other empirical evidence presented later in this paper supports the obvious fact that participation, even as outlined above, is no panacea for development. It is likewise obvious that, without some participation in developmental actions, the services provided may go unused. In the case of rural water supplies, popular "rejection" of a water system may be due to inappropriate technology, improper access (physical and institutional) or the organoleptic (taste, smell) qualities of the water(2).

II. Self-Help Paradigm

A. A Life Cycle Approach to Rural Water Systems

In practice self-help is usually approached in two general ways, namely, (1) as an article of faith and (2) as a resource input into construction. The first approach, which is often attributed to politicians and non-governmental organisations, assumes self-help as either a "good thing to do" or at least a necessity of political life. It does not question the specific impacts of self-help and participation in the project undertaken nor does it subject the self-help intervention(s) planned to rigorous benefit cost calculations. Most often this approach boils down to perfunctory informal contact with local elites sometime before project implementation. It neither demands much from self-help efforts nor gives self-help much of a chance to contribute.

At the other extreme, technicians and planners often regard self-help as only a question of resource allocation. Technocrats tend to accept technology as a given and seek to minimise cost. The time horizon for self-help to them is heavily biased to the construction phase and self-help must prove itself as "necessary and sufficient." In this case, self-help becomes restricted to cash, local materials for construction and frequently free labour. The technical hand cost efficiency of self-help unpaid labour is much debated in the existing literature, specifically that portion written by water engineers. Isolated in time and restricted in scope, this type of self-help often degenerates into conflict between priorities

---

(1) The ILO has launched an interesting experimental effort in this area. See A. Rahman, "Research on Participation of the Poor in Development", loc.cit.

(2) D. Okun, "Review of Drawers of Water," Economic Development and Cultural Change, Vol. 23(3), April 1975, pp.580-583.

established by central authorities and desires of local residents. It is alleged that self-help labour is not forthcoming in the right place, at the right time and of the required quantity; the qualifications and experience of self-help labour are of questionable quality. These points are developed more fully in the section on hypotheses.

If one agrees that most self-help and participation (at least that proportion recorded in the evaluation literature) has been restricted in time and scope, what then should be a more comprehensive framework? The approach adopted below is that of a life cycle of a "typical" water installation. It incorporates the major components of participation outlined in the preceding section.

The paradigm (Table 1) is presented in the scheme which follows. The major phases of a water system are indicated as the column headings and an illustrative time duration between phases is provided in the last line. Thus, project pre-planning (problem awareness to alternative proposals) begins in year one; the project is designed in year two; construction is finished in year four; by the tenth year or so, the project will require alteration/modification. The function-time relationship highlights two important aspects of a typical rural water system (or almost any other rural development activity). First, there are often significant time lags between the decision to initiate a project (project feasibility) and the date services actually begin to be delivered. In the case of rural water supplies, the time gap is frequently from three to five years. Second, like other systems, rural water systems require periodic revision. The capacity of a water system is put under pressure due to population increases, improved public health (possibly due to the water system itself), and greater incomes. Consequently, there is a feed-back loop at the end of a decade or so when decisions must be made to augment or improve the system. Each successive loop through the system need not however be regarded as unique; an on-going process of planning and evaluation may provide the necessary linkages. It can be expected, however, that the total benefits and thus demand will increase in each successive round through the cycle; therefore, the system will change in scope through time.

The most important point for present purposes is that, once generated, self-help must be sustained. This is inevitably a critical factor in the time period between when the project exists on paper and when it exists in reality. For this reason, and the more general principle that self-help and participation should be incorporated as integral parts of the whole system, the paradigm includes local self-help modules and outside interventions at each step or phase of the water system. The paradigm does not indicate an entry point because one should not preclude problem identification from either the local level or by outside agents. Likewise, although the paradigm appears to depict local and outside actions being undertaken simultaneously at every step, there may be slightly different time schedules.

Table 1

PARADIGM OF SELF-HELP AND RURAL DRINKING WATER SYSTEMS

WATER SYSTEM LIFE CYCLE								(1)
(1) ←Problem Awareness	Commitment	Set Alternatives	Design	Maintain Interest	Construction	Administration management	System Alteration	↑
LOCAL SELF-HELP MODULE								
Perception ..... Need		Needs-Desires		Household.. Visits	Ceremony...	Meetings		
Agenda	Internalize Organise Institution-alise Leadership Fund Drives/	Information Rules of system	Land use	Preparation for Construction	Labour, Materials Staff ..... Funds	Staff system policing	Evaluation	
OUTSIDE INTERVENTION								
Awareness generation	Organis-ation	Standardized packages	Modification long-term	Timetable	T A materials	T A		
Service organisation Special campaigns	Encouragement Acknowledgement Acceptance	T A	Syst. plan. Training plan	Communication ..... Training	Credits	Organis. & Mgt.manuals Follow-up schedules	Evaluation	
Information flows								
DURATION								
Year: 1		2		4		8 - 10		

In any case, the purpose of the paradigm is to identify the range of possible interventions. It is meant to be a general model rather than a specific blueprint for implementation(1).

B. Potentials for Self-Help Interventions

For purposes of presentation, the local self-help models can be aggregated into five stages: (1) project identification and pre-planning (problem awareness, commitment and set alternatives); (2) design; (3) implementation (maintain interest and construction); (4) administration, operations and maintenance; (5) evaluation and system alteration.

Ignoring for the moment exactly who might initiate the self-help actions - indigenous or sponsored from the outside - the question remains as to what actions can be undertaken at the local level. In the first instance, three actions should be undertaken. First, there should be a broad based perception and recognition of the problem (in this case an inadequate water supply). This perception should then be translated into a statement of needs; this statement need not be written but should represent a declaration of the overall desires for the water system: its functions, priority uses, access, etc. The final preliminary step should be the creation of an agenda. This obviously represents the departure of perception to commitment.

Whereas the process of the articulation of an agenda and its scope will be case-specific, it should include the following steps: (1) an internalisation of commitment to specific actions, (2) an organisation of the actions to be undertaken as to priority, time schedule and responsibility, (3) an institutional framework - formal or informal/existing or newly created for the water project - to fascilitate representation and participation of the whole target population, (4) an acknowledged leadership whose functions will be to guide the project from the outset, resolve disputes and act as liaison with central technical authorities, and (5) an attempt to establish some type of capital accumulation fund to aid the project over time.

---

(1) The paradigm does not account for the tremendous range in the possible scale of operations and number and size of villages which might confront a rural water planner. For example, the actual type of water programme would be determined largely by resource availabilities: if one need choose 100 villages out of 100,000 each year, the programme might be quite different than if one could choose 10,000. Some agencies, like non-governmental organisations, might be constrained to initiating only one system (village) a year. Likewise the paradigm does not account for the number of separate motivations in a village or over time necessary to generate and/or sustain self-help. Both of these factors could - and should - be incorporated into the programme specific self-help and participation plan.

These steps will be important in the next stage, namely, the formulation of alternatives both as to the type of system and its administration desired by the local population. These two stages are obviously inter-active.

Outside interventions by higher level local, regional, national or possibly even international organisations could have an important role to play in these early stages. The role(s) for outside experts and agencies should be predicated by their capacity to: (a) acknowledge and accept the situation of the local participants and (b) deliver services on a timely basis(1). This does not imply a docile or even passive role for governments but rather one of partnership. It does imply an end to paternalism and perpetual dominance. Four specific actions are identified in the paradigm. First, outside-agents can play an important role in awareness generation even if the local participants are well launched into the steps identified earlier. Second, outside agents can operate many of the functions of a consumer service organisation by, for example, advocating the benefits of improved sanitary practices.

The provision of general information about water systems such as legal codes concerning water rights and organisational experiences in other localities can constitute the third function. By far the most important, however, will be the technical services that can be offered by outside experts. This function could profitably take two forms: (1) simple designs as to alternative standardised packages of water systems applicable to the type of situation under study and (2) technical assistance by water engineers and health officials in charge of the systems at the central or regional level. The first should allow the local participants to make rational judgements as to the best system within those available; the second should guide them in doing so. As before, agendas of joint and separate actions should be created between local participants and outside agents.

We have dwelt at length on these preliminary steps within the paradigm largely due to the lack of precision about them in the literature and often voiced opinion of planners that they do

---

(1) Whereas it is usually the local participants who are characterised as slow to adopt changes and unable to meet activity schedules, the Latin American experience demonstrates that central authorities are as likely to be so characterised: "The mobilisers lack the needed attitudes as well as training; the aid falls short of promises or proves partly inappropriate. The unauthenticity of this kind of mobilisation can result in apathy and alienation ...", UN ECLA, "Popular Participation in Development," loc. cit., p. 88.

not know where to begin in sponsoring participation. Whereas many practitioners regard the design stage as a technical prerogative of central bureaux, there can be several key self-help and participatory roles to be undertaken. First, the local beneficiaries, via the delegated water organisation, should be involved in the project design not only for reasons of democratic representation but also to ensure that they understand the obligations to be encountered (in terms of materials, labour and finances) and that they can meet such obligations. Likewise, clearly the rules (or guidelines) to be adopted for the administration of the system should be compatible with the system's design.

Local participants may assist in the design of the system and possibly improve on its impact by drawing plans on land use within the locality. This may be extremely important where livestock and small animals may be potential violators of the water system. This function might be particularly beneficial if the central authorities have the foresight to help the community lay down longer-term plans as to potential modifications to the system, even if in relatively crude terms.

During the implementation phase, self-help and participation can be especially useful in two areas: (1) preparation for construction (land preparation, stocking local materials for construction and the organisation and training of labour teams) and (2) construction (labour and labour supervision). Since this aspect of self-help and participation has received the most in-depth treatment in the literature, it will be examined further in the section on hypotheses.

After construction is finished the vast majority of rural water supplies are left to the responsibility of the locals. In many cases, the local beneficiaries have little, if any, knowledge, training or parts and equipment to maintain or repair even the simplest of systems; often they do not realise that they are responsible for operations and maintenance. If the water system is to be operational for long and have the desired impact(s), the joint partnership of local participants and outside agents cannot be regarded as finished with construction. It has simply moved into a new phase.

During this phase, the local water association will take over the primary responsibility for the daily administration, operations and maintenance of the system. Broad based participation should continue in terms of periodic "policing" of the system as in, for example, campaigns to clean the area surrounding the water system in order to decrease contamination and public meetings to enforce administrative rules and enhance rate collection. Likewise, the role for outside experts and agents is far from finished after construction. Periodic technical assistance for pump operators and off-line water distribution in the case of irrigation should continue; moreover, scheduled, follow-up maintenance checks should be established with the local water authority.

Finally, in the last phase of the system, that of evaluation, the partnership of local participants and outside agents should be preserved, especially as to the proposals for modification of the system. Thus, the system "loops" back to the beginning as described in the previous section on the project life cycle. It is a life cycle which should be acknowledged as having no end.

There are likely readers who may question the realism of this paradigm and may criticize the apparent high level of services required and time necessary. It should be reiterated that the paradigm is presented only as bench mark. Not every step is needed in every situation and nowhere is it a panacea. As portrayed above, self-help and participation can be integrated more fully into water systems if, and only if, a greater role is allowed during the early phases, especially project identification and pre-design. This may increase the actual total period of time before the final date of construction; however, the efforts to be undertaken are mostly at the local level by the local participants and therefore should not require substantial increases in the level of outside resource inputs. Consequently, it may be more of a question of scheduling of inputs (or motivations) than the level of supply. Delays down-stream in the project may also be avoided by a more integral role of self-help and participation from the outset.

Even if the time period required per unit of system constructed does increase somewhat (and even this is not known), the potential impact of self-help and participation may be threefold as regards the project: (1) total resource inputs from extra local sources may be decreased, (2) system's failure rates may decrease, and (3) the desired impacts may have a greater chance to be achieved. The following section presents a series of hypotheses which depict these potential benefits in more detail.

III. Research Hypotheses about Self-Help in Rural Water Systems

There are two sets of hypotheses concerning the role of self-help in rural development in general and in the policy context of rural water systems examined in this paper. These two may be classified as: (a) project related hypotheses and (b) impact hypotheses. The sections which follow present the various hypotheses most frequently investigated in the literature. One striking conclusion emerges from this review: in no case other than a partial attempt in the Centre's case study in Mexico, was the present author able to find a study in which both sets of hypotheses were examined using the same data set. Moreover, in both cases decent time series data on hypotheses are virtually non-existant(1). These findings are all the more important since, in my opinion, self-help and participation cannot be expected to improve project impact unless incorporated more fully into project design aspects from the outset as depicted in the paradigm. Whereas the present effort does nothing to improve the data hiatus, it may assist in future efforts by delineating the whole range of potential hypotheses for self-help interventions. Future scholars and water systems planners should then be able to build upon these efforts.

Three final introductory comments must be emphasized before the hypotheses are presented. First, as Warner(2) notes, "in the case of rural water supplies, the intended objectives, as well as the resulting benefits, are rarely stated explicitly; more often, they are left as either implicit assumptions or vague expectations." Consequently, an analysis of past expectations must be guided more by theoretical understanding and conjecture than clearly defined goal-purpose-outputs-inputs interrelationships.

Second, because self-help and participation are multidimensional in character and multi-objective in purpose, it is difficult to isolate the inter-relationships. In slightly more technical jargon of the economist, there exists a definition problem due to joint products and indivisibilities, especially

---

(1) Only in one case cited in the literature has there been an attempt to compile adequate time series data. This was Zaina in Kenya; however, both Carruthers [4, p.39] and Warner [36, p.165] note that the re-visit surveys were unable to provide many insights due to significant exogenous changes to control groups.

(2) Warner [36, p.3].

as to beneficiaries(1). Furthermore, since much of the hypothesis testing in the literature deals mostly with resource mobilisation - especially labour (e.g. transforming idle labour into things)(2) - and not real participation, the conceptual framework developed above in the paradigm must be borne in mind. Finally, it is assumed, for purposes of brevity, that readers are familiar with formal hypothesis formulation. Consequently, detailed descriptions for some hypotheses are cited for further reading in the existing literature.

A. Project related Hypotheses

The hypotheses in this section derive directly from the paradigm developed earlier. They can be distinguished at three levels: (1) project design and implementation, (2) finance, and (3) operations and maintenance. Possible self-help interventions and general hypotheses at each level are presented in summary form in Table 2. Most of these are self-explanatory.

The subjects of finance and organisation require some further comment. In the area of finance, the basic question is less one of "should local users contribute to financing water systems?" but more one of "how and how much of what should local users contribute?". The form of contribution or payment can be in the form of capital contribution (money), local materials, and/or labour. The means of payment can be direct into specific project development funds or indirect via taxation. Whereas economists and financing agencies generally prefer the former means, politicians often opt for the latter. There is no consensus in the literature on "how much of what." The World Bank sector policy includes, for example, the following guidance:

---

(1) This is a general problem of community-wide development projects especially in infrastructure. To cite an example from another aspect of rural development, the "rural poor" sometimes receive food as payment (food for work) on rural road construction yet it is the more well-to-do who often benefit more from the road itself. Further examples are stated in R.J. Szal, "Popular Participation, Employment and the Fulfilment of Basic Needs," International Labour Review, Vol. 118, No. 1, 1975, p.33.

(2) The fact that planners and technocrats employ the term participation when in reality they mean the more narrow concept of labour mobilisation is well documented in ECLA, op. cit., p. 79 and 86. From a review of eight major self-help schemes (as declared by the Water Department) in Tanzania, Tschannerl concluded that "self-help was nearly always limited to a contribution of free unskilled labour under the supervision of the water department" [27, p. 2].

Table 2

Project Related Self-Help Hypotheses

Step Within Project Cycle	Possible Self-Help Intervention(s)	General Statement of Hypothesis
Design and Implementation		
- Identification	- Request for project	- Indigenously identified project represents a high commitment and revealed felt need.
- Design Preparation	- Site selection, system configuration, design and capacity determination	- As above plus participation in design could lead to a more technically appropriate system for community.
- Implementation and Construction	- Provision of local materials, capital and labour (supervisory and workers)	- Participation by providing inputs demonstrates commitment, may lead to more appropriate systems and will decrease costs to central government budgets.
Finance		
	- Initial capital contributions	- As above.
	- Determination and collection of water rates	- Local involvement in fee fixing and collection will lead to more efficient and higher rates of payment.
Operations and Maintenance		
	- Water users organisation	- User involvement will lead to less frequent breakdown, cheaper maintenance and therefore less costly and more efficient systems in the long run.

"As a first approximation, levels of payments on many projects might be set to cover at least ten per cent of construction costs and all operating and maintenance costs. These levels would be applied to the 'basic system' costs, with a supply through public hydrants. Where individual householders require private connections, they should normally meet the full additional costs ..."(1). In the final analysis, however, the level, form and means of payment are decisions of political as well as economic importance and they may vary widely due to country-specific situations.

The structure and function of local organisations whose mandate is to administer the water system also vary widely from one situation to another. In Asia, as reported by Coward(2), small-scale, water users associations in irrigation foster direct linkages with indigenous leadership roles and accountability for water usage. In other cases, administration of the water system is included in a broader based organisation; for example, water administration is reported to be one of the functions of the emerging "comunidades de base" (base community) type integrated organisations in Latin America(3). In either case (e.g. an organisation specifically created for the water supply or a more general institution), the presence of a viable local organisation reduces the number of separate contacts and motivations that **central** authorities need initiate per village or local community. This effective link is often noted in the literature; however, unfortunately it remains that "institutional weakness is probably the most important single problem in rural water supply"(4).

---

(1) World Bank [40, p. 41]. The World Bank has been criticised frequently for adopting these levels more as a rule than as mere guidance.

(2) Coward [6].

(3) As reported in Time of 7 March, 1979, p. 53, there are now 300,000 comunidades de base in Latin America. An interesting paper of this general subject has been published by the Royal Tropical Institute (RTI) of the Netherlands (K. Verhagen, "How to Promote Peoples' Participation in Rural Development Through Local Organisations," RTI mimeo, March 1979.

(4) World Bank [40, p. 47].

There are two aspects of participation for which hypotheses have not been articulated, namely (a) the magnitude and consequences of possible time lags inherent in the process of participation especially in the early stages of project design and (b) participation in project evaluation. Although, in principal, participation in project evaluation may yield important benefits(1), no hypotheses were formulated because cases could not be found in which this aspect had been attempted.

Possible magnitudes and consequences of time lags due to participation are often noted in the literature but the state of knowledge is very crude. For example, the World Bank sector paper notes that "the process of consultation with the villages takes time. Where programmes have to be executed to meet externally imposed time-tables, systems may have to be installed with little previous local input, and without clear sectoral policies or a proper analysis of many of the pertinent factors ..."; however, they further acknowledge that "while such decisions may be essential, it must be recognized that inevitably a number of these systems will fail or prove to be unsuitable"(2).

This appears to be a testimonial to a self-fulfilling prophesy. It clearly implies that a lack of popular participation increases risk exposure of failure. But is it necessary that participation takes more time for project execution? And whose time? It may be argued that the incidence of the time factor occurs in the village, with the villagers and should not "slow down" central authorities and external financing agencies. One might also contend that some amount of a time lag might be a kind of hidden benefit for the World Bank conclusion; a bit more time might obviate predictable failures and this should be of importance to cost-conscientious financing bodies. Clearly, much more scientific research should be devoted to this issue.

---

(1) Popular participation in project evaluation might assist for example in the identification of what were the real effects of the water system and why. Such knowledge could greatly improve future project design and implementation, including aspects of participation.

(2) World Bank [40, p. 64]. See also Carruthers [4, p. 88] and Feachem [10, p. 59].

Finally, the hypotheses listed in Table 2 should be viewed in two ways. First of all, each hypothesis is important in-and-of itself at the different levels of the project life cycle. Secondly, the set or range of hypotheses are important as an integral group. That is to say that hypothetically participation at any level would be more beneficial - and its statistical explanatory power of project success greater - if participation had occurred at the preceeding stage. Unfortunately, no experimental design has been conducted to test this.

B. Impact Hypotheses

The body of literature on the impact hypotheses is much more extant than that for the project related hypotheses. Impact hypothesis - testing for rural drinking water supplies has usually not been designed to control between participatory and non-participatory projects for individual hypotheses. If there is any substantive analysis of self-help, it is most often in terms of project construction cost reduction. Nevertheless, given the purported potential improvements to project design and implementation due to self-help and participation, it follows that self-help and participation should increase desired project impacts. The following brief discussion is thus presented with the caveat that it does not correspond to current field practice or the formal literature in this area.

It is universally acknowledged that water has wide-ranging physiological and psychological impacts on daily life; however, attempts to isolate and to quantify these impacts have proven difficult, especially since it is methodologically unknown as to how to separate these effects. The following table, Table 3, attempts to clarify some of these difficulties by classifying impacts or benefits (both individual and collective) into primary and secondary benefit types, indicating likely intervening variables.

The primary benefit types are: (a) improved public health, (b) higher labour productivity, (c) greater village-level development (employment opportunities and income generation), and (d) increased modernisation and sense of nationalism. These benefits are ubiquitous to societies of different political persuasions and economic systems. In some Third World cases however, such as Tanzania, rural water supplies have been chosen as a cornerstone in attempts to transform existing social orders. The table of benefits also highlights a conventional wisdom in this field, namely, that achievement of the desired impacts of a rural drinking system requires significant complementary inputs. Put slightly differently, this means that "water is perhaps a necessary condition for development. But it is demonstrably not a sufficient condition"(1).

---

(1) Carruthers [4, 29].

Table 3

Improved Water Supply and
Self-Help Impact Hypotheses

Primary Benefit type	via Intervening Variable(s)	and Secondary Benefit(s)
Public Health	- Increased access to and consumption of water	
	- Higher quality of water	
	- Reduced incidence of diarrhoea	- Higher productivity
		- Higher school attendance
	- Increased frequency of bathing	- Better quality housing
Productivity	- Better health	- Acquisition of skills
	- Increased agricultural output	- Increased village GDP
	- Expansion of water-using industries	- Increased village GDP
		- Greater employment opportunities
		- New commercial activities
	- Reduced disparities in obtaining water	
Village Development	- Greater employment opportunities	- Less income disparities
		- Less migration
	- Greater awareness of benefits of co-operative efforts	- Greater involvement in development projects
		- Better local institutions
	- Increased use of local resources	- Increased village GDP
		- Increased home ownership

../..

Table 3 (continued)

Primary Benefit type	- - - via Intervening Variable(s) - - -	and Secondary Benefit(s)
Nationalism and Modernisation	- Increased rate of development - Greater democratic participation in decision-making - Increased population clustering - Greater acceptance of new technology	

C. Decentralisation and Authority

As in the case of self-help and popular participation, in the abstract sense, decentralisation receives a great deal of sympathy if not philosophical support in the literature. But decentralisation is most often dropped from the agenda as one moves closer to the operational implications. There is no way that a paper of this scope and orientation can treat this issue adequately. Two points could perhaps be worthy of mention.

First, although developmental efforts are usually considered in quantum steps, called projects, activities or programmes or even plans, development is a continual process. In the short run, one might conceive of attempts to sponsor greater popular participation without much structural change in administrative and fiscal authority in a given project or set of projects. In the longer run, however, popular participation implies decentralisation of authority. As the World Bank notes, decentralisation of authority "(1) to formulate projects; (2) to administer projects and run enterprises; (3) to allocate expenditure; and (4) to raise revenue"(1).

Second, the implications of the commitment to popular participation and decentralisation are indeed profound. The commitment necessitates shifting decision-making centres closer to the people not just a device of shifting problems to them(2). For many countries, if not most, this is not just a question of some degree of "fine tuning" but rather a "paradigm shift"(3), a re-orientation of basic political and economic tenets.

---

(1) World Bank, Rural Development Sector Policy Paper, 1975, p. 35.

(2) Tévoedjrè, op. cit., p. 105. Pushing problems back at the local people has no intrinsic appeal over pushing money at problems. For one thing, one runs a risk of "overloading" the local capacity of administration. For a discussion of this problem, see A. Ayazi, G.P. de Brichambaut, A. Mackmillan and R. Spinks, "An Evaluation Check List for Rural Development Projects," Ceres, Nov. - Dec., 1978, pp. 43-47.

(3) For a discussion of the "paradigm shift", see, J. Robertson, The Same Alternative: Signposts to a Self-Fulfilling Future (London: James Robertson, 1978).

A modest attempt to show how popular participation and decentralisation link together within a rural domestic water supply is presented in Table 4. The table is structured to indicate the potential benefits of participation on administrative structure from both the individual (or community) and central government viewpoint. The bottom part lists possible attitudional changes on the part of individuals and these changes are as easily applicable to individuals at the centre, including technocrats and so-called policy-makers, as they are to villagers.

Potential positive and negative impacts on the overall domestic water supply programme are listed at each level. This is done for two reasons: (1) to illustrate the linkages in a slightly different form than in a usual hypothesis statement; and (2) to indicate clearly that participation is not like a known physical or chemical process, it involves risks.

The time has now come to apply the paradigm developed in Chapter II and the hypotheses formulated above. The subsequent chapter presents a summary of the findings of case studies undertaken by the Development Centre and a review of other evidence from the literature. The Centre's studies were intentionally experimental in orientation; in other words, their major purpose was to test approaches rather than to evaluate specific settings.

Table 4 - PARTICIPATION - DECENTRALISATION LINKAGES: RURAL DOMESTIC WATER SUPPLY

	Participation Stimulus	Structural Consequence	Economic Modernization Implications	Potential Impact on Domestic Water Supply Programme	
				Positive	Negative
A. ADMINISTRATIVE					
1. Individual Perspective	More the individual involvement in local problem solving	More viable community as unit of self-help More potential for personal and group influence	More responsive individual is to community modernisation needs and to external innovation	More involvement in self-help aspects of construction of system and compliance with management including collection of water rates	- Poor technical standard of construction (therefore more frequent breakdowns) - Inefficiencies and diseconomies in implementation
2. Perspective of Centre	Higher level of village participation	Less national resources required for local development More co-operative self-help administration	More central government is free to direct national resources allocation	Water supplies at lower cost per capita to public funds	Fewer water supplies to be built at a higher cost in any given time

Continued/..

Table 4 (continued)

	Participation Stimulus	Structural Consequence	Economic Modernization Implications	Potential Impact on Domestic Water Supply Programme	
				Positive	Negative
3. Linkage effects	More individual is exposed to government technical service agents and extra-local contacts	More effective centre-local linkages	Greater penetrative ability of Centre to communicate	Better and cheaper maintenance	Demands on maintenance services greater than capability to meet
B. ATTITUDINAL					
4. Integrative/ Economic Modernization	More individual participation in local and extra-local activities	More integrated into system	More receptive to communication	Catalize community into seeking improvement in existing water system	Pressures to design systems more elaborate and expensive than required
		More self-confident and trusting of technical service agents	More likely to alter economic behaviour	More likely to maximize benefits of improved water supply	Non essential consumption exceeds system supply capacity

IV. Review of Evidence and Hypothesis Testing

A. Development Centre Case Studies on Participation and Self-Help in Rural Water Supplies

1. The Case of Mexico

a) Case Study Background

During the year 1977, an empirical analysis of the experience of Mexico in self-help and participation within rural drinking water supplies was undertaken. This study was initiated and supervised by Eng. Francisco Leon de la Barra Rowland, then Director of Rural Water Supplies of the Construction and Sanitary Engineering Commission of the Ministry of Health and Welfare (CCISSSA). The findings of this investigation were published in June 1978 under the title "Analysis of Experiences of Self-help and Public Participation in Rural Water Supplies: the Case of Mexico", OECD Development Centre, Experiences in Rural Development, Occasional Paper No. 6, CD/R(78)19 by Eng. de la Barra Rowland.

The data base for this research was obtained from a sample survey conducted uniquely for this subject. A proportionate sample was taken from the 458 communities in which CCISSSA initiated activities during the calendar years 1974 through 1976. In the end, 137 localities from 10 States of Mexico were chosen; 94 of these localities co-operated in one or more of the aspects of participation in rural water supplies as defined by the Mexican authorities (see below) and 43 did not participate. Within each community, 14 individuals, or a total of 1,918 people were selected at random and interviewed. Another set of questionnaires was given to the government officials in charge of water systems.(1)

---

(1) For a full description of the sampling method, see de la Barra Rowland, op.cit., pp. 8-10. The two sets of questionnaires are presented in the Appendixes 1 and 2, op. cit., pp. 47-62. The questionnaires for Government officials were given to the relevant authorities in the Secretariat of Public Works and Administrative Committee for the Construction of Public Schools which, in addition to CCISSSA, have some authority for rural water works.

Mexican authorities employ the following components as part of their self-help and public participation programmes with local communities:

1. Work petitions
2. Donation of necessary land for the implementation of the system
3. In construction:
   a) Unskilled manual labour
   b) Primary regional materials
   c) Cash contributions
   d) A combination of the preceding factors
4. Formation of community committees for local development
5. Work administration
6. Project operation
7. Project maintenance
8. Project rehabilitation
9. Project enlargement

b) Hypothesis Testing

The case study concentrates on seven fundamental hypotheses about user involvement in rural water supplies. The hypotheses tested were as follows:

H_1 User involvement will cause inefficiencies and diseconomies in the implementation phase,

H_2 User involvement will cause a poor technical standard of construction that leads to more frequent breakdowns,

H_3 User involvement will therefore cause fewer water supplies to be built at a higher cost in any given time,

H_4 User involvement will lead to better and cheaper maintenance,

H_5 User involvement will lead to more efficient collection of water rates,

H_6 User involvement will lead to community motivation and institution building,

H_7 User involvement will catalyse other development action in the community.

These hypotheses represent a revised set of those discussed at the OECD Development Centre Meeting of Experts on Water Resources Utilisation and Management, mentioned earlier(1).

The first three hypotheses, covering implementation and construction, were investigated in the questionnaire given to government officials in charge of the water supply programmes. Self-help and participation were found to be integral parts in a majority (62 per cent) of the various water supply programmes in Mexico. Within the planning and implementation stages, self-help has contributed in the following ways: unskilled manual labour, 96%; local materials, 63%; committees created, 46%; land donated, 38%; cash contributed, 30%.(2)

The experience of those institutions interviewed indicated the following advantages and disadvantages created by the self-help endeavours.(3)

---

(1) OECD, Water Resources Utilisation and Management, op. cit., pp. 23-24.

(2) de la Barra Rowland, op. cit., p. 14.

(3) Ibid., p.15.

Advantages — 62.1% (total)

Factors	% distribution
1. Facilitates institutional actions because labour problems are reduced:	29.5 %
2. Creates community development:	27.3 %
3. Improves maintenance and preservation of the project mainly because the community feels their ownership of the work:	22.7 %
4. Generates employment:	11.4 %
5. Allows more possibilities of constructing more works at any given cost:	9.1 %
Total	100.0 %

Disadvantages — 37.9 % (total)

Factors	% distribution
1. Delays the construction phase:	59.3 %
2. Promotes paternalism:	14.8 %
3. Impedes technical quality of the project:	14.8 %
4. Intensifies conflicts between those who participate and those who do not:	7.4 %
5. Requires more supervision:	3.7 %
Total	100.0 %

In terms of the paradigm presented earlier, the Mexican experience (from Government officials) indicates that self-help is of maximum benefit in the following stages: project design, recurrent maintenance and inducement to further community actions. In some cases, however, self-help created delays in project construction. Unfortunately, the data collected on institutional savings generated by self-help were inconclusive. Although most of the officials reported that self-help allowed

savings for the public sector, they were unable to provide precise orders of magnitude of those savings.

The findings about the relationship between self-help and maintenance (Hypothesis 4) were more conclusive. A comparison between participatory and non-participatory water systems was made regarding two fundamental aspects of systems operations and maintenance: 1) System Efficiency and the Incidence of Corrective Action and 2) Administration and Maintenance. The results obtained are presented in Tables 5 and 6 below.

It is evident from Table 5 that within each class or degree of participation, the failure rates were much lower in participating projects and, where necessary, corrective actions were more likely undertaken. The latter conclusion must be regarded as tenuous given the high response rate of unknown. Data from Table 6 indicate that the same trends were observed as regards the systems administration and maintenance. Everyone of the participation sub-groups reported higher rates of known administrative and maintenance structures. Given these findings, Eng. de la Barra Rowland accepted the hypothesis.

The Mexican case study also reported data which tend to confirm that user involvement leads to more efficient collection of water rates (Hypothesis 5). The range of positive responses to the question of timely payment were from 28 per cent for communities which participated with materials only to 71 per cent for those which gave a cash contribution. Probably the most representative were those communities which created a committee structure. In those communities, 52 per cent of the rates were paid on time. On the other hand, none of the non-participatory communities reported timely payment of water rates.

The last two hypotheses (H_6 : User Involvement will lead to community motivation and institution building, and H_7 : User involvement will catalyse other development action in the community) were tested by enquiring about subsequent community actions. The data reported are noteworthy because most attempts to investigate these relationships ask prospective rather than

TABLE 5

Percentage Distribution of Systems' Efficiency and Corrective Action Taken by Degree of Participation

Degree of Participation (at a Community level)	Functioning of the Water System			Have deficiencies been corrected ?		
	It works	It does not work	Unknown	Yes	No	Unknown
1) None	51	49	-	-	49	51
2) In Committee	60	38	2	20	11	69
3) With labour	73	26	1	23	9	68
4) With materials	68	21	11	18	15	67
5) With money	78	22	0	26	2	72
6) Combination of 3, 4 or 5 above	83	15	2	13	2	85
7) Combination of 2 with 3, 4 or 5 above	71	23	6	13	16	71

TABLE 6

Percentage Distribution of Systems' Administration and Operations and Maintenance by Degree of Participation

Degree of Participation	Is someone in charge of the system administration ?			Is someone in charge of the operation and maintenance of the system ?		
	Yes	No	Unknown	Yes	No	Unknown
1) None	51	49	-	51	49	-
2) In Committee	76	13	11	68	16	16
3) With Labour	80	7	13	69	14	17
4) With materials	68	18	14	68	18	14
5) With money	87	2	11	81	8	11
6) Combination of 3, 4 or 5 above	90	6	4	87	7	6
7) Combination of 2 with 3, 4 or 5 above	78	15	7	68	20	12

Source : de la Barra Rowland, op. cit. pp. 28-29.

retrospective questions, e.g. "Do you plan to" instead of "did you"? Of those communities that initiated community projects after the construction of the water system, 68 per cent had self-help projects. In only 15 per cent of the non-participatory communities were follow-up action programmes undertaken.

In terms of individual recall, almost one-half of those persons in self-help water communities participated in a subsequent activity whereas less than one out of ten did so in the other communities. Although subject to some bias, the following data may reveal a summary version of the popular reaction to self-help in Mexico:

Opinions about Self-help and Participation by Communities that Participated/Did not Participate in Self-help Water Schemes

(percentages)

	Participated	Did Not Participate	Grand Total
Positive	94	89	91
Negative	1	1	1
Undecided	5	10	8

This high regard for self-help and participation across the total population is even more striking given the fact that de la Barra Rowland discovered that specific, relatively homogeneous, groups have the highest propensity to participate. The major characteristics which appear to explain the propensity to participate were found to be age, education and income. Of those persons who participated, one out of four were over the age of 46 and only one out of ten were between the ages of 15 and 25.

Although the degree of participation was usually high for all sub-groups of educational attainment (never less than 44 per cent), the highest rates were for those people who, though not illiterate, either knew only how to read and write or had never

completed primary education. Rates of participation generally fell as the level of educational attainment increased. Finally, the rates of participation appeared to increase as the level of income increased. For example, approximately one-half of the unemployed or persons earning the minimum wage participated; 65 per cent of those earning from 1.5 to 3.0 times the minimum wage were participants. The incidence of participation for wage earners over 3 times the minimum rose to over three-quarters of the group. This finding appears to put into question the common notion that participation is neutral to socio-economic class, if not pro-poor.

2. The Case of Senegal

a) Case Study Background

In 1977 the Development Centre, in collaboration with the Société d'Aide Technique et de Coopération (SATEC) in Paris, and the Société d'Aménagement et d'Exploitation des Terres (SAED) in Senegal, launched a case study of a small scale irrigation scheme in the Matam region of Senegal. Although supported by financial assistance from the outside /In 1974 by SATEC and in 1975-76 by the Fonds d'Aide et de Coopération (FAC) in Paris/, the Matam Programme incorporated many aspects of self-help and popular participation.

The case study had two major purposes:

1) To investigate the roles of self-help and participation in various aspects of project design and implementation, finance and operations and maintenance, and

2) To evaluate the impact of self-help on agricultural output and the distribution of revenues.

Findings reported under the first objective are summarised in this section; those relating to the impact of self-help and participation are given in the next section of this paper. The full case study was published in April 1978, as S. Fresson, "Public Participation on Village Level Irrigation Perimeters in the Matam Region of Senegal", OECD Development

Centre, Experiences in Rural Development, Occasional Paper No. 4(1).

The Matam Project was created in response to the vulnerability of local residents to the Sahelian agricultural cycle. In Senegal, as elsewhere in the Sahel, the population is highly dependent on quick-growing crops (millet, sorghum, maize); moreover, in years of short rainfall, even those harvests are at risk. On the other hand, it has been observed that the River Senegal retained high water levels up to three or four months after the rainfall stops. Consequently, this potential source of water was explored for a second crop.

The SAED-SATEC programme in Matam aimed at financing pumped water supplies to small perimeters along the river. Two types of increased agricultural production were planned:

1) Winter rice planting,

2) Off-season crops of maize or tomatoes via market-gardening produce grown around the edges of the plots.

It was foreseen that rice consumption, previously a semi-luxury reserved for feast days, should become a staple item for the local population. The programme further aimed at reaching the maximum number of families in the region; therefore, the size of each plot was limited to 20 ares (1 are = 100 square meters).

A random sample of four out of the existing 19 perimeters was chosen (Matam 1, Matam 2, N'Guidjilone, and Thialy); all four areas are populated by the same ethnic group (Toucouleurs). A survey was conducted among 194 households which corresponds to slightly less than 15 per cent of the total population serviced by the programme.

---

(1) The document was published originally in French as listed in the selected references /12/.

b) Comparative Costs and Output

Given the restricted sample size, the comparative advantages/disadvantages of self-help and participation in irrigation must be drawn by inference as regards two phenomena. Firstly, the SAED-SATEC irrigation scheme, as undertaken in the Matam Region, must be less costly than more conventional, non-participatory irrigation programmes. Secondly, agricultural yields obtained in the Matam Programme area must equal or exceed those obtained in other areas. In other words, if the project costs are significantly less and/or yields derived greater (at equal cost or less), then the examination of self-help and participation within the Matam framework can be generalised to the larger set of irrigation schemes in Senegal.

Fresson reports that capital costs of the Matam regional project were less than 300,000 F. CFA per hectare irrigated (1976 constant prices). These compare quite favourably to the one to two million F. CFA capital costs of major irrigation works undertaken in Senegal. Furthermore, assuming an average size of farm unit of eight persons, the derived annual average ration per head is almost identical with independent estimates of rice production and consumption in Senegal.(1) Consequently, the data may be accepted for comparative purposes.

c) Findings

To date meetings between SAED and farmers have been informal and non-contractual; however, the mutual commitments undertaken cover the following:

SAED on its side undertakes to:

- give the group full technical instructions for constructing the water system;

(1) Although Fresson reports (p. 25) lower average yield estimates than given in a 1976 SAED study, she concludes that the SAED data were probably not accurate due to the smaller size of their sample.

- carry out the division of the perimeter into equal plots;

- supply (for a fee) the requisite tools for the development work.

Once the construction work is finished, SAED further agrees to:

- install a pump engine which becomes the group's own property;

- train a pump operator appointed by the village;

- supply the group with the requisite technical advice for cropping techniques;

- supply the group with agricultural inputs (for a fee).

The group on its side will:

- collectively execute land clearance and site preparation;

- collectively build irrigation channels and engineering works;

- arrange the individual plots;

- be responsible for yearly maintenance of irrigation channels and constructive works;

- arrange for replacement of pump engine whenever necessary(1).

Although no formal hypothesis testing was undertaken in this part of the analysis, the case study yielded the following general findings in terms of the groups of project related hypotheses.

---

(1) Ibid., p. 39.

- Project design and implementation

The villages were actively involved in the initial project identification and site selection of the irrigation works; however, given the policy of SATEC and SAED, all project preparation was done by the central technical offices. Since SATEC plans to expand the irrigation programme to 180 additional perimeters between 1977 and 1981, they have decided to use a set of technical criteria to screen projects; on the other hand,the concept of village participation in project design will remain an integral part of the programme philosophy.

As stated above, the mutual understanding between SAED and the villagers clearly stipulates that the villagers must contribute to project implementation in terms of both site preparation and actual construction. Fresson summarises the extent of village involvement in the following way:

"Unlike what happens on most irrigation schemes, the volunteer farmers themselves do all the work, manually, and bear the cost of materials and equipment (cement, tools) and payment of a mason, if any.

"During the development phase, which lasts about four months, the group is given the advice of a SAED officer. But the group's own officers, more especially the chairman, take charge of organisation of the work. In particular they set up work teams, enact rules and see that they are enforced.

"All group members are required to bear a share of the work or, if prevented from doing so, to send another member of their family to take their place"(1).

Thus, one of the basic tenets of the SAED-SATEC approach is that the prospective villagers establish an organisation to be in charge of the irrigation work. In Matam region,

---

(1) Ibid., p. 49.

the committee, called a Producer Group, comprises heads of families. All are volunteers and are chosen due to kinship or community ties rather than as individuals. In this manner, the project is assured respected and authoritative direction. The group's officers constitute the regular link between farmers and SAED; their functions include the following:

- organisation of collective work,
- regulation of water distribution,
- adjudication of disputes,
- purchase of agricultural inputs,
- fund raisers,
- control over maintenance.

It is also worth noting that, as in the case of Mexico, Fresson discovered that effective participation was more a matter of servicing the needs of a specific population than mobilising large numbers of the population:

"The upshot has been that homogeneity of membership in relation to the kind of activity, kinship, residential locality and caste is found to be more determinant for the smooth functioning of the groups than size of membership"(1).

- Finance and maintenance

As noted earlier, the Matam experiment has yielded capital costs from three to seven times cheaper than other irrigation developments undertaken. This has been possible due to the provision of local labour and materials by the farmers. Likewise, total system's operating costs are paid by the Producer Group. Since the project had been running for only four years, the experience of village controlled operations and maintenance was limited. There had been however no major breakdowns of the irrigation works and all pumps remained functional and working.

---

(1) Ibid., p. 38.

3. Planning and Design of Rural Drinking Water Projects - Africa

In 1975, the Development Centre initiated a research project entitled "Planning and Design of Rural Drinking Water Projects." The major purpose of this comparative analysis was to investigate two questions:

1. Is there clean water available and used in the village three to five years after the construction of the rural water scheme has been completed?

2. Why/why not is the water system working and used by the population(1).

This research was designed to be more of a process evaluation (was the system supplying water?) than an impact evaluation (did the water system create the desired change within the population served?). Popular participation and self-help were not critical issues of this project; therefore, the whole range of hypotheses was not explored. Also, as noted by Bennell(2) some caution should be exercised in interpeting the

---

(1) For a description of this project, see N. Imboden, "Planning and Design of Rural Drinking Water Projects: A Research Framework to Analyse Experiences", OECD Development Centre, Experiences in Rural Development, Occasional Paper No. 2, CD/R(77)22, September, 1977.

(2) T. Bennell, "Planning and Design of Rural Drinking Water Projects: Results from Pilot Runs", OECD Development Centre, Experiences in Rural Development, Occasional Paper No. 8, CD/R(79)19, March 1979, p.25 in draft. Data were collected for 97 villages in seven countries as follows:

Country	Number of Villages
Botswana	13
Cameroon	3
Kenya	25
Lesotho	10
Malawi	10
Tunisia	27
Zaire	9

A majority of the systems were piped-hydrant installations (59%); the rest were either piped-house connections (26%) or hand pumps (16%).

results because of two reasons:

1. The sample size (97 villages in seven African countries) was too small to allow elaborate statistical analysis,
2. The respondents' recall as regards many questions might not be accurate.

Nevertheless, data were collected on the major aspects of participation.

As before, the findings may be grouped into three categories: (1) project design and implementation, (2) finance, and (3) operations and maintenance. The general questions addressed and results obtained are summarised below. In each case, aspects of participation were related to the following project "success/failure" indicators:

1. Number of days of the longest breakdown within the last year in each village,
2. Per cent of installations out of order in each village(1).

These criteria were classified into the following sub-groups:

Longest Breakdown (days)	Facility Failure Rate (per cent)
0 - 7	0 - 9
8 - 21	10 - 29
22 - 60	30 - 69
61 - 180	70 - 89
181 - 365	90 - 99

- Project Design and Implementation

The role of participation within the basic steps of project design and implementation was investigated by asking the

(1) Ibid., pp. 27-28.

following questions(1) concerning the water project:

- Who originally requested the installation?
- Who prepared the project?
- Who participated in its implementation?
- Who chose the site?
- Has a village organisation been used to execute the project?
- Was the organisation specifically created for the water supply project?

Answers to the first four questions were grouped into two categories as follows: villagers (private individual, group of villagers or local administration) and outsiders (central administration, private national organisation or international organisation). The answers to the last two questions were either yes or no.

The underlying hypothesis in each case is that the level of success increases if there is village-level participation. For the most part, the findings appear to confirm this type of hypothesis. Data on participation within each stage of project design and implementation are presented below.

- Request for the water installation

Data were collected on this question to reveal if participation at the outset of the project affected subsequent success. The relationship should be strong at this level because the request for a water facility by the villagers themselves reveals an important "felt need" and a commitment to achieve their goal. Of the total number of projects studied, 68 per cent were requested by the villagers.

---

(1) Imboden, op. cit., Annex IV, pp. 4-7.

Two-thirds of the projects which experienced the highest rate of success were those which were requested by the villagers. On the other hand, a frequency distribution of village-requested projects and those initiated by an outside agency (Table 7) indicates roughly equal proportions of high success. The actual rates were 62.1 and 67.7 per cent for the village and outside requested projects respectively. The results are further complicated in that village initiated projects also had twice the proportion of high failure rates as the outside initiated projects. The cumulative ratio for village initated projects which experienced failure rates of 70 per cent or more was over one-quarter, whereas that for the outside projects was only about one-eighth.

A clearer view becomes apparent in the findings about length of breakdown. Of those projects which had breakdowns of one week or less in the last year, three out of four were village initiated. In terms of total performance, 60 per cent of village initiated projects had breakdowns of only one week compared to 43 per cent for those initiated outside (Table 7). The incidence of higher rates of breakdown were generally less for the village projects. Consequently, we are prepared to accept the hypothesis that participation at this stage of the project cycle enhances success.

- Project Preparation

It can be anticipated that village participation in project preparation should improve success. Of the projects investiaged, almost all (93 per cent) of them were prepared by outside agents. Consequently, the hypothesised relationship could not be adequately examined. The success rates of the projects prepared by outside agents were much higher than anticipated. Approximately three-fourths of the projects had failure rates less than 30 per cent and the longest reported breakdown was less than two months duration. It is not very likely that villagers would be able to replicate such high rates of success.

Table 7

Frequency Distribution of Project Success and Participation in Project Identification Request

		Initiator of Project	
		Village	Outside
Facility Failure (n=97)			
Percentage	0 - 9	.621	.677
	10 - 29	.061	.161
	30 - 65	.045	.032
	70 - 89	.045	.065
	90 - 99	.227	.065
	Total	1.000	1.000
Longest Breakdown (n=91)			
Days	0 - 7	.603	.429
	8 - 21	.079	.143
	22 - 60	.079	.179
	61 -180	.032	.071
	181 -365	.206	.179
	Total	1.000	1.000

- Choice of Site

Villagers were involved in the choice of the site in about one-half of the project cases. Although the frequency distribution by facility failure did not reveal any large differences, the distribution by length of breakdown indicated a much higher success for the village selected sites. The respective rates for breakdowns of a week or less were 64 per cent for village selected sites and 49 per cent for those selected by outside agents. Also, at the other end of the spectrum, those sites selected by outside agents experienced higher breakdowns of one month or more. It appears, therefore, that all things being equal, village participation in site selection can improve project success.

- Project Implementation

As in the case of "Who requested the installation", villagers were involved in project implementation by providing local materials and/or labour in most of the cases (68 per cent). Consequently, the finding that 72 per cent of the most successful projects (by length of breakdown) had village involvement does not provide clear evidence of variation. More importantly, the frequency distributions of both success criteria do not differ much between projects with and without village participation in implementation. In this case, village participation in project implementation does not appear to increase significantly success of the water system.

- Village level Organisations, Participation and Project Success

It is often hypothesised that a formal committee or other duly constituted body in charge of the water system at the village level should improve project success. Besides the possible psychological effects of an established authority, a committee can monitor the water system on a routine basis and follow up on any changes needed in operations and maintenance, fee collection, etc. Experience and evidence from the literature and

guidance from field workers are not clear as to whether or not it is more efficient for the committee to be created especially for the water system.

Data collected in this investigation appear to confirm that the existence of a committee is indeed important but the necessity for a special single purpose water committee is not supported. Of those projects with the highest success in terms of short breakdown durations (one week or less), almost three out of four had a committee structure. In terms of the total frequency distribution, of all projects with a committee structure, 64 per cent had breakdowns of one week or less; the corresponding figure for those projects without a committee was only 40 per cent.

- Summary of Project Design and Implementation

Village participation in aspects of project design and implementation seemed to improve project success in one or both of the indicators used in the following sub-groups: project request/identification, site selection and organisational structure. The fact that hypotheses about project preparation and implementation were not supported may indicate that the technical aspects of the water system, even if relatively simple, may require special skills and training not often available in the villages. Secondly, possible economies of scale in project planning and construction may indeed favour a more centralised authority for those functions.

- Project Finance

Four questions were asked which relate to participation and project finance; these were:

1. Who financed the operations?
2. Who fixed the amount of charges?
3. Who apportioned the charges among the villagers?
4. Who collected the charges for the water?

As before, the responses were grouped as between villagers and outsiders. Unfortunately, the response rate for the last three questions was extremely low (less than 25 per cent); therefore, no analysis was possible for those aspects of participation. Concerning the first question, it is generally thought that village-financed contributions to a water system are highly desirable for two principal reasons:

1) It decreases the unit system cost that must be financed from central government development funds,

2) It represents tangible proof of the village commitment to the system.

The data collected did not appear to support these posited relationships in terms of project success. The frequency distribution of participatory/non-participatory projects by length of breakdown did not reveal any sizeable differences amongst the different sub-groups of success rates. The distribution by per cent of facility failure does, however. Over 80 per cent of those projects with only outside financing had failure rates of 30 per cent or less, whereas projects with village financing experienced only 60 per cent of such rates. Unfortunately, the investigation did not attempt to probe for explanations of the potential differences; therefore, we cannot expound on alternative hypotheses.

- Maintenance

Only one question was asked about maintenance, e.g. "Who actually is responsible for maintenance in the village?". Responses were grouped by villagers and outsiders. As in the cases above, the general hypothesis underlying this question was that village participation in, if not direct responsibility for, the operations and maintenance should improve project success since the villagers could perform preventative maintenance and correct minor deficiencies without delay. This in fact did seem to be the case in the projects examined in this research.

Only a slight majority of the projects studied (54 per cent) had maintenance responsibility mandated to the villagers. These projects performed much better, however, in terms of the length of breakdown. Over 60 per cent of the maintenance by villagers projects had breakdowns of less than one week. The corresponding figure for projects with maintenance performed by outside agents was slightly above 45 per cent. The results were more striking at the opposite end of the scale. Almost 40 per cent of the projects with maintenance from outside had breakdowns of over one month, whereas only about 10 per cent of the village level projects experienced such a rate. This finding was by far the most powerful of all the relationships studied in this analysis.

- Summary of Findings

These data on 97 villages in seven African countries suggest that participation plays an important role in rural water supply systems at two levels: (1) in the early stages of project design (project identification, site selection and organisational authority for the operations) and (2) in the recurrent maintenance of the system. The more physical aspects of the water system, its plan preparation, construction and finance, would appear to provide less of a role for local participation and self-help.

B. Other Supporting Evidence

The evidence to be presented in this section is drawn from the existing literature. The term "evidence" is preferable to possible stronger words (facts, findings, etc.) because the literature is quite heterogeneous in terms of the coverage, methodological sophistication and presentation of findings. It ranges from the anecdotal yet insightful to the sophisticated yet banal. Some of the evidence strongly reinforces findings mentioned above, some strongly refutes them. In most cases, the findings present a mixed picture as do the Centre's own field surveys.

1. Project Design and Implementation

Of the few studies that address the issue of early participation in project identification and design, most report that participation was excluded or severely limited. Most of these go on to lament that, as in the case of the ESCAP region, "if the initiative does not come from a community itself but from other sources, the project usually meets with failure after construction is completed"(1). The range of possibilities may be indicated by reference to two contiguous African countries, both of which have significant self-help traditions and/or policies. In the case of Kenya, Vierstra(2) cites conclusions from a review of the Kiairia "A" Harambee programme where motivation sprang up from the village itself and participation was widespread, representative and fruitful at every level of the programme. Although he does not present any data, Vierstra implies that the programme was successful and benefits were distributed equitably.

From his review of eight programmes in Tanzania(3), Tschannerl concludes that although participation should be encouraged, it can and did lead to design faults. The people usually were able to diagnose these faults and initiate temporary measures but costly repairs had to be effected by the central water authority.

Two well-known studies present evidence which in general questions the role of self-help in project implementation. Feachem(4) concludes that self-help labour was not less productive than contract labour in Lesotho but the variation was

---

(1) ESCAP [29, p. 133].

(2) Vierstra [35, p. 152 and following].

(3) Tschannerl [27, p.27].

(4) Feachem [10, p. 57].

not significant enough to make any impact. Carruthers(1), in contrast to Vierstra, states that Kenyan experience indicates that self-help labour is too difficult and time-consuming to organise and therefore may have a negative impact on project performance. Both studies appear to imply that self-help labour may be productively utilised if the gestation period between project planning and construction is short. Both reports however address self-help as a means of labour mobilisation rather than within the broader framework depicted in the paradigm developed above.

2. Finance

The literature is very mixed as to conclusions in this area. It does appear that those investigations of self-help labour mobilisation only (Carruthers, EEC, Feachem) found small and rather insignificant savings (a 5 per cent savings was most often reported). These studies had a relative broad coverage and were conducted by economists or water engineers. Less broad but more in-depth (village rather than programme) investigations undertaken mostly by sociologists (Coward, Kikuchi et al., Vierstra) indicated higher savings (15 to 20 per cent and above) to what appears to be a broader concept of participation. This conclusion is based more on inference than direct comparison and thus is both tentative and subject to different interpretations. It is a bit shocking that so little is known about this area, especially given the importance attached to project finance.

3. Operations and maintenance

The literature is more conclusive on this aspect of self-help and participation. Most studies in Asia (Coward, Kikuchi, Ongkmjco, Radosovich) and Africa (Vierstra and Tschannerl) conclude that responsibility for water use and system maintenance at the local level will lead to greater accountability for performance thus decreasing failure due to poor preventative maintenance. According to Coward, this "builds on the simple observation that indigenous leadership roles in agrarian organisations are linked with various 'follower' roles in ways that foster accountability."(2). Clearly this conclusion can be generalised beyond rural water supplies.

Coward(3) supports the conclusions by de la Barra-Rowland and Fresson when he adds that water users associations should be geared to a "terminal group." This group should be kept small

---

(1) Carruthers [4, p. 88].

(2) Coward [6, p. 101].

(3) Coward [7, p. 8 and following].

and be homogeneous for efficient functioning of the system. His concept of the "terminal group" is based on findings from Bali (Subak associations), the Philippines (Sitios and Zangjera) and Thailand (Chaek).

4. Impact Hypotheses

That improved water systems has a significant impact on public health is usually accepted as an article of faith. This, in turn, is built upon the assumption that either the quality of water has increased or the quantity consumed of a given "safe" supply increased and public health was improved via bathing and washing of utensils, etc. Again, the literature provides a mixed response to this issue. This is in part due to the technical difficulties and high cost of conducting a systematic health impact study but also due to the high variability of local conditions. Carruthers [4] found no significant public health impact in his Kenya review; Tschannerl [27] discovered a significant increase in water quality but no direct increase in total consumption in the Tanzanian schemes. Studies by Lee [17] and Warner [36] do, however, provide conclusions that improved water supplies have a significant impact on public health. These conclusions are shared by the WHO and World Bank in their sector policy statements.

Other direct and indirect water supply impacts are even more difficult to substantiate or refute and the role played by self-help and popular participation has been rarely investigated in a systematic way. Most reports identify two streams of benefits: (a) increased productivity due to improved public health and greater convenience (e.g. less time spent fetching water) and (b) indirect benefits such as slowing down rural-urban migration, redistribution of real income in favour of the poor, and development of village institutions. Most authors would agree with Warner in that "the benefits from an improved water supply, firstly, cannot be readily separated from those of complementary inputs and, secondly, are almost impossible to quantify."(1) Consequently, some authors reject the hypothesised water supply benefits while others beg the question of any direct linkages. For example, the World Bank notes that "at the community level, a good water supply is only one among many infrastructure components ... essential for the development of village growth centres. By itself, it is unlikely to have a significant effect, but its absence will prevent, or at least greatly hinder development."(2) A few authors, notably White et. al. [37] and Tschannerl [27], ask whether or not the technology employed is appropriate. If not, impacts may be invalidated and self-help and popular participation pre-empted by technical design.

---

(1) Warner [36, p. 165].

(2) World Bank [40, p. 58].

V. Synthesis of Findings and the State of the Art

"Water is the most widespread object of individual choice. No other decision affecting man's dealings with his natural environment is as simple, repeated, universal and independent"(1). The state of knowledge about water itself is highly developed. Unfortunately, that of man's use of water is not so well developed. Water use is a subject area replete with potential self-fulfilling prophecies: people will use no more water than is provided; self-help and popular participation can only have benefits when understood and encouraged. As noted repeatedly above, the literature in this field is neither comprehensive nor well organised; moreover, much of it is contradictory. Our review has been based largely on the experiences in Africa and Asia. The case study on Mexico was initiated to fill at least partially our lack of access to experiences in Latin America.

The findings concerning project related hypotheses are summarised and synthesised in Table 8. Three trends are notable from this table. First, in general, self-help and participation have greater benefits on aspects of project design and implementation if they are incorporated into the project from the outset and repeated at each step of the project cycle. The nature and scope of participation is clearly culture- and case-specific. Second, the financial impacts of participation are yet unproven as a general rule. On the other hand, savings to public funds and efficient rate collection appear to have been more prevalent where participation was active in the early stages of project design and implementation. Finally, self-help and participation had their most powerful impact on the operations and maintenance aspects of water systems. This is most important because this is usually the weakest area of rural water supplies.

The findings concerning the impact hypotheses are, except for the case of public health, even more disparate. Warner reports the following proven and high priority clustering of objectives for rural water supply development:

- Increased consumption of water
- Higher quality of water
- Greater frequency of bathing
- Reduced incidence of diarrhoea
- Greater efforts on former productive activities
- Greater accessibility to water
- Reduced disparities of effort in obtaining water
- Increased use of local labour, supervision and materials
- More reliable water supply(2).

---

(1) White, et. al. [37, p. 4].

(2) Warner [36, p. 366].

Table 8

Summary of Findings

Self-Help and Participation Effects on Water Projects

Type of Hypothesis	Research Country (Area)	de la Barra Rowland (Mexico)	Fresson (Senegal)	Imboden/ Bennell (a)	Vierstra (Kenya)	EEC (b)	Feachem (Lesotho)	Coward (c)
Project Design & Implementation								
- Request		-	Yes	Yes	Yes	-	No	Yes
- Preparation		-	-	No	Yes	-	No	-
- Site Selection		-	Yes	Yes	Yes	-	-	-
- Implementation		Yes	Yes	No	Yes	No	No	Yes
- Organisation		Yes	Yes	Yes	Yes	-	-	-
Finance								
- Construction		Yes	Yes	No	Yes	No	No	-
- Operations		Yes	Yes	-	Yes	No	-	-
- Cost to Government		Yes	Yes	-	-	No	No	-
Maintenance		Yes	-	Yes	Yes	No	No	Yes

(a) Botswana, Cameroon, Kenya, Lesotho, Malawi, Tunisia, Zaire

(b) Chad, Ivory Coast, Niger, Senegal, Togo, Upper Volta

(c) Burma, Indonesia, Laos, Philippines, Thailand.

Most of these relate to public health and are now generally accepted, even if not widely documented.

Impacts upon individual productivity and increased economic activity are more contestable. Of the literature reviewed, only Fresson [12] and Vierstra [35] report evidence that the water system contributed directly to increased community output and employment and improved distribution of incomes. Other community level impacts such as increased school enrollment and attendance, less rural to urban migration and the development of community institutions remain, for the most part, untested and therefore unknown. Only de la Barra-Rowland provides convincing data that rural water supplies can yield an opportunity to sustain, if not initiate, such institution building motivations.

The implications of self-help and participation to a greater acceptance of modernising influences such as technology and a greater sense of nationalism have received no serious treatment in the literature. On the other hand, some authors warn that participatory water supply projects may yield negative impacts on national development planning. Feachem(1), for example, admonishes that participation may lead to excessive demands such that they outstrip the public capacity to delivery services. Carruthers concludes more boldly that "however laudable self-help activities may be, they cannot be used to distort national priorities, nor should the impatience of participants be permitted to result in a waste of their own scarce resources."(2) Thus the pitfalls and even dangers of promoting self-help and popular participation are real; however, the ramifications of a non-participatory rural water system development programme are as real and probably more far-reaching in the longer run.

The literature is not very rich in terms of policy-oriented guidance. Two points appear to emerge however. One, where experience is lacking, begin with modest objectives; address relative small groups; and seek to utilise indigenous traditions, role associations and existing institutional arrangements. This need not mean project planners are doomed to working only with local elites. Two, self-help and popular participation are not readily transferable; they are effective where there is a spirit of co-operation between the centre and local communities and a tradition of some degree of decentralisation. Whereas partial and paternalistic attempts to mobilise local resources usually do fail in method and objective, the advantages of broader based participation can be reaped over time and space.

---

(1) Feachem [10, p. 51].

(2) Carruthers [4, p. 57].

SELF-HELP AND POPULAR PARTICIPATION IN RURAL WATER SUPPLY SYSTEMS

Selected References

1. de la Barra-Rowland, F., "Self-Help and Public Participation in Rural Drinking Water Systems - The Case of Mexico", OECD Development Centre, Occasional Papers on Experiences in Rural Development, No. 6, June, 1978.

2. Beaty, K.M. and Pierce, J.C., "Representation and Public Involvement in Water Resource Politics: A Comparison of Six Participant Types", Water Resources Bulletin, Vol. 12, No. 5, October, 1976, pp. 1005-1017.

3. Bennell, T., "Planning and Design of Rural Drinking Water Projects: Results from Pilot Runs", OECD Development Centre, Occasional Papers on Experiences in Rural Development No. 8, March, 1979.

4. Carruthers, I.D., Impact and Economics of Community Water Supply: a Study of Rural Water Investment in Kenya (London: Wye College, Agrarian Development Unit, 1973).

5. Commission des Communautés Européennes, Direction Générale du Développement, Evaluation (Ex-Post) Sectorielle de Projets d'Approvisionnement en Eau Urbain et Villageois (Bruxelles, Août 1978).

6. Coward, E.W., "Indigenous Organisation, Bureaucracy and Development: The Case of Irrigation", Journal of Development Studies, Vol. 13, No. 1, October, 1976, pp. 92-105.

7. Coward, E.W., "Small Groups and Large Projects: Technology, Organisation and Irrigation Performance", Thirteenth American Water Resources Conference, Tucson, Arizona, 1977.

8. Donaldson, D., "Rural Water Supply in Latin America: Organisational and Financial Aspects", UNESCO Assignment Children, Vol. 34, April-June, 1976 (Water and Community Development), pp. 46-57.

9. Dozina, G., M. Kikuchi and Y. Hayanic, "Mobilizing Local Resources for Irrigation Development: A Communal System in Central Luzon", Agricultural Economics Department, International Rice Research Institute, May, 1976.

10. Feachem, R., et al., Water, Health, and Development (London: Tri-med, 1978).

11. Field, D.R., Barron, J.C. and Long, B.F., eds, Water and Community Development: Social and Economic Perspectives (Ann Harbor: Ann Harbor Sciences Publishers, 1974).

12. Fresson, S., "La Participation Paysanne sur les Périmètres Villageois d'Irrigation par Pompage de la Zone de Matam au Sénégal", Centre de Développement de l'OCDE, Expériences de Développement Rural, Document Spécial, No. 4, Avril 1978.

13. Heijnem, J.D. and Conyars, D., "Impact Studies of Rural Water Supply", Bureau of Resource Assessment and Land Use Planning (BRALUP), University of Dar-Es-Salaam, 1971.

14. Imboden, N., "Planning and Design of Rural Drinking Water Projects", OECD Development Centre, Occasional Paper on Experiences in Rural Development, No. 2, September, 1977.

15. International Rice Research Institute and Agricultural Development Council, Bibliography on Socio-Economic Aspects of Asian Irrigation (Singapore: Singapore University Press, 1976).

16. Last, G.C., "A Survey of Rural Water Supply in Ethiopia", Planning Unit, Ministry of Education, July, 1975.

17. Lee, T.R., Residual Water Demand and Economic Development (Toronto: University of Toronto Press, 1969).

18. Mandl, P.E., "La Participation Populaire, Une Dimension Nouvelle des Programmes d'Hydraulique Rurale", Assignment Children, loc. cit., pp. 5-7.

19. Miller, D., "Concepts and Conflicts Inherent in Participation Strategies within Integrated Rural Development", address at UNESCO Meeting of Experts on the Institutional Problems of Participation in Strategies of Integrated Rural Development, Lima, 4-8 September, 1978.

20. OECD, Summary and Conclusions, Expert Meeting on Water Resources Utilisation and Management; Paris 17-19 March, 1976 - mimeo. July, 1976.

21. Radosevich, E., "Water User Organisations for Improving Irrigation Agriculture: Application to Pakistan", Colorado State University, Water Management Technical Report No. 44, December, 1975.

22. Ramirez, J.M. and Orozco, O.L., "Participacion Combonitaria y Saneamiento Basico Rural en Colombia", Assignment Children, loc. cit., pp. 89-101.

23. République Française, Ministère de la Coopération, Service des Etudes Economiques et des Questions Internationales, Dans les Villes Africaines Une Politique de "L'Eau pour Tous" est-elle possible? (Paris, 1978).

24. Saunders, R.J. and Warford, J., "Village Water Supply in Developing Countries", IBRD Mimeo, 1973.

25. Schumacher, E.F., Small is Beautiful: Economics as if People Mattered (London: Harper and Row, 1975).

26. Scott, W., Measurement and Analysis of Progress at the Local Level (Geneva: UNRISD, 1978).

27. Tschannerl, G. and Mujwahuzi, M.R., "Impact of Rural Water Supply: Eight Self-Help Schemes in Arumeru, Masai and Lushoto Districts", BRALUP, University of Dar-Es-Salaam, 1975.

28. United Nations Economic Commission for Africa, "Problems of Water Resources Development in Africa" E/CN.14/NRD/WR/1, July, 1976.

29. United Nations Economic and Social Commission for Asia and the Pacific, Proceedings of the Symposium on Social and Non-Economic Factors in Water Resources Development (New York, 1976).

30. United Nations Economic Commission for Latin America, "The Water Resources of Latin America", ST/CEPAL/Conf. 57/L.2, August, 1976.

31. United Nations Economic Commission for Western Asia, "Report of the ECWA Regional Preparatory Meeting for the United Nations Water Conference", E/ECWA/42/REV.1, December, 1976.

32. United Nations Water Conference, "Report on Community Water Supplies", E/Conf. 70/14, January, 1977.

33. United Nations Water Conference, "Policy Options", E/Conf. 70/CBP/3, March, 1977.

34. United Nations Water Conference, Report of the United Nations Water Conference, E/Conf. 70/29, 1977.

35. Vierstra, "Towards a Fuller Appreciation of Community Development", paper presented at the WHO International Reference Centre for Community Water Supply, International Training Seminar on Community Water Supply in Developing Countries, September, 1976.

36. Warner, D., Evaluation of the Development Impact of Rural Water Supply Projects in East African Villages (Palo-Alto: Stanford University, Program in Engineering-Economic Planning, 1973).

37. White, G.F., Bradley, D.T. and White, A.U., Drawers of Water: Domestic Water Use in East Africa (Chicago: The University of Chicago Press, 1972).

38. Whyte, A., "Towards a User-Choice Philosophy in Rural Water Supply Programmes", Assignment Children, loc. cit., pp. 28-45.

39. Wiener, A., The Role of Water in Development, (New York: McGraw Hill, 1972).

40. World Bank, Village Water Supply: A World Bank Paper, March, 1976.

41. WHO, UNDP, IBRD, UNICEF, IDRC, UNEP, OECD, Ad Hoc Working Group on Rural Potable Water Supply and Sanitation, "An Assessment Study of Rural Water Supply and Sanitation: Comparative Case Studies of Past Undertakings", mimeo. February, 1975.